

Psychometric Properties of the Persian Version of the Online Learning Readiness Scale

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Abstract

Background: The rapid growth of information technology has created opportunities for online learning.

Objectives: The aim of this study was to investigate the psychometric properties of the Persian version of the Online Learning Readiness Scale (OLRS) and assess the readiness of health care providers in this regard.

Methods: This cross-sectional study was conducted in 2022 among 181 health care providers in Kerman, selected through multi-stage sampling. The data collection tool included a questionnaire with demographic information and the Persian version of OLRS, comprising 18 questions across 5 subscales: computer/internet self-efficacy, self-directed learning, learner control, learning motivation, and online communication self-efficacy. Data were analyzed using Pearson correlation, independent *t*-test, and analysis of variance (ANOVA) in SPSS v. 26, as well as LISREL v. 8.8 software.

Results: Cronbach's alpha coefficient for subscales ranged from 0.74 to 0.93, with factor loadings of items ranging from 0.54 to 0.96. Goodness-of-fit indices met acceptable standards. The mean scores for all subscales exceeded the average (2.5). Health care providers in rural areas had higher mean scores in the self-directed learning ($P=0.04$), learning control ($P=0.02$), and learning motivation ($P=0.001$) subscales. Men scored higher in the self-directed learning ($P=0.01$) and learning motivation ($P=0.04$) subscales.

Conclusion: The Persian version of OLRS demonstrates satisfactory psychometric properties and can be used to assess the readiness of learners for online learning. When planning such training, it is crucial to consider factors related to learners' readiness, including demographic and occupational characteristics.

Keywords: Online Learning, Online Learning Readiness, Health Workers, Psychometric Properties, Iran

Background

In recent years, virtual education has offered numerous opportunities to enhance the educational experience through the utilization of advanced technologies. The incorporation of technology into education and the emergence of virtual education have been global phenomena since 1985. Over the years, various generations of virtual education have evolved, with a pivotal moment occurring in 1995 when advancements in computer technology and telecommunication network bandwidth paved the way for webinars. This technological progress enabled the creation of high-quality web-based audio and video content, marking the

advent of the fourth generation of virtual education. Digital technology, particularly web-based tools, has continued to evolve, encompassing a more comprehensive array of learning experiences and training opportunities. With the motto of "education accessible anytime, anywhere," virtual education has made significant strides, becoming a cornerstone of modern education (1).

Iran's educational system underwent notable transformations in parallel with the rest of the world. Virtual education was prioritized and embraced by the educational system, especially in response to the COVID-19 pandemic. Schools and universities adopted

the slogan, "Schools and universities are closed, but education remains open." Consequently, the pandemic and the widespread adoption of virtual education can be seen as a pivotal moment in Iran's educational landscape (2). Numerous studies have highlighted the advantages and capabilities of virtual education, emphasizing features such as direct digital learning and communication, learner-centered approaches, flexibility, innovative teaching methods, reproducibility, and error correction. These factors have contributed to the appeal and effectiveness of virtual education (3).

Presently, the advancement of telecommunication networks and the enhancement of hardware systems, including smartphones and laptops, have facilitated participation in major international scientific events from even the remotest villages. Medical universities must adapt to these developments and evolve their educational management systems to cater to diverse learners and health care providers (4). In Iran, a substantial portion of health care services is provided by community health service providers, known as *behvarz*, who operate in health houses in rural regions. They are considered the front line of health care delivery, particularly in underserved and rural areas, making them a vital component of the country's health care system (5).

Given the geographical dispersion of health posts and health houses across the country, conducting in-person continuing education programs entails significant time and financial resources. Therefore, following the experience of the COVID-19 pandemic and with the establishment of suitable virtual education infrastructure in the country, virtual education can serve as an efficient means for the ongoing training of health care providers at the primary level.

Objectives

This study aimed to assess the psychometric properties of the Persian version of the Online Learning Readiness Scale (OLRS) and evaluate the readiness for online learning and its associated factors among health care providers working in health centers affiliated with the Kerman Health Center in 2022.

Methods

This study employed a descriptive-analytic cross-sectional design. The target population encompassed all health care providers employed in health centers affiliated with the Kerman Health Center in 2022. A total of 180 participants were selected using a multi-stage sampling approach. Given that one of the study's

objectives was to assess the psychometric properties of the Persian version of the OLRs, the sample size was determined to be 10 times the number of items in the questionnaire (6, 7). Consequently, a final sample of 181 individuals participated in the study.

Inclusion criteria comprised health care providers working within the health centers affiliated with the Kerman Health Center during the study period and their willingness to partake in the research. Exclusion criteria included the intention to change workplaces or retire within the next 6 months and questionnaires with more than 10% unanswered questions.

The data collection instrument consisted of a 2-part self-administered questionnaire. It encompassed demographic characteristics and the Persian version of the OLRs, originally developed in 2010 by Min-Ling Hung et al. The OLRs comprised 18 items categorized into 5 subscales: self-directed learning (5 items), learner control (3 items), learning motivation (4 items), computer/internet self-efficacy (3 items), and self-efficacy of online communication (3 items). The original version employed a 5-choice Likert scale ranging from "completely disagree" (1) to "completely agree" (5). Subscale scores were obtained by summing the scores of the respective items and dividing by the number of items. The minimum and maximum scores for each subscale were 1 and 5, respectively.

For the preparation of the Persian version, the translation-retranslation method was utilized following permission from the original designers. Its reliability was evaluated through Cronbach's alpha and the corrected item-total correlation in a pilot study involving 30 health care providers, who later became part of the main analysis. Since this study employed a translated questionnaire, some experts argue that there is no need to reassess content validity, as it has already been validated in the original version (6). The face validity of the questionnaire was qualitatively confirmed by a panel of experts consisting of 5 medical education specialists. Construct validity was assessed using confirmatory factor analysis.

The researcher distributed 200 questionnaires in selected centers, with 181 questionnaires ultimately completed by the participants. Questionnaires were submitted anonymously, and oral consent was obtained. The time required for questionnaire completion averaged 10 minutes. Data were collected and analyzed using SPSS v. 26 (IBM Corp., Armonk, NY, USA). Qualitative variables were described using frequency and percentage indices, while quantitative variables

were summarized using mean and standard deviation. The analysis employed Pearson correlation, independent *t*-test, and one-way analysis of variance (ANOVA). The significance level was set at less than 0.05. Confirmatory factor analysis was conducted using LISREL v. 8.8 (Scientific Software International, Inc. USA), along with the assessment of model fit using goodness-of-fit indices. The study received approval from the Ethics Committee of Kerman University of Medical Sciences with the code IRKMUREC.1401.200.

Results

The study included a total of 181 health care providers, with a mean age of 35.65 ± 7.97 years and a predominance of females (87.8%). Table 1 presents the participants' characteristics.

The mean score of the subscales was 3.78 ± 0.95 , 3.35 ± 0.85 , 3.33 ± 0.94 , 3.64 ± 0.99 , and 3.73 ± 0.99 for computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy, respectively. Among the online learning readiness subscales, computer and internet self-efficacy had the highest mean score at 3.78, followed closely by online communication self-efficacy with an average of 3.73. The lowest average, 3.33, was observed for the learner control subscale.

Table 2 displays the factor loadings, *t*-test results, and Cronbach's alpha values for the subscales of the Persian version of the OLRs. The internal consistency, as indicated by Cronbach's alpha, ranged from 0.74 to 0.93 for subscales. The overall scale showed a Cronbach's alpha coefficient of 0.95. Moreover, the corrected item-total correlation demonstrated that all items had coefficients exceeding 0.4, underscoring the instrument's strong reliability. Examining Table 2, the factor loadings of the items fell within the range of 0.54 to 0.96, with none of the items warranting removal in the Persian version. Additionally, considering that all *t*-values exceeded 1.96, it suggests that the observed correlations are statistically significant (Table 3).

Table 1. Characteristics of the health care providers

Variables	Categories	Heath care workers in urban areas	Heath care workers in rural areas
Gender N (%)	Female	125(95.4)	34(68.0)
	Male	6(4.6)	16(32.0)
Experience of virtual education N (%)	Yes	110(84.0)	40(80.0)
	No	21(16.0)	10(20.0)
Educational level N (%)	Diploma	4(3.1)	46(92.0)
	Associate degree	43(32.7)	2(4.0)
	Bachelor's degree and above	84(64.2)	2(4.0)
Age Mean (SD)		34.60(7.54)	38.40(8.46)
Working experience Mean (SD)		9.43(7.78)	15.70(9.17)

In the confirmatory factor analysis, the majority of the goodness-of-fit indices met acceptable standards (Table 3).

Table 4 illustrates the mean scores of the subscales of online learning readiness and their comparison based on the participants' characteristics. Accordingly, the mean scores of all online learning readiness subscales were higher among health care workers in rural areas compared to their urban counterparts. However, statistically significant differences were found in the mean scores of self-directed learning, learner control, and learning motivation, while the mean scores of computer/internet self-efficacy and online communication self-efficacy did not exhibit statistically significant differences.

Furthermore, men had higher mean scores than women in all online learning readiness subscales. However, the mean scores of computer/internet self-efficacy, learner control, and self-efficacy of online communication in both men and women did not show statistically significant differences. Notably, the self-directed learning and learning motivation subscales had significantly higher mean scores among men than women.

Also, the mean score of online learning readiness subscales had no statistically significant difference based on online education experience. In subjects with diploma, the mean score of the learner control and learning motivation was significantly higher than those with bachelor's degree and above. The mean score of computer/internet self-efficacy, self-directed learning and online communication self-efficacy subscales did not show statistically significant differences based on education level.

Moreover, there was a significant inverse correlation between the participants' mean age and the mean score of computer/Internet self-efficacy ($r = -0.16$, $P = 0.03$) and online communication self-efficacy ($r = -0.17$, $P = 0.02$). This suggests that as participants' age increased, the mean scores of these subscales decreased.

Table 2. Factor loadings, T-values of the items and Cronbach's alpha of the subscales of the Persian version of the Online Learning Readiness Scale

Subscales	Factor loadings	T value	Cronbach's alpha
Computer/internet self-efficacy			0.74
Being confident in doing the programs like PowerPoint, Word and Excel	0.66	9.46	
Being confident about my knowledge and skills to manage computers and the Internet for online learning	0.87	13.82	
Being confident in finding the necessary information through Internet	0.80	12.19	
Self-directed learning			0.87
Design my study plan for online learning	0.68	10.14	
Get help from others when facing problems	0.62	8.88	
Manage my time well during online learning	0.84	13.71	
Set the online learning goals for each session	0.79	12.47	
Having higher expectations from my online learning	0.81	13.01	
Learner control			0.77
Having ability to measure my progress in online training	0.88	14.24	
Not be distracted by other online activities such as WhatsApp, Instagram and Facebook during online learning	0.54	7.53	
Repeat the online training content according to my specific requirements	0.81	12.63	
Motivation for learning			0.93
Being open to new ideas while learning online	0.88	15.00	
Being motivated to learn online	0.91	15.64	
Consider the previous mistakes to improve my learning	0.91	15.80	
like to share my ideas with others during online learning	0.84	13.77	
Online communication self-efficacy			0.87
Being confident in using online learning tools to communicate with others (friends, professors...)	0.80	12.78	
Being confident in expressing my thoughts and theories about a topic through online text messages (comments)	0.96	17.08	
Being confident in posting my questions in an online discussion	0.90	15.25	

Table 3. Goodness of fit indices of the Persian version of online learning readiness scale in confirmatory factor analysis

Goodness of fit indices	Present study	Acceptance range
Normed Chi-square	3.2	1-5
Standardized Root Mean Square Residual (SRMSR)	0.06	<0.05
Comparative Fit Index (CFI)	0.97	>0.90
Incremental Fit Index (IFI)	0.97	0-1
Normed Fit Index (NFI)	0.95	>0.90
Non-Normed fit index (NNFI)	0.96	>0.90

Discussion

The aim of this study was to investigate the psychometric properties of the Persian version of the OLR. Cronbach's alpha was calculated to be 0.95 for the entire scale and ranged from 0.74 to 0.93 for the subscales, indicating the Persian version's strong reliability. The original version of the scale also reported combined reliabilities between 0.72 and 0.87, which were considered acceptable, as a combined reliability

exceeding 0.70 is generally acceptable. This study demonstrated that all subscales exhibited good combined reliability (8). In another study by Engin, Cronbach's alpha was reported to be within the range of 0.65 and 0.86 (9). A separate study conducted in Turkey further confirmed the reliability and validity of this tool (10). In the present study, during the construct validity assessment of the Persian version of the scale, most of the goodness-of-fit indices met acceptable standards, indicating the approval of the proposed model with its 5 subscales. In the original scale and other similar studies, the validity of the proposed model was consistently confirmed. Consequently, the Persian version of the scale exhibits good validity and reliability and can be effectively utilized to assess the readiness of learners for online education. The experience gained during the COVID-19 pandemic underscores the utility of virtual training as an alternative or complementary approach to conventional training methods. Therefore, evaluating learners' readiness to embrace virtual education is essential to fully

harness the benefits of this mode of learning when necessary.

The current study revealed that the participants' average scores in all subscales exceeded the mid-point

score of 2.5 (on a scale of 5). Similarly, Farazkish et al. reported that students' perceptual readiness for e-learning in 15 selected universities in our country was 4.9 out of 10, indicating a moderate level of students' perceptual readiness (11).

Table 4. Comparison of the mean score of readiness for online learning readiness scale subscales in health workers based on the participants' characteristics

		Computer/internet self-efficacy	Self-directed learning	Learner control	Motivation for learning	Online communication self-efficacy
Gender	Male	3.97(0.69)	3.94(0.69)	3.62(0.47)	4.03(0.580)	3.86(0.75)
	Female	3.76(0.98)	3.47(0.86)	3.29(0.95)	3.58(1.02)	3.71(1.01)
P Value		0.340	0.010	0.120	0.040	0.490
Experience of online education	No	3.56(0.96)	3.40(0.97)	3.34(1.14)	3.53(1.25)	3.43(1.14)
	Yes	3.83(0.95)	3.56(0.83)	3.33(0.89)	3.66(0.93)	3.79(0.94)
P Value		0.150	0.390	0.940	0.590	0.100
Level of Education	Diploma	3.84(0.69)	3.75(0.68)	3.63(0.78)	3.99(0.66)	3.86(0.78)
	Associate degree	3.66(1.03)	3.56(0.98)	3.44(0.96)	3.62(1.09)	3.84(0.98)
	Bachelor's degree and higher	3.81(1.05)	3.39(0.85)	3.09(0.95)	3.44(1.04)	3.59(1.08)
P Value		0.580	0.06	0.003	0.008	0.210
Workplace	Urban	3.77(1.02)	3.45(0.89)	3.23(0.96)	3.49(1.06)	3.68(1.04)
	Rural	3.82(0.74)	3.74(0.69)	3.59(0.80)	4.02(0.62)	3.86(0.80)
P Value		0.770	0.040	0.020	0.001	0.250

Values are as mean (standard deviation)

Moreover, based on the findings of Mohammad Ismail and Karimi's study (12), the average e-learning readiness of information science students was 4.09, surpassing the mid-point. To elevate the readiness for electronic learning beyond the average level, planning computer skills and English language training for students can be considered.

Furthermore, our study identified that the average scores for self-directed learning, learner control, and motivation to learn were significantly higher among health care workers in rural areas compared to their urban counterparts. Longer work experiences among health workers in rural areas may partially account for this finding. Conversely, the lower motivation for online learning among urban health care workers may be attributed to their higher levels of education compared to their rural counterparts. However, the higher average age of health care workers in rural areas did not justify this difference, as an inverse correlation (though non-significant in some subscales) was observed between participants' average age and all subscales. It is worth mentioning that factors such as inadequate training, limited access, and the ability to use online learning technology can significantly impact the readiness for online learning in both groups. In this regard,

Shahnavazi et al. found that due to the lack of appropriate technological infrastructure for e-learning, only 32.3% of students exhibited a high level of readiness for this type of learning (13).

Another notable result of the present study was that the mean scores for all subscales of readiness for online learning were higher among male health care workers compared to their female counterparts. However, this difference was statistically significant only in the self-directed learning and learning motivation subscales. In line with these findings, a study by Kabir et al. highlighted that lower acceptance and lack of self-confidence were 2 significant reasons for female nursing students' reluctance to prefer online learning. These researchers also pointed out that factors such as age, educational qualification (similar to the current study), place of residence, parents' education level, having a single room, vision problems, and access to technology were related to the acceptability of e-learning (14). In general, several studies have explored the impact of gender on online learning outcomes and have reported varying results (15). Some studies have found no significant differences in terms of readiness for online learning, motivation, performance, or satisfaction between men and women (16). Interestingly, during the

COVID-19 pandemic, some studies reported that women outperformed men in online learning, especially in academic performance (17). Moreover, in a study conducted by Nicol et al., gender did not play a significant role in students' online learning readiness (18). While some studies have indicated the influence of gender on online learning readiness, the findings in this area are not consistent, suggesting the need for further research to gain a better understanding of the relationship between gender and online readiness.

Results of the present study, although not statistically significant, suggested that a history of online education might be directly related to the level of readiness for online learning. In a study investigating this relationship, the results indicated that previous experience with online education was a significant predictive factor for students' readiness for online learning (19).

One of the strengths of the current study lies in the examination and confirmation of the psychometric properties of the OLRs, which can be applied in future studies involving different populations. Another noteworthy aspect is that most previous studies in this field focused on students who were actively engaged in some form of learning. In contrast, the present study targeted health care workers who were on the front lines, actively involved in patient care, and where the outcome of their continuous training directly impacts the health care system and public health. Given the geographical dispersion of health centers in our country, conducting face-to-face continuous training programs for this group would entail significant costs and time. However, with the provision of suitable virtual training infrastructure in the country, especially following the experience of the COVID-19 pandemic, virtual training can be effectively utilized for the ongoing training of community health care providers at the primary level. Enhancing their readiness for online learning can help overcome many limitations related to time and location. Nevertheless, it is essential to note that the current study is cross-sectional in nature, and caution should be exercised when generalizing its results. Additionally, due to the cross-sectional design, causal relationships cannot be investigated.

Conclusion

The present study demonstrated that the Persian version of the OLRs possesses appropriate psychometric properties and can serve as a valid and reliable tool to assess the online learning readiness status of medical

learners. Furthermore, given the applicability of online training for health service providers, it is imperative to consider factors related to online learning readiness, including demographic factors and job characteristics, before planning such training programs.

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