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Practices and Challenges: Lived Experiences of Supervisors and Supervisees regarding ICT integration in Research and Supervision Process at Public Sector Universities of Pakistan

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Abstract
The focus of the study was to explore the practices and challenges of supervisors and supervisees regarding integration of ICT during research and supervision process in public sector universities of Pakistan. A qualitative research approach was used. Participants of the study were the faculty members who were supervising M. Phil and PhD Scholars and the supervisees who were working on their M. Phil and PhD dissertations. Respondents were selected through multi-stage sampling technique. Semi-structured interviews were conducted to collect data. Data were analyzed using qualitative data analysis strategies such as codes, concepts, categories and themes. Themes emerged from the analysis of semi-structured interviews of supervisors and supervisees are; basic knowledge of ICT applications, contributions of seminars and workshops in developing ICT skills, point of views of supervisors and supervisees regarding integration of ICT applications during research supervision process, experiences regarding integration of ICT applications during research supervision process and the challenges supervisors and supervisees confront while using ICT applications during research supervision process. Findings of the study are expected to contribute for provision of further policy implications for improvement of ICT facilities in public sector universities.
Key words: Practices, Challenges, Supervisors, Supervisees, Research, Supervision

Introduction

The practice of Information and Communication Technology (ICT) has brought incredible advancement in every walk of life, especially in progressing countries, which caused enormous change in the role of teachers and learners as well as advancement in the teaching and learning process. ICT is serving as major factor to shape the new global economy and bringing advancements for humanity (Daniels, 2002). Its range and exposure is unparalleled in human development as access to facts, communication, information, amusement and knowledge. The new tools of ICT are changing the communication styles of the people due to which many fields such as education, agriculture, business; medicine and engineering are getting transformed (Yusuf, 2005). Information and Communication Technology has the potential to bring transformation in the field of education, teaching methodologies and responsibilities of teachers and learners in the teaching-learning process (Mooij, 2007). In developed countries, people are using ICT successfully but in progressing countries such as Pakistan due to limited financial resources the usage of ICT is limited. According to Kanwal (2017), Pakistan is currently facing a number of challenges with resources using IT such as the unavailability of the internet services in many areas. Therefore, a large number of population has been deprived of internet services. Secondly, less educational facility and capacity in ICT as well as lack of infrastructure in ICT. Thirdly, there is a lack of research and development in ICT particularly in Pakistan. Thus, the quality of internet and improvement of ICT need to be paid attention in Pakistan for the promotion and strengthening of country and its utilization in economy. Manzoor (2012) said that an inadequate educational capacity of ICT in Pakistan is another big gap in our institutions. In addition, majority of our public and private institutions have no proper ICT integrated classroom and computer labs. Therefore, it is the responsibility of our government to ensure standardized ICT education in Pakistan (Hassan & Sajid, 2013).In Pakistan, research and development has been low priority both in public and private sectors, which needs to be improved and strengthen (Kanwal,

2017). In addition, the world rank of Pakistan is low in ICT, while Information Technology (IT) sector is one of the most dynamic sectors for the latest trends and technologies. In this report, a great emphasis is given on the country-wide establishment of IT parks as well as international investors need to be attracted for the incubation of technology. The curriculum designers should introduce information technology subjects at all levels and the students should be made aware about the importance of ICT (Sohaib, 2010). Lincoln (1865) once said "if I had 60 minutes to cut down a tree, I would spend 40 minutes sharpening the axe and 20 cutting it down" (p. 189). The same would be better for the policy makers which the experts call "sharpening the axe". Unfortunately, in Pakistan, usually 50 minutes are spent in sharpening the axe and it is feared that the rest of 10 minutes would certainly elapse soon. Indeed, the policy making takes much time, however the implementation is not paid any attention. There may be required ample time on designing and implementation of ICT programs in both public and private sector (Khan, 2017).According to Pakistan Telecom Authority (PTA) Statistics (2016) the broadband penetration has hardly arisen from 3 percent to 17 percent in Pakistan which cannot satisfy the desired level. Thus, for the upward progress in innovation and economy, such a big gap needs to be fi lled in focus on making broadband because it's the basic need of everyone. In this regard, Punjab and national IT policy draft has already discussed this issue in detail and it has been suggested to remove all types of taxes from the broadband. Indeed, it could be a good move in ensuring the internet facility. Moreover, in Punjab-policy regarding the internet as an essential utility, like water, and electricity. Similarly, the time would come to see cheaper and faster broadband in the Punjab (Amir, 2016).

The study of Shaikh and Khoja (2011) revealed the significance of ICT in higher education system of Pakistan. They studied that in big cities of Pakistan, ICT is widely used but when it is compared with rural areas, hardly the percentage of ICT users are 50% in the whole country. As they further stated that the research studies, the use of ICT is not more than 50% in Pakistan. Moreover, they found the major causes in their study including uneven or poor distribution of ICT infrastructure and resources, lack of money and high ICT expenditures, poor ICT policy and lack of skilled staff, lack of ICT competencies and the educational online material is purely in English.These materials need to be made available in local languages. According to Nisar, Munir and Shad (2011), other reasons are delay in ICT integration with higher education, lack of teachers-ICT expertise, lack of resources for access to computers and software, lack of willingness and creativity to alter the system and the need of ICT facilities in lecture room instead of in computer labs.Shah (2017) suggested that the provision of ongoing faculty training in promoting ICT skills, creating constant funds to support ICT use for the long run, raising a systematic method for the target-oriented and effective policy and satisfactory delivery of technological resources. Similarly, Sohaib (2010) recommended modification in the current ICT curriculum and complete examination of the existing condition of higher education system, consisting curriculum, pedagogy, capacity building, infrastructure, educational content and ICT financing for the improvement of ICT in Pakistan.Uses of ICT in research and supervision process are technically and professionally significant (Manathunga & Lant, 2006). Uses of ICT in research process have transformed the research process, current researches are quite different from the researches took place many decades ago (Sim, 2015). Incorporating new technologies for data collection, data organization, data analysis and presentation of findings brought big revolution in research and supervision process. Regardless of advantages and quickness, the biggest challenge is how to operate a technology, what technology could be used for specific purpose and how we can use it (McCallin & Nayar, 2012). This is all due to non-familiarity with such ICT. This issue is especially with the senior researchers who used traditional or manual method for conducting research. Linton (2009) stated that challenges of older adults regarding uses of ICT can be overcome through social support and be systematized. He further found that once senior researchers are not being alienated from incorporating ICT or Computer Applications, they will acknowledge the ICT as sign of competency and intellectuality. The number of universities has been increased for the last two decades in Pakistan. Since the inception of higher education commission (HEC), research work has been increased in all disciplines. M. Phil / MS and PhD degrees are pre-requisite and mandatory for the lecturers and assistant professors of universities. Therefore, universities have become center of research work. In addition, software for checking the similarities or plagiarism test is available to improvise originality and avoid repetition of the

research work. Thus, with the enhancement of research in Pakistan, the supervision process has been multiplied. Moreover, the practices of information and communication technology (ICT) havemade the research work more reliable and usable. Before the practices of ICT and internet very few students accomplished their degrees of M. Phil and PhD in public sector universities of Pakistan. They had more difficulty to find the literature related to their topics. Supervisors and supervisees used to sit in libraries for many hours to find some related material from the books. Data collection, analysis and interpretation process were manually done which usually took months and sometimes years in the completion of research reports. In public sector universities of Pakistan, ICT tools (computer and smart devices) have increased the practices of research supervisors and scholars. Murray (2011) stated that ICT refers to the latest information technology in connection to the integration of software, telecommunication, computers and other data system support, transmit and store unified technologies for users to manipulate and access information. It is understood that research students practice ICT throughout their studies, but it is important to know that how they use ICT to help in their research practice.

This study would reveal the practices and challenges while using ICT in the entire research process consisting preparation, analysis, field work, report writing and the supervision process. In addition, the current study seeks to get a coherent understanding about the role of ICT in the process of research supervision at university level.

Purpose of The Study

Purpose of the study was to explore the lived experiences of supervisors and supervisees regarding integration of ICT during the research and supervision process in public sector universities of Pakistan. This study aimed at, to explorehow supervisors and supervisees perceive integration of ICT applications, what extent have skills to integrate ICT and what are the main obstacles they face while using ICT during research and supervision process.

Research Questions

This study was based on the following research questions:-

1. How supervisors and supervisees perceive integration of ICT applications in research and supervision process in public sector universities of Pakistan?
2. To what extent supervisors and supervisees have basic skills of working on ICT applications in public sector universities of Pakistan?
3. How supervisors and supervisees experience integration of ICT applications in research and supervision process in public sector universities of Pakistan?
4. How supervisors and supervisees perceive challenges regarding using ICT applications in research and supervision process in public sector universities of Pakistan?

Theoretical Framework

Post-modernism theory underpins the research topic. Watson (2001) stated that in the accelerating post-modernism internet / ICT has played a significant part by reducing time and space as well as fragmentizing experience. Indeed, ICT has produced an access of information that undermines the capability of a single meta-narrative, while hyperlinking and multimedia allow users to make their personal sequences and connections, all of which affects in diverse experience of life (Best & Kellner, 2001). Benton and Craib (2011) discussed that there is too much knowledge exist which causes a particular degree of relativity with respect to truth. Therefore, Sim (2001) stated that reproduction of images and copies are the beauty of postmodernism society. Thus, it is not astonishing to find post-modernist traits in the discipline of computer. Gregg, Kulkarni and Vinze (2001) stated that IT practitioners should serve boundary between people and computing. The IT expert should understand what people really want and must understand the reality from what they desire such thing. Ballsun-Statnton (2010) defined that a typical post-modernist view point is to acknowledge and accept that belief and values are built into the computer programs. In turn, these encoded principles cause technologies to have the philosophical implication which results in a repetitive ICT-postmodernism series (Kroeze, 2010b).

Methodology

Constructivist paradigm was employed in this study to explore and investigate the in-depth understanding of practices and challenges of supervisors and supervisees regarding integration of ICT during research supervision process in public sector universities of Pakistan. In constructivist paradigm researcher try to understand the meaning and understanding of people about the phenomenon being experienced (Guba & Lincoln, 1994). Interaction between researcher and the participants serve as source of knowledge (Guba & Lincoln, 1994). Researchers using constructivist paradigm, initially use dialogue and reasoning to investigate the phenomenon under study and then frequently consult the sources of data to understand the meanings concluded from participants and meaning according to the researcher (Rudestam & Newton, 1992). Qualitative research approach was adopted because the qualitative methods are helpful in ascertaining the meaning which people conclude from what they experience in specific situations (Merriam, 1998). Qualitative research approach includes various methods such as interviews, observations, focus-group discussions and open-ended surveys etc.

Participants and Data Collection

Supervisors who were supervising the M. Phil and PhD Scholars and the scholars who were working on their M. Phil and PhD dissertations were the population of the current study. Multi-stage sampling strategy was adopted to select the sample. At the first stage those universities were selected which established before 2002, then at the second stage some faculties were selected from the said universities and at third stage from selected faculties few departments were selected. At the last stage, from these selected departmentssupervisors and supervisees were accessed conveniently for semi-structured interviews.

Analytical Plan

For the analysis of data from semi-structured interviews IPA (Interpretative Phenomenological Analysis) was conducted. In IPA, a researcher tries to explore the meanings of any state, events and happenings participants experience in their personal and social life. IPA is a phenomenological approach which involves detailed investigations of personal experiences and participants' perceptions regarding an object or events as opposed to objectives statements about the object itself. Thus, applying IPA techniques, data from semi-structured interviews were analyzed. Firstly, all interviews were transcribed, secondly all transcribed interviews were read multiple times in order to be familiar with the content and to get the overall impression. Then, passages that were interesting highlighted and notes were made. At initial level these notes were mere reflection of interviews but after several re-reading of transcriptions these notes become specific. These notes were read several times to investigate deeply the phenomenon understudy.At initial level codes were drawn from the interview transcripts, after several readings of codes, connections in codes were identified that led towards categories (Merriam, 1998).Then interrelationship in categories were sought, this relationship led towards the emergence of themes(Strauss & Corbin, 1998).

Trustworthiness

To ensure trustworthiness in qualitative research, four things need to be established such as credibility, dependability, transferability and confirmability (Lincoln and Guba, 1985). To decrease the threats to credibility, the researcher used the triangulation technique. For the purpose of ensuring dependability the researcher used the strategy of audit trail and described in detail how the data was collected, what procedure was adopted to derive codes, concepts, categories and how the themes were emerged and how the decisions were made, thus the researcher used in-depth and thick description techniques (Merriam, 1998) that led towards transferability in other words generalizability. For the purpose of ensuring confirmability,the researcher used the constant comparison method which includes searching the literature related the phenomenon being studied,obtaining the various point of views about the phenomenon (Strauss & Corbin, 1998) and looking for negative views about the phenomenon, checking and rechecking of data (Marshall and Rossman, 1989).

Results

From the analysis of interviews conducted with supervisors and supervisees working on M. Phil and PhD level research, following themes were emerged. First of all, the themes emerged from the interviews with supervisors are discussed.

Themes emerged from the interview transcript of supervisors

Theme 1. Perceptions about ICT applications

Perceptions are, how supervisors perceive about integration of ICT in research supervision process. Majority of supervisors have positive perceptions about ICT, they think that ICT facilitated the research supervision process;it becomes very convenient to communicate with supervisees without having any meeting in the office. As one supervisor expressed that "ICT bring great advancement in research supervision process, like that we are sitting 1000 miles away and communicating through ICT" (S3). Supervisors have point of view that ICT facilitates them regarding meeting with supervisees and getting assessment of their research work, with the uses of ICT supervisors and supervisees set their time of meeting in advance due to which supervisors do not get disturbed, as they have meetings and other official work, using ICT it becomes easy to spare free time for meetings, now a supervisor can check his or her schedule and specify free time for supervisees, so that no office work and other university duties may create hindrancesin the communication among supervisors and supervisees, as one supervisor said, "I think this is very economical and convenient, as you have not to travel or visit your supervisor. Secondly, the supervisor and supervisees have to match their time and would easily share their views about the research work. Thirdly, it needs fewer efforts for example, you use zoom software for the online guidance or support in research, then simply one has to enter his email and zoom ID. In the past, hard copies of these were sent abroad for the external evaluation but now a days these theses are being sent through online which is less time consuming activity" (S1).

Now due to ICT, supervisors and supervisees do not have to travel for libraries, situated at far off places which consume a lot of time and financial resources too, using ICT, they can access world level digital libraries on the distance of only one click, as on supervisor expressed,"Yes, it is very essential in these days for information regarding research process because in the past we usually used to go towards the printed journals, books and theses in various libraries but today due to the uses of ICT we easily get data at our places and no need to go for such information" (S4).ICT has revolutionized every aspect of research supervision process. ICT becomes an integral part of research and supervision process, now even one cannot imagine completing his or her research supervision process without using a single ICT application. As one of supervisors uttered that"I think ICT is very important. In my opinion without having exposure to these ICTs we will not be able to continue our research and supervision process especially in the current era" (S3).Another one expressed, "Now a days complete research process depends upon ICT. If the researcher has no perception about the uses of ICT would certainly be unable to cope up with his research" (S5).Thus, majority of supervisors have good perceptions about the integration of ICT in research supervision process. They think that ICT is facilitating them in every respect, now they can conduct online meetings without traveling far off places and can save a lot of time and resources.

Theme 2.Basic skills regarding using ICT applications

ICT skills are very important for conducting research and supervision process especially in the 21st century. Without having adequate knowledge of ICT any one can face many hurdles. So when supervisors were interviewed in this regard, majority of supervisors shared that they didn't receive any specific diploma or degree regrading using ICT. For example a supervisor said, "I didn't receive any training or diploma in ICT, my all learning about ICT is informal" (S3). The other one said "Specifically I have not done / obtained any degree or certificate regarding ICT. In fact in our time we were not familiar with ICT" (S8). Supervisors have the point of view that in their times, they were not much familiar with ICT so they didn't get any diploma or degree in ICT related applications, as one supervisor uttered, "I didn't get any awareness about ICT in formal way, however I myself keep updating about ICT by watching videos on YouTube about the issue I face or related to task which I have to perform in my research supervision" (S2). Majority of supervisors said that they belonged to age when there was no concept of ICT, they had to perform their all related tasks manually.

Theme 3. Contributions of workshops or seminars regarding ICT applicationsskills in research supervisors

Seminars or workshops in universities help a lot in building knowledge about ICT, can introduces many latest software which are being used in research and supervision process in all over the world. So, when supervisors were asked about the workshops or seminars, majority of supervisors replied that few workshops and seminars were being conducted, but everyone couldn't get benefits from those seminars or workshops because everyone did not have ICT background knowledge. To get true benefits it is very essential for one to have adequate basic knowledge about ICT. For example one supervisor said, "Candidates who have statistics background can get benefit from these seminars and the participants who don't have any statistics background fail to understand these seminars". So supervisors have point of view that having some basic knowledge about ICT and Statistics is very necessary,otherwise these seminars or workshops serve no purpose. Thus, having some sort of background knowledge about ICT can be beneficial in attending the workshops.

Theme 4. Experiences regarding practicing ICT applications in research supervision process

Practicing ICT in research supervision process include making use of ICT applications during research supervision process such as making online forums, guiding or motivating the supervisees about using ICT applications, assigning tasks online, checking the work online etc. So, when supervisors were asked about to what extent they integrate ICT in their supervision process and what specific ICT applications they use. Majority of supervisors have the views that they try to use most of the ICT applications in research supervision process, especially in the situation of COVID-19, one must have to rely on ICT. As one supervisor said, "I was not in touch of ICT application before, but due to prevailing situation of COVID-19, I have to use some ICT applications to guide my students about their research work following the government SOPs about maintaining social distance" (S9).

For integration of ICT related applications in research supervision process the things that is required, is the guidance or motivation from supervisors, so when supervisors were asked that they guide or motivate their supervisees regarding the integration of ICT in research work. Most of the supervisors expressed that they try to guide their supervisees, but if they themselves don't have any knowledge about that particular ICT then they refer their supervisees to the person having concerned expertise in the area. As one of the supervisors was interviewed expressed,"I don't know much about ICT that's why I usually refer my supervisees to one of my friends who has expertise about using ICT applications" (S8).The main reason to send their supervisees to the experts, is lacking the specific adequate expertise in the concerned area, due to which many of supervisors don't guide or motivate their supervisees regarding using ICT, as a result, they direct them to use the manual method. As one supervisor stated, "Frankly speaking we as a supervisor don't guide or motivate our supervisees regarding using ICT application, instead we force them to follow the same old manual method that we used to follow for long period of time" (S2). Literature review is main part of any research study and without the guidance of supervisors this task cannot be accomplished, so when supervisors were asked regarding this point one of supervisors uttered,"Yes of course, when we need literature review for our research, we need to use various sites to view articles, journals, books and theses. In fact, I advise them to review minimum 40 to 50 articles related to their research topics to extend their knowledge and perception about research, conversely without the uses of ICT, it's not possible for them". One other supervisor uttered,"Recently, during covid-19, I used zoom software as well as google classroom for posting some tasks related to their research. Moreover, videos are being shared on YouTube through which the scholars are guided and educated" (S5).In the past manual methods were used to adopt for research supervision purposes but since the advent of ICT applications in research supervision process, supervisors prefer to use modern methods even who don't have any training regarding using ICT applications, as one of supervisors expressed his perception,"In the past, the students of research were supposed to do the things manually, such as, data analysis or collecting literature review but the communication gap has waved off and there is no need for the traditional method of conducting the research. So, I never prefer the traditional method of research. Even those supervisors who have not used ICT applications during their research would never prefer traditional method of research. Today, no one study the books, if you visit the library you will not find

students who used to sit in the past for hours & hours because they frequently use their smart phones and internet for soft copies"(S1). Thus, majority of supervisors have positive perceptions about the integration of ICT in the research supervision process, they want to integrate ICT in the research supervision process but the main hurdle which they find in the integration of ICT is the lack of proper training regarding using the specific ICT application for the concerned purpose.

Theme 5. Challenges regarding integration of ICT applications

During using ICT applications in the research supervision process, the main obstacle that supervisors are facing is not having the proper ICT related training. Majority of supervisors do not have adequate training to use the specific ICT application for the specific purpose, due to which many of supervisees can dodge them, as one supervisor expressed his experiences about his own PhD supervisor, he said that his supervisor had his PhD degree from New Zealand but cannot use ICT applications, he didn't know the quantitative and qualitative data analysis software, even he couldn't open his email ID. Supervisors expressed,"Having no knowledge of using the computer, for example my own research supervisor had no idea about the computer; he couldn't use it, even though he got his PhD from NewZealand. He was unable to open his email ID. Therefore, it is very essential for the supervisors to be technically trained to properly supervise their research supervisors.

Moreover, if the supervisors are trained then students will be unable to dodge them, for example the students will excuse that the software does not work therefore, such data cannot be inferred etc." (S5). One another supervisor uttered,"My notion about 21st century generation is different because they frequently use various software for their research but if I share my own experience about ICT, so I hardly used it because I belong from the era of print media like studying books, articles, theses and newspaper for the collection of data and literature review. The fact is we had no idea about such kind of advanced things during our school, college and university life".Thus, provision of proper training regarding using ICT application during research supervision process can be a solution and in this regard initiatives of HEC can serve the purpose as one supervisor expressed, "The most important thing which I suggest that in-service training regarding ICT should be arranged for the university teachers. Moreover, my perception about this issue is, now it is high time for HEC to educate M. Phil and PhD supervisors regarding the latest software of ICT" (S6). When supervisors were asked about the technical challenges they face during using ICT applications then majority of the supervisors mentioned that power failure and connectivity issues are the main challenges they confront while using ICT applications, "In the context of Pakistan, for example, the issue of power failure, charging the devices, connectivity issue, downloading issue etc. and many more technical issue" (S3). Using ICT applications also cause some health related issues such as headache, eyesight weakness and body pain etc. As one of supervisors stated,"The most serious health issues which I personally experienced are radiation, headache, eyesight weakness and body disorder" (S2). One another supervisor communicated,"I personally faced this issue during pandemic lockdown as I used to sit on computer for almost 10 to 15 hours on daily basis for months. As a result, I lost my near eye sight, when I supposed to analyze the data of 6 to 7 students. Consequently, pain started in my backbone, shoulders and fingers" (S4). Thus, continuous uses of ICT applications also cause some health related issues.

Themes emerged from interview transcripts of supervisees

Themes 1. Supervisees' perceptions regarding integration of ICT applications

Like supervisors, supervisees were also interviewed about their perceptions about the integration of ICT applications in the research and supervision process. Majority of supervisees responded positively about their perceptions of ICT uses in the research supervision process. They have the opinion that using ICT applications they can communicate with their supervisors conveniently as one supervisees expressed, "I thankful to the ICT applications due to which I can take time in advance from my supervisor for meeting, otherwise I have to wait hours and hours for meeting" (S2). Using different ICT applications supervisees can search different articles, different books and other research work related to their research topic. Moreover, they can visit digital libraries and access the knowledge from all over the world by clicking one button. As one of the supervisees stated,"ICT applications bring advancements in every field of life,especially in research process, now researcher can search related material from all over the world by

clicking simply one button and can improve their research further" (S5). Using ICT applications supervisees can study independently, they don't need much guidance from supervisors as one supervisee stated, "I can guide myself about the problems I counter during my research process by watching the videos on YouTube about the problem or the specific point where I need guidance from my supervisor" (S5). Thus, uses of ICT applications are minimizing the need of guidance from supervisors.

Theme 2. Role of workshops & seminars in developingbasic skills regarding ICT applications

Seminars and workshops are helpful in developing the skills to use the specific ICT applications during the research process. Supervisees were asked about workshops and seminars, they had the opinion that such type of workshops and seminars need to be conducted very frequently, as one expressed, "No, in my university, this type of workshop is never conducted, however, I attended some workshops conducted by other universities regarding SPSS, Endnote, Amose and NVivo etc. I gained some basic knowledge about these applications such as interface and purpose of uses, further I improved my knowledge about by seeing the videos on YouTube". Another one expressed, "In my university there is no culture of conducting workshop for the training of such ICT applications such as SPSS, AMOS, NVivo etc. However, I and my colleagues tried to conduct this type of workshops especially about SPSS, Endnote and Mendeley. During these workshops with students I came to know that majority of students do not know even basic skills of ICT, like working on MS office and MS Excel". Thus, many universities do not pay attention towards theseservices and rarely conduct such type of workshops for their students which can be beneficial for their research work. Another issue is that if these workshops are conducted then these workshops merely transfer theoretical knowledge to their attendees. Majority of supervisees expressed that these seminars and workshops couldn't be helpful if students were engaged practically. As one supervisee stated,"Workshop can be helpful only when resource persons in the workshops stops delivering theoretical knowledge and starts engaging the students in practical activities" (S4). So supervisees have the point of view that majority of resource persons in these workshops teach mere words not actions, thus some practical activities like working on data sets, testing specific tests for specific data types should be taught in these workshops, so that student can get true benefits of these workshops. Other reason for not taking the true benefits of these workshops is that, students are not assessed on the basis attending workshops and performing some practical tasks such as making data set applying certain tests on the data. Due to which students do not take interest in these workshops as one of supervisees expressed that "Usually, students do not practice because they know that they will not be assessed on the basis of practical skill but on the base of what they will write, so they start memorizing the things instead of learning the skills" (S7). Thus, workshops should be conducted and some practical activities should be offered to students to perform and students should be engaged practically in these workshops, so that they can get true benefits of these seminars or workshops.

Theme 3. Experiences regarding practicing ICT during research process

Practicing ICT applications means using ICT during conducting research process such as selecting a research problem, searching related literature, designing research, collecting data, analyzing data and reporting the findings etc. For all the above said purposes, specific ICT applications are being used in all over the world. So, when supervisees were asked about practicing different ICT applications, majority had the opinion that it is not possible to conduct research without using ICT applications. ICT applications are the integral part of conducting research. As one supervisee stated, "It is impossible to conduct research without using a single ICT application, especially in the current era" (S2). A researcher has to consult many search engine to find related research articles or journals, and for this purpose there are many search engines, such as Google, Bing, Ask.com,Google Scholar, Yandex, Wolfram.Alpha, DuckDuckGo, Excite, Yahoo and many others, so when supervisees were asked, what major search engines they used during searching related articles, majority had the opinion that they only use google and Google Scholar for this purpose. They even don't know the names of different search engines. As one supervisee uttered, "I use Google and Google Scholar for searching different research articles, for first time I am listening the name of Yandex, DuckDuckGo, Excite and Bing etc." (S7). Thus, majority of the supervisees don't know even name of the search engines other than Google and Google Scholar. This is actually the tasks of supervisors to guide or motivate their supervisees about the uses of current ICT applications, when they

were asked whether their supervisors guided or motivated them regarding using ICT applications, majority had the answer that they were only told them search 10 to 15 research articles related to their topics but they did not guide what are the different search engines that can serve the purpose. As one of the supervisees expressed, "My supervisor frequently direct me to search at least 15 research studies related to this topic but she never told me about the name of the search engines from where you can find the research articles easily" (S9).

Access to different digital libraries is another issue that majority of researchers belonging from various universities are facing. Researchers do not have access to download research articles from various digital libraries. Universities didn't take step to provide access to digital libraries and free of cost downloading of research articles from these digital libraries. Even majority of students in universities do not know about digital libraries, as one supervisee stated that "Students do not know about digital libraries and access to the libraries, when I asked the librarian of my university how I can access digital library, he wondered and said that you are the first student in the university who came to ask me about how I can access digital library, no student com to me to ask about his issue yet except you" (S11). Thus, majority of students in the university do not know how to access digital libraries. There is a need to create awareness about this point and this can be done by the proper guidance from the supervisors. For the analysis of quantitative and qualitative data, there are many software available such as software for quantitative data analysis are SPSS, STATA, SAS, MATLAB, etc. and software for qualitative data are NVivo, MAXQDA, Quirkos, Qualtrics, etc. but majority of supervisees only have information about SPSS for quantitative data analysis and about other software even they don't know the name of these software. When theywere asked about having the full command or expertise on SPSS, majority had the answer that they can perform only simple tests on SPSS, as one supervisee stated, "I can perform only simple tests on SPSS and with the guidance of YouTube, whenever I need to apply certain test on certain data, I watch videos on YouTube about this test and note the ways or steps I have to follow and then I apply the test on data using SPSS" (S5). So there is a need to create awareness about these software and arranging proper training sessions both for supervisors and supervisees. In the past, researchers had to manage references manually but now various software for arranging and managing references are available such as Mendeley, EndNote, Zotero, RefWorks, JabRef, etc. Supervisees were asked whether they used these software to manage references of their dissertations or research articles, majority replied no, they stated that they did not have the training to use these software for reference management, as one supervisees communicated, "I managed the references of my dissertation manually because I don't know how to manage references online or by using these software" (S3). Another expressed,"I never used any software for reference management, I manually arrange references of my dissertation, one of colleague guided me about to manage references by using these software but I couldn't understand" (S5). Thus, there is a need that training sessions should be arranged for integration of these software for reference management in dissertations and research articles.

Theme 4. Challenges regarding integration of ICT applications

During integration of ICT applications in research process, supervisees encounter various types of challenges, such as technical challenges, lack of training related challenges, health related challenges, non-availability of guiding material and lack of guidance or motivation from supervisors regarding how to apply the specific ICT application for specific purpose etc.If we do ranking of challenges according to the responses of supervisees which they faced during research processthen lack of training related challenges and guidance from supervisors come on first number and second number is technical challenges and next health related challenges and so on. When supervisees were asked about the challenges they confront while using ICT application during the research process, majority of supervisees expressed that the main challenges they countered was the lack of training regarding using any specific ICT application. For example one supervisee stated, "I know the benefits of using ICT applications but I don't have ICT background knowledge due to which I cannot even understand by watching videos on YouTube" (S5). Another one expressed, "I have theoretical knowledge about SPSS but I don't know how to use it, I don't have proper training of it" (S7). One PhD supervisees stated that "As I told you in the start that I faced various issues but today I still face some problems such as online portals and in some other software but

even I cannot edit and animate the things related to Microsoft word. I usually avail the expertise of those who have more skills in ICT. The remaining task such as to make file, to save something etc. I do it myself" (S3). Many of supervisees reported that they facedtechnical challenges such as connectivity issues, limited technical support, network issues, and electricity failure etc. As one supervisee stated, "I get disturb whenever I face the issue of network connectivity" (S2). Another one said, "Major technical issue that I face in using ICT application during my research process is the connectivity issuesof Wi-Fi and pirated software, due to which I lost my tempo of doing work" (S8). Another challenge is the virus detection in computers and software, many of supervisees reported this issue, as one said, "It is very problematic to deal the virus issueduring working on ICT applications such as desktop computers or laptops etc." (S9). Other type of challenges that supervisees confront are the health related challenges such as backbone problem, eyesight weaknesses, neural problems and body aches due to continuous sittings in front of laptops and desktop computers.

As one PhD scholar stated, "Yes continuous or excessive use of ICT application cause health problem. I want to share the experience of my colleague, she did her PhD from china, she did all her typing calculation work using many ICT applications, due to which she is facing neuron problem. In my opinion ICT affects eye sight, backbone and neural receptors badly" (S11). Other one stated, "During COVID-19 I have to work on ICT applications continuously due to which I lost my near eyesight -2" (S4). Backbone issue such as pain in spinal code and stiffness in joints are also the results of continuous sittings or working ICT application.So having many benefits, ICT applications also have some serious health related problems, which should be overcome and some alternate ways should be adopted to minimize the side effects of continuous uses of these applications. The users of ICT applications have to face some technical challenges because prices of ICT devices such as Laptop, Desktop computers and smart mobiles are very expensive, that a researcher cannot afford in his/her limited income. As one supervisee said, "Yes, of course, some ICT applications software are quite expensive for the students to buy because mostly students belonging from low socio-economic background" (S11). Some software need to be purchased and downloading of some related research articles also demand fee in dollars which everyone cannot afford, as one PhD supervisee stated, "As they are unable to pay in dollars for purchasing these software. In addition, the membership of digital libraries is also beyond their access" (S5). Another PhD scholar stated,"Exactly, our mostly students belong from low socio-economic background and they couldn't afford to buy some software, as a result they quit their research because of their financial position. I myself got HEC scholarship for my PhD, otherwise I couldn't have done my PhD due to lack of finance". Thus, financial resources are also the main hurdle in integration of ICT application during research supervision process.

DISCUSSION

This study was conducted to determine the practices and challenges supervisors and supervisees face regarding integration of Information and Communication Technology (ICT) during research supervision process in public sector universities of Pakistan. For this purpose qualitative research method was adopted. Semi-structured interviews with supervisors who were supervising the M.Phil and PhD scholars and supervisees who were working on their M. Phil and PhD dissertations were conducted to gain the in-depth understanding of the research problem. These supervisors and supervisees were selected from public sectors universities, established before 2002 or before the advent of Higher Education Commission (HEC) using multi-stage sampling techniques. Interpretative Phenomenological Analysis (IPA) method was used to analyze the interview data. Themes emerged from the analysis of semi-structured interviews of supervisors and supervisees are;basic knowledge of ICT applications, contributions of seminars and workshops in developing ICT skills, point of views of supervisors and supervisees regarding integration of ICT applications during research supervision process, experiences regarding integration of ICT applications during research supervision process and the challenges supervisors and supervisees confront while using ICT applications during research supervision process in public sector universities of Pakistan. Study found that majority of supervisors and supervisees don't have any background knowledge or any previous diploma or degree regarding ICT applications, their whole learning about ICT applications is mostly informal, they mostly learn uses of ICT apps by watching videos on YouTube (Maor

& Currie, 2017).Regarding seminars or workshops, majority of supervisors and supervisees had the opinion that these workshops or seminars were conducted rarely and mostly were on theoretical based, participants are not engaged practically in these workshops. About perceptions findings of the study show that majority of supervisors and supervisees have positive perceptions regarding integration of ICT applications during research supervision process (Mihajlovic, 2012). Regarding practicing ICT applications majority of supervisors and supervisees do not have practical knowledge of ICT applications such as working on different quantitative and qualitative data analysis software, accessing digital libraries, using reference management software and checking plagiarism etc. Challenges regarding integration of ICT applications are of various types such as technical issues, lack of proper training, health related issues and finance related issues which need to be solved (Green and Bowden, 2012).

Conclusion and Policy Recommendations

Study found that Information and Communication Technology have significant contributions in research and supervision process in public sector universities of Pakistan. There is a dire need to conduct the seminars and workshops for the training regarding integration of latest ICT applications in the process of conducting research and facilitating the supervisors and supervisees by using latest ICT applications in the process of supervising M.Phil and PhD scholars.Practical experiences should be provided to the supervisors and supervisees regarding latest software being used in the process of research and supervision such as various software being used for quantitative and qualitative data analysis, various software for reference management, plagiarism checkers and free of cost access to various databases. Efforts should be made to minimize the challenges related to technical, training, health and financial issues confronting by research supervisors and supervisees.

ICT constraints exist almost in every university. If we want to improve our research skills, then we must be well acquainted with these latest software and applications. Therefore, special packages & incentives should be given to resolve this issue and research institutions should arrange ICT related courses both for the supervisors and supervisees. This is the responsibility of HEC and universities to facilitate the researchers regarding integration of ICT during research supervision process.

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