Providence of online education at university level in the backdrop of COVID-19 pandemic: Insights from Pakistan

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Abstract

This study aimed at exploring faculty computer self-efficacy and computer attitude towards adoption of online education in the universities of Pakistan in the backdrop of COVID-19 pandemic that obligated the authorities to adopt this mode of education. The abrupt outburst of this world wide pandemic did not give much time for preparing the teachers, so this article is an attempt to investigate beginning, advanced and mainframe level of their computer self-efficacy and computer liking, computer confidence and computer anxiety in the domains of computer attitude. Exploratory sequential mix method design was adopted to gather qualitative data from 18 teachers through focus group discussions and quantitative data through a purposive sample of 200 faculty member with the help of two adapted questionnaires about computer self-efficacy and computer attitude. Findings revealed that mostly the faculty is from beginning to advanced level of computer self-efficacy, whereas they need to build confidence and liking towards mainframe computer use for online education. Supportive information and communication structure, frequent trainings and incentives will help in overcoming the barriers and moving towards successful adoption of online education at country level so that learning arena becomes comfortable when school's out but class's in.

Key words: *computer self-efficacy, computer anxiety, computer confidence, computer liking, Covid-19 pandemic, online education*

Introduction

Information and communication-based education at higher education level is becoming inevitably important these days. ICT integration into teaching- learning process helps in combating digital divide, bringing about digital learning opportunities and paradigm shift in learning environment from teacher centered to learner centered approaches. Blended and Online education have become latest trends today. Active exploration for successful implementation of e-learning is being carried out throughout the world. Although many models for application of blended and on-line education have emerged but these are still being used as a supplement to regular education. So, we can deduce that since recent times, on-line education lacks practical application scenario on large scale (Sengkey, Paturusi, Sambul & Gozali, 2019).

It is an admitted fact that online education has many benefits if embedded properly; such as free, easy and time flexible access to learning material. Furthermore, online education excels in teaching milieu by using simulations, on-line learning modes such as learning management systems and helps in keeping a scientific track record of the learner/student. Online education allows convenient and efficient access to learning opportunities provided both parties; teachers/instructor and students/learners have proper internet connectivity. Researches state that face-to-face education has a high positive effect on self-efficacy but in the scenario of online education, its consequences are less vibrant (Prior, Mazanov, Meacheam, Heaslip & Hanson, 2016).

Moore and Kearsley (2012) have concluded that online teaching-learning scenario enhances the capacity of the educational systems, expands the cost effectiveness of learning resources, improves the quality of existing educational structures, offers a combination of education with family life and work life, delivers educational material to specific target audiences and lastly adds an international dimension to the educational/learning experiences. Finch and Jacobs (2012) while discussing best practices of online education stated compensations such as increased opportunities to access with experts of the field locally and globally, reducing cost and time, allowing for adjustments to the learning content and providing flexibility to access learning material at one's own convenience.

Apart from the benefits of online learning, there are multiple challenges associated to this practice also. Instructors may not have digital readiness to accept this mode of teaching, information and communication technology infrastructure may not be supportive, learners may not have technological skills, insufficient internet connectivity, content development and assessment issues are the most prevailing challenges identified by several researchers (Akçayır & Akçayır, 2017; Kebritchi, Lipschuetz & Santiague, 2017). So, we can conclude that for all online education's potential, there are still some key difficulties holding it back. And the sooner we tackle these challenges, the sooner we'll be able to unleash its potential.

The global pandemic's (COVID-19) outbreak by the end of 2019 was declared a major public health emergency by China. Later on, World Health organization declared this outbreak as a Public Health Emergency of International Concern on 30thJanuary 2020. After getting positive COVID-19 cases from February 2020 onwards, Government of Pakistan initiated a complete lock down on 1st April, 2020. But before this, educational institutions were closed in order to stop major spreads of the Corona virus cases. Abrupt closure of educational institutions at all levels created a chaotic situation as no one was ready to cope with the situation. Talking about universities and professional colleges, they were in a confused state due to semester system that gives very little margin for completion of stipulated teaching credit hours.

Higher Education Commission, Pakistan notified all the higher education institutions having well-built learning management systems to initiate online classes. Moreover, this commission clarified that universities facing technical, technological and spatial limitations can remain closed and this period be marked as summer vacations. It was further guided to make arrangements for conduction of online classes. This situation came as a novel condition for not only the teachers but students as well. It is an admitted fact that blended learning and online education are emerging trends, yet the developing countries are in a very preliminary phase of adopting them. Now as this situation rose, even those higher education institutions with well-equipped learning management systems were is a confused state of affairs. Digital readiness on part of administration, faculty and students is required for adopting such changes. Current scenario reflects that people and institutions have varying levels of preparedness for using online learning resources. These varying levels may ultimately raise the chances that either online education may have positive or negative consequences at both ends of teaching and learning.

This study tries to investigate faculty's attitude towards computer usage and computer self-efficacy in using computers for online education. As discussed earlier, this pandemic did not give time for preparation of virtual education so the teachers started working according to their own computer liking, computer confidence, computer anxiety and computer self-efficacy.

Review of the related literature

Computer self-efficacy and teaching faculty

The term computer efficacy is used for the phenomena that deals with the confident usage of computer, acceptance of computer technology and learning new skills about the computer for improving teaching and learning process(Scherer & Siddiq,2015; Compeau, Gravill, Haggerty, & Kelley, 2015). Many studies have approved that computer self-efficacy is an important skill for teachers as it is very helpful in facilitating the process of teaching and learning(Yusuf, 2005,Aran, & Yagci, 2016) .This confidence of computer usage and acceptance is very helpful for teachers of present era as it is considered the most rich era of technology. Yeşilyurt, Ulaş, & Akan, (2016) considered it an important element of the self-efficacy of teachers in present era. Their research documented the results that there is a strong relationship

between self-efficacy, computer efficacy and utilizing computer in the process of teaching and learning. Popper (2012) presented the view that the inclusion of technology in the process of teaching and learning is emerging as new "learning culture" that includes the self-paced and self-regulated learning process along with the teacher planned learning activities. He further asserted that another dimension of technology induced learning includes collaborative learning activities in which both teacher and students need to have a good command on the usage of computer as well as other technologies and skills that are essential for effective use of this methodology. So, it becomes imperative for prospective teachers to be technologically equipped. Aran, Derman, & Yagci, (2016), quoted many researches stress proper usage of computer and technology in teaching and learning for adopting online education.

Many researchers highlighted that there are some elements that can play very crucial role in the attitudes and application of teachers' use of computer induced teaching practices. These elements included teacher's beliefs about significance of technology, their competence in adopting the technology basedteaching techniques, their experience of including technology in their task of teaching, and their positive opinion about the usage of technology for teaching (Anderson, & Maninger, 2007; Çetin, & Güngör, 2014; Govender, & Govender, 2009; Sang, Valcke, Braak , & Tondeur,2010;.Kaya, & Koçak Usluel, 2011;Sang, Valcke, Braak, Tondeur, & Zhu, 2011). Baturay, Gökçearslan, & Ke (2017) concluded that adoption of ICT in the teaching has become a prerequisite shift in the paradigm of teaching practices. Without this paradigm shift, it will not be possible for prospective teachers to adapt to the teaching demands of 21st century. Furthermore readiness, perception and behaviour of prospective teachers also play a vital role in their adoption of technology for teaching.

Attitude of teachers towards use of computer for online education

In current era, computer and technology has become a very important skill for students in general and teachers in specific. In this respect teachers need to have an accepting and adopting behaviour towards technology and computer-based learning as a source of creating indulging and conducive environment towards online education. Yeşilyurt, Ulaş, & Akan, (2016) verified that the along with the academic self-efficacy, computer self-efficacy is also an important factor for adopting online education. Baturay, Gökçearslan, & Ke, (2017), conducted a study to explore the relationship of attitudes of teachers towards adoption of the technology for online education. They summed up that facilities such as ownership of a computer, access of internet facility, and time spent daily on computer use has no relationship towards utilizing computer in teaching.

Computer anxiety in using computers for online education

Achim and Al Kassim, (2015) described computer anxiety as state of an individual where they can experience negative emotions like fear, worry or distress while using computer or feeling inability to cope with use of advanced level of applications for different purposes. This situation creates stress and anxiety on part of the employee. Their study concluded that a weak relationship prevails among the variables of computer anxiety and computer self-efficacy. They further explained that this state slightly affects self-efficacy of teachers in this regard. Baydas and Goktas, (2016) conducted the study to explore the factors that affect the intentions of teachers about using computer and technology tools for their teaching. They explored that gender and universities do not contribute to the perceptions of students about usefulness, ease and anxiety towards computer usage, while the factor of department or subject do have influence on the aspects of anxiety, intention and perceptions of usefulness of computers. Aslan, and Zhu (2017) conducted the study to explore the extent to which the intention of using technology for teaching is affected by variables like competence, attitudes and anxiety affect the notion of utilization of technology for teachers in Turkey. The study concluded that computer technology related courses and competence in using computers or technology related programs can help in reducing the level of anxiety in teachers and as a result can increase the chances of the integration of technology in their teaching. Kitchakarn, (2015) stated that ability to use computer affects the attitude towards utilizing technology in teaching whereas difficulty/inability to use computer creates anxiety in adopting online education.

Confidence to use computer for online educational purposes

Merç, (2015) stated that teachers who have more knowledge and practice in the field of computer technology were found to be more confident and had a positive attitude towards using Information communication technology in their future online teaching. Demirel, and Akkoyunlu. (2017) concluded that teachers with computer skills showed a high tendency towards lifelong learning. While Achim, & Al Kassim, (2015) inferred in their findings that teachers are confident in their usage of computer due to readiness to accept the new technology and the ability to modify their behaviors according to the demands of current era of technology.

Açıkgül, and Aslaner, (2015) summarized that teachers have not indicated any difference in confidence due to gender or grade level but difference of confidence in using technology induced teaching strategies was affected by the factors of ownership and frequency of computer usage. Sen and Temel, (2016) suggested that for development of computer usage confidence in teachers it is necessary that they should be provided the opportunity to develop technological, pedagogical content knowledge during their pre-service teacher education programs.

Computer liking for online educational purposes

Williams (2015) quoted that computer liking refers to the state of enjoyment while using computer for teaching-learning process. Zogheib (2015) concluded that computer trainings provided to teaching faculty have a positive effect on the computer

liking attitudes of them. Many studies show that teachers have shown liking towards usage of computer in their teaching due to its usefulness, ease of use, wider benefits as virtual classroom and laboratory creation in cases like unavailability of laboratories etc. Sometimes the trainings or learning provided to the teachers during their educational sessions or the IT related courses also created the positive effect on prospective teachers in the form of creating liking for using computers in teaching process (Koksal, Yaman, & Saka, 2016; Hursen,2018). Sachdeva (2016) stated that an individual's attitude towards computer as an effective tool for teaching is dependent upon some factors and liking of computer is one of these factors. Some other factors enlisted in this study are confidence of using computer programs, anxiety felt during using computer, utility and value. He further states that this liking towards using computer motivatesteaching faculty for learning and enhances their ability to use computer for online teaching.

Conceptual framework

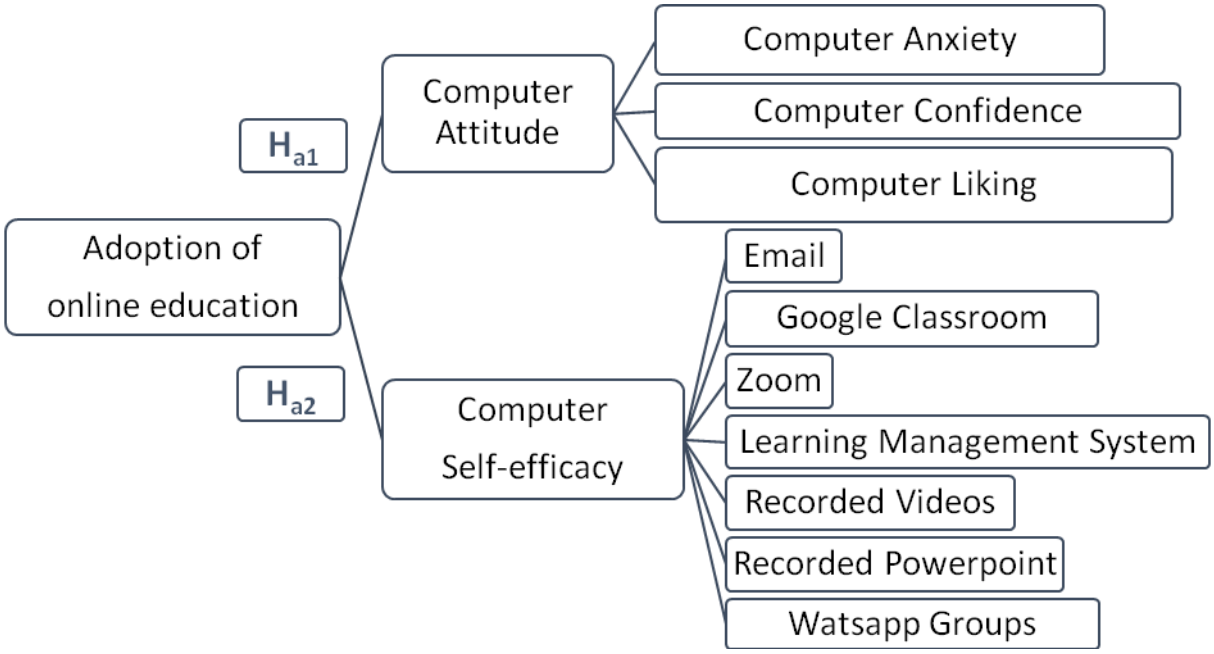

Figure 1: Conceptual framework of the study

The conceptual framework of this study was adopted taking in view current scenario of faculty's shift towards online education. Best practices in online education include teachers' liking and confidence for computer use and overcoming the anxiety in this regard. In addition to this, computer self-efficacy in adopting different modes also add up towards best practices in online education. In the current scenario, paradigm shift from face to face teaching towards online education was an epiphany and defining moment for universities. Online education requires tutor attitude towards effective use of computer as it serves the basis of multiple modes of online education. Attitude is based on confidence and anxiety in using computer and liking for it. If

teachers show a positive attitude towards computer use, then computer self-efficacy in using different available modes of online learning become imperative for best practices in the field. Researches also suggest that computer attitude and computer self-efficacy are strong predictors for adopting online/computer supported education (Yeşilyurt, Ulaş & Akan, 2016; Birisci & Kul, 2019; Bacos & Grove, 2019; Teck, Hanafi & Osman, 2019). Based on previous researches and intensive literature review following research objectives and hypotheses were formulated for exploration:

Research Objectives:

1. Examining faculty's computer attitude towards adopting online education in universities of Pakistan.
2. Investigating faculty's computer self-efficacy towards adopting online education in universities of Pakistan.

Hypotheses:

H_{a1} Adoption of online education is dependent on faculty's computer attitude in universities of Pakistan.

H_{a2} Adoption of online education is dependent on faculty's computer self-efficacy in universities of Pakistan.

Methodology

This study adopted exploratory sequential mixed method design which is characterized by an initial qualitative phase of data collection and analysis, followed by a phase of quantitative data collection and analysis, with a final phase of integration or linking of data from the two separate strands of data. For the purpose of gathering qualitative data, focus group sessions of 30 minutes were carried out through online mode. Each focus group consisted of 8 participants from two public sector universities of Islamabad region. As it was an online discussion so meet.google.com and zoom meeting were used to support the meetings. Data was analysed through extracting codes after transcription (Interpretive codes), which was further triangulated through quantitative analysis. For quantitative data collection, modified computer self-efficacy questionnaire by Murphy (1989) consisting of 20 statements and the computer attitude scale by Loyd & Gressard (1984) were utilized to gather the data from a purposive convenience sampling of 200 faculty involved in taking online classes after abrupt closure of universities due to COVID-19 pandemic. On the basis of data received from focus group discussions, self-efficacy scale was divided into three sections showing the levels of efficacy. These three sections were labelled as beginning level, advanced level and mainframe level. Furthermore, this questionnaire was adapted as five-point likert scale type. The computer attitude scale measured three subscales, namely, computer anxiety, computer confidence and computer liking. The other questionnaire measured self-efficacy in using learning management system, google classroom, zoom meeting, emails, recorded videos, recorded power point slides and WhatsApp groups.

Results and Findings

Phase I: Qualitative Data Analysis

Phase I constituted analyzing data collected from 2 focus groups having 8 participants in each group. Following interpretive codes were generated from broad themes:

Table1: Themes and interpretive codes (n=16)

Participants	Themes	Interpretive codes
P1	I use computer very frequently because it makes things easy so had no problem in shifting towards online education	Liking for computer use
P2	Computers are uncomfortable to use and I feel anxious when I have to use it.	Anxiety in using computers
P3	I am not very skillful in using computers but have confidence that frequent trainings will make me expert	Confidence in using computers
P4	I feel comfortable in using zoom instead of university's learning management system or google classroom.	Self-efficacy in using zoom
P5	For me, it is difficult to make presentations, record and then upload them. I feel comfortable in searching from You Tube.	Anxiety in making recordings. Self-efficacy in using You Tube
P6	I am not sure whether the I will be able to handle technical issues related to computer use in online mode.	Anxiety in handling technical issues of computers
P7, P16	I feel that I am unable to operate certain devices or use certain programs, and do not know what to do with the devices or programs and I feel that I would not be able to keep up with the development of computer technology.	Lack of self-efficacy in using computers
P8, P15	I lack easy access to computers so I a more comfortable in face to face teaching.	Lack of liking for computer use
P9, P 13	I am not confident whether my university administration will facilitate and provide latest ICT support.	Lacking confidence
P10	Use of computers in online education demands that too much time be spent on technical problems.	Lack of liking for computer use
P11	Online education through computer use is successful only if there is cooperation from students.	Confidence is using computers
P12, P 14	I am fully aware how to use learning management system as I have been using it regularly,	Self-efficacy in LMS use.

Focus group discussion were carried out among 2 groups (8 participants each group) in two public sector universities of Islamabad region. The researcher personally acted as the facilitator of the focus group sessions. Each session lasted for 30 minutes and the mode was online through google meet. After meetings, notes were transcribed, summarized and results were interpreted through interpretive codes. The data clearly states that focus group participants highlighted that either they have liking or no liking for computer use which is precedent of adopting online education with ease or difficulty. These findings are in line with the multiple studies conducted previously(Haron, Hanafi, Ahmad, Zainal, Mamat, & Yusof, 2018; Kaufman & Buckner, 2019). Research questions related to preparation level, coping up and recovery plan are answered in multiple dimensions. Interpretive codes state that teachers did not get time for preparation to switch towards online education in a scientific manner with proper training and infrastructure. The pandemic situation pushed them to adopt intensive computer use without much readiness and preparedness. As far as recovery plan is concerned, the participants illuminated that if they get proper training, cooperation from university administration and readiness on part of students for the adoption of online education mode, they will be able to use this path smoothly and effectively. Furthermore, the participants reflected that they are efficient is using some tools like Zoom, Google meet but if provided proper training, will be able to use learning managements systems effectively and efficiently. Additionally, support from university management, extensive trainings and peer support will help them to overcome the computer anxiety, thus enabling them towards computer self-efficacy. These findingsare totally consistent with the work done by Awofala (2019) and Thongsri, Shen,& Bao (2019).

Phase II: Quantitative Data Analysis

Table 2: Demographics of respondents (n=200)

Gender	N	%age
Male	110	55%
Female	90	45%
Age of Males		
Years <35	40	37%
Years 35-45	45	41%
Years > 45	25	22%
Age of Females		
Years < 35	25	31%
Years 35-45	30	38%
Years > 45	25	31%
Computer Experience		

of Males		
Years < 3	45	41%
Years 3-6	40	37%
Years > 6	25	22%
Computer Experience of Females		
Years < 3	30	38%
Years 3-6	25	31%
Years > 6	25	31%

Demographics table indicates that 55% male teachers and 45% female teachers took part in this quantitative survey. For males age less than 35 years was 37%, between 35-45 years was 41% and greater than 45 years was 31%. For female faculty, 31% were less than 35 years of age, 38% comprised of age between 35 to 45 years and 31$ were above 45 years. As far as computer experience is concerned, a novel finding states that male faculty with 3 years of experience is the major lot at 41% whereas among females, it was 38% with 3 years' experience.

Table 3: Analysis of computer self-efficacy scale (n=200)

Tools for computer self-efficacy	Frequency	Percentage
Email use	200	100%
Google classroom	150	75%
Zoom Meeting	110	55%
Learning Management System	90	45%
Recorded Videos	190	95%
Recorded Power point	190	95%
Wats App Groups	200	100%

Table 3 highlights the use of various tools for computer self-efficacy. These tools were listed according to the responses of participants. Most frequently used tools included email and Wats App (100%) as these are easy to use and accessible to all. Second option showing computer self-efficacy is related to use of recorded videos and recorded power point slides (95%), Teachers felt confident in using these thus reflecting their efficacy and confidence for these tools for online education. Google classroom use is 75% whereas zoom meetings for live/recorded sessions is 55%. It is an alarming finding that only 45% respondents have shown self-efficacy in using learning management system being provided by the universities.

Table 4: Descriptive Analysis of Computer Self-efficacy Scale related to beginning level of computer use(n=200)

Beginning level (Computer Self-efficacy scale)	***SDA***	***DA***	***N***	***A***	***SA***	***M***	***SD***
I feel confident working on personal computer for online education	5%	15%	4%	55%	21%	4.2	1.1
I feel confident choosing a data file to view on a monitor screen and sharing it with others screens	19%	18%	26%	22%	15%	**2.9**	1.3
I feel confident making selections from an onscreen menu	15%	23%	32%	13%	17%	3.0	1.2
I feel confident storing software correctly	6%	4%	5%	38%	47%	4.2	1.1
I feel confident adding and deleting information to and from a data file	0%	1%	11%	51%	38%	**4.3**	1.1
I feel confident in using available softwares for conducting online classes	50%	15%	10%	15%	10%	2.0	0.7
I feel confident escaping/exiting from a program or software	35%	25%	05%	20%	15%	3.0	
						Mean of means3.93	

Above mentioned table displays lowest mean score for the statement " I feel confident choosing a data file to view on a monitor screen and sharing it with others screens" as 2.9 and highest mean score for the statement " I feel confident adding and deleting information to and from a data file" as M=4.3. It means that the respondents do not feel condiment in handling data files for sharing purposes on screen whereas they felt confident in adding/deleting information from respective data files. These statements are under the domain of beginning level related to computer self-efficacy scale. Overall mean of means of this scale is M=3.93, meaning that average skills are present at beginning level sub scale of the self-efficacy instrument.

Table 5: Descriptive Analysis of Computer Self-efficacy Scale related to advanced level of computer use (n=200)

Advanced level (Computer Self-efficacy scale)	***SDA***	***DA***	***N***	***A***	***SA***	***M***	***SD***
I feel confident using the user's guide/manual provided by my university when help is needed.	2%	1%	9%	49%	40%	**4.4**	1.1
I feel confident learning to use a variety of programs (software) for online education.	15%	17%	32%	13%	23%	3.1	1.2
I feel confident learning advanced skills within a specific program (software)	2%	10%	0%	49%	40%	4.1	1.1
I feel confident using the computer to organize information for online education.	17%	15%	13%	33%	22%	2.9	1.3
I feel confident writing simple programs for the computer to be used in online education.	40%	48%	9%	02%	01%	2.5	1.7
I feel confident using the computer to make student assessments for online education.	40%	40%	6%	05%	09%	2.3	1.6

I feel confident explaining why a program (software) will or will not run on for online educational purposes.	30%	48%	4%	07%	11%	**2.2**	1.2
Total							**3.07**

Table No.5 illuminates that the statement "I feel confident using the user's guide/manual provided by my university when help is needed" has highest mean score as M= 4.4, whereas another statement " I feel confident explaining why a program (software) will or will not run on for online educational purposes" shows a lowest mean score of M= 2.2 on the subscale of advanced level related to self-efficacy instrument. It can be concluded that teachers feel confident in using soft wares for online education when they have proper guidelines with them, otherwise they don't possess previously acquired specific skills to implement in this situation. Furthermore, as they have no specialized training to run new software programs to enhance learning through online education. Mean of means M=3.07 indicates that respondents mostly do not agree that they possess advance level computer self-efficacy.

Table 6: Descriptive Analysis of Computer Self-efficacy Scale related to mainframe level of computer use (n=200)

Mainframe level (Computer Self-efficacy scale)	***SD A***	***DA***	***N***	***A***	***SA***	***M***	***SD***
I feel confident logging onto a mainframe computer system.	15%	23%	32%	13%	17%	**3.0**	1.2
I feel confident in working on university learning management system for online education.	17%	15%	13%	33%	22%	2.9	1.3
I feel confident is using multiple recording soft wares to record my lectures	40%	48%	9%	02%	01%	2.5	1.7
I feel confident to embed multiple files for later use in online education.	40%	40%	6%	05%	09%	2.3	1.6
I feel confident in using multiple resources for retrieving relevant material for my lectures.	30%	48%	4%	07%	11%	2.2	1.2
I feel confident in logging out of mainframe computer system after saving soft files at proper place.	30%	48%	4%	07%	11%	**2.1**	1.2
Total							**2.5**

Table No 6 describes that respondents' highest mean score was on the statement " I feel confident logging onto a mainframe computer system", M= 3.0 where as they scored least on the statement " I feel confident in logging out of mainframe computer system after saving soft files al proper place", M= 2.1. It can be deduced that the teachers have appropriate skills to log into mainframe computer system but they are not skillful to log out of the system after properly saving the recorded/embedded files, Overall mean of means of the subscale of the research instrument related to main frame level is M=2.5, indicating that respondents disagree mostly that they have computer self-efficacy in acquiring main frame level for online education.

Table 7: Distribution of Computer Attitude Scale (n-200)

Predictor	Level (range of score)	Frequency	Percentage	Mean	Std.Dev
Computer attitudes	Low(40-90)	70	35%	106.84	24.87
	Moderate (91-130)	90	45%		
	High (131-200)	40	20%		

As displayed in Table 7, 45% of the respondents indicated a moderate level of computer attitude towards online education. Whereas 35% reflected low computer attitude and only 20% have shown a high level of this.

Table 8: Descriptive analysis of computer attitude scale related to computer liking (n=200)

Computer liking (computer attitude scale)	*SDA*	*DA*	*N*	*A*	*SA*	*M*	*SD*
I would like working with computers.	5%	15%	4%	21%	55%	**4.2**	1.2
The challenge of solving problems with computers does not appeal to me.	19%	18%	06%	42%	15%	3.6	1.1
I think working with computers would be enjoyable and stimulating.	15%	23%	32%	13%	17%	**3.0**	1.3
Figuring out computer problems does not appeal to me.	6%	4%	5%	38%	47%	3.8	1.2
Once I start to work with a computer, I would find it hard to stop.	0%	1%	11%	51%	38%	4.0	0.9
I will do as little work with computers as possible.	15%	15%	05%	50%	15%	3.9	0.7
						Mean of means3.7	

Table No 8 displays the mean scores of sub scale "computer liking". The highest mean score in this subscale is M= 4.2 for the statement "I would like working with computers', thus showing that respondents stronglyagree towards working computers for online education. Whereas lowest mean score M= 3.0 was for the statement "I think working with computers would be enjoyable and stimulating'. Thus, it means that respondents have a liking towards working with computers but do not have much confidence that this venture will be stimulating and enjoyable or not. Moreover, mean of means M= 3.7 indicates that respondents mostly agree to the statements of this subscale.

Table 9: Descriptive analysis of computer attitude scale related to computer confidence (n=200)

Computer confidence (computer attitude scale)	***SDA***	***DA***	***N***	***A***	***SA***	***M***	***SD***
I am sure I could do work with computers.	19%	18%	06%	42%	15%	3.6	1.2
I don't think I would do advanced computer work.	10%	05%	05%	40%	40%	**3.9**	1.1
Generally, I would feel okay about trying a new problem on the computer.	55%	10%	05%	15%	15%	2.9	0.7
I'm no good with computers.	45%	15%	10%	15%	15%	**2.8**	0.9
I'm not the type to do well with computers.	55%	25%	0%	10%	10%	3.0	1.1
I am sure I could learn a computer language.	10%	15%	15%	30%	30%	3.7	1.3
I have a lot of self-confidence when it comes to working with computers.	15%	05%	05%	40%	35%	3.8	0.9
						Mean of means3.3	

This table indicates that overall mean of means M=3.3 for the sub scale of computer confidence. It means that all respondents show slight agreement towards the given statements. Lowest mean score M=2.8 reflects that respondents lack confidence towards computer use whereas highest mean score M= 3.9 for the statement "I don't think I would do advanced computer work" specifies that respondents mostly agreed that doing advanced computer work is not easy task for them.

Table 10: Descriptive analysis of computer attitude scale related to computer anxiety (n=200)

Computer anxiety (computer attitude scale)	***SDA***	***DA***	***N***	***A***	***SA***	***M***	***SD***
Computers make me uncomfortable.	40%	40%	05%	06%	09%	2.3	1.6
It would not bother me at all to take computer trainings.	48%	30%	04%	07%	11%	**2.2**	1.2
I feel aggressive and hostile toward computers.	40%	04%	30%	15%	11%	2.9	0.9
I do not feel threatened when others talk about computers.	10%	05%	05%	40%	40%	**3.9**	1.2
Computers do not scare me at all.	18%	10%	05%	32%	35%	**3.9**	1.1
Working with a computer would make me very nervous.	40%	40%	05%	06%	09%	2.3	1.1
Computers make me feel uneasy and confused.	45%	31%	06%	04%	14%	2.5	0.9
						Mean of means 2.8	

Table No 10 indicates that lowest mean score M=2.2 is for the statement that respondents do not agree that they are not bothered about computer trainings. It means that they take such trainings seriously for competence building. Highest mean score M= 3.9 reflects that

respondents are not at all threatened when other talk about computers, nor they are scared of using them.

Discussion and Conclusion

This study involved around investigating teachers' computer attitude and computer self-efficacy in adopting online education at higher level in Pakistan. Existing scenario developed in the back drop of COVID-19 pandemic gave a panoramic view of how successful was the current practice of shifting towards online education without much preparation. Qualitative analysis illuminated that faculty had some anxiety and lack of confidence is abrupt shift towards online education. However, the respondents are hopeful that with proper training and infrastructure support, they will be able to recover from this shock and cope up in a more efficient manner. Same findings had been highlighted by Teck,Choo, Hanafi & Osman (2019). Another novel finding of this study states that less teachers considered learning management systems provided by their universities as major tool for online education. Instead they were using outside sources such as zoom and google. Meet for live sessions. The reason for this may be lack of training for the proper use of LMS, whereas for outside tools, easy help is available through YouTube videos etc. Scores on computer self-efficacy scale indicate that teachers need to move from beginning level towards advanced and main frame levels. Zheng, Wang, Doll, Deng & Williams (2018) state that effectiveness of online education is positively correlated to teachers' enhanced computer self-efficacy. Furthermore, it is suggested that supportive organizational environment can lead towards successful implementation of online education. Teachers with advanced level computer skills ensure successful adoption of synchronous and asynchronous modes of learning in this arena of "school's out but class's in". Similarly, faculty need to overcome computer anxiety or "technophobia", as a term that describes resistance, fear or anxiety towardscomputers that transcend age and other demographic boundaries (Ben-Jacob & Liebman, 2009) in order to show confidence and liking towards computer use for online education.Scientific research also indicates that individuals with suchadverse psychological reactions to computing technologies will generally under-utilize computing-intensiveenvironments or avoid interacting with computing technologies" (Vician & Davis, 2002). Providing proper environment, support and extensive trainings will help faculty cross the hurdles such as computer anxiety, lack of confidence for using computers and develop liking for them. University management has a realization that large-scale online education in this pandemic crisis requires empowered, confident virtual teachers/instructors instead of anxious online teachers, and enormous measures are being taken to integrate technology for online education through empowerment of faculty and students.

Recommendations

1. Strong and supportive ICT infrastructure is need of the day as the pandemic situation may prevail longer than expected.

2. Frequent training may be given for the use of university learning management system so that the teachers do not confuse students by using multiple outside sources.
3. Students may be provided guides/manuals with proper instructions for using online sources. This will facilitate the teachers if their students have technological know- how for using online resources.
4. Faculty may be provided a support system in the form of a dedicated go-to-person or staff support.
5. Faculty may be empowered in the domains of making online course packs, online assessments, online quizzes and conducting online sessions without disruptions.

References

Achim, N., & Al Kassim, A. (2015). Computer usage: the impact of computer anxiety and computer self-efficacy. *Procedia-Social and Behavioral Sciences*, *172*, 701-708.DOI: 10.1016/j.sbspro.2015.01.422

Açıkgül, K., & Aslaner, R. (2015). Investigation of TPACK confidence perception of prospective elementary mathematics teachers. *Journal of Education Faculty*, *17*(1), 118-152.DOI: http://dx.doi.org/10.17556/jef.04990

Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. *Educational Research Review*, 21-11.https://doi.org/10.1016/j.edurev.2016.11.002

Albugami, S., & Ahmed, V. (2015). Success factors for ICT implementation in Saudi secondary schools: From the perspective of ICT directors, head teachers, teachers and students. IJEDICT, 36-54.https://www.learntechlib.org/p/151051/.

Anderson, S. E., & Maninger, R. M. (2007). Preservice teachers' abilities, beliefs, and intentions regarding technology integration. Journal of Educational Computing Research, 37(2), 151-172.https://doi.org/10.2190/h1m8-562w-18j1-634p

Aran, Ö. C., Derman, İ., & Yagci, E. (2016). Pre-Service Science and Mathematics Teachers' Thoughts about Technology. *Universal Journal of Educational Research*, *4*(3), 501-510.https://doi.org/10.13189/ujer.2016.040305

Aslan, A., & Zhu, C. (2017). Investigating variables predicting Turkish pre- service teachers' integration of ICT into teaching practices. *British Journal of Educational Technology*, *48*(2), 552-570.https://doi.org/10.1111/bjet.12437

Awofala, A. O., Olabiyi, O. S., Awofala, A. A., Arigbabu, A. A., Fatade, A. O., & Udeani, U. N. (2019). Attitudes toward Computer, Computer Anxiety and Gender as determinants of Pre-service Science, Technology and Mathematics Teachers' Computer Self-efficacy. *Digital Education Review*, (36), 51-67.https://doi.org/10.1344/der.2019.36.51-67

Bacos, C., & Grove, K. (2019, March). Using Online Education to Improve Traditional Classroom Instruction: A Blended Learning Approach. In *Society for Information*

Technology & Teacher Education International Conference (pp. 374-379). Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/primary/p/207667/

Baturay, M. H., Gökçearslan, Ş., & Ke, F. (2017). The relationship among pre-service teachers' computer competence, attitude towards computer-assisted education, and intention of technology acceptance. *International Journal of Technology Enhanced Learning*, *9*(1). https://doi.org/10.1504/IJTEL.2017.084084

Baydas, O., & Goktas, Y. (2016). Influential factors on preservice teachers' intentions to use ICT in future lessons. *Computers in Human Behavior*, *56*, 170-178.https://doi.org/10.1016/j.chb.2015.11.030.

Berk, Ş., & Yıldız, Y. (2016). Examining Self-Efficacy Beliefs and Attitudes of Prospective Music Teachers Trained with Concurrent and Consecutive Model. *International Online Journal of Educational Sciences*, *8*(4).DOI: http://dx.doi.org/10.15345/iojes.2016.04.009.

Birisci, S., & Kul, E. (2019). Predictors of technology integration self-efficacy beliefs of preservice teachers. *ContemporaryEducationalTechnology*, *10*(1),75-93. https://doi.org/10.30935/cet.512537

Compeau, D., Gravill, J., Haggerty, N., & Kelley, H. (2015). Computer Self-Efficacy. *Human-computer Interaction and Management Information Systems: Foundations: Foundations*, 225.

Demirel, M., & Akkoyunlu, B. (2017). Prospective Teachers' Lifelong Learning Tendencies and Information Literacy Self-Efficacy. *Educational Research and Reviews*, *12*(6), 329-337.https://doi.org/10.5897/ERR2016.3119.

Govender, D., & Govender, I. (2009). The relationship between information and communications technology (ICT) integration and teachers' self-efficacy beliefs about ICT. Education as Change, 13(1), 153-165. https://doi.org/10.1080/16823200902943346.

Haron, H., Hanafi, J., Ahmad, Z., Zainal, K., Mamat, M., & Yusof, A. S. (2018). The Reasons Concerning Teachers' Attitude Toward Computer In Education At Primary Level. *International Journal of Civil Engineering & Technology (IJCIET)*, *9*(5), 326-335.

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen

Hursen, C. (2018). The impact of edmodo-assisted project-based learning applications on the inquiry skills and the academic achievement of prospective teachers. *TEM Journal*, *7*(2), 446-455.

Kaufmann, R., & Buckner, M. M. (2019). Revisiting "power in the classroom": exploring online learning and motivation to study course content. *Interactive Learning Environments*, *27*(3), 402-409.https://doi.org/10.1080/10494820.2018.1481104.

Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems, 46*(1), 4-29.https://doi.org/10.1177%2F0047239516661713.

Kitchakarn, O. (2015). EFL Learners' Attitudes towards Using Computers as a Learning Tool in Language Learning. *Turkish Online Journal of Educational Technology-TOJET*, *14*(2), 52-58.http://www.tojet.net

Merç, A. (2015). Using Technology in the Classroom: A Study with Turkish Pre-Service EFL Teachers. *Turkish Online Journal of Educational Technology-TOJET*, *14*(2), 229-240.

Moore, M., & Kearsley, G. (2012). Distance education: A systems view of online learning (3rd ed.). Belmont, CA: Wadsworth.

Popper, V., Strohmeier, D., & Spiel, C. (2012). Using the internet positively in schools: The case for notebooks. In A. Costabile, & B. A. Spears (Eds.), The impact of technology on relationships in educational settings (pp.77-90). Newyork: Routledge.

Prior, D. D., Mazanov, J., Meacheam, D., Heaslip, G., & Hanson, J. (2016). Attitude, digital literacy and self-efficacy: Flow-on effects for online learning behavior. The Internet and Higher Education, 29, 91-97.https://doi.org/10.1016/j.iheduc.2016.01.001.

Røkenes, F. M. (2016). Preparing Future Teachers to Teach with ICT: An investigation of digital competence development in ESL student teachers in a Norwegian teacher education program.http://hdl.handle.net/11250/2395012.

Sachdeva, R. (2016). *Attitudes towards Computers. An investigation into the use of computers by teachers*. GRIN Verlag.

Sang, G., Valcke, M., Braak, J., & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. Computers & Education, 54(1), 103-112.https://doi.org/10.1016/j.compedu.2009.07.010

Scherer, R., & Siddiq, F. (2015). Revisiting teachers' computer self-efficacy: A differentiated view on gender differences. *Computers in Human Behavior, 53*, 48-57.https://doi.org/10.1016/j.chb.2015.06.038

Sen, S., & Temel, S. (2016). An analysis of prospective chemistry teachers' attitudes towards information and communication technologies, and of their confidence in technological and pedagogical content knowledge. *Participatory Educational Research*, 1-10.http://dx.doi.org/10.17275/per.16.spi.2.1

Sengkey, D. F., Paturusi, S. D. E., Sambul, A. M., & Gozali, C. T. (2019). A Survey on Students' Interests toward On-line Learning Media Choices: A Case Study. *International Journal for Educational and Vocational Studies*, *1*(2), 146-152.https://doi.org/10.29103/ijevs.v1i2.1527

Šorgo, A., Lamanauskas, V., Slavica, Š. Š., Ersozlu, Z. N., Tomažič, I., Kubiatko, M., & Usak, M. (2017). Cross-national study on relations between motivation for science courses, pedagogy courses and general self-efficacy. *Eurasia Journal of Mathematics, Science and Technology Education*, 6497-6508.https://doi.org/10.12973/ejmste/76970

Teck, W. K., Choo, G. S., Hanafi, H. F., & Osman, R. (2019). Computer attitudes and use among novice teachers: the moderating effects of school environment. *Malaysian Journal of Learning and Instruction*, *7*, 93-112.

Teo, T., Milutinović, V., & Zhou, M. (2016). Modelling Serbian pre-service teachers' attitudes towards computer use: A SEM and MIMIC approach. *Computers & Education*, *94.https://doi.org/10.1016/j.compedu.2015.10.022*

Thongsri, N., Shen, L., & Bao, Y. (2019). Investigating academic major differences in perception of computer self-efficacy and intention toward e-learning adoption in China. *Innovations in Education and Teaching International*, 1-13. https://doi.org/10.1080/14703297.2019.1585904

Tunkler, V., Ercan, A. N., Beskirli, M., & Sahin, I. (2016). Relationship between preservice teachers' course attitudes and professional self-efficacy beliefs. *International Journal of Research in Education and Science*, *2*(1), 212-222.https://doi.org/10.21890/ijres.71307

Williams, C. J. (2015). An investigation of K-12 teachers' attitudes toward computer technology use in schools. *Journal of Business & Economic Policy*, *2*(1), 71-87.

Yeşilyurt, E., Ulaş, A. H., & Akan, D. (2016). Teacher self-efficacy, academic self-efficacy, and computer self-efficacy as predictors of attitude toward applying computer-supported education. *Computers in Human Behavior*, *64*, 591-601.https://doi.org/10.1016/j.chb.2016.07.038

Yürekli, B. İ. L. G. E. (2015). Prospective teachers' self-efficacy for preparing and implementing worthwhile mathematical tasks. *Unpublished doctoral dissertation, Middle East Technical University, Turkey*

Zheng, Y., Wang, J., Doll, W., Deng, X., & Williams, M. (2018). The impact of organizational support, technical support, and self-efficacy on faculty perceived benefits of using learning management system. *Behaviour & Information Technology*, *37*(4), 311-319.https://doi.org/10.1080/0144929X.2018.1436590

Zhou, L., Wu, S., Zhou, M., & Li, F. (2020). 'School's Out, But Class' On', The Largest Online Education in the World Today: Taking China's Practical Exploration During The COVID-19 Epidemic Prevention and Control As an Example. *But Class' On', The Largest Online Education in the World Today: Taking China's Practical Exploration During The COVID-19 Epidemic Prevention and Control As an Example (March 15, 2020)*.

Zogheib, S. (2015). Preservice teachers' computer use in single computer training courses; Relationships and predictions.*International Journal of Information and*

Communication Technology Education (IJICTE), 11(3), 77-89.DOI: 10.4018/IJICTE.2015070107