ONLINE LEARNING ENGAGEMENT OF MEDICAL STUDENTS: A STRUCTURAL EQUATION MODELING APPROACH

Noreen Hassan
Assistant Professor
Business Administration
Federal Urdu University of Art, Science and Technology
Karachi - Pakistan
n.hassan@fuuast.edu.pk

Aisha Sharif Ansari
Assistant Controller Examination
SZABIST
Hyderabad - Pakistan
aisha.ansari@hyd.szabist.edu.pk

Shumaila Jamil
Lecturer
Business Administration
Federal Urdu University of Arts, Science and Technology
Karachi - Pakistan
Shumailajamil86@gmail.com

Abstract:

During this unprecedented time of COVID-19, the prompt change from traditional face-to-face learning to online learning has become a shift from an amenity to a necessity and medical students are not the exception to it. The present study aims to examine the readiness and engagement of medical students in an online learning system. By employing, the convenience sampling technique 403 participants were analyzed using smart PLS. The study found direct relationship of online learning environment on the readiness and student engagement. Moreover, indirect relationship of readiness for online learning between learning climate and student's engagement also supported. As online learning has not yet received wider internalization, findings of this study add to the knowledge that in order to develop students' meaningful engagement with use of redundancy elements, it is necessary to develop students' readiness for such learning. While doing this, organizations and leaders need to develop environment for smooth conduction of this online learning modality.

Keywords: COVID-19 pandemic, Online Learning climate, Readiness for Online Learning, Online Students' Engagement.

1. Introduction

COVID-19 pandemic has drastically reshaped the human lives in all aspects. Across the globe, this scenario has radically altered the routine lives of all concerned with emergence of new challenges, beside health issues that need to be dealt with empirical evidence (Ahmed, Allaf, & Elghazaly, 2020).With more than three billion people in isolation, the status of digital spaces is switching from an amenity to a necessity, as they become not only the main way to access information and services, but also one of the only remaining vectors for economic, educational, and leisure activities as well as for social interactions to take place(Rose, 2020). Like many aspects of modern day life, education has changed dramatically during the COVID-19 pandemic with multidimensional prospective with the perception of studying remotely getting universal acceptance (Chiodini, 2020). Since last two decades, the popularity of Information and Communication technologies (ICT) highlighted the significance and adoption of online learning practices as a useful tool in education across many countries (Bowers & Kumar, 2015; Prudnikova & Poskakalova, 2019). Yet, due to the sudden closure of educational institutions across the globe during COVID-19 pandemic, a rapid transition from traditional face-to-face learning to online learning has emerged as an alternative to continue the academic activities. Online learning still has not advanced to extent where learning experience takes place similar to as it happens in traditional face to face learning (Bolliger & Halupa, 2018). Notably, readiness and preparedness for effective online learning is the call of the time, emphasizing the need to streamline the best possible strategies to enhance the effectiveness of online learning practices.

Most of the studies as well as print media have focused on the impact of COVID -19 pandemic over the work and lives of doctors, nurses, physician, assistants, and other healthcare workers (Dubey et al., 2020). However, a few studies have conducted to see the impact on learning of medical students during this crisis. The possibilities of feeling of disconnectedness, anxiety, confusion and frustration goes up during online learning (Zembylas, 2008) as students could not develop immediate social interaction with the instructor (Phirangee & Malec, 2017). Social dis-connectivity in online learning has also been linked with students disengagement (Bowers & Kumar, 2015)that leads towards withdrawal or failing of course (Chatterjee et al., 2020; Kahn, Everington, Kelm, Reid, & Watkins, 2017).

Online learning has received greater acceptance in developed countries (Abe, 2020; Chen, Stocker, Wang, Chung, & Chen, 2009; Panigrahi, Srivastava, & Sharma, 2018).However the popularity and feasibility of online learning in developing countries is subjected to many challenges (Isaac, Aldholay, Abdullah, & Ramayah, 2019; Naresh & Reddy, 2015; Nawaz, 2012; Olaniran, 2008). In the similar vein, Pakistan being a developing country having lack of required resources, previously did not opt for electronically learning modes as a common practice in higher education sector. Before this pandemic, traditional face-to-face learning practice were the main teaching modality, nevertheless the immediate closure of all academic educational institutes with switching to online learning as a solution to evade students' academic is adopted(Higher Education Commission of Pakistan, 2020).

Since it is not feasible to reopen the universities during the pandemic, consequently it is expected that students have to continue online learning for coming academic sessions in future (Higher Education Commission, 2020). No doubt, digital transformation in the form of online learning is well- thought off as a new beginning; nevertheless, this sudden transition poses certain prominent challenges for Pakistani students precisely for medical students. Previously, few studies from Pakistani context attempted to identify the key barriers in adoption of online learning (Iqbal & Ahmad, 2010; Kundi & Nawaz, 2012; Qureshi, Ilyas, Yasmin, & Whitty, 2012). One of the major challenge identified by previous studies was the lack of student's engagement in adopting online learning practices (Kanwal, Rehman, Bashir, & Qureshi, 2017). Although literature acknowledges the importance of students' engagement and digital readiness for students' academic performance, however what impacts students readiness and engagement especially in terms of role of academic institutes, faculty and other climate factors is needed to be explored (Kim, Hong, & Song, 2019). Therefore, this study contributes to the extent literature in multiple ways: First, empirical evidence pertinent to examining the role of online learning climate in fostering readiness and student's engagement. Second, the study attempts to examine the role of readiness for online learning as a mediator between the relationship of learning climate and students' engagement.

2. Hypothesis Development

2.1 Online learning climate to readiness for learning

An online learning environment/climate can be viewed as is an online-based interface that offers students and academician digital solutions that boost the learning practice among the students whereas the Learning readiness refers to how likely a person is to seek out information and remain involve in changing the learning behavior. Many factors influence individuals' readiness to learn. Anything that affects physical or psychological comfort such as pain, fatigue, anxiety, or fear can affect an individual's ability and motivation to learning(Cole, Lennon, & Weber, 2019)

To actualize the readiness notions, McVay (2000)established an implementation for gauging readiness for online learning through student's performance and approaches in online learning and found that instructor's supportiveness and availability leads to readiness towards online learning. Far ahead, Smith, Murphy, and Mahoney (2003) conducted a fact-finding study to examine Readiness for Online Learning that collected in the United States and Australia and generated a two-factor structure of readiness for online learning i.e. "Comfort with online-learning" and "Readiness for online learning". Somehow both factors have emerged as an essential factor for the pandemic situation.

For instance, student's comfort during e- learning mode will effect on learning climate as they are more aware of electronic gadgets and face less difficulty in technological adoption so that comfort leads towards the readiness for online learning. Later, (Smith, 2005) conducted a survey study with 314 Australian undergraduate university students and dyed-in-the-wool that Readiness for Online Learning is useful pertinence to enquire and drill in the extent of student's internet learning environment. In online learning climate, there are various gears accessible for trainers, mentors and teachers to collect unceremonious information about student's contribution in the learning. Teachers can evaluate log-in information, time for being online, outlooks of learning components or course content, and self-reported

information from students by using surveys, reflections, discussions, and other formative tools (Gray & DiLoreto, 2015). Due to that information, students are bound to develop study climate as per the restrictions announced by their lecturer. A relationship between the current studies with earlier associated studies discloses that students' readiness in this pandemic situation is certainly an imperative concern in online learning climate and expected to create readiness for such learning. It may perhaps include computer-mediated communication. Study conclusions point out that nervous students be likely to feel more contented in online climate than in traditional climate where face-to-face support of instructor is available(Al-Bataineh, Brooks, & Bassoppo-Moyo, 2005). Readiness has had an important influence on learners' attitudes and learning behaviors in educational research and practice (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011). Online Learning climate takes place through interplays between cognitive and readiness variables, and these two aspects are enchanting for the students to create the readiness for online learning (Anderson, 2008; Means, Toyama, Murphy, Bakia, & Jones, 2009). However, online learner readiness needs to point out the facades that lean to diverge ominously, such as instructor's backing, knowledge of the contents, internet- steering proficiency, and learner control over the categorization and picking of resources (McMurray, 2001). Therefore, the subsequent fragments of the existing paper review additional dimensions that can stand in the readiness concept in terms of online learning climate (Cole et al., 2019). Recent literature on adoption of online learning by medical universities stresses creating readiness and engagement by revisiting and developing suitable climate to enhance student readiness (Ibili, 2020). Various theories related the role of resources in organizations explain this rationale. For example, broaden and build theory (Fredrickson, 2001), job demands resource theory (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) and conservation of resources theory (Hobfoll, 2002).By using these theories a popular article published in Journal of Organizational Behavior suggested that learning related climate will foster readiness and adaptation in organizations (Eldor & Harpaz, 2016). Based on similar argument this paper contends that:

H1: Online learning climate is positively associated with readiness for online learning for medical students during COVID-19.

2.2 Readiness for learning to student's engagement

Student's engagement has been demarcated as students' readiness, necessity, aspiration, and obligation to contribute and efficacious in the learning procedure ((Bradford & Wyatt, 2010). Student's engagement may perhaps be defined in standings of the quantity of time, energy and properties students dedicate to online learning undertakings (Krause, 2005; Robinson & Hullinger, 2008).Moreover, there are numerous affecting features associated with student's engagement which embrace attitude, personality, preparedness, motivation, effort, and self-confidence (Mandernach, Donnelli-Sallee, & Dailey-Hebert, 2011). Meyer and Murrell (2014) indicate activities that meant to engage pupils in their individual learning through cooperative drills and manifold opinions with the preparedness of student's online learning at regional university and reported 70% of the pupils were studying online. They recognized that attaining pupil engagement in online classes was possible only through pupil's readiness for online learning. Research emphasized the need to develop strategies to promote advance education and learning for enriched online engagement (Martin & Bolliger, 2018). (Meyer &

Murrell, 2014) proposes that preparedness affects student engagement while Sun and Rueda (2012) contend that interest and perception of efficacy foster the engagement of students at multiple levels. This implies that student's perception of having control over electronic based learning with his or her own preparedness, amount to their engagement in e-learning. E-learning classes necessitate instructive approaches that drive as much knowledge and engagement chances as possible. Student engagement is link with the state of curiosity established by pupils by means that they interrelate, and motivate about the online way of learning (Briggs, 2015).Because once pupils are encouraged, prepared, and ready to give their most possible in their internet based lectures, with their desire to learn, and eager to employ the determination expected by their teachers, their engagement in learning is expected to be enhanced(Gray & DiLoreto, 2016; Mueller, Mandernach, & Sanderson, 2013).Warner, Christie, and Choy (1998)recommended the notion of readiness for e- learning in terms of three aspects. (1) Pupils' likings for the method of conveyance as opposed to face-to-face lecture hall lessons. (2) Pupil self-reliance in operating microelectronic transmission for learning (3) capability to engage in sovereign learning. Literature on readiness – engagement link is supported by conservation of resources theory that suggests that availability of some set of resources generates other set of resources due to increases in positive emotions (Hobfoll, 1989). Recent research found positive association between digital readiness and academic engagement in Korea (Kim et al., 2019). Hence, present study based on the prior literature hypothesized:

H2: Readiness for Online Learning is positively associated with Online Student Engagement for medical students during COVID-19.

3.3 Readiness for online learning as a mediator

Readiness is the state of mind constructed through assessing environmental and personal clues and it reflects one's preparedness and willingness to accept new things for adaptation. (Armenakis, Harris, & Mossholder, 1993) Researchers and practitioners stressed on creation of readiness for change to make online learning successful during the pandemic (Kamal, Shaipullah, Truna, Sabri, & Junaini, 2020; Pal, Singh, & Dhaliwal, 2020; Warden, Yi-Shun, Stanworth, & Chen, 2020). The student's engagement in online classes considered multifaceted and different from conventional face-to-face teaching settings by many studies. (Bradford & Wyatt, 2010).Hence, students' engagement to adjust in new learning climate needs to be ready in the COVID -19 pandemic. The student's engagement is referred as "ability to hold the attention of an individual or to induce the individual to participate in some sort of activity" (Martin, Wang, & Sadaf, 2018), therefore, gaining success in engaging students in online learning activities could be viewed as first step towards effective online learning. Because learning readiness will engage student in virtual learning climate, draw impetus from instructional content, their peers, and their instructor (Bolliger & Halupa, 2018). Learning climate could offer an interactive setting, where students can gets at preparedness level and actively engages in thinking, talking and interacting with instructor, fellow students and course content (Jamaludin & Osman, 2014; Redmond, Abawi, Brown, Henderson, & Heffernan, 2018; Zheng, Lin, & Kwon, 2020).

Again, conservation of resources theory provide a rational for the role of readiness for online learning to facilitate impact of learning climate and students engagement in e-learning. The

provision of resources in terms of supportive university, administration, faculty and other positive communication through media channels, enhances readiness that can be further transformed into their actual engagement in online learning (Hobfoll, 2002). This notion is supported by empirical research as well (Eldor & Harpaz, 2016). Therefore, present study hypothesized

H3: Readiness for online learning mediates the relationship between online learning climate and online student engagement for medical students during COVID-19.

Conceptual framework

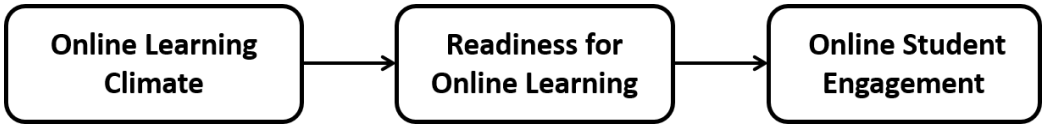

Figure 1: Conceptual Framework

Source: Researcher

3. Method

This cross sectional study involved survey from medical students of Sindh province Pakistan. Data collected over the month of June 2020 using convenience non-random sampling technique where Questionnaires distributed online through email and WhatsApp to medical students

3.1 Measures

All adapted and pre-tested instruments are used. Online Student Engagement (OSE) measures the student's engagement in online learning environment and its 18-item scale namelyOSE1, OSE2, OSE3, OSE4, OSE5, OSE6, OSE7, OSE8, OSE9, OSE10, OSE11, OSE12, OSE13, OSE14, OSE15, OSE16, OSE17, AND OSE18 was adopted from the work of (Dixson, 2015).Learning Climate measures supportiveness for measuring Online Learning Climate (OLC)of the instructor and its 6-item scale, namely OLC1, OLC2, OLC3, OLC4, OLC5 AND OLC6 was adopted from the work of (Williams & Deci, 2001). Readiness for online learning (ROL) measures the student's readiness for learning in an online environment and its 18-items scale namely (ROL1, ROL2,ROL3,ROL4,ROL5,ROL6,ROL7,ROL8,ROL9,ROL10,ROL11,ROL12,ROL13,ROL14,ROL15, ROL16, ROL17 and ROL18 is adopted from the work of (Hung, Chou, Chen, & Own, 2010). Students were asked to respond on a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". For testing reliability, validity, the significance and relevance of path coefficients, partial least square, structural equation modelling (PLS-SEM) approach was employed using SMART PLS 3.0 (Ringle, Wende, & Becker, 2015).

Table 1 indicating demographic details.

Table 1: Demographic Details

GENDER		
	Frequency	Percent
Male	126	31.3
Female	277	68.7
Total	403	100.0
AGE		
	Frequency	Percent
18-22	117	29.0
23- 27	198	49.2
Above 27	88	21.8
Total	403	100.0
UNIVERSITY		
	Frequency	Percent
Isra University	32	7.9
Bahria University Medical and Dental College	30	7.4
Baqai Medical College	26	6.4
Dow International Medical College	37	9.1
Hamdard College of Medicine and Dentistry	28	6.9
Liaquat University of Medical and Health Sciences	36	8.9
Jinnah Medical & Dental College	24	5.9
Shaheed Mohtarma Benazir Bhutto Medical College	16	4.2

Sir Syed College of Medical Science	19	5.0
Ziauddin Medical College	22	5.4
Peoples University of Medical & Health	33	8.1
Muhammad Medical College	29	7.1
Allama Iqbal Open University	21	5.2
Indus Medical College	32	7.9
Agha Khan University	18	4.6
Total	403	100.0

CITY

	Frequency	Percent
Karachi	202	50.2
Hyderabad	32	7.9
Jamshoro	36	8.9
Tando Muhammad Khan	32	7.9
Mirpurkhas	29	7.3
Nawabshah	33	8.2
Sukkur	39	9.6
Total	403	100.0

Source: Researcher

4. Data Analysis

4.1 Measurement Model Analysis

Table 2 indicates the outer loadings are satisfactory and establish indicator reliability as all values are greater than 0.50 (Hair, Sarstedt, Hopkins, &Kuppelwieser, 2014). The values of

composite reliability as indicated in Table 2 are higher than the recommended value of 0.7. Hence establishes internal consistency reliability in the data (Hair, Black, Babin, Anderson, & Tatham, 2006). From Table 2, it is indicated that the average variance extracted values are greater than 0.5 that establishes the convergent validity (Hair et al., 2014)

Table 3 indicates the ascertainment of discriminant validity (Henseler, Ringle, & Sarstedt, 2015)

Table 2: Indicator & Internal Consistency Reliability and Convergent Validity

CONSTRUCTS	ITEMS	OUTER LOADINGS	COMPOSITE RELIABILITY	AVERAGE VARIANCE EXTRACTED (AVE)
Online Learning Climate(OLC)	OLC1	0.837	0.926	0.678
	OLC2	0.830		
	OLC3	0.738		
	OLC4	0.825		
	OLC5	0.854		
	OLC6	0.850		
Online Student's Engagement(OSE)	OSE1	0.734	0.95	0.514
	OSE10	0.720		
	OSE11	0.698		
	OSE12	0.698		
	OSE13	0.695		
	OSE14	0.682		
	OSE15	0.725		
	OSE16	0.750		
	OSE17	0.754		
	OSE18	0.749		
	OSE2	0.794		
	OSE3	0.718		
	OSE4	0.704		
	OSE5	0.714		
	OSE6	0.627		
	OSE7	0.626		

	OSE8	0.739		
	OSE9	0.753		
Readiness for Online Learning(ROL)	ROL1	0.574	0.946	0.502
	ROL10	0.842		
	ROL11	0.777		
	ROL12	0.803		
	ROL13	0.766		
	ROL14	0.844		
	ROL15	0.814		
	ROL16	0.841		
	ROL17	0.825		
	ROL18	0.700		
	ROL2	0.577		
	ROL3	0.531		
	ROL4	0.547		
	ROL5	0.589		
	ROL6	0.508		
	ROL7	0.734		
	ROL8	0.736		
	ROL9	0.628		

Source: Researcher

Table 3 below indicates all the HTMT values are less than 0.85 indicating discriminant validity ascertained (Henseler, Ringle, & Sarstedt, 2015)

Table 3: Discriminant Validity

	1	2	3
Online Learning Climate(OLC)			
Online Student's Engagement(OSE)	0.649		
Readiness for Online Learning(ROL)	0.773	0.725	

4.2 Structural Model Analysis

Present study employed bootstrapping method with 5000 resamples by means of Bias-Corrected and Accelerated (BCa) Bootstrap where significance level is 0.05 (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014) acceptable T-value should be greater than 1.645 at 5%

significance level with one-tailed (Hair, Sarstedt, Hopkins, &Kuppelwieser, 2014) Indirect effect of 5% and 95%; CI should not overlap the zero value (Preacher & Hayes, 2008)

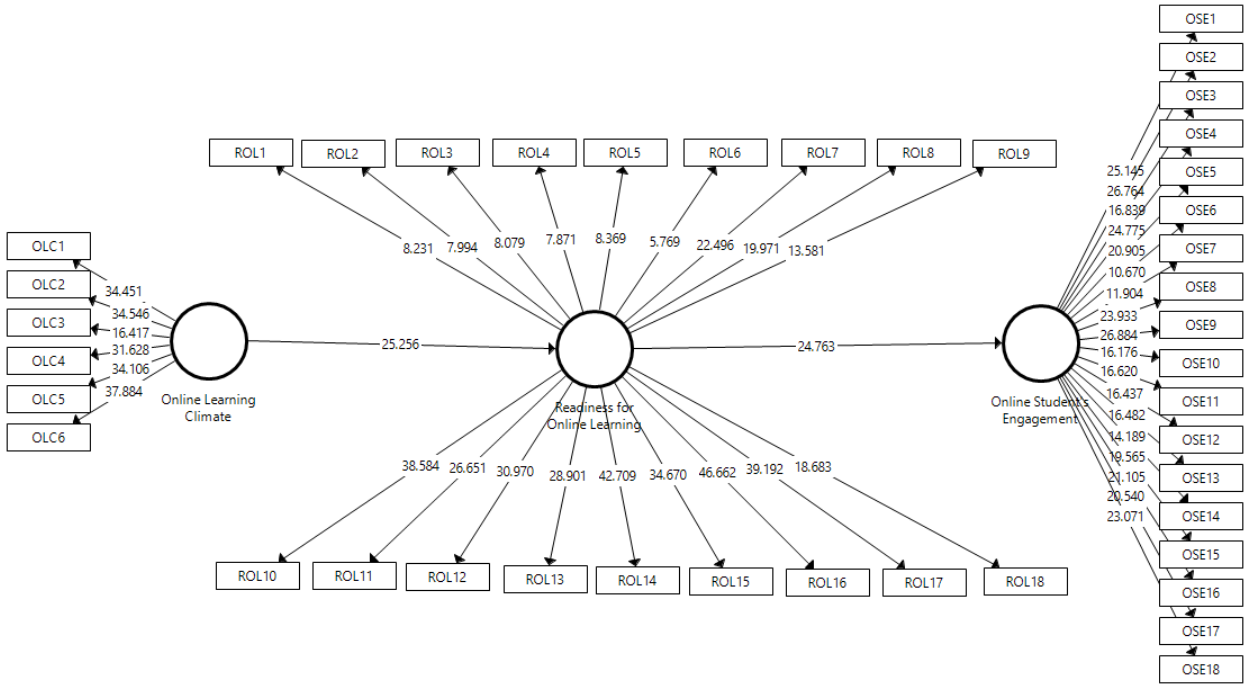

Figure 2: Structural Model SMART-PLS

Source: Researcher

Table 4 specifies acceptance of H1and H2 as direct relationships are positive and significant β =0.743, t-value=25.256, p<0.05, CI [0.689, 0.788] and β =0.726, t-value=24.763, p<0.05, CI [0.660, 0.765] respectively (Hair, Hult, Ringle, & Sarstedt, 2017; Preacher & Hayes, 2008)The effect size of H1& H2 relationship is large (f^2 = 1.231; f^2 = 1.231)respectively. Table 4 also indicates that the indirect effect of readiness for online learning is significant β = 0.539, t- value 15.152 and p < 0.05, Confidence Interval [0.467, 0.590](Hair, Hult, et al., 2017; Preacher & Hayes, 2008).

Table 4: Significance of Relationship

Hypothesis - Relationship	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Confidence Interval		F^2	Effect size
					5.00%	95.00%		

H1	OLC → ROL	0.743	0.029	25.256	0.000	0.689	0.788	1.231	Large
H2	ROL → OSE	0.726	0.029	24.763	0.000	0.660	0.765	1.113	Large
H3	OLC → ROL → OSE	0.539	0.036	15.125	0.000	0.467	0.590	-	-

Source: Researcher

Table5indicates that present study model explains 57.2% and 55.2% of total variance in online student engagement and readiness for online learning respectively representing moderate level of R^2 in both endogenous variables (Chin, 1998)and table 5 also indicates the predictive relevance of the model (Hair, Sarstedt, Ringle, & Gudergan, 2017; Henseler, Ringle, & Sinkovics, 2009).

Table 5: Variance Explained and Predictive Relevance

Endogenous Variable	R^2	Variance explained	Q^2	Predictive Relevance
Online Student Engagement	0.527	Moderate	0.243	Medium
Readiness for Online Learning	0.552	Moderate	0.258	Medium

Source: Researcher

5. Discussion

Major aim of this study was to know how medical students' engagement to online learning can be promoted during COVID 19. It was hypothesized that learning climate is positively related to readiness for online learning. Results supported this hypothesis. This finding is augmented by the literature that suggests that contextual resources increase individuals preparedness for new ways of doing things, more specifically this study supports the notion that whenever new pursuit of working is to be adopted, it is imperative to first develop culture that incorporates all needful to implement new paradigms (Gibb, 2002). Then it is necessary to attain individuals preparedness in terms of readiness for change (Choi & Ruona, 2010). The current study has found a positive relationship between online learning climate and readiness for online learning. This finding is in line with literature that the perception of online learning climate has witnessed a surge in undergraduate students of medical science for online learning readiness.

Online Learning climate takes place through interplays between cognitive and motivational variables, and these two aspects are enchanting for the pupils towards the online learning climate (Pintrich, 2002; Stefanou & Salisbury-Glennon, 2002). Furthermore, the readiness for

online learning is positively in related to the medical student's engagement towards learning virtually or online. As Students engagement partially interceded by instructor existence on student engagement. Additionally, in line with present study, Meyer and Murrell (2014) proposes that preparedness towards online learning affects student engagement(Sun & Rueda, 2012). Besides the height of devotion to online learning correspondingly gives an impact on students' intellectual engagement(Paulsen & McCormick, 2020).So, this means that pupil attitudes of contribution and involvement lead towards pupil's engagement. Online classes necessitate instructive approaches that drive as much learning and engagement chances as possible(Xu, Chen, & Chen, 2020). For that reason, it is likely that as an outcome of such steadiness between instructor support and providing up to date contents, students believe that this is an extremely important aspect to improving their learning(Warner et al., 2020). This may be explained by the possibility that as students interact with one another; they are increasing their learning whether consciously or subconsciously. A comparison of the present study with previous related studies reveals that learners' readiness is indeed an important issue in online learning engagement.

The current study suggests a wide-ranging necessary model to conclude whether the online learning readiness is mediating the relationship between online learning climate and online learning engagement. Additionally, learning climate could offer an interactive readiness, where students can actively engage in thinking, talking and interrelating with instructor, companion students and syllabus content (Zheng et al., 2020). Thus, it was unenthusiastically concluded by 403 undergraduate pupils registered in a cross-campus, common edification asynchronous medical universities in Sindh Pakistan. That the indispensable estimate demonstrating examines, student workstation/Internet, self-readiness and motivation for learning put forth a direct, positive influence on their online learning climate. Therefore, a study indicates that achieving victory in engaging students in online learning activities viewed as first step towards effective online learning climate. Because learning readiness will involve pupil in online learning climate mainly appeal motivation from their instructor (Bolliger & Halupa, 2018). However, it was establishing that students' computer/Internet, self-interest for online learning readiness plays a mediating role on the effect of online learning climate on student's online engagement. The conclusions of recent study is obliging for both academics and practitioners of online learning to design online climate that particularly highlight readiness towards online learning by creating the climate appropriate for medical student's online engagement.

6. Conclusion

With the emergence of COVID-19 pandemic online learning has becomes new normal in higher education globally. The present study examined the underlying dynamics between online learning climate, readiness for online learning and online students' engagement. This highlighted that if the online learning climate is designed and demonstrated in such a way that it creates readiness for online learning, it arouse online student engagement to get best out of online learning practices. The present study indicate that if the learning climate is designed and demonstrated in such a manner that it creates readiness in students' it may stimulate student engagement to get the best out of the online learning context in relation to the wider pedagogical practices. Whilst we note that online learning for university students

specifically for medical students in Pakistan is a novel learning experience on its own, it requires some degree of a transition period to get adjusted to this distinctive setting. Here, it is pertinent to mention that due to the sharp rise and widespread penetration of the number of Corona-virus cases reported in Pakistan, students are already suffering some degree of psychological distress. Hence, focusing on education during these unprecedented times poses other severe challenges and pressures. It is worthy to say that amidst this global health crisis, students' mental health and well-being should take precedence over other educational demands. By paying more heed towards developing students' readiness may not only make their online learning experience fruitful and effective, but may also make them strong in facing other emerging challenges in future. The practical implications from this study inform policy-makers, academics and practitioners in the higher education sector to reflect on current practices and implement better pedagogical strategies within virtual teaching environments. This will enable both management and academics to work together and develop effective policies and standards as a guideline for teaching in virtual environments. Efforts should be made concerning the various aspects of online learning to facilitate students' sense of autonomy, competence and relatedness. While it is suggested that instructors be provided thorough and standardized training sessions to design and implement autonomy supportive learning climates in support of developing students' readiness, this strategy will also drive better pedagogical practices. Furthermore, in order to promote students' cognitive development, instructors should facilitate students in exploring new ways of task completion and being self-initiators instead of putting pressure on students to behave in certain ways. This further implies that purposeful efforts should be taken to develop an interactive, participatory and learner-centered approach for online learners with the provision of digital platforms to freely share their views, thoughts and concerns. Although integrated SEM approach to study the relationship between study variables, caution needed to draw the inference concerning the causal relationships between study variable taken into consideration the cross-sectional nature of the study. Longitudinal and experimental studies might conduct in future to cross validate the present study findings. Second, the present study based on self-reported data. Moreover, the data collected only from students may create issue of common method biasness. Future studies might collect data from both students and teachers to make informed comparison between students and teachers perspectives. The study focused on the predictive variable of the online learning climate. Nevertheless, there is plenty room for future research to examine other variables that may positively contribute towards online students engagement. There is ample room for future researchers to examine other variables that may affect readiness of students and how it ultimately affects their engagement in virtual environments. This may steer new directions for the implementation of evidence-based strategies to facilitate students in gaining desired results from the online learning context.

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