Readiness for Online Learning during COVID-19 pandemic: A survey of Pakistani LIS students

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ARTICLE INFO

ABSTRACT

This study was designed to determine the perceived online learning readiness (OLR) of LIS (Library and Information Sciences) / IM (Information Management) students in Pakistan during COVID-19 pandemic. A quantitative approach based on survey method was used to collect data from 340 LIS students from nine public sector universities of Pakistan through an online questionnaire. The collected data was analyzed using the SPSS and AMOS. The findings revealed that LIS students were not fully personalized and successful in decisions about their online educational activities during COVID-19 pandemic. However, they were motivated to learn through online learning and felt confident in performing basic functions of computers and internet. A significant difference of opinion was observed on 'computer/internet self-efficacy' and 'online communication self-efficacy' based on respondents' gender. Similarly, students from different levels of degree programs reported significantly different computer, internet, and online communication self-efficacy and learning motivation. Moreover, the age and grades of respondents were noted to be strong predictors of their OLR. These findings would be helpful for library schools, universities, and faculty members in Pakistan to improve the quality of online education and implement clear policies and guidelines. This study provides some theoretical and practical implications based on the findings.

Introduction

The Corona Virus Disease 2019, commonly referred to as COVID-19, which appeared in the first quarter of the year 2020 and quickly spread all over the world has, indubitably, forced the global learner community to transition from the traditional in-class method of learning to a mode of online learning within a very short period of time. The COVID-19 pandemic has brought the world to a standstill, entire cities have been locked down, and people have been restricted to their homes in order to stop or slow the spread of this disease. Despite this challenging situation, most academic institutions in the world have tried to ensure the continuity of the learning process. They have shifted to an online mode of learning, where the students and teachers interact with each other using different kinds of technological tools and techniques. This method of learning is also referred to as e-learning. Even though some institutions had been experimenting with e-learning before the pandemic, it is only

now that its full benefit has been realized. It provides the students with a lot of opportunities and benefits such as convenience (Poole, 2000), flexibility (Chizmar & Walbert, 1999), time-saving, teamwork, as well as opportunities to collaborate with others across physical boundaries (M. L. Hung, Chou, Chen, & Own, 2010). It also allows students to have more control over their learning activities and to make decisions about their routine classwork in terms of space, pace, depth, breadth, and time management (Stansfield, McLellan, & Connolly, 2004).

In Pakistan, like many other countries of the world, the Higher Education Commission (HEC) and Higher Education Department (HED) have mandated that all public and private sector educational institutes should conduct all their teaching and learning activities online until the curve of the spread of COVID-19 is flattened (Higher Education Department, 2020). Consequently, universities in Pakistan have been actively trying to transform their pedagogical teaching and learning activities into a virtual model. Most of them have developed efficient

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online learning systems and have transitioned to online learning. Teachers have uploaded their lessons, projects, groups work, and reading material into these online learning management systems, and virtual classes have been organized using various videoconferencing applications such as Zoom, Google Meet, Microsoft Teams, Webex, etc. It cannot be denied that online learning was the best solution to this unprecedented situation. However, it does have some drawbacks, as Chung, Subramaniam, and Dass (2020) asserted, it cannot replicate the direct face-to- face human contact, or the level of social engagement one experiences when in a classroom. These challenges may cause the students to feel that something is lacking, and result in decreased student engagement and interaction with a resultant subpar learning experience.

Technology has played a pivotal role during the e-learning process. Various Information & Communication Technology (ICT) tools such as a desktop computer, laptop, smartphone, smart device, an internet connection, and online learning platforms (software/mobile apps) are essential for e-learning. The students have to have access to some of these to successfully participate in e-learning. Furthermore, they can use different kinds of communication tools to communicate with one another and their teachers to easily share information and knowledge. There are various asynchronous (threaded discussion, emailing) and synchronous (live chat, live audio/video call, instant messaging) tools, that are widely available and very user-friendly. Thus, online learning provides a computer-mediating environment for sharing one's perspective with others confidently and comfortably. However, it needs the users to have a certain degree of technical training and aptitude for virtual learning. A certain degree of preparedness is essential if users are to gain maximum benefit from this virtual mode of learning. This has raised the question of whether the students in Pakistan are ready and prepared to easily adopt e-learning and cope with the challenges associated with it. This study was designed to explore the level of online learning readiness (OLR) of students in Pakistan. Additionally, it also investigated whether any demographic factors (gender, age, various levels of LIS degree program, and their grades) made an impact on their OLR. Several studies have been conducted to determine the online learning readiness (OLR) of students (Afrianti & Aditia, 2020; Chung et al., 2020; Firat & Bozkurt, 2020; Forson & Vuopala, 2019; Herguner, Son, Son, & Dönmez, 2020; Joosten & Cusatis, 2020; Zgheib, AlDaia, Serhan, & Melki, 2019), but none have been conducted in Pakistan or the context of Library and Information Sciences (LIS) students. Therefore, this study was designed to investigate the online learning readiness of LIS students currently enrolled at HEC recognized public sector universities of Pakistan.

Research questions

The following research questions were framed to address the research objectives:

RQ1 – What has been the perceived level of readiness towards online learning (OLR) of LIS students during the COVID-19 pandemic?
RQ2 – Does gender predict the perceived OLR of LIS students?
RQ3 – Is there any significant impact of age on their OLR?
RQ4 – Does the level of various LIS programs such as BS, MA, M. Phil., and Ph. D. affect the LIS students' perceived OLR during the COVID-19 pandemic?
RQ5 – Do the grades achieved by LIS students significantly influence their readiness for online learning during COVID-19?

Theoretical perspectives and literature review

Researchers have been trying to measure the level of online learning readiness (OLR) of students ever since the advent of online learning. The first concept of online learning readiness was proposed by Warner, Christie, and Choy (1998). They defined it as 1) students' preference for classroom instructional method against the face-to-face learning, 2)

students' confidence in using different kinds of technology, internet, and especially computer-mediated tools for communication in online learning, and 3) students' engagement in their autonomous learning. M. McVay (2000, 2001), later developed a 13-item scale to measure the readiness of students towards online learning. In the McVay questionnaire, the students' attitudes and behavior were taken as predictors. P.J. Smith, Murphy, and Mahoney (2003) conducted a study using M. McVay's (2001) Readiness for Online Learning questionnaire and reported that the students' self-management of learning and their level of comfort with e-learning were the two main factors that predicted their success. However, these two factors did not comprehensively cover all dimensions of students' readiness towards online learning. To expansively understand the core of online learning readiness, researchers put their efforts into developing more dimensions that would broadly cover all necessary aspects of online learning. Previous studies have found that the technical skills needed to perform computer and computer-based tasks were also the key determinant factors of students' performance in a web-based learning environment (Peng, Tsai, & Wu, 2006). Similarly, the students' perceptions regarding the internet were also related to their attitudes and behavior towards online learning (C.C. Tsai & Lin, 2004). Another important factor affecting the students' OLR was found to be their ability to manage their time.

In 2010, M.L. Hung et al. (2010) developed a comprehensive scale to measure the readiness of students regarding online learning. The scale covered all aspects of OLR and had five dimensions: 1) computer/internet self-efficacy, 2) self-directed learning, 3) learner control, 4) motivation for learning and 5) online communication self-efficacy. The conceptual model of OLR has been structured around the following dimensions:

Computer & internet self-efficacy

Self-efficacy is a person's particular set of beliefs that determine how well one can execute a plan of action in prospective situations (A. Bandura, 1977). As online learning is delivered through online networks, therefore, it is essential to determine the perception of students about ICTs, and to assess their competencies in using these technologies for online learning. The underlying theory of assessing self-efficacy is the 'social cognitive theory' which provides the basis for understanding self-efficacy beliefs through cognitive, motivational, affective, and decisional processes (A. Bandura, 1977, 1986, 1997). Accordingly, several scales have been developed to measure the computer and internet self-efficacy of individuals. A 10-item instrument by Compeau and Higgins (1995) has identified that computer self-efficacy had a significant impact on computer-use outcomes, computer user's emotional reactions, and actual computer use. Similarly, Eastin and LaRose (2000) pointed out that internet self-efficacy was not merely uploading or downloading files but was also related to the ability of an individual to apply his/her higher-level skills in troubleshooting and problem-solving technical problems while using the internet. M.J. Tsai and Tsai (2003) found that students with high internet self-efficacy performed and learned better than those with lower internet self-efficacy during online learning.

Self-directed learning

Knowles (1975) defined self-directed learning (SDL) as the process of taking the initiative to understand one's learning needs, establish learning goals, identify human and material resources needed for learning, choose and implement the appropriate learning strategy, and evaluate learning outcomes. Based on Knowles' work, Guglielmino (1977) developed a scale, the Self-Directed Learning Readiness Scale (SDLRS), to help determine students' learning needs and personality traits, as well as promote their autonomy. Garrison (1997) also developed a comprehensive model of SDL and defined SDL as "an approach that helps stimulate students' assumption of personal responsibility and

collaborative control over the cognitive (self-monitoring) and contextual (self-management) processes in constructing and confirming meaningful and worthwhile learning outcomes" (p. 21).

Online learning has been steadily growing with the rapid development of ICTs. Therefore, it has become imperative that distance learning students learn to be proactive, act as independent learners, and prepare themselves for the e-learning experience. Lin and Hsieh (2001) argued that successful online students made decisions on their own to meet their needs by utilizing their existing knowledge and learning goals. It helps self-directed students take responsibility for their learning and be more enthusiastic about their learning activities.

Learner control

This dimension is also very important to understand one's readiness towards online learning. In contrast to the traditional mode of learning, where students have direct access to textbooks and other physical forms of information, they have more options, flexibility, and freedom in the e-learning environment. The students can control the content, sequence, and pace of learning (Reeves, 1993). Broadly speaking, learner control is "the degree to which a learner can direct his or her own learning experience and process" (Shyu & Brown, 1992, p. 3). This concept of learner control has evolved with the rapid development of ICTs.

According to the Component Display Theory of Merrill (1983) and the Elaboration Theory of Reigeluth and Stein (1983), it is an essential element for effective learning that may boost the students' performance. Further, Merrill (1983) described that students should be given complete control of the sequence of the instructional material so that they could discover how to make instructional decisions and experience the results of those decisions. However, in an e-learning environment, there seems to be no instructional sequence (M.L. Hung et al., 2010). L.-C.C. Wang and Beasley (2002) found that learner control had an impact on the task performance of students in a web-based learning environment. Therefore, those students who were empowered by their own learning decisions exhibited a better performance during the online learning setting, as compared with those who were not.

Learning motivation

In any educational setting, motivation is a factor that significantly affects a student's attitude and behavior towards learning (Fairchild, Jeanne Horst, Finney, & Barron, 2005). Active learning is a mixture of two invisible variables: cognition and motivation (Pintrich & Schunk, 2002). Motivationally oriented (intrinsic and extrinsic) students tend to perform better academically than those who lack the motivation to learn (Ryan & Deci, 2000). Intrinsic motivation helps a student develop cognitively, physically, and socially. It is associated with a lower dropout rate, higher-quality learning, and better learning strategies (Deci & Ryan, 1985). Extrinsic motivation, on the other hand, is related to the attainment of rewards i.e., obtaining high academic grades, awards and prizes.

In Garrison's model (1997), it has been proposed that learning has two forms of motivational aspects: 1) the perceived value of learning and 2) the anticipated success in learning. Motivation is intertwined with doing something willingly without any external pressure and has been taken reciprocally with responsibility by most researchers. However, to sustain their motivation, students must become active learners with a strong desire to learn (Candy, 1991). Ryan and Deci (2000) reported that students felt free to determine their learning paths in an online learning environment as a result of their motivation.

Online communication self-efficacy

In an online learning environment, students require various computer-mediated tools to perform their educational activities (Palloff & Pratt, 1999). It is empirically evident that shy and hesitant students

perform better in an online learning setting than in a traditional learning environment. Therefore, it is imperative that students have opportunities to interact and communicate with other students and their instructors during web-based learning (M. McVay, 2000). The successful students communicate with each other using computer-mediated tools and raise questions in an online discussion to understand their subject or concepts in depth. In case of connectivity issues or burn-out situations, the students should take advantage of the opportunity to work with other students online. Past studies have also concluded that online communication self-efficacy was necessary for students to prevent limitation of online communication as well as isolation in online learning (M.L. Hung et al., 2010).

Students' readiness towards online learning during the COVID-19 pandemic

Since the start of the COVID-19 pandemic, academic institutes in most countries have transferred their learning and teaching activities from a physical model to an online one. Ever since then, researchers have been trying to determine the factors that could affect the readiness of students towards online learning. Consequently, there has been an abundance of literature published on this topic in recent days. Naji et al. (2020) recently conducted a study on engineering students to determine the factors that affected their readiness towards online learning during the COVID-19 pandemic. They found that four factors had an impact on their level of readiness: 1) initial preparedness and motivation for online learning, 2) self-efficacy beliefs about online learning, 3) self-directed online learning, and 4) support for online learning. Callo and Yazon (2020) reported that familiarity and capability regarding online learning, preparation of the online learning experience, device and connectivity, self-efficacy, and prior experience with technology significantly influenced the preparedness of Polytechnique students for online learning modality in the context of COVID-19. Furthermore, they stated that the readiness of students and teachers towards online learning could be determined through their capability to access and use technology as well as their e-learning self-efficacy. Shawaqfeh et al. (2020) investigated the online distance learning experience of pharmacy students in the Kingdom of Saudi Arabia during the outbreak of COVID-19 and found that the pharmacy students had a receptive attitude towards gaining an education in an online learning environment during the quarantine period of COVID-19. However, they also identified some challenges for the students such as a lack of motivation, boredom during class, information overload, and lack of digital skills, etc. They emphasized the need for computer training for pharmacy students so that they could learn the skills and tools needed to be effective and successful learners during these unprecedented times. Similarly, Kalkan (2020) examined the e-learning readiness of university students in Turkey using the e-learning readiness scale of Yurdugül and Demir (2017). He found that computer, internet, and online communication self-efficacy were the top-ranked factors that significantly affected the e-learning readiness of students, followed by self-learning, learning control and motivation. Allam, Hassan, Sultan, Mohideen, and Kamal (2020) surveyed students of communication and media studies to explore their readiness towards online learning during the outbreak of COVID-19. They revealed that while the study participants had computer/internet literacy, they lacked the motivation to learn online and engage in self-directed learning. Neupane, Sharma, and Joshi (2020) investigated the OLR of medical students during the COVID-19 pandemic and found that the medical students were ready for learning online during the lockdown situation and had sufficient technological facilities and skills to utilize these computer-mediated tools in their learning process. Kalman, Esparza, and Weston (2020) collected data from the students who were enrolled in a chemistry course. They concluded that adaptability, organizational skills, and self-awareness were some of the personal characteristics that enabled the students to succeed and excel as online students. Similarly, Lee (2020) explored the OLR of Malaysian students during the

pandemic. They reported that female students and students enrolled in a degree program were more comfortable with online learning than the male students and those studying for a diploma. Furthermore, the students shared that if given the choice, they would prefer onsite classes over online ones. They concluded that, overall, students were ready for online learning during a pandemic.

Research design and procedures

A quantitative approach based on a survey method was used for the purpose of this research study. LIS students currently enrolled at HEC recognized public sector universities of Pakistan were selected purposively as a unit of analysis. A sample of 385 was drawn from the intended population using the following formula given by Wrenn, Stevens, and Loudon (2002):

$$n = \frac{Z^2(p.q)}{(e)2}$$

$$n = \frac{1.96^2(5 \times .5)}{(05)2} = 384.16$$

where:

n = Sample size,
Z = Value from normal distribution table for desired confidence level (i.e. corresponding to the chosen alpha level – for 0.05 is 1.96)
p = Obtained population proportion (i.e. 50%) and q = l-p
e = Error of sampling or desired precision = ±0.05

There are 09 library schools in the various public sector universities of Pakistan. A sample size of 43 per library school was calculated using the equal size sampling technique as shown in Table 1.

The scale for data collection was adopted from a study by M.L. Hung et al. (2010) and was slightly modified per the pandemic situation (Annexed). This data collection instrument had 18 items covering five dimensions related to the online learning readiness of students: 1) computer/internet self-efficacy (3 items), 2) self-directed learning (5 items), 3) learner control (3 items), 4) motivation for learning (4 items), and 5) online communication self-efficacy (3 items). Demographic information such as gender, age, level of LIS program i.e., BS, MA, M. Phil., or Ph. D. and Grade Point Average (GPA) of the respondents in the previous semester were added to the questionnaire. The final questionnaire was then designed in Google forms and made available via an online link. This was to ensure maximum reach of the survey, keeping in view the lockdown situation in the country. The link for the online survey was sent to the heads of the concerned departments, and coordinators of students' affairs (CSAs) to be disseminated among concerned students for data collection. Participants were also approached through personal contacts of the researchers as well as the friends-of-

friends method. A total of 340 (87.9%) responses were received after an extensive follow-up. The collected data were imported to Statistical Package for Social Sciences (SPSS) version 22 for the necessary statistical analyses.

The validity, reliability, and correlation matrix of the measures

The data collection instrument's construct validity was assessed using the convergent and discriminant forms of validity. Composite reliability (CR) and Average Variance Extracted (AVE) were calculated in this regard. The value of CR was calculated and the resultant value of all the dimensions was found to be more than 0.70. Whereas the resultant values of AVE ranged from 0.484 to 0.587. The values of CR and AVE were above the threshold value of CR = 0.60 and 0.50 = AVE suggested by Byrne (2016). However, the value of AVE for the two constructs (learner control and learning motivation) was slightly lower than these cut-off values. It was also noted that the values of AVE were less than the values of CR for each dimension (Table 2).

The Cronbach's alpha value was calculated to check the internal consistency and reliability of the eighteen scale items. The alpha value was found to be 0.90, which indicated good consistency between the various items of the scale. Furthermore, this α value was above the recommended value of ≥0.70 (Hair, Babin, Anderson, & Black, 2018). Dimension-wise alpha value was also calculated, as shown in Table 2.

Pearson's Moment correlation was applied to determine the relationship between the five dimensions of the OLR scale. The results revealed that all of the dimensions were positively and significantly correlated with each other at a p-level of 0.01. Further, Cohen's (1988) criterion was used to assess the strength of the association between these dimensions. According to this criterion, computer/internet self-efficacy was strongly correlated with self-directed learning ($r = 0.590^{**}$), motivation for learning ($r = 0.575^{**}$), and online communication self-efficacy ($r = 0.617^{**}$), while its relationship was medium with learner control ($r = 0.483^{**}$), and LC was moderately correlated with learning motivation ($r = 0.460^{**}$) (Table 2).

Model testing results

As this study used a pre-validated instrument for data collection, therefore Confirmatory Factor Analysis (CFA) was run to validate it on LIS students in the Pakistani context. To confirm the hypothetical model of the study, AMOS (Analysis of Moment Structure) version 21 was used. For this purpose, the values of x^2/df (chi-square/degree of freedom), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), CFI (Comparative Fit Index), and RMSEA (Root Mean Square Error of Approximation) were calculated. The results of the above-mentioned model fit indices showed that the values were in acceptable ranges, as recommended by Brown (2015) (Table 3). It was concluded that the study model was a good fit in the Pakistani context; however, two items (SDL2 and LC2) had poor factor loading (< 0.50) (Fig. 1). Overall, the results of factor loading showed that all of the items were statistically significant and each item in the scale was successfully loaded (≥ 0.50) under the latent dimension (Fornell & Larcker, 1981) (Table 5).

Results

Demographic profile of the respondents

The respondents were asked about their gender, age, level of program of study, and GPA in the previous semester to collect their demographic information. The results showed that the majority of the study participants ($n = 194$, 57.1%) were female, while 146 (42.9%) were male. The majority of participants ($n = 309$, 90.9%) were also young adults with aged less than 30 years, 24 (7.1%) were between 31 and 40 years of age, while only 7 (2.1%) were older than 40 years. Almost 42% of participants were enrolled in BS-LIS/BS-IM degree

Table 1
Population and responses.

SN	University name	Equal size sample	Responses received (%)
1	University of the Punjab, Lahore	43	43 (100)
2	University of Sargodha, Sargodha	43	43 (100)
3	Islamia University, Bahawalpur	43	41 (95.0)
4	University of Okara, Okara	43	7 (16.3)
5	University of Peshawar, Peshawar	43	42 (97.7)
6	Khushal Khan Khatak University, Karak	43	43 (100)
7	University of Karachi, Karachi	43	41 (95.0)
8	University of Baluchistan, Quetta	43	41 (95.0)
9	Allam Iqbal Open University, Islamabad	43	39 (90.7)
	Total	387	340 (87.9)

Table 2

Correlation, validity and reliability of measures.

SN	OLR Dimensions	CR	AVE	α value	CIS	SDL	LC	MLF	OCS
1	Computer/Internet self-efficacy	0.810	0.587	0.839	1				
2	Self-directed learning	0.758	0.513	0.832	0.590**	1			
3	Learner control	0.501	0.496	0.854	0.483**	0.594**	1		
4	Motivation for learning	0.772	0.484	0.834	0.575**	0.607**	0.460**	1	
5	Online communication self-efficacy	0.751	0.504	0.824	0.617**	0.587**	0.536**	0.664**	1

Cohen's criterion: $r = 0.10$ (small effect); $r = 0.30$ (medium effect), and $r = 0.50$ (large effect).

** Correlation is significant at the 0.01 level (2-tailed).

Table 3

Model fit indices.

	x^2/df	GFI	AGFI	CFI	RMSEA
Cut-off values	≤ 3	≥ 0.90	≥ 0.90	≥ 0.90	≤ 0.08
Model Fit Indices	162.464 / 93 = 1.747	0.947	0.923	0.968	0.047

programs and the same percentage were enrolled in the MLIS/MA-IM programs. 12.4% ($n = 42$)) of the participants were working towards an M. Phil. and only 3.8% ($n = 13$)) were pursuing a Ph.D. in LIS/IM. They were also asked about their grades in the previous semester and it was found that the majority of the respondents ($n = 241, 70.9\%$) had secured more than a 3.00 GPA, 98 (28.8%) had a GPA between 2.01 and 3.00, while only one participant had a GPA less than 2.00 in the previous semester (Table 4).

RQ1 – LIS students' perceived Online Learning Readiness during COVID-19

The respondents were given a set of 18 items to determine their perception of OLR during COVID-19. The responses of the participants for each item with their mean (M) and standard deviation (SD) are presented in Table 5. The results showed that the top ranked dimension of OLR of LIS students during COVID-19 was a motivation for learning with a mean score of 3.88 (0.717). Further, the results unveiled that LIS students were motivated to learn, open to new ideas, and liked to share their ideas with other class fellows during COVID-19 online learning. The second ranked dimension was computer/internet self-efficacy (M = 3.66, SD = 0.906) followed by self-directed learning (M = 3.62, SD = 0.672), and online communication self-efficacy (M = 3.53, SD = 1.011). However, learner control remained the lowest ranked dimension of OLR for LIS students with a mean score of 3.37 (0.761). The results showed that the majority of the participants agreed on having sufficient computer and internet skills. They felt confident in performing the basic functions using the Microsoft (MS) Office suite i.e., MS Word, MS Excel, and MS PowerPoint (M = 3.70, SD = 1.044). They were proficient in managing different software tools used in online learning (M = 3.44, SD = 1.083) and in retrieving the relevant information (M = 3.83, SD = 1.070) (Table 5).

RQ2 – gender and perceived LIS students' OLR

An independent sample *t*-test was applied to see the difference of opinion between students based on their gender. The results revealed that there was a significant difference of opinion between male and female students on two out of the five dimensions under investigation, i.e., computer/Internet self-efficacy (CIS) (0.007 < 0.05) and online communication self-efficacy (OCS) (0.048 < 0.05) at p-level of 0.05. The opinion of LIS students on both of these dimensions were higher in the male students (for CIS: M = 3.81, SD = 0.941; for OCS; M = 3.58, SD = 3.39) than in the female students (Table 6).

RQ3 & RQ5 – impact of LIS students' age and grade on their OLR

A simple linear regression analysis was run to assess the impact of age and grades (previous semester) of LIS students on their OLR during COVID-19 (Table 6). The results observed a positive significant impact of age on two dimensions of the OLR i.e., computer/internet self-efficacy (β = 0.35**, $p = .000$) and online communication self-efficacy (β = 0.023*, $p = .013 \leq 0.05$). These findings depict that the older students performed better in using computers and the internet as compared to the younger ones. Further, the results showed that the older students were more confident in using online tools (email, discussion) to effectively communicate with others, in expressing their emotions and humor through text, and were more capable of posting questions during online discussions (Table 6).

The students' grades also exhibited a significant positive influence on self-directed learning (β = 0.165*, $p = .044 \leq 0.05$) and learning motivation (β = 0.142**, $p = .009 \leq 0.001$). These findings highlight the positive impact of a high GPA. The students with higher grades were more likely to be self-learners and more motivated to explore new ideas during online learning in the time of pandemic than those students with lower grades (Table 6).

RQ4 – impact of various degree programs on their perceived OLR

To measure the impact of various levels of LIS degree programs (BS, MS, M. Phil., pH. D.) on their perceived OLR during COVID-19 pandemic, a one-way ANOVA test was applied. A significant difference of opinion was observed on computer/internet self-efficacy (F = 5.268, Sig. = 0.001** < 0.000), motivation for learning (F = 2.710, Sig. = 0.045* < 0.05), and online communication self-efficacy (F = 2.682, Sig. = 0.047* < 0.05) (Table 6). However, difference of opinion among other dimensions remained insignificant.

To further explore the significant difference between the groups (BS, MA, M. Phil., and Ph.D.), a post-hoc Tukey test was run. This analysis revealed that there was a significant difference of opinion between the students enrolled in BS and M. Phil. (Sig. = 0.038* < 0.05) and Ph.D. students (Sig. 0.018* < 0.05) on computer/internet self-efficacy. The opinion of Ph.D. students was dominant over BS and M. Phil. students.

Discussion

The overall findings of the study revealed that Pakistani LIS students were sufficiently prepared for online learning during the COVID 19 lockdown in the country. They were motivated to learn online, were receptive to new ideas, learned from their mistakes, and were willing to interact and engage with their fellow students while learning online. These findings are similar to those of M.L. Hung et al. (2010), Saadé, He, and Kira (2007), and Hsu, Wang, and Levesque-Bristol (2019) who have reported that motivation played a vital role in online learning. Furthermore, the findings revealed that LIS students possessed a relatively good level of self-efficacy while performing basic functions on the computer using MS Office suite (MS Word, MS Excel, MS PowerPoint, etc.), managing and using different kinds of software necessary for online learning, and using the internet. Alqurashi (2016) and C.L. Tsai,
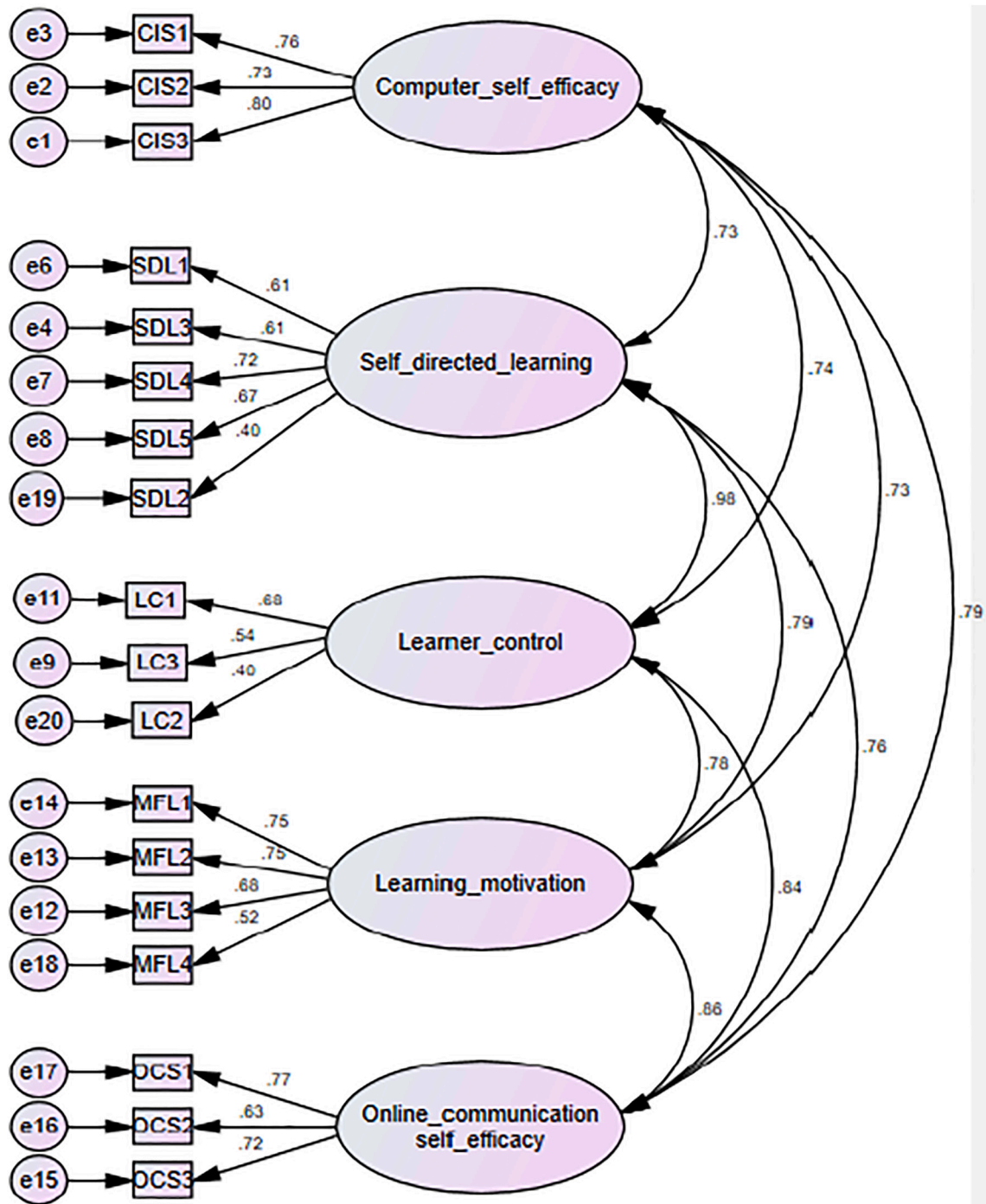
Fig. 1. Measurement model and factor loading.

Cho, Marra, and Shen (2020) also concluded that computer self-efficacy was essential for online learning and was significantly correlated with the success of the online learning of students.

LIS students further reported that they were proficient users of online tools such as email and chat to communicate with others effectively and were confident in expressing their emotions and humor through text. In an online learning environment, the interaction of students and teachers mostly occurs through computer-mediated tools often called asynchronous tools. The study depicted that LIS students' self-efficacy related to online communication was relatively good. This finding is in line with the findings of Yasin and Ong (2020) who concluded that online communication self-efficacy in a blended learning environment could promote the OLR of students. However, it in contradiction with those of

Estira (2020) and Cigdam and Yildirim (2014), who found that online communication self-efficacy of students was comparatively less important.

The results further indicated that the students felt that they had less control over their learning environment and time management. These findings are similar to those of M.L. Hung et al. (2010) and Naji et al. (2020) who have reported that learner control was a lower rated dimension of OLR among students as compared to other dimensions. The reason might be that online learning is different from traditional face-to-face learning where there is a high possibility of disruption e.g. students engaging in disruptive activities such as playing online games, internet surfing, chatting or instant messaging with friends, etc.

Time management is an important aspect of online learning, and

Table 4
Demographic composition of respondents.

SN	Demographic variables	Frequency	Percentage (%)
1	*Gender*		
	Male	146	42.9
	Female	194	57.1
2	*Age brackets (years)*		
	Up to 20	49	14.4
	21–30	260	76.5
	31–40	24	7.1
	41 and above	7	2.1
3	*Level of LIS Program*		
	BS-LIS / BS-IM	142	41.8
	MLIS / MA-IM	143	42.1
	M. Phil.	42	12.4
	Ph.D.	13	3.8
4	*GPA (previous semester)*		
	≤ 2.00	1	0.3
	2.01–3.00	98	28.8
	3.01–4.00	241	70.9

Table 5
Perceived Online Learning Readiness during COVID-19 ($N = 340$).

ID	Statements	M	SD	Factor Loading
	Computer/Internet self-efficacy (CIS)	3.66	0.906	
CIS1	I feel confident in performing the basic functions of Microsoft Office programs (MS Word, MS Excel, and MS PowerPoint).	3.70	1.044	0.764
CIS2	I feel confident in my knowledge and skills of how to manage software for online learning.	3.44	1.083	0.726
CIS3	I feel confident in using the Internet (Google, Yahoo) to find or gather information for online learning.	3.83	1.070	0.805
	Self-directed learning (SDL)	3.62	0.672	
SDL1	I carry out my own study plan.	3.66	0.929	0.609
SDL2	I seek assistance when facing learning problems.	3.54	0.969	**0.405**
SDL3	I manage time well.	3.43	1.055	0.626
SDL4	I set up my learning goals.	3.74	0.912	0.733
SDL5	I have higher expectations for my learning performance.	3.76	0.973	0.678
	Learner control (LC)	3.37	0.761	
LC1	I can direct my own learning progress	3.54	0.903	0.683
LC2	I am not distracted by other online activities when learning online (instant messages, Internet surfing).	3.03	1.186	**0.398**
LC3	I repeated the online instructional materials on the basis of my needs.	3.54	0.978	0.540
	Motivation for learning (MFL)	3.88	0.717	
MFL1	I am open to new ideas.	3.77	0.922	0.754
MFL2	I have the motivation to learn.	3.84	0.956	0.748
MFL3	I improve from my mistakes.	4.01	0.910	0.676
MFL4	I like to share my ideas with others.	3.90	0.949	0.520
	Online communication self-efficacy (OCS)	3.47	0.886	
OCS1	I feel confident in using online tools (email, discussion) to effectively communicate with others.	3.53	1.127	0.771
OCS2	I feel confident in expressing myself (emotions and humor) through text.	3.53	1.011	0.630
OCS3	I feel confident in posting questions in online discussions.	3.37	1.117	0.721

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.
Bold data signifies Poor factor loading (< 0.50).

students should devote adequate time to their respective courses, participate in group discussions by posting messages, and submit their work on time (Roper, 2007; P. Wang, Wu, Wang, Chi, & Wang, 2018). The lack of control over their learning environment might result in poor performance of students, therefore, H.T. Hung and Yuen (2010), and L.-C.C. Wang and Beasley (2002) have suggested that students who had

appropriate control over their learning setting might exhibit better academic performance in a web-based learning setting as compared with those who did not have any control. As things stand, no one is certain about the reopening of educational institutions. The world is still struggling with the second wave of COVID 19 (Sultan, 2020). In these challenging times, almost all nations have transitioned to online learning. This has resulted in additional responsibility for the students to take ownership of their education, to properly manage their time, and control their learning environment so that the educational systems and processes can continue to run smoothly. Control over their learning environment would allow the students to make decisions about their learning, individualize the selection of media, manage time, and control their educational content.

In relationship analyses, the study observed a significant difference of opinion on two dimensions of OLR (computer/internet self-efficacy and online communication self-efficacy), based on the LIS students' gender. On these dimensions, the perception of male students was higher than the female students. These findings are similar to those of Sakal (2017), who found a significant difference in online communication in men. Kay (2009) also depicted that the perception of male students was stronger than female students on the interactive classroom communication systems. This greatly contributed to the learning process of the male students. However, these findings are not compatible with the findings of Chung et al. (2020) and M.L. Hung et al. (2010) who did not find any significant difference in attitude and behavior of male and female students on all five dimensions of the OLR scale. One possible explanation of this inconsistency might be the socio-cultural and socio-economic differences between the participants of these studies.

Furthermore, the present study findings have unveiled a significant difference in students' readiness towards their computer, internet, and online communication self-efficacy and learning motivation depending on the level of their program of study. The perception of M. Phil. and Ph. D. students was higher than BS and MLIS/MIM students. This was also an anticipated finding, as it is generally assumed that the self-efficacy of students tends to improve as they progress in their studies. Additionally, these findings might be the result of policies set forth by the HEC of Pakistan making ICTs related courses compulsory for students in higher degree programs. Another reason could be that most LIS students with higher level degrees (M. Phil. and Ph.D.) were working also working as professional librarians and thus had more advanced IT skills. Likewise, research students were more engaged in different kinds of information seeking and research activities and, therefore, had a better computer, internet, and online communication self-efficacy as compared to other students, as asserted by Naveed and Mahmood (2019).

Furthermore, age appeared to be a strong predictor of two of the dimensions of online readiness (computer and internet self-efficacy, and online communication self-efficacy). These findings are not surprising. Generally, a student's learning experience, confidence, and competencies also improve with increasing age. Chung et al. (2020) and Lee, Yeung, and Ip (2016) have also reported that matured students tended to exhibit a greater readiness for online learning than the younger students.

Moreover, grades of LIS students are also reported as being a significant predictor of two dimensions of OLR (self-directed learning and motivation for learning). It seems that the students who scored higher grades in their previous semester exhibited a higher readiness towards self-directed learning and learning motivation compared to those who had lower grades. These findings show that students possessing higher grades were more confident in executing their study plans, seeking timely assistance, managing their time, setting learning goals, and had higher expectations for their learning performance. This finding highlights that high academic achievers were more innovative, motivated, and more likely to share their ideas with their fellows and teachers. These findings are congruent with the findings of M.L. Hung et al. (2010) who concluded that grades were a strong predictor of self-directed learning and learning motivation.

Table 6
Summary table of results.

Variables	Statistics applied	Computer/Internet self-efficacy		Self-directed learning		Learner control		Motivation for learning		Online communication self-efficacy	
		Test statistics	p-value	Test statistics	p-value	Test statistics	p-value	Test statistics	p-value	Test statistics	p-value
Gender	Independent sample t-test	0.007**	0.731	0.438	0.679	0.194	0.973	0.939	0.754	0.048*	0.120
Age	Simple linear regression	0.35** ($R^2 = 0.039$)	0.000	0.009 ($R^2 = 0.005$)	0.181	0.004 ($R^2 = 0.001$)	0.619	0.012 ($R^2 = 0.008$)	0.108	0.023* ($R^2 = 0.018$)	0.013
Level of LIS Program	One-way ANOVA	0.001**	0.01	0.275	0.05	0.262	0.05	0.045*	0.05	0.047*	0.05
Previous semster GPA	Simple linear regression	0.039 ($R^2 = 0.000$)	0.723	0.165* ($R^2 = 0.012$)	0.044	−0.010 ($R^2 = 0.000$)	0.918	0.229** ($R^2 = 0.020$)	0.009	0.110 ($R^2 = 0.003$)	0.310

[*] Significant at the 0.05 level (2-tailed).
[**] Significant at the 0.01 level (2-tailed).

Theoretical and practical implications

This study would be a good addition in the area of online education particularly, during a pandemic situation. This is a baseline study in the context of Pakistani LIS students that would open new horizons of exploration for future researchers. This investigation has explored the readiness of students regarding online learning during the COVID-19 pandemic through the OLR scale developed by M.L. Hung et al. (2010). The results have shown that the OLR scale was not fully applicable to the LIS students in an emergency as it had some convergent validity issues on two of its dimensions (learner control and learning motivation). Therefore, there was a need to develop a new scale or modify this one for investigating the LIS students in a pandemic like situation for all future research studies. Furthermore, it is suggested that some additional personal (urban/rural, race, marital status, etc.) and academic factors should be included in the scale while determining the OLR of LIS students. This study may be replicated on students of other disciplines to compare their preparedness for online learning during COVID-19 for holistic findings.

This study has some practical implications for heads of LIS schools, university administrators, and policymakers: 1) The study participants have indicated a lack of self-efficacy in posting questions during an online discussion. This had some serious implications for their poor academic performance. Therefore, LIS departments must arrange training and orientation sessions for their students to improve their online communication self-efficacy. This would enable them to fully participate in the online learning experience gain the maximum benefits from it. L.-C.C. Wang and Beasley (2002) have also claimed that such interventions would result in better academic performance among students. 2) Since the LIS students reported a lack of confidence in managing the various software tools used for online learning, therefore, the university IT department must conduct training/orientation sessions to teach about these tools. 3) As the students claimed a lack of control over their learning and had time management issues, so the course instructor should try harder to engage every student in task-based online group discussions. This would encourage student engagement and discourage their involvement in other disruptive activities like chatting, texting, online gaming, etc. during an online class. 4) Lastly, the university administration should play a key role in this regard by establishing a strong system of oversight to monitor student activities during online classes.

The BS and MA students' perception about their computer/internet self-efficacy and online communication self-efficacy was weaker than that of M. Phil. and Ph.D. students. This result may be used by policymakers to develop and offer short ICTs related courses for BS and MA students. Such courses would help improve their ICTs proficiency and allow them to cope with the challenges presented by online learning during the prevailing COVID-19 pandemic.

Limitations and future research directions

This research has certain limitations. Firstly, the study explored the OLR of LIS students enrolled in the nine public sector universities in Pakistan, therefore, its results may not be generalized to the students of other disciplines. Secondly, the sample was drawn via an equal size purposive sampling technique (a form of nonprobability sampling) that could create the issue of generalizability. Thirdly, the study adopted the self-assessment method to collect data about the students' perceived online learning readiness. This raises the issue of bias. Lastly, it is empirically evident that the individuals tend to overestimate their self-efficacy (Botes, 2016; Schlösser, Dunning, Johnson, & Kruger, 2013), therefore, the theory of the Dunning-Kruger effect should be taken into consideration while interpreting this study's results.

The present study suggests some topics for future research, for instance, a survey of the viewpoint of LIS teachers who are currently involved in online education should be conducted. A mixed-methods study could be carried out once this pandemic is over, i.e., a post-pandemic study. Moreover, a qualitative study exploring the opinions of students and teachers would be a worthy endeavor.

Conclusion

During the COVID-19 pandemic, LIS students were not much personalized and successful in their decisions about their online educational life; however, they were motivated to learn in this e-learning environment. Female LIS students' computer/internet and online communication self-efficacy was lower than their male counterparts. Postgraduate students (M. Phil. and Ph.D.) exhibited a higher readiness towards computer/internet, online communication self-efficacy, and learning motivation than undergraduate (BS) and graduate students (MA). Furthermore, the age and grades (GPA) of LIS students appeared to be strong predictors of OLR dimensions during emergencies such as COVID-19.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.acalib.2021.102346.

CRediT authorship contribution statement

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in the *Journal of Academic Librarianship*.

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