CHAPTER- V

FINDINGS, ANALYSIS AND DISCUSSION

5.1 Introduction

This research study was initiated with the main objective of assessing ICT in higher education focusing on its utilization in four universities of Assam, namely Assam University, Dibrugarh University, Gauhati University and Tezpur University. More specifically, the objectives were to assess the existing ICT facilities, communication technology being utilized, problems and prospects of implementation of ICT in higher education institutions of the state, evaluate the usages and application of ICT on imparting quality education and finally explore the scope for improving the present status. For this purpose data had been collected from 320 students, 140 teachers and 40 ICT experts / administrators of the target universities using questionnaires.

5.2 Demographic indicators of the respondents

The researcher had tried to capture the demographic factors related to each respondent. Thus, these factors have been summarized in Table 5.1.

5.2.1 Gender

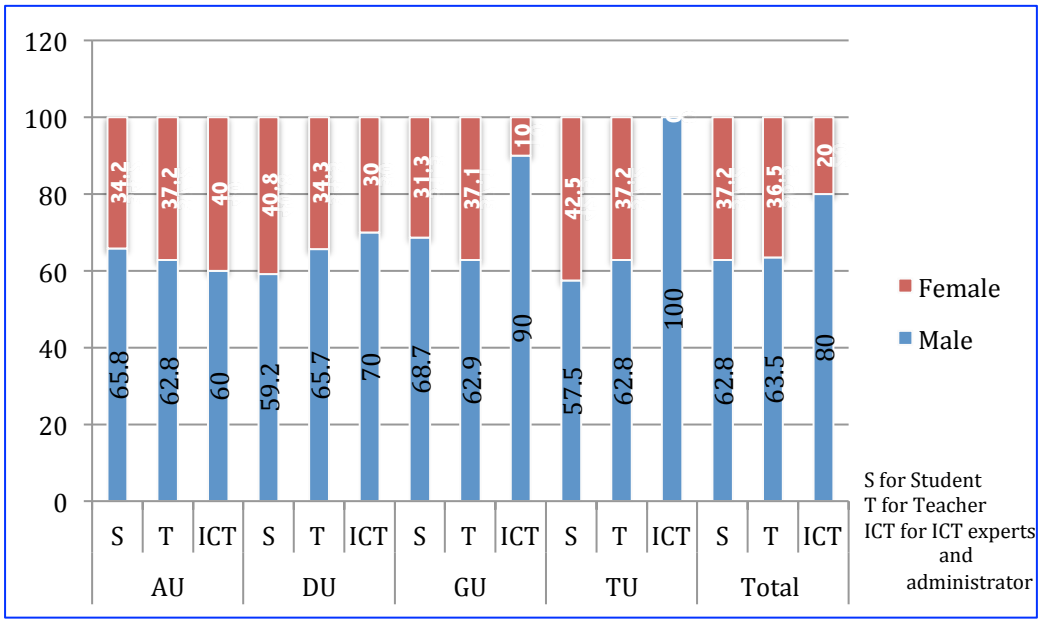
Table 5.1: Gender ratio of respondents

Respondents	Gender	Universities									
		AU		DU		GU		TU		Total	
		N	%	N	%	N	%	N	%	N	%
Students	Male	52	65.8	48	59.2	55	68.7	46	57.5	201	62.8
	Female	27	35.2	33	40.8	25	31.3	34	42.5	119	37.2
	Total	79	100	81	100	80	100	80	100	320	100
Teachers	Male	22	62.8	23	65.7	22	62.9	22	62.8	89	63.5
	Female	13	37.2	12	35.3	13	37.1	13	37.2	51	36.5
	Total	35	100	35	100	35	100	35	100	140	100
ICT experts and Administrator	Male	6	60	7	70	9	90	10	100	32	80
	Female	4	40	3	30	1	10	0	0	8	20
	Male	10	100	10	100	10	100	10	100	40	100
Grand Total	Male	80	65.5	78	61.9	86	68.8	78	62.4	322	65.4
	Female	44	35.5	48	38.1	39	31.2	47	37.6	178	35.6
	Total	124	100	126	100	125	100	125	100	500	100

Based on Table 5.1, out of the total 500 respondents 65.4% were male and 35.6% were female. The highest rate of female participation was observed in DU which constituted 38.1% followed by TU (37.6%), AU (35.5%) and lastly GU (31.2%). In case of male gender distribution, GU has the highest participation covering 68.8% followed by AU has 65.5%, TU (62.4%) and lastly DU (61.9%).

Table 5.1 shows that 62.8% of male student and 37.2% female student participated in the study. Accordingly, teacher participation was 63.5% male and 36.5% female. In case of ICT and administration, 80% were male and 20% female. The Gender distribution of respondents also presented graphically in Figure 5.1

Figure 5.1: Gender distribution of respondents



5.2.2 Residence of students

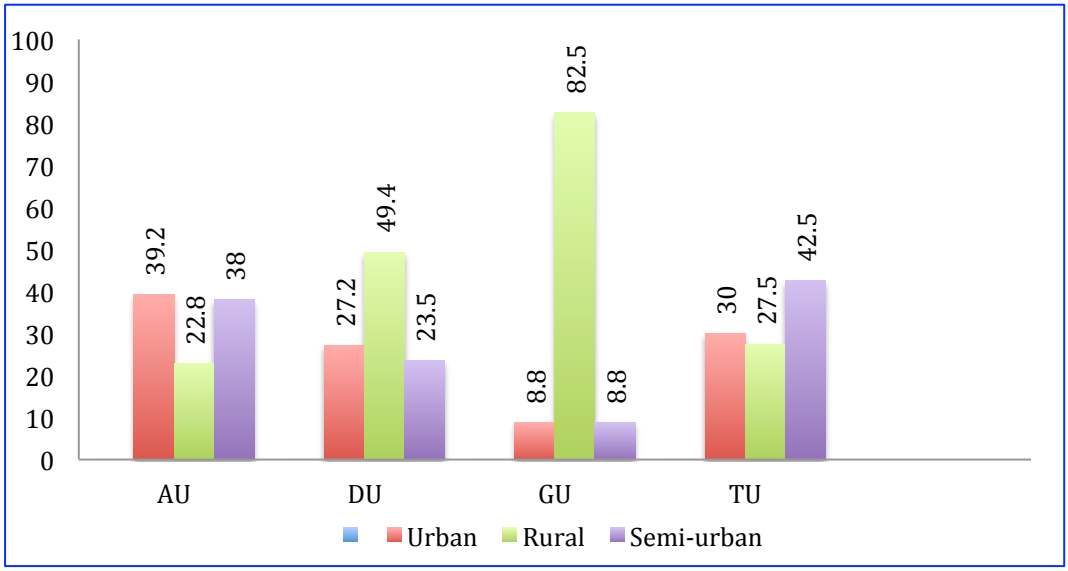
The areas where from respondent students are coming from is indicated in Table 5.2 as urban, rural and semi urban.

Table 5.2: Residence of students

Name of University	Count	Residence of students			Total
		Urban	Rural	Semi-urban	
AU	N	31	18	30	79
	%	39.2	22.8	38.0	100
DU	N	22	40	19	81
	%	27.2	49.4	23.5	100
GU	N	7	66	7	80
	%	8.8	82.5	8.8	100
TU	N	24	22	34	80
	%	30	27.5	42.5	100
Total	N	84	146	90	320
	%	26.3	45.6	28.1	100

The knowledge we have about ICT and related facilities depends on the exposure we have, which is highly related to urbanization. As most of the students in this study are coming from rural and semi urban setups, this may have a negative impact on the understanding and utilization of ICT as well. In this study, 45.6% and 28.1% are coming from rural and semi urban settings respectively. It was only 26.3% who are coming from urban set ups. Within universities, 82.5% of the students of GU are coming from rural areas followed by 49.4% of DU. In the universities of TU and AU students who came from rural setup were 27.5% and 22.8% respectively. This distribution is graphically represented in Figure 5.2.

Figure 5.2: Residence of students



5.2.3 Schools and Departments

The student participants were also reviewed in line with their schools and departments or areas of study. This has been indicated in Figure 5.3 and Table 5.3.

Figure 5.3: Student distribution (school and programme wise)

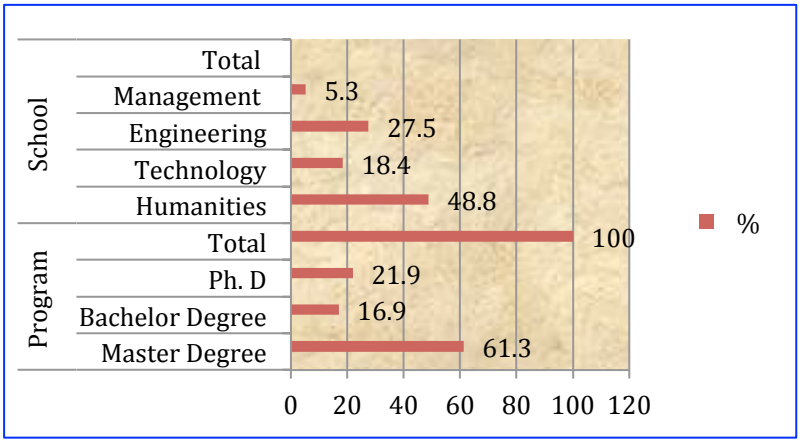


Table 5.3: Student distribution (school and programme wise)

Programmes and Schools		N	%
Programme	Master Degree	196	61.3
	Bachelor Degree	54	16.9
	Ph. D	70	21.9
	Total	320	100.0
School	School of Humanities and Social Sciences	156	48.8
	School of Science and Technology	59	18.4
	School of Engineering	88	27.5
	School of Management Sciences	17	5.3
	Total	320	100

Based on their programmes, 61.3% of the students in all sample universities were from MA programme, 21.9% from Ph.D. and 16.9% from Bachelor Degree programs.

Again among these respondents, 48.8% which is the highest, represented students from School of Humanities and Social Sciences, 27.5 % from School of Engineering and the remaining 18.4% and 5.3% represented School of Science and Technology and School of Management Sciences correspondingly.

5.3 Understanding about ICT

ICT has now become part of the education system for facilitating learning and improving performance of students by creating, using and managing appropriate technological process and resources (Sinha, 2011). This will be effective if there is an undemanding and proper utilization of it. Teacher educators and students should develop an understanding, skills, and disposition about ICT since ICT is now being an integrated component in the teaching learning environment (Ramganesh and Johnson 2008). It demands to know about the terms ICT as the information contained in ICT is data that has been processed or need to be processed to make it meaningful to its recipients (Murugan, et al. 2012). According to them, “in digitalization ICT has made it possible to design, develop, deliver, manage and assess the learning and training process”. This is possible if educators and students have an understating about ICT. It

is presumed that the level of understanding about ICT among respondents is different since they are coming from different backgrounds in terms of areas of trainings (academia), location and family as well. For this rationale, the researcher posed a research question especially for students as 'what is your idea about ICT?' The feedback to this question has been summarized in the following Table 5.4.

Table 5.4: Students' understanding about ICT

Leading Statements	University									
ICT means	AU		DU		GU		TU		Total	
	N	%	N	%	N	%	N	%	N	%
Internet connectivity	3	3.8	2	2.5	3	3.8	0	0	8	2.5
A combination of internet and computerized facilities	9	11.4	5	6.2	1	1.2	8	10	23	7.2
Combinations of telecommunications (telephone lines and wireless signals), computer with software, audio-video systems that enable users to access, store, transmit and manipulate information.	8	10.1	11	13.6	8	10	21	26.2	48	15.0
Combination of all the above	59	75.7	63	77.7	65	81.2	51	63.7	238	75.4
Any other	0	0	0	0	3	3.8	0	0	3	.9
Total	79	100	81	100	80	100	80	100	320	100.0

Table 5.4 was geared with the aim of understanding students' perception about ICT. For this purpose 75.4% of them perceived ICT as 'combinations of internet connectivity, a combination of internet and computerized facilities, telecommunications (telephone lines and wireless signals), computer with software, audio-video systems which enable users to access, store, transmit and manipulate information'. It was only 2.5% of the respondents who understood ICT as internet connectivity.

The analysis of the responses can be broadly catrgorised into three group according to the three research questions and the other sub questions also discussed. The three main Research Questions are:

RQ1. What kind of ICT tools and methods are being used in the universities of Assam?

RQ2. How do users perceive ICT and its benefits in their pedagogy?

RQ3.What are the perceived issues that hinder proper integration of ICT into their pedagogy?

5.4 Analysis of Research Question 1: ICT tools and methoads used in Universities of Assam

The researcher try to capture all the responses in relation to different ICT tools and methods used by the universities in Assam.

5.4.1 Availability of ICT facilities

The need for ICT in the teaching-learning process, especially in the 21st century is now becoming not only a support of the teaching-learning process but mandatory due to the digital arena. Thus, the need to draw up and design the learning process with the support of ICT facilities has become a prerequisite for teachers. For this purpose, the availability and use of ICT facilities in higher education has become decisive because of the fact that these institutes are producing graduates that need to teach, demonstrate and mange systems using ICT (Ramganesh & Johnson, 2008).

5.4.2 Major ICT facilities required by students' in their programmes

Furthermore, the study tried to assess which software is required more by the students for their study or courses. In increasing efficiency of the teaching learning and making it more powerful in bringing impact on students and teachers, no single technology or software is adequate (Murugan, et al., 2012). However, there may be software that are highly-demanded or used by students compared to the others. For this, the preference of students in terms of necessities to their course had been summarized in the following Table 5.5.

Table 5.5: Major ICT facilities required by students' in their programmes

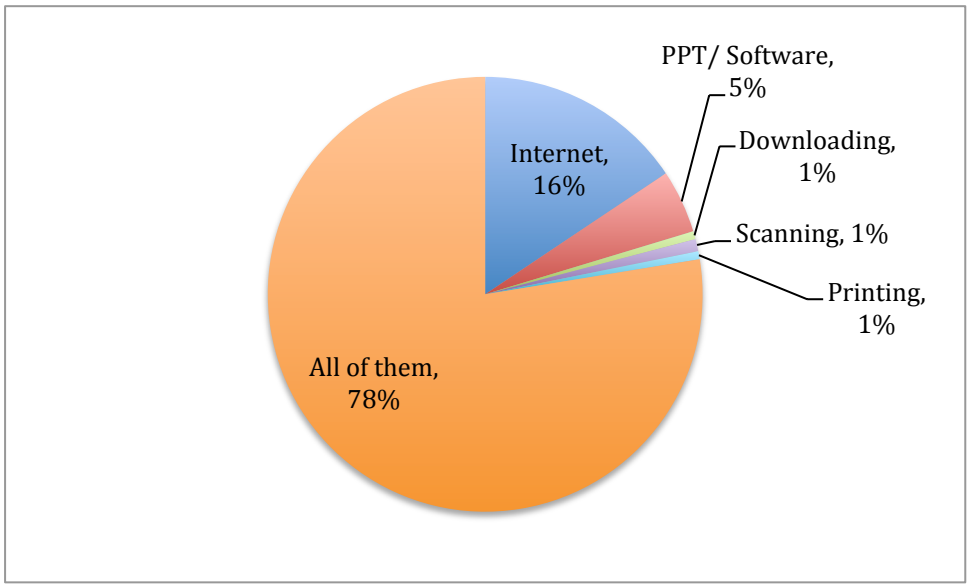
Universities		Major ICT services required for your course						
		Internet	PPT / Software	Downloading	Scanning	Printing	All of them	Total
AU	N	22	1	1	0	2	53	79
	%	27.8	1.3	1.3	0	2.5	67.1	100
DU	N	16	6	0	0	0	59	81
	%	19.8	7.4	0	0	0	72.8	100
GU	N	4	6	0	0	0	70	80
	%	5.0	7.5	0	0	0	87.5	100
TU	N	8	2	1	3	0	66	80
	%	10.0	2.5	1.3	3.8	0	82.5	100
Total	N	50	15	2	3	2	248	320
	%	15.6	5.7	.6	.9	.6	77.5	100

Based on the feedback of students, 248 (77.5%) of them reflected as all of the facilities are required for their course and within this, students of Gauhati gave more value to all (87.5%) compared to the other universities which was followed by TU (82.5%) and DU (72.8%). Following the option 'which of all of the facilities are important', internet was given as a priority than the remaining others as 15.6%.

5.4.3 Software needed by students for their courses

Facilities like downloading, printing and scanning were less in demand for the course of students' which are needed with a maximum degree of 1% each. On the other hand, PPT / Software were a little bit better demanded than these facilities which got 5% of the respondent's attention as a requirement for their course. The graphical presentation is shown in Figure 5.4.

Figure 5.4: Software needed by students for their courses



Education at higher institute level should be ICT-compliant as it is being found useful in other sectors as well like e-commerce, e-banking, e-engineering, e-management, e-leadership, e-governances etc.

Table 5.6: Students and teachers feedback on the availability of ICT facilities

ICT Facilities	Respondents	Yes, and I use it				Yes, but I don't use it				Not available			
		AU	DU	GU	TU	AU	DU	GU	TU	AU	DU	GU	TU
Desktop / Laptop / without Internet	Students	23	2	1	3	4	1	1	1	5	4	4	3
	Teachers	11	2	1	1	3	5	1	1	2	1	2	2
	Total	34	4	2	4	7	6	2	2	7	5	6	5
Desktop / Laptop / with Internet access	Students	26	30	26	67	5	8	5	11	48	43	49	2
	Teachers	30	21	23	27	1	4	6	4	4	10	6	4
	Total	56	51	49	94	6	12	11	15	52	53	55	6
Digital reader (iPad / Table)	Students	8	9	11	10	4	7	0	10	67	65	69	60
	Teachers	8	1	6	1	0	1	2	1	27	33	27	33
	Total	16	10	17	11	4	8	2	11	94	98	96	93
Multimedia Projector	Students	27	26	20	40	3	11	8	26	49	44	52	13
	Teachers	30	21	23	27	1	4	6	4	4	10	6	4
	Total	57	47	43	67	4	15	14	30	53	54	58	17
Video conf. / Virtual Classroom / IB	Students	16	8	14	15	2	15	7	36	61	58	59	29
	Teachers	5	3	5	5	4	2	2	4	26	30	28	26
	Total	21	11	19	20	6	17	9	40	87	88	87	55
Printer	Students	21	15	49	27	3	13	11	35	55	53	20	18
	Teachers	12	14	13	12	2	6	3	0	21	15	19	23
	Total	33	29	62	39	5	19	14	35	76	68	39	41
Scanner	Students	47	11	39	25	14	13	11	38	18	57	30	17
	Teachers	14	12	11	10	1	6	3	10	20	17	21	25
	Total	61	23	50	35	15	19	14	48	38	74	51	42
Total	Students	168	101	160	187	35	68	43	157	303	324	283	142
		61%	58%	66%	69%	74 %	71 %	65 %	87 %	74 %	74 %	72 %	55 %
	Teachers	110	74	82	83	12	28	23	24	104	116	109	117
		40%	42%	34%	31%	26 %	29 %	35 %	13 %	26 %	26 %	28 %	45 %
	Total	278	175	242	270	47	96	66	181	407	440	392	259

With this basic notion, the assessment on the availability of ICT facilities in universities of Assam has been found imperative with a key statement of "whether any of these devices are available for use of students in your institute / department / class". This section of the research advocates on the key objective of the research. The assessment result has been presented in the Table 5.6.

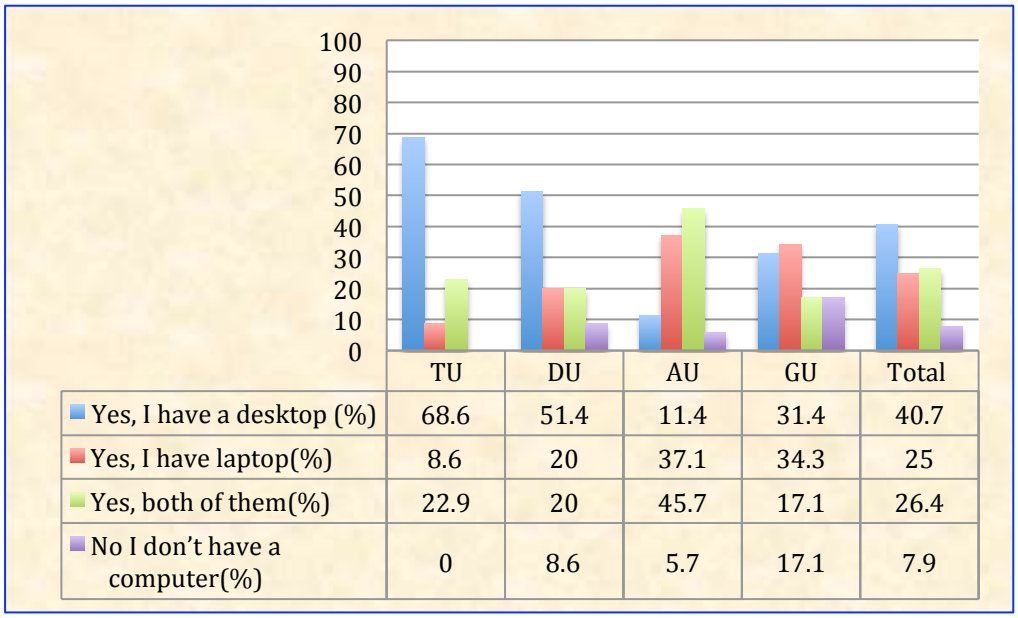
As depicted in Table 5.6, TU is relatively better than other universities in availing ICT facilitates. In general, the availability of desktop or laptop without internet was confirmed by 15.1% of them but they are not using it and 56.9% of them have reported totally the unavailability of it. On the other hand, desktop or laptop with internet was available and used by 46.6 % but 9.1% of the respondents are again not using though it is available. In this regard, TU has the highest as we have it and use it as 83.8% and the option not available was highest in AU as 60.8%

As indicated in Table 5.6, AU 61% of the student and 40% teachers confirm ICT facility availability. In DU 58% students and 42% teachers agrees that ICT facility is available and in GU 66% student, 34% confirm the availability of ICT facilities. In TU 69% of the student and 31% of teachers confirm and use of ICT facilities. Tezpur University is relatively better than other universities in availing and using of ICT facilitates as 38.5% and 'Yes, and I use it' available but 'I do not use' 30.9%. Specially, the availability of video conferencing / virtual classroom / interactive board (45.1%), desktops and laptops with internet was confirmed by (43.8%) of the respondents and almost double compared to other Universities. This implies that TU is in good status in availing basic ICT facilities whereas GU is a little bit behind compared to the others in terms of availing desktop / laptop without internet (22.5%).

The researcher has also addressed teachers in terms of their view towards the availability of office ICT facilities of Computer and laptop. Thus, their feedbacks have been summarized in Figure 5.5.

As it is clearly depicted in Figure 5.5, it was only 40.7% of the teachers who have a desktop in their office, accordingly university wise TU 68.6%, DU 51.4%, GU 31.4% and AU 11.4%. If we calculate the percentage of 'laptop' user then the highest is at GU 37.1%, GU 35.3, DU 20% and TU only 8.6% respectively.

Figure 5.5: Availability of teachers' laptops and desktop computers



	TU	DU	AU	GU	Total
Yes, I have a desktop (%)	68.6	51.4	11.4	31.4	40.7
Yes, I have laptop(%)	8.6	20	37.1	34.3	25
Yes, both of them(%)	22.9	20	45.7	17.1	26.4
No I don't have a computer(%)	0	8.6	5.7	17.1	7.9

On the contrary, 22.9% of TU, 20% of DU, 17.1% of GU have both laptop and desktop computer and AU have the maximum of 45.7. Positively, 26.4% of the respondents of all universities have both laptop and desk top computers. This is a little bit higher in AU. However, 7.9% of the respondents have neither desktop nor laptop computer whereas the problem was more serious in GU.

As ICT experts and administrators of the universities who are mostly in charge of the management, maintenance and training of ICT facilities, the researcher has addressed them to know how much of key ICT facilities are available in each unit. Thus, their feedback is summarized in the following Table 5.7.

As referenced from Table 5.7 and Figure 5.6, majority of the ICT experts and administrators (55%) confirmed that departments have on an average 100 and above sets of computers and the highest was observed in TU (70%) and the remaining three universities were 50% each in having this number of sets.

Table 5.7: ICT experts and administrators' feedbacks on the availability of computer in department, library, laboratory etc.

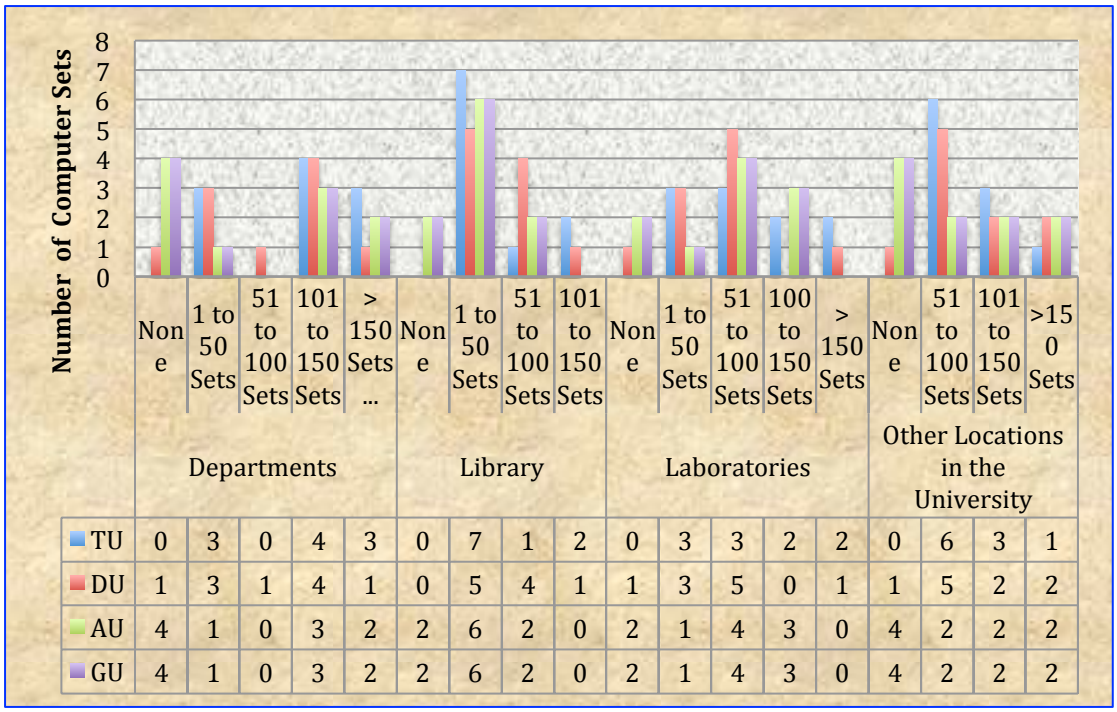
How many Computers in		Universities				Total
		TU	DU	AU	GU	
Departments	None	0	1	4	4	9
	1 to 50 Sets	3	3	1	1	8
	51 to 100 Sets	0	1	0	0	1
	101 to 150 Sets	4	4	3	3	14
	> 150 Sets...	3	1	2	2	8
Library	None	0	0	2	2	4
	1 to 50 Sets	7	5	6	6	24
	51 to 100 Sets	1	4	2	2	9
	101 to 150 Sets	2	1	0	0	3
Other locations of the university	None	0	1	4	4	9
	51 to 100 Sets	6	5	2	2	15
	101 to 150 Sets	3	2	2	2	9
	>150 Sets	1	2	2	2	7
Laboratories	None	0	1	2	2	5
	1 to 50 Sets	3	3	1	1	8
	51 to 100 Sets	3	5	4	4	16
	100 to 150 Sets	2	0	3	3	8
	> 150 Sets	2	1	0	0	3

In a similar pattern, it has been reported that universities have 50 and above sets of computers in their libraries. Again here 100% of TU and DU respondents affirmed the presence. However, AU and GU were at 80%. Still, 72.5% of the respondents affirmed the presence of 50 and above sets of computers in other places of the universities where 27.5% of them reported no sets of computer s in other locations. The presence of computer in other locations was 80% in TU and 90% in DU.

Computers are also now available in laboratories, thus, 40% of them affirmed its presence form 51 to 100 sets per university, 20% with quantity of 100 to 150 sets and 7.5% with a quantity of 151 and above sets per university. In general, 70% of each university of TU, AU and GU ensured the presence of above 50 sets of computers in

the laboratories and at DU, 60 of them are in favour of the presence of above 50 sets of computers in the laboratories. However, 17.5% again reported 'no' as it is not available in laboratories.

Figure 5.6: ICT experts and administrators' feedback on the availability of computers

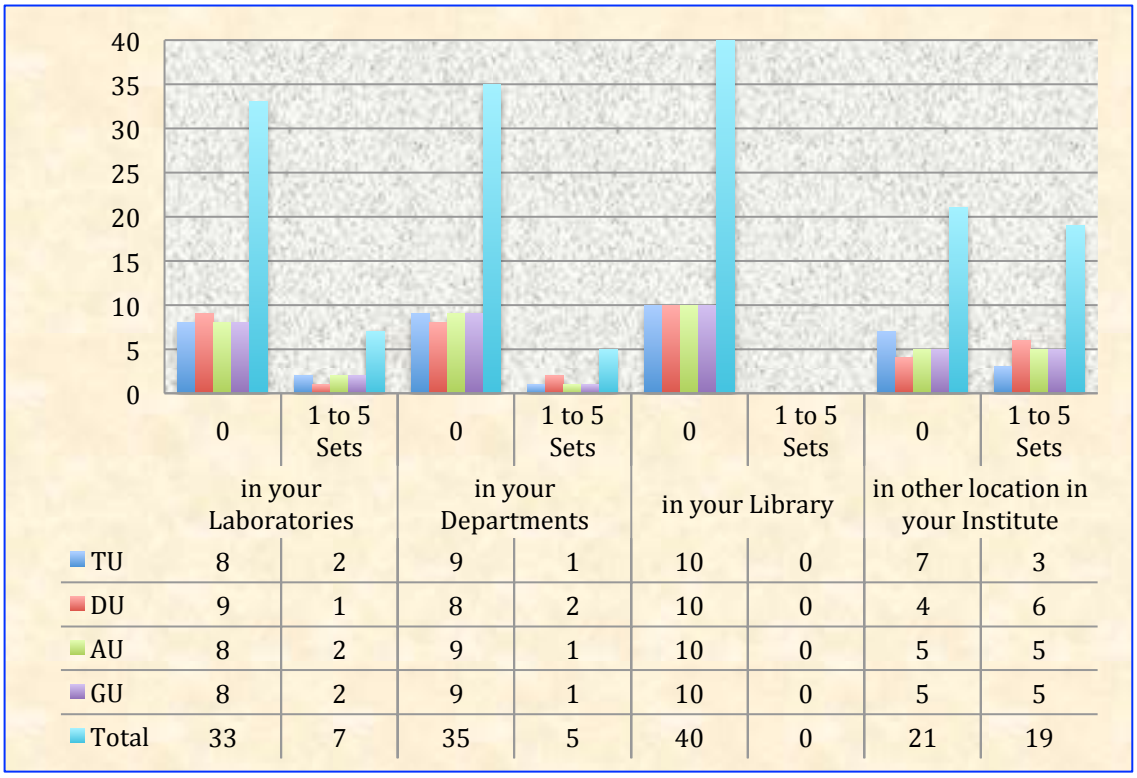


	Departments					Library				Laboratories					Other Locations in the University			
	None	1 to 50 Sets	51 to 100 Sets	101 to 150 Sets	> 150 Sets ...	None	1 to 50 Sets	51 to 100 Sets	101 to 150 Sets	None	1 to 50 Sets	51 to 100 Sets	100 to 150 Sets	> 150 Sets	None	51 to 100 Sets	101 to 150 Sets	>150 Sets
TU	0	3	0	4	3	0	7	1	2	0	3	3	2	2	0	6	3	1
DU	1	3	1	4	1	0	5	4	1	1	3	5	0	1	1	5	2	2
AU	4	1	0	3	2	2	6	2	0	2	1	4	3	0	4	2	2	2
GU	4	1	0	3	2	2	6	2	0	2	1	4	3	0	4	2	2	2

Interactive white board is usually a rare ICT facility in the present scenario of educational institutes as indicated in Figure 5.7. Henceforth, 82.5% of the ICT experts and administrator respondents affirmed the unavailability of it in their laboratories and it was only 17.5% who affirmed its presence with a range of 1 to 5 in number. Similarly, 87.5% of them showed the unavailability of the interactive white board in their departments and it was again 12.5% who reported its presence with a quantity of 1 to 5 pieces. It was totally nil in the libraries of all universities.

Overall, internet bandwidth or speed of the universities, 80% of them confirmed as 50 to 1000 MBPS and 20% of them have reported as 1 to 50 MBPS especially in AU and GU where, 30% of the respondents are in favour of 1 to 50 MBPS.

Figure 5.7: ICT expert and administrators' feedback on the availability of interactive board



	in your Laboratories		in your Departments		in your Library		in other location in your Institute	
	0	1 to 5 Sets	0	1 to 5 Sets	0	1 to 5 Sets	0	1 to 5 Sets
TU	8	2	9	1	10	0	7	3
DU	9	1	8	2	10	0	4	6
AU	8	2	9	1	10	0	5	5
GU	8	2	9	1	10	0	5	5
Total	33	7	35	5	40	0	21	19

ICT experts and administrators have also reflected their observations on computer networking, university website and other social networking. Thus, their practical observation is presented in Table 5.8.

As it is reflected from Table 5.8, all universities have their own home pages or websites, local area network (LAN) and email addresses for more than 50% of teachers. Besides, 70% of the respondents agreed on the presence of email addresses for more than 50% of the students. When we review the availability of virtual learning environment (virtual classroom / video conferencing), 70% of TU respondents, 60% of AU and DU agreed on its presence whereas respondents in DU are at mid-way both on its presence and absence.

Table 5.8: ICT experts and administrators' feedback on home page, email account and LAN

ICT experts and administrators' feedback:		University				
		TU	DU	AU	GU	Total
Does your institute have own homepage or website	Yes	10	10	10	10	40
Does your institute have Institute email addresses for more than 50% of teachers	Yes	10	10	10	10	40
Does your institute have Institute email addresses for more than 50% of students	Yes	7	7	7	7	28
	No	3	3	3	3	12
Does your institute have its own A LAN (local area network)	Yes	10	10	10	10	40
Does your institute have own If yes, is this LAN also wireless (Wi-Fi)?	Yes	8	6	8	8	30
	No	2	4	2	2	10
Does your institute have own A virtual learning environment (virtual classroom/video conferencing)	Yes	7	5	6	6	24
	No	3	5	4	4	16
Total		10	10	10	10	40

In general, the availability of ICT in higher education is a concern of all educationalists in the 21st century. This is with the critical rationale and immense advantages of the technology. According to Hussain (2010), ICT is well-suited to offer help in the area of remedial teaching because of its flexibility, allows the students to work at their own pace, different students may have difficulty with different concepts and can go as per their speed and students may concentrate on specific areas without holding up the rest of the group. Furthermore he explained that small departments can benefit from ICT by reducing certain costs e.g. expensive, laboratory experiments can be replaced by simulations and there may be less need to have human experts constantly available, use of multimedia in ICT attracts even quite young students and captures the interest of reluctant learners and ensures a more consistent course delivery and eliminates the need to cope with different tutoring styles and personality clashes between teacher and student. In ICT, teachers are free to do other necessary work, hence increasing educational productivity, can get immediate feedback increases its effectiveness, and attractively flexible as students can learn as per convenience

without the need of constant tutor guidance (ibid). Furthermore, ICT forces active participation of every student as it works on one-to-one basis and when ICT is used to replace traditional teaching, its cost is justified due to high student usage and re-usability in various classes.

5.4.3 Availability of e-journals and database

E-journal is the direct outcome of technology. Thus as indicated in Table 5.9, 100% of the respondents affirmed the presence online e-journals for their teaching and 70% of them are accessing it regularly, 21.4% once in a week and 8.6% of them twice a week.

Table 5.9: Availability of e-journals and data base

			University				Total
			TU	DU	AU	GU	
Online e-journals for teaching	Yes	N	35	35	35	35	140
		%	100	100	100	100	100
	No	N	0	0	0	0	0
		%	0	0	0	0	0
If yes, frequency of access	Regular	N	27	29	21	21	98
		%	77.1	82.9	60	60	70.0
	Once in a week	N	5	5	9	11	30
		%	15.3	15.3	2.7	31.4	21.4
	Twice a week	N	3	1	5	3	12
		%	8.6	2.9	15.3	8.6	8.6

Like teachers, ICT experts and administrators had reflected their observations on the availability of e-journals and database. All university respondents affirmed that the universities are using computerized student management system (for registration, payment of fees) computerized examination system, OPAC service for their libraries, automation software for libraries and awareness services about the library. Besides these, they have confirmed the availability of research support services and open course which are fully utilized. Their reflection on number of journals and services provided by the library are summarized in Table 5.9.

Further, teachers were asked about their utilization of the virtual learning system or learning management system software like Litmos Learning Management system, WebCT, Moodle, etc. in their teaching learning activity. However, 91.3% of the teachers are not using at all. A better attempt in using this software's was observed in AU where 17.6% of the teachers have replied in positive. Among these universities,

TU was the last in the attempting to use the software where 97.1 % of the teachers gave their practical observation where LMS is not used in the teaching learning as shown in Table 5.10.

Table 5.10: Use of virtual learning system

Use of	Count		University				
			TU	DU	AU	GU	Total
Any learning management system or environment software / Virtual Learning System	Yes	N	1	2	6	3	12
		%	2.9	6.0	17.6	8.6	8.7
	No	N	33	33	28	32	126
		%	97.1	95.0	82.4	91.4	91.3
	Missing	N	1	0	1	0	2

5.4.4 Availability of Training and support for ICT use

Students of the target universities were asked about the need for training for handling ICT facilities at the beginning of their courses. Their feedback has been summarized in the following Table 5.11.

Table 5.11: Students' view on the need for training

Do you feel the necessity of training for	Response	Universities				
		AU	DU	GU	TU	Total
Handling ICT facility at the beginning of your course	Yes	72	73	61	64	270
	%	91.1	90.1	76.3	80	85.4
	No	7	8	19	16	50
	%	8.9	9.9	23.8	20	15.6
Total		79	81	80	80	79

On the necessity of ICT training for handling facilities at the beginning of the course, 85.4% of the respondents affirmed its importance. Specially, students in AU and DU need the training as a high number of respondents expressed their need as 91.1% and 90.1% respectively. On the other hand, students of GU marked it 76.3% on the need of training which is still high demand but compared to the other universities, it is the

least. However, this has no link with the students' residential area. In contrast to this, the highest number of students coming from rural set up was from GU which was 82.5% and semi urban 8.8%.

Table 5.12: ICT expert and administrators' view on training

	University				
Response	AU	DU	GU	TU	Total
Does your institute provide user training for handling ICT facilities? Yes	10	10	10	10	40
%	100	100	100	100	100
No	0	0	0	0	0
%	0	0	0	0	0

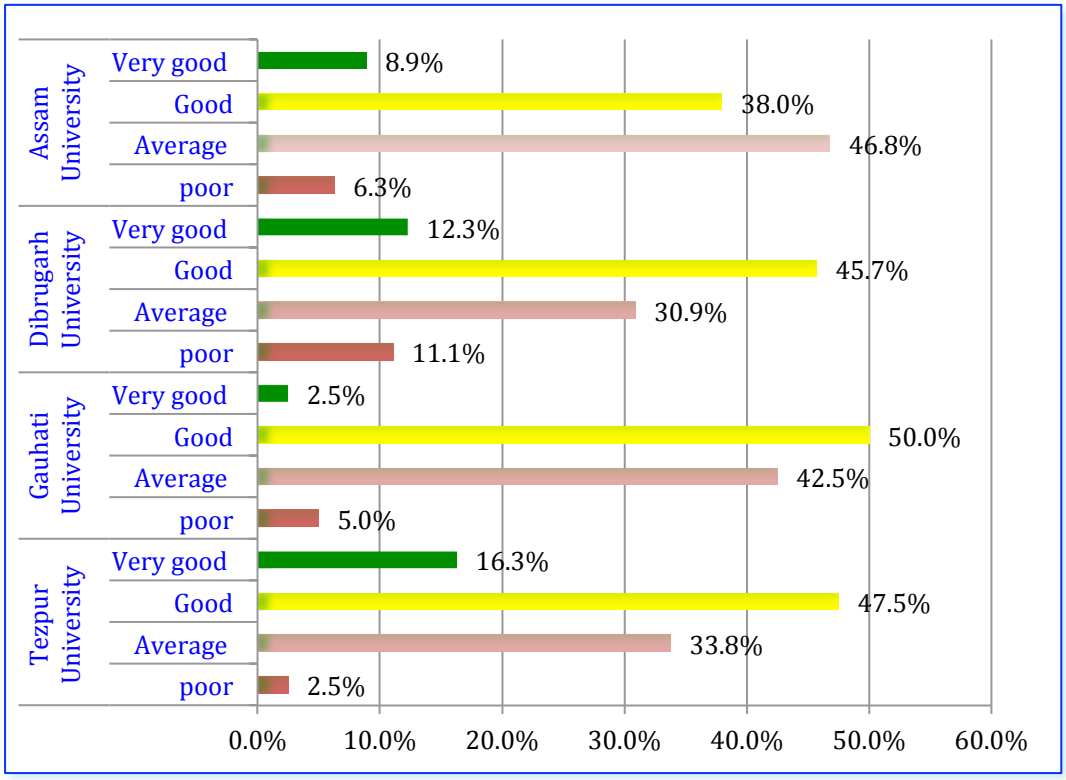
In line with the the necessity of training for students in handling ICT facility at the beginning of their course, all of the ICT experts and administrators affirmed the provision of training for handling ICT facilities by their respective universities as shown in Table 5.12. In line with this, Hussian, (2010) reminded that, "the introduction of computer into the classroom needs first to train the teacher to control the learning process and to educate the students how to use computers and learn from the computer''. According to him the teacher provides the course material as well as the first criteria to analyse and judge the learner's progress and the programmer develops the learning package and the computer understands the course material. Similarly, Pea and Maldonado, (2006) clarified that the use of electronic equipment especially computers in the field of education demands a learner and a teacher to be well versed and comfortable with the use of computers to process the information.

Likewise as shown in Table 5.13 and Figure 5.8, the quality of technological support, 45.3% reported as 'good', 38.4% of them have reported as 'average' and 10% as 'very good'. It was only 6.2% of them who ranked this provision as poor and the highest dissatisfaction was observed in DU which was 11.1% and the highest satisfaction was observed in TU which was 97.6% being 'average, and above followed by GU which was 95%.

Table 5.13: Students view on the quality of technical support

How would you rate the quality of technological support provided in your institution?						
University	Count	Poor	Average	Good	Very good	Total
AU	N	5	37	30	7	79
	%	6.3	46.8	38.0	8.9	100
DU	N	9	25	37	10	81
	%	11.1	30.9	45.7	12.3	100
GU	N	4	34	40	2	80
	%	5.0	42.5	50.0	2.5	100
TU	N	2	27	38	13	80
	%	2.5	33.8	47.5	16.3	100
Total	N	20	123	145	32	320
	%	6.3	38.4	45.3	10.0	100

Figure 5.8: Students' view on the quality of technical support



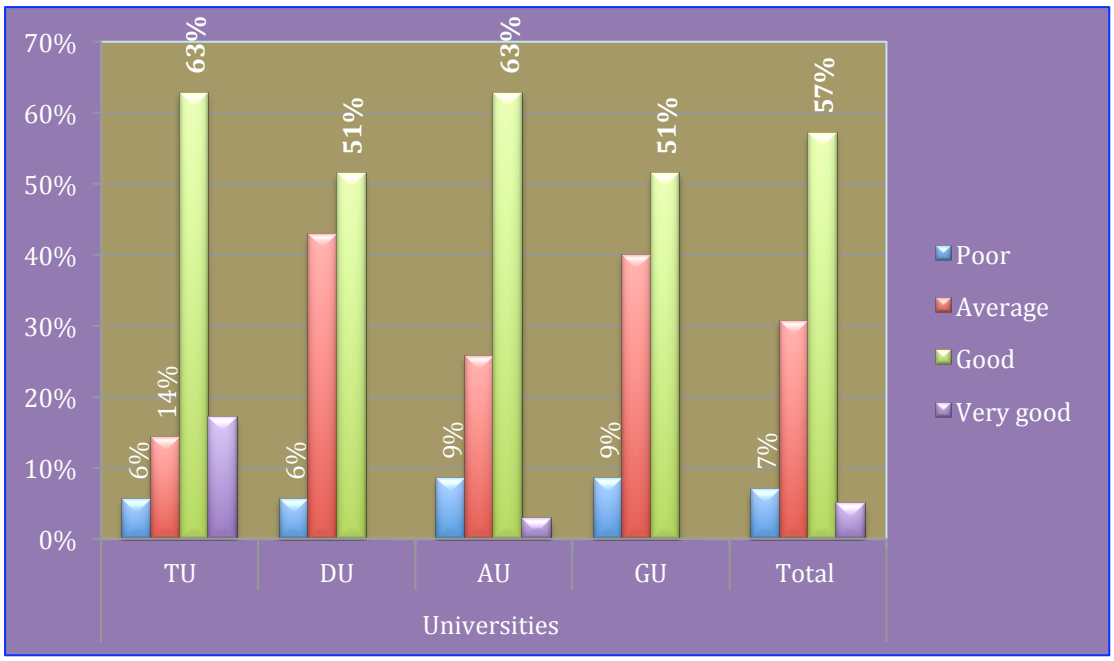
When we review the support of each university of 'good' and 'very good' as an

aggregate, TU 51(63.8%), DU 47(58%), GU 42(52.5%), and AU 37(46.9%).

The Figure 5.8, indicates that TU has the highest value in terms of 'very good' (16.3%) followed by Dibrugarh (12.3%). On the other hand, on the technical support of ranking 'good', Guwahati has scored the highest (50.0%) followed by Tezpur (47.5%). With the rating of 'poor', Dibrugarh is first being marked by 11.1% of the respondents preceded by Assam (6.3%).

Practical observations and experiences on the quality of the technical support indicated by the teachers in Figure 5.9 and Table 5.14.

Figure 5.9: Teachers' view on the quality of technical support



Based on Table 5.14, 130 (93%) of the teachers are satisfied with the technical support with a degree of 'average' and above and 6 (17%) TU respondents have marked very well for the technical supports they are getting from their technical staff.

Table 5.14: Teachers' view on the quality of support

	Count	Universities				
		TU	DU	AU	GU	Total
Quality of technological support	Poor	2	2	3	3	10
	Average	5	15	9	14	43
	Good	22	18	22	18	80
	Very good	6	0	1	0	7
	Total	35	35	35	35	140

On the maintenance of the ICT facilities, ICT experts and administrators of each university has given their practical experiences as summarized in Table 5.15.

Table 5.15: ICT experts and administrators' view on the maintenance of ICT equipment

Who maintains the ICT equipment in your institute?	Universities				Total
	TU	DU	AU	GU	
Own staff	10	10	9	9	38 (90%)
External agency	0	0	1	1	2 (10%)
Total	10	10	10	10	40 (100%

As depicted in Table 5.15, TU and DU thoroughly used their own staff for maintenance of ICT equipment in their institutes whereas AU and GU use external resource or agencies for maintenance purpose in rare cases which is up to 10%. Overall, 90% of the time, universities use their internal resource for maintenance of ICT equipment and facilities.

Teachers were also asked about the quality of technological supports provided to them. Thus, 62.1% respondents said good and very good, 30.8% average and 7.1% was poor. Within the target universities, TU was better than the others in response to 'good' and 'very good' (80%) followed by AU (65.8%). The remaining two university

respondents of DU and GU ranked 51.4% good and very good equally on the quality of the technological support. This has been demonstrated in Table 5.16.

Table 5.16: Teachers' view on the quality of technological support

Technological support is	Universities									
	TU		DU		AU		GU		Total	
	N	%	N	%	N	%	N	%	N	%
Poor	2	5.7	2	5.7	3	8.6	3	8.6	10	7.1
Average	5	15.3	15	42.9	9	25.7	14	40.0	43	30.8
Good	22	62.9	18	51.4	22	62.9	18	51.4	80	57.1
Very good	6	17.1	0	0.0	1	2.9	0	0.0	7	5.0
Total	35	100.0	35	100.0	35	100.0	35	100.0	140	100

Furthermore, ICT experts and administrators were asked about the maintenance of ICT equipment and the provision of user training for handling ICT facilities in their respective universities almost all of them affirmed that maintenance is done by the university staff and training is also provided in all of the universities.

Table 5.17: ICT expert and administrator satisfaction on the overall ICT facilities provided by their universities

Are you satisfied with the overall ICT facilities provided by your Institution	Universities				
	TU	DU	AU	GU	Total
Fully satisfied	2	1	0	0	3 (7.5%)
To a great extent	6	5	7	6	24 (60.0%)
To some extent	2	3	3	3	11 (27.5%)
Not at all	0	1	0	1	2 (5.0%)
Total	10	10	10	10	40 (100%)

Based on table 5.17, ICT experts and administrators were satisfied with the overall ICT facilities provided by their universities ‘to a great extent’ (60%), ‘to some extent’ (27.5%). It was only 7.5% who are fully satisfied where as 5% were not at all. Among

the universities, experts and administrators of AU are a little bit better than the others in terms of their satisfaction at a 'great extent' followed by TU and GU at equal level.

5.5 Analysis of Research Question 2: Impact of ICT tools and methods and its benefits in the pedagogy.

Availability is not a guarantee for the utilization of ICT facilities. Thus in line with the availability of basic facilities and common understanding about ICT, it was important to know the utilization as well.

In general, ICT came to the teaching-learning-process or education sector with the perceived benefits in assisting students in accessing digital information efficiently and effectively, support student-cantered and self-directed learning, produce a creative learning environment, promote collaborative learning in a distance-learning environment, offer more opportunities to develop critical (higher-order) thinking skills and improve teaching and learning quality and support teaching by facilitating access to course content (Fu, 2013).

5.5.1 Students feedback on utilization of computer

For exploring the application and implementation of ICT in achieving the stated benefits, students were asked about their abilities in doing their key tasks using ICT facilities. This has been summarized in Table 5.16.

Based on Table 5.18, on the utilization of computer in general, students' responses varied from 55.1% agreed and 25.4% strongly agreed as working with computer was 'really fun, very important for academic work, brings interest, learning will help in the work that I want to do later on and will not lose track off time when I am are working on it'.

Overall, 78.5% of them agreed on the use of computer. On the aggregate level, AU students rated 83.6% as 'agree and strongly agree', TU (81.6 %), GU (79.0%) and DU (75.1%). Among these statements, 'use a computer to learn as it will help in the work that I want to do later on' was highly ranked by all students with an average response

rate of 96.9% (having agree 65.4% and strongly agree 32.5%) which was followed by 97.2% of 'It is very important to work with computer for academic work' (having agree 47.5% and strongly agree 49.7%).

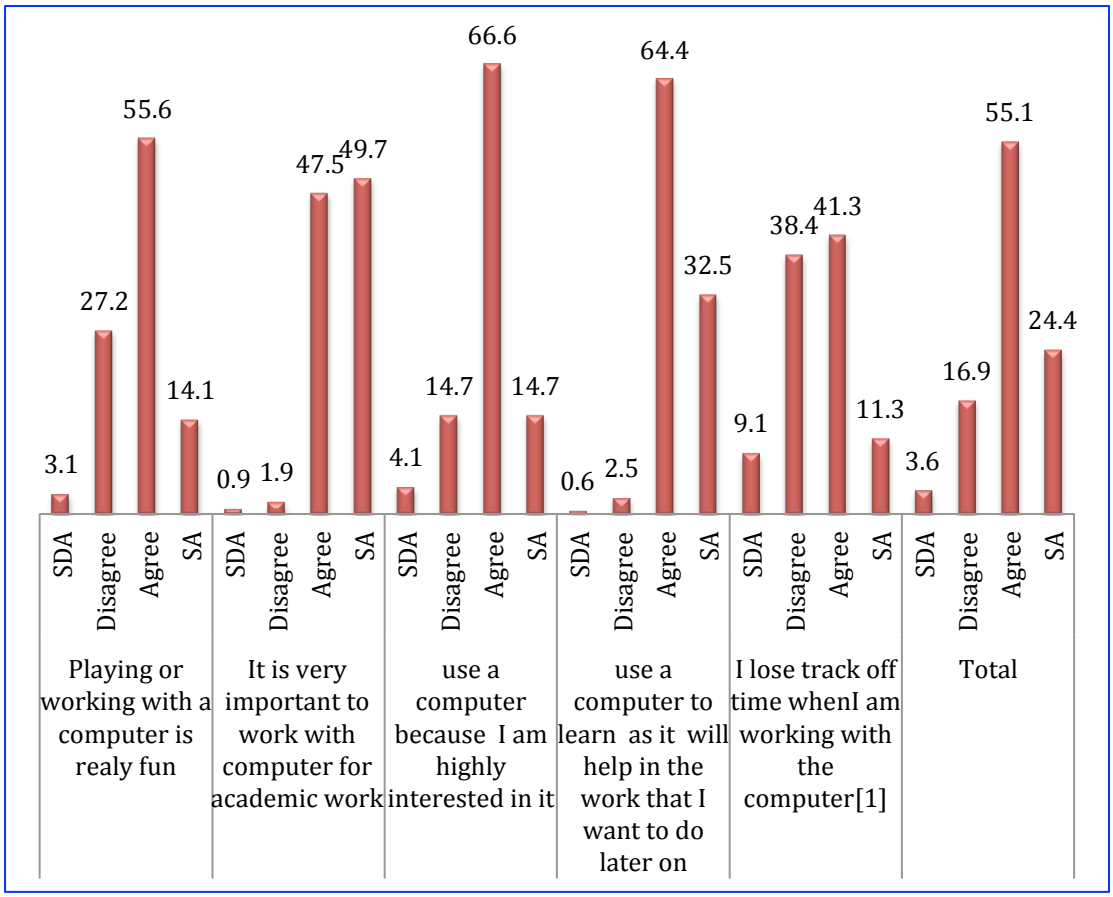
Table 5.18: Students feedback on utilization of computer

Do you agree that	Response	University									
		TU		GU		DU		AU		Total	
		N	%	N	%	N	%	N	%	N	%
Playing or working with a computer is really fun	SDA	1	1.3	1	1.3	7	8.6	1	1.3	10	3.1
	Disagree	16	20	27	33.8	31	38.3	13	16.5	87	27.2
	Agree	46	57.5	46	57.5	41	50.6	45	57	178	55.6
	SA	17	21.3	6	7.5	2	2.5	20	25.3	45	15.1
It is very important to work with computer for academic work	SDA	0	0	1	1.3	2	2.5	0	0	3	0.9
	Disagree	3	3.8	0	0	1	1.2	2	2.5	6	1.9
	Agree	40	50	40	50	38	46.9	34	43	152	47.5
	SA	37	46.3	39	48.8	40	49.4	43	55.4	159	49.7
Use a computer because I am highly interested in it	SDA	3	3.8	4	5	6	7.4	0	0	13	5.1
	Disagree	12	15	4	5	19	23.5	12	15.2	47	15.7
	Agree	49	61.3	66	82.5	50	61.7	48	60.8	213	66.6
	SA	16	20	6	7.5	6	7.4	19	25.1	47	15.7
Use a computer to learn as it will help in the work that I want to do later on	SDA	1	1.3	1	1.3	0	0	0	0	2	0.6
	Disagree	2	2.5	0	0	4	5.9	2	2.5	8	2.5
	Agree	54	67.5	64	80	38	46.9	50	63.3	206	65.4
	SA	23	28.8	15	18.8	39	48.1	27	35.2	104	32.5
I lose track of time when I am working with the computer[1]	SDA	10	12.5	9	11.25	3	3.8	7	8.8	29	9.1
	Disagree	26	32.5	41	51.3	28	35.0	28	35.0	123	38.4
	Agree	28	35	26	32.5	43	53.8	35	43.8	132	41.3
	SA	16	20	4	5	7	8.8	9	11.3	36	11.3
Total	SDA	15	3.8	16	5.1	18	5.4	8	2.0	57	3.6
	Disagree	59	15.8	72	18.2	83	20.5	57	15.4	271	16.9
	Agree	217	55.3	242	61.3	210	51.9	212	53.7	881	55.1
	SA	109	27.3	70	17.7	94	23.2	118	29.9	391	25.4

SA – Strongly agree, SDA --- Strongly disagree

[1] The statement is negative and the feedback is inversely recorded

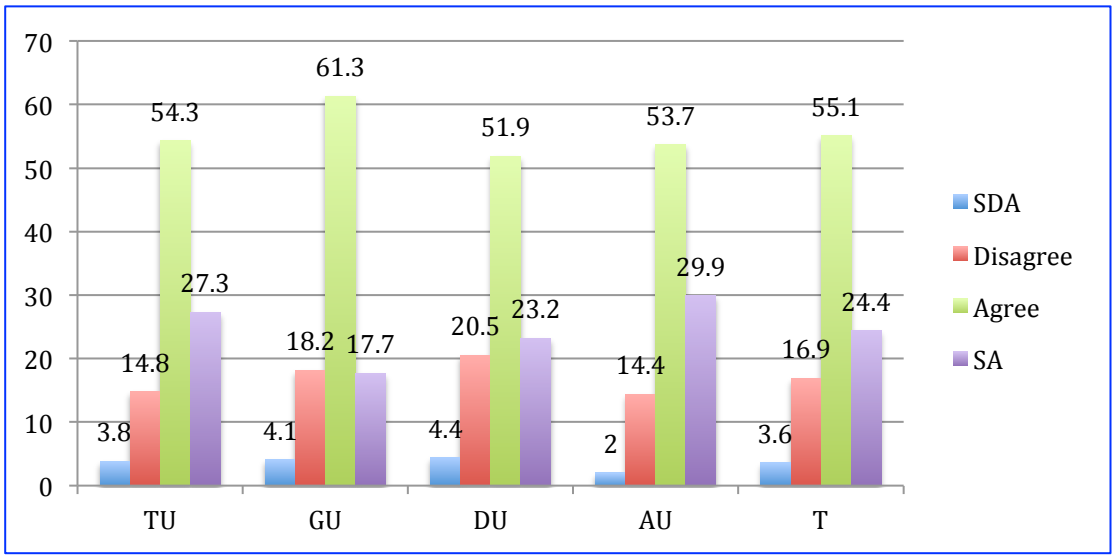
Figure 5.10: Students agreement on the use of computer as mentioned the following statements



The statement "use a computer because I am highly interested in it' got the highest rate (66.6%) at a level of "agree" followed by use a computer to learn as it will help in the work that I want to do later on (65.4%), playing or working with a computer is really fun (55.6%), and it is very important to work with computer for academic work (47.5%). This, aligned with the view of Youssef and Domain (2008), that thee students learned more in less time and liked their classes more when ICT-based instruction was included.

As shown in Figure 5.11, the responses of the student for regular use of computer in their academic work, total 55.1% 'agree' and 25.4% 'strongly agree', while 16.9% 'disagree' and 3.6% 'strongly disagree'.

Figure 5.11: Students agreement for use of computer in regular academic work



Research studies conducted by other scholars explored why students are interested in working with ICT facilities. These students' preferences also contribute to our understanding of why ICT enhances achievement and the need for investing on ICT facilities as well. According to Hussain (2010) some of the key preferences why students liked working with computers was because of the computers never gets tired, never gets frustrated or angry, allows students to work privately, never forgets to correct or praise, is funs and entertaining, individualizes learning, is self-paced, does not embarrass students who make mistakes, make it possible to experiment with different options, gives immediate feedback, are more objective than teachers, free teachers for more meaningful contact with students, are impartial to race or ethnicity, are great motivators, gives a sense of control over learning..

5.5.2 Teachers' technological expertise in class

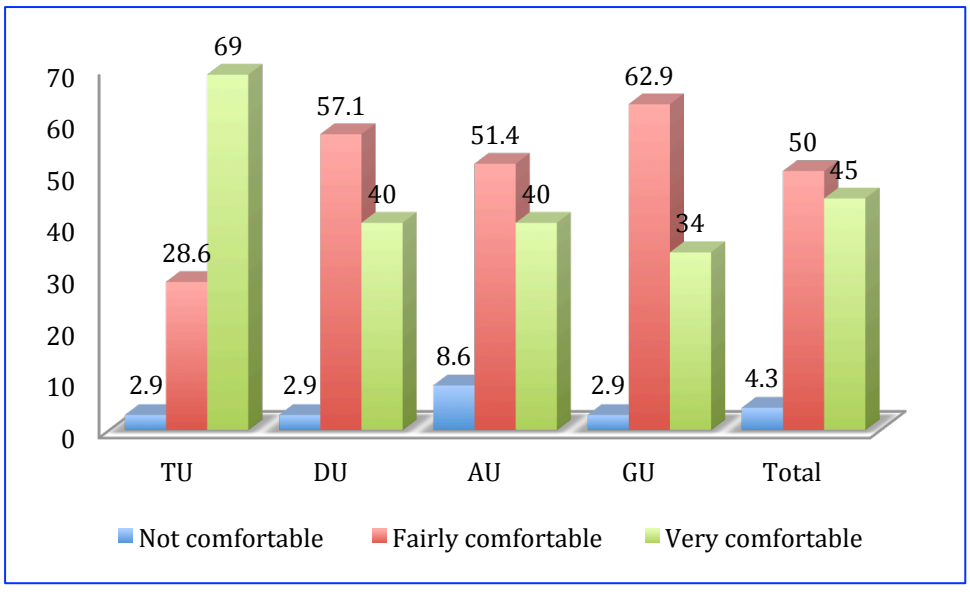
Teachers also shared their experiences on technological expertise in using ICT in their daily classes. Hence, 50% of the teachers are fairly comfortable and 45.7% are very comfortable. It was only 5.3% of them who are not comfortable in their technical expertise in class. Among universities, TU teachers are very much comfortable with a response rate of 68.6% followed by DU and AU each having 40% response rate. Again in terms of the fair comfortable, GU is the highest (62.9%). This is clearly indicated in Table 5.19 and Figure 5.12.

Table 5.19: Teachers' technological expertise in class

Technological expertise in the class		University				
		TU	DU	AU	GU	Total
Not comfortable	N	1	1	3	1	6
	%	2.9	2.9	8.6	2.9	4.3%
Fairly comfortable	N	10	20	18	22	70
	%	28.6	57.1	51.4	62.9	50.0%
Very comfortable	N	24	14	14	12	64
	%	68.6	40.0	40.0	35.3	45.7%
Total	N	35	35	35	35	140
	%	100	100	100	100	100

In support of the need of teachers' expertise in computers, Hussain (2010) boldly articulated that instructors shall be better equipped to capture the attention of the current generation of students who had grown up with updated technologies. According to Wilson (1990) cited in Hussain (2010: 38), "When potential students sit in a class session, they realize how easy it has been made for them to approach learning and that completely changes the psychology of the classroom''. This means that those students can stay in class with improved learning results since students' attentiveness is held at a high level throughout the classes.

Figure 5.12: Teachers' technological expertise in class



Thus, ICT provides a suitable. Alternative for lectures in response to the current trend of increased number of students and higher teacher / student ratio and the subsequent pressure on the teachers (Hussain, 2010).

Clark (1983) opines that ICT-assisted instruction is presumed to have a few importance in meta-analysis where ICT-supported instructions give better opportunities for meta-analyses compared to the traditional method of teaching.

Students' ability to explore the Microsoft Office technology was also assessed using key statements that addressed their capacity in editing digital photographs or other graphic images, creating a database (e.g. using <Microsoft Access®>), using spread sheet to plot a graph, create presentation (e.g. using <Microsoft PowerPoint®>), and create a multi-media presentation (with sound, pictures, video). Based on these leading statements, the responses of students had been summarized in Table 5.20.

In line with the statement of creating a multi-media presentation (with sound, pictures, video), 81.9% of the respondents can create a multimedia presentation with sound, picture and video where 31.9% of them are doing this with the help of someone and 50% of them can do this very well by themselves. The remaining students, 11.9% know about multimedia but cannot do it and 6.3% of them don't know what multimedia means. It was AU which has the highest number of students 69.6% who can create multimedia presentation very well by themselves, followed by GU 63.3% whereas the least is observed in DU 25.7%. In terms of the ability of creating presentation using Microsoft PowerPoint, it is 71.3% of the students who are able to do it very well by themselves. Those who can do this with the help from someone were 20.6%. The highest ability in using PowerPoint was observed in AU 81.0% which was again followed by TU and GU with a response rate of 73.8% each. The least ability in PowerPoint was observed in DU 56.8% however, 35.6% of the students in DU still can do with the help from someone.

Creating access was only well done by 33.1% of the students and 31.9% of the students can still practice it with the help of others. However, 22.2% of them cannot do it and 12.8% of them even do not know what Microsoft Access meant.

Table 5.20: Students' ability in Microsoft office

To what extent are you able to do	Statements	Response	Universities				
			TU	GU	DU	AU	Total
Edit digital photographs or other graphic images	I can do this very well by myself	N	20	36	21	42	119
		%	25.0	45.0	25.9	53.2	37.2
	I can do this with help from someone	N	31	24	45	27	127
		%	38.8	30.0	55.6	35.2	39.7
	I know what this means but I cannot do it	N	28	7	11	6	52
		%	35.0	8.8	13.6	7.6	16.3
	I don't know what this means	N	1	13	4	4	22
		%	1.3	16.3	5.9	5.1	6.9
Create a database (e.g. using <Microsoft Access®>)	I can do this very well by myself	N	20	30	19	37	106
		%	25	37.5	23.5	46.8	33.1
	I can do this with help from someone	N	19	23	39	21	102
		%	23.8	28.8	48.1	26.6	31.9
	I know what this means but I cannot do it	N	30	10	18	13	71
		%	37.5	12.5	22.2	16.5	22.2
	I don't know what this means	N	11	17	5	8	41
		%	13.8	21.3	6.2	10.1	12.8
Create presentation (e.g. using <Microsoft Power Point®>)	I can do this very well by myself	N	59	59	46	64	228
		%	73.8	73.8	56.8	81.0	71.3
	I can do this with help from someone	N	15	14	28	9	66
		%	18.8	17.5	35.6	11.4	20.6
	I know what this means but I cannot do it	N	2	3	4	4	13
		%	2.5	3.8	5.9	5.1	5.1
	I don't know what this means	N	4	4	3	2	13
		%	5.0	5.0	3.7	2.5	5.1
Create a multi-media presentation (with sound, pictures, video)	I can do this very well by myself	N	34	51	20	55	160
		%	42.5	63.8	25.7	69.6	50.0
	I can do this with help from someone	N	33	15	38	16	102
		%	41.3	18.8	46.9	20.3	31.9
	I know what this means but I cannot do it	N	12	5	17	4	38
		%	15.0	6.3	21.0	5.1	11.9
	I don't know what this means	N	1	9	6	4	20
		%	1.3	11.3	7.4	5.1	6.3

Among the students in these universities, 37.5% of TU and 22.2% of DU know what Microsoft Access meant but cannot do it where as 21.3% of GU and 13.8% of TU do not know what it meant.

This section on the utilization of ICT facilities for browsing and doing communication was aimed at exploring the skills that students have in utilization of the ICT facilities available in each university. Thus, their competencies in using these facilities have been explored. For these questions or statements related to knowledge on browsing the internet for academic requirement (e.g. downloading reference), use of e-mail for communication with friends and family, use of e-mail for communication with teachers and use of e-mail for submission of assignments were presented and their feedback had been summarized in Table 5.21.

Table 5.21: Skill of students while using Internet, email etc.

To what extent are you able to do	Alternatives	Response	Universities				
			TU	GU	DU	AU	Total
Do you know how to: browse the Internet for academic requirement (e.g. downloading reference)	I can do this very well by myself	N	76	53	56	77	262
		%	95.0	66.3	69.1	97.5	81.9
	I can do this with help from someone	N	1	24	9	0	34
		%	1.3	30.0	11.1	0.0	10.6
	I know what this means but I cannot do it	N	2	3	13	0	18
		%	2.5	3.8	16.0	0.0	5.6
	I don't know what this means	N	1	0	3	2	6
		%	1.3	0.0	3.7	2.5	1.9
Use e-mail for communication with friends and family	I can do this very well by myself	N	77	63	70	65	275
		%	96.3	78.8	86.4	82.3	85.9
	I can do this with help from someone	N	1	11	3	12	27
		%	1.3	13.8	3.7	15.2	8.4
	I know what this means but I cannot do it	N	1	6	5	0	12
		%	1.3	7.5	6.2	0.0	3.8
	I don't know what this means	N	1	0	3	2	6
		%	1.3	0.0	3.7	2.5	1.9
Use e-mail for communication with teachers	I can do this very well by myself	N	69	59	63	66	257
		%	86.3	73.8	77.8	83.5	80.3
	I can do this with help from someone	N	2	11	5	8	26
		%	2.5	13.8	6.2	10.1	8.1
	I know what this means but I cannot do it	N	8	10	9	1	28
		%	10.0	12.5	11.1	1.3	8.8
	I don't know what this means	N	1	0	4	4	9

		%	1.3	0.0	5.9	5.1	2.8
Use e-mail for submission of assignments	I can do this very well by myself	N	58	55	46	58	217
		%	72.5	68.8	56.8	73.4	67.8
	I can do this with help from someone	N	10	8	11	14	43
		%	12.5	10.0	13.6	17.7	13.4
	I know what this means but I cannot do it	N	9	14	20	5	48
		%	11.3	17.5	25.7	6.3	15.0
	I don't know what this means	N	3	3	4	2	12
		%	3.8	3.8	5.9	2.5	3.8

Based on Table 5.21, students are good at using the ICT facilities related to browsing where 81.9% respondents agreed on with the option of 'I can do this very well by myself'. The rating of 'do you know how to: use e-mail for communication with friends and family', 85.9% confirm that they use it, use e-mail for communication with teachers 80.3%, and use e-mail for submission of assignments 67.8%. When we review the feedback in line with each university, AU students were more efficient in utilising ICT for browsing the internet for academic requirements (e.g. downloading reference) with a rating of 'I can do this very well by myself' 97.5% which was followed by TU 95.0%, DU 69.1% and finally GU 66.3%. It was GU 30.0% who are using it with the help of someone and 19.7% of DU students are with the status of "I know what this means but I cannot do it' and 'I don't know what this means'.

The use of email for communication is now a familiar and common phenomenon across the world. Based on Table 5.21, on the use of e-mail for communication with friends and family, 96.3% of TU students responded 'I can do this very well by myself'. This was followed by DU students 86.4%, AU 82.3% and lastly GU 78.8%.

Utilization of ICT facilities also depend on the age level as well where the younger generation is found to be more at ease of these ICT facilities. Many comparative studies have shown that ICT facilities are more beneficial for younger students than for older ones. While research shows ICT facilities to be beneficial to students in general, the degree of impact decreases from the elementary to secondary to post-secondary levels (Hussain, 2010). In addition to this, he has compiled that the comparisons of low and high-achieving students showed that ICT-supported teaching learning is more effective with lower-achieving students than with higher-achieving ones though both

these categories of students benefit from it. However, the comparatively greater benefits experienced by lower-achieving students, like those experienced by younger students, are largely due to the need these groups have for elements common to the majority of ICT programme - extensive drills and practices, privacy and immediate feedback and reinforcement.

The importance and utilization of ICT-supported teaching-learning activity has shown slight difference among subjects. Researches have shown the effectiveness of ICT-assisted instruction in different curricular areas and it was most effective in the areas of science and foreign languages, followed by activities in Mathematics, reading, language, arts and English (Hussain, 2010).

Though there are many advantages and uses of ICT in the teaching-learning process, still there are researchers who are forwarding their objection to the use of ICT in this process. According to Hussain (2010), some of the researchers have a logical justification for their objection which may include; how could a machine do what my teacher did for me in the class?, computer programmes always have bugs, will breakdown and again, will be left without anything, computers can teach only certain facts, not the important higher-order thinking, a machine cannot make judgments that a human being can make and cannot teach values, a machine cannot develop natural, instant and frequent interaction among students, a machine cannot give necessary emotional support and meaningful personal attention to students, student can waste their time if no teacher checks on them or available to them for assistance, some students will be unable to use computers either through fright or incompetence and could not receive any education and computer-based instruction is not cost-effective. Likewise, Pea and Maldonado (2006)) have enumerated the shortcomings of ICT-supported teaching-learning process which included computer networks are costly to develop and the technology is changing so quickly that it needs an effort to keep pace with the "latest" technological advancements.

5.5.3 Impacts of ICT on teaching-learning process

ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form which may include personal computers, digital television, email, robots. So ICT is concerned with the storage, retrieval,

manipulation transmission or receipt of digital data Pea and Maldonado (2006). According to them, it allows teachers and students to communicate and share information digitally via internet i.e. LAN (Local Area Network) or WAN (Wide Area Network). Thus ICT has become the backbone of today's fast-growing education system. It is used for collection, storage, retrieval, transmission, manipulation and dissemination of information as accurately and efficiently as possible for the purpose of enriching the knowledge, developing communication, decision making and problem solving ability.

Thus, ICT is considered as one of the variables that can affect the teaching-learning process especially in the 21st century where it is supposed to be ICT-supported. In line with these researches based assumptions, the researcher posed issues for students, teachers', ICT experts and administrators about in which areas ICT is bringing effect in the teaching-learning process. For these, their feedback has been summarized in the following Table 5.22.

Based on Table 5.22 on the importance of ICT, 38.8% of the respondents responded 'a lot' in terms of its use in favouring concentration more on what they are learning and 33.8% as 'somewhat' and 18.9% as 'a little'. However, 9.1% of the respondents have replied 'Not at All' on the role of ICT to do with concentration on their learning. When we view it in line with each university student in AU 49.4%, DU 43.2%, and GU 38.8% and finally TU 23.8% have mark as 'a lot' in terms of creating concentration on learning.

In terms of increasing the understanding level of students, 45.7% have replied 'a lot' that ICT helps to understand more easily what they are learning and 25.9% 'somewhat' and 24% 'a little'. When we view it again across universities, 'a lot' has been the choice of 50% of GU students, 46.3% for TU students, 45.3% for AU and 38.3% DU. Still people have selected 'not at all' at 7.5% in GU. At the same time 'a little' was chosen by 37.5% of GU, 28.4% in DU, 20.3% in AU and 13.8% in TU.

The role of ICT in enhancing the possibility of remembering more easily what students have learnt was assessed in this study. Cognizant of this, 38.1% of the students have chosen 'a lot', 31.3% 'somewhat', 22.5% 'a little' and 8.1% 'not at all'. When it is reviewed in line with universities, it was students form AU who scored as 'a lot'

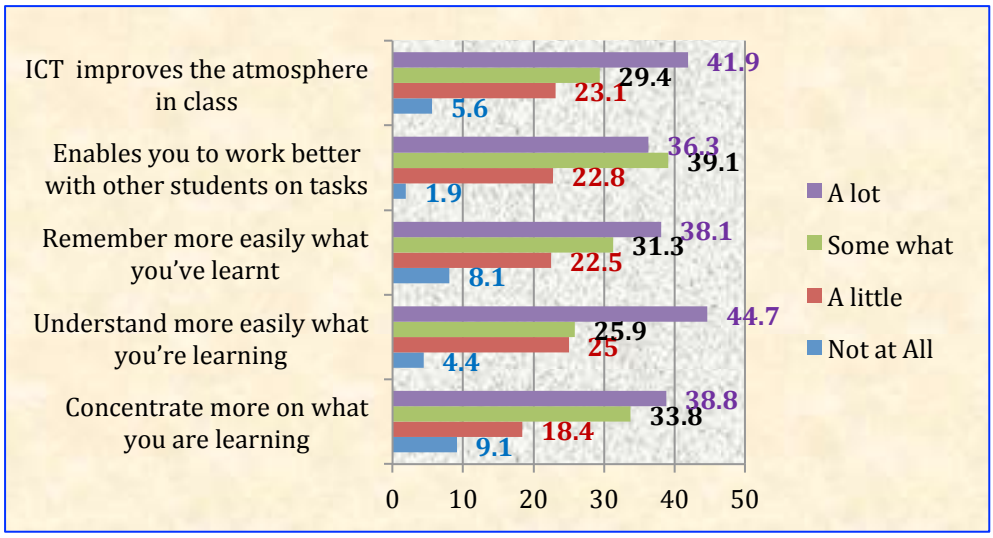
45.6%, TU 40%, GU 33.8% and finally DU 33.3%. Among the benefits of ICT in remembering, 'not at all' was 10% in GU, 9.9% in DU and 6.3% both in TU and AU.

Table 5.22: Impact of ICT in learning

Do you believe that using ICT in classes have positive impact on		University									
		TU		GU		DU		AU		Total	
	Responses	N	%	N	%	N	%	N	%	N	%
You concentrate more on what you are learning	Not at all	8	10.0	8	10.0	5	6.2	8	10.1	29	9.1
	A little	5	6.3	18	22.5	25	30.9	11	13.9	59	18.4
	Some what	48	60.0	23	28.8	16	19.8	25.0	31.7	108	33.8
	A lot	19	23.8	31	38.8	35	43.2	39	49.4	124	38.8
You understand more easily what you're learning	Not at all	3	3.8	6	7.5	3	3.7	2	2.5	14	5.4
	A little	11	13.8	30	37.5	23	28.4	16	20.3	80	25.0
	Some what	29	36.3	4	5.0	24	29.6	26	32.9	83	25.9
	A lot	37	46.3	40	50.0	31	38.3	35	45.3	143	45.7
You remember more easily what you've learnt	Not at all	5	6.3	8	10.0	8	9.9	5	6.3	26	8.1
	A little	7	8.8	21	26.3	29	35.8	15	19.0	72	22.5
	Some what	36	45.0	24	30.0	17	21.0	23	29.1	100	31.3
	A lot	32	40.0	27	33.8	27	33.3	36	45.6	122	38.1
ICT enables you to work better with other students on tasks	Not at all	0	0.0	3	3.8	1	1.2	2	2.5	6	1.9
	A little	17	21.3	24	30.0	14	17.3	18	22.8	73	22.8
	Some what	41	51.3	22	27.5	36	45.4	26	32.9	125	39.1
	A lot	22	27.5	31	38.8	30	37.0	33	41.8	116	36.3
ICT improves the atmosphere in class	Not at all	3	3.8	6	7.5	4	5.9	5	6.3	18	5.6
	A little	30	37.5	21	26.3	14	17.3	9	11.4	74	23.1
	Some what	23	28.8	24	30.0	27	33.3	20	25.3	94	29.4
	A lot	24	30.0	29	36.3	36	45.4	45	57.0	134	41.9

ICT is expected to be helpful in enabling students to work better with other students on tasks. In line with this, the researcher has assessed the view of students. Thus, Figure 5.13, shows that 39.1% and 36.3% have chosen 'somewhat' and 'a lot' respectively where as 22.8% have chosen 'a little'. Among these respondents across universities, students in AU gave the highest value 41.8% followed by GU 38.8%, DU 37.0% and finally TU 27.5%. 'A little' and 'not at all' were given by students in GU 33.8%, AU 25.5%, TU 21.3% and finally 18.5% was by DU. Overall, it was only TU which totally ignores the choice of "not at all' ensuring that it as a benefit staring from at least a little 21.3%.

Figure 5.13: Impact of ICT in learning process



Based on this nature, it can be positive, healthy or unhealthy. When the classroom community feels comfortable, they can interact with each other freely. Henceforth as shown in Figure 5.13, 41.9% of the students are in favour of 'a lot' in terms of the role of ICT in improving the atmosphere of the classroom and 29.4% are in favour of 'somewhat' and 23.1% are 'a little' whereas 5.6% are 'not at all'. Along these respondents, AU students are relatively with high value 57% of 'a lot' preceded by DU 45.4%, GU 36.3% and TU 30.0%. The response of 'a little' was highly rated by TU 37.5% followed by GU 26.3%, DU 17.3% and AU 11.4%.

5.5.4 Students' preference of ICT facility in their classes

A similar study of the impact of "ICT in higher education: A survey" in colleges of Ramanathapuram District, Tamil Nadu, India by Kamal and Banu (2010), affirmed that ICT is used by all departments and students are required to submit assignments online, use LCD / PPT for presentations at seminars and conferences, browse websites for downloading materials for presentation and for class room discussion.

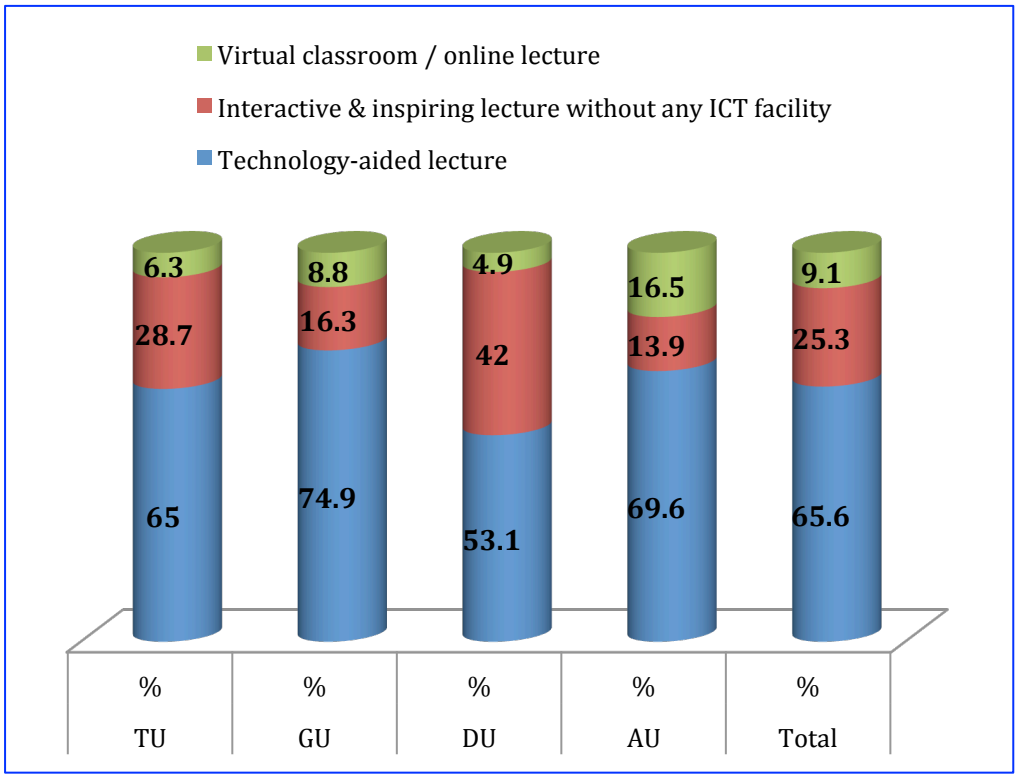
Furthermore, the researcher was worried on the role of ICT in improving the climate of the class though it is more of a psychological concept. It is like the personality of an individual, climate is for the organization that refers to the social, academic and emotional contexts of a class, the "personality" of the learning context (Blum, 2007).

Table 5.23: Students' preference of ICT facility in their classes

Which mode of lecture you prefer most in your class?	Universities								Total	
	TU		GU		DU		AU			
	N	%	N	%	N	%	N	%	N	%
Technology-aided lecture	52	65.0	60	75.9	43	53.1	55	69.6	210	65.6
Interactive & inspiring lecture without any ICT facility	23	28.7	13	16.3	34	42.0	11	13.9	81	25.3
Virtual classroom / online lecture	5	6.3	7	8.8	4	5.9	13	16.5	29	9.1

Based on the understanding and skill they have, students were asked about which mode of lecture they preferred the most in their classes. As shown in Table 5.23 and Figure 5.14, students have expressed their high preference on 'technology-aided lectures' as 65.6% of them are in favour of it and the highest preference was again observed in GU as 75.9% of the respondents are in favour of it and followed by AU 69.6%, TU 65% and finally DU 53.1%. The second preference, 'interactive and inspiring lecture without any ICT' was relatively higher in DU 42% which was followed by TU 28.7%, GU 16.3% and AU 13.9%. Virtual classroom / online learning was relatively highest preference in AU 16.5% compared to the remaining universities.

Figure 5.14: Students' preference of ICT facility in their classes



Students have expressed their interests and preference on different approaches of technology supported lectures. The researcher was curious to know why they prefer it and what real positive impacts it can bring on the class and the teaching-learning process in general for students and teachers. In order to get answers for these concerns, questions were raised as 'Do you believe that using ICT (Internet, computers, interactive boards etc.) during classes have positive impact on the teaching learning?
As indicated in Table 5.24, AU and GU have the highest value of ICT in improving the relationship of students and teachers to the level of 'great extent' which was 30.4% and 30.0% respectively and at the level of 'some extent', TU has the highest value of 78.8% followed by DU (63.0%), AU (58.2%) and finally GU (52.5%).

Table 5.24: Impact of ICT on student-teacher relationship

Do you think that your relationship with your teacher has improved due to ICT enabled teaching learning			Name of University				Total
			TU	GU	DU	AU	
Has improved due to ICT enabled teaching learning?	To a great extent	N	13	24	20	24	81
		%	16.3	30.0	25.7	30.4	25.3
	To some extent	N	63	42	51	46	202
		%	78.8	52.5	63.0	58.2	63.1
	Not at all	N	4	14	10	9	37
		%	5	17.5	12.3	11.4	11.6

Overall, ICT enabled teaching learning has improved the relationship of students and teachers at a level of 'great' extent' to 63.1% of 'some extent'. On the contrary, 11.6% of them have replied that ICT-enabled teaching learning activity has 'not at all' improved the student's teacher relationship where the highest rate was observed in GU 17.5% and DU 12.3%.

Students were also asked about whether excessive use of technology is creating a gap among the people and driving them towards virtual reality. Accordingly, 18.4% of them agreed on 'to a great extent', 63.2% 'to some extent' and 18.4% not at all. This is demonstrated in Table 5.25.

Based on Table 5.25, the negative effect of excessive technology usage was 'great extent' 23.8% in GU and 23.5% in DU. Similarly, its effect was reflected at a level of 'to some extent' in AU 72.2% and GU 66.3% which were above the mean percentile

63.2%. Overall, the state universities GU and DU are victims of it more having the highest value which is leading them to the status of technological dependency.

Table 5.25: Effect of excessive technology usage

Do you think that excessive use of technology			University				Total
			TU	GU	DU	AU	
Creates a gap among the people and driving them towards a virtual reality?	To a great extent	N	5	19	19	16	59
		%	6.3	23.8	23.5	20.3	18.4
	To some extent	N	45	53	47	57	202
		%	56.3	66.3	58.0	72.2	63.2
	Not at all	N	30	8	15	6	59
		%	37.5	10	18.5	7.6	18.4

In addition to the teaching-learning process, technology is used in communication with students and their parents. Thus, the use of technology in this regard has been assessed in the target universities and summarized in Table 5.26.

Table 5.26: Use of Technology by teachers in communication and learning

Use of Technology in Communication by teachers	Response	Universities									
		TU		DU		AU		GU		Total	
		N	%	N	%	N	%	N	%	N	%
Use of technology for communication with student	Not important	1	2.9	0	0.0	0	0.0	0	0.0	1	0.7
	Important to some extent	7	20.0	10	28.6	3	8.6	11	31.4	31	22.1
	Quite important	13	37.1	15	42.9	19	55.3	10	28.6	57	40.7
	Very important	14	40.0	10	28.6	13	37.1	14	40.0	51	36.4
Use of technology for communication with parents	Not important at all	5	6.3	1	2.9	5	15.3	3	8.6	14	10.0
	Important to some extent	17	21.3	12	35.3	13	37.1	18	51.4	60	42.9
	Quite important	8	10.0	16	45.7	9	25.7	8	22.9	41	29.3
	Very important / a lot	5	6.3	6	17.1	8	22.9	6	17.1	25	17.9

As depicted in Table 5.26, 40.7% and 36.4% of the teachers found it ‘quite important’

and ‘very important’ about the use of technology for their commutation with their students respectively. This figure was higher in AU where teachers rated it as ‘quite important’ 55.3% and ‘very important’ 37.1%. The next highest rating as to the technological impact of ICT for combination with students was in DU where it was rated as ‘quite important’ 42.9% and ‘very important’ 28.6%. The use of technology for communication was also rated by TU teachers as 37.1% ‘quite important’ and 40.0% ‘very important’ which was the same as GU. The technology was also useful for teachers in communication with parents where the highest ‘quite important, was in DU 45.7% and ‘very important’ was in AU 22.9%.

Technology is both a capacity and means of capacity building. In line with this, teachers were asked about the use of technology in terms of development of students and teachers’ own capacity as indicated in Table 5.27.

Table 5.27: Use of technology for teachers and students development

Use of Technology	Response	Universities									
		TU		DU		AU		GU		Total	
		N	%	N	%	N	%	N	%	N	%
Use of technology for own development	Important to some extent	2	5.7	2	5.7	0	0.0	1	2.9	5	3.6
	Quite important	8	22.9	6	17.1	6	17.1	7	20.0	27	19.3
	Very important	25	71.4	27	77.1	29	82.9	27	77.1	108	77.1

Henceforth, 77.1% of the teachers found it very important and 19.3% of them as quite important in the self-development of teachers and students. It was highly ranked by AU teachers where they rated 82.9% as ‘very important’ which was followed by GU and DU 77.1%.

As technology is also a tool for management, teachers were asked to rate it in terms of its role in organizing work, keeping record, preparing lesson and finding learning digital resources. For this, their feedback had been summarized in Table 5.28.

As clearly stipulated in Table 5.28, technology is taken as a management tool by 50.5% of the respondents with a level of ‘very important’ and 41.6% with ‘quite

important' making their aggregate agreement of 92.1%. These figures imply that technology is now becoming a key tool in managing digital learning and resources, preparing lesson plans and organizing daily works. In terms of being a management tool, TU teachers were highly fond of it where 62.1% of them rated as very important which was followed by GU 55.7%. Among the key tasks of management which are run by technology, 'organizing their work and keep record' was rated as the task that highly needed technology where 56.4% of the teachers ranked it as 'very important'. The second highest was 'finding digital learning resources' which was rated by 51.4% of them and the last was designing own digital resources with a rating of 46.4%.

Table 5.28: Technology as a management tool

Use of Technology in	Response	Universities									
		TU		DU		AU		GU		Total	
		N	%	N	%	N	%	N	%	N	%
Organizing their work and keep record	Important to some extent	2	5.7	5	15.3	2	5.7	3	8.6	12	8.6
	Quite important	9	25.7	18	51.4	13	37.1	9	25.7	49	35.0
	Very important	24	68.6	12	35.3	20	57.1	23	65.7	79	56.4
For preparing lessons	Important to some extent	2	5.7	3	8.6	4	11.4	2	5.7	11	7.9
	Quite important	13	37.1	23	65.7	14	40	12	35.3	62	45.3
	Very important	20	57.1	9	25.7	17	48.6	21	60	67	47.9
For finding digital learning resources	Important to some extent	1	2.9	4	11.4	2	5.7	1	2.9	8	5.7
	Quite important	10	28.6	15	42.9	17	48.6	18	51.4	60	42.9
	Very important	24	68.6	16	45.7	16	45.7	16	45.7	72	51.4
For designing own digital resources	Important to some extent	3	8.6	6	17.1	3	8.6	1	2.9	13	9.3
	Quite important	13	37.1	17	48.6	16	45.7	16	45.7	62	45.3
	Very important	19	55.3	12	35.3	16	45.7	18	51.4	65	46.4
Total	Important to some extent	8	5.7	18	12.9	11	7.9	7	5.0	44	7.9
	Quite important	45	32.1	73	52.1	60	42.9	55	39.3	233	41.6
	Very important	87	62.1	49	35.0	69	49.3	78	55.7	283	50.5

In addition to academe achievements, researchers have affirmed that ICT has an impact on the Retention of Learning; research studies carried out about the comparative studies of learning retention indicate that the retention of content learned using computer assisted instruction is superior to retention following traditional instruction alone.

5.5.5 Students –teachers' future integration of technology

Besides this, ICT can have an impact on the attitude of learners which is the most important predetermined factor for utilization of ICT. Much of the research that examines the effects of ICT on student learning outcomes also investigates effects upon students' attitudes. This general finding has emerged from studies of the effects of ICT on student attitudes towards use of computer in education, course content / subject matter, quality of instruction, school in general and self-as-learner. Hence, it has been confirmed that the use of ICT leads to more positive student attitudes than the use of conventional instruction (Hussain 2010).

Table 5.29: Students –teachers' future integration of technology

Use of Technology	Response	Universities									
		TU		DU		AU		GU		Total	
		N	%	N	%	N	%	N	%	N	%
Facilitate teaching specific concepts or skills	Not important at all	4	11.4	5	15.3	6	17.1	4	11.4	19	9.6
	Important to some extent	5	15.3	3	8.6	6	17.1	2	5.7	16	10.4
	Quite important	10	28.6	21	60.0	18	51.4	19	55.3	68	48.6
	Very important	19	55.3	11	31.4	11	31.4	14	40.0	55	31.4
Support various student learning styles and to personalize learning	Not important at all	1	1.3	0	0.0	0	0.0	0	0.0	1	0.7
	Important to some extent	5	6.3	3	8.6	6	17.1	2	5.7	16	11.4
	Quite important	10	12.5	21	60.0	18	51.4	19	55.3	68	48.6
	Very important	19	23.8	11	31.4	11	31.4	14	40.0	55	39.3
Facilitate teaching students with disabilities	Not important at all	2	2.5	0	0.0	1	2.9	0	0.0	3	5.2
	Important to some extent	4	5.0	4	11.4	7	20.0	6	17.1	21	15.0
	Quite important	11	13.8	17	48.6	12	35.3	10	28.6	50	35.7
	Very important	18	22.5	14	40.0	15	42.9	19	55.3	66	47.1
Support activities that support higher-order thinking	Not important at all	0	0.0	1	2.9	1	2.9	3	8.6	5	3.9
	Important to some extent	6	17.1	6	17.1	6	17.1	3	8.6	21	15.6
	Quite important	13	37.1	13	37.1	14	40.0	13	37.1	53	37.9
	Very important	16	45.7	15	42.9	14	40.0	16	45.7	61	43.6
Support creativity	Not important at all	1	2.9	2	5.7	1	2.9	2	5.7	6	5.3
	Important to some extent	8	22.9	5	15.3	6	17.1	6	17.1	25	17.8
	Quite important	12	35.3	13	37.1	10	28.6	6	17.1	41	29.3
	Very important	14	40.0	15	42.9	18	51.4	21	60.0	68	48.6

Like communication, technology has a great role in integrating students and teachers

focusing on the teaching-learning process. It is a key means for teaching concepts, skills, accommodating and addressing different learning styles of students, more so for children with special needs, encouraging higher order of thinking and creativity. For this, teachers' reflections had been summarized in Table 5.29.

As indicated in Table 5.29, the responses of teachers and students in regard to future integration of technology for the statement 'facilitate teaching specific concepts or skills' 31.4% indicated as 'very important', 48.6% 'quite important', 10.4% 'important to some extent' and 9.6% marked as 'not important at all'. Like this in the second statement 'support various student learning styles and to personalize learning' 39.3% indicated as 'very important', 48.6% 'quite important', 11.4% 'important to some extent' and .7% marked as 'not important at all'.

When it was asked whether ICT helps to 'Facilitate teaching students with disabilities' the response 47.1% indicated as 'very important', 35.7% 'quite important', 14% 'important to some extent' and 5.2% marked as 'not important at all'. In the statement for ICT future integration of technology 'support activities that support higher-order thinking' 43.6% indicated as 'very important', 37.9% 'quite important', 15.6% 'important to some extent' and 3.9% marked as 'not important at all'. The responses for the statement whether ICT will 'support creativity' in future, 48.6% indicated as 'very important', 29.3% 'quite important', 17.8% 'important to some extent' and 5.3% marked as 'not important at all'.

Likewise, according to Pachauri and Kumar (2011), ICT can facilitate self-paced learning, individualize learning while giving immediate reinforcement and feedback and integrate graphic, print, audio and video capabilities and can effectively link various technologies with instructional units, lessons, and learning environments.

I. Computer is interactive. Microcomputer systems incorporating various software packages are extremely flexible and maximize learner control.
II. Computer technology is rapidly advancing. Innovations are constantly emerging, while related costs are dropping every day. By understanding their present needs and future technical requirements, the cost-conscious educator can effectively navigate the volatile computer hardware and software market.

III. Computer increases access. Local, regional, and national networks link resources and individuals, wherever they might be. In fact, many institutions now offer complete undergraduate and graduate programmed relying almost exclusively on computer-based resources.

According Stennett's (1985) review cited in Hussain (2010), "well-designed and implemented drill and practice or tutorial used ICT as a supplement to traditional instruction have shown significant improvement in students' final examination achievements. In the research findings of Kemal (2010), the use of ICT has modernized classroom instruction and student learning processes. He also further explained that multimedia, digital photography, DVD, CD ROM, PowerPoint and laptops are often used by both teachers and learners. However, there are no concrete and strong research support indicating the superiority of ICT-supported teaching learning, nevertheless the evidence indicates that ICT approaches as a whole produce higher achievements than traditional instruction by itself (Hussain, 2010).

It has also been agreed by many researchers (Hussain, 2010) that ICT has a positive impact and influence on other variables and found it to confer benefits on:

- Locus of Control: ICT-assisted students have more of an internal locus of Control / sense of self-efficacy than conventionally-instructed students,
- Attendance: ICT assisted students had better attendance,
- Motivation / time-on-task: ICT-assisted students had higher rates of time-on-task than traditionally instructed controls and
- Cooperation / Collaboration: Cooperative, pro-social behavior was Greater with ICT-assisted work.

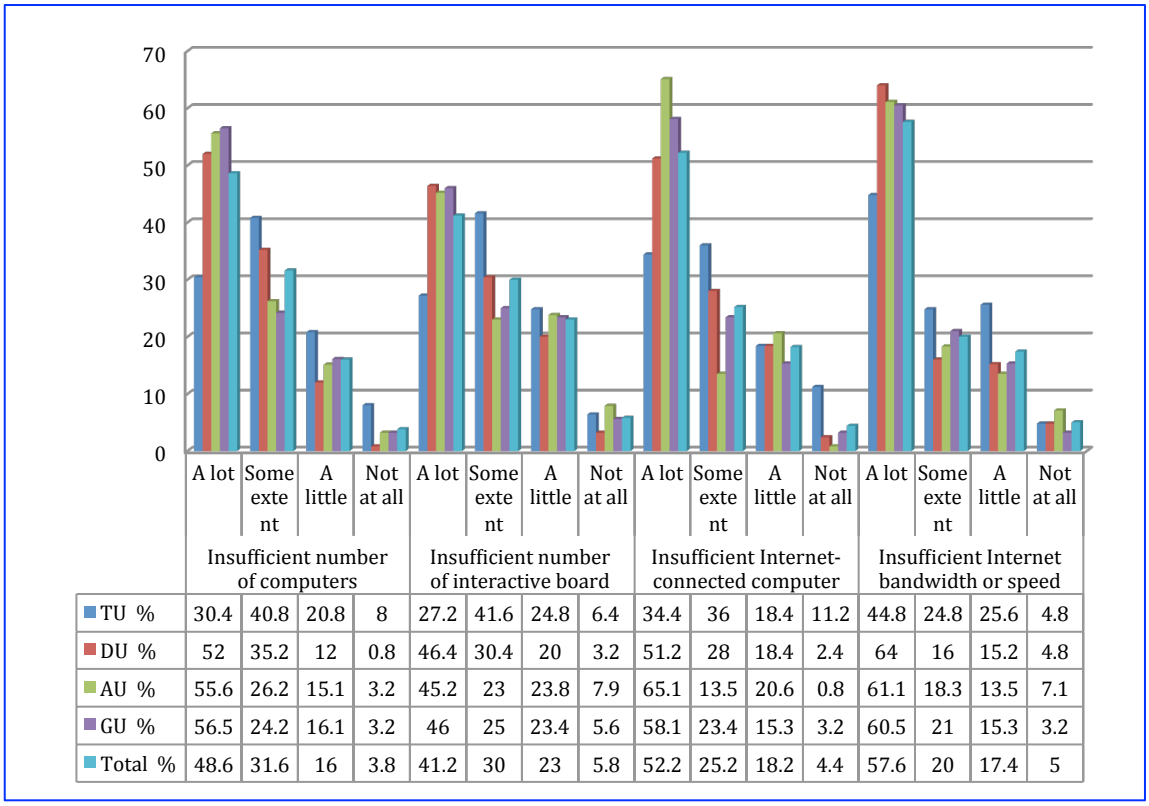
5.6 Analysis of Research Question 3: Issues that hinder proper integration of ICT in the pedagogy.

In this study, the challenges or barriers encountered in the use of ICT were grouped under the category of barriers related to physical facilities, in-house regulations and codes of conduct, training and technical supports, attitudes of ICT users and administrators to it and curriculum-related challenges.

5.6.1 Physical facilities

Non-availability or inadequacy of ICT facilities is a challenge for the teaching-learning process. As depicted in Figure 5.15 and Annexure-1, the impact of insufficient computers is 'a lot' at a rate of 48.6% and 'to some extent' 31.6% and 'a little' is 16%. However, 3.8 % of the respondents have reported no impact on the teaching-learning process. When we review this figure across universities, the highest impact at a level of 'a lot' is in GU 56.5%, AU 51.6% DU 52% and finally TU 30.4%. At a level of 'some extent' impact on the teaching-learning process, TU was 40.8%. Those who reported that insufficient computer has 'a little' and 'not at all' impact on the teaching-learning process were TU 28.8%, GU 19.3%, AU 18.3% and DU 12.8%.

Figure 5.15: Inadequacy of ICT facilities



	Insufficient number of computers				Insufficient number of interactive board				Insufficient Internet-connected computer				Insufficient Internet bandwidth or speed			
	A lot	Some extent	A little	Not at all	A lot	Some extent	A little	Not at all	A lot	Some extent	A little	Not at all	A lot	Some extent	A little	Not at all
TU %	30.4	40.8	20.8	8	27.2	41.6	24.8	6.4	34.4	36	18.4	11.2	44.8	24.8	25.6	4.8
DU %	52	35.2	12	0.8	46.4	30.4	20	3.2	51.2	28	18.4	2.4	64	16	15.2	4.8
AU %	55.6	26.2	15.1	3.2	45.2	23	23.8	7.9	65.1	13.5	20.6	0.8	61.1	18.3	13.5	7.1
GU %	56.5	24.2	16.1	3.2	46	25	23.4	5.6	58.1	23.4	15.3	3.2	60.5	21	15.3	3.2
Total %	48.6	31.6	16	3.8	41.2	30	23	5.8	52.2	25.2	18.2	4.4	57.6	20	17.4	5

5.6.2 In-house regulations and codes of conduct

It is obvious that there are rules and regulations that are binding for the internet users and the university which should be abided by all. However, the rules and regulation, polices or codes of conduct should not hamper the ultimate purpose of availing ICT facilities. For this, the researcher posed a question to students how much these were

affecting the intended purpose of ICT facilities in each university. This has been summarized in Table 5.30**.**

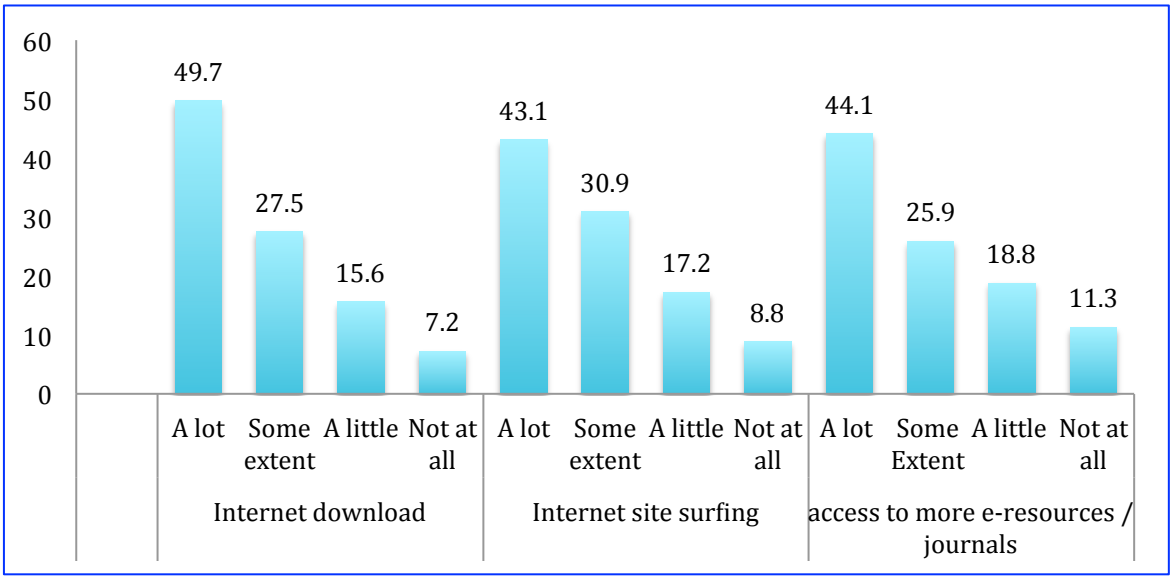
As depicted in Table 5.30 and Figure 5.16, restriction on the downloading, access to more e-resources / journals and internet site surfing is affecting the students to the level of 'a lot' and 'to some extent'. On the practical effects of restriction on downloading, 49.7% have agreed to a degree of 'a lot' and 27.5% with a level of 'some extent'. Its effect was more severe in AU and GU where respondent students agreed 'a lot' with 59.3% and 58.2% of response rate consecutively.

Table 5.30: Students feedback on the effects of regulations on ICT

Inadequacies affect teaching-learning because of			TU	DU	AU	GU	Total
Restriction of internet download	A lot	N	25	40	48	46	159
		%	31.3	50.0	59.3	58.2	49.7
	Some extent	N	27	23	23	15	88
		%	33.8	28.8	28.4	19.0	27.5
	A little	N	14	14	9	13	50
		%	17.5	17.5	11.1	16.5	15.6
	Not at all	N	14	3	1	5	23
		%	17.5	3.8	1.2	6.3	7.2
Restriction of internet site surfing	A lot	N	14	33	45	46	138
		%	17.5	41.3	55.6	58.2	43.1
	Some extent	N	41	25	20	13	99
		%	51.3	31.3	25.7	16.5	30.9
	A little	N	12	15	11	17	55
		%	15.0	18.8	13.6	21.5	17.2
	Not at all	N	13	7	5	3	28
		%	16.3	8.8	6.2	3.8	8.8
Insufficient access to more e-resources / journals	A lot	N	18	27	50	46	141
		%	22.5	33.8	61.7	58.2	45.1
	Some Extent	N	47	14	6	16	83
		%	58.8	17.5	7.4	20.3	25.9
	A little	N	8	34	9	9	60
		%	10.0	42.5	11.1	11.4	18.8
	Not at all	N	7	5	16	8	36
		%	8.8	6.3	19.8	10.1	11.3

This was followed by DU and TU with response rate of 50.0% and 31.3%. The other factors - 'restriction of internet site surfing' was more impactful in a negative way again in GU and AU where respondents rated 'a lot' with 58.2% and 55.6% respectively. This was very less in TU which attracted only 17.5% of the respondents to rate as 'a lot', however, it attracted 51.3% of the respondents to rate it 'some extent'. Access to e–resources or journals was again a restriction that needs to be addressed especially in AU and GU where 61.7% and 58.2% of respondents rated its impact 'a lot' respectively. Overall, the impact of restriction on access to e-resources was rated 45.1% as 'a lot' and 25.9% 'to some extent' by all responding students.

Figure 5.16: Students feedback on impact of in-house regulation



5.6.3. Technical support

This section was planned to assess the extent and impact of technical support in affecting the teaching-learning process. Thus, the reflection of students, teachers and ICT experts and administrators have been summarized in the following Table 5.31 reflecting the level and extent to which technical support is affecting the system.

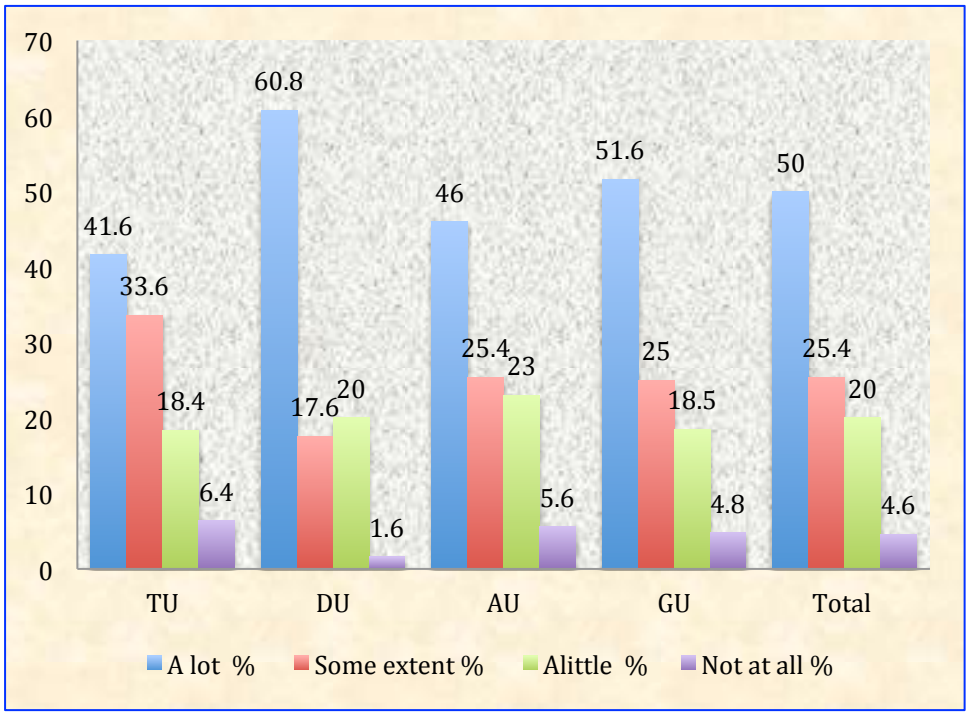
Based on the feedback of respondents as indicated in Table 5.31 and Figure 5.17, insufficient technical support of the ICT support in teaching and learning is affected 'a lot' which was rated by at 52.8% and 52.5% of the students and ICT experts and administrators rrespectively and 42.9% of the teachers also rated it 'a lot'. The

problem was severe in DU and GU where 60.8% of DU and 51.6% DU total residents (students, teachers and ICT expert) rated its impact 'a lot'.

Table 5.31: Level of Impact of technical support in the teaching learning process

Insufficient technical support affects the teaching-learning process		TU		DU		AU		GU		Total	
		N	%	N	%	N	%	N	%	N	%
A lot	Students	37	46.3	38	47.5	46	56.8	48	60.8	169	52.8
	ICT experts and administrators	5	50	8	80	4	40	4	40	21	52.5
	Teachers	10	28.6	30	85.7	8	22.9	12	35.3	60	42.9
	Total	52	41.6	76	60.8	58	46.0	64	51.6	250	50
Some Extent	Students	25	31.3	18	22.5	15	18.5	17	21.5	75	23.4
	ICT experts and administrators	3	30	1	10	3	30	3	30	10	25
	Teachers	14	40.0	3	8.6	14	40.0	11	31.4	42	30.0
	Total	42	33.6	22	17.6	32	25.4	31	25	127	25.4
A little	Students	16	20.0	22	27.5	16	19.8	12	15.2	66	20.6
	ICT experts and administrators	2	20	1	10	3	30	3	30	9	22.5
	Teachers	5	15.3	2	5.7	10	28.6	8	22.9	25	17.9
	Total	23	18.4	25	20	29	23.0	23	18.5	100	20
Not at All	Students	2	2.5	2	2.5	4	5.9	2	2.5	10	3.1
	ICT experts and administrators	0	0	0	0	0	0	0	0	0	0
	Teachers	6	17.1	0	0.0	3	8.6	4	11.4	13	9.3
	Total	8	6.4	2	2.5	7	5.6	6	5.8	23	5.6

Figure 5.17: Feedback of teachers, students and ICT experts and administrators on technical support



5.6.4 Perceptions towards ICT

The perception we have about ICT, its advantages and disadvantages will affect our commitment to use it. Maslowski (2001) cited in Fu (2013) has related this to the university culture encompassing the vision, plans, norms and values that are shared by school members. Similarly, it was reported that school culture has a mediating role that influences teachers' actions, beliefs, and attitudes (Chai, Hong and Teo 2009) cited in Fu (2013). Therefore, besides physical facilities, regulation and codes of conduct, technical support, university culture also affects the implementation of ICT in successful technology integration of higher education (Tezci 2011b in Fu, 2013).

For this reason, the researcher has tried to assess the attitudinal factors affecting the implementation of ICT in the teaching-learning process.

Table 5.32: Attitudes of teachers and students towards ICT

Inadequacies affect teaching-learning because of			TU			DU			AU			GU			Total		
			S	T	Total	S	T	Total	S	T	Total	S	T	Total	S	T	Total
Most of the teachers are not in favor of the use of ICT in class	A lot	N	12	2	14	20	2	22	13	1	14	16	6	22	61	11	72
		%	15	5.7	12.2	25	5.7	19.1	16	2.9	12.1	20.3	17.1	19.3	19.1	7.9	15.7
	Some extent	N	19	13	32	17	10	27	12	12	24	14	14	28	62	49	111
		%	23.7	37.1	27.8	21.2	28.6	23.5	15.8	35.3	20.7	17.7	40	25.6	19.4	35	25.1
	A little	N	24	10	34	32	10	42	43	10	53	44	9	53	143	39	182
		%	30	28.6	29.6	40	28.6	36.5	53.1	28.6	45.7	55.7	25.7	46.5	45.7	27.9	39.6
	Not at all	N	25	10	35	11	13	24	13	12	25	5	6	11	54	41	95
		%	31.2	28.6	30.4	13.7	37.1	20.9	16	35.3	21.6	6.3	17.1	9.6	16.9	29.3	20.7
ICT in teaching and learning not being a goal in our institution	A lot	N	17	6	23	27	2	29	5	0	5	18	3	21	67	11	78
		%	21.2	17.1	20	33.7	5.7	25.2	6.2	0	5.3	22.8	8.6	18.4	20.9	7.9	17
	Some extent	N	24	10	34	19	3	22	22	15	37	24	13	37	89	41	130
		%	30	28.6	29.6	23.7	8.6	19.1	27.2	42.9	31.9	30.4	37.1	32.5	27.8	29.3	28.3
	A little	N	19	7	26	15	2	17	12	8	20	6	4	10	52	21	73
		%	23.7	20	22.6	18.7	5.7	15.8	15.8	22.9	17.2	7.6	11.4	8.8	16.3	15	15.9
	Not at all	N	20	12	32	19	28	47	42	12	54	31	15	46	112	67	179
		%	25	35.3	27.8	23.7	80	40.9	51.9	35.3	46.6	39.2	42.9	40.4	35	47.9	38.9

As depicted in Table 5.32, for the question 'most of the teachers are not in favour of ICT in class', 20.7% 'not at all' and 39.6% 'a little' of the teachers and students

marked on their disagreement. This is an indicator that teachers and students are in favour of ICT in the teaching-learning process. Among the universities, TU is the first to oppose the statement where 30.4% of the respondents marked it 'not at all' and 29.6% marked it as 'a little'. This was followed by AU respondents where 21.6% of respondents marked 'not at all' and 45.7% rated as 'a little'. Again with in respondents, students of TU 31.2% and teachers of DU 37.1% were the first to stand against the statement.

The statement 'ICT in teaching and learning not being a goal in our institution' was opposed by 38.9% of the teachers and students with the option of 'not at all' and 'a little' 15.9%. However, there are still respondents who agree on it and marked as 'a lot' 15.9% and 'some extent' 28.3%. The highest opposition to the statement was in AU where 46.6% of the teachers rated it as 'not at all' and the highest support was observed in DU 25.2%. Among respondents, students of DU 33.7% and teachers of TU 17.1% were in favour of the statement with the choice of 'a lot' whereas students of AU 51.9% and teachers of DU 80% were against the statement with the option of 'not at all'.

5.6.5 Challenges of ICT implementation in curriculum

Table 5.33 indicates the views of teacher respondents on the basic impact of ICT on parts of the curriculum implementation that includes which content / material to be used for teaching, difficulties to integrate ICT in curriculum, lack of pedagogical model about how to use, pressure for examination and tests and unclear benefit to use ICT for teaching. Among these factors which are presumed to address curriculum related issues, teachers agreed to the level of 'some extent' with 43.4% and 'a lot' 18.7% and 18.1% have replied as 'there is no impact of ICT facilities on the teaching-learning process' related to curriculum issues. Among the variables, 'insufficient content / material for teaching' was rated 48.6% as having 'lot of impact' and 30% 'somewhat in the teaching-learning process'. The next factor – 'inadequacies affect teaching-learning because of difficulties to integrate ICT in curriculum' was rated with 'some extent' with a degree of 55.3% followed by lack of pedagogical model how to use with a degree of 48.6%, unclear benefit to use ICT for teaching was the least factor

in affecting the teaching-learning process having an impact of ‘a lot’ 8.6% and ‘some extent’ 40.7%.

Table 5.33: Impact of ICT on curriculum-related implementation

Inadequacies affect teaching-learning because of	Responses	TU		DU		AU		GU		Total	
		N	%	N	%	N	%	N	%	N	%
Insufficient content / material for teaching	A lot	17	48.6	25	71.4	12	35.3	14	40.0	68	48.6
	Some extent	12	35.3	7	20.0	12	35.3	11	31.4	42	30.0
	A little	3	8.6	1	2.9	8	22.9	5	15.3	17	12.1
	Not at all	3	8.6	2	5.7	3	8.6	5	15.3	13	9.3
Difficulties to integrate ICT in curriculum	A lot	7	20.0	4	11.4	4	11.4	3	8.6	18	12.9
	Some extent	16	45.7	23	65.7	18	51.4	19	55.3	76	55.3
	A little	6	17.1	6	17.1	6	17.1	10	28.6	28	20.0
	Not at all	6	17.1	2	5.7	7	20.0	3	8.6	18	12.9
Lack of pedagogical model on how to use ICT	A lot	8	22.9	3	8.6	1	2.9	5	15.3	17	12.1
	Some extent	18	51.4	19	55.3	16	45.7	15	42.9	68	48.6
	A little	7	20.0	10	28.6	9	25.7	8	22.9	34	25.3
	Not at all	2	5.7	3	8.6	9	25.7	7	20.0	21	15.0
Pressure for examination and tests	A lot	8	22.9	1	2.9	3	8.6	4	11.4	16	11.4
	Some extent	17	48.6	13	37.1	15	42.9	16	45.7	61	43.6
	A little	7	20.0	12	35.3	11	31.4	11	31.4	41	29.3
	Not at all	3	8.6	9	25.7	6	17.1	4	11.4	22	15.7
Unclear benefit to use ICT for teaching	A lot	4	11.4	2	5.7	1	2.9	5	15.3	12	8.6
	Some extent	14	40.0	6	17.1	18	51.4	19	55.3	57	40.7
	A little	6	17.1	4	11.4	4	11.4	4	11.4	18	12.9
	Not at all	11	31.4	23	65.7	12	35.3	7	20.0	53	37.9
Total	A lot	44	25.1	35	20.0	21	12.0	31	17.7	131	18.7
	Some extent	77	45.0	68	38.9	79	45.1	80	45.7	304	43.4
	A little	29	16.6	33	18.9	38	21.7	38	21.7	138	19.7
	Not at all	25	15.3	39	22.3	37	21.1	26	15.9	127	18.1

When we review the feedback across universities, insufficient content / material for teaching is a more serious factors for DU with a degree of 71.4% ranked its impact as ‘a lot’ but unclear benefit to use ICT for teaching was the last factors in impacting on the teaching learning in DU 65.7%, ‘not at all’ which was followed by TU 48.6%. Lack of pedagogical model on how to use ICT was a point where TU respondents worried at a level of ‘some extent’ and ‘a lot’ with response rate of 51.4% and 22.9% respectively. There are ample evidence that students learn best when they are engaged

in activities that are authentic, motivating and pertinent to their needs and desires (Hussain, 2010). According to him, the interaction of human beings with computers from a pedagogical point of view can address these characteristics as well as to present the subject matter at hand. Thus, the traditional methodology of the expository process of instruction-presenting information, guiding the student, practicing the student and assessing student learning is typically found in ICT-supported instruction. This mode of instruction can address the areas of cognitive theories related to perception and attention, memory, comprehension, active learning, motivation, locus of control, transfer of learning and individual differences.

Overall, ICT should be integrated with the curriculum. As stated in Hussain (2010), the integration of ICT in subject curriculum is promoted with the key objective of helping students to prepare for their subsequent careers by familiarizing them with information technology. On the view of Julie as cited in Levin (2003), technology allows us to do things in an easier way and it is important for teachers to see technology in that way and develop a curriculum that will give students experiences that are appropriate for their levels, subject and when they graduate we want them to be able to use these tools.

Table 5.34: ICT expert and administrator opinion of inadequacy affect in teaching-learning process

Inadequacy affect the teaching-learning process because of		Universities								Total	
		TU		DU		AU		GU			
		N	%	N	%	N	%	N	%	N	%
Lack of adequate content / material for teaching	A lot	10	100	10	100	9	90	9	90	38	95
	Not at all	0	0	0	0	1	10	1	10	2	5
Too difficult to integrate ICT use into the curriculum	A lot	3	30	8	80	4	40	4	40	19	47.5
	Some what	7	70	2	20	6	60	6	60	21	52.5
Lack of pedagogical models on how to use ICT for learning	A lot	3	30	8	80	4	40	4	40	19	47.5
	Some what	5	50	2	20	6	60	6	60	19	47.5
	A little	2	20	0	0	0	0	0	0	2	5
Pressure to prepare students for exams and tests	A lot	6	60	9	90	7	70	7	70	29	72.5
	A little	4	40	1	10	3	30	3	30	11	27.5

ICT experts and administrators had also reflected their observation as shown in Table

5.34, on the impact of ICT facilities on the implementation of the teaching-learning process (TLP), like inadequacy of contents, lack of integration of ICT in the TLP, scarcity of pedagogical models on how to use ICT for the TLP and preparing students for examinations was reported. Based on Table 5.34, lack of ICT-supported content / materials for TLP was the highest gap observed where 95% of the respondents agreed on its inadequacy with a rate of 'a lot' which was followed by pressure to prepare students from examination and texts which was rated by 72.5% of the respondents as 'a lot'. The remaining one - difficulty to integrate ICT to the curriculum and lack of pedagogical models on how to use ICT for learning were rated by 47.5% of the respondents as 'a lot'.

In general, the study has reported the significance of the challenges of physical facilities, in-house regulations and codes of conduct, training and technical support, attitudes of ICT users and administrators to it and curriculum related challenge. A similar study done by Fu (2013; p 115) has come up with a list of barrivers to effective technology integration from teacher perspectives which are cognizant to this study as:

- lack of clear goals for ICT use in schools
- A lack of teacher collaboration and pedagogical support, as well as a lack of experience among cooperating teachers
- Insufficient time to master new software or integrate ICT during a class period
- Insufficient skills for managing teaching materials
- Low software competence and habitual ways of conceptualizing what and how student should learn
- Limited knowledge and experience of ICT in teaching contexts
- A lack of specific knowledge about technology and how to integrate it with the existing pedagogical content knowledge to support student learning
- A lack of recognition and encouragement of the timely and effective use of ICT
- A lack of in-service training on the use of ICT
- A lack of technical and financial support
- Uncertainty about the possible benefits of using ICT in the classroom
- Lack of specific and definite ideas about how integrating technology into

instruction will improve students' learning

5.7 Suggestions

In order to have a better TLP, ICT needs to be integrated which can enable technology in the course for a better process. For these, several possible suggestions were gathered from respondents based on thematic areas.

5.7.1 Physical facilities

The respondents of this research, students, teachers and ICT experts and administrator have forwarded their opinions or remedial actions that need to be considered in solving the problem of physical facilities. These have been summarized in the following Table 5.35.

Table 5.35: Teacher and ICT experts' suggestion for ICT facility improvement

Suggestion for use of technology for			University									
			TU		DU		AU		GU		Total	
			Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT
Better access of equipment	SAI	N	5	0	12	0	4	0	6	0	27	0
		%	3.6	0	8.6	0	2.9	0	5.2	0	19	0
	HI	N	17	4	15	5	20	5	19	5	71	19
		%	12	10	10.8	12.5	14	12.5	13.6	12.5	50.8	47.5
	VHI	N	13	6	8	5	11	5	10	5	42	21
		%	9	15	5.8	12.5	7.9	12.5	7	12.5	30	52.5
Reliability of equipment	SAI	N	3	0	10	0	3	0	4	0	20	0
		%	2	0	7	10	2	0	2.9	0	14	0
	HI	N	17	4	15	5	18	5	16	5	66	19
		%	12	10	10.8	12.5	12.9	12.5	11	12.5	47	47.5
	VHI	N	15	6	10	5	14	5	15	5	54	21
		%	10.8	15	7	12.5	10	12.5	10.8	12.5	38.6	52.5
HI – High important, VHI – Very High Important, SAI-Some Amount of Importance, ICT – ICT experts and administrator												

In relation to 'better access of equipment' as depicted in Table 5.35, 50.8% of the teachers and 47.5% ICT experts and administrators have proposed 'high importance'. Again 30% of teachers and 52.5% of ICT experts and administrator marked as "very high importance'. Thus they recommended for ICT facilities to be more accessible to

beneficiaries. Likewise, the teachers put their reflection on the reliability of equipment as 47% ‘high importance’ and 38.6% ‘very high importance’. The ICT experts and administrator reflected their opinion by 47.5% ‘high importance’ and 52.5% ‘very high importance’. When we review these across universities, 14% of AU, 13.6% of GU, 12% of TU and 10.8% of DU marked ‘high importance’. They marked as ‘very high importance’ 7.9% of AU, 7% of GU, 9% of TU and 5.8% of DU. The accessibility of ICT facilities which can be considered as a key point for management staff and ICT experts and accordingly, DU, TU and GU marked as 12.5% ‘very important’ while TU marked as 10%. They have also suggested as ‘very high importance’ 15% TU, and remaining three universities marked as 12.5% for the better access of equipment.

Again when this data were reviewed for reliability of equipment, teachers suggestion was 47% ‘highly’ and 38.6% ‘very highly important’. Accordingly, ICT experts and administrator has suggested as 47.5% ‘highly’ and 52.5% ‘very highly important’ for the integration of ICT in the teaching-learning process.

5.7.2. Training

Training is presumed to be important for the practical integration of ICT in the teaching-learning process. For these, the perception of respondents has been summarized in Table 5.36.

Respondents have also recorded their suggestion for the training aspects. Based on Table 5.36, 47.9% of the teachers marked as 'highly important', and 35.7% as ‘very high importance’. The ICT experts and administrator recorded their suggestion for the training on pedagogical area is 55% as 'highly important', 45% as ‘very high importance’. The rankings of ‘very high importance’ were 7.1.% of DU, 7.1% of GU, 10% AU TO 11.4% TU. The difference between Sate and Central Universities was in significant which is Central Universities are higher only in 3%.

The issue of training or course on hands and technological was another point where respondents proposed their suggestions to make it practice-oriented where 55% of the ICT expert and administrator marked it as ‘very high important’ and 40% as ‘high importance’.

Table 5.36: Teacher and ICT experts' suggestion for training

Suggestion for use of technology for			University									
			TU		DU		AU		GU		Total	
			Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT
Training courses in pedagogical	SAI	N	7	0	5	0	5	0	6	0	23	0
		%	5	0	3.6	0	3.6	0	5.3	0	16.4	0
	HI	N	12	6	20	6	16	5	19	5	67	22
		%	8.6	15	15.3	15	11.4	13	13.6	13	47.9	55
	VHI	N	16	4	10	4	14	5	10	5	50	18
		%	11.4	10	7.1	10	10	13	7.1	13	35.7	45
Technological support	SAI	N	7	0	5	2	5	0	6	0	23	2
		%	5	0	4	5	4	0	5	0	17	5
	HI	N	16	5	10	2	16	5	10	4	52	16
		%	12	13	8	5	12	13	8	10	38	40
	VHI	N	12	5	20	6	14	5	19	6	65	22
		%	9	13	15	15	10	13	14	15	47	55
HI – High important, VHI – Very High Important, SAI-Some Amount of Importance, ICT – ICT experts and administrator												

The teachers also suggest for 38% 'high' and 47% 'very high importance'. It was almost at the same level of result across central universities (TU and AU) at 13% as 'very high importance' and State universities (DU and GU) at 15%. The last suggestion of the respondents with regard to training was on the issues of support.

5.7.3. In-house regulations / policies

Policies of regulations are guidelines or codes of conduct in the use of ICT utilization. Hence, the view of respondents towards the current polices or regulation and their importance has been assessed and summarized in Table 5.37.

Policies on using ICT across services were taken as a serious point for ICT experts and administrator. As indicated in Table 5.37, 58% and 28% of them marked 'very high important' and 'some amount of importance'. Every university ICT expert and administrator was highly marked on its importance as DU 18% compared to the others which is followed by GU 13%, AU 13% and lastly TU 5%. The recommendation of teachers for polices were marked as 37% and 45% 'very high important' and 'high

important' respectively. University wise GU and DU marked at 10% and AU 9% and TU 9% respectively as 'very high important'.

Table 5.37: Suggestion on policies

Suggestion for use of technology for			University									
			TU		DU		AU		GU		Total	
			Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT
Policies on using ICT across curriculum	SAI	N	8	3	4	2	9	3	6	3	27	11
		%	6	8	3	5	7	8	5	8	20	28
	HI	N	15	1	17	1	14	2	16	2	62	6
		%	11	3	13	3	10	5	12	5	45	5
	VHI	N	12	6	14	7	12	5	13	5	51	23
		%	9	5	10	18	9	13	10	13	37	58
HI – High important, VHI – Very High Important, SAI-Some Amount of Importance, ICT – ICT experts and administrator												

Suggestions were also forwarded related to incentives or salary and time to prepare academic work. As per the findings of the study, teachers responses for the statement of time to prepare, explore and develop academic work were 57% confirmed 'highly important' and 28% 'very highly important' on the issues. The responses from the ICT experts and administrator were 50% for both the 'highly important' and 'very highly important'. The university wise responses of 'very important' were highest 17% AU, then 15% GU 13% for both TU and DU.

Again the teachers responses for the statement that they need any incentives (salary, promotion) for doing ICT related work were 45% confirmed 'highly important' and 23% 'very highly important' on the issues. The responses from the ICT experts and administrator were 50% for both the 'highly important' and 'very highly important'.

As depicted in Table 5.38, respondents have also suggested the need for time to prepare, explore and develop academic works for integration of ICT-enabled technology in the course for having better teaching-learning process.

Table 5.38: Suggestions on the use of technology

Suggestion for use of technology for			University									
			TU		DU		AU		GU		Total	
			Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT	Teacher	ICT
Time to prepare, explore and develop academic work	NAAI	N	0	0	2	0	1	0	2	0	5	0
		%	0	0	2	0	1	0	2	0	4	0
	SAI	N	3	0	7	0	2	0	4	0	16	0
		%	3	0	5	0	2	0	3	0	11	0
	HI	N	18	6	18	4	23	5	20	5	79	20
		%	13	15	13	10	17	13	15	13	57	50
	VHI	N	14	4	8	6	9	5	9	5	40	20
		%	10	10	6	15	7	13	7	13	28	50
Task related to incentives (salary, promotion)	NAAI	N	5	0	2	0	1	0	0	0	8	0
		%	4	0	2	0	1	0	0	0	5	0
	SAI	N	7	0	10	0	10	0	11	0	38	0
		%	5	0	8	0	8	0	8	0	27	0
	HI	N	17	6	17	4	14	5	15	5	63	20
		%	13	15	13	10	10	13	11	13	45	50
	VHI	N	6	4	6	6	10	5	9	5	31	20
		%	5	10	5	15	8	13	7	13	23	50

HI – High important, VHI – Very High Important, SAI-- ICT – SAI-Some Amount of Importance, NAAI – Not At All Important, ICT -- ICT experts and administrator

This was rated by 83.7% of the respondents as highly important and very highly important when it is revised across universities.

The review of Fu (2013, p 2016) has also proposed a similar research-supported strategies for dealing with challenges encountered in the implementation of ICT which may address individuals, institutions or management like ---

- Provision of professional development activities related to technology to update teachers' skills and knowledge and offer technical support when needed
- Support partnerships that help teachers share effective technology practices and experiences
- Provide workshops that allow teachers to reflect upon effective strategies for

technology integration into instruction

- Offer opportunities to virtually observe teachers who use technology
- Support the curricula with technology-enhanced materials
- Provide effective, timely, and continuous training to improve ICT skills and manage a technology-rich classroom
- Encourage positive attitudes about the significance of integrating ICT into instruction
- Provide adequate technical support.

5.8 Chapter summary

This chapter presented a discussion of the key findings of the research study. It also gives the details of the demographic factors of the respondents, understanding about ICT, training and support, availability of ICT facilities, importance and utilization of ICT and its impact on the TLP.

The factors that affect implementing ICT in HEIs and their suggestions are also discussed in details in this chapter.

Reference:

Chai, C. S., Hong, H. Y., & Teo, T. (2009). Singaporean and Taiwanese pre-service teachers' beliefs and their attitude towards ICT: A comparative study. *The Asia-Pacific Education Researcher*, 18(1), 117–128.

Clark, B. (1998): Creating Entrepreneurial Universities: Organizational Pathways of Transformation, IAU Press.

Clark, B. (1983). The higher education system: academic organization in cross-national perspective Berkeley, USA: University of California Press.

Chandrasekhar C.P. (2014). ICT in a Developing Country Context: An Indian Case Study. *Centre for Economic Studies & Planning*. Jawaharlal Nehru University. New Delhi.

Fu, J. S. (2013). ICT in education: A critical literature review and its implications. *International Journal of Education and Development using Information and Communication Technology*, 9(1), 112-125.

Hussain, M. A. (2010). Technology Based Learning Environment and Student Achievement in English as a Foreign Language in Pakistan. *World Academy of Science, Engineering & Technology*. Issue 37, p129

Kamal, A. R. N. & Banu, A. T. (2010). ICT in Higher Education – A Study, *Canadian Journal on Data, Information and Knowledge Engineering* Vol. 1, No. 1, April 2010

Levin, J. A., Stuve, M. J., & Jacobson, M. J. (1999). Teachers' conceptions of the Internet and the World Wide Web: A representational toolkit as a model of expertise. Journal of Educational Computing Research, 21(1), 1-23.

Maslowski, R. (2001). School Culture and School Performance: An Explorative Study into the Organizational Culture of Secondary Schools and Their Effects, Twente: Twente University Press, Enschede.

Murugan BO, et.al., (2012). A study on library usage and ICT skills among the internees of a rural medical college in Tamilnadu. *SRELS Journal of Information Management,* 49(3), 305-315.

Pea, R., & Maldonado, H. (2006). WILD for learning: Interacting through new computing devices anytime, anywhere. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (pp. 427-441). Cambridge: Cambridge University Press.

Ramganesh, E. & Johnson, N. (2008). EQ of teacher educators: A survey. *Edutracks*, 7(9): 34-37.

Sinha, M. K. (2011). Information Communication Technology (ICT) Awareness amongst University and College Teachers of North Eastern Region of India: A Survey. *Library Progress (International),* 31 (2) July-Dec, 2011, 217-235. ISSN: 0970-1052.

Youssef, B., A., & Dahmani, M. (2008). Student's performances and ICTs. *University and Knowledge Society Journal* (RUSC), March 2008, 45-56.