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Validation of the Online Learning Readiness Scale (OLRS) in the Context of Pakistan

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ABSTRACT

The primary objective of the research study was to validate the Online Learning Readiness Scale (OLRS) in the specific context of Pakistan. A method of quantitative inquiry was adopted to administer and validate the instrument on a sample of 368 students from higher education institutions in south Punjab, Pakistan. For the purpose of to validate it, the confirmatory factor analysis (CFA) was specifically conducted utilizing AMOS (Analysis of Moment Structures). The research results indicated that the model was found as being suitable in Pakistan, and no aspect was omitted from the model in question. Further, all the calculated values of model fit indices in accordance with the results were in acceptable limits. The scale revealed acceptable composite reliability and construct validity. The study has the potential to support institutions in tailoring their online learning programs in order to better satisfy the needs of their students, ultimately resulting in higher student achievement in online courses.

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1. Introduction

With the constant evolution of new technology, online education in all of its forms has become increasingly popular globally. Additionally, many terms are used interchangeably when it comes to online learning (Carrillo & Flores, 2020). Tondeur, Scherer, Siddiq, and Baran (2017) have now indicated how the incredible growth of virtual learning environments has fundamentally changed the landscape of higher education. Moreover, Thomas (2011) presented an in-depth examination of how online instruction delivery has remained effective in educational settings. In certain situations, academic organizations switched the focus away from a physical campus and towards a wall-free, high-tech learning environment. However, the pandemic has had a major impact on global education, and the transition to online learning has shown to be a suitable solution (Bozkurt & Sharma, 2020; Cockerham, Lin, Ndolo, & Schwartz, 2021; Favale, Soro, Trevisan, Drago, & Mellia, 2020; Lee, Fanguy, Bligh, & Lu, 2022). Subsequently a worldwide epidemic transformed the whole system of education (Minhas, Hussain, Ghani, Sajid, & Pakistan, 2021). Pakistan's educational institutions are also driving this wave of change, but at a slower pace than in other Asian countries. Considering this context, Tayyib et al. (2020) claimed that the country's ability to adopt online learning and the quality of its communication technology have a significant effect on any required action or plan implementation. On the other hand, many higher education institutions, particularly those from low-income countries like Pakistan, focus on the consumer acceptance of online learning systems (Qazi et al., 2020). In this respect, Espiritu and Budhrani (2019) indicated that readiness must be recognized as a crucial factor attribute that influences the manner in which staff members in any organization are prepared for change implementation. According to the literature, key stakeholders' preparation is crucial for integrating technology into the higher

education system. Khan et al. (2014) endorsed this perspective, suggesting that assessing the level of readiness of stakeholders at institutions is an essential step in the implementation of any system change. Chorrojprasert (2020) highlighted that a further significant aspect to consider when focusing on learner readiness is the student's tendency for learning, which should be reinforced before starting on any educational endeavor with the goal of reaching optimal positive outcomes.

The Online Readiness Scale, that was initially presented by Hung, Chou, Chen, and Own (2010), is an instrument originated in Taiwan to measue learners' preparation to study online in an ICT-rich learning environment. Nonetheless, in developing countries such as Pakistan, it requires a thorough evaluation as these countries' technological infrastructure is quite distinct from that of those in the West.Consequently; an unvalidated Online Readiness Scale for Pakistani students would not effectively measure their particular needs and requirements. The primary intent of this reserch study was to highlight the importance of region-specific distinctive characteristics in the application of educational technology. The validation of Online Readiness Scale in Pakistan is intended to assist educators in developing inclusive learning practices that are flexible to any learning environment Online learning has become very popular in Pakistan particularly in the wake of COVID-19 outbreak but little is known regarding the preparedness of students in this regard within Pakistani scenario. A specifically designed Online Learning Readiness Scale (OLRS) may help in determining the preparedness of the students for online learning. However, validity of its applicability is dependant on cultural and educational background. Knowing about students' preparedness may enable the educators and policy makers to design and implement strategies that might support students in their online learning environment and hence increase their achievement. This investigation seeks to validate the OLRS in Pakistan in order to ensure that the tool can be used to determine the preparedness of the students, as well as the areas that require attention. As a result of cultural, economic and social differences, OLRS may not be entirely relevant to the Pakistan context and the specific aspects of online learning. This is important because it enables the creation of useful data that can be used in the formulation of specific recommendations for the improvement of online education in Pakistan.

2. Concept of Readiness

First, Erickson and Warner (1998) highlighted that students should be prepared for online setting.Thus, ther is a need to assess the learner readiness to measure the effectiveness of online learning practices (Heo & Han, 2018). Yurdugül and Demir's study suggests that individual and organizational preparedness for online learning can be predicted based on prior knowledge which could be highly beneficial in online learning.,. Cigdum and Ozturk's study highlights the importance of the assessment and enhancement of learner engagement in online learning.. Following this, Martin, Wang, and Sadaf (2020) presented explanations of this concept: since online learning is growing more prevalent in organizations, there will be a need to concentrate on student readiness levels in order to develop a complete method for gauging student readiness. In the context of this problem, Engin (2017) asserted in an investigation that students must be well prepared to reap the maximum benefits of platforms for online learning. Dorsah (2021) also pointed out that learners' readiness and self-reliance in their capacity to effectively use technology are important determinants of success in the digital academic sphere. In another research pursuit, Buzdar, Ali, and Tariq (2016) emphasised that of online learning preparation is beneficial for effective engagement in virtual spaces. Husin, Jabar, and Omar (2021) advised students to prepare for a tech-driven learning environment. Followin it, Arinto (2013) also described that learners may not succeed in online activities without required readiness.

2.2. Online Learning Readiness Scale (OLRS)

Several studies have approached the notion of online learning readiness differently, focusing on its multiple components. Within this framework, Yurdugül and Demir (2017) designed an e-learning readiness assessment for undergraduate students and described online learning readiness as an approach encompassing characteristics that include autonomous learning and self-efficacy regarding technology usage. Additionally, Pillay et al. (2007) developed an assessment tool to evaluate the preparedness of tertiary-level students for online learning, using a sample of university students ranging from first-year undergraduates to postgraduates. They referred to online learning readiness as a combination of technical abilities, computer self-efficacy, learner preferences, and attitudes toward computers.

Furthermore, Hung et al. (2010) generated a tool to gauge college students' preparedness for online learning and defined it as a construct that includes the dimensions of self-directed learning, motivation for learning, computer/internet self-efficacy, learner control, and online communication.

2.3. Different Dimensions of Online Learning Readiness

In this regard, Joosten and Cusatis (2020) observed that research, particularly within the online learning sector, has emphasized the need of with an emphasis on several components and dimensions influencing preparation for students for an online application of learning. The next section discusses the many elements of students' preparation for online learning.

2.4. Computer Self-efficacy

The concept of self-efficacy in online usage was pioneered by Hung et al. (2010). Self-efficacy is also a very useful intrapersonal chateristic, as Khalifeh et al. (2020) have shown. Similar notion was endorced by Zimmerman (2000) that students' self-efficacy based on technology can affect their preparedness to use technology. Aditionally, Hong and Kim (2018) further defined "self-efficacy" as students' understanding of technology, aptitudes, attitudes, and capacities to achieve learning goals. .Finally, need of considering other crucial factors including the availability of devices and the competence to manage technology is also very important.

2.5. Motivation for Learning

In this regard Ryan and Deci (2000) divided learning drive or motivational level into two categories internal motivation level and external motivation level . Thus, motivation supports learners retain to comprehend, recall, what they already learned or studied. In similar way, internal motivation determines interest levels of a person. Moreover, external motivation helps to achieve targets mainly through rewards.

2.6. Self-efficacy in Online Communication

In this context, Palloff, Pratt, and Stockley (2001) found that computer-mediated conversation might be part of online education and students who have command on technology can discuss freely as well as completely comprehend their content .Further, Roper (2007) also asserted that students must actively take part in online communication with their teachers and other students to get maximum potential of learning online.

2.7. Self-Directed Learning

In the words of Kohan, Arabshahi, Mojtahedzadeh, Abbaszadeh, Rakhshani, and Emami (2017), a self-directed learning is necessary really in online learning environment. Ayyildiz and Tarhan (2015) highlighted those independent learners' posses' characteristics to perform work in difficult situation. .Futhermore, "Self-directed" learners may choose appropriate content, as highlighted by Robinson and Persky (2020). Aditionally, Kraiger and Jerden (2007) reinforced this idea, claiming that online education is more versatile than traditional classroom instruction.

2.8. Learner Control

The idea of learner control has evolved throughout time to incorporate new learning paradigms and technology. Furthermore, students who can adjust and control their learning pace in an online academic culture may do well. Aditionally, learner performance in an online setting is influenced by their amount of control. Thus, students who can make their own learning decisions can easily achieve effective results than those who do not posses these skills (Wang & Beasley, 2002).

2.9. Material and Methods

The primary purpose of this quantitative research design was to verify the Online Readiness Scale within the context of higher education institutions in Punjab, Pakistan. The scale was applied to a sample of 368 students, including 151 males and 217 females who were selected from 9,163 students enrolled in BS programs across six departments of the faculty of social sciences at higher education institutions.The (OLRS) was utilized with approval of the author. The OLRS has 18 items on a Likert scale. The OLRS encompasses five different aspects.

In this context, Garrison (1997) defines "self-directed learning" as the learner's duty to reach certain educational objectives in their learning environment. The measure of "learner control" was created to explain how learners may influence and control the "pace of learning". Aditionally, the computers self-efficacy is related to learner's capability to effectively execute computer. Whereas motivation corresponds to the learners' perceives about online learning. Furthermore, self-efficacy in online communication abilities, which symbolizes students' ability to adapt to the online environment via conversation and inquiry. The OLRS has total 18 eighteen queries on a Likert scale. In addition, the scale runs from severe disagreement (1) to strong agreement (5). The measure, which originally had been created in English, was used without changing language, considering that in Pakistani students at universities can understand English well. Later, an online survey and a Google form were executed to measure the perceived degree of preparedness of students who were regular and enrolled in acdemic programs (BS) in selected social science departments. The data gained was examined for completeness and incomplete answers were removed from the analysis. The data's missing values were chosen through Missing Complete at Random (MCAR). The entire statistical analysis was conducted employing SPSS version 22.

The KMO test and Bartlett's sphericity test were applied to determine the appropriateness of the variables for factor analysis. Skewness and Kurtosis were further utilized to figure out the normality of data. Furthermore, exploratory factor analysis (EFA) was performed out at first to look into the scale's underlying component structure. EFA with PCM followed by varimax rotation was applied on 18 statements to extract the questionnaire's uncorrelated items. The constructs' internal consistency (reliability) was tested using composite reliability (CR) following Nunnally and Bernstein's (1994) guidelines, with CR values > 0.7 signifying a suitable value. Average variance extracted (AVE) was employed for assessing convergent validity; values > 0.5 suggested by (Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014). When the square root of the AVE of each component exceeded its association with any other factor, discriminant validity was found (Fornell & Larcker, 1981). Pearson's Moment correlation was utilized to asses the link among the five aspects of the scale. The OLRS was assessed using confirmatory factor analysis and(SEM) structural equation modeling. Analysis of Moment Structure) version 21 was implemented for confirming the study's model. To calculate values of x2/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 applied .Furthermore, ethical standards were adhered to, including getting informed permission from all participants to ensure they were aware of the study's intent, their voluntary participation, and maintaining the confidentiality of their responses.

3. Results and Discussion

Table 1 shows the instrument's reliability and validity. It further demonstrates the relationship between the components of the scale (OLRS). For this reason, "construct validity" was determined using both "discriminant" and convergent validity forms. Composite reliability (CR) was used to conduct this analysis. Further, the average variance extracted (AVE) was computed. The assessed CR value for all of the scale's constructions was greater than 0.70. Similarly, (AVE) values ranging between 0.511 and 0.661 on the same scale. To assure reliability and internal consistency, the observed Cronbach's Alpha meet the parameters as Hair et al. (2018) described and was greater than 0.70 . Moreover, Pearson's moment correlation was used in evaluating the connection between the various scale dimensions. In the current investigation, the various scale dimensions were shown that they were strongly related at a p-value of 0.01.

Table 1: Validity, Reliability and Correlation Index

Sr.No	Dimensions	CR	AVE	α value	CIS	SDL	LC	MFL	OCS
1	Self-efficacy in Computer	0.779	0.543	0.774	1				
2	Self-Directed learning	0.87	0.579	0.864	0.443	1			
3	Learner Control	0.757	0.511	0.756	0.250	0.217	1		
4	Learning Motivation	0.818	0.529	0.817	0.245	0.297	0.458	1	
5	Self-efficacy in Online Communication	0.854	0.661	0.850	0.487	0.501	0.180	0.313	1

3.1. Exploratory Factor Analysis

For this purpose, Principal Component Analysis (PCA) and (Varimax rotated method) were used to reduce the different measures of the Online Learning Readiness Scale (OLRS) scale. The table above offers the alpha value and factor loading for every item on the scale.

Table 2: Factor Loading of (OLRS)

Item No.		Factor loading	Cronbach's alpha
Computer Self-efficacy			0.774
CIS1	I am confident about my knowledge in managing software for online learning.	0.743	
CIS2	I am confident in usage of Microsoft Office basics.	0.819	
CIS3	I am confident in utilizing the Internet for online learning..	0.775	
Self-Directed Learning			0.864
SDL1	I manage my time very well.	0.626	
SDL2	I ca effectively carry out my study plan.	0.738	
SDL3	I can set up my learning objectives.	0.850	
SDL4	I seek support when facing learning issues.	0.752	
SDL5	I have great expectations for my academic performance.	0.832	
Learner Control and Autonomy			0.756
LC1	I am not easily diverted by online activities.	0.797	
LC2	I am able to successfully steer my learning development.	0.793	
LC3	I can go over the online lessons as many times as I need to.	0.741	
Motivation for Learning			0.817
MFL1	I have the motivation to learn.	0.763	
MFL2	I am always open to new concepts and ideas.	0.809	
MFL3	I can effectively improve my mistakes.	0.697	
MFL4	I like to share my ideas with others.	0.753	
Online Communication Self-efficacy			0.850
OCS1	I am confident in usage of online tools to effectively communicate.	0.880	
OCS2	I feel highly confident expressing through text.	0.814	
OCS3	I feel confident in in online discussions.	0.701	

As indicated in Table 3.6, the OLRS scale featured five components and a total of 18 items. The range of factor loading on the first dimension was 0.743–0.819. There were five different components overall in the second dimension of the scale. This dimension had a factor loading between 0.626 and 0.850. The range of factor loading on the third dimension was 0.741–0.797. Likewise, the fourth dimension included four components, and the factor loading varied from 0.697 to 0.809. The fifth dimension consisted of three distinct parts in total. The range of factor loading on this dimension was 0.701–0.880. In addition to this, Cronbach's alpha coefficients to ensure the reliability of scales were used in the study. The self-confidence in computers and the Internet was found to be 0.7, with a Cronbach's alpha coefficient of 0.774. The second dimension scale, which measures an individual's responsibility for the learning process, had a Cronbach's alpha of 0.864.Further, learner control dimension had 0.756. Moreover, motivation for learning had 0.817. Finally, self-efficacy in online communication scale, measuring confidence in digital media interaction, had a high reliability test of 0.850.

Table 3: (OLRS)Skewness and kurtosis

	Skewness		Kurtosis	
		Std. Error		Std. Error
Computer Self-efficacy	-1.194	.127	1.821	.253
Self-directed Learning	-.794	.127	.394	.253
Learner Control	-.747	.127	.259	.253
Motivation for Learning	-.370	.127	-.024	.253
Communication Self-efficacy	-.935	.127	.646	.253

The study's skewness and kurtosis were within the acceptable range of +2 to −2 (Hair et al., 2014). All of the components showed value under 1.96.

Table 4: KMO and Bartlett's Test for Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.862
Bartlett's Test of Sphericity	Approx. Chi-Square	3046.655
	Df	153
	Sig.	.000

The sampling adequacy of OLRS was (.862), as demonstrated in Table 4. In addition, a significant result (.000) demonstrated that all items were significantly related, which fulfilled the criteria to perform the Confirmatory Factor Analysis. The Bartlett's Test of Sphericity, which is a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, found to be highly appropriate for this data (Bartlett, 1954).

Figure 1: Confirmatory Factors Analysis (CFA) of (OLRS)

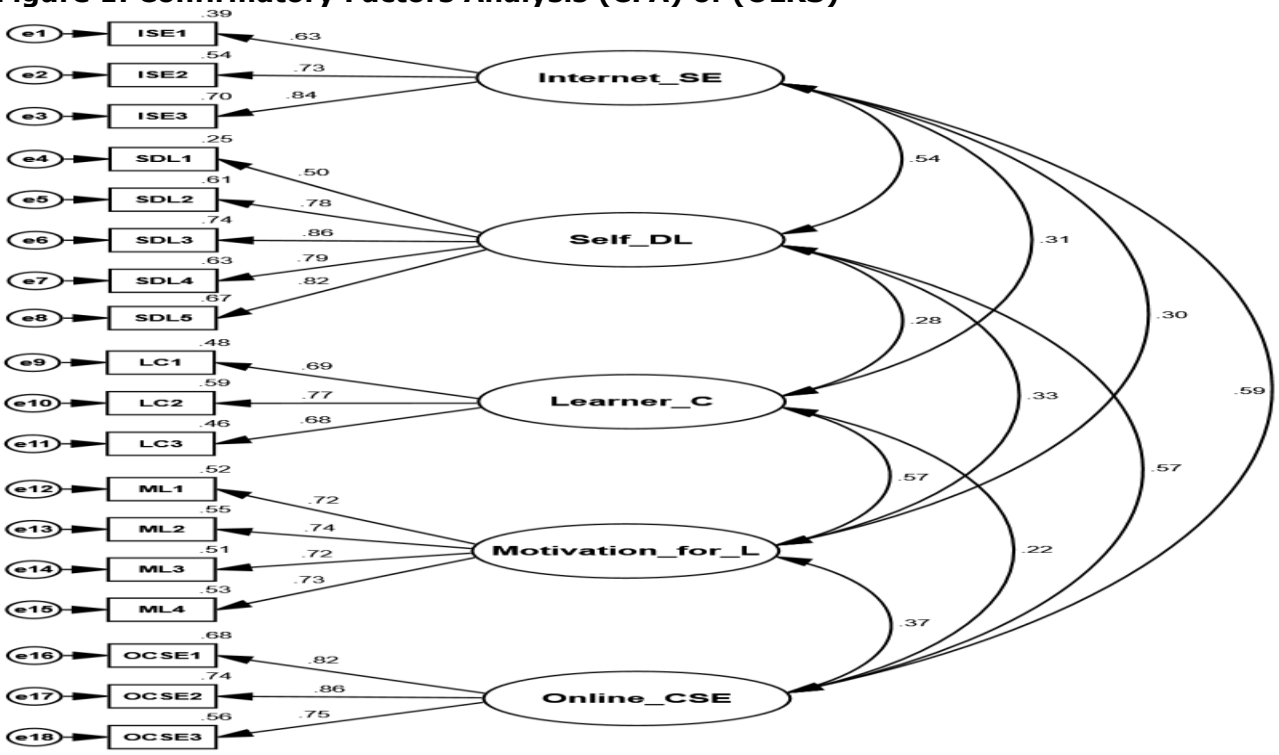

Figure 2: Structural Model

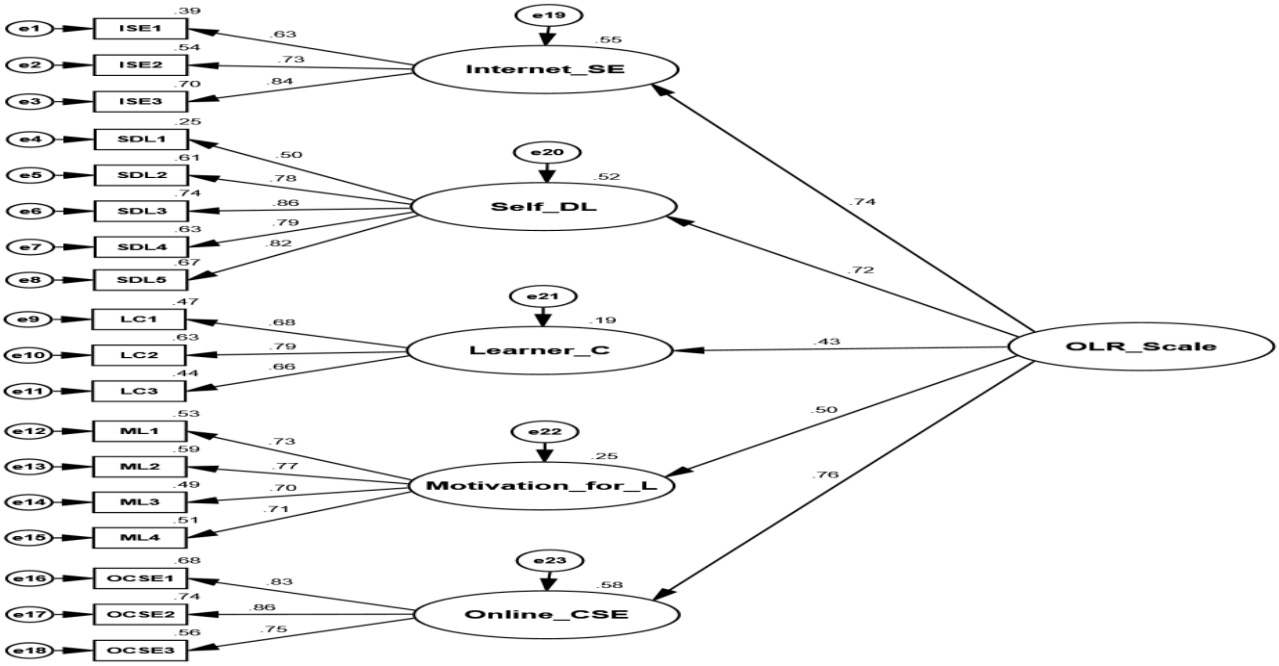

Table 5: Model Fit Indices

Model fit Measures	Estimate	Threshold	Interpretation
Absolute fit measures			
X^2 (chi-square)	285.122	-	-
Df (degree of freedom	125	-	-
X^2 Significance	0.000	p<0.05	Significant
Chi-square/df (X^2/pdf)	2.281	<3	Standard Range
goodness of fit index (GFI)	0.946	>0.90	Standard Range
Root mean square error approximation RMSEA	0.05	<0.08	Marginal fit < 0.090 Acceptable < 0.080 Good fit < 0.050
Incremental fit measures			
adjusted goodness of fit index (AGFI)	0.908	>0.90	Acceptable Range
NFI (Normed Fit Index)	0.908	>0.90	Acceptable Range
Comparative fit index (CFI)	0.946	>0.90	Acceptable Range
IFI (Incremental Fit Index)	0.946	>0.90	Acceptable Range
TLI (Tucker Lewis index)	0.934	>0.90	Acceptable Range

The ORLS scale's model fit was satisfactory complying with the confirmatory factor analysis, as indicated by the CFA. The model fit indices of the Chi-Square text of OLRS are as follows: χ2 285.122, n= 368 =0.946, p = <.00, Goodness of Fit Index, GFI =0.90, Root Mean Square Error of Approximation, RMSEA =0.05, Comparative Fit Index, CFI = 0.946, Tucker-Lewis Index, TLI = 0.934.The aim of this research study was to establish the validity of the (OLRS) Scale in Pakistan. Both the structural model (Figure 2) and measurement model (Figure 1) are accepted owing to the acceptable level of fit based on by the GFI, CFI, TLI, PCFI, and RMSEA indices. Based on Hair Jr et al. (2014), both models demonstrate a satisfactory model fit for the data. Further, the corresponding latent construct was substantially loaded by all of the indicators. In conclusion, the fit indices values indicate the measurement model is moderately compatible to the sample data (Byrne & Van de Vijver, 2010). Additionally, the structural model confirms the five-factor structure of the Online Learning Readiness Scale from a standpoint of students in higher education institutions. The online readiness scale was also found to be an acceptable measurement instrument by the composite reliability and construct validity tests. In conclusion, the measurement model of OLRS can be established to be reliable and valid. Therefore, the OLRS scale's reliability as a tool for assessing learning readiness in Pakistani universities has been assessed.The study might be useful to researchers and practitioners who have an interest in examining online learning processes in educational organizations within this context.

4. Conclusions

Educators at higher education institutions in Pakistan may use the (OLRS) to assess the level of readiness of learners for online learning. The investigation verifies the model fit of (OLRS). The scale's reliability and validity have been verified in accordance with the established standards (Livote & Wyka, 2009). Therefore, it provides educationist opportunity to assess the readiness of students for online learning. The readiness of online learning is a prerequisite for online education to have a significant effect (Arbaugh et al., 2008). The model fit indices provided above yielded values within the acceptable limits, as advised by Brown (2015). The study model was accepted as suitable for the Pakistani context. The factor loading analysis revealed that all items were statistically significant and effectively loaded (≥ 0.50) into the latent dimension (Fornell & Larcker, 1981). The results from the confirmatory studies have a two-fold outcome. The academic literature provides a wealth of profound insights suitable for both teaching and policy-making. Therefore, unlike in the past, the online readiness scale in higher education is in a position to break localized online education boundaries and easily meet the specific requirements of online learners. The (OLRS) was validated and determined to be a useful tool for measuring the levels of preparedness of students in Pakistan for online learning. Thus, the tool proves to be very reliable and valid in the way that it can capture various dimensions of readiness. This is therefore a valuable addition to the understanding of the current state of online learning readiness in Pakistan since the validation of the OLRS is done in

the country. It is a valid and reliable tool for determining levels of preparedness, makes it easier for authorities to recognize areas in which specific educational initiatives are necessary, contributes to the existing body of knowledge, and provides a foundation for future studies. To sum up, the identified readiness gaps need to be addressed in order to enhance the quality and effectiveness of online education and to make it more inclusive in the context of Pakistan in order to enhance the learning outcomes in the country. This will be useful in the global research on online learning readiness in Pakistan especially because the validation of OLRS would enable comparison with other cultural and educational environments.

4.1. Practical Implications of the Study

The Online Learning Readiness Scale (OLRS) in Pakistan holds significant implications in the context of educational systems.

- Thus, by evaluating the students' preparedness for online learning, educators can determine which aspects may require more attention and, therefore, create specific training programs and materials.
- Policymakers are therefore able to use the validated OLRS to collect data on Online Learning Readiness for different populations and geographical locations, which can help in the formation of policies and interventions to support for equal opportunities in the use of online learning.
- In addition to this, on the basis of readiness assessments, educational institutions can plan their resource utilization effectively by improving the technological facilities, enhancing the teachers' training, or expanding the student support services.
- Further, the validity assessment of OLRS can also indicate the specific aspects where the teachers should direct their efforts in order to enhance their students' preparedness for online classes.
- Moreover, through the comparison of the students' preparedness to the standards of other institutions nationally or internationally, institutions can have guidelines for improvement and measure the student's achievement over time.
- Aditionally, sharing students' readiness levels with the students may help to understand their weaknesses and shortcomings, and hence it may motivate them to strive to make productive changes that will enhance their learning.

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