Online learning self-efficacy: A necessity for virtual education

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Abstract:

BACKGROUND: Online learning self-efficacy is considered a major contributor to academic success. The present study was conducted to assess the psychometric properties of the Persian version of the Online Learning Self-Efficacy Scale.

MATERIALS AND METHODS: A cross-sectional study was conducted on 211 medical students at Kerman University of Medical Sciences in 2021 who were selected through the convenience method. Data were collected using a two-part self-administered online questionnaire containing demographic information and the Persian version of the Online Learning Self-Efficacy Scale (OLSES). Forward and back-translation methods were used to provide the Persian version of OLSES. Internal consistency of the Persian version was determined by the Cronbach alpha coefficient in a pilot study. Exploratory and confirmatory factor analyses were conducted using SPSS version 20.0 and LISREL version 8.80.

RESULTS: The mean of the participants' age was 21.40 ± 2.52 years, and most of them (56.4%) were female. The Cronbach alpha coefficient was determined as 0.74, 0.90, 0.75, and 0.89 for learning, time management, technology use subscales, and the whole scale, respectively. Exploratory factors analysis revealed the justifiability of factor analysis. In confirmatory factor analysis, most of the goodness of fit indices had an acceptable level.

CONCLUSIONS: Our study found that the Persian version of OLSES had good psychometric properties and can be used as a simple, valid, and reliable tool to assess students' self-efficacy related to the e-learning environment.

Keywords:

Distance learning, Iran, medical students, online learning, reliability, self-efficacy, validity

Introduction

The COVID-19 pandemic left no choice for the educational systems around the world and forced them to almost completely replace face-to-face training with virtual/distance methods. Before the pandemic, some effort was made in our country to move at least parts of the training toward the virtual, as supported or blended learning, but these efforts did not lead to significant changes in medical sciences education.[1]

Along with all the benefits of e-learning, such as cost-effectiveness, simplicity, and availability at any time anywhere, the educational systems may encounter some challenges which are related to the university, professors, students, e-learning systems, and e-classroom environment.[2]

To provide a successful virtual/distance program, the abovementioned challenges should be seriously considered, especially for students, that seems to have been somewhat overlooked.[1] Previous literature revealed some students' related factors such as having skills of time management, satisfaction and motivation with e-learning systems, and e-classroom environment, and students self-efficacy influence the success of e-learning programs.[3,4] One of these factors, online learning self-efficacy, facilitates students' adaptation to the online learning environment and is a major contributor to academic success.[5-7]

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Until the start of the COVID-19 pandemic, limited studies have been performed on self-efficacy related to online learning, and most previous studies in this field have been more focused on technology-related self-efficacy (computer, learning management system, and Internet). In this regard, various tools have been designed, each of which measures different dimensions of self-efficacy related to virtual/online/distance learning. One of these scales is the Online Learning Self-Efficacy Scale (OLSES) which was designed in 2016 by Zimmerman and Vulakovich.

In addition to being valid, reliable, and simple, the tool's designers reported that having an online learning experience or would not make a significant difference in the results of this tool.[4,7]

Due to the mentioned advantages and the importance and necessity of having a valid tool to assess students' self-efficacy concerning the online environment, the present study was conducted to assess the psychometric properties of the Persian version of the OLSES.

Materials and Methods

Study design and setting
A cross-sectional study was conducted at Kerman University of Medical Sciences between January and May 2021.

Study participants and sampling
Given that the main purpose of the study was to assess the psychometric properties of an instrument, the sample size was considered to be five to ten times per item of the tool.[8] Therefore, 211 medical students were selected through the convenience method. Inclusion criteria were studying at Kerman University of Medical Sciences during the study period and willingness to participate. The questionnaires with more than 10% of unanswered questions were excluded from the study.

Data collection tool and technique
Data were collected using a two-part self-administered questionnaire in which the first section contained demographic information including age, gender, marital status, household income, grade, and parent's education. The second part was the Persian version of the OLSES which was designed in 2016 by Zimmerman and Kulikowich.[7] This questionnaire has 22 questions with three subscales: technology use, learning in an online learning environment, and time management with five, ten, and seven items, respectively. The response to each item is on a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). A higher score on each subscale represents more online learning self-efficacy.

After getting permission, the forward and back-translation method was used to provide the Persian version of OLSES, and the final version was adapted culturally and based on our educational system settings. Through an expert panel including four community medicine and six medical education specialists, the face and content validity of the instrument was evaluated, although Nakhaei has stated in his book that content validity analysis is not common in a questionnaire that is standardized from another language to Persian.[9,10] Content validity index of the whole questionnaire was calculated as 0.88. An online questionnaire was made through https://porsline.ir/and its link was shared with the medical students to complete it voluntarily and anonymously.

Ethical consideration
The participants assured that the data would be used only for research purposes. The study was approved by the research board at Kerman University of Medical Sciences (IR. KMU. REC.1399.399).

Data were analyzed by SPSS version 20.0 (SPSS Inc., Chicago, IL, USA) and LISREL version 8.80 (Scientific Software International, Chicago, IL, USA). Internal consistency of the Persian version was determined by the Cronbach alpha coefficient in a pilot study on 40 students who then entered the study. Exploratory and confirmatory factor analyses were conducted.

Results

Out of a total of 211 students who participated in our study, most of them were female (56.4%) and in the preclinical stage (57%). The mean of the participants' age was 21.40 ± 2.52 years with a minimum and maximum of 18 and 32 years, respectively.

Using the Cronbach alpha coefficient, the internal consistency of the Persian version of the OLSES was determined as 0.74, 0.90, 0.75, and 0.89 for learning, time management, technology use subscales, and the whole scale, respectively.

In exploratory factors analysis (principal component analysis), Kaiser–Meyer–Olkin measure was 0.88, and Bartlett's test of sphericity was statistically significant ($P = 0.001$, $\chi = 1987.50$, and df. $= 231$) indicating the adequacy of sampling, the justifiability of factor analysis. Table 1 shows the exploratory factor loading of the scale.

In confirmatory factor analysis, most of the goodness of fit indices had acceptable level ($\chi^2/df = 3.54$, RMSEA = 0.11, SRMR = 0.08, NFI = 0.86, NNFI = 0.88, CFI = 0.90, IFI = 0.90, and RFI = 0.85).

Table 1: Factor loading of the Persian version of the Online Learning Self-Efficacy Scale items

Items	Factor number	Factor loading
Navigate online course materials efficiently	3	0.73
Communicate effectively with my instructor through e-mail	3	0.83
Communicate effectively with technical support through e-mail, mobile phone, or live online chat	2	0.70
Submit assignments to an online drop box such as Google Drive	3	0.41
Overcome technical difficulties on my own	2	0.62
Navigate the grade through online systems	3	0.40
Manage time effectively	1	0.97
Complete all assignments on time	1	0.87
Learn to use a new type of technology efficiently	2	0.51
Learn while you and your instructor are in distant places	2	0.60
Learn without being in the same room as other students	2	0.49
Search the Internet to find the answer to a course-related question	3	0.47
Search the online course materials	3	0.43
Communicate using asynchronous technologies (e-mail, etc.)	2	0.62
Use synchronous technology to communicate with others (such as Skype, Google Meet, and Zoom)	2	0.46
Meet deadlines with minimal reminders	1	0.97
Complete a group project entirely online	2	0.66
Focus on schoolwork when faced with distractions	1	0.71
Develop and follow a plan for completing all required work on time	1	0.70
Use the library's online resources efficiently	2	0.79
When a problem arises, promptly ask questions in the appropriate forum (e-mail, etc.)	2	0.75
Find the course syllabus online	3	0.60

Discussion

Experiences obtained during the COVID-19 pandemic reminded us that students' psychological factors such as online learning self-efficacy should be taken into account by educational systems. Due to the rapid shift of training toward virtual/distance learning, there was no right opportunity for students to become well acquainted with this teaching method.

Our study found that the Persian version of OLSES had good psychometric properties and can be used as a simple, valid, and reliable tool to assess students' self-efficacy related to the e-learning environment.

Like its original version,[7] the Persian version of OLSES had also good reliability based on the Cronbach alpha coefficient. Yavuzalp and Bahcivan revealed that the internal consistency of the Turkish version was determined as 0.98.[4]

Zimmerman and Kulikowich[7] introduced the original version of the scale with three subscales: technology use (five items), learning in an online learning environment (ten items), and time management (seven items). We found in confirmatory factor analysis that this three-factor model had an acceptable level for almost all of the fit indices. Unlike, a single-dimension model with 21 items was confirmed for the Turkish version.[4] Therefore, it is required to examine the scale in different populations.

Although the current generation of students, known as millennials, is familiar with the technology, several studies have shown that their readiness for online courses varies.

Previous studies revealed that when students encounter online education for the first time, like what happened during the COVID pandemic, they may feel less confident, even if they are a day-to-day user of technology, due to the different nature of the capabilities required for an online learning environment and the mere use of computers and technology. Most of these studies considered learner control and online learning self-efficacy as important predictors which can facilitate academic success.[11]

Gallardo-Echenique *et al.* revealed in a review that although there is a common belief that the new generation of learners "digital natives" has more willingness and capability to use the technology, the evidence does not support that this generation is more competent in using technology for academic purposes. This study recommended that other factors rather than age should be considered to provide a better understanding of how students use technology and are they really competent to transfer their digital skills to the academic environment.[12]

Rakhmawati and Kusuma found that more research is needed to determine the related factors which affect students' perspectives move from "living technology" toward "learning technologies." They emphasized based

on other similar literature that this transition is neither automatic nor guaranteed.[13]

It should be borne in mind that even if the pandemic disappears completely, our educational programs, especially higher education, will not return to the prepandemic situation, which was mainly face-to-face. Therefore, to provide the ground for a successful virtual/distance education, educational systems need to identify the factors affecting a successful teaching–learning process in a virtual environment and the challenges associated with it. Experiences gained during the COVID-19 pandemic can be a great help to the educational systems in this regard. The present study, based on the available evidence on the role of self-efficacy in successful virtual education, tried to provide a valid and reliable tool to investigate this important factor.

Limitation and recommendation

The cross-sectional method has its limitation, but according to the purpose of the study, the use of this method seems appropriate. On the other hand, this study was performed on a limited population of medical students at the Kerman University of Medical Sciences. Accordingly, OLSES needs to be studied in different contexts and diverse student populations which can affect the structure of the tool.

Conclusions

Our study found that the Persian version of OLSES had good psychometric properties and can be used as a simple, valid, and reliable tool to assess students' self-efficacy related to the e-learning environment.

Conflicts of interest

There are no conflicts of interest.

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