



## Validation of Comparative Model of the Teacher Education Systems

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### ABSTRACT

The present study aimed to validate the comparative model of teacher education systems. For this quantitative study, correlation method and path analysis test were used in line with research purposes. The statistical population was faculty members of Farhangian University, Iran. The cluster sampling method was used to determine the sample size, and 250 faculty members from all over the country were selected as the study sample. A researcher made questionnaire including 50 items designed based on the components of the comparative model of the teacher education system was used to collect the data. Moreover, the exploratory factor analysis test was used to investigate the reliability of the instrument, employing the Principal Components Analysis (PC). The results showed that 7 factors had been identified according to the eigenvalues. The results of the explained variance showed that these 7 factors predicted a total of 70% of the structural changes. Then, in order to test the theoretical model, the proposed conceptual model analyzed by path analysis, employing the maximum probability method. After testing the model with fit indices, it was shown that the tested model enjoyed a good fit with the conceptual model and the collected data. In the end, suggestions were made, including that researchers and those involved in teacher education systems all over the world can use this model as a conceptual framework in their comparative approach in order to benefit from successful methods of teacher education.

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## 1. Introduction

One of the most important educational institutions in any society is the organization in which the teachers required for different educational courses are trained. This importance is due to the fact that the product of this type of organization is teachers who are the starting point of any educational development and can transform the face of the educational organization with the help of knowledge and skills they have acquired. These organizations are different in different countries. There are universities and educational centers in each community to train teachers in order to prepare them for different levels of education, from elementary school to high school. In Iran, teacher education is the responsibility of the two universities. One of these centers is Farhangian University, which trains primary and secondary school teachers, and the other is Shahid Rajaei Teacher Education University, which is responsible for education students for vocational schools.

Teacher education in Iran, like any other country, has a long history. An examination of the history of the development of education in Iran shows that initially, there was no place for education those who wanted to be teachers so that they could be prepared for the teaching profession. Teachers were selected among the graduated and studious students of seminaries. The professors of these seminaries made this choice in the form of granting teaching licenses to the students who outperformed others. Teaching licenses were, in fact, the teacher's scientific certificate. The teacher wrote these licenses on the last page of one of the books he taught, and this handwriting was considered a valid document for that student. In this certificate, the teacher mentioned books his student could use as a teacher, as well as the names of the professors in whose presence the student studied. This handwriting and those names were considered a scientific honor for the students. At that time, there was no salary for a teacher and there was no organization for this purpose, and teachers made their living from the gifts and sums paid by their disciples.

Furthermore, since these sums and gifts were insufficient, the teacher turned to other jobs, such as document writing, copying books, or tutoring children of aristocratic families in their homes. The first step towards the employment of teachers was taken in the second half of the 13th century (AH) with the establishment of the Dar-Al Funun by Amir Kabir. It was then that teachers, like other government employees, found themselves a state position and achieved a better social position (Aghazadeh, 2005). The teachers at the Dar-Al Funun School were mostly European and sent from Austria, France, Germany, and Italy. A small number of Iranian teachers in the fields of Persian Literature, Arabic language, history, and geography were also seen among the teachers of the Dar-Al Funun (Aghazadeh, 2005).

With the establishment of the Dar-Al Funun in 1849, the formation of the Ministry of Science in 1854, and the construction of new schools in the cities of Urmia, Tabriz, Isfahan, and Tehran, the approval of the Constitution of Education in 1911, and defining four degrees for study (village primary school, city primary school, high school, and higher education schools), the need for teachers in society was well felt (Safi, 2008). The first teacher education center established in 1911 under the name of the Central Teachers' College (Dar-Al Moallemin), headed by Abolhasan Foroughi. Specialized classes held to teach the basics of teaching at the Dar Al-Funun in the early 1910s. Since 1910, when the first Ministry of Education was established, the responsibility of educating teachers transferred to these teacher education centers by establishing the Teachers' College (from 1918 to 1933). From 1933 to 1979, elementary and higher colleges undertook this serious task. A period from 1980 to 2002 was a time of revision and expansion of teacher education programs.

Furthermore, a period from 2002 to 2008 was dedicated to different approaches to teacher education and teacher provision and the gradual closure of teacher education centers (Safi, 2008). Farhangian University was established with a new statute and organization in 2011. Attracting students interested in the teaching profession began, and the first group of students began studying at the university in January 2013. The university had 98 branches in the form of 64 campuses, 34 campus-affiliated centers, and about 65,000 students. In different countries of the world, this task is the responsibility of independent institutions or institutions affiliated with the universities of that country, or it was the responsibility of the universities themselves. However, the critical point is that in some countries of the world, new policies have been designed to train teachers, which has led to the change of the country from poverty and backwardness to a leading country (Mehr Mohammadi, 2015). What can change the education of Iranian teachers is the use of the experiences of prosperous countries in this field. Comparative studies must be conducted to make the change come true. To conduct comparative studies in teacher education systems, researchers need to develop initial awareness in this regard. One of the things that help them is to have a model for conducting a comparative study in teacher education systems in order to prevent the dissemination of information collected in the comparative method and also to know how to use this information optimally. The conceptual model for the comparative study of teacher education systems, presented by the authors of the article based on a grounded theory methodology in 2018, could help comparative researchers. In this article, while briefly introducing the comparative model of teacher education systems, the authors sought to validate this conceptual model using quantitative methods.

## 2. Review of Literature

For a comparative study of teacher education systems in two or more countries, researchers compared part or all of a country's teacher education with one or more countries. The goal of the researchers was to identify the world's most successful teacher education systems and to emulate them for their country. The choice of countries for a comparative study of teacher education is usually based on the international success that those countries have achieved or countries that owe growth and development in other areas to their education. In the comparative method, the researcher selects the comparison criteria of his choice, and there is no single model for this. As an example, Sarkar Arani (1994), in a study entitled "A Comparative Study of the Education System of Iranian and Japanese Teachers," investigated some aspects of teacher education in these two countries. The criteria used to compare these two countries were: distribution of teachers according to their degrees in different courses of study, salaries and welfare facilities of teachers, teacher certificates, working and teaching hours per week, method of selecting teachers, distribution of teachers according to their academic degree.

Some studies investigated only one aspect of teacher education. As an example, Darun Parvar (1999), in a study entitled "Analytical and Comparative Study of the Application of Information and Communication Technology (ICT) in the Education of Teachers in Iran, The United Kingdom, and Singapore," mentioned that the purpose of conducting his study was to use the experiences of other countries in the use of ICT in teacher education. He believed that this technology could be used with these experiences at the lowest cost and most efficiently. The criterion used in his comparative study was using ICT in teacher education.

Some of these studies just introduced the experiences of prosperous countries in teacher education. For example, Farahmandian (2000) introduced the teacher education system in South Korea and China. This study examined educational programs to improve the quality of teachers' work and introduced measures that could be taken to turn a person into a teacher in teacher education centers in those two countries. These measures included pre-service education (internship), executive courses for teacher education, one-year quality courses after graduation from teacher education, and the like. The criterion he used was the element of the curriculum in teacher education. Sha'bani (2004) referred to the process of teacher education and compared Iran with several prosperous countries (Germany, Japan, England, and Canada) in a comparative study. The criteria he used were: conditions for recruiting teacher volunteers, professional teacher education, practical teacher education, the years of study in teacher education, student internship

programs for teachers, and in-service programs for teachers. Esmaeili (2004) investigated one of the curricula of teacher education, which was of great importance for the body and soul of students. He conducted a study entitled "Comparative Study of the Physical Education Curriculum of Iran and Several Countries in the World" and presented a model. In the present study, Iran has been studied and compared with 16 countries from all continents of the world. The comparative criteria used in his study included: general goals, general content, teaching time, sports venue, sports materials and equipment, evaluation method in elementary school sports curriculum.

In another study, Daraki (2005) analyzed the characteristics of the Iranian teacher education system and compared its differences and similarities with those of Germany and Japan. The criteria used to understand and compare the characteristics of teacher education in 3 countries were: teacher selection stage, teacher education stage, teacher recruitment, and employment stage. Each of these criteria had sub-criteria introducing the details of each step. In some studies, only one field of study in teacher education was compared. For example, Fahimi (2009) in his study entitled "Comparative Study of the Curriculum of Mathematics Teacher Education in Iran, Japan, Singapore, South Korea, and the United States," tried to identify the characteristics of the desired teacher education program, finding the weaknesses in the teacher education program in our country. Nazeri (2009), in a study entitled "Comparative Study of Education in Japan and Iran: How Did Japan Become Japan?" pointed out that developments in Iran, Japan, and Germany began at the same time. In Germany, Bismarck was a pioneering leader who took great strides toward industrialization. Emperor Meiji, in Japan, paved the way for great uprisings by breaking the boundaries of this society. In Iran, Amir Kabir was the flag bearer of reforms and the initiator of the era of change. He went on to answer the question of why this trend stopped in Iran with the death of Amir Kabir, while it moved fast in the other two countries. Sociologists consider one of the keys to the success of these two countries (Japan and Germany) to be the special attention paid to the institution of education and significant investments in this field. In some comparative studies on teacher education, the researchers compared a part of a program in teacher education in Iran with that of several countries. For example, Nikookar (2009) compared the components of student selection and student education for becoming teachers with a comparative study on the selection and education of public education teachers in Iran, the United States, and France. Movahhedian (2010) conducted a study entitled "A Comparative Study of the Theoretical Foundations of Language Teaching Policies and Models in Iran, China, and Singapore." The criteria used in his comparative study were language teaching models and differences in relevant core policies. Sometimes studies conducted in the field of teacher education, which may be the responsibility of

other institutions in some countries. For example, Asadi (2013) conducted a study entitled "Investigation of the Education Process of Iranian, British, and German educators" and introduced the trustees of teacher educators in these three countries. His criterion for comparison was the process of education kindergarten trainers.

Beyond a comparative study, some researchers pointed to a pattern of change in teacher education in the country. Mehr Mohammadi (2013), in a study entitled "Teacher Education Curriculum and its Participatory Executive Model: A Transformational Strategy for Teacher Education in Iran," presented a participatory executive model for the first time in teacher education in Iran. This proposed model was based on the fundamental components of the teacher education curriculum and supported the division of labor. Studies have sometimes turned to the quality assessment system of teacher education programs. In a study entitled "Comparative Study of the Quality Assessment System of Teacher Education Curriculum in South Korea, England, and Iran" conducted by Amrollah and Hakimzadeh (2014), they reviewed the assessment components of curriculum goals, curriculum content, and the learning process in the curriculum. A study conducted by the University of Maryland in 2010, Rebecca L. Oxford and Yesim Yilmaz Sahin entitled "A Comparative Analysis of the Development Models of the Teacher Education Scientific Board for Technological Integrity (Technology Coordination)," the component used for the comparative study was the use of new technologies in teaching for professors and students.

Also, in a comparative study on the Japanese and Spanish teacher education system conducted in 2015 by Ramirez Carpeno and Yoko Mekochi, it was shown that researchers have considered various components for comparison in the educational, political, social, economic and cultural fields. These components included geographical location, capital, political system, size, population, GDP, currency, language, religion, all kinds of professional qualifications for teachers, the characteristics of the education system, and the cost of education. Some comparative studies sought to model several countries for one country. For example, two Pakistani researchers, namely Muhammad Shafi Messo and IqbalAhmed Panhwar, affiliated to the University of Sindhjamshoro in Pakistan, conducted a study entitled "Comparative Study of the Teachers Education in Japan, Germany, and Pakistan." Researchers sought to analyze teacher education programs in Japan and Germany and extend them to Pakistan because they believed that there were teachers in Japan to establish and maintain schools and provide educational facilities. At the same time, Pakistan did not have such a system, and their schools were operated under the direct supervision of the central

government. Criteria used in their comparative study of teacher education programs were the objective, content, process, and evaluation.

### 3. Conceptual Model

Ezazi and Noorian (2018) proposed a conceptual model in order to consider all the crucial components in the comparative study of teacher education systems. This model has been designed and presented using the grounded theory methodology by conducting interviews and collecting extensive information from comparative studies conducted in Iran and other countries of the world. After performing a meta-analysis on the information, the researchers reached 12 components or categories. According to the analyses performed, the conceptual model has been designed, and longitudinal and transverse communication of these 12 components has been identified (see Figure 1). The components were: 1) Historical ,2) Social , 3)Political , 4)Cultural , 5)Economic , 6)Geographical , 7)Change requirements , 8)Modeling ,9) Localization , 10)Components of vocational education , 11)Teacher education program curriculum and 12) Student recruitment in the teacher education program. To compare two or more teacher education systems, this model suggests that researchers pay attention to the following:

Components 1 to 6 are a set of underlying factors that shape the context and structure of that country. These components are unique to each country and are the cause of many effects of that society. Components 7, 8, and 9 are intermediate factors that lead to change conditions. These components must be identified and analyzed in detail by the comparative researcher. Components 10, 11, and 12 also form the set of internal (educational) factors of teacher education. The comparative researcher tends to know more about these internal factors of teacher education. Most of the studies conducted also showed that researchers emphasized this internal set of factors. However, what is certain is that one cannot expect the comparative study to be flawless without considering the previous nine components. Therefore, it is possible to point out the priority that each component has in figure 1, and that the time when the comparative researcher uses each component.

Underlying factors include social, economic, cultural, historical, geographical, and political factors, and, as is clear from the figure, these factors must first be carefully analyzed in both countries. Each meaningful comparative study should be able to identify the causes of differences and similarities between the subjects being compared and to understand the relationships between the causes that created them. Kubow and Fossum (2003), for example, designed a useful method

that juxtaposes the comparative aspects of countries concerning socio-political, geographical, and demographic factors (Bery et al. 2007). The underlying factors refer to the external contexts of teacher education and are, in fact, the causes of many educational phenomena. The second category is the internal factors of teacher education such as curriculum, vocational education (workforce, educational content, internship, etc.), the student recruitment program and other internal factors in teacher education, which each researcher chooses one or more internal factors for comparative study in compliance with his/her purpose. "Change requirements," "modeling," and "localization" are intermediate (causal or mediating) factors. These factors are the cause of change conditions, and given that any comparative study does not ultimately lead to modeling and localization of models, dotted lines are used in the proposed pattern for this purpose.

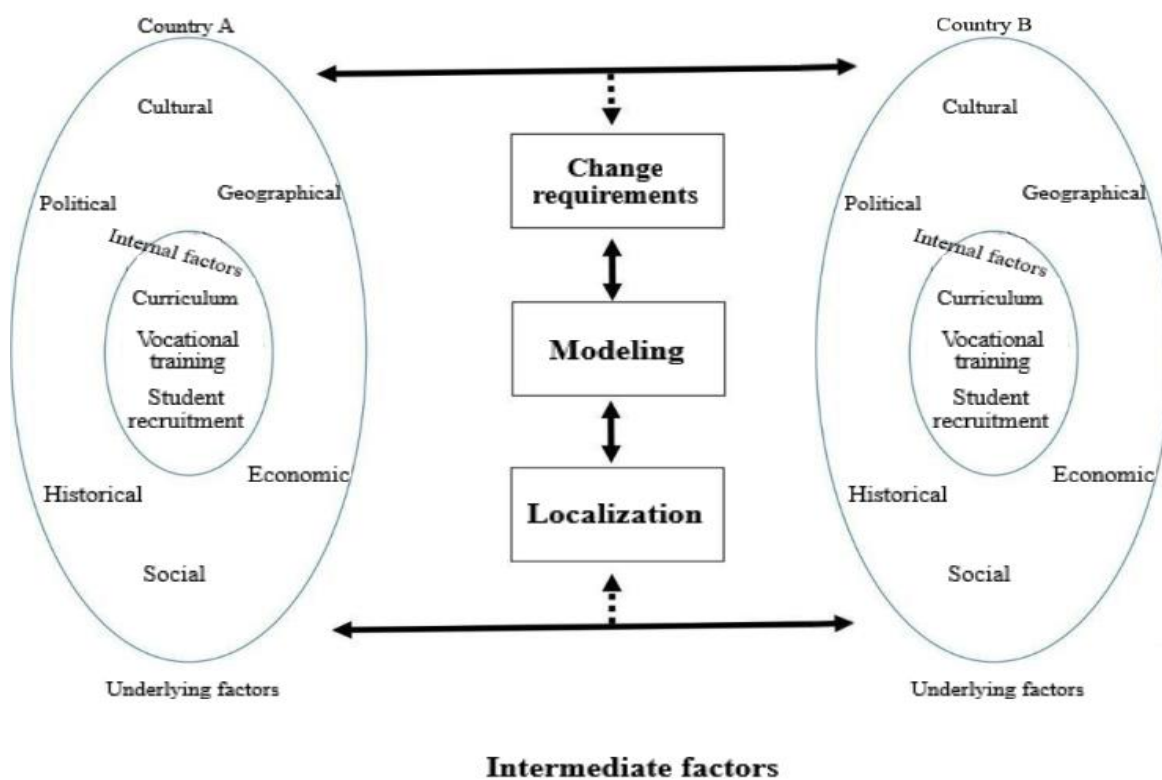


Figure 1. The conceptual model for the comparative study of teacher education systems



The present study was conducted to validate the pattern of the comparative study of teacher education systems. Therefore, the question is whether the model of the comparative study of teacher education systems is valid? Moreover, "are the components and the type of communication approved by the professors of Farhangian University?"

#### **4. Research Method**

This study aimed to validate the model of the comparative study of teacher education systems. The research approach is quantitative, and the research method is correlational based on the path analysis test. Path analysis is a technique in order to examine the relationship and interdependence between variables. In path analysis, the measurement model is not available, and it only includes the causal structure of the model. Path analysis can only be performed on observed variables. It is a generalized method of regression that can show indirect effects and the overall effect of each of the independent variables on the dependent variables in addition to the direct effects, and interpret the observed relationships and correlations between them with logical expression (Azar, 2002). On the other hand, the exploratory factor analysis method used to investigate the validity of the questionnaire. The reason for using this method was that the researcher designed a questionnaire and used it for the first time. Therefore, those confirmatory factor analysis methods that were explicitly designed for standard questionnaires that have already been developed cannot be used.

The statistical population was all faculty members of Farhangian University with more than 20 years of teaching experience. The number of these members was 780, according to the information obtained from the University Data Processing Center. The reason for choosing such a population was that the analysis of the desired model required sufficient experience of teaching in the teacher education program. Therefore, the statistical population was identified based on the experience criterion of more than 20 years, and then the research sample selected among them. Two-stage cluster sampling was used to determine the sample size. Since all 31 provinces of the country had campuses and higher education centers of Farhangian University, the provinces that had the most professors at Farhangian University were selected as the central cluster. There were a total of 12 campuses and 7 higher education centers in the six provinces, which employed about 250 professors. Among these 250 professors, 135 were male and 65 were female. Moreover, 174 of them had Master's degrees and 76 had PhD degrees. All 250 had more than 20 years of experience.

The information was collected using a researcher-made questionnaire. The items of the questionnaire were designed based on the components of the model of comparing teacher education systems (E'zazi and Nourian, 2018). The questionnaire was developed in three dimensions or three main criteria: the criterion of underlying factors in teacher education systems, the criterion of internal factors of teacher education systems, and the criterion of internal or intermediate factors in teacher education systems. Several questions or items were designed for each criterion. In this questionnaire, which initially had 75 questions, some questions were removed. The number of them reduced to 50 items by examination of 20 experts in the field of comparative study and teacher education who had authored or researched in this field or had more than 20 years of teaching experience in the teacher education program. Questionnaires were given to the samples in person and virtually (sending email). 217 questionnaires were received. Among these questionnaires, 17 questionnaires were not completed correctly. Therefore, the content of 200 questionnaires was examined and analyzed. The information on the questionnaire was collected and analyzed in two stages. To collect the information from the questionnaire, each of the items was first entered into SPSS22 software, and then this information entered into AMOS software for analysis. To calculate the initial reliability of the questionnaire, the researchers calculated statistical characteristics including mean and the standard deviation of each question, along with its correlation coefficient using the whole set of 50 questions (items) and Cronbach's alpha coefficient (Table 1).

Table 1: Mean and standard deviation of each question with its correlation coefficient using the whole set of 50 questions and Cronbach's alpha coefficient

Item	Mean	Standard deviation	Correlation with the whole test	The alpha coefficient in case of item exclusion
1	1.5	0.71	0.67	0.89
2	1.92	0.60	0.48	0.91
3	1.58	0.66	0.57	0.90
4	1.97	0.72	0.39	0.89
5	1.63	0.66	0.58	0.90
6	1.88	0.72	0.44	0.90
7	2	0.78	0.33	0.90
8	1.161	0.70	0.69	0.89
9	1.81	0.66	0.55	0.90
10	1.55	0.67	0.61	0.89
11	1.81	0.67	0.44	0.91
12	1.45	0.65	0.70	0.89
13	1.82	0.65	0.50	0.90

14	1.59	0.69	0.67	0.89
15	1.75	0.71	0.61	0.89
16	1.63	0.76	0.57	0.89
17	1.87	0.71	0.46	0.90
18	1.93	0.63	0.57	0.69
19	1.70	0.72	0.38	0.90
20	1.80	0.66	0.52	0.90
21	1.16	0.72	0.76	0.86
22	1.70	0.67	0.52	0.90
23	1.97	0.89	0.52	0.87
24	1.63	0.72	0.44	0.89
25	1.88	0.70	0.52	0.88
26	1.11	0.78	0.69	0.89
27	1.33	0.85	0.55	0.90
28	1.34	0.66	0.61	0.90
29	1.56	0.71	0.44	0.89
30	1.78	0.72	0.70	0.90
31	1.33	0.69	0.50	0.87
32	1.45	0.72	0.67	0.90
33	1.66	0.70	0.69	0.72
34	1.89	0.77	0.55	0.85
35	1.70	0.88	0.52	0.88
36	1.39	0.72	0.52	0.88
37	1.78	0.72	0.70	0.90
38	1.33	0.69	0.50	0.87
39	1.45	0.72	0.67	0.90
40	1.66	0.70	0.69	0.87
41	1.89	0.77	0.69	0.85
42	1.70	0.88	0.52	0.88
43	1.66	0.72	0.70	0.89
44	1.78	0.70	0.70	0.90
45	1.48	0.69	0.67	0.87
46	1.45	0.59	0.67	0.84
47	1.65	0.70	0.69	0.87
48	1.78	0.80	0.66	0.85
49	1.70	0.82	0.67	0.87
50	1.44	0.72	0.70	0.90
Sample size = 200	Number of questions: 50			Total alpha coefficient: 0.91

The results of Table 1 show that the overall alpha coefficient of the questionnaire was 0.91. Also, the findings showed that the whole alpha coefficient of the questionnaire did not change with the exclusion of items 2 and 11, but questions 18 and 33 reduced the amount of alpha; therefore, these four items were removed from the analysis. After removing these four questions, the overall alpha coefficient of the 46-item questionnaire was 0.91. Therefore, the analysis continued with a 46-item questionnaire. The exploratory factor analysis method was also used by employing the analysis of the Principal Components (PC) in order to determine that the content of the instrument was saturated with several factors. To perform factor analysis, to ensure the adequacy of sampling, and to ensure the non-zero matrix of data correlation matrices in the population, the results of the KMO test and the Bartlett Sphericity test were calculated (Table 2).

Table 2: Sampling adequacy test results and non-zero data correlation matrix

KMO	Bartlett Spehrity test	
	Chi-square	Level of significance
0.92	9057.68	0.001

By observing the figures in Table 3, it can be concluded that the implementation of factor analysis can be justified because the value of KMO was 0.92, which was more than the acceptable level of 0.70. The Bartlett Sphericity test was also 9057.68, which was significant at the level of 0.001.

## 5. Results

In this section, first, the methods of determining the number of items in the questionnaire and the selection method are explained. Then, to achieve a simple structure, the factor analysis rotation method is explained, and then the method used in this study is introduced. In the third stage, the results of the rotation of the factors and the new naming of the factors, the descriptive indicators of the factors (mean, standard deviation, skewness, and kurtosis) are shown, and at the end of this section, the correlation matrix and the model test are introduced.

### - *Determining the number of items in the questionnaire*

One of the issues that researchers face when conducting exploratory factor analysis is selecting the right number of factors of a questionnaire. This selection is so critical that choosing too many factors can lead to confusion for the researcher in interpreting the results, and selecting the few factors causes the loss of vital data. The following is a description of how to determine the number of factors.

- *The method of selecting the number of factors*

In the present study, the Scree test and eigenvalues were used to identify the number of underlying factors.

1. The Scree test: In this test, first, the graph of eigenvalues and especially the factor analysis are drawn. The graph of these eigenvalues is declining. To identify the number of factors, the point where the slope of the line changes the most on the chart is found, and then the slightest change is found and then the points before that change are counted. The sum of these points indicates the number of factors for rotation (Figure 2).

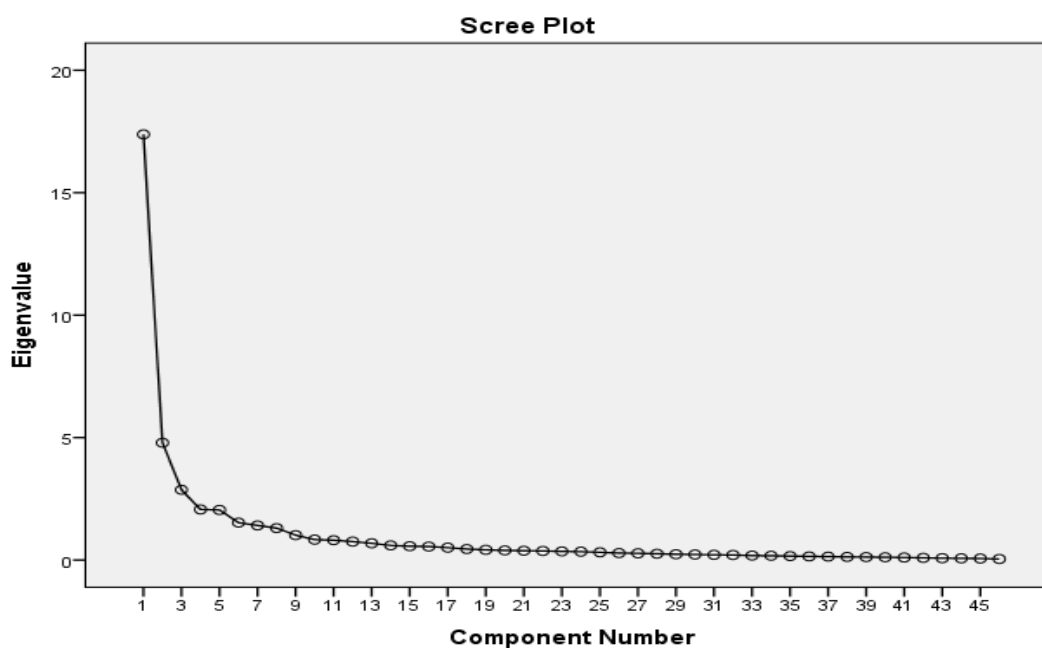


Figure 2: The scree test to estimate the number of factors

Figure 2 shows that the graph is approximately bent, starting from factor 7 or 8. This bending indicates that factors 7 or 8 have been identified in this data. However, due to the optical illusion, and the unreliability of this method, the eigenvalue method was used.

## 2. Eigenvalue method

In this method, only those factors are selected whose eigenvalue is greater than one. Table 3 shows the results of factor analysis and eigenvalue.

Table 3: Factors analysis and eigenvalue results

Factor	Factor eigenvalue	Cumulative variance	Explained variance
1	16.78	38.15	38.15
2	4.66	48.74	10.59
3	2.51	54.45	5.70
4	2.06	59.14	4.68
5	2.04	63.77	4.63
6	1.52	67.34	3.46
7	1.36	70.32	3.08

Table 3 shows that 7 factors identified according to the eigenvalues; the results of the explained variance also showed that these 7 factors predicted a total of 70% of the structural changes. Promin rotation was used to determine the items of each factor, the results of which are shown in Table 4.

#### *Determining the method of factor rotation*

In the present study, the inclined Promin rotation method was used. Given that the research questionnaire consisted of three dimensions or factors, therefore, the best way to rotate factors is by using the Promin method (Table 4). Since the factor matrix was not rotated and its factor loads did not acquire a meaningful structure, it was decided that the extracted factors be transferred to new axes using the Promin inclined rotation in order to make it possible both to discover the general form of the questionnaire material and to identify a more straightforward structure that displays the primary and relatively clear lines to arrive at interpretable solutions.

Table 4: Results of rotation of questionnaire factors using the Promin method

Factors \ Questions	1	2	3	4	5	6	7
1							0.60
3							0.67
4							0.80
15							0.55
5						0.58	
6						0.58	

16						0.83	
17						0.84	
9		0.52					
43		0.58					
46		0.60					
36		0.81					
47		0.84					
48		0.85					
49		0.84					
50		0.81					
10					0.69		
12					0.79		
13					0.83		
14					0.79		
19	0.81						
20	0.74						
21	0.77						
25	0.80						
22	0.78						
23	0.75						
26	0.73						
27	0.74						
38	0.62						
24	0.74						
34	0.66						
35	0.73						
37	0.64						
44	0.65						
28			0.73				
29			0.76				
30			0.79				
31			0.75				
32			0.73				
39				0.67			
40				0.72			
41				0.66			
42				0.72			
45				0.48			

Table 4 shows the results of loading each item on each factor in the present study questionnaire. It should be noted that questions 7 and 8 were removed from the analysis due to loading on two factors. After this step, it was necessary to name each of the factors (Table 5).

Table 5: Naming each factor based on related questions

Items	Factor naming	Alpha
1-3-4-15	Political-geographical	0.70
5-6-16-17	Social-historical	0.77
9-43-46-36-47-48-49-50	Modeling and localization	0.81
10-12-13-14	Cultural	0.83
19-20-21-25-22-23-26-27-38-24-34-35-37-44	Curriculum, vocational training, student recruitment	0.78
28-29-30-31-32	Economic	0.89
39-40-41-42-45	Change requirements	0.90

As can be seen, based on the results of exploratory factor analysis, 7 factors were identified and named by the researcher based on theoretical foundations. Due to the high level of correlation between curriculum-related questions, vocational training, and student recruitment, these three variables were identified as a factor. Localization and modeling both also identified as a factor due to the high level of correlation between questions and the loading of questions on a factor.

#### *Descriptive indicators of current study variables*

After identifying each of the factors, the descriptive indicators of the research factors are reported below.

Table 6: Descriptive indicators of research factors

Factor	Mean	Standard deviation	Skewness	Kurtosis
Political-geographical	17.83	4.18	-1.01	1.52
Social-historical	24.61	4.50	-0.80	0.50
Cultural	18.98	4.99	-1.29	1.58
Economic	18.45	6.01	-0.86	-0.60
Change requirements	18.87	3.83	-0.65	0.02
Modeling	19.14	4.28	-0.87	0.53
Localization	20.22	3.92	-0.87	-0.04
Curriculum	15.47	3.48	-1.03	0.49
Vocational training	17.95	4.16	-0.57	-0.91
Student recruitment	19.23	4.39	-0.74	-0.44



Based on the data in Table 6, the mean and standard deviation indices of the variables indicated the appropriate distribution of data and skewness and kurtosis indices indicated that the distribution of the research variables was normal. To check the normal distribution of single-variable data, the absolute value of the variability and kurtosis of the variables should not be more than 3 and 10, respectively (Kline, 2011).

#### *Theoretical model test and research hypotheses*

Given that the correlation matrix is the basis for analyzing causal models, especially structural equation modeling, the correlation matrix of the latent variables, along with the correlation coefficients and their significance levels are presented in Table 7 to examine the relationship between the variables. The correlation matrix showed that there was a paired, significant positive relationship between all variables. For example, this relationship was true between student recruitment and geographical factor (0.35), social factor (0.29), cultural factor (0.45), economic factor (0.51), change requirements (0.44), modeling (0.62), localization (0.45), curriculum factor (0.46), and vocational training (0.19).

Table 7: Correlation matrix of latent variables of the theoretical model in the present study

Number	Variable	1	2	3	4	5	6	7	8	9	10
1	Political-geographical	1									
2	Social-historical	**0.31	1								
3	Cultural	**0.46	**0.45	1							
4	Economic	**0.48	**0.28	**0.41	1						
5	Change requirements	**0.53	**0.71	**0.56	**0.53	1					
6	Modeling	**0.50	**0.46	**0.78	**0.62	**0.69	1				
7	Localization	**0.36	**0.34	**0.30	**0.50	**0.47	**0.60	1			
8	Curriculum	**0.42	**0.37	**0.57	**0.55	**0.63	**0.64	**0.41	1		
9	Vocational training	**0.29	**0.20	**0.19	**0.34	**0.26	**0.28	**0.50	**0.20	1	
10	Student recruitment	**0.35	**0.29	**0.45	**0.51	**0.44	**0.62	**0.45	**0.46	**0.19	1

### Theoretical model test

In order to test the theoretical model, the proposed conceptual model was investigated by path analysis using the maximum probability method. The path analysis is an extension of the regression method, in which model variables are considered as observable variables. Thus, the fitness indicators proposed by Giffen et al. (2000) was used to check the fitness of the model. These indicators included the following: the ratio of the chi-square to the degree of freedom ( $\chi^2 / d.f$ ) in which values less than 3 are acceptable; Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI), in which values greater than 0.9 indicated the appropriate fit of the model, and the root mean square error of approximation (RMSEA) in which values less than 0.08 indicated the appropriate fitness of the model. Figure 3 shows the tested model of the present study.

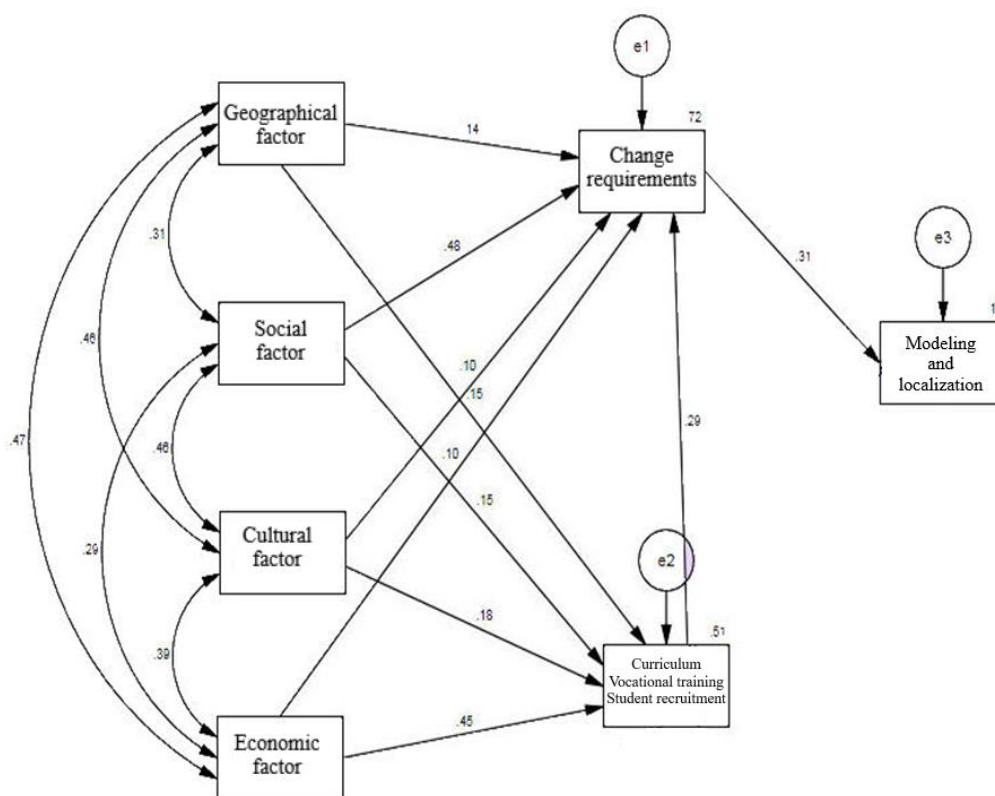


Figure 3: Tested model of the present study

- *Direct effects*

The direct effect occurs when one variable affects another variable, without the third variable between them (Hooman, 2011), that is, one variable can predict another variable or is the cause of it. According to Figure 3, the geographical factor with a coefficient of 0.15, the social factor with a coefficient of 0.15, the cultural factor with a coefficient of 0.18, and the economic factor with a coefficient of 0.45 affected all curriculum variables, student recruitment, and vocational training. Also, the geographical factor with a coefficient of 0.14, the social factor with a coefficient of 0.48, the cultural factor with a coefficient of 0.10, and the economic factor with a coefficient of 0.10 had a direct effect on the change requirements. Besides, the sum of the variables of the curriculum, student recruitment, and vocational training with a coefficient of 0.29 had a direct effect on the change requirements. Change requirements also affected localization and modeling with a coefficient of 0.31. Variables of geographical, social, cultural, and economic factors explained 51% of the variance of the total curriculum variables, student recruitment, and vocational training. Also, these variables (social, cultural, geographical, and economic) explained 72% of the variance of the change requirements. Finally, the change requirements also explained 12% of the variance of modeling and localization. Table 8 shows the estimated coefficients of direct effects.

Table 8: Estimation of coefficients of direct effects

Variables	Path coefficient	T-statistics	Level of significance
On change requirements from:	-	-	
Political-geographical factor	0.14	2.95	0.01
Social-historical factor	0.48	11.18	0.001
Cultural factor	0.10	2.03	0.01
A total of curriculum, student recruitment, and vocational training	0.29	5.43	0.001
On the sum of three variables (curriculum, student recruitment, and vocational training):	-	-	-
Geographical factor	0.15	2.58	0.01
Social factor	0.15	2.67	0.01
Economic factor	0.45	7.80	0.001
On localization and modeling from:	-	-	-
Change requirements	0.31	4.66	0.001

*Fit test*

Three categories of absolute, comparative, and Parsimonious fit indices were used, which are reported separately in Table 9.

Table 9: Goodness of Fit Indices of the tested model

Absolute Fit Indices			
Index	FGI	AGFI	RMR
Value obtained	0.98	0.91	0.91
Acceptable limit	> 0.90	> 0.80	Small value
Comparative Fit Indices			
Index	CFI	NFI	IFI
Value obtained	0.99	0.98	0.99
Acceptable limit	> 0.90	> 0.90	> 0.90
Parsimonious Adjusted Fit Indices			
Index	X <sup>2</sup> /df	PNFI	RMSEA
Value obtained	2.31	0.81	0.08
Acceptable limit	< 3	> 0.60	<0.08

These indices (absolute fit, comparative fit, and parsimonious adjusted fit), compared the tested model with the zero models, where there is no path between the variables. Thus, in most cases, the comparative fit indices showed how far the developed model has been able to move away from independence or zero model. The higher the distance, the more desirable was the goodness of fit of the model. Parsimonious fit indices also clearly raise this question of how the model in question combined fitness, parsimony, or brevity (Kline, 2011). According to Table 10 for the tested model, the GFI was 0.98, which was more than 0.90. The AGFI was 0.91, which was higher than 0.80. Moreover, the root-mean-square residual (RMR) was 0.91, which was lower than the acceptable value. The CFI was 0.99, which was higher than 0.90. The Normed Fit Index (NFI) was 0.98, which was higher than 0.90. The Incremental Fit Index (IFI) was 0.99, which was higher than 0.90. The chi-square divided on the degree of freedom (X<sup>2</sup>/df) was 2.30. The PNFI was 0.81, and the RMSEA was 0.88. Accordingly, the tested model of the present study had enjoyed a good fit with the conceptual model and the collected data.

## 6. Conclusion

The use of the conceptual model was not prevalent in comparative studies. Comparative researchers preferred to use an executive model such as Bereday's model because it explained the

steps of conducting a comparative study step by step. Conceptual models were the result of theorizing. Advocates of a variety of conceptual models focus on the depth of the subject, and they put much less emphasis on processes and procedures, for example, Schwab's deliberative model and Gardner's multiple intelligence model (1990) (Dehghani, Amin Khandaghi, Jafari Thani & Noghani Dokht Bahmani, 2011). In the present study, the validity of the conceptual model entitled "comparative study of teacher training systems" was assessed. Models need validation to be used, and if they are validated or credited, they can be used in a comparative study in teacher training systems. In the process of conducting a study using the grounded theory methodology, the comparative model was designed for teacher training systems. This model had three essential dimensions: the underlying dimension, the causal dimension (internal or intermediate), and the internal dimension. Comparative researchers must consider all three dimensions in conducting a comparative study, and neglecting any dimension and its factors will cause the collected information not to enjoy the necessary validity to be used in other countries. There are 12 factors in these three dimensions: Geographical, political, historical, economic, social, cultural, curriculum, vocational training, student recruitment, change requirements, modeling, and localization.

For the validation process of the proposed model, a 50-item questionnaire was completed by Farhangian University professors who had more than 20 years of teaching experience. The number of questionnaire items, which initially was 75, reached 50 items after expert corrections. The questionnaire was derived from the concepts of the comparative model. The goodness of fit test performed with the help of a quantitative approach and the use of the correlation method and path analysis test in order to measure the validity of the model. This test performed by removing and combining some factors in the model. The results of this test confirmed the conceptual model of the comparative study of teacher training systems. This model allows researchers to pay attention to the underlying and contextual dimensions in the teacher training system of countries, track the challenges in these contexts, examine the causes of the status quo of each teacher training system in comparison to other countries. This model also helps prevent providing the same prescriptions for different countries. Concerning the modeling and localization factors of teacher training programs, this model made the researcher aware of the existing contexts and conditions of each country. Similarly, the conceptual model provides an executive approach to the change requirements in the teacher training systems and makes it clear whether there is a need for change. The above model has undergone a superficial and straightforward comparison and has emphasized more critical concepts in the comparative study of teacher training systems. These factors include underlying and contextual factors, internal factors, and intermediate or mediating factors. In other words,

using the concepts of this model, the comparative researcher followed a comprehensive and inclusive approach in his research process.

This model showed that there are four essential variables in the comparison of teacher training systems: 1. change requirements; 2. curriculum, vocational training, student recruitment; 3. modeling, localization; 4. geographical, political, social, cultural, historical, economic factors. In explaining the tested model, it can be said that underlying factors (geographical-political, social-historical, cultural and economic) while having a bilateral relationship and correlation with each other, affected the totality of internal or educational factors of teacher training (curriculum, vocational training, student recruitment) and even on one of the intermediate factors, namely the change requirements. Also, internal factors affected one of the mediating factors, namely the change requirements. This factor, in turn, affected modeling and localization factors. In other words, when the "change requirements" factor, which itself was under the influence of several other factors, affects modeling and localization factors, this means that in every society, it is necessary to reach this point, that is, the need for change in education and teacher training. Then, some measures should be taken towards creating a localized model by modeling and model demanding. The necessity for conducting a comparative study and determining the criteria for conducting a comparative study are also originated from this model. After testing the fitness of the model, it was concluded that the tested model enjoyed a good fit with the conceptual model and the data collected. It means the validity of the conceptual model, and this model can be used for conducting a comparative study on teacher training systems. Suggestions for comparative researchers, as well as policymakers and educators, are as follows:

- If the required areas for conducting a comparative study of educational and teacher training systems are specified, comparative researchers can act professionally and, as a result, more practical results can be obtained; therefore, it is suggested that all departments in the education system, especially in the teacher training system, specify the change requirements in each area to determine the need for conducting a comparative study in that area for researchers and practitioners.
- Teacher training in Iran has recently taken great strides towards change, but it seems that it has not reached the required maturity; therefore, it is suggested that they provide more ground for conducting comparative studies, and this should be among the research priorities of Farhangian University.

- The country's education policymakers can accurately evaluate each of the criteria listed in this study for conducting a comparative study. In the case of their approval, it is suggested that the teacher training system of Iran be compared with countries with which the comparison seems practical and reasonable, using the proposed model of the present study.
- The curriculum of teacher training systems in the world is very diverse., therefore, it is suggested that more attention be paid to the internal factors of teacher training, especially the curriculum. It is also recommended that comparative researchers get more involved and conduct a comparative study of successful programs.
- The discussion of modeling the world's teacher training systems is imperceptibly underway in Iran. What is wrong with looking for conducting comparative studies in order to extract appropriate models for teacher training in Iran in a more clear manner and using more explicit mechanisms. Therefore, it is suggested that successful comparative researchers called for help in this regard.
- Since comparative studies conducted in Iran just addressed similarities and differences of the countries investigated, it is recommended that the conceptual model of the present study be used as a model in the research process.
- Vocational training is one of the most essential factors in teacher training. In order to achieve the desired vocational training in teacher training, it is necessary to study the standard ways and methods in the world in this area. The proposed conceptual model can be used in this regard.
- Comparative education is one of the most important courses in the undergraduate course of educational sciences, which, unfortunately, has a low position in the Iranian teacher training system and it is taught virtually in the current academic year, and this is while this course was excluded from teacher training for three years; therefore, it is suggested that the importance and position of this course be strengthened through the implementation of research projects in this field. The research priorities of universities can be a crucial factor in this regard.

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