Challenges of On-Line Learning in the Emerging Digitalized Educational Eco-System: A Teacher's Perspective

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Abstract

The adoption of Electronic learning (E-learning) has altogether changed the educational paradigm in higher education institutions around the globe. Technology is getting pervasive in all domains of our lives; therefore, educationalinstitutions are also expected to boost E-learning systems. Their implementation, however, often fails. Literature highlights that the success of education delivery depends primarily on the teachers. Therefore, the purpose of present study is to identify online teaching challenges from teacher's perspective in three major categories, that is, technological, pedagogical, and individual challenges. Discourse analysis using interpretivist approach has been applied on a sample of 5 teachers selected from two public sector universities of Pakistan to conduct the present research study. Data gathered through semi-structured interviews by employing an inductive approach resulted in highlighting 9 major discourses pertaining to on-line teaching challenges for teachers, which need to be addressed to improve overall E-learning success and to deliver high quality web-based education in Pakistan.

Key Words: E-learning, Discourse Analysis, Higher Education Challenges, Human Computer Interaction (HCI)

Introduction

In recent years, the proliferation of digital media and Information & Communication Technologies (ICT) in learning context have been witnessed at a rapid pace, with many extolling electronic learning over classroom based traditional education (Martínez-Cerdá, Torrent-Sellens, & González-González, 2020; Pavel, Fruth, & Neacsu, 2015). Multiple researches defined E-learning as "the use of electronic systems and applications within learning processes" (Teo, Kim, & Jiang, 2020; Moore, Dickson-Deane , & Galyen, 2011). E-learning provides facilitation in remote interaction procedure between learners and teachers/ professors (Wang, Zhu, Chen, & Yan, 2009). An electronic medium has been utilized to deliver learning content "internet, satellite TV, radio, CD-ROM, etc."(Navimipour & Zareie, 2015; Bates & Bates, 2005; Federico, 2000), which encompasses electronic based learning methods "digital collaboration and virtual classrooms". Moreover, in developing countries, E-learning has gained much focus owing to its ubiquitous accessibility, especially from researches comprising wide-ranging diverse cultures and contexts(Lin, 2010). E-learning system has been highly preferred by majority of research community due to amalgamation of synchronous and asynchronous methods (Ali, Uppal, & Gulliver, 2018).

Multiple researches have highlighted the implementation failure of electronic based education by stating that "despite such rhetoric, the long-term adoption, diffusion, and exploitation of e-learning solutions has been much less successful than originally projected" (Vershitskaya et al., 2020; Naveed et al., 2017). For instance, Asia has one of the highest demand growth rates "17.3 percent per annum", yet implementation failure rates and student dropout rates are also increasing; ultimately risking the long-term usage of E-learning system by higher education sector(Ali, Uppal, & Gulliver, 2018). Furthermore, E-learning has been widely adopted in entire education system of Pakistan; however, successful implementation often fails due to the complex combination of challenges that are limiting the success of electronic based learning (Perveen, 2016).

The existence of prevailing paradox "growing public demand, yet failing implementation/acceptance", has gained much attention from researchers and practitioners in the context of E-learning implementation failure challenges (Lee, Yoon, & Lee, 2009). Although a lot of research has been conducted to comprehend the implementation challenges pertaining to E-learning from students' perspective (Al-Gahtani, 2016; Kwofie & Henten, 2011), limited work has been done from higher education teachers' perspective. The present study aimed to identify E-learning implementation challenges by conducting semi-structured interviews from the teachers of higher education institutions ofPakistan.

Literature Review

Understanding E-learning dynamics: Discourse and educational context

In the recent past, discourse has been featured in various educational studies as "an analytic and methodological tool, theoretical frame, realm of implication, and a foundational definition of educational policy" (Anderson & Holloway, 2020; Levinson, Sutton, & Winstead, 2009; Bacchi, 2000). A number of studies in which discourse has been utilized highlightthata wide range of analysis techniques and strategies exist across a continuum of diverse fields and context – "i.e. from micro-interactional phenomena (e.g. what people say), meso-institutional phenomena (e.g. how schools or curricula shape ways of meaning and doing), macro-social phenomena (e.g. how circulating ideologies shape how we see and act in the world), to phenomena that can be traced across and between these scales" (Warriner & Anderson, 2017; Canagarajah & DeCosta, 2016).

Moreover, multiple qualitative and quantitative researches have been conducted pertaining to E-learning and related concepts by utilizing diverse methodologies and analysis tools, for instance, Phenomenology, Grounded theory, discourse analysis, ethnography, and structural equation modeling in quantitative study(Rouleau et al., 2019).However, research pertaining to discourse analysis in E-learning system is still in its infancy in the context of higher education institutions of developing countries. Although E-learning through various platforms offers multiple opportunities for new ways of connectivity and invites innovative pedagogies; however, its implementation often fails due to multiple challenges (Vershitskaya et al., 2020).Though the resistance to the use of technology still remains substantially high in which Human Computer Interaction (HCI) is the fundamental component. There is a need for digital mindset particularly in teaching profession, since every

teacher has different ability and attitude to cope up with technology and rapidly advancing mobile gadgets(Nikoli et al. , 2019).Teachers, especially in higher education sector, are the pivotal component that can contribute to positive outcomes of students; however, they are facing multiple challenges that are causing hindrances in their ways to meet learning outcomes(Nikoli et al. , 2019).

Various perspectives of Discourse Analysis

Multiple researches defined discourse in its broadest sense including "talk, text, and action as well as more broadly circulating narratives, sets of beliefs, and ways of seeing the world" (Anderson & Holloway, 2020). This can be inferred that discourse seems to be the locus of both meaning and/or action; therefore, in line with this discourse can be deemed as a vehicle in making of meaning, doing things, or both (Warriner & Anderson, 2017; Lester J., Lochmiller, & Gabriel, 2017). However, many researchers hold a view that discourse is not neutral; rather it is motivated by multiple factors "by political interests, power relations, ideologies, rhetorical positioning" (Anderson & Holloway, 2020).Moreover in educational context, wide range of components exist that are deemed to be of motivated meaning and action that gains focus for discursive exploration e.g. educational documents, procedures, policies etc. for instance, "it can be understood as situated in texts and/or interactions both by how it is constituted (i.e. what it does) and how it is taken up (i.e. what it is understood to mean)" (Tejedor, Segalàs, & Rosas-Casals, 2018; Gee, 2014).

Moreover, majority of studies highlighted that discourse analysis has been utilized in researches from multiple perspectives "a method of analysis; a methodology; a perspective on social life that involves meta-theoretical, theoretical, and analytic principles; and a critique of mainstream psychology"(Anderson & Holloway, 2020; Crotty, 1998). It is used for both processes i.e. encompass a way of conceptualizing and analyzing language. Discourse analysis has various ranges and varieties, which reveals its multidisciplinary background and point of origin that belong to various branches of body of knowledge "philosophy, sociology, linguistics, psychology, and literary theory"(Hodges, Kuper, & Reeves, 2008; Wood & Kroger, 2000).

According to Wood and Kroger (2000), wide ranging varieties of discourse analysis are not following a single concept since they differ on various dimensions "epistemological position (e.g., constructionist vs. critical realist), ontological positions, nature and role of theory (e.g., as explanatory tool or discursive text available for analysis; as foundational or peripheral), the sorts of data that are analyzed (e.g., researcher-generated or naturalistic), how context is understood and treated (e.g., as background and to be acknowledged or as determinative and to be analyzed), and how claims are warranted (e.g., empirically, theoretically, ideologically)". Moreover, from educational context, majorly two paradigms support the concepts and logics of discourse analysis i.e. structuralism and post-structuralism. Scholars use these paradigms according to the situations and selected type of discourse analysis since there are multiplevarieties from diverse research perspective including "Critical Discourse Analysis (CDA), Poststructuralist Discourse Analysis (PDA), Potter and Wetherell's Discourse Analysis and Semiotic Discourse Analysis" (Gravells, 2017).Various approaches pertaining to discourse analysis are related to

the Frankfurt School's approach to critical theory and operate within a structuralist framework (Anderson & Holloway, 2020).Furthermore, in the context of Critical Discourse Analysis (CDA), some of its forms belong to structuralism; however, the basic tenets of CDA are laid out by Fairclough &Wodak(1997), which encompasses the concept of discourse as "socially mediated action (which can also be seen to align with post-structuralist tenets)".

Theoretical Foundations

Underlying Theories

In context of E-learning, multiple technology adoption theories, diverse learning theories, and consumer behavior theories can be applied (Bean & Bradley, 1986; Bhattacherjee, 2001; DeLone & McLean, 1992). Thus, specifically two theories "i.e. The Cognitive Theory of Multimedia Learning (CTML) and The Native Language Magnet (NLM) Theory" were taken from literature due to their best suited tenets in accordance with the present study.

Mayer (1997) proposed "the Cognitive theory of multimedia learning", often termed as the "multimedia principle", which has its roots in various cognitive theories. CTML advocates the view that ''people learn more deeply from words and pictures than from words alone''. Moreover, it encompasses multiple dimensions as the visualization effect on learning process, process of human information, and successively learning(Clark, & Mayer, 2016; Gress , Fior, Hadwin, & Winne, 2010). Earlier researches highlighted that while teaching a difficult topic, visualization is deemed to be a significant factor to make concepts better understandable, for instance, the atomic particles, neural networks, or solar system (Roberts et al. , 2017). Hence, CTML tenets are best suited in comprehension and adoption of technology-based learning content.

Furthermore, the Native Language Magnet (NLM) theory also termed as Neural Commitment Theory, proposed by Kuhl(1993), provides insights pertaining to developmental changes caused due to native language usage and its impact on student's cognitive ability in learning process. Multiple researches confirmed that regardless of culture, students learn their native language effortlessly and rapidly (Goujon, Lutz, & Samir, 2015)that ultimately leads toward lower cognitive load and increased satisfaction (Filipovi , 2018).

Material and Methods

The present study explores the challenges of on-line teaching from teacher's perspective by considering three major barriers;"technological challenges, pedagogical challenges, and individual level challenges", particularly in higher education sector of Pakistan. Data have been gathered from 5 teachers of two leading public universities of Lahore, Pakistan,that is, Government College University (GCU), Lahore and University of Engineering & Technology (UET), Lahore. Moreover, a semi-structured interview with open ended questions has been conducted from respondents with iterative approach. Qualitative approach has been utilized to design the methodology as well as for data collection procedure. Furthermore, Simple random sampling has been utilized for university selection and the teachers of

Business Department of both the Universitieswere interviewed using purposive sampling to get useful insights particularly from those teachers who were already delivering education through E-learning. There were 3 questions in total andthe collected data were analyzed using discourse analysis though interpretivistapproach. This approach requires complete understanding of the ways in which people explain their responses and interpret their experiences, which is based on their social lives.

Moreover, the data were categorized into themes after transcribing and coding responses of the teachers. In order to reach the results, inductive approach was utilized that assisted in the development of themes from responses of teachers. Then literature was sorted to check the linkage of themes with pre-established theories. Further adding to this, four fundamental elements are deemed to be significant for all categories of research processeswhile selecting components of methodology and related concepts i.e. Method, Methodology, Theoretical perspective, and Epistemology (See figure 1):

Epistemology- "The theory of knowledge embedded in the theoretical perspective and thereby in the methodology"

Theoretical Perspectice- "The philosophical stance informing the methodology"

Methodology- "The strategy, process or design lying behind the choice and use of particular methods and linking the choice & use of methods to desired outcomes"

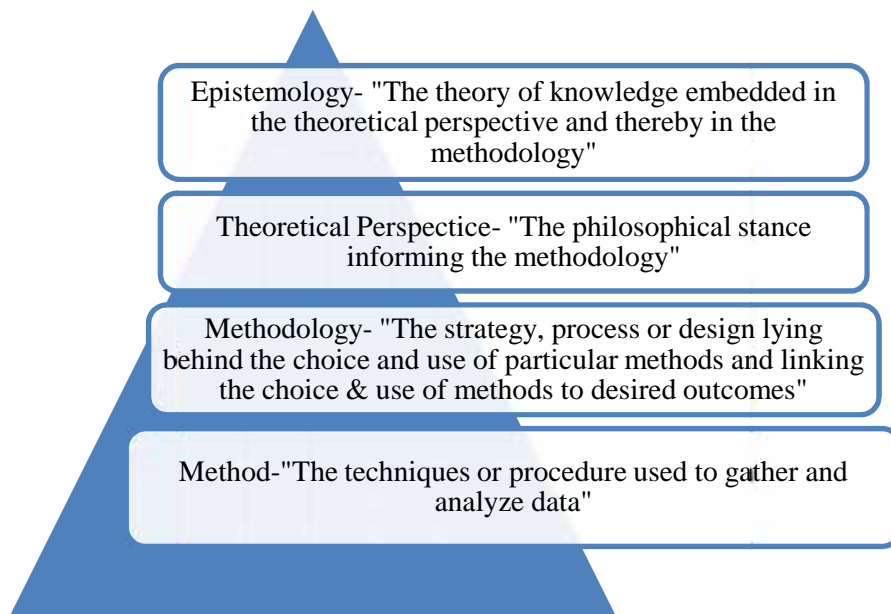Method-"The techniques or procedure used to gather and analyze data"

Figure 1 Fundamental components of research(Crotty, 1998)

Furthermore, in the present study, literature was sorted out by utilizing two-step processes. The first step comprises of sourcing relevant articles from the literature. In this regard, credible and well-established peer-reviewed international journals were utilized, specifically from relevant and reputable publishers; including "EmeraldInsight, IEEE, Jstor, Science Direct, SpringerLink, Wiley, etc." Multiple search terms "including E-learning, technology-based learning, technology-enhanced learning, virtual learning, online learning, ICT-based learning", were utilized in combination with wide-ranging synonyms that expressed the semantics "challenges"; "including issues, barriers, hurdles, problems, success factors, obstacles, challenges, failure".

Besides this, Google Scholar was utilized in order to obtain additional peer-reviewed articles to enrich data and diversity of literature. Review of both i.e. qualitative and quantitative research was done. Moreover, no limitations were applied in any field "such as in result of country of study or educational level"; that showed literature from all domains"i.e. higher education, training centers, organizational trainings etc."

Furthermore, discourse analysis encompassed verbal communication, talk, text, formal speech or writing on a topic that were used by linguistics in order to analyze the linguistic phenomenon (Anderson & Holloway, 2020) and samehas been made applicable while processing the data in analysis section. In the present study, discourses have been constructed by looking at the responses of university teachers since data were categorized into themes after transcribing and coding responses. Then results were linked to the literature that validated the existence of similar E-learning teaching challenges in other parts of the world both in institutions and at nationwide.

Results and Discussion

The collected data were analyzed using discourse analysis through interpretivist approach; hence, transcribing & coding resulted in total 34 major themes pertaining to on-line teaching challenges that were being faced by the teachers, based on which ultimately 9 major discourses were identified (see table 1):

Table 1
Sample of teachers' responses to questions

Questions	Responses to questions	General Themes
	Participant # 1:	
1-What are the biggest technological challenges that are causing barriers in teaching on-line?	"I believe.... the biggest technological challenge is non-availability of high-speed internet. Even in Metropolitans, like Lahore, there are areas where 3G and 4G internet is not available. …	Low bandwidth and weak internet Deficiency of reliable internet connection
	In other cities, the broadband facility is streaming on orthodox speed coupled with excessive	power outage i.e. the loss of the electrical power network supply
2- What are the challenges related to the pedagogical aspects?	load shedding that actually makes it virtually impossible to conduct on-line teaching in a smooth manner. …"	Lack of digital/ computer literacy
	"There are a number of pedagogical issues involved in on-line teaching matrix. The biggest is lack of training for the teachers on the effective management of the use of technology in classroom settings.	Lack of technological proficiency resulting into poor teacher-learner interaction Difficulty in coping

3- What are the individual level challenges that are faced by university teachers?	….. On the other hand, students are also not technology savvy; resulting in poor teacher-learner interaction. ….. Certain applications are not user friendly and it becomes quite hard to manage questions and comments of the students which otherwise, may effectively be managed in a real time interactive class room session."	up with methods of computer-based education
		Occurrence of stress in context of precision of communication and accuracy of content
	"Stress is the biggest challenge that a teacher is undergoing in these situations…. On-line classroom sessions demand mechanical output from a teacher with a lot of accuracy of content and form. The human interaction turned into methodically strict technological boundaries has added a certain pressure on a teacher for want of precision of communication and accuracy of content……Umm .. The anxiety of being recorded is also adding to the personal challenges that a teacher has to bear while delivering a lecture on-line…."	Resistance to change and being recorded

In order to bring more clarity and understanding, complete detail of themes drawn from teachers' responses have been shown below in segregated form (See figure 2):
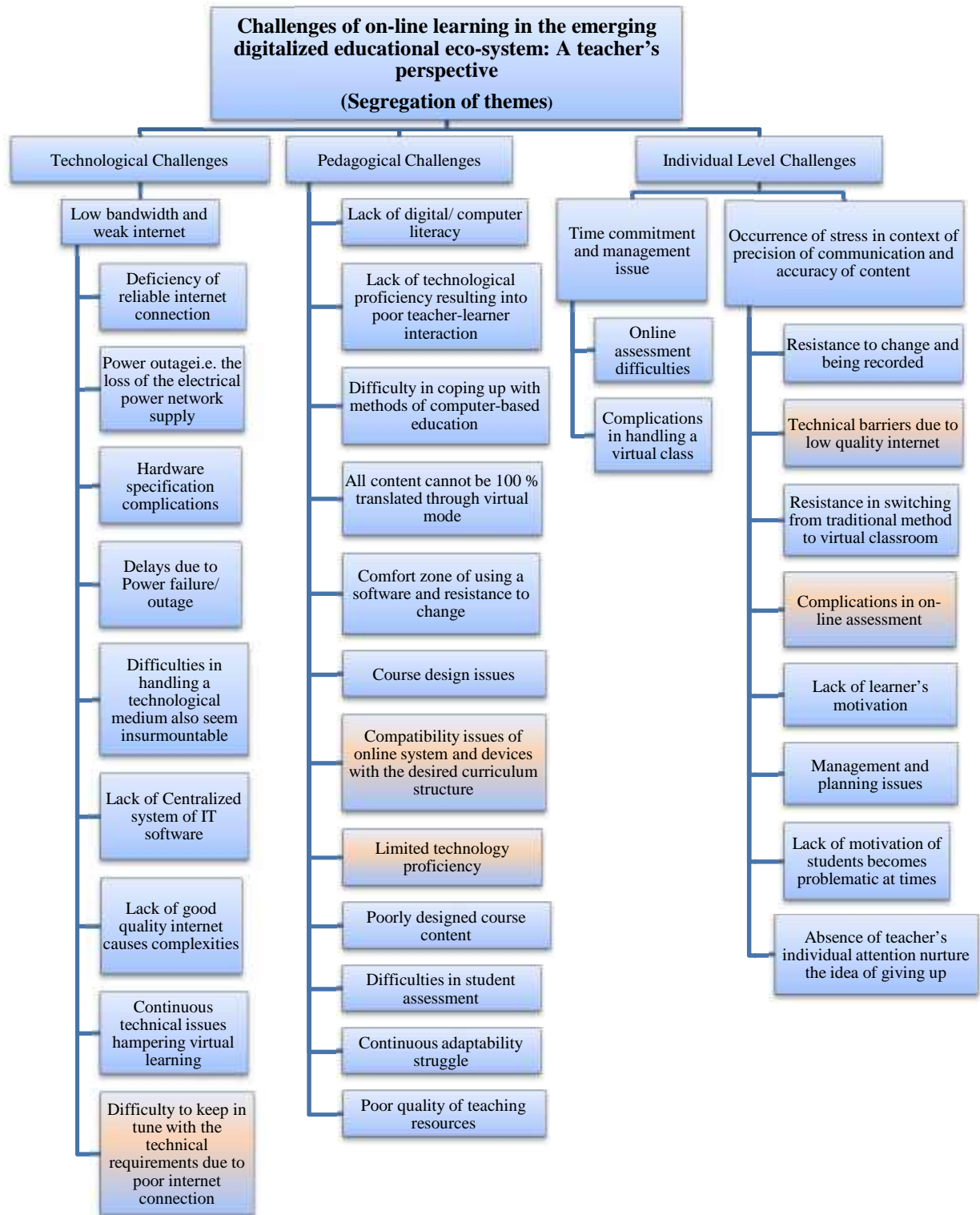
Challenges of on-line learning in the emerging digitalized educational eco-system: A teacher's perspective

(Segregation of themes)

Technological Challenges

- Low bandwidth and weak internet
  - Deficiency of reliable internet connection
  - Power outagei.e. the loss of the electrical power network supply
  - Hardware specification complications
  - Delays due to Power failure/ outage
  - Difficulties in handling a technological medium also seem insurmountable
  - Lack of Centralized system of IT software
  - Lack of good quality internet causes complexities
  - Continuous technical issues hampering virtual learning
  - Difficulty to keep in tune with the technical requirements due to poor internet connection

Pedagogical Challenges

- Lack of digital/ computer literacy
- Lack of technological proficiency resulting into poor teacher-learner interaction
- Difficulty in coping up with methods of computer-based education
- All content cannot be 100 % translated through virtual mode
- Comfort zone of using a software and resistance to change
- Course design issues
- Compatibility issues of online system and devices with the desired curriculum structure
- Limited technology proficiency
- Poorly designed course content
- Difficulties in student assessment
- Continuous adaptability struggle
- Poor quality of teaching resources

Individual Level Challenges

- Time commitment and management issue
  - Online assessment difficulties
  - Complications in handling a virtual class
- Occurrence of stress in context of precision of communication and accuracy of content
  - Resistance to change and being recorded
  - Technical barriers due to low quality internet
  - Resistance in switching from traditional method to virtual classroom
  - Complications in on-line assessment
  - Lack of learner's motivation
  - Management and planning issues
  - Lack of motivation of students becomes problematic at times
  - Absence of teacher's individual attention nurture the idea of giving up

Figure 2 Segregation of themes

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In recent times being the latest wave of education;E-learning has significant implications due to the continuous rapid changes happening throughout the world. Moreover, in order to enhance the capabilities and competitiveness owing to recent pandemic i.e. Covid-19 and multiple other threats, educational institutions and organizations are inclined towards being learning organizations or intelligent organizations. In education sector, digital divide has also been taking place on a larger scale since utilization of digital platforms and information technologies are transforming the education (Soomro et al., 2020; Hillier, 2018). Rowsell, Morrell, & Alvermann(2017) highlighted that "the digital divide is multilayered and includes several related dimensions of computer access, usage, and skill. In terms of physical access, the divide seems to be closing in the most developed countries; concerning digital skills and the use of applications, the divide persists or widens".

However, owing to the easy affordability of handheld devices today, the current meaning of digital divide has been altering from having access to the knowledge of how to use the technologies productively. Therefore, multiple challenges are taking place due to the utilization of information technologies in context of education and more specifically E-learning settings. By eliciting major themes from the teacher's responses, and by removing duplications, 9 discourses regarding E-learning challenge have been identified below:

Discourse 1 - Unstable and unreliable internet connectivity creates one of the leading challenges for on-line learning.

The biggest challenge in online education/teaching is insufficient internet service provision in Pakistan. Pakistan is still not among those countries that are technologically advanced with adequate network infrastructure. Secondly, there are compatibility problems between devices and networks that end up badly stumbling the process of on-line education resulting in less dynamic, less interactive and boring e-teaching and learning experience. Moreover, the quality of sound also hinders teachers' and learners' mutual access and understanding.

Since a strong internet connection is deemed to be indispensable for computer-based education in a virtual classroom; whereas, low bandwidth and weak internet can badly affect the entire process and experience of E-learning. Though Wi-Fi locations can be available but the poor quality of internet connection can hamper the participation of students in the virtual class; hence, resulting into non-fulfillment of learning objectives that have been planned by teachers. All these factors add to teachers' frustration that ultimately reduces students' engagement, which not only disrupts the teaching and learning experience but also results into abandoning of the course by students.

Discourse 2 - Power outage is another major reason why people cannot use electronic learning and internet conveniently.

The power crisis is deemed to be one of the most crucial and a fundamental barrier that has been faced by both teachers and students quite recently; thus, resulting in limitation of their complete engagement in technological based virtual educational setting. In majority of cases, the educational processes mostly count on archaic methods that lower the productivity of the entire-learning experience.

Moreover, multiple factors can be detrimental in web-based learning "i.e. Poor management, failing infrastructure, power outage, and load shedding". Majority of developing countries is facing similar challenges that are hampering the successful adoption of technological based educational learning. Furthermore, in order to deliver quality education through E-learning mode and to access learning material through internet, reliable and predictable supply of electricity is deemed to be the significant factor in this regard.

Discourse 3 - Lack of technical know-how and support is hampering the progress of online learning.

In a virtual learning setting, technical barriers are deemed to be one of the main stumbling blocks that may hamper the smooth functioning of web-based education. Various compatibility issues have been faced by teachers including operating system issues, browser issues, device compatibility i.e. smart phones, tabs etc., resulting in increased cognitive load on teachers and discontinuity of course by students.

Moreover, a strong quality internet connection is required for successful completion of online courses; only then teachers would be able to impart high quality education by solving the technical issues that are being faced by students. It becomes quite difficult for teachers to follow the course management system due to hardware specification complications and also due to weak monitors, which makes their teaching process problematic. For instance, at times technological device i.e. laptop is not that strong to support the longer sessions, which creates frustration for students. Since most of the students live off campus that's why to keep their handheld devices in tune with the ongoing technical requirements becomes hard to follow, ultimately resulting in low grades despite of teachers' efforts.

Discourse 4 - Limited digital literacy creates a challenge for teachers to use different methods for on-line teaching.

Although teachers are generally deemed to be tech savvy; thus, it is believed that they would be better equipped to manage technological devices well i.e. laptop, computer, tab, stylus. However, lack of digital literacy is one of the major challenges among teachers now-a-days. Majority of them are not having expertise to operate basic computer programs i.e. "Microsoft word, Power point, Microsoft excel etc."; therefore, even file handling becomes quite challenging task for most of them. Moreover, fixing of simple computer problems often becomes troublesome for many of them, since they possess limited knowledge in this regard. Technological proficiency is deemed to be a fundamental element to design and utilize different methods and digital platforms for on-line teaching.

Besides this, it will not only assist in management of their entire course systematically but also will require less struggle while conducting virtual class. Having a fundamental knowledge pertaining to computer literacy would assist them in enhancing student's knowledge in their respective fields and would help in smooth web-based education without interruptions and hindrances.

Discourse 5- Lack of skill and knowledge of the teachers in content creation that is pedagogically developed.

One of the major challenges being faced by an E-learning instructor is lack of expertise and insufficient time spent on course development and its design; thus, leading towards poorly developed virtual learning experience. Wang & Okamuru(2020) highlighted that "the time needed to design and implement a well design online course", is a significant consideration. They further pointed out that "instructors reported an increase in the amount of time they spent creating e-learning courses because of new content, new technologies, and new ways of engaging online learners". Multiple researches highlighted one way to overcome prevailing barriers in context of limited knowledge of teachers and time constraint issues in developing an online course content, is to collaborate within their E-learning professional communities. The benefits of this collaboration and discourse are manifold, since it will assist in minimization of time that is spent in planning and designing of a course.

Discourse 6 - Assessment criteria and tools are not designed according to the level of students in online setting.

Primarily, teachers consider on-line teaching to be a monotonous activity and more boring with additional element of technological difficulties. It seems the entire process needs to be well-directed and meaningful instead of just fulfilling the requirement of delivering a lecture and attending a lecture. Moreover, the assessment techniques are not properly planned and practiced due to which this angle has added an additional psychological burden on the part of teachers. Besides that, online instructors are not properly equipped to assess the learning achievement of students and on how to create teaching and learning activities that foster learning as per their mindset and intellectual level. Furthermore, conversion of all the concepts to slides or other replacement online methods is quite challenging task in virtual learning. However, in on-line education, teacher seems to be under constant observation which is a counter-productive element.

Discourse 7 - Lack of learner's motivation is an obvious barrier that teachers face in e-learning.

Motivation in the context of both teachers and students is deemed to be a significant requirement. However, majority of online learners lack it; resulting in an obvious challenge for teachers in virtual learning. After the completion of enrollment procedure in E-learning courses, a lot of students fall behind; thus, it nurtures the idea of giving up web-based education. Moreover, barriers in managing a technological medium also foster the factor of lack of students' motivation.

In this regard, teachers should encourage students to adopt new educational trends and to gain expertise to compete with future jeopardies in their educational and professional lives. The need is to change the mindset of students with positive attitude in order to reap the benefits of online education; only then teachers would be able to achieve their planned learning objectives.

Discourse 8 - Lack of personal planning in the context of both learners and teachers is also a challenge that they have to overcome.

Time management is one of the major difficult tasks for E-learning teachers and students, since planning of time and intensive work are required in online courses. Time commitment issue causes hurdles as the preparation and related procedures are time taking in virtual learning.

Moreover, flexible planning causes convenience for teachers and students both; however, lack of personal planning and other responsibilities besides education "i.e. work and family, everyday commitment" also add a lot of burden on the mindset of teachers and students in E-learning setting. Hence, a schedule planner would provide significant assistance in this regard, as reminders can provide support in management of time and systematic planning.

Discourse 9 - Difficulty in managing online classes is causing discomfort among teachers.

The e-education has altogether changed the classroom dynamics. One of the biggest pedagogical challenges is the recent shift of learner-centered approach to teacher-centered approach and on-line assessment difficulties. This transition has altogether changed the entire pedagogical paradigm. The interactive and learner-centered classroom approach has been replaced by monologues and monotones content-ridden lecture delivery by teachers due to which the learners are facing retention issues in longer sessions with an additional element of boredom. The human interaction turned into methodically strict technological limitations has caused stress on a teacher for want of precision of communication and accuracy of content.

Moreover, certain applications are not user friendly and it becomes quite hard to manage students in virtual setting. Further adding to this, the element of collaborative learning has also lost its essence resulting in poor learning outcomes among the students.

Conclusion

In recent times, various digital platforms and Information &Communicational Technologies (ICT) i.e. Web2.0 applications, are casting major impact on education sector since educational paradigms have been shifted from traditional learning to virtual learning throughout the world due to pandemic, Covid-19 and multiple reasons. In an E-learning setting, the classroom dynamics have been changed altogether; resulting in new barriers and challenges for teachers and students in web-based education. Accordingly, the present study highlightedthe major on-line teaching challenges fromteacher's perspective in three major categories, that is,technological challenges, pedagogical challenges and individual level challenges, with focus on higher education sector of Pakistan. Moreover, discourse analysis has been utilized to analyze the data. To ensure success of technology-based learning, 9 major discourses pertaining to on-line teaching challenges have been highlighted to solve E-learning problems and deliver high quality web-based education.

The role of teachers has great significance in providing best practice solutions to prevailing technological, pedagogical and individual challenges by implementing a learning environment that may boost collaboration among teachers and students. There is another added factor in the present study that since teachers are facing challenges on individual level that can be considered as micro level challenges; thus, ultimately it will lead towards aggregate challenges at institutional level within the country, e.g. at macro level. Therefore, when micro level barriers pertaining to teachers would be solved, eventually that will lead towards smooth working of E-learning operations in all universities of a country. It will also cast an impact at macro level, which should be an essential point of consideration for every university.

When learners would be provided with multiple opportunities to "collaborate, share, and create", it will enhance their skills regarding technology usage for the learning purpose. This will ultimately result in enhancement of their E-learning experience and will assist in self-directed and ongoing virtual learning. This strategy would be beneficial for teachers since the impact of technological and individual level challenges would decrease by frequent usage of digital platforms. Furthermore, the technological incompetence of students should be considered by teachers and they should proceed with the mindset of accepting learners having various ability levels. Furthermore, students should be given leverage in the context of expected performance since that will eventually result in completion of designed learning outcomes from teachers' perspective.

Teachers should encourage learners to ask questions, obtain additional knowledge from other reliable sources, reflect often, and have more interaction with other students in academic discourse by keeping in mind the online learning objectives. This will assist teachers in designing of their E-learning course contentby considering different intellectual levels of students. Multiple researches highlighted the significance of virtual collaborative learning that "having an online community where learners can collaborate in a safe and respected learning environment will help close the gap of the new digital divide, and in doing so helps to create a culture of digital natives conducive to effective e-learning"(Soomro et al., 2020; Hillier, 2018). The results of the study showed that in an E-learning environment, teachers have a fundamental role that may be helpfulin overcoming theaforementioned challenges and delivering high quality online education.

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