

# Transcultural Adaptation and Psychometric Evaluation of the Online Learning Self-Efficacy Scale among High School Seniors in Bandar Abbas City

Habibollah Barani<sup>1</sup>, Mohammad Reza Mohammadi Soleimani<sup>2, 3</sup>, Azita Amirfakhraei<sup>1\*</sup>, Seyyed Abdul Wahab Samavi<sup>4</sup>

<sup>1</sup>Department of Psychology, Bandar Abbas Branch, Islamic Azad University, Bandar Abbas, Iran

<sup>2</sup>Faculty of Psychology and Counseling, Farhangian University, Tehran, Iran

<sup>3</sup>Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran

<sup>4</sup>Department of Psychology, Hormozgan University, Bandar Abbas, Iran

## ABSTRACT

**Background:** Online education has become more popular in recent years. Nevertheless, students may face challenges in online courses that can influence their academic self-efficacy (ASF). However, a comprehensive and localized tool for measuring ASF in online courses in Iran is needed. This study aimed to validate transcultural adaptation and psychometrically evaluate the Online Learning Self-Efficacy Scale (OLSES) among high school seniors in Bandar Abbas City.

**Methods:** This transcultural adaptation study validated the OLSES in Tehran in 2022. The sample consisted of 1080 High School Seniors living in Bandar Abbas who participated in the cluster sampling procedure. The researchers used the OLSES and the ASF Questionnaire (ASEQ), which were sent to the participants via Google Forms. The OLSES questionnaire was translated using the back-translation method, and ten experts evaluated its face and content validity. The concurrent validity of the OLSES questionnaire was examined by correlating it with ASEQ. The OLSES questionnaire's construct validity was tested by exploratory and Confirmatory Factor Analysis (CFA) using SPSS 21 and LISREL 8.80 software. The reliability of the OLSES questionnaire was evaluated by Cronbach's alpha, test-retest, and split-half methods. The confidence interval for testing the hypotheses was 0.05.

**Results:** The results showed that the OLSES questionnaire had acceptable face and content validity, concurrent validity, construct validity, and reliability. The mean Content Validity Ratio (CVR) and Content Validity Index (CVI) values for the items were 0.88 and 0.83, respectively. The Pearson correlation coefficient between the OLSES and ASEQ scores was 0.56. The OLSES questionnaire had a valid three-factor structure, measuring online learning self-efficacy (OLSE) in online learning environments, technology self-efficacy, and time management. These factors explained 63.606% of the total variance, with variances of 25.87%, 18.78%, and 13.23%, respectively. The CFA indicated that the three-factor model was better for the data than the one-factor model, with acceptable fit indices: SRMR=0.021 and CMIN/DF=2.39. The number of items in the OLSES questionnaire remained unchanged at 22 throughout the validity and reliability assessments. The overall scale had a Cronbach's alpha coefficient of 0.95 and a test-retest reliability of 0.79.

**Conclusion:** The OLSES questionnaire was a valid and reliable measure of OLSES among high school seniors. It can be used to assess students' confidence in online learning.

**Keywords:** Cultural Characteristics, Psychometrics, Online Systems, Self-Efficacy, Students

\*Corresponding author:

Azita Amirfakhraei,  
Department of Psychology,  
Islamic Azad University,  
Bandar Abbas Branch, Bandar  
Abbas, Iran

Tel: +98 76 33665500

Fax: +98 76 33665510

Email: h09900318771@gmail.  
com

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## Introduction

In recent years, online education has become more common and widespread in various educational settings (1, 2). Online education has its pros and cons (3). On the one hand, this method of education provides new opportunities and rich resources for learning (4). On the other hand, this method of education requires specific skills and abilities that are challenging for some students (5). Besides, online education can negatively affect academic self-efficacy (ASF), interaction and collaboration, and student attendance and commitment (6, 7). Studies have shown that academic self-efficacy in online courses is significantly lower than in face-to-face courses (8). This decrease in self-efficacy can lead to poor academic performance, less motivation for learning, and ultimately academic failure (9).

Academic self-efficacy is the confidence and belief of an individual in the skills and abilities required for academic success (10). Evidence has shown that academic self-efficacy is positively linked to students' success and progress, motivation, and satisfaction (9). In other words, people with high self-efficacy in education experience more success. Therefore, low levels of ASF can lead to reduced success and progress (11).

On the other hand, some studies have shown that online education lowers students' ASF compared to face-to-face education (12). For example, an investigation of 351 students in a Chinese school showed that online education resulted in a 25% decrease in ASF compared to face-to-face education (13). In England, a study on students showed that the ASF of students in online courses was about 30% lower than that of face-to-face courses (14). In Iran, too, limited studies have been done in this field, which show results consistent with foreign research (15-18).

These studies showed that students face various academic challenges in online education. These challenges can include time management, technology skills, the online learning context, communication with classmates and teachers, and problem-

solving (4). Therefore, it is necessary to assess students' strengths and weaknesses to cope with these challenges. Thus, a valid tool to evaluate ASF in online courses is required.

Various tools have been developed to measure ASF. The essential tools are: a) Scholz's general self-efficacy scale covers a wide range of activities but is unsuitable for measuring ASF (19). b) Pintrich and Schunk's ASF scale measures self-efficacy in specific academic fields, including mathematics, science, language, and art (20). c) The challenge-oriented self-efficacy scale measures self-efficacy in dealing with complex and unknown academic problems and situations (21). These tools each have their strengths and weaknesses. For example, Pintrich and Schunk's ASF scale is suitable for measuring self-efficacy in specific academic fields but not for measuring self-efficacy in general and comprehensive academic fields (20). Also, the challenge-oriented self-efficacy scale is suitable for measuring self-efficacy in new and unpredictable situations but not for measuring self-efficacy in everyday and usual situations (21). In addition, these tools are not designed to measure ASF in online courses and may not be compatible with technological and lifestyle changes (2) as technology and lifestyle have changed significantly in recent decades (1, 22). These changes directly affect the concept and prevalence of ASF (23). With the advancement of technology and the widespread use of the Internet and smart devices, students have easy access to online educational resources (24). This new situation requires more appropriate and comprehensive tools for measuring ASF in online classes (25). So far, there has yet to be a comprehensive and localized tool for measuring ASF in online classes in our country. Therefore, there is a need for a comprehensive and localized tool for measuring ASF in online courses.

To this end, since Zimmerman and Kulikowich's OLSES (Online Learning Self-Efficacy Scale) has been utilized to evaluate online self-efficacy based on the OLSES tool model developed by them in 2016 for measuring American students' OLSES (26),

this research was performed to validate and examine the factorial structure of the Persian version of OLSES. This 22-question scale covers various tasks required for online learning, such as time management, technology skills, and online learning environment.

One of the sensitive groups in online education is high school seniors preparing to take the national exam (Konkur) (27). This exam can be decisive in their future educational and professional path. Therefore, accurately assessing their ASF in the virtual environment is critical so that if weaknesses are identified, the necessary actions are taken to address them. This effort can help increase their success in the national exam (28, 29).

Therefore, considering the points raised in the previous paragraphs, validating an Iranian tool for evaluating students' ASF in the online learning setting seems necessary. Since OLSES covers the necessary sub-scales for measuring self-efficacy in the online setting and has been used to measure online self-efficacy, this research was performed to validate and examine the factorial structure of the Persian version of OLSES.

## Methods

### *Study Design and Setting*

This study was a transcultural adaptation and psychometrically evaluated OLSES in Bandar Abbas city. The research method was conducted from December 2021 to May 2022 among the 12<sup>th</sup>-grade students of public high schools in Bandar Abbas for the academic year 2021-2022.

To translate the questionnaire, the translation and back-translation method based on the protocol of the World Health Organization was used (30). The researchers translated the questionnaire with the permission of the original author of the measure. They translated the questionnaire into Persian and then back-translated it into English. Moreover, a translator with English as a native language and good proficiency in Persian participated in the translation process. After the agreement of the two

translators, the final questionnaire was received ([supplementary file](#)).

The study population consisted of 12<sup>th</sup>-grade students of public high schools in Bandar Abbas city who had experienced online learning for at least two semesters. The study setting included 12 randomly selected high schools (six for boys and six for girls) from the two educational districts of the city.

### *Participants and Sampling*

The target population of this study was 12<sup>th</sup>-grade students who had online learning experiences for at least two semesters in public high schools in the city of Bandar Abbas. The sample size was determined based on the following criteria: For the assessment of concurrent validity, a minimum of 61 participants was required, which was increased to 200 participants in this study (1, 31). For exploratory factor analysis (EFA), a minimum of 20 participants per item was required, which resulted in 440 participants in this study (32). For CFA, the sample size ranged from 200 to 1000 participants, which was set to 340 participants in this study (33, 34). For reliability, 100 participants (50 participants for each type of reliability) were considered (33). In total, 1080 participants were selected as the study's final sample. Cluster sampling was used to select the participants. First, 12 boys' and girls' high schools were randomly selected from the two educational districts of the city. Then, 90 students were randomly selected from each high school using their student ID numbers. The eligibility criteria were being in the 12<sup>th</sup>-grade, having an online learning experience for at least two semesters, and consenting to participate in the study. The exclusion criteria were refusing to participate in the study or not completing more than 20% of the questionnaire. The participants were informed about the objectives and procedures of the study and gave their written consent before filling out the questionnaire. They were also assured that their information would be protected and that they could withdraw from the study any time.

### Data Collection

The data collection tools included two self-report questionnaires: the OLSES and the ASF Questionnaire (ASEQ).

The OLSES measured three dimensions of OLSES: Time Management (TM, and 5 items), Technology Self-Efficacy (TSE, and 7 items), and Online Learning Environment (OLE, and 10 items). The items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The final back-translated version of the questionnaire is available as a supplementary file. The scale has been validated using a sample of 338 students with different levels of online learning experience and has shown good psychometric properties. The Cronbach's alpha values for the three subscales were 0.890, 0.855, and 0.843, respectively. The EFA uses principal component analysis (PCA) with oblimin rotation (Oblimin rotation is a type of factor rotation method that is used in factor analysis). Factor rotation is a technique that aims to make the factors more interpretable and meaningful by changing the basis of the factor space. Oblimin rotation allows the factors to be correlated, unlike varimax rotation, which forces the factors to be orthogonal (uncorrelated). Oblimin rotation may produce a better fit to the data and a more realistic representation of the underlying factors, especially when the factors are expected to be related to each other (35), and supported the three-factor structure of the scale, which explained 55.89% of the total variance. The factor loadings varied from 0.59 to 0.81, with a mean loading of 0.71 (26). The CFA using structural equation modeling (SEM) also supported the three-factor structure of the scale, which had a good fit to the data. The test-retest method showed that the scale had a high stability over time, with an intraclass correlation coefficient (ICC) of 0.91.

Jinks and Morgan created the ASEQ to assess the ASF beliefs of students (36). The scale has 30 items that are divided into three subscales: ability (10 items), effort (10 items), and context (10 items). The items use a four-

point Likert scale from 1 (strongly disagree) to 4 (strongly agree). Some items have reversed scores. The scale was tested on a sample of 1,022 students from various academic levels and demonstrated satisfactory psychometric properties. The three subscales had internal consistency coefficients (Cronbach's alpha) of 0.78, 0.66, and 0.70, respectively. The CFA with structural equation modeling (SEM) supported the three-factor structure of the scale, which fit the data well. Jamali et al. (2013) also adapted and validated the scale in Iran on a sample of 300 students. The overall scale and the three subscales had internal consistency coefficients (Cronbach's alpha) of 0.76, 0.79, 0.62, and 0.59, respectively (36, 37).

### Data Analysis

The data were summarized using descriptive statistics, including frequency and percentage. The structural relationships of the research model were examined using advanced statistical analysis software SPSS V21 (SPSS Inc., Chicago, IL, USA) and LISREL 8.80 (Scientific Software International, Inc., Lincolnwood, IL, USA). The confidence level for testing the study hypotheses was 0.05.

The face validity of the questionnaire was evaluated using both qualitative and quantitative methods. First, 10 people from the target population were interviewed to check the difficulty and clarity of the questions and to collect their feedback. Then, 10 people from the same population rated the questions using a five-point Likert scale (38). Questions with an impact score of less than 1.5, were either deleted or revised (39).

Ten experts used CVR and CVI methods to determine the questionnaire's content validity. The experts rated each question for CVR as essential, useful, or unnecessary and for CVI as simple, specific, and clear. Based on Lawshe's table and guideline (1), the acceptable values for CVR and CVI were 0.62 and 0.79, respectively (40).

The concurrent validity of the OLSES questionnaire was assessed by performing a correlation analysis between OLSES scores

and ASEQ scores.

The construct validity of the OLSES questionnaire was verified using exploratory and CFA. The sampling adequacy for EFA was checked using the Kaiser-Meyer-Olkin (KMO) test and Bartlett’s Test of Sphericity. The KMO test evaluates the sampling adequacy of the data, and a value above 0.70 suggests that the data are appropriate for factor analysis (33). The Bartlett’s Test of Sphericity examines the null hypothesis that the correlation matrix of the variables is an identity matrix, which means that the variables are not correlated and factor analysis is not suitable (33). A significant p-value (less than 0.05) for this test rejects the null hypothesis and shows that the data are appropriate for factor analysis. Therefore, in this study, we presented the p-value of the Bartlett’s Test of Sphericity to demonstrate that the data satisfied the assumption of factor analysis. Factors with eigenvalues greater than 1 were obtained using the principal factor method

and varimax rotation (33). The model fit for CFA was evaluated using several indices, such as standardized root mean square residual (SRMR<0.08), goodness of fit index (GFI>0.90), comparative fit index (CFI>0.90), adjusted goodness of fit index (AGFI>0.80), root mean square error of approximation (RMSEA<0.09) and discrepancy divided by degree of freedom (CMIN/DF<3) (32). The threshold values for these indices and the factor loadings (>0.40) were used to determine if the model had a good fit (32).

The reliability of the OLSES questionnaire was assessed using Cronbach’s alpha coefficient (>0.7) (2), and the test-retest method. The split-half method was also applied to provide an additional internal reliability measure less influenced by the number of items in a questionnaire.

### Results

Of the total of 1062 students participating in this study, 59 people (5.6 percent) were

**Table 1:** Demographic characteristics of the students participating in the study according to different sections (N=1062)

		Total (n=1062)	Concurrent validity (n=196)	EFA* (n=433)	CFA* (n=334)	Reliability (n=99)
Marital status	Married	59 (5.6)	10 (5.1)	25 (5.8)	18 (5.4)	6 (6.1)
	Single	980 (92.3)	179 (91.3)	400 (92.4)	310 (92.8)	91 (91.9)
	Divorced	23 (2.2)	7 (3.6)	8 (1.8)	6 (1.8)	2 (2.0)
Age (years)	17	276 (26.0)	35 (17.9)	120 (27.7)	93 (27.8)	28 (28.3)
	18	717 (67.5)	157 (80.1)	280 (64.7)	217 (65.0)	63 (63.6)
	19	36 (3.4)	2 (1.0)	18 (4.2)	12 (3.6)	4 (4.0)
	20	33 (3.1)	2 (1.0)	15 (3.5)	12 (3.6)	4 (4.0)
Number of family members	2	18 (1.7)	1 (0.5)	9 (2.1)	6 (1.8)	2 (2.0)
	3	84 (7.9)	16 (8.2)	35 (8.1)	25 (7.5)	8 (8.1)
	4	403 (37.9)	88 (44.9)	155 (35.8)	125 (37.4)	35 (35.4)
	5	312 (29.4)	43 (21.9)	136 (31.4)	103 (30.8)	30 (30.3)
	6	187 (17.6)	40 (20.4)	74 (17.1)	55 (16.5)	18 (18.2)
	7	39 (3.7)	6 (3.1)	16 (3.7)	13 (3.9)	4 (4.0)
Mother’s employment status	Housewife	978 (92.1)	177 (90.3)	400 (92.4)	308 (92.2)	93 (93.9)
	Employed	84 (7.9)	19 (9.7)	33 (7.6)	26 (7.8)	6 (6.1)
Father’s employment status	Retired	218 (20.5)	34 (17.3)	94 (21.7)	69 (20.7)	21 (21.2)
	Employed	844 (79.5)	162 (82.7)	339 (78.3)	265 (79.3)	78 (78.8)
Father’s education	Diploma and below	818 (77)	154 (79)	332 (77)	256 (77)	76 (77)
	University	244 (23.0)	42 (21.4)	101 (23.3)	78 (23.4)	23 (23.2)
Mother’s education	Diploma and below	822 (77.4)	159 (81.1)	332 (76.7)	255 (76.3)	76 (76.8)
	University	240 (22.6)	37 (18.9)	101 (23.3)	79 (23.7)	23 (23.2)

\*EFA: Exploratory Factor Analysis; CFA: Confirmatory Factor Analysis

married, 980 people (92.3 percent) were single, and 23 people (2.2 percent) were divorced. The age of the students ranged from 17 to 20 years, with a mean of 18.1 and a standard deviation of 0.7. The highest number and percentage of students were 18 years old,  $n=717$ , 67.5%. The number of family members of the students ranged from 2 to 9 people, with a mean of 4.3 and a standard deviation of 1.2. The highest number and percentage of students had families of four,  $n=403$ , 37.9%. The employment status of the students' mothers was as follows: 978 people (92.1 percent) were housewives, and 84 people (7.9 percent) were employed. The employment status of the fathers of the students was as follows: 218 people (20.5 percent) were retired, and 844 people (79.5 percent) were employed. The education of the students' mothers was as follows: 822 people (77.4 percent) had a diploma or lower, and 240 people (22.6 percent) had a university degree. The education of the fathers of the students

was as follows: 818 people (77 percent) had a diploma or lower, and 244 people (23 percent) had a university degree (Table 1).

To ensure face validity, the research team incorporated feedback from the sample population regarding item simplicity, fluency, and relevance to the research problem. The impact scores of all items ranged from 1.92 to 3.33 and were higher than 1.5, indicating acceptable face validity of the questions (Table 2).

As Table 2 shows, each item has acceptable CVI and CVR values. More precisely, all items have CVR values above 0.74 and CVI values above 0.76, which are higher than the minimum threshold for content validity (2). This indicates that the scale has sufficient content validity for OLSES among students.

To test the concurrent validity of the OLSES questionnaire, the same questionnaire was given to the students along with the ASEQ questionnaire. A total of 196 students participated in the study.

**Table 2:** Rotated Component Matrix for the Study Items

	Factor			Impact score	CVR*	CVI*
	OLE*	TSE *	TM*			
i1	0.12	0.74	0.15	2.45	0.83	0.87
i2	0.11	0.75	0.13	3.33	0.77	0.81
i3	0.11	0.73	0.13	2.73	0.84	0.86
i4	0.72	0.10	0.13	3.20	0.76	0.76
i5	0.11	0.74	0.14	2.80	0.77	0.79
i6	0.75	0.11	0.15	3.04	0.74	0.79
i7	0.11	0.74	0.13	1.92	0.77	0.79
i8	0.18	0.17	0.70	2.52	0.88	0.90
i9	0.19	0.18	0.72	3.01	0.84	0.89
i10	0.75	0.10	0.13	2.15	0.77	0.79
i11	0.72	0.11	0.15	2.04	0.74	0.79
i12	0.73	0.10	0.13	2.45	0.74	0.78
i13	0.13	0.77	0.16	2.10	0.79	0.82
i14	0.11	0.74	0.13	2.32	0.86	0.90
i15	0.74	0.11	0.14	2.52	0.75	0.78
i16	0.18	0.17	0.79	2.04	0.83	0.85
i17	0.73	0.11	0.14	1.98	0.85	0.87
i18	0.76	0.11	0.14	2.04	0.78	0.80
i19	0.17	0.16	0.67	2.24	0.87	0.88
i20	0.17	0.16	0.71	2.88	0.77	0.82
i21	0.72	0.10	0.13	2.16	0.76	0.81
i22	0.75	0.11	0.13	2.66	0.89	0.93

\*CVR: Content Validity Ratio; CVI: Content Validity Index; OLE: Online Learning Environment; TSE: Technology Self-Efficacy; TM: Time Management

The Pearson correlation analysis revealed a positive and significant correlation between the total score of the OLSSES questionnaire and the ASEQ questionnaire ( $r=0.564$ ,  $P<0.0001$ ). Moreover, a positive and significant correlation was found between each of the dimensions of the OLSSES questionnaire, such as OLE, TU, and TM, and the total score of the ASEQ questionnaire ( $0.371<r<0.463$ ,  $P<0.0001$ ). These results suggest that the OLSSES questionnaire has suitable concurrent validity for assessing OLSSES among students.

In this study, the EFA method was used to determine the dimensions of the questionnaire in the Iranian population. The KMO measure was 0.920, and the Bartlett's test was significant (approximate chi-square=5632.457,  $df=231$ ,  $P<0.001$ ), indicating an adequate sample size for conducting EFA. The principal axis factor extraction method with Varimax rotation identified three factors that accounted for 63.606% of the total variance (Figure 1). The three discussed factors are as follows: the first factor is OLE, evaluated by questions 4, 6, 10, 11, 12, 15, 17, 18, 21 and 22, explaining 25.878% of the total variance. The second factor is TU, assessed by questions 1, 2, 3, 5, 7, 13, and 14, accounting for 18.788% of the total variance. The third factor is TM, evaluated by questions 8, 9, 16, 19, and 20, explaining 13.229% of the total variance. (Table 2).

The CFA results indicated that the data fitted the 3-factor model better than the 1-factor model, as shown by the fit indices: Standardized Root Mean Square Residual (SRMR)=0.021 (below 0.10), Root Mean Square Error of Approximation (RMSEA)=0.065 (below 0.08), Comparative Fit Index (CFI)=0.98 (above 0.90), Normed Fit Index (NFI)=0.97 (above 0.90), Goodness of Fit Index (GFI)=0.89 (above 0.90), Adjusted Goodness of Fit Index (AGFI)=0.86 (above 0.80) and Minimum Discrepancy Function divided by Degrees of Freedom (CMIN/DF)=2.39 (below 3). Figure 2 also demonstrates the model's alignment with the data, suggesting that the data supports the 3-factor model. The three factors are OLE, TSE, and TM.

The Cronbach's alpha coefficient for the overall scale was 0.95, and for its subscales, arousal and reactivity, negative alterations in cognitions and mood, avoidance, and intrusion, the coefficients were 0.97, 0.95, and 0.93, respectively. All items correlated positively and significantly with the scale score from 0.552 to 0.764 ( $P<0.01$ ). The split-half reliability was 0.95 for the first half (11 questions) and 0.93 for the second half (11 questions) of the data; the correlation between them was 0.67 ( $P<0.01$ ). The Cronbach alpha value did not change with the removal of each item, indicating that no items will be deleted. The test-retest results were 0.791 ( $P<0.0001$ ).

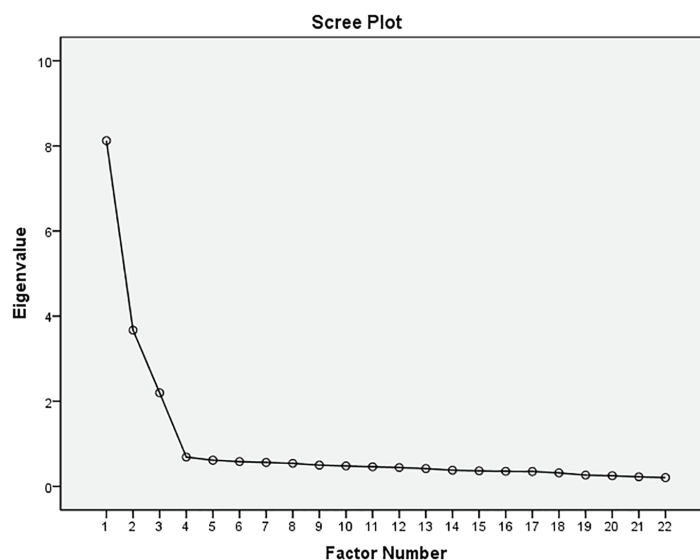


Figure 1: Scree Plot

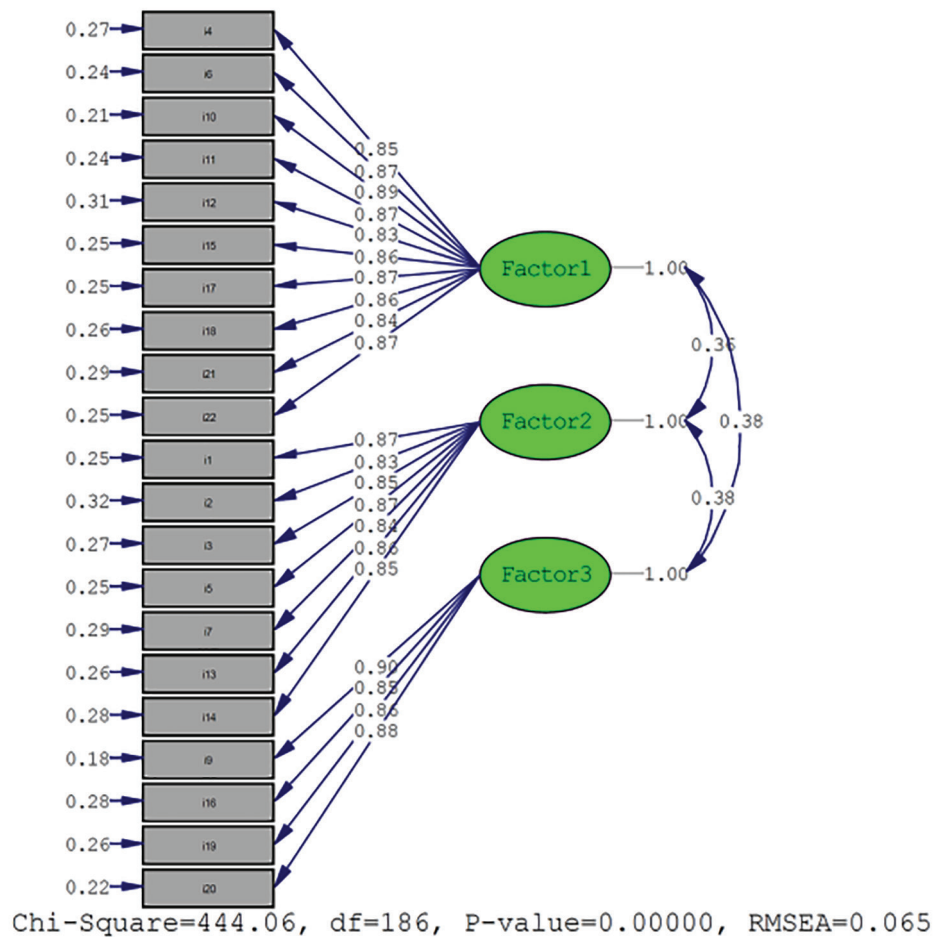


Figure 2: CFA\* results. \*CFA: Confirmatory Factor Analysis

## Discussion

One of the objectives of this study was to assess the face validity of the OLSES for Iranian high school seniors. To ensure face validity, the research team incorporated feedback from the sample population regarding item simplicity, fluency, and relevance to the research problem. The impact scores of all items ranged from 1.92 to 3.33 and were higher than 1.5, indicating acceptable face validity of the questions. This finding is consistent with previous studies that have used the same instrument to measure OLSES in different contexts and populations (26, 41). This result means the respondents perceived the questionnaire items as relevant and suitable for measuring their OLSES. This implies that the questionnaire has a good level of content validity, which is the degree to which the items cover all the aspects of the concept being measured. However, face

validity is a subjective and superficial measure of validity, and it does not guarantee that the items are measuring what they are supposed to measure. Therefore, other types of validity should also be examined in future studies.

The results showed that all items have CVR values above 0.74 and CVI values above 0.76, which are higher than the minimum threshold for content validity. This indicates that the scale has sufficient content validity for measuring OLSES among students. This result means that the questionnaire items adequately cover the content domain of OLSES, which includes OLE, TM, and TSE. This implies that the questionnaire has a high relevance, clarity, and simplicity for measuring this concept. However, content validity is only one aspect of validity, and it does not ensure that the items are measuring what they are supposed to measure. Therefore, other types of validity, such as construct validity and



criterion validity, should also be examined in future studies. This finding is consistent with previous studies that have used or adapted the OLSES to measure OLSES in different contexts and populations (26, 41).

The Pearson correlation analysis revealed a positive and significant correlation between the total score of the OLSES questionnaire and the ASEQ questionnaire ( $r=0.564$ ,  $P<0.0001$ ). Moreover, a positive and significant correlation was observed between each of the dimensions of the OLSES questionnaire, including the OLE, TSE, and TM, with the total score of the ASEQ questionnaire ( $0.371<r<0.463$ ,  $P<0.0001$ ). These results indicate that the OLSES questionnaire has appropriate concurrent validity for measuring OLSES among students. This finding is consistent with previous studies that have used or adapted the OLSES to measure OLSES in different contexts and populations (26, 41). This result means that the OLSES questionnaire measures a concept that is related to ASF, which is a broader and more general concept. This means students with higher OLSES also have higher ASF, and vice versa. This is consistent with the theoretical framework of self-efficacy, which suggests that self-efficacy is a domain-specific construct that can vary across different situations and tasks. However, concurrent validity is only one aspect of validity, and it does not ensure that the OLSES questionnaire measures OLSES as a distinct construct from ASF. Therefore, other types of validity, including construct validity, should also be examined in future studies.

The EFA results indicated that the OLSES questionnaire had a three-factor structure that matched the original instrument developed by Zimmerman and Kulikowich (26). The OLE, TSE, and TM were the three factors, which explained 63.606% of the total variance. The factor loadings of each item on its respective factor were high and significant, ranging from 0.61 to 0.83, with a mean loading of 0.73. The CFA results verified that the three-factor model fit the data better than the one-factor model, as shown by various fit indices that

satisfied the criteria for a good model fit. These results indicate that the OLSES questionnaire has appropriate construct validity for measuring OLSES among students. This means that the questionnaire items assess the three dimensions of OLSES, which are OLE, TSE, and TM, as described by the theoretical framework of self-efficacy. This finding agrees with previous studies that have applied or modified the OLSES to evaluate OLSES in different contexts and populations. For instance, Yavuzalp and Bahçivan modified the OLSES into Turkish and gave it to 300 students who had enrolled in online courses (41). They discovered that the OLSES had a three-factor structure with high reliability and validity and that the factors accounted for 54.5% of the total variance. Likewise, Zimmerman and Kulikowich (26) created the OLSES and gave it to 338 university students with various experience levels with distance learning courses. They discovered that the OLSES had a three-factor structure with high reliability and validity and that the factors accounted for 55.89% of the total variance. These studies indicate that the OLSES is a reliable and valid tool for assessing OLSES across different settings and groups.

In the following, each of the three dimensions of the questionnaire is defined, and its alignment with other dimensions of ASF is checked:

- **OLE:** This dimension measures the ability and confidence of students to communicate effectively with the instructor, other students, and technical support in an online setting. It also measures the ability and confidence of students to learn independently and collaboratively without being in the same physical space as the instructor and other students. This dimension is similar to the social presence dimension of the online learning self-regulation scale (OLSR) developed by Barnard et al. (42). Social presence refers to the degree of awareness and interaction among participants in an online course. This dimension is essential because it reflects the quality and quantity of online communication and collaboration,

which can affect students' learning outcomes and satisfaction.

- **TSE:** This dimension measures the ability and confidence of students to use various technologies for online learning, such as internet search, online library resources, online storage, and synchronous and asynchronous tools. It also measures the ability and confidence of students to overcome technical problems and learn new technologies. This is similar to the TSE dimension of the computer self-efficacy scale developed by Compeau and Higgins (43). TSE refers to the belief in one's ability to use computers and related technologies for performing specific tasks. This dimension is essential because it reflects the level of competence and comfort with using technology for online learning, which can affect the engagement and performance of students.

- **TM:** This dimension measures the ability and confidence of students to manage their time effectively for online learning, such as completing assignments on time, complying with deadlines, focusing on schoolwork, and developing and implementing a plan for completing the necessary work. It also measures the ability and confidence of students to balance their academic and personal responsibilities. This dimension is similar to the TM dimension of the academic self-regulation questionnaire (SRQ-A) developed by Ryan and Connell (44). TM refers to strategies and skills for organizing and allocating time for academic tasks. This dimension is essential because it reflects the level of self-discipline and self-control for online learning, which can affect the motivation and achievement of students.

The OLSES questionnaire demonstrated high reliability for assessing OLSES among students. The overall scale and the three subscales (OLE, TSE, and TM) had Cronbach's alpha coefficients above 0.90, indicating strong internal consistency. The items had high and significant correlations with the scale score (0.552-0.764), showing convergent validity. The split-half reliability was above 0.90 for

both halves of the scale, and the correlation between them was 0.67, showing parallel forms reliability. The test-retest reliability was 0.791, showing temporal stability. The test-retest reliability was 0.791 ( $P < 0.0001$ ), indicating that the scale scores were stable over time. This finding is consistent with previous studies that have used or adapted the OLSES to measure OLSES in different contexts and populations (26, 41). This result means that the OLSES questionnaire produces consistent and stable scores for measuring OLSES among students. This implies that the questionnaire items are clear, unambiguous, and relevant for measuring this concept. However, reliability is only one aspect of quality, and it does not ensure that the OLSES questionnaire measures OLSES as a valid construct. Therefore, other quality aspects, such as validity and sensitivity, should also be examined in future studies.

#### *Limitation and Suggestion*

This research had some limitations that need to be taken into account. First, this research was carried out only in the city of Bandar Abbas, which may limit the applicability of the results to the target population. To overcome this limitation, future research is suggested to use larger and more diverse samples in different geographical areas. Second, this research used a questionnaire to collect quantitative data, which may involve errors in sampling, response, and validity. To overcome this limitation, it is suggested that future research use other data collection methods such as interviews, observation, or tests.

#### **Conclusion**

This research aimed to validate transcultural adaptation and psychometrically evaluate OLSES in Bandar Abbas city. The results showed that the scale had acceptable face and content validity, concurrent validity, construct validity, and reliability for measuring OLSES among students. The scale consisted of three factors: OLE, TSE, and TM, which explained 63.606% of the

total variance. The scale can be used as a reliable and valid instrument for assessing the level of OLSES among students and identifying its correlation with other variables such as academic performance, motivation, satisfaction, and dropout.

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### Authors' Contribution

HB drafted the manuscript, MRMS performed the statistical analysis and validation. AA and SAWS reviewed and approved the final manuscript.

### Conflict of Interest

The authors declare no conflict of interest.

### Ethical Consideration

This research was conducted under ethical principles and with the permission of the Research Ethics Committee of the Islamic Azad University of Bandar Abbas Branch (Code: IR.IAU.BA.REC.1402.003). The study participants provided informed consent, and the research methodology adhered to the university's regulations and posed no risk to the participants.

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