CHAPTER 2
REVIEW OF LITERATURE

The purpose of this study is to find out the use and integration of ICT by the faculty members of the Maharaja Sayajirao University of Baroda, Vadodara. Their opinions regarding ICT and problems faced by faculty members while integrating ICT were also studied. This chapter deals with the review of related literature. The research studies have been gathered from a number of sources, such as Smt. Hansa Mehta Library of Maharaja Sayajirao University of Baroda and various e-resources were also referred, such as Research Gate, Academia.edu, Shodhganga, Google Scholar, ProQuest, and Springer. As the study was focused on ICT in higher education, the reviews were searched by using different keywords like use ICT by university teachers, integration of ICT, ICT, and teaching-learning, ICT for teaching and research, and so on. The literature reviewed for the present study was divided into the following sections:

2.1 Studies Conducted in India

2.2 Studies Conducted in Abroad

2.2.1 Studies on use of ICT in education

2.2.2 Studies on integration of ICT in education

2.2.3 Studies on views/attitudes of teachers towards ICT

2.2.4 Studies on problems/challenges in the use of ICT in Education

2.1 Studies Conducted in Indian

Das, Kharbuli, and Rynjah (2017) carried out a study on knowledge of ICT and Computer Proficiency in College and University Teachers of North-Eastern Hill University, Shillong. The study undertaken through a survey seeks to gain insight into the teacher's perception of the integration of ICT in their professional development. The objectives of the study were to understand the general awareness amongst the teachers about ICT in general and their capabilities in using ICT in teaching-learning. It also examined the institutional support provided to teachers in adopting ICT in their professional development. A questionnaire was designed and prepared to collect primary data pertaining to the study. The questionnaires were distributed to 488 Assistant Professors and Assistant Librarians from almost all states of the country, who attended the Orientation Programmes (OPs) and Refresher Courses (RCs). Altogether

five OPs and fifteen RCs (in Library and Information Science, Hindi, Education, Botany, Economics, Geography, Political Science, History, Commerce, Zoology, Philosophy, Tribal Studies, Mathematics, English, and Chemistry) were conducted by the University Grants Commission (UGC)- Academic Staff College (ASC), North-Eastern Hill University (NEHU), Shillong during the academic session 2011-2012. Of the 488 surveys distributed, 475 completed surveys were received, yielding a response rate of 97%. The descriptive statistics performed on the demographic information for the six variables i.e. gender, age, category, designation, qualification, and nature of appointment were obtained in percentage.

The study revealed that respondents who owned a computer were 89.60% for OP, and 85.71% for RC, whose purpose of use was mainly for MS-office, internet, and others a significant difference was observed in users for MS-office between participants who attended the OP and RC. The use of the internet for mailing purposes, downloading documents and research work between OP and RC respondents, also shows a significant difference indicating that participants of OP utilize the internet more for the above three reasons, as compared to the participants of RC. A significant difference was observed between the participants of OPs and RCs, in the manner in which knowledge was acquired in using ICT. It was very much evident from the results that in both groups (OPs and RCs), the majority of the participants acquired knowledge on ICT by self-instruction. For the role played by ICT in making professional work easier between the participants of the OPs and RCs. It was also observed, that there was a significant difference in the number of participants using ICT for preparing reading material. Similarly, there was a significant difference in the number of participants using ICT for making PowerPoint presentations for lectures between participants of the OPs and RCs.

These results certainly indicate that participants of OPs are more aware of ICT and more proficient in using it in their professional development. Rating less ICT awareness in college/university; and lack in their use/implementation of ICT in teaching, strongly points out that the Institutional support in ICT was not satisfactory. Findings indicate strongly that sessions on ICT were conducted more in the OPs than RCs. Both the participants of the OP and RC agreed that Academic Staff College should conduct more awareness courses on ICT. The study concludes that the present

work based purely on the responses received from the respondents, strongly indicate that participants of the Orientation Programmes are more competent and confident ICT users than those of the Refresher Courses. Teachers are a key component in the learning environment and therefore the impact of ICT on teachers and the strategies they employ to facilitate the environment is critical.

The results generated indicate inadequacies in their knowledge and skills regarding ICT, thus prompting us to further research so that we can work out on strategies to improve our training programmes.

Gracebell (2017) carried out a study on the integration of ICT among commerce teachers in Madurai. The major objective of the study was to find out the level of integration of ICT among commerce teachers at the Madurai district. It also finds out the level of the significant difference in the mean score of the integration of ICT among commerce teachers concerning their Gender, residence, and discipline of the study. The investigator adopted a survey method of research with 220 samples selected from fifteen different colleges of education from the Madurai district using a stratified random sampling technique. The ICT integration inventory was prepared by the investigator. The major findings of the study were

- The level of integration of ICT among commerce teachers at the Madurai district was found to be average.
- The male and female commerce teachers differ in the integration of ICT. Female teachers were significantly higher than the male teachers on their ICT integration.
- There was no significant difference in the Integration of ICT among Commerce Teachers in terms of residence and discipline studied. The commerce and science teachers did not differ significantly in their integration of ICT.

While the research on the barriers to effective use of modern technology, in general, is undoubtedly important, more focused research on the barriers relating to the use of specific technologies is increasingly necessary. The reasons behind teachers' attitudes and anxieties also craving further research. There is ample opportunity for researching impediments and barriers and factors conducive specific to individual technologies, such as the internet, file sharing, e-contents, or digital video. Such work could help in increasing the use of these technologies in the classroom.

Ganesan and Krishnakumar (2016) carried out a study on the attitude of teacher educators towards ICT in Colleges of Education in Coimbatore, South India. The objectives of the study were to analyze the attitude of teacher towards ICT in relation to their gender and to study the attitude of teacher educators towards ICT in relation to their locality of the home. The descriptive Survey Method was adopted to investigate the aim of the present study. The sample consisted of 12 male and 18 female teacher educators selected from the esteemed teacher education colleges in Coimbatore, South India. A cluster sampling method was adopted for selecting the sample for the study. The attitude scale on ICT was used to collect the required information. The tool was standardized by the investigator.

It was observed that ten percent of teacher educators have an unfavorable attitude, thirty percent of teacher educators have a moderate attitude and the majority (60%) have a favorable attitude towards ICT. The analysis reveals that most of the teachers have a favorable attitude and show the hypothesis 'Teacher educators do not have a favorable attitude towards ICT'. There was no significant difference between male and female teacher educators in their attitude towards ICT. There was a significant difference between rural and urban teacher educators in their attitude towards ICT.

The inference of the investigation has dragged the attention of experts towards the teacher educators of rural areas. The comparison of mean scores shows a huge difference. Special training programmes on ICT should be organized for them. The regulatory bodies should monitor the implantation of ICT in the teacher education curriculum at all levels. All universities should take the initiation of ICT studios for innovative pedagogical perspectives.

Sivakami & Rajendran (2016) carried out a study on usage of ICT in Arts and Science College Libraries. The study focuses on the gender & age wise usage of ICT Media. The study aimed at finding of the usage of ICT by the faculties in Arts and Science Colleges of Erode. For this purpose a survey method was used. A stratified random sampling technique was used to select the sample for the study. Nearly 210 questionnaires were distributed among the faculty members in Erode out of which 200 (95%) were selected as data generating questionnaire. The result of the study shows that the users of mobile phone (92%) were higher than the other tools such as video conferencing, voice mail, and intranet. Further, it indicates that male and female differ

in the usage of ICT Media. Male used mobile phone (47%) higher than female whereas female used internet (48%) more than the male. The findings also indicate that on the basis of age those were below 35 use e-mail tool (49%) and those were above 35 uses more mobile phone (46%). The services of (Video Conferencing and Voice Mail) were not seen sufficiently. So it should be increased in Arts and Science Colleges. The respondent suggested that the use of ICT tools going well potentially for collecting information and it is accessible for users to have touch with their friends and social community.

Surana and Rani (2015) carried out an exploratory survey on the teacher's attitude towards utilizing future gadgets in Education. The major objectives of the study were to analyze the perceptions of teacher educators about the use of future gadgets that can be used for educational purposes. To analyze the perceptions of teacher educators regarding barriers to the use of future gadgets that can be used for educational purposes. To analyze the perceptions of teacher educators regarding preparatory-needs about the use of future gadgets that can be used for educational purposes. The independent variables are the background variables such as gender, age, stream, and teaching classes. The dependent variables are the perception of teacher educators about the use of future gadgets teaching/instruction domain of education. The self-made opinionnaire scales were administered to teachers to study their opinions. The tool was administered to teachers of engineering, technical and professional teachers of the Chandigarh region randomly of various educational institutions. The investigator has selected a list of 234 gadgets using Content-Analysis techniques using a purposive sampling method. The analysis of data collected from the sample leads to the following conclusions:

- There is no significant difference in the perception of teachers about the utilization of available future gadgets in education in the teaching/instruction domain concerning gender, age, stream, and teaching class.
- Most of the teachers have a positive attitude towards the use of future gadgets in education.
- By analyzing the available future gadgets according to the gender-wise, it has been found that the maximum number of female teachers found that the utilization of future gadgets to be highly relevant, whereas, most of the male

teachers opined future gadgets to be of most usefulness in terms of teaching/instruction domain of education.

- By analyzing the available future gadgets according to the teaching-class wise, it has been found that the maximum number of teachers teaching at post-graduate level, most of the teachers teaching at the undergraduate level, some of them teaching at the graduate level and very few of them teaching at the doctorate level, opined the future gadgets to be of high relevancy regarding the use of future gadgets in teaching/instruction domain of education.

Angadi (2014) carried out a study on teachers' attitudes towards information and communication technology. The major objectives of the study were to find out the difference between male and female teacher educators' attitudes towards ICT. It also aimed to find out the difference between senior and junior teachers' attitudes towards ICT and to find out the difference between science and art teacher educators' attitudes towards ICT. Teachers of the 45 B.Ed colleges which are affiliated to Rani Channamma University, Belagavi Karnataka, constituted the population of the present study. Out of these 45 B.Ed colleges, only five B.Ed colleges were selected as the sample of the study by random sampling method. From the five B.Ed colleges, only fifty teachers were selected as the sample of the study by employing the stratified random sampling technique. The teacher educators' attitude scale was constructed by the investigator to collect the data for the study.

The study gets a significant difference in the two variables for each test. The attitude mean score towards ICT of males was higher than the females, junior teachers were also higher than the senior teachers, and similarly, science teachers were higher than the arts teachers. There was no significant difference between the senior and junior teachers in their mean attitude scores towards ICT. There was a significant difference between the arts and science teachers in their mean attitude scores towards ICT because the total mean score of the science teachers was greater than the arts teachers.

The study concludes that males and females as well as science and art teachers of B.Ed colleges had a significant difference in their attitudes towards ICT. It also found that knowledge of ICT will be highly helpful in the development of educational institutions.

Maheswari (2013) carried out a study on the practice of ICT among the students and teachers of technical universities and its impact on their communication behavior. The major objectives of the study were to trace the existing ICT environment and to know the Knowledge, Attitude, and Practice (KAP) of ICT among the students and teachers of Technical Universities. To analyze the impact of ICT on the teaching-learning process among the teachers and students, to analyze the impact of ICT on the teacher's and students communication behavior and to identify the gaps in the effective usage of ICT among the teachers and students in technical Universities and suggest new approaches to improve. The study was conducted in two pioneering technical universities in Chennai, namely Anna University (Government) and Sathyabama University (Private). The study adopted Focus Group Discussion (FGD), Observation, Survey, and In-Depth Interview methods along with the descriptive research design that describes the current ICT practices among the students and teachers of Technical Universities. A Sample of 40 students and 10 teachers were selected from four major courses in engineering colleges. The ICT infrastructure and practices were observed in two universities. The survey was administered among 710 students.

During the study, it was observed that there was a significant difference between Government and Private University with regards to access, knowledge, attitude, practice (KAP), ICT impact on communication pattern, and ICT impact on higher education. Based on the mean score government university was better than a private university in different characteristics. This could be due to the higher availability of ICT facilities and constant encouragement in using ICT in the Government University. A survey among the students and staff revealed that the majority of the students own one or more ICT gadgets. A very small percent of the student does not own a laptop or desktop. Mobiles with internet facilities were highly popular among (80%) the students. The majority of the students said that they had access to ICT within their institution. A larger group of students had a good knowledge of computers and were very confident with computers. Government university students were better than private engineering college students in computer competency. ICT has helped them to overcome their inhibitions, increased their frequency of interaction with their teachers, and enabled 24x7 communications between teachers and students. Many students had stated a shortage of time as one of the important barriers in ICT usage within the university.

The study had observed that effective implementation of ICT in the university will allow students more flexible access to study materials, reducing barriers of time and place of study. Students' interaction with teachers was changed with the use of ICT such as e-mail, chat, or video-conferencing, with implications for students' effective learning and teacher's workload.

Ziba (2013) carried out a study on university teachers' attitudes towards information and communication technology use in relation to computer competency and anxiety.
The main objectives of this study were:
1. To develop and validate scales on attitude towards ICT use and computer competency.
2**.** To study university teachers' *attitudes towards ICT use* belonging to different faculties with regard to computer competency.
3. To study university teachers' *attitudes towards ICT use* at different levels of computer competency.
4**.** To study the interaction between type of faculty and levels of computer competency with regard to university teachers' *attitudes towards ICT use.*
5. To study university teachers' *attitudes towards ICT use* belonging to different faculties with regard to computer anxiety.
6. To study university teachers' *attitudes towards ICT use* at different levels of computer anxiety.

The study was delimited to 200 academic full-time faculty members of Panjab University Chandigarh. The study was delimited with respect to the variables of attitude towards ICT
use, computer competency, and computer anxiety. The sampling technique used was purposive-cum random. Stratified Random Sampling Technique was also used for the selection of the sample in the study. Hence, 200 university teachers of different faculties and departments of Panjab University were selected.
The tools used in the study were as follow:
• Demographic characteristics data sheet (developed by the investigator)
• Scale of attitude towards ICT use (developed and validated by the investigator)
• Computer Competency Scale (developed and validated by the investigator)
• Computer Anxiety Scale (CARS) by Roslani Embi (2007)

Mahat, Jamsandekar, and Nalavade (2012) carried out a study on teachers' attitudes towards the ICT teaching process in the computer science department of Smt. Kasturbai Walchand College, Sangli. The purpose of this study was to examine the relationship between

1. Teacher’s attitude towards ICT teaching and Student engagement in the class.
2. Teacher’s attitude towards ICT teaching and teaching time required.
3. Teacher's attitude towards ICT teaching time and student engagement in the class.

Subjects participating in this study were 80% of teachers taking the ICT classes for the BCS course in the faculty of Computer Science at Smt. Kasturbai Walchand College, Sangli. All the teachers have completed their master's degrees in computer science. The total sample size was 30. The attitude scales for ICT teaching (ATICT), attitude scales for student engagement in the class (ATSE), and attitude scales for ICT teaching time (ATITT) were developed by the researcher to assess teacher's attitudes toward ICT.

Simple regression analysis results were indicated significantly high and positive correlations between attitudes toward ICT teaching (ATICT) and teaching time in the class (ATITT). It was found that there was a significantly high and positive correlation between student engagement in the class (ATSE) and teaching time (ATITT). On the other hand, no correlation was indicated between attitude toward ICT teaching (ATICT) and student engagement in the class. The result indicated that the correlation coefficient between ICT teaching in class (ATICT) and attitude toward teaching time (ATITT) was significant and negative therefore hypothesis was rejected. Results revealed that positive significant correlation was observed between the attitude toward ICT teaching in the class (ATICT) and student engagement in the class (ATSE).

It can be said that ICT reduces the time required for teaching. The highly positive correlation between the attitude toward ICT teaching in the class (ATICT) and student engagement in the class (ATSE) shows that ICT will increase student engagement in the class. Effective ICT teaching methods increase student engagement in the class and reduce teaching time. The study understands ICT is essential in designing effective computer-related courses.

Tyagi (2012) carried out a study on the adoption of Web 2.0 technology in universities of the National Capital Region, India. The main objective of the study was to conduct a usage analysis of Web 2.0 technologies in the learning environment by faculty members from different streams and departments (Agriculture, Arts, Education, Engineering, Management, and Science) of selected universities at NCR (National Capital Region), India.

A close-ended structured questionnaire method was used to collect the data. Total 6 universities namely Amity University, Noida, Chaudhary Charan Singh University, SRM University's NCR Campus, Ghaziabad, Sardar Vallabh Bhai Patel University of Agriculture and Technology, Swami Vivekanand Subharti University, and Shobhit University were selected for the study. A total of 300 self-administered questionnaires were distributed among Professors, Associate Professors, and Assistant Professors of different streams and departments (Agriculture, Arts, Education, Engineering, Management, and Science) by adopting stratified random sampling procedure. 147 valid samples were collected and analyzed with the 49% response rate.

The majority of the respondents had good knowledge about blogs, Wikipedia, RSS (Really Simple Syndication) Feed, Social Networks, and Podcasting. In the case of SNS (Social Networking Service) and Mashups, the faculty members were less aware, except Assistant Professors (61.90%). It was observed that the Web 2.0 tools were in a good stage of adoption by the faculty members. The respondents in the study had been asked to indicate which tools they use most. Seventy-two percent of Professors use social bookmarking which was followed by wikis (67.44%) and blogs (39.53%). Of the population of Associate Professors, 80.48% use social bookmarking followed by wikis (65.85%) and blogs (46.34%). Among Assistant Professors, 68.25% use a social bookmarking site which was followed by wikis (58.73%) and blogs (50.79%). It was observed that social bookmarking was the most frequently used Web 2.0 tool among the respondents which followed by wikis and blogs. On analysis it was found that majority of the faculty members had been using Web 2.0 tools for the three major purposes: for Web-based teaching and research (89.11%); for interactive learning features (92.51%); and to keep themselves up to date (93.87%) on a related topic of interest. It was found that the use of Web 2.0 tools for online submission of papers (35.37%), personalized Web services (12.24%), self-publishing on the Web (8.16%),

professional communication with others (31.97%), and entertainment (4.76%). Therefore, it was evident that faculty members had a favorable attitude to use Web 2.0 to positively influence the teaching-learning process. Thirty-one percent of the respondents said that they use a slide show presentation application, while 12.24% of respondents make use of the text blog which was followed by wiki pages (8.16%). The findings also showed that 19.04% of the respondents use an inflibnet blog followed by study freak (10.88%) and education for all in India (4.76%) for their education purpose. The analysis showed that Facebook (75.51%) is widely used by faculty members, which was followed by Twitter (58.50%) and LinkedIn (30.61%). It was observed from the analysis that the majority of faculty members were engaged in collaborative/corporation work. The majority of the respondents (82.99%) stated that Web 2.0 tools in Indian higher education is still marginal and will have to overcome a lot of obstacles to hold its ground as in higher education of developed countries.

The study concludes that the faculty attitude and their perceived behavioral control are strong predictors to their intention to use Web 2.0. This suggests that administrators interested in increasing the use of Web 2.0 in the classroom might focus their attention, efforts, and investments on improving faculty attitude and enhance their perceived behavioral control of Web 2.0 use. More specifically, these efforts should focus on improving the perceived usefulness, ease of use, and compatibility (with current practices) of Web 2.0 applications, as well as improving faculty's self-efficacy with these emerging technological tools. Additionally, while these tools show pedagogical promise, “best practices” models are needed to further facilitate the adoption of these emerging technologies as tools for improving teaching and learning in higher education.

Sharma (2009) surveyed the use and impact of E-Resources at Guru Gobind Singh Indraprastha University to analyze the dependency of the teachers and research scholars on e-resources. The study also examined the perceived impact of the e-resources on their academic efficiency and problems faced by them while using the e-resources. A questionnaire was used to collect information. A total of 100 questionnaires were distributed to collect the primary data out of which 82 questionnaires were found usable for analysis. Simple random sampling was used to collect information. The findings of the study highlighted that only the well-known e-resources (e-journals) were preferably

used by the researchers and faculty members, the rest of the e-resources i.e. e-bibliography, e-maps, e-thesis, e-books were comparatively less used.

The majority of teachers 34 (65.38%), and research scholars, 23 (76.67 %,) were using the library web site as a gateway to access the electronic sources. The findings revealed that 37 (71.15%) faculty members and 26 (86.67%) research scholars make the use of PowerPoint in their class teaching. Majority of the teachers use Science Direct, Springer Link and Wikipedia often, i.e. 24 (46.51%), 20 (38.61%) and 18 (34.61%) respectively, whereas 18 (60%) research scholars use Science Direct often and 16 (53.33%) use Springer Link often. Twenty-one (40.38%) teachers and 8 (26.66%) research scholars use UGC InfoNet sometimes whereas 20% of the respondents are unfamiliar with ACM (Association for Computing Machinery) which was shocking in a technical university. It is observed that the availability of e-resources on the campus is almost sufficient for all the existing disciplines but the infrastructure to use these resources is not adequate and can hinder the ability to meet the requirements of users.

2.2 Studies Conducted in Abroad

2.2.1 Use of ICT in education

Fofanah (2018) carried out a descriptive survey on ICT Usage/Habits for teaching and learning at Njala University. The main purpose of this study was to check the availability of ICT infrastructures to meet the ICT needs of the University. It also found out whether the investment or adoption or improvement in the "ICT-designed learning environment" will create the desired impact in the transfer of knowledge to the learner at the Njala University.

In this study, a questionnaire was developed to investigate ICT usage/habits, perceived ICT competency, and related ICT issues that affect University students and lecturers at Njala University. The survey employed a stratified, purposeful, and convenient sampling method. Stratified sampling was used to identify students selected as respondents to the ICT survey. Purposeful sampling was used to acquire the appropriate number of student's representatives in the survey. Convenient sampling was used to identify the lecturers/staff that formed part of the survey. The reason for this was that the lecturers/staff were relatively few. A sample size of 192 students was selected from the target population and additionally, a total of sixteen (16) staff members were

selected from the Njala University, Kowama Campus. The primary data collection instrument for the study was a digital survey questionnaire that was designed and uploaded into Android smartphones using the 'KoBoCollect' application.

The results of the survey depict that most of the ICT resources were unavailable, except for Internet/E-mail Services (48%), Department Computer Laboratory (42%), Proprietary Software Printing and Photocopying Services (39%) that were fairly available. The level of ICT Competencies for both students and university staff shows that the overall competencies in the use of ICT tools were below average. Forty-one percent of the respondents were able to browse the internet regularly. Both staff and students had very little access to ICT facilities in the university. More than half of the respondents (63%) had never accessed the computer laboratory; and about the same percentage (63%) agreed that they sometimes use the university's internet facility. On the other hand, nearly half (47%) of the respondents sometimes had access to ICT facilities (mainly internet) at home. More than half of the respondents (54%) sometimes had access to ICT facilities in the university library. The use of ICT tools was a huge problem in the university as 84% of the respondents agreed that the use of technology itself was a problem. On the other hand, 58% of the respondents said there were no available ICT tools for teaching and learning purposes. Additionally, 60% of students responded to have inadequate access to online resources. Nearly half of the respondents (48%) agreed that the ICT department did not have the requisite support that was required for the department. It was clear that the use of ICT tools for academic work among Staff was very high (87%) when compared to Students (64%). Staff and students also frequently used ICT tools associated with smartphones to perform different academic tasks. Forty-one percent (41%) of the respondents in the survey agreed that sometimes they normally used other ICT tools such as - Internet, Network Virtual Drive, Intranet systems, e-mail, SMS and social media discussion tools like WhatsApp, Twitter, and Facebook to accomplished tasks related to their academic work.

The study recommends that the successful implementation of ICT at Njala University requires comprehensive training of both staff and students in ICT skills. The training should be mainly geared towards building and enhancing the capacity of staff and students in the use of ICT tools. Investment in any ICT infrastructure should be

accomplished by the development of a detailed sustainability plan that is realistic, scalable, and achievable. There is a need for investment in E-services as the survey clearly shows that the ownership of smartphones is high among staff and students.

Nour (2018) has invested the impacts of ICT in public and private Sudanese universities. The study aims to test four hypotheses: (1) the use of ICT facilitates connection within knowledge institutions, namely in Sudanese universities. (2) The use of ICT enhances access, production and the dissemination of knowledge in Sudanese universities. (3) The use of ICT facilitates collaboration between Sudanese universities and international universities. (4) The use of ICT has both positive and negative effects by providing opportunities for the positive transformation and production of knowledge by building connections and organizational changes, but simultaneously also creating negative effect and hazards to transformations and knowledge production by creating disconnection for those who do not know how to use ICT in Sudanese universities and knowledge institutions. To examine the four hypotheses on the impacts of ICT across Sudanese universities presented above, this section uses the descriptive approach and primary data based on the university survey (2009), which was drawn from 10 public and private Sudanese universities.[5] The data from the university survey provides information particularly useful for presenting interesting public-private comparative analysis to elaborate ICT role to enhance connection and transformation in Sudanese universities from public-private perspectives and from academic teaching staffs, support staffs and students' perspectives.

She has come to the conclusion that from all universities academic teaching staff, support staff and students' perspectives the Internet leads to many positive impacts, opportunities and advantages. From all universities academic teaching staffs' perspective the Internet provides many opportunities and advantages for facilitating connection and transformation and enhancing the production, creation and transfer of knowledge. For instance, the top opportunities and advantages include increasing digital knowledge for academic and researchers by finding information that was earlier not available or accessible, rapid quantitative (in number) and qualitative (efficiency and speed) increase in transferring available information and development of a new model for disseminating and distributing electronic information, where the information moved towards the user. In addition to increase creation and transfer of knowledge,

increase possibility of introduction of research outside academic fields, increase free access to electronic publications for academic purposes and create linkage and contact between people with common interests in different activities related to increase of knowledge. The general conclusion is, however, that there are more advantages than disadvantages to using ICT in Sudanese universities.

Lubis, Syed, and Sarji (2017) carried out a study to discover the difference use of ICT between faculty members in Medan, Indonesia with regards to their demographic factors namely: gender, age, teaching experiences, educational level, and department of origin. A total of 260 lectures were selected through stratified random sampling for the study. Questionnaire was used to collect the data. The findings of the study indicated that female and male lecturers have the distinction in ICT adoption in learning process. Hence, the result rejects the hypothesis and fulfills the answer that the lecturers' gender has the difference in ICT usage. Further it revealed that age of lecturers make a dissimilarity of the ICT utilization and there is no difference in using ICT based on lecturers' teaching experiences. There is no difference of ICT usage regarding to the lecturers' education level. Lecturers who held Master level is similar to the PhD level and it also indicated that lecturers' department origin has a difference in ICT usage. According to the findings, only one hypothesis is still defended that is the lecturers' age has a difference in ICT usage. Thus, it can be concluded that the different age of lecturers have a different use of ICT. To sum up, in Medan, Indonesia, the different use of ICT by lecturers for their learning process in higher education is influenced by several factors. The demographic factors are gender, age, and department origin.

Abuelhassan and Ahmed (2017) carried out a study on the significance of ICT usage in Sudanese Universities. The specific objectives of the study were to present the concept of ICT as a tool for teaching-learning in higher institutions in Sudan and to identify the impact of ICT in the teaching-learning process in Sudanese Universities setting (Madani Ahalia University). The study was mainly devoted to investigating the significance of using ICT by tertiary instructors of Madani Ahalia University in the academic year 2016/2017 during the first semester. The questionnaire is employed as a tool for collecting the data. The population of the study was represented by English lecturers in the Madani Ahalia University. A total of 12 instructors have been chosen

randomly to represent the whole population (Madani Ahalia University teachers) to respond to the questionnaire.

The study inferred that 83.4 % of the teachers enjoyed using a computer while 8.3% of teachers did not enjoy using the computer. Using ICT in teaching and learning was found essential to prepare students to live and work in the 21st century. The usage of ICT could increase teaching effectiveness. Ninety-two percent of the respondents agreed that ICT supported various student learning styles and created radical changes in language teaching. All the respondents agreed that ICT made communication easy through the internet e.g. E-mail, chatting, Skype, teleconferencing, video conferencing, etc.

The study concludes that teachers have a strong desire for the integration of ICT into education but they encountered many barriers to it. It also indicated that ICT has great significance in supporting university lecturers in their teaching process and the instructors' attitudes levels towards the use of ICT had a direct relation with the use of ICT for educational purposes. Using ICT in teaching and learning is essential to prepare teachers and students to live and work in the 21st century. It could be stressed that ICT makes communication easy through the internet.

Gazi and Arikan (2015) carried out a study on the use of the Internet and Web 2.0 tools among EFL (English as a Foreign Language) instructors at various universities in Turkey. In language learning and teaching, the Internet and Web 2.0 tools present resources and opportunities for both students and teachers mainly because of these tools' communicative potentials.

The purpose of this study was to investigate the use of the Internet and Web 2.0 tools among EFL ((English as a Foreign Language) instructors and examine their perceptions concerning the use of the Internet and Web 2.0 tools for teaching purposes. A descriptive research design was used to achieve the objectives of the study. The participants were selected in accordance with a convenience sampling procedure. Data was gathered via a questionnaire developed in cognizance of the related literature and expert opinion. The questionnaire was distributed online to EFL instructors (n=112) at various universities in Turkey. The resulting data was analyzed using SPSS 20.0 and

reported employing descriptive statistics, frequencies, means, percentages, and standard deviations.

Considering the mean scores, it was found that search engines (3.46), e-mails (3.41), and social network sites (3.28) were the most frequently used tools amongst EFL instructors. On the other hand, the least frequently used tool was the podcast (1.68) which is followed by blogs (2.04). These results suggest that Web 2.0 tools are not popular when compared with Web 1.0 tools. Word processing (98.2% "*knowledgeable*" or "*very knowledgeable*"), presentation software (83.9% "*knowledgeable*" or "*very knowledgeable*"), instant messaging (78.6% "knowledgeable" or "*very knowledgeable*"), and downloading films/music and saving them for the future (77.7% "*knowledgeable*" or "*very knowledgeable*") were the applications with which the participants had a high level of proficiency. Almost eighty-five percent of the participants agreed that using Web 2.0 tools makes teaching more interesting and 82.1% claimed that using Web 2.0 tools increases student motivation. The results showed that EFL (English as a Foreign Language) instructors had positive attitudes towards the use of the Internet and Web 2.0 tools. Although they had positive thoughts concerning Web 2.0 tools, they were not sufficiently using these tools in their teaching and were not pleased with the degree of opportunity their university gave them to learn about the Internet.

The study concluded with a remark that the EFL instructor showed a positive attitude towards the use of the internet and web 2.0 tools in language teaching. However, they are not using these tools adequately in their teaching.

Reilly (2014) carried out a study on information and communication technology use in the college classroom: adjunct faculty perspectives. The purpose of this study was to investigate the variations in gender, teaching discipline, the average number of courses taught per semester, and perceived barriers to ICT use by adjunct faculty members. ICT integration into teaching and perceptions of ICT use to improve teaching was also studied. Data were collected through an internet-based survey, administered to a random sample (n =186) of part-time faculty who were on the contact list of new Faculty in U.S. colleges and universities. Multiple linear regression analysis was conducted, one for each dependent variable.

One-third of the sample (34.6%) taught an average of two courses per semester over the past 3 years, while 9.2% taught one course per semester. Most of the respondents (40.3%) listed their teaching discipline as the humanities; 19.9% taught in the social sciences and 11.8% indicated their teaching discipline to be the arts. Twenty-five percent of the respondent had 6 to 10 years of teaching experience; 38 (20.4%) had 11 to 15 years of experience, and 28 (15.1%) had five years of experience or less. Most faculty members reported that they *often* use productivity tools, multimedia presentations, internet and web applications, course websites, learning management systems, computer projection, e-mail, technology to demonstrate learning, asking students to use technology for communication, and using technology to create content. Most respondents reported they *rarely* use content-specific software, reference software, drill and practice, desktop publishing, wireless handheld devices, imaging devices, teaching in a computer classroom, and asking students to use technology for collaboration. Most respondents reported that they *never* use web authoring tools, podcasting/vodcasting, and games or simulations.

The use of productivity tools had the highest mean and the use of games and simulations had the smallest mean. Most respondents reported that technology creates learning problems, takes time away from classroom instruction, and slows the teaching process. Most respondents *strongly agree* that technology use fosters an effective teaching and learning environment and that technology provides greater access to learning resources. The most frequently identified barrier to ICT use in teaching was lack of time to learn with which 69.0% of the respondents either agreed or strongly agreed. The second most frequently identified barrier to ICT use in teaching was lack of equipment and infrastructure with which 68.1% either agreed or strongly agreed. The third most frequently identified barrier was lack of effective training with which 61.9% either agreed or strongly agreed. Statistically significant correlations were found between reported ICT integration into teaching and the average number of courses taught per semester as well as perceived barriers to ICT use. Statistically significant correlations also were found between perceptions of ICT use to improve teaching and perceived barriers to ICT use as well as teaching discipline.

The study concluded that adjunct faculty members teach almost half of the courses offered on college campuses and are becoming a significant influence on college

campuses. Several suggestions for practical applications of the results were recommended. These suggestions included: making office space available to adjunct faculty members and providing time for them to learn to use the available technology; creating a partnership between full-time professors and the adjunct faculty members to establish a sense of collegiality that would ensure the exchange of ideas and encourage best practices in the implementation of ICT; providing training in emerging technologies to enable adjunct faculty members to learn to incorporate ICT into the curriculum in meaningful ways, and developing a mentoring partnership across disciplines so that each area can influence the others and share ideas for successful use of ICT in all disciplines.

Edumadze and Owusu (2013) carried out a case study on the use of information and communication technology for teaching and learning in Ghanaian Universities, the University of Cape Coast. The study focused on the use of ICT in the teaching and learning process in Ghana. The study employed the case study design, sampled 237 respondents comprising 37 lecturers and 200 undergraduate students using multiple sampling procedures. Survey instruments were used to collect data from the University of Cape Coast to ascertain the use of ICT in the university. The variables of the study were the use of ICT and lecturer prior knowledge/skills in ICT.

The descriptive statistics revealed that a majority of the lecturers 24(64.9%) indicated that they have computers and other gadgets such as public address systems and projectors at the faculty or department for their use. The study results showed that the university provides some ICT teaching and learning resources even though these resources are not adequate. It also showed that lecturers' prior knowledge and skills in ICT use best predicted the extent of ICT integration in the teaching process. The study also revealed that there was a significant relationship between ICT related courses (ICTRCs) and students' competencies in ICT. The findings suggested that on the part of students, ICTRCs are helping them to improve their ICT skills and knowledge even though the relationship between the variables was found not statistically significant.

It was concluded from the study that lecturers lack the technological know-how to efficiently integrate ICT into their teaching. Encouraging lecturers to integrate ICT into their teaching may help equip them with the skills and make them literate with the knowledge they require for the effective integration of ICT in teaching. Universities

would have to redouble their efforts to integrate ICTRCs such as information retrieval courses into the curriculum. In most cases, ICT resources are used by lecturers in their lesson delivery even though these resources are not enough. Lecturers who employ ICT in teaching must use various teaching strategies to connect the learning style of each student. Information and communication technologies (ICTs) which include radio and television, as well as newer digital technologies such as computers and the Internet have been touted as potentially powerful, enabling tools for educational change and reform. Therefore, university management should do all within their means to provide more ICT teaching resources to enhance quality education delivery on campuses. The computer centers when given face-lifts would increase the stock of ICT resource materials for use by lecturers and students.

In respect to the outcomes, some recommendations have been made to improve the diffusion of ICT in the teaching and learning process. It was suggested, among other things, that the computer center of the University of Cape Coast be adequately resourced to develop instructional materials and provide computer-based tutorials for lecturers and students to equip them effectively to be able to integrate ICT into their teaching.

Opati (2013) carried out a study on the Use of ICT in Teaching and Learning at Makerere University. The main purpose of the study was to investigate how ICT was integrated into instruction at MUK. It also aimed at bridging the existing knowledge gap in the use of ICTs in teaching and learning. The study employed a qualitative case study research design. Purposive sampling was used to select participants both among students and faculty as well as convenient sampling was also used for data collection. A sample size of 9 students and 6 lecturers was decided upon. In total, there were 20 participants (including the 5 from the focus group interview). Semi-structured qualitative interviewing was used as the main data collection method.

All the lecturers interviewed pointed out that they use ICT basically as a tool for preparing and organizing lectures. Asked to describe how exactly this is achieved, they explained how they read extensively and then typed lecture notes which notes would be availed to students through photocopying. This, according to them, saves the time which would have been spent dictating notes or writing on the boards. Here, *learning with* technology was seen from the teacher's perspective. Lecturers seemed to

extensively use the computer and the internet as teaching aids. Typed notes in this context serve as important teaching material for some of the lecturers. Only two of the lecturers interviewed used a computer in the class to teach students and only when teaching technology-related course units that aimed at exposing teacher-trainees to educational technology. They pointed out the absence of other support tools like projectors, public address systems, and the unstable supply of electricity in lecture halls which ruled out the use of power-point presentations or audio-visual materials.

All the lecturers claimed that they used office application packages to manage class records for example students' marks in different assignments and exams. The Literature fraternity came across as the more adept in using ICTs as instructional artifacts. All without exceptions attested to using the internet as a source of educational materials. Though all the lecturers were noncommittal about the time they spent using ICT, all of them, after being asked to estimate the minimum time stated that this was not less than 3 hours per day. It also emerged that some lecturers did not only enrich their knowledge base by reading online sources but also found guides on how to teach (available online) very useful. One interviewee used the internet to communicate with students especially when passing information to different groups with regards to assignments or change of lecture venues. Comparatively, faculty use ICT in education more than students. They spend less time on social media and more time doing teaching-related activities.

It was concluded from the study that there was a limited formal academic use of ICT at the College. It was primarily used as a tool for preparing lectures, for record management, and for socializing. Results also indicated that the ICT environment at the College is fraught with a plethora of challenges that hamper its full integration in teaching and learning.

Mahdi & Sa'ad Al-Dera (2013) carried out a study on The Impact of Teachers' Age, Gender and Experience on the Use of Information and Communication Technology in EFL Teaching. This study investigates the impact of teacher's age, experience, and gender on the integration of ICT into language teaching. This study utilized a mixed-method approach of investigation, which applies both qualitative and quantitative methods. The instruments used for data collection were a survey and an interview. The survey was administered to 46 in-service EFL teachers working at Najran University, Saudi Arabia. Ten out of these participants were interviewed. The respondents were

categorized into two groups. First group includes teachers from the age group of 20-40 and second group includes the teachers from the age group of 41.60. The results of the study indicate that regarding training courses, two-thirds (75%) of the respondents in the first group did not attend any training course in ICT, while half of the respondents in the second group had attended training courses in ICT. Most of the teachers in both groups had their own personal computers, and they could access the internet at home. However, the teachers in the second group (41-60) reported that they could access the internet in their offices more than the teachers in the first group. Regarding using ICT in their teaching, more teachers in the second group (89.5%) had used ICT in their teaching, whereas 70.4% of the teachers in the first group had used ICT in their teaching. The results indicate that there is no significant difference in using ICT between the two groups of teachers according to their age and experience. However, the results indicate that there is a difference between male and female teachers in using ICT in language teaching. Female teachers reported less use of ICT in their instruction than male teachers. The results showed a lack of ICT training for most of the teachers who participated in the study. Therefore, ICT training courses should be provided to improve ICT integration into EFL language teaching and learning contexts. The authors suggest that female teachers need to receive more support and be trained to use ICT in their instruction. In addition, seminars and workshops by female ICT experts should be provided for in-service female teachers.

Ali, Haolader, and Muhammad (2013) carried out an empirical study on the role of ICT to make Teaching-Learning effective in Higher Institutions of Learning in Uganda. The specific objectives of the study were to determine factors influencing the use of ICT and identify the innovations that ICT has brought in the teaching-learning process in higher institutions of learning in Uganda. A descriptive method and quantitative analysis of data were used in the study. The target sample of the study was 90 teachers and 75 administrators. The sample was selected using a stratified random sampling technique from five selected higher institutions of learning in Uganda. A questionnaire was designed and used to collect the data.

The institutions provide Computer, Multimedia Projector, Whiteboard facilities to support the teaching-learning process. The majority of the teaching staff used computers for teaching-learning mostly to prepare a lesson plan and they were familiar

with the software so they were able to teach the students easily. Some of the software they used include Tally, Microsoft Office, and other programming languages. The teaching staffs have ICT knowledge and were able to integrate it into teaching-learning. They also encouraged their students to use ICT for learning for that they become proficient in it and able to widen their knowledge. Most of the institutions have internet facilities to support the teaching-learning process and this made it easy for the teaching staff and administrators to integrate ICT in education and improving students and their knowledge. The teaching staff and administrators need training on ICT to integrate ICT effectively in teaching-learning. It was found that most of the respondents strongly agreed that ICT is necessary for the teaching-learning process.

All the respondents agreed that a new method of learning called E-learning (Electronic learning) brought innovation in teaching-learning at the higher education level. They also agreed that ICT made communication easy through the internet e.g. E-mail, chatting, Skype, teleconferencing, video conferencing, etc. They reported that ICT helped in easy and quick access to information that is stored on the server or remote computers. Most of the respondents also agreed that ICT has reduced the burden of keeping hardcopy since most of the data or files are kept in soft form. ICT also exposed teachers and administrators to the modern world through searching, reading, and connecting with resourceful people throughout the world with the help of the internet. It has also improved the quality of work in the office since most of the teachers and administrators use software and management information systems to do most of their work.

It can be concluded that the factors that positively influenced teachers‟ and administrators‟ use of ICT in education include teachers‟ attitudes, ICT competence, computer self-efficacy, teaching experience, education level, professional development, accessibility, technical support, leadership support, the pressure to use technology, government policy on ICT literacy, and technological characteristics. However, the presence of all factors increases the probability of excellent integration of ICT in the teaching-learning process. Therefore, the training of teachers in the pedagogical issues should be increased if teachers are to be convinced of the value of using ICT in their teaching-learning process.

Adegun, Akomolafe, and Adesua (2013) carried out a study on the usage of Information Communication Technology (ICT) by women in Tertiary Institutions in Ekiti State, Nigeria. The main objectives of the study were to study the knowledge, usage, and challenges faced by women in the use of ICT. The study was a descriptive research design of the survey type. The population comprised all the tertiary institutions in the state. A sample of one university, only existing polytechnic and college of education was purposively used for the study. A sample of 230 women was proportionately sampled from the institutions for the study based on the number of women in each institution. A total of 100 women were sampled from the University, 50 from the Polytechnic, and 80 from the College of Education. A self-designed and validated questionnaire was used for data collection.

The study revealed that on average, 72.5% of the respondents indicated that they knew about ICT while 27.5% did not know much about ICT. Seventy-five percent of the respondent knew ICT tools, 65.7% know the different ICT providers. The high majority (90.4%) search for information on the internet regularly, 92.2% use GSM for another usage apart from phone calls and 87.0% can send or receive e-mails. The majority (73.0%) respondents were familiar with various software on the computer, 84.8% can use a computer for word processing and 60.0% know how to use PowerPoint presentations. The result revealed that the challenges faced by women in the use of ICT include domestic pressure, lack of adequate ICT facilities, lack of personnel to give adequate training, high cost of purchasing ICT tools, poor internet network, erratic power supply, and, non-availability of internet provider.

It was discovered in the study that the use of ICT was low. This indicates that even though they knew ICTs they possibly have a positive attitude and interest towards it but limited use was put into it. The study also revealed that there was no difference in the use of ICT by women in the three tertiary institutions sampled. This could be a result of the fact that institutions all over the world use ICT similarly for a diverse purpose like communication, training, learning, research, and others.

It was recommended that an enabling environment that will encourage the usage of ICT by women in tertiary institutions should be created. Women should be encouraged to acquire more ICT skills and knowledge. ICT infrastructure should be provided to facilitate effective teaching and learning to meet up with the present educational

challenges. Efforts should be made to reduce and suppress the factors that are militating against the usage of ICT in institutions. The authorities of each institution should provide ICT services at a lower cost and ensure adequate funding. Moreover, an effective and sustainable ICT policy and initiatives that will improve ICT usage by women should be put in place.

Lawal and Oloyede (2013) carried out a study on enhancing the quality of learning and teaching via information communication and technology (ICT). The main objective of this research was to critically analyze how the quality of learning and teaching at the university can be enhanced via Information Communication and Technology (ICT). Also, the study highlighted the impact of ICT on students and teachers. It further the study highlighted the impact of ICT in the University's Learning and Teaching. The study targeted fifty (50) students to participate in the study. On the other hand, a range of fifty-six (56) lecturers from the Faculty of Communication and Information sciences were sample population targets. Sampling was done using a simple random sampling procedure.

A high percentage (94.1%) of the respondent used ICT in their day to day activities. More than half (52.4%) of the lecturers used ICT primarily for personal communication while 42.9% used ICT for educational purposes. The e-mail was the tool that was most frequently used for educational purposes among both the lecturers and the students. The second most frequently used ICTs were online libraries, which at least 40% of students and 33% of the lecturers indicated that they use either daily, with a further 40% of students and 29% of lecturers indicated that they use it every week. On another note ICT tools such as multimedia and projectors engaged the learners in the learning process and the findings showed that a higher percentage of the respondent rarely use it, with an average of 64% use them on a monthly bases and approximately 15% of them don't even use it at all.

The most frequently used format of ICT, according to the sampled lecturers, was the use of word processors, presentation software and other digital resources to enhance learners. Fifty-seven (57%) percent of the lecturers indicated the frequency of this as always while another 10% responded with frequently. This was followed by the use of search engines, which obtained a response of 48% (always) and 24% (frequently). The least frequent use was the use of ICT to meet the needs of learners with special

education needs (14% always‘ and 5% frequently‘). However, a remarkable proportion, (52%), uses it occasionally for the same reason.

This study revealed that the introduction of ICT into the University can transform its teaching and learning, based on the lecturer's belief that ICT has numerous benefits and the potential to transform education in the Nigerian context. However, the study also reveals that for ICT to withstand the test of time, there are aiding and hindering factors that must be put into consideration. In conclusion, the University should not see ICT as another tool to aid learning and teaching but as a change, catalyst to transform learning and teaching to help produce graduates who are competent, skilled, and relevant to the 21st-century global market.

Egberongbe (2011) surveyed the use and impact of electronic resources at the University of Lagos. The major objectives of the study were to investigate the use of electronic resources, the perceived impact of the use of electronic resources on the academic productivity of lecturers, and problems faced by researchers while using electronic resources at the University of Lagos (Unilag) Library. The study was limited to the lecturers and students of the University of Lagos, Nigeria. A questionnaire was used to collect information. Two hundred (200) questionnaires were distributed to collect the primary data, One hundred and eighty-two (182) were found useable. Simple random sampling was used for selecting the samples for the study.

The findings of the study indicated that there was heavy usage of popular and well-known resources (e-journals, e-books) by the faculty members and the research scholars. The rest of the electronic resources such as bibliographic databases, e-newspapers, e-magazines were comparatively less used by lecturers and research scholars. Seventy-one percent of lecturers and the high majority (78.6%) of the research scholars reported in the survey as being aware of e-resources. Awareness of e-resources indicated user knowledge of the availability of the resources, their services, and use of them. The majority of lecturers used Science Direct 60(53.6%), EbscoHost 32(28.6%), or Agora, 24(21.4%) respectively, whilst 48(67%) used Science Direct quite often and 20(28.5%) used both AGORA and IEEE often. The majority of lecturers preferred to use e-resources in comparison to traditional resources. The majority (66%) of them considered e-resources as time-saving, 70(59.1%) considered it easy to use, whereas 52(46.5%) considered it more useful.

The study found that integrating ICT into teaching, learning, and research is crucial for harnessing ICT developmental potential in university education. ICT has proved to promote the quality delivery of educational services. The teachers' burdensome tasks of teaching, record keeping setting and marking examination/test keeping records, setting and marking examination/test scripts, basic information searched research, among others can be made higher if the numerous gains of ICT are harnessed. However, the extent these gains of ICT are useful and tapped highly depends on teacher-ICT competence.

Francese (2011) carried out a descriptive survey on the usage of Reference Management Software (RMS) in an academic environment at Tallinn University, Estonia. The major objective of the study was to measure the usage of Reference Management Software (RMS) in an academic environment. An online questionnaire was used as a tool to collect the data. The questionnaire was sent to a list of 754 members of TLU, comprising Ph.D. students, Researchers, Professors. The sample mostly represents the areas of humanities and social sciences. The questionnaire got 58 responses, which constitute the 7.7% of the sample.

Respondents claimed a general awareness of the existence of RMS, only 25% declare to know nothing about this type of tool. Forty-four percent said that they do not use these instruments at all. At this point, it is very important to state that the academic library at TLU provides support to RefWorks. All TLU students, faculty, staff, and alumni have free access to RefWorks. Considered this, it was quite interesting to note how low the responses were concerning RefWorks. The 43% knew about its existence, yet only 7% used it. Endnote by Thomson confirms to be the most widely known instrument, 70% of respondents knew about its existence, even though only 21% used it. It was interesting to compare the usage of Endnote and Zotero. Though the former was more known than the latter, the percentage of usage was the same, 21%. This suggested how a good free-of-cost alternative may often be preferred to high-quality and high-expensive tools. When questioned about the reasons for nonuse, respondents claimed a lack of knowledge and awareness (8 respondents), lack of skills and training (10), lack of interest, need, and/or time (6). Some were unaware but showed to be interested in knowing more or to need just a little more support.

The study concluded that RMS usage was low and not well supported by proper knowledge. Scholars of every role and age do not seem to be enough aware of the potential of these tools neither they had a good knowledge of their features and mechanism. The approach to it seems casual: despite the license and support provided on RefWorks by the library, only a small percentage of respondents used this tool. To get the maximum efficiency more official and continuous initiatives of literacy, information and training should be taken regularly and would constitute a good investment by libraries.

Dang (n.d) carried out an exploratory study of the use of ICT in modern language teaching at the tertiary level in Vietnam, taking the case of Hanoi University (HANU), Vietnam. A mixed-methods approach was applied. In total, 222 questionnaires were collected from the 350 ones delivered to language teachers, resulting in a response rate of around 63%. Follow-up interviews were conducted with 43 participants (F = 53%, M = 47%), inclusive of HANU senior leadership, ICT experts, and language teachers.

In general, teachers use ICT to prepare for lessons and to deliver those lessons in class. For lesson preparation, the results showed the following common pattern of ICT use. Teachers search the internet; download relevant materials; design practice activities with word processing; prepare presentations with Microsoft (MS) PowerPoint. The email was used for the exchange of communication with other colleagues and/or students. Audio editing, mind mapping, video editing, e-lecture making, photo editing, Hot Potatoes, screencasting, and voice threads were often viewed as difficult and consequently rarely used by teachers. Data analysis reveals three major ICT inhibitors. The most important barrier was a lack of vision. Eighty-one percent of the respondents claimed that they had never read an ICT plan. Next, 82.5% agreed that this ICT plan, if it exists, has not been disseminated to teaching staff. As a result, language teachers do not know why they need to apply ICT, and where ICT will lead them to. The next inhibitor lies in teachers' belief that ICT increases the burden on their shoulders. It was believed that ICT increases workloads for teachers. As the rule of thumb, one hour of ICT-enhanced lesson requires 3-4 hours of preparation. Therefore, it was generally agreed that lesson preparation using ICT was time-consuming. Hence, teaching with ICT was a burden for teachers in terms of time, money, and workloads.

Another major barricade was the lack of access to ICT equipment and training. Fifty-eight percent of the respondents had access to a desktop computer which they had to share with other colleagues. Computers and internet connection were found only in a small number of classrooms, computer labs and the main library, making it difficult and inconvenient for teachers to use. In terms of ICT training, over the past two years, teachers received about 5 hours of training on an average, with limited focus on MS Office programs. Hence, many teachers did not feel confident or competent in using ICT. The factor analysis suggests three possible ICT enablers. The most important factor was teachers' positive beliefs and attitudes toward ICT use. All of the respondents were aware of the benefits of ICT. Most of the respondents believed that ICT would enhance lesson preparation (91.1%) and improved teaching performance (98.1%). Many teachers even thought that ICT would increase their productivity. The next enabling factor was perceived as ICT usefulness for learning. In the views of most teachers, ICT would promote autonomous learning; facilitate a shift from the teacher-centric method to a learner-centered approach. Some teachers even believed that ICT would help students understand subjects more deeply; gain better results in their studies; enhance employability for students in the future. Perceived ease of ICT use was another facilitator.

It was observed from the study that in general, teachers found it easy to use the internet and computers for lesson preparation and classroom teaching. Regarding the scope of usage, the teaching staff often sticks to their comfort zone, e.g. internet browsing, download, MS Word, and MS PowerPoint. Interestingly, many teachers found it easy to use ICT to share teaching experiences with others.

Ezeugbor (n.d) surveyed enhancing teacher efficiency in university education through the use of information and communication technology (ICT). The study investigated the extent to which ICT enhanced the efficiency of university teachers in their onerous task of teaching, research, and publications. The sample was made up of 510 teachers drawn from three universities in Anambra State (1Federal, 1State, and 1Private University) through convenient sampling. A 30- item research questionnaire structured by researchers titled, "Questionnaire on teaching with ICT" (QTICT) and was used to collect relevant data for the study. Out of 510 questionnaires distributed, 492 were returned, representing a 96% return rate.

The findings of the study showed that the lecturers agreed that ICT improved lesson delivery, enhanced students understanding of lessons, planning lesson environment, and minimizing time wasted in developing problem-solving skills in the students. The findings revealed that the use of ICT by teachers enhanced their efficiency in classroom teaching, management of students` records, and in their communication with students. It also enhanced their efficiency in research and publications by Publishing journal articles through the web, accessing the internet for international conferences and seminars, and making connections and collaborations with other researchers worldwide. The study equally revealed that as the competence level of the teachers' increases, the more enhanced their efficiency at work. Based on this latter finding, the researcher recommended that the ICT training of teachers should be a regular and continuous process.

The study recommends that the government through its agencies and in collaboration with the university management should provide enough funds for the provision and installation of ICT resources and capacity building to enable university lecturers to effectively harness the ICT gains for quality teaching. Teachers ICT training should not be a perfunctory programme but one that would be seen as stimulating and on-going, capable of motivating lecturers to fully integrate the new technology.

2.2.2 Integration of ICT in education

Shaikh and Khoja (2013) carried out a study on Higher Education in Pakistan: An ICT Integration Viewpoint. This study measures expert opinion of Pakistani higher education system (HES) experts on what role Information and communication technologies (ICTs) can play in shaping the future of Pakistani HES. Suggestions are formulated in higher education (HE) policy and planning, and provision of essential technological infrastructure. For this purpose, a 35-item literature-based questionnaire was developed for the modified version of the Delphi study which spanned two rounds; and administered to 30 participants randomly selected from urban and rural areas of Pakistan. HE experts selected from five categories – faculty members, students, parents, administrative staff, and ICT policymakers. Although current use of ICT tools/applications in those HEIs of Pakistan is sufficient which are in big cities, on a country basis, their use is 50% as suggested by this study, half as compared to near

future (The year 2019)/developed countries (where ICTs use is 100%). Educational/research tools are supposed to be used extensively in the near future but unfortunately, as suggested in this study, their current use is 50% which is not a good figure. In participants' views, the help provided by ICTs to university personnel in their job-related tasks is 75%. Major causes of the deprived standard of HE were found to be poor /uneven distribution of ICT resources/infrastructure, high ICT expenditures and lack of money, poor/lack of robust and effective ICT policy. Defining the role of ICT as a cure-all for organizational transformation, making ICT responsive to the organizational vision and mission, and developing a non-systemic method of implementation of ICT policy were also found.

Participants highlighted inadequate technological infrastructure, underfunding, and high cost of sustainability of the technology. They also highlighted poor educational policy and planning, ongoing teachers/staff skills development training/workshops, lack of ICT competencies among support/teaching staff as challenges. There was a need to develop/design material in local/regional language as language and educational content development challenges. Reasons for delay in the integration of ICTs in HE includes teachers lack ICT competencies as they spend a little time to learn ICT skills, lack of money leading, to limited access to computers and software, lack of creativity and willingness to change the running system, needing ICT facilities in lecture halls rather than in computer labs, etc. However, the complexity of connecting ICT to the curriculum was not considered to be very significant. The study suggests, development of a systemic and politically committed method of implementation of robust, effective and target-oriented ICT policy, adequate provision of technological resources such as fast/affordable internet connectivity, availability of latest/contemporary ICTs in HES, sustainable availability of electricity and telephony, access to computers in schools/communities and households, affordable teleconferencing facilities, free access to digital libraries /online books/articles/magazines, etc., modifications in HE ICT curricula emphasizing both theoretical as well as the practical use of ICTs. Participants identified a major gap in demand and supply of ICTs in HEIs i.e. 25%. In their views, the current demand for ICTs is 75% but only 50% is provided. University had the finance but they did not know about its utilization properly for ICT. This study suggests the development of a systemic and politically committed method of implementation of robust, effective, and target-oriented ICT policy for higher education.

Ekpoh and Etor (2012) examined academic staff utilization of Information and Communication Technology (ICT) in knowledge creation in universities in Cross River State. The major objectives of the study were to find out the level of provision of ICT tools in universities, to explore the ICT competency level of academic staff and to investigate the extent of academic staff usage of ICT in knowledge creation activities. The study used a questionnaire-based survey to gather quantitative data for analysis. Copies of the questionnaire were distributed to 300 academic staff that was purposively drawn from the University of Calabar (UNICAL) and the Cross River University of Technology (CRUTECH), Cross River State, Nigeria. In terms of institution, 200 were drawn from the University of Calabar and 100 from Cross River University of Technology.

The findings revealed that the majority of the respondents stated that ICT tools were not at all adequate, with percentages ranging from 76% to 97.3%. It was also reported that 42% of the academic staff had zero competence level in e-Library, video conferencing (48 %), e-learning (41.3%), and e-payment (37.3 %). Findings also indicated that 42.7% had little competence in net-working (collaboration), use of model and simulations (52.7%), and data analysis (44.7%). Similarly, some of them were quite competent in research (42.%), word processing (41.3 %), and PowerPoint presentation (37.3%), while some of them were very competent in handling e-mail (36%). With this result, it can be said that the competency level of academic staff in ICT usage for knowledge creation was low. The extent of academic staff utilization of ICT in knowledge creation activities was significantly low. Recommendations made include the provision of ICT facilities for staff usage by university authorities and mandatory ICT training for all academic staff.

From the findings of this study, the following conclusion was derived. The provision of ICT facilities in the University of Calabar and Cross River State University of Technology were grossly inadequate to facilitate knowledge creation activities. The level of ICT competence among academic staff was low and the extent of academic staff utilization of ICT in knowledge creation activities was significantly low.

Vajargah, Jahani, and Azadmanesh (2010) conducted a study on the application of ICTs in teaching and learning at the university level. The major objectives of the study

were to find out the obstacles, facilitators, and the risks of using ICT in teaching and learning in higher education. The research was conducted at the Shahid Beheshti University (SBU) (The National University of Iran). The research population consisted of three major groups: university academics, curriculum planners, and ICT professionals. A sample was selected using a stratified sampling technique and a total of 231 samples were selected. The research employed a survey research method and the questionnaire was designed to collect the data. The first question was on possible domains of using ICT in curriculum decision-making in higher education, the analysis of the answer to the open-ended question showed the following applications of ICT in curriculum activities:

1. Used digital libraries and internet-based information for the enrichment of curriculum content and process,
2. Shared and exchanged learning and experiences among university professors working inside and outside of the university,
3. Included students' interests and needs in curriculum decision-making through web-based need assessment,
4. provided a web-based presentation of the curriculum before and during the semester,
5. Used email in teaching and learning activities,
6. Web-based diagnostic, formative and summative assessments,
7. Used supplementary soft wares for effective teaching and learning,
8. Designed a dynamic feedback system,
9. Produced digital unlimited leaning materials (e-books, handouts …)

The lack of budget in faculties to equip the classes and the necessary possibilities of hardware was a very important point. The least important one was the professors' increasing average of age and their reluctance to use computers in education. The first important priority for the second section/question (facilitators for using ICT) was: "The possibility of having enough budgets to equip the classes and the necessary possibilities of hardware". The less important one was: "Professor's notice and follow the new and effective ICT`s instruments and equipment". The most important item for the third section/question (the risks of using ICT) was: "The missing of the technical substructures, which were necessary for the education and evaluation based on ICT". The least important one was: "The destructive effects of missing the culture of using ICT in educational environments". As the data of the present research shows computer

illiteracy of academics, especially experienced faculty members is one of the most important barriers, and therefore, assessing ICT literacy of Iranian academics and planning the professional development for them will improve their performances on teaching and learning activities.

Peeraer and Petegem (2010) carried out a study on factors influencing the integration of ICT in Higher Education in Vietnam. The major objective of the study was to know the extent of ICT integration in teacher education in an emerging developing country, and to what extent ICT was used in teaching practice. Apart from this, the researcher wanted to estimate the importance of external and internal manipulative factors for the integration of ICT in teaching practice, over the influence of non-manipulative factors of age and gender or main subject teaching. The variables of the study were gender, age, subject teaching, ICT skills, computer confidence, and attitude towards computers.

Data was collected through a questionnaire presented to a total of 863 teacher educators of 5 teacher education institutes in 5 provinces in the North and the middle of Vietnam. All staff members of the 5 teacher education institutions were invited to fill out the questionnaire. In total 783 questionnaires were filled out during plenary sessions in the 5 teacher education institutes, resulting in a response rate of 91 %.

Most teacher educators did not use many ICT applications intensively. Fifty-seven percent never or rarely used subject-specific software for integration into lesson practice, 65.3 % never or rarely used electronic communication tools like e-mail for communication with students, and 86.0 % never or rarely used classroom management software. The picture was different for other applications like word processing software and presentation software where respectively 73.7 % and 55.0 % of teacher educators used these applications on a more regular basis. Fifty-seven percent sometimes or regularly access information through a CD-ROM or DVD and 73.6 % sometimes or regularly used the internet as a source of information. Women tend to use limited ICTs for teaching practice than men and age have a negative influence on intensity and diversity. It was remarkable that the use of the computer for working purposes positively contributes to the use of applications for teaching practice, but that ICT use, in general, has a significant negative influence on the use of ICT for teaching practice. Access to a personal computer in the institute negatively influences the uptake of ICT for teaching practice. An ICT skill was a strong influencing factor and together with

computer confidence, these factors remained significant after adding other variables to the model. Internal factors like attitude towards computers and conceptions of student learning as the construction of knowledge did not significantly influence the use of ICT applications for teaching practice.

Further research on the importance of the availability of equipment for teaching practice is necessary. Skills training is still important. Vietnam could make a difference though and aim to go beyond a limited; skills-based approach, striving for integration of ICT in education as a tool for active teaching and learning. It is clear that Vietnamese teacher educators are very much aware of the potentials of ICT and they are open for constructivist approaches of teaching and learning. Vietnamese teachers and teacher educators should be prepared for changing teacher role and should know how ICT can be used in a way it improves the learning process towards active teaching and learning.

Chowdhury (2009) carried out a study on the relationship between information and communication technologies integration and improvement in teaching as perceived by college instructors. The purpose of this quantitative, non experimental study was to investigate the relationship between ICT integration into teaching and faculty perceptions of ICT use to improve teaching. The study also sought to determine if a correlation existed between faculty beliefs and practices regarding ICT integration and whether there were differences across gender, disciplines, technology experience, and teaching experience in faculty perceptions and use of ICT. A sample of 203 faculty members from 4 Canadian colleges participated in this survey-based, research. Survey data were analyzed using descriptive statistics, correlation analysis, and MANOVA.

The result indicated that most faculty members (90.1%) reported often using productivity tools, 83.8% reported often or very often using multimedia presentations. 83.2% reported often or very often Internet and web applications, course website, computer projection, and 89.2% reported often or very often using e-mail or other Internet tools. The findings also indicated that college instructors with less than 2 years of teaching experience tended to incorporate ICT less into their teaching than more experienced faculty. The results indicated that most faculty members reported agreeing that ICT integration is an important aspect of a teaching career and that ICT integration provides greater access to learning resources.

The results of the correlation analysis identified a significant inverse relationship between beliefs about ICT integration and practice in the classroom. The result of the MANOVA tests indicated significant differences across gender, discipline, technology experience, and teaching experience with the use of ICT in the classroom to improve teaching and learning. These findings may be used to promote positive social change through the integration of ICT into curriculum, the encouragement of ICT training for college instructors, and the development of technology plans to establish more effective ICT integration practices.

In general, the study concludes that the colleges need to support instructors and technical support staff by developing a system for communication between these groups that will facilitate the integration of ICT into teaching and learning effectively. Colleges and ICT developers need to establish a clear channel of communication to develop ICT that will support teaching and learning needs.

2.2.3 Teachers views/attitude towards ICT

Bamigboye, Bankole, Ajiboye, and George (2013) surveyed teachers' attitudes and competence towards the use of ICT resources in the University of Agriculture, Abeokuta Ogun State, Nigeria. The major objectives of the study were to examine the attitude of teachers towards the use of ICT resources, the competence of teachers in the use of ICT resources, and the influence of the use of ICT resources on the academic performances of students. The research design used for the study was the survey method, using questionnaires and observation as instruments for data collection. The population for the study was the academic staff of the Federal University of Agriculture, Abeokuta. A total of 250 copies of the questionnaire were distributed to academic staff in the nine colleges, out of this number, only 211 copies of questionnaire were returned to the researcher.

The result shows that the majority of the respondents show a positive attitude towards the use of ICT in the teaching and learning process. Eighty-four percent of the respondents agreed that they had the right attitude towards the use of ICT. The high majority (90.5%) and (86.7%) agreed with the fact that ICT makes the course more interesting and that the use of ICT is worthwhile respectively. Also, 64.4% of the

respondents disagreed with the statement that ICT equipment was not available for use. About 79.1% of the respondents disagreed that they won't have anything to do with ICT about seventy there indicated that they were comfortable using ICT resources in the teaching-learning process. According to the result of the analysis ninety, two percent of the respondent indicated that they can locate and run the application programme. Moreover, 75.3% of the respondents indicated that they can search for files on the computer system while 24.7% cannot. Furthermore, 84.8% of the respondents indicated that they can connect the computer and its peripherals while 15.2% indicated that they could not. The result of the respondents' also shows that the teachers were competent in the use of ICT in the following areas:

- Access information on a CD/DVD
- Opening a new document in word,
- Create a basic presentation package
- Access an internet site via its website address
- Downloading file from the internet
- Attached file to outgoing e-mails,
- Use web search engines very well and use a digital camera to capture images.

There was a significant influence on the use of ICT resources on the academic performance of students. Findings revealed that the majority of the respondents had integrated ICT resources into their lectures. The study concluded that to promote effective integration of ICT resources into lectures, lecturers must have a positive attitude and competency towards the use of ICT in their teaching. Lecturers are also advised to go for training in the area of ICT resources so that they can have up-to-date knowledge of these ICT resources.

Abbas (2011) carried out a study on university teachers' views on the use of information communication technologies in teaching and research. This study used a convergent parallel mixed method design consisting of a survey followed by interviews to describe the views of a group of Iranian university teachers on the application of ICTs in teaching-learning processes as well as reported uses of ICTs. A total of 115 full-time faculty members were randomly selected from social sciences, engineering, science, and the arts at three major universities in central Iran participated in the survey. Their familiarity with ICTs, their views about the instructional benefits of ICTs in

higher education, and their reported uses of ICTs were studied using a researcher-made 20-item Likert-scale questionnaire. A purposive subsample of 15 was also interviewed to offer data on obstacles blocking their ICT use.

The analyses of data showed that Iranian university teachers strongly agreed with the educational benefits of ICTs in higher education. Despite this, they reported infrequent uses of ICTs for research and instruction. All of the 115 respondents strongly agreed that ICTs were more powerful than printed materials and other traditional tools of teaching and research. The data suggested that teachers in the context of this study emphasized the educational usefulness of ICTs and reported good levels of familiarity with ICTs. However, based on the responses to the related items, they less frequently reported the use of ICTs in their teaching and research in higher education. All the participants strongly agreed that their experience of using ICTs for research and instruction in English was limited.

Limited resources and facilities, insufficient skills, lack of time for initial preparations, and policy-makers' little support and encouragement were reported as the most serious problems faced by university teachers in the use of ICTs. Based on the results and the possible social, cultural, and economic limitations, the article highlights the necessity of promoting staff members' and policymakers' knowledge of the educational potentials of ICTs as a major priority in in-service training.

The conclusion that can be drawn from this study is that the use of ICTs as weapons against ignorance may be limited not only because of individual human failures (e.g. lack of skills, insufficient trainers, etc.) but also because of socio-cultural influences (e.g. loss of managerial support due to felt potential ideological threats behind ICT use). Making sure that there are enough qualified teachers who can operate computers and use ICTs in their learning and teaching is a very important part of today's educational reform and development.

Larbi-Apau (2011) carried out a study on computer attitude, and the impact of personal characteristics and information and communication technology adoption patterns on the performance of teaching Faculty in higher education in Ghana, West Africa. The study was modeled within the theoretical framework of innovation-diffusion (Rogers, 2003), computer attitude (Selwyn, 1997), and professional

performance standards (ISTE-NETS-T, 2000). A cross-sectional research design was applied to surveying three public universities. Mixed methods of quantitative and qualitative instruments were applied in collecting data and information. Pooled data from 164 randomly sampled multidiscipline academic staff were subjected to descriptive analysis. MANOVA was applied in testing differences in mean variability, while Simultaneous Multiple Linear Regressions (MRAs) was used in estimating ICT performance impact on defined independent variables. ICT adoption patterns were analyzed and compared to the standardized normal distribution of Rogers (2003, 1995).

The result of the overall computer attitude was high and positive. Affective and usefulness constructs dominated computer attitude scores compared with behaviour and control factors. Evidence of differential ICT adoption thresholds for general purpose, teaching, research, and computer purchase was reported. Significant variability in mean differences was observed in ICT performance factor levels on age and academic discipline, but not on gender and professional status. Also reported were mixed regression statistics for ICT performance impact. Independently, laggards predicted the overall high statistically significant impact of ICT performance at 52%. All other significant predictors fall within moderate to high regression coefficients of 17% and 38%. Age was consistently negative and significant on ICT performance impact. Only Engineering and Computer Science were the positive and significant covariates of academic discipline on performance. Regression coefficients of gender and professional status were mixed and non significant. ICT adopter categories varied in predicting the statistically significant impact on performance. Years of teaching experience had no significant impact on ICT-based performance. Also reported were reasons, incentives, and barriers to ICT integration together with special computer proficiency levels for triangulation.

Mwalongo (2011) carried out a survey on teachers' perceptions about ICT for teaching, professional development, administration and professional use. The main research question that guided this study was: what are the teachers' perceptions about ICT for teaching, professional development, administration and personal use. The sub-questions were: how was ICT used for teaching, administration, personal development and personal use? How often do teachers use ICT for teaching, administration, professional development and personal use? The research participants were teachers enrolled in one

of the pedagogy courses at one of the universities in Tanzania. The total 74 teachers were selected through purposive sampling. Data was collected from two sources, namely an online survey questionnaire using SurveyMonkey and from online posting generated from the researcher's blog. The findings of the study highlighted that the level of ICT competency was influence by training and frequency of using certain ICT resources was influence by access. ICT use for teaching included preparation of notes, teaching-learning materials, examinations and searching materials with students. Such uses helped to clarify difficult concepts, save time, make learners active, and simplify teachers' work. Administratively ICT was used for preparing reports, letters, timetables and schemes of work. Personal use included communication with friends, entertainment, storage of resources and online application.

In general, teachers did not use ICT to radically change their pedagogical practices, instead, ICT in some cases were used to maintain teachers' traditional pedagogical practices. Future research could focus on two areas, namely classroom observations to ascertain the actual use of ICT in teaching and learning and the role of university leadership in the integration of ICT in university.

Onasanya, Shehu, Oduwaiye, and Shehu (2010) carried out a study on higher institutions' lecturers' attitudes towards the integration of ICT into teaching and research in Nigeria. The research hypotheses were as follows:

- There was no significant difference between male and female lecturers' attitudes towards the integration of ICT into classroom teaching and research work.
- There was no significant difference between science and science-related lecturers' willingness to use ICT facilities for teaching, learning, and research in tertiary institutions.
- There was no significant difference between less experienced and highly experienced lecturers' competence in the use of ICT for teaching and research at university, polytechnics, and colleges of education.
- There was no significant difference between lecturers in the universities, polytechnics, and colleges of the education level of computer skills in the use of ICT for teaching and research work.

Three tertiary institutions in Kwara State were selected for the study. These were University of Ilorin, Ilorin Nigeria, Kwara State Polytechnic, Ilorin and Kwara State College of Education, Ilorin, Nigeria. A total of 150 lecturers participated in responding to the questionnaire. Among the participants, 90 were males, while 60 were females. The instrument used for this study was a 29 item questionnaire designed by the researcher.

The findings showed that gender has no effects on the attitudes of lecturers towards the integration of ICT into teaching and research in tertiary institutions. Science oriented lecturers' attitudes towards the integration of ICT in the tertiary institution were higher than other non science oriented lecturers. Less experienced lecturers were more exposed to the use of ICT than moderately and highly experienced lectures. University lecturers acquired more ICT skills than their counterparts in polytechnics and colleges of education. Many lecturers lacked adequate training and competence in using a computer as a tool for effective teaching and research purposes. It was recommended among other things, that higher institutions should encourage their lecturers to be computer literate by organizing conferences, seminars, and workshops. Old lecturers should be encouraged to develop good attitudes toward the use of ICT for teaching and research work. Recommendations were made toward the effective integration of ICTs in tertiary institutions in Nigeria.

2.2.4 Problems/challenges in the use of ICT in education

Ferreira (2019) carried out a qualitative action research study on barriers to information and communication technology integration at an Eastern Japan Liberal Arts College, Japan. The purpose of this qualitative action research study was to explore the perceptions and experiences of English as foreign language (EFL) university teachers in Eastern Japan to overcome barriers to integrate information and communication technology (ICT) in their daily teaching practice. The research setting was a liberal arts college in Eastern Japan and purposeful sampling was used to attain a sample of 12 EFL university teachers. The interview was used as a tool for data collection.

The MAXQDA 12 software was used to identify codes, patterns, and themes across the collected data. The three major themes were: (a) no computer, no projector, and no Internet were faculty barriers to ICT integration, (b) software too difficult to use for teaching purposes was a barrier to ICT integration, and (c) faculty contemplation of learning objectives and learning outcomes informed decisions to integrate ICT successfully. Recommendations for educational leadership included (a) to equip every computer classroom with an Internet-connected computer and a projector and to ensure these devices were operational at the start of class, (b) to provide reliable Wi-Fi connectivity to improve adoption of ICT, (c) to create a theoretically-driven ICT training program tied to curriculum learning objectives, and (d) to hire educational technologists to provide "just-in-time" techno-pedagogical support.

Tapera and Kujeke (2019) carried out a descriptive survey on the evaluation of information and communication technology (ICT) challenges in teaching chemistry in Zimbabwean Polytechnics. The study aimed to ascertain the challenges faced by lecturers in the use of ICTs in teaching Chemistry at three selected Polytechnics in Zimbabwe. The research was carried out at three selected Polytechnic colleges across Zimbabwe. Eighteen (18) practicing Chemistry lecturers with at least four years of work experience were randomly selected for the study. The researcher used one interview schedule, one questionnaire for the Chemistry lecturers, and an observation guide. The observation guide was used to observe the ICT facilities, infrastructure, and gadgets at the Polytechnics and get reliable first-hand information.

In response to computers for lecturers, only 2 (11.1%) indicated that they were adequate, 12 (66.7%) indicated that they were inadequate and 4 (22.2%) were not sure. As regards Laptops for lecturers, only 2 (11.1%) respondents said they were adequate whilst 14 (77.8 %) said they were inadequate and 2 (11.1%) indicated that they were not sure. Regarding Projectors, 10 (55.6%) indicated that they were inadequate, 8 (44.4%) indicated that they were not sure and none of the respondents indicated that projectors were adequate. As for Video Cameras, 10 (55.6%) indicated that they were inadequate, 8 (44.4%) indicated that they were not sure and none of the respondents indicated that Video cameras were adequate. Regarding Printers, 17 (94.4%) of the respondents indicated that they were inadequate, only 1 (5.6%) was not sure and none of the respondents indicated that Printers were adequate. A total of 16 (88.9%)

respondents indicated that computer lab was inadequate; 2 (11.1%) respondents said computer furniture was adequate whilst 13 (72.2 %) said was inadequate and 3 (16.7%) indicated that they were not sure. Regarding uninterrupted power supply, 3 (16.7%) indicated that there was an adequate uninterrupted power supply, 14 (77.8%) indicated that the uninterrupted power supply was inadequate and only 1 (5.5%) was not sure. Challenges affecting chemistry lecturers were found to be either extrinsic or intrinsic factors. The results revealed that inaccessibility to ICT resources was the major extrinsic factor affecting most Chemistry Lecturers in the use of ICTs at their institutions. The results also showed that limited technical support and lack of computer training were the second major extrinsic factors affecting most chemistry Lecturers in the use of ICTs at their institutions. Insufficient time allocation was indicated to be the least major extrinsic factor affecting most chemistry lecturers in the use of ICTs at their institutions. On the other hand, the results revealed a lack of competency and resistance to change as the major intrinsic factors affecting most chemistry lecturers in the use of ICTs at their institutions. The results showed that attitude towards ICT use was the third major intrinsic factor affecting most chemistry lecturers in the use of ICTs at their institutions. Personal beliefs were indicated to be the least major intrinsic factor affecting most chemistry lecturers in the use of ICTs at their institutions. The need to continuously train chemistry lecturers on the use of ICTs was ascertained. The provision of adequate ICT gadgets, facilities, and services in the teaching and learning of chemistry was strongly recommended.

The study concludes that ICTs play several important roles in the teaching and learning of Chemistry. Amongst the challenges faced by Chemistry lecturers in Zimbabwean Polytechnics are extrinsic (school-level) barriers such as inaccessibility of ICT resources, time constraints, limited technical support, and lack of training and intrinsic (teacher-level) barriers such as lack of competency, attitudes towards use, resistance to change and personal beliefs. Most of the Chemistry lecturers in Zimbabwean polytechnics lack major ICT gadgets such as personal computers/laptops, projectors, video cameras, printers, and major ICT facilities which includes enough classrooms, reliable power supplies, enough computer laboratories, and modern computer furniture.

Lawrence (n.d) carried out a study on “Information and Communication Technology in Universities in Nigeria: Challenges for Teaching and Learning”. The purpose of the

study was to review the deployment and implementation of information and communication technology in universities in developing nations with emphasis on Nigeria. The historical development, the problems, and the present status were highlighted in the study. The study looked at the challenges faced by universities in integrating information and communication technology into teaching and learning. Five questions were raised to guide the study. The study employed the survey research design because a sample was drawn from the population using the stratified sampling technique. The population for the study consisted of university teachers in all the 45 public universities in Nigeria. The universities were stratified into six zones following the country's geopolitical structure. One university each was randomly selected from each of the zones. Forty respondents were randomly selected from each of the six universities. This gave a total of 240 respondents in the study.

The findings of the study revealed that 73% of the respondents were favorably disposed to the use of the computer indicating a moderately high positive attitude. The chi-square statistics were used to determine how significant the differences in their attitude were. The finding further revealed that junior academics appear to be more favorably disposed to the use of the computer than senior academics. Only about 16% of respondents indicated that they would like the use of ICT tools in teaching and learning. This implies that quite a large percentage (84%) is un-interested in the integration of ICT into teaching and learning. The responses show that about 72.5% were familiar with the use of e-mail services and about 70% were conversant with other internet activities. When they were asked to indicate the purpose of usage, 73% indicated personal, 65% indicated research, 15% indicated occasional use for teaching and learning. The findings show that 73.5% of respondents indicated that universities do not have enough funds, 76.5% indicated that universities lack adequate technical expertise and 69% indicated that not enough bandwidth was provided to implement ICT in universities. One of the major challenges faced by universities in Nigeria in the integration of ICT into teaching and learning was the issue of staff training, development, and retention. The study revealed that the majority of staff managing ICT facilities in the universities were ad-hoc staff from the private sector who were partnering with some of the universities. Universities did not have direct and effective control over such a category of staff.

The study concludes that the high cost of bandwidth, inadequate and unreliable telecommunication services, and applications remained major challenges. Obtaining and retaining the technical expertise to implement and manage ICT facilities in Nigerian universities had been a great problem.

2.3 Research Trend

The research trend has been observed from an in-depth analysis of the literature. The empirical studies referred to and reviewed were related to the use of ICT, integration of ICT, the impact of ICT, and barriers to integrating ICT in teaching-learning. The time frame for the reviewed studies ranged from 2009 to 19. Forty studies were reviewed in the categories listed above. In all the reviewed studies, it was observed that the survey method was used for the collection of quantitative data, while the interview and observation methods were used for the collection of qualitative data. Only one researcher used focus group discussion for qualitative data collection. The maximum sample size was 492 and the minimum sample size was 12. In seven studies sample were teachers as well as students and researchers. Sampling techniques found in most of the reviewed studies were stratified random sampling, and random sampling for the collection of quantitative data. A convenient sampling technique was used for qualitative data collection. The variables analyzed in most of the reviewed studies were gender, ICT competency, type of university, discipline, teaching experience, and age.

All the researchers focused on use ICT, integration of ICT, ICT competency, and barriers to integrating ICT. Some of the researches also focused on the attitudes of the teachers towards ICT. The studies conducted in India focused on the use of ICT and the use of e-resources. It was also observed from the reviewed Indian studies that the teachers have knowledge about well-known resources and they use it for teaching. These studies also focused on the attitude of the teachers on ICT and the impact of ICT. Only one reviewed research focused on ICT competency. The variable studied in most of the reviewed researches were gender, discipline, place of residence, and teaching classes. None of the reviewed studies focused on the opinions of teachers towards ICT and infrastructure availability on the campus.

However, a total of 29 foreign studies were collected and reviewed. The studies were conducted in different countries of North and East Africa, Iran, Pakistan, Vietnam,

Japan, and Canada. The reviewed researches were related to the use and integration of ICT, opinions, or attitude of teachers towards ICT and barriers and challenges faced by teachers in the use of ICT. The questionnaire, interview, and observation were used as a tool for data collection in the reviewed researches. The findings of the reviewed researches indicated that university teachers were using different ICT tools in teaching and learning, their attitude affects the use of ICT in teaching, and gender has no relation to the use of ICT in teaching-learning. The findings of the study also revealed that teachers face problems in the use of ICT.

2.4 Conclusion

From the above-mentioned research studies and research trends, it can be concluded that university teachers are using and integrating ICT in the teaching-learning process irrespective of their age, designation, and discipline. The use of ICT was higher with a low level of competency. The literature review highlighted the research gaps in the reviewed researches. None of the research focused on the opinions of the teachers regarding ICT and the influence of ICT on research and administration work. All the reviewed researches focused on the use and integration of ICT in teaching. None of the studies focused on the use and integration of f ICT in research work and administration work by the university teachers.

The present study is an attempt to understand the use and integration of ICT by the teachers of The Maharaja Sayajirao University of Baroda. It will also showcase the opinions of teachers towards ICT, their competency in using ICT, the influence of ICT, and the problems they faced while using ICT for professional work.