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"ILCT[1]", A Test to Measure Independent Learner's Characteristics in the Distance Education System with E-Learning

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Abstract
The present study was based on research findings designed to identify the characteristics of an independent learner in a distance education system and to develop a standardized test to measure the characteristics and skills of an independent learner in a distance education system with e-learning. Based on the theoretical foundations of the research and the background of previous studies, while identifying the characteristics of an independent learner, a tool was developed under the name of "Independent Learner's Characteristics Test (ILCT) in the distance education system with e-learning", and the reliability of the factors of each item in the tool was measured and standardized using the exploratory factor analysis method. The present study, also, discussed and scrutinized the development and standardization of ILCT. The present study is an applied research which uses both field and documentary methods. It was carried out with a mixed method with quantitative and qualitative strategies. In order to develop and standardize ILCT, the characteristics of motivation, intelligence, and emotional intelligence were selected and evaluated as necessary characteristics of a learner from among other characteristics using the Delphi method according to the views of experts and professionals of educational and cognitive psychology sciences. Data on each characteristic was collected using available standardized questionnaires[2]. The questionnaires were prepared electronically in the form of a "temporary website of the questionnaire" and the website URL was provided to the virtual students of the Payame Noor University. A total of 452 postgraduate e-students studying at Payame Noor University of Iran answered the questions. The results were analyzed using SPSS (21.0), STATISTICA (8.0) and LISREL (8.7) softwares using an appropriate statistical method. In the end, the final test based on extracted results and standardization of the items was introduced under the name of "Independent Learner's Characteristics Test (ILCT) in the distance education system with e-learning" for use by learners, teachers, planning authorities, content producers, etc. in distance education systems.

Keywords
Standardization, Independent Learner, Independent Learner's Characteristics, E-Learning, Motivation, Intelligence and Emotional Intelligence, Lifelong Learning.

Introduction

E-learning is perhaps one of the most commonly used terms that have been introduced into the field of education along with the term information technology (IT). In distance education systems, many educational centers, especially universities, make e-learning a part of their long-term plans, and they mainly invest heavily in this category [1]. With the increasing expansion of network and computer facilities, the interest in this new area of education has been growing and welcomed by many people. In other words, today, for many reasons, distance education and electronic and network-based learnings are highly welcomed, low-cost, and appropriate for any situation. This new educational method, as one of the ways of continuous access to information at any time or

1. Independent Learner's Characteristics Test
2. Culture Fair Intelligence Test (CFIT)

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place, has changed the world's view of humankind from the instrumental point of view to a source of wealth and intellectual property (brain-ware era), and has introduced the process of independent learning as an instrument of empowering him (Ibid.).

Due to the specific characteristics of distance education and e-learning systems, learners are independently responsible and owner of their own learning. Using previous knowledge and thinking, they try to explore, solve problems, participate in learning and work in groups. They do learning activities without direct supervision of the teacher and educator. They appear both in the role of teacher and learner so that self-learning, self-direction, self-management, and independence in learning come true. Therefore, it is necessary to have a scientific model for understanding the psychological, educational and social characteristics of learners, and to use this knowledge in e-learning and virtual learning environments for collecting information, producing educational content, developing curriculums, providing feedback, and guiding the learner for realizing independent learning and becoming an independent learner [2]. On the other hand, as noted, rapid economic, social, and educational changes have made people need to learn new sciences, knowledge, and techniques throughout their lives and, be able to become "lifelong learners" through these learning activities. "Encouraging learners to accept learning responsibilities is an important step in achieving successful educational efficiency, both in terms of specific knowledge structures and in terms of achieving high-level cognitive skills that are essential for lifelong learning" [3]. Consequently, with regard to independent learning topics, lifelong learners should first be independent and autonomous learners who can manage their own learning and possess the characteristics required by an independent learner in order to be able to achieve their goals in learning and resolve their learning needs [10].

As a result, it is necessary to address recognizing the characteristics and abilities of the learner as one of the main inputs and pillars of distance education systems, end-users of e-learning, or individuals who want to realize their learning and meet their educational needs in this system. It is a pillar that all activities in the educational system, especially distance education, are formed around [7]. In this system, the electronic learning of learners as end users has a special position. Curriculum developers, planners, and educational content providers need to be familiar with and consider the characteristics of this group in order to improve the quality of their work. Careful and scientific study of the characteristics, traits and abilities of learners and provision of a scientific and validated model can allow for developing a comprehensive and standard test to measure the characteristics of independent learners, including the level of information and technology literacy, learning styles, personality styles, intelligence, critical thinking skill, motivation, and other components and characteristics in order to be able to help learners in a distance education system to become independent learners[9]. Also, preparing and constructing a test based on a model designed using learners' characteristics and skills for measuring independent learner's characteristics will help the e-learning, distance education and virtual education authorities in policy-making, planning and selecting appropriate methods based on a proper understanding of the audiences. This is because tests are tools for obtaining a sample of the behavior and characteristics of persons [4,6].

Pasha Sharifi (2010), quoting Lord Kelvin, wrote, "If you can measure and quantify what you're talking about, you can claim that you know about it, otherwise your knowledge of it is scant and insufficient" [8]. Therefore, the purpose of this study was to recognize the characteristics of an independent learner and to construct a standardized tool for measuring independent learner's characteristics in the distance education system with e-learning. As a result of the survey conducted in this study, based on the determined goals, an appropriate tool called "Independent Learner's Characteristics Test (ILCT)" was developed, standardized and introduced.

Method

This was an applied study, which according to the research subject, was conducted with a mixed research method using qualitative and quantitative research strategies. One of the features of the mixed research method is the sequence of using qualitative and quantitative methods. The researcher can collect qualitative and quantitative data simultaneously or sequentially. In this study, qualitative data were collected first, and then quantitative data were collected.

Using a qualitative strategy and reviewing the domestic and foreign literature, the components, characteristics and skills needed for students to become independent learners were investigated. Using the educational Delphi method and interviewing experts in education and psychology (cognitive, general, and learning), the characteristics of motivation, intelligence and emotional intelligence were agreed by all experts to be examined and used for test development from among five characteristics (motivation, intelligence, emotional intelligence, personality styles, and learning styles). Based on the obtained statistical results and the exploratory factor analysis on each and every item in each questionnaire, the reliability of each item of the questionnaires was evaluated and, finally, the "Independent Learner's Characteristics Test (ILCT) in the distance education system with e-learning", was developed, standardized, and presented with its answer key.

The statistical population of this study consists of all students studying in virtual courses at Payame Noor University of Iran in the 2011-2012 academic year, which consists of a total of 2635 students in different fields. According to the number of students and the university studied, Tbachick & Fidell (2001) model was used to determine the sample size which considered 500 subjects as a sufficient sample size [5]. The questionnaires were developed electronically on a temporary website and in collaboration with the educational authorities of the Office of E-learning at Payame Noor University. The website URL was randomly sent to 750 students through e-mail. It should be noted that all these students have passed two semesters and their GPA was used as their academic achievement and the criterion variable for statistical assessments. Finally, 452 of the 750 students answered all the questionnaires. The statistical assessments were performed on the information obtained from the responses of these 452 people.

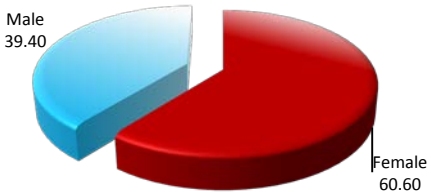
Exploratory factor analysis was used in order to answer the research questions, or in other words, to generalize the results of the sample to the statistical population of the study, the results of which are presented in separate tables. It should be noted that data screening was performed before the final analysis. For this purpose, the outliers for each of the variables were removed; subjects with similar response patterns and subjects with abnormal response patterns were removed; unanswered data were replaced using the EM algorithm; data were examined in terms of multivariate normality and homogeneity (presumptions of multivariate tests); and some subjects' questionnaires were also omitted due to being incomplete.

Information and quantitative data were obtained using standard questionnaires of R. B. Cattell's Intelligence Test: Scale 3, Form B; Schutte Emotional Intelligence Questionnaire (SEIS); and Motivated Strategies for Learning Questionnaire (MSLQ).

Results

In the present study, among the 452 subjects, 274 (60.60%) were female and 178 (39.40%) were male. Considering the proportion of males and females in the university entrance exam, this ratio appears to be reasonable. The pie chart below clearly illustrates this ratio. It should be noted that, due to the high volume of the results, only the gender ratio of the students is presented from among the descriptive findings of the study.

Figure 1. Students' gender ratio



The necessary scientific measures were taken to answer the research question of: "Can we develop, standardize, and introduce a test to measure independent learner's characteristics in the distance education system with e-learning?" Based on the results obtained, it was determined that there is a possibility to develop and present a valid test to measure independent learner's characteristics. Therefore, in order to construct and standardize a test to measure independent learner's characteristics, the following steps were taken: After the implementation of the questionnaires, the exploratory factor analysis technique was used to identify the most important items of each factor (i.e. those factors with the highest factor loadings). At the same time, the internal consistency of items (Cronbach's alpha) was used to check the reliability of each factor. Exploratory factor analysis was performed on each factor individually because the questionnaires used alone are at an acceptable level in terms of validity and reliability, and this technique was used for data reduction and in order not to compromise the content validity of each factor. It should be noted that some factors were eliminated in the final design and extraction of the questionnaire, which was due to the Cronbach's alpha coefficient calculated for that factor. As, relevant binary techniques were used for some questionnaires they were designed with a binary response scale (Yes/No). For instance, the tetrachoric correlation matrix was used instead of the Pearson correlation matrix to perform exploratory analysis or calculate the Cronbach's alpha coefficient. Such statistical analyses were performed using FACTOR and STATISTICA software, and SPSS-21 was used to analyze the multi-valued data (Likert spectrum). In the following, the analyses for each questionnaire are presented separately, which include two sections of the exploratory factor analysis and the Cronbach's alpha statistic calculation. Before this analysis, the assumptions of exploratory factor analysis were examined, the results of which are presented in the following tables. It should be noted that this analysis was carried out on 452 valid questionnaires.

Schutte Emotional Intelligence Questionnaire (SEIS)

- ✓ **Exploratory factor analysis and reliability of the emotion regulation factor:** Bartlett's sphericity test with a degree of freedom of 21 and a value of 1162.84 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.607).

Table 1. Bartlett's sphericity test and KMO statistic of the emotion regulation factor of SEIS

Bartlett's sphericity	KMO
1162.84 (df=21; P<0.001)	0.607

The factor loadings for each item related to the emotion regulation factor of SEIS is presented in the following table. Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 2, 10, 14 and 31 had the highest factor loadings and the extracted variance was more than 28%.

Table 2. Factor loadings of emotion regulation factor of SEIS

Items	Factor loadings
2. When I encounter obstacles in my way, I remind myself of the times that I have encountered similar obstacles and have eventually overcome them.	0.616
10. I'm awaiting good events.	0.757
14. I'm looking for activities that make me happy.	0.754
31. When faced with obstacles, I use good feelings to help myself keep trying.	0.626

The reliability of the four items that make up the emotion regulation factor was obtained

according to the following table.

Table 3. Psychometric properties of SEIS (emotion regulation)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
Emotion regulation factor α=0.633	2	12.7588	3.212	0.328	0.619
	10	13.0265	2.035	0.489	0.514
	14	12.9137	2.385	0.557	0.453
	31	12.8053	3.093	0.316	0.625

According to the results of the above table, the reliability of emotion regulation factor of SEIS was 0.633 which does not increase by eliminating any of the items.

- ✓ **Exploratory factor analysis and reliability of the emotion evaluation factor:** Bartlett's sphericity test with a degree of freedom of 36 and a value of 383.855 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.535)

Table 4. Bartlett's sphericity test and KMO statistic of the emotion evaluation factor of SEIS

Bartlett's sphericity	KMO
383.855 (df=36; P<0.001)	0.535

In the table below, the factor loadings of each item related to the emotion evaluation factor of SEIS are presented.

Table 5. Factor loadings of emotion evaluation factor of SEIS

Items	Factor loadings
15. I am aware of the non-spoken messages (such as tone of voice, tune, face movements, etc.) and the meaning of those messages that I send to others.	0.333
18. When others try to hide the emotional state of their faces, I can understand what they are feeling.	0.837
19. When my feelings change, I know why this change occurs.	0.878

Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 15, 18 and 19 had the highest factor loadings and the extracted variance was more than 20%. In the following, the reliability of the three items that make up the emotion evaluation factor is presented.

Table 6. Psychometric properties of SEIS (emotion evaluation)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
Emotion evaluation factor α=0.533	15	8.7257	1.455	0.087	0.777
	18	8.8164	0.784	0.472	0.189
	19	8.7235	0.963	0.555	0.109

According to the results of the above table, the reliability of emotion evaluation factor of SEIS was 0.533 which can be increased to 0.777 by eliminating item 15.

- ✓ **Exploratory factor analysis and reliability of the social skills factor:** Bartlett's sphericity test with a degree of freedom of 55 and a value of 753.079 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.522).

Table 7. Bartlett's sphericity test and KMO statistic of the social skills factor of SEIS

Bartlett's sphericity	KMO
753.079 (df=55; P<0.001)	0.522

In the table below, the factor loadings of each item related to the social skills factor of SEIS are presented.

Table 8. Factor loadings of the social skills factor of SEIS

Items	Factor loadings
4. It is easy for other people to trust me and share their secrets with me.	
6. A series of important events in my life have made me reassess the things that are important in life for me and things that are not.	
30. When others feel embarrassed and sad, I help them to be relieved of that feeling.	

Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 4, 6 and 30 had the highest factor loadings and the extracted variance was more than 18%. In the following, the reliability of the three items that make up the social skills factor is presented.

Table 9. Psychometric properties of SEIS (social skills)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
Social skills factor α=0.573	4	8.4580	1.522	0.633	0.151
	6	8.6969	1.954	0.098	0.910
	30	8.5177	1.310	0.547	0.191

According to the results of the above table, the reliability of the social skills factor of SEIS was 0.573 which can be increased to 0.910 by eliminating item 6.

Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich and De Groot

- ✓ **Exploratory factor analysis and reliability of the self-efficacy factor:** Bartlett's sphericity test with a degree of freedom of 36 and a value of 477 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.591).

Table10. Bartlett's sphericity test and KMO statistic of the self-efficacy factor of MSLQ

Bartlett's sphericity	KMO
1100.477 (df=36; P<0.001)	0.591

In the table below, the factor loadings of each item related to the self-efficacy factor of MSLQ are presented.

Table 11. Factor loadings of the self-efficacy factor of MSLQ

Items	Factor loadings
6. I'm sure I can understand what is taught in this academic year.	0.684
10. I think I'll learn in this academic year.	0.987
12. I'm sure I can do my assignments in the best way possible.	0.987

Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 6, 10 and 12 had the highest factor loadings and the extracted variance was more than 35%. In the following, the reliability of the three items that make up the self-efficacy factor of MSLQ is presented.

Table 12. Psychometric properties of MSLQ (self-efficacy)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
Self-efficacy factor α=0.629	10	6.2434	٠.708	٠.742	-٠.010
	12	6.2699	٠.747	٠.759	-٠.017
	6	3.5664	1.781	-٠.007	٠.975

According to the results of the above table, the reliability of the self-efficacy factor of MSLQ was 0.629 which can be increased to 0.975 by eliminating item 6.

- ✓ **Exploratory factor analysis and reliability of the** Intrinsic Goal Orientation **factor:** Bartlett's sphericity test with a degree of freedom of 36 and a value of 1030.449 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.549).

Table 13. Bartlett's sphericity test and KMO statistic of the intrinsic valuation factor of MSLQ

Bartlett's sphericity	KMO
1030.499 (df=36; P<0.001)	0.599

In the table below, the factor loadings of each item related to the intrinsic valuation factor of MSLQ are presented.

Table 14. Factor loadings of the intrinsic valuation factor of MSLQ

Items	Factor loadings
1. I prefer homework that is somewhat hard so that I can learn something new from it.	0.934
11. I often choose topics for essay writing that I learn things from. Even if those topics require a lot of work.	0.937
16. Even if I get a bad score in the exam, I will try to learn from my mistakes.	0.261
17. I think that things that I'm learning in this academic year are useful to me.	0.240

Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 1, 11, 16 and 17 had the highest factor loadings and the extracted variance was more than 21%. In the following, the reliability of the four items that make up the intrinsic valuation factor of MSLQ is presented.

Table 15. Psychometric properties of MSLQ (intrinsic valuation)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
intrinsic valuation factor α=0.610	1	12.3650	2.401	0.492	0.454
	11	12.2699	2.495	0.513	0.438
	16	12.0332	3.442	0.364	0.571
	17	11.9292	3.073	0.242	0.655

According to the results of the above table, the reliability of the intrinsic valuation factor of MSLQ was 0.610 which can be increased to 0.655 by eliminating item 17.

- ✓ **Exploratory factor analysis and reliability of the cognitive strategies factor:** Bartlett's sphericity test with a degree of freedom of 66 and a value of 2626.984 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.675).

Table 16. Bartlett's sphericity test and KMO statistic of the cognitive strategies factor of MSLQ

Bartlett's sphericity	KMO
2626.984 (df=66; P<0.001)	0.675

In the table below, the factor loadings of each item related to the cognitive strategies factor of MSLQ are presented.

Table 17. Factor loadings of the cognitive strategies factor of MSLQ

Items	Factor loadings
33. When I study, I take notes so I can better remember them later.	0.987
36. When I study for an exam, I repeat the important parts over and over for myself.	0.987
42. I pause for a moment when studying and review what I have studied.	0.987
46. While studying, I try to relate what I study to what I already know.	0.955

Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 33, 36, 42 and 46 had the highest factor loadings and the extracted variance was more than 30%. In the following, the reliability of the four items that make up the cognitive strategies factor of MSLQ is presented.

Table 18. Psychometric properties of MSLQ (cognitive strategies)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
Cognitive strategies factor α=0.987	36	13.8473	3.788	0.981	0.980
	42	13.8208	3.802	0.981	0.979
	33	13.8208	3.802	0.981	0.979
	46	13.8053	4.064	0.927	0.994

According to the results of the above table, the reliability of the cognitive strategies factor of MSLQ was 0.987 which can be increased to 0.994 by eliminating item 46.

- ✓ **Exploratory factor analysis and reliability of the self-regulation factor:** Bartlett's sphericity test with a degree of freedom of 28 and a value of 457.967 was significant at 99% confidence level, and the KMO statistic was reported at an acceptable level (0.513).

Table 19. Bartlett's sphericity test and KMO statistic of the self-regulation factor of MSLQ

Bartlett's sphericity	KMO
457.967 (df=28; P<0.001)	0.513

In the table below, the factor loadings of each item related to the self-regulation factor of MSLQ are presented.

Table20. Factor loadings of the self-regulation factor of MSLQ

Items	Factor loadings
34. I work on the exercises and answer the questions at the end of each chapter, even when I do not have to.	0.928
35. Even when the things I should study are tiring and not interesting, I will continue studying until I finish them.	-0.921
43. When I study, I repeat the content for myself several times so I can remember them later.	0.266

Considering the factor loadings of each item after exploratory factor analysis, it can be seen that items 34, 35 and 43 had the highest factor loadings and the extracted variance was more than 23%. In the following, the reliability of the three items that make up the self-regulation factor of MSLQ is presented.

Table 21. Psychometric properties of MSLQ (self-regulation)

Scale reliability	Item	Mean by removing the item	Variance by removing the item	Correlation of the item with the whole	Reliability by removing the item
Self-regulation factor α=0.620	34	8.8827	0.702	0.693	0.104
	35	8.9469	0.551	0.639	0.148
	43	8.1040	1.428	0.075	0.871

According to the results of the above table, the reliability of the self-regulation factor of MSLQ was 0.620 which can be increased to 0.871 by eliminating item 43.

In the following, descriptive indices and the central tendency of the research variables are presented. It should be noted that only the frequency of the correct and incorrect answers for the binary factors and the central tendency (mean, deviation, etc.) for multiple choice factors were reported.

Table 22. Correlation of the factors of SEIS

	Emotion regulation	Emotion evaluation	Social skills
Emotion regulation	1	-0.008	0.466**
Emotion evaluation	-0.008	1	-0.012
Social skills	0.466**	-0.012	1

* P<0.05; ** P<0.01

Table 23. Frequency distribution of selected items of MSLQ

	Self-efficacy	Intrinsic valuation	Cognitive strategies	Self-regulation
Mean	1.698	1.950	1.392	2.358
Median	1.667	2.000	1.000	2.333
Mode	2.00	2.00	1.00	2.33
Standard deviation	0.479	0.530	0.654	0.204
Skewness	0.525	0.401	1.715	-0.332
Standard deviation of skewness	0.115	0.115	0.115	0.115
Elongation	0.561	-0.076	2.632	6.942
Standard deviation of elongation	0.229	0.229	0.229	0.229

Table 24. Correlation of the factors of MSLQ

	Self-efficacy	Intrinsic valuation	Cognitive strategies	Self-regulation
Self-efficacy	1	-.036	-.057	.015
Intrinsic valuation	-.036	1	.067	-.047
Cognitive strategies	-.057	.067	1	-.050
Self-regulation	.015	-.047	-.050	1

* P<0.05; ** P<0.01

Table 25. Frequency distribution of intelligence (IQ) in raw and converted scores (with a mean of 100 and a standard deviation of 15)

	Raw score	Converted score
Mean	19.88	100.00
Median	20.00	100.42
Mode	20.00a	100.42a
Standard deviation	4.28	15.00
Skewness	-0.383	-0.383
Standard deviation of skewness	0.115	0.115
Elongation	0.226	0.226
Standard deviation of elongation	0.229	0.229

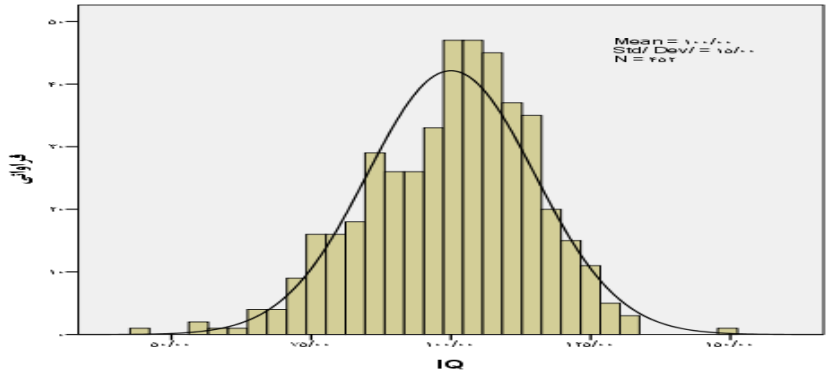


Figure 2. Distribution of students' intelligence scores (with a mean of 100 and a standard deviation of 15)

Based on the Figure 2, the learners' intelligence scores have a normal distribution and a desirable condition.

Table 26. The coefficients and significance of direct and indirect effects of the variables

Predictor variable	Criterion variable	Type of effect	β	t-statistic
Intelligence (IQ)	Academic achievement	Direct	0.86	-12.30 **
	Academic achievement	Indirect	0.13	42.06 **
	Academic achievement	Total	0.99	9.67 **
Emotional intelligence	Academic achievement	Direct	0.24	13.00 **
	Academic achievement	Indirect	0.28	14.00 **
	Academic achievement	Total	0.52	15.00 **
Motivated strategies	Academic achievement	Direct	0.80	36.36 **
	Academic achievement	Indirect	0.17	12.83 **
	Academic achievement	Total	0.97	20.95 **

* P<0.05; ** P<0.01

Discussion and Conclusion

In this study, which aimed at identifying the characteristics and abilities of an independent learner in a distance education system and developing and standardizing a tool for measuring these characteristics, the characteristics of **emotional intelligence** and **motivated strategies** were approved for an independent learner using the Delphi method. After statistical analysis of the data from responses of 452 virtual students of Payame Noor University to electronic questionnaires, the reliability of each of the items was measured using exploratory factor analysis, and a valid questionnaire to measure the characteristics of an independent learner called "Independent Learner's Characteristics Test (ILCT)" in a distance education system was developed and standardized with 24 items as described in the following table. The test has 24 items whose separate distribution includes the measurement of the characteristics of emotional intelligence and motivated strategies. This test can be used by learners to self-assess their characteristics as independent learners; authorities and planners; those involved in learning systems in general, and in the distance education system in particular; universities and educational institutions that with the expansion of new educational methods, particularly distance education, deal with a large number of learners who are responsible for their learning independently and are involved in independent learning; and to gain insight about motivated strategies and emotional intelligence in learners. It should be noted that the only study in the field of determining characteristics or a tool to measure such characteristics or abilities in learners is the present study. The results of this study are merely consistent with the results that Dr. Seraji has obtained in a study titled "*Developing an Instrument for Assessing E-Learner Entrance Readiness*". The results of the study by Seraji led to the development of a tool for assessing the entrance characteristics of the e-learners. These two tools together can provide the grounds for measuring entrance readiness and learning characteristics in e-learning educational systems.

Table 27. Measurement factors

Measurement factors for motivated strategies in the ILCT questionnaire	Number of the items
Self-efficacy	1 to 3
Intrinsic valuation	4 to 7
Cognitive strategies	8 to 11
Self-regulation	12 to 14
Measurement factors for emotional intelligence in the ILCT questionnaire	Number of the items
Emotion regulation	15 to 18
Emotion evaluation	19 to 21
Social skills	22 to 24

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