



Applying Structural Equations Modeling (SEM) in Designing an Educational Effectiveness Model (Case Study: Governance Organization Employees)

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Abstract

The role of education and retraining in organizations is important; in a way that education affair composes one of the most important concerns of the managers and policy makers of effective organizations. The purpose of this research is to design an educational effectiveness model for the governance organizations employees with a structural equation modeling approach in Iran. In order to achieve the research goal, a sequential mixed method has been used, which includes two qualitative and quantitative parts. In the qualitative part of the research, interview has been used. Necessary information and data were collected from experts and senior managers of the governance organization and then the design of the educational effectiveness model for the governance organization employees has been validated by structural equations. To investigate the expertise validity of the research model, the fuzzy Delphi method was used, for which the identified indicators were sent to the experts over several periods, and after the performed adjustments, 56 indicators were confirmed. Confirmatory factor analysis was used to evaluate the validity of the research variables construct. The research results showed that the educational effectiveness model for the governance organization employees has two parts: the main factors and their indicators. This model has been composed of indicators that are the core and heart of this model and are the basis for evaluating the educational effectiveness, which are called effective factors. The educational effectiveness model for the governance organization employees has 7 main factors: learner's readiness, training need assessment, training targeting, training program design, resources and equipment allocation, course monitoring and evaluation, and training course management, which include 56 indicators composing them.

Keywords: Education, Effectiveness, Employees, Governance Organization, Structural Equations.

Introduction

The today's world is a world of change and development. Rarely a day passes by without innovation and change in production or service status. In such a situation, most organizations are looking for a solution to adapt to this situation. The solution stated by most experts is training and improving human resources. In most large companies

in the world, about 50% of investments are made in training and development domain (Storey, 2014), and companies around the world spend millions of dollars on employees' training. Training enables employees to acquire new skills and knowledge, but there is no guarantee that training lead to performance improvement; specifically this event occurs when

knowledge and skill are taught to employees that are not proportionate with the organization. Therefore, the issue of education is a very important issue.

In today's competitive world, an organization has a chance to survive that can constantly adapt itself to environmental changes. Environmental changes have forced organizations to constantly seek the best solutions and procedures in order to adapt to their environment and thus achieve a competitive advantage. Therefore, one of the ways to acquire sustainable competitive advantage is to emphasize on increasing the performance of managers (Stiehl et al., 2015). Improving performance promotion and increasing productivity have been used in order to achieve maximum output from human and material resources, and optimal achievement of organizational goals is one of the most important duties of managers, which providing effective trainings help this important issue. There are conditions and factors in providing effective trainings that affect increasing the performance of managers (Vivek, 2016).

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and factors in providing effective trainings that affect increasing the performance of managers (Priyadarshini & Dave, 2012). Organizations have been composed of important pillars such as structure, human resources, technology and management, which according to many human resource experts are the most important elements in this respect, because the efficiency of the organization depends on the correct and exact performance of these forces in the department and headquarter. Since the human resources compose a high percentage of resources and capitals of organizations; therefore, providing this human capital requires performing regular and continuous training activities at all organizational levels (Pfeifer et al., 2013). In other words, with the frequent changes and today's unstable world, having a capable and trained workforce is vital for the growth and success of any organization. Organizations need internal changes to adapt to the environment. In order to implement any kind of change in the organization, management must think about training and informing its employees (Seyed Javadin, 2013).

In this regard, a training program can only justify its worth when it provides reliable and credible evidences about the effect of training on improving participants' behavioral patterns (Ghahremani, 2013). This point refers to an important aspect of education that is usually referred to as "Educational Effectiveness". In other words, the value of education, like other organizational activities, is also measured by determining it in achieving organizational goals (Nasreen & Mirza, 2012). Meanwhile, one of the main problems of governmental and industrial organizations and other organizations is the lack of seriousness of employees and managers in education affair, inappropriate evaluation of the educational effectiveness of courses and as a result



providing appropriate feedback from training results, and finally when it is necessary, the required follow-up is not performed (Ardeshir, 2015).

(Siam, 2013) in a research addressed "The Educational Effectiveness of Flourishing on Psychological Capital in Female Employees of Shahid Chamran University of Ahvaz". The aim of present research was to determine the educational effectiveness of flourishing on psychological capital and its components (hope, self-efficacy, optimism and resilience). In order to achieve the objectives of the research, a pre-test, post-test experimental design with a control group was used. The statistical population of the present research included all female employees of Shahid Chamran University of Ahvaz. From this population, 40 people were selected using random sampling method and then randomly assigned to two experimental and control groups (20 people each). To collect data, the participants in the research in both groups answered the questionnaires of psychological capital and flourishing. The results showed that flourishing training has created a significant difference between the two experimental and control groups. This means that the mean of the experimental group compared to the control group has had a significant increase, which indicates the educational effectiveness of flourishing on increasing psychological capital and its components (hope, self-efficacy, optimism and resilience).

In a research, (Babaei, 2017) determined the priorities for compiling a safety, health and environmental trainings program in district 3 of Tehran Water and Sewerage Company. This research was conducted to determine the training programs in the HSE department of district 3 of Tehran Water and Sewerage Company. For this purpose, after determining the statistical population, the

Delphi method was used to determine the educational priorities and headlines of the workshop. Then, by holding a training course, the desirability ratio of the educational content and the compiled headlines, along with the level of learning, change in behavior and its scientific results have been investigated through the levels of Kirkpatrick's model. The research results showed that the training items have had the highest importance according to experts in determining training headlines for the methods of carefully selecting the contractor (safety), "health retraining programs as scheduled for all employees", "standards of water storage tanks" (sanitary), "training to reduce the ratio of waste production at the origin" and "the separation of dry and wet wastes at the origin" (environmental). In addition, the awareness level of the participants before holding the educational workshop has been lower than the limit of (9.45) and statistical analysis (t-test) indicates a significant difference before and after holding the training workshop; therefore, it can be concluded that the determined priorities can be effective in changing the attitude and behavior of learners and the effectiveness of the training course has been confirmed.

(Bani Davoodi & Atabi, 2017) in a research addressed "Investigating the Relationship between the Effectiveness of In-Service Courses of Employees with Job Consequences in Abuzar Hospital in Ahvaz", in the Journal of the Paramedical Faculty of Tehran University of Medical Sciences. This cross-sectional research was of descriptive-analytical type and in terms of purpose it was applied, and was conducted in the statistical population of the employees of Abuzar Hospital in Ahvaz in 2015. All 100 hospital employees were studied. Data collection tool included a researcher-made questionnaire to evaluate in-service

educational effectiveness, organizational citizenship behavior questionnaire, job satisfaction questionnaire and organizational commitment questionnaire.

Hosseini (2017) in a research addressed "Investigating the Effect of Human Resource Management Methods on the Innovation of Service-Oriented Organizations (Case Study: Hafez Hospital, Shiraz)". The purpose of the present research is to investigate the impact of human resource management methods on the innovation of service-oriented organizations. This research was of correlation type. The statistical population of this research includes all managers, deputies and the heads of wards of Hafez Hospital in Shiraz in 2017 that were investigated by census method. Data collection tool include a researcher-made questionnaire on human resource management methods and a combination of the organizational innovation questionnaire of Jimenez-Jimenez et al. (2008), Penyadez (2006), Perajko and Sohel (2006). To investigate the validity of the questionnaire, face validity and factor analysis methods have been used and to investigate the reliability of the questionnaire, Cronbach's alpha coefficient has been used by applying SPSS-19 software. The results show that the questionnaires of the present research have proper validity and reliability. The results obtained from data analysis performed by inferential correlation statistics and simple regression analysis methods show a positive and significant relationship between human resource management methods (performance evaluation and training and the improvement of human resources) and organizational innovation. Human resource management methods are also able to predict the changes of organizational innovation variable (Asgari, 2016).

In a research, (Thomas, 2018) addressed "Education and Development: Investigating the Educational Effectiveness in Employees' Performance". This article talks about the importance of employees in a business, especially when they are properly trained. This article addresses more deeply various educational methods used by various organizations. The pros and cons of training have also been examined. Research findings indicate that training in the organization has a significant effect on employees' performance results, customer satisfaction, turnover ratio, employees' loyalty and market value of the company.

(Sopjani et al., 2017) in a research addressed "Education as an Effective Tool to Increase Knowledge about Organizational Actions: A Study to Evaluate the Educational Effectiveness in Kosovo". The aim of this study was to investigate the effect of World Health Organization (WHO) sanitary multi-purpose company tool in all public hospitals and clinical centers of the University of Kosovo. The research findings indicate that employees' awareness before and after training improved significantly ($p < 0.001$), and the effect of training on promoting the knowledge of participants had a positive and significant effect. Therefore, the average knowledge promotion was about 41.66%.

(Thabit et al., 2016) in a research addressed "Evaluating the Role of Training Strategy in Increasing Educational Effectiveness". In this article the role of training strategy in increasing educational effectiveness was evaluated using Performance Leadership Assessment Tool (PLAT) as an instrument to measure the impact of leadership in designing good training programs in the companies. The researchers distributed 100 questionnaires randomly in a group of managers, instructors and interns at Al Jazeera companies. The researchers concluded that the design training program



should be converted to a precise process of performance evaluation for leaders, instructors and interns, as well as the creation of a specific program for training strategy in each company to create an effective training program.

Cappelli (2015) by publishing an article entitled "Why We Love to Hate Human Resources...and What Human Resources Can Do About It", considered training and development of employees as one of the most important macro processes and functions in the field of human resources, in the middle of the fundamental importance of the human resources field, on the one hand, and senior managers' criticisms of the performance of this field, on the other hand. Organizations after costs related to employees' salaries and benefits, spent heavily on the development and training of their employees and managers. Accordingly, senior managers of the organization are very interested to observe the effects of this investment on the key results and achievements of the organization. To be more precise, a large part of today's criticisms and challenges regarding training in organizations is focused on showing the effectiveness status of the cost of this field and the obtained results in the organization's business. Therefore, there are wide expectations from training managers regarding the demonstration of the effectiveness of this field.

The American Society for Training and Development (ASTD) of Human Resources in 2014 has compiled a report with the aim of preparing performance indicators in the field of education. This report examines, analyzes and compares more than 30 key indicators in the field of education in American organizations. According to this report, American organizations have invested more than 156 billion dollars in learning and development of their

employees in 2014. The report also indicates that the investment trend of organizations in employees' training and learning is still ascending (Franko, 2014).

AlYahya (2013) wrote an article entitled "Evaluating the Development and Educational Effectiveness: Kirkpatrick's Model". This article was approved by human resource development managers to investigate the model of educational effectiveness for self-planning, design and implementation of training program. The results indicate that employees' awareness of the objectives of training courses, training continuity and appropriate software for training at workplace have direct affect on the improvement of educational effectiveness.

Research Method

In general, types of research are classified according to three criteria: a) based on nature b) based on purpose, c) based on the method of data collection. Since the results of the present research can be used for the governance organization employees, in terms of nature it can be considered of quantitative research type and in terms of purpose, it is considered among applied researches, because the purpose of applied researches is to develop applied knowledge in a specific field. Also, the present research in terms of data collection is among the field of mixed researches, in which interview and questionnaire tools are used. According to the research topic, the statistical population of this research consists of all experts and senior managers of the governance organization. The conditions for the interviewees to enter are: 1- Having scientific and executive experiences in the field of employees' empowerment 2- Having compilations in the field of research topic, 3- Having at least five years of work

experience in the governance organization. The sampling method of this research is of judgmental type (non-probable purposeful) due to the limited population. This sampling is used when a limited class of people has the desired information, and therefore those are selected as samples that are in the best position to provide the required information. Cochran's formula will be used to estimate the sample size.

The present research is carried out spatially in the geographical area of Yazd and the statistical population of the research includes all experts and senior managers of the governance organization. And in terms of time it is carried out in 2017-2018, and research information is collected in the form of interview and questionnaire in this time period.

It should be mentioned that in the process of performing the present research, first by interviewing experts and scholars in the governance organization, a model for research variables has been selected. Since the model used in this research is system dynamics, after extracting the cause-effect model that will be investigated by the experts of the governance organization and after correction, it will be confirmed. The required information will be obtained from interviewing the experts and the library study of available statistics and documents related to the governance organization.

Using the data obtained from the questionnaire and with the aid of SPSS statistical software, the confidence coefficient ratio was calculated by Cronbach's alpha method (Table 1).

Table 1. Reliability of Research Tool

Variable	Cronbach's Alpha
Learner's Readiness	0.85
Training Need Assessment	0.89
Training Targeting	0.90
Training Program Design	0.82
Resources and Equipment Allocation	0.85
Course Monitoring and Evaluation	0.81
Training Course Management	0.92

According to the provided explanations related to the fit indices, the initial results obtained from the confirmatory factor

analysis of the research categories have been presented in (Table 2):



Table 2. Final Model Fit Indices

Index Type	Index	Acceptable Value for Model Fit Confirmation	Result
Absolute	X ² /DF	Value between 1 to 3	Confirmation of the Model Goodness of Fit
	RMSEA	Value lower than 0.08	Confirmation of the Model Goodness of Fit
	SRMR	Value lower than 0.08	Confirmation of the Model Goodness of Fit
	GFI	Value higher than 0.9	Confirmation of the Model Goodness of Fit
	AGFI	Value higher than 0.9	Confirmation of the Model Goodness of Fit
Relative	NFI	Value higher than 0.9	Confirmation of the Model Goodness of Fit
	TLI	Value higher than 0.9	Confirmation of the Model Goodness of Fit
	IFI	Value higher than 0.9	Confirmation of the Model Goodness of Fit
	CFI	Value higher than 0.9	Confirmation of the Model Goodness of Fit
Economic	PGFI	Value higher than 0.5	Confirmation of the Model Goodness of Fit
	PNFI	Value higher than 0.5	Confirmation of the Model Goodness of Fit
	PCFI	Value higher than 0.5	Confirmation of the Model Goodness of Fit

As it is specified from (Table 2), almost all indicators of confirmatory factor analysis indicate the model goodness of fit. With the

help of experts, a conceptual model of educational effectiveness model has been compiled (Figure 1).

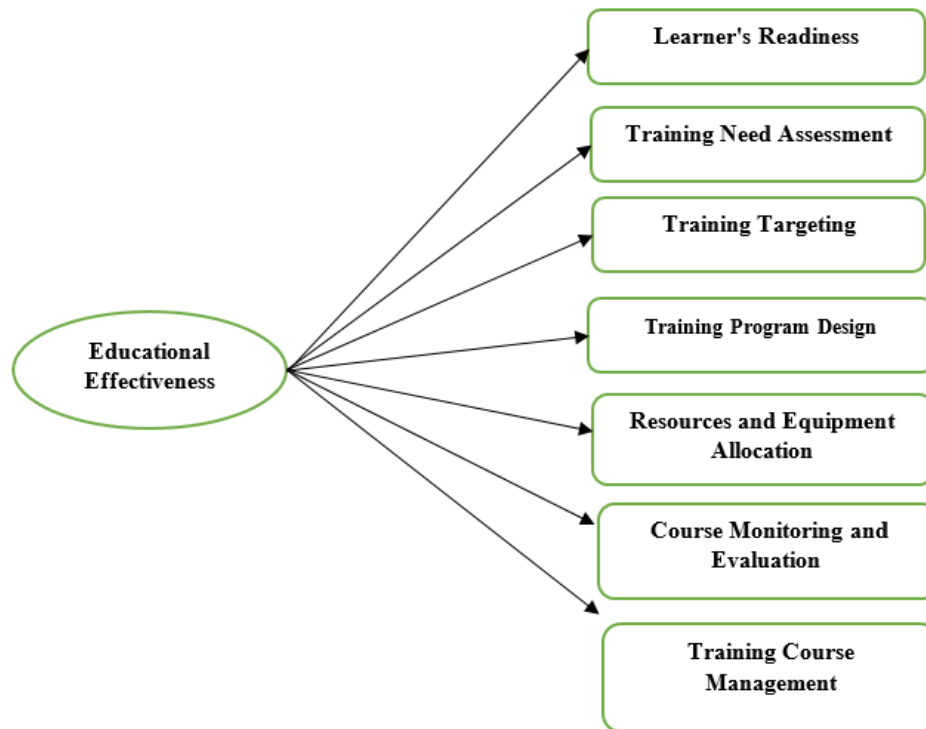
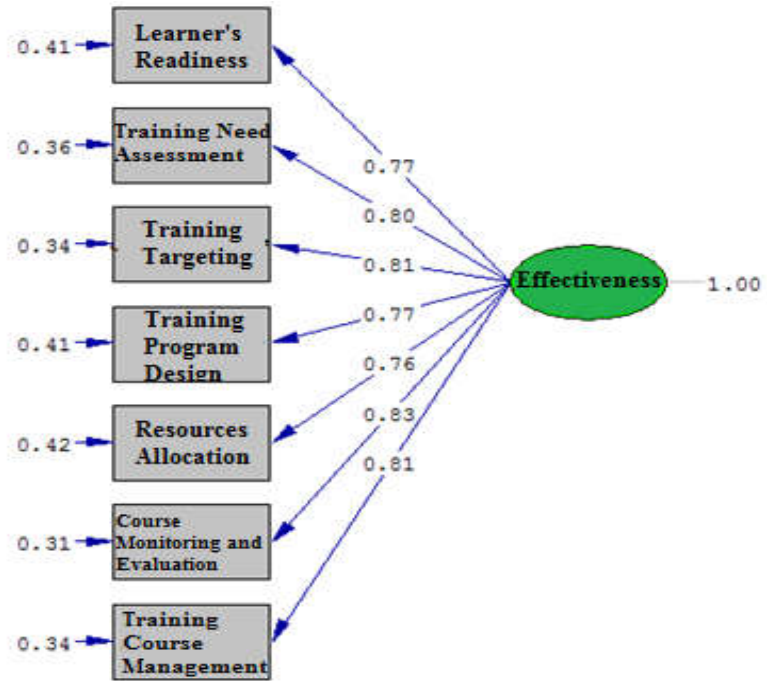


Figure 1. Research Conceptual Model

Research Final Model Fitness

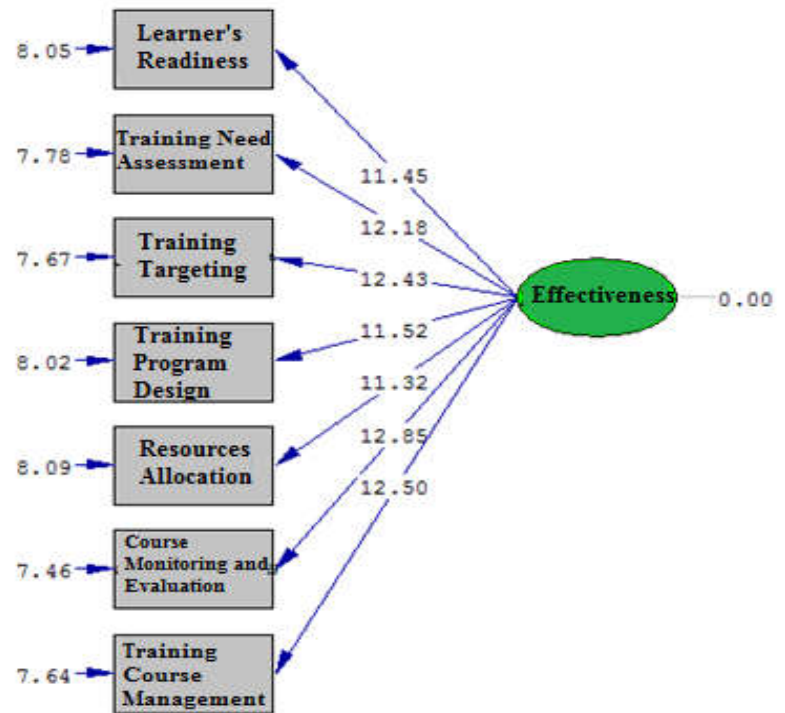
In the following, the results of path analysis of the educational effectiveness model of the

governance organization employees have been presented (Figure 2).



Chi-Square=1043.24, df=346, P-value=0.00000, RMSEA=0.063

Figure 2. Educational Effectiveness Model of the Governance Organization Employees in the Standard Coefficients State



Chi-Square=1043.24, df=346, P-value=0.00000, RMSEA=0.063

Figure 3. Educational Effectiveness Model of the Governance Organization Employees in the t Significance Numbers State

As it is observed in (Figure 3), all significance numbers related to the model parameters (including factor loads and their errors) have become significant, because their significance number is higher than

1.96. In the following and in (Table 3), the fitness indicators of the educational effectiveness model of the governance organization employees have been reported.

Table 3. General Fit Indicators of the Educational Effectiveness Model of the Governance Organization Employees

Index	Estimate
Chi-Square Ratio to Degree of Freedom (χ^2 / df)	3.01
Root Mean Square Error of Approximation (RMSEA)	0.063
Goodness of Fit Index (GFI)	0.93
Adjusted Goodness of Fit Index (AGFI)	0.91
Comparative Goodness of Fit Index (CFI)	0.93
Normed Fit Index (NFI)	0.92

According to the results (Table 4), the structural model fit indices show that the model has a relatively good fit; although the Chi-square index on the degree of freedom is slightly higher than 3, the root mean square error of approximation is lower than 0.08 and other indices have been obtained higher than 0.90.

Confirmatory Factor Analysis of the Second Order Educational Effectiveness of the Governance Organization Employees

As in the present research, the variable of educational effectiveness of the governance organization employees has six components that can act as an indicator of this structure, so the second order factor analysis to test the measurement model and also the validity of the components of the structure of educational effectiveness of the governance organization employees has been examined (Figure 4).

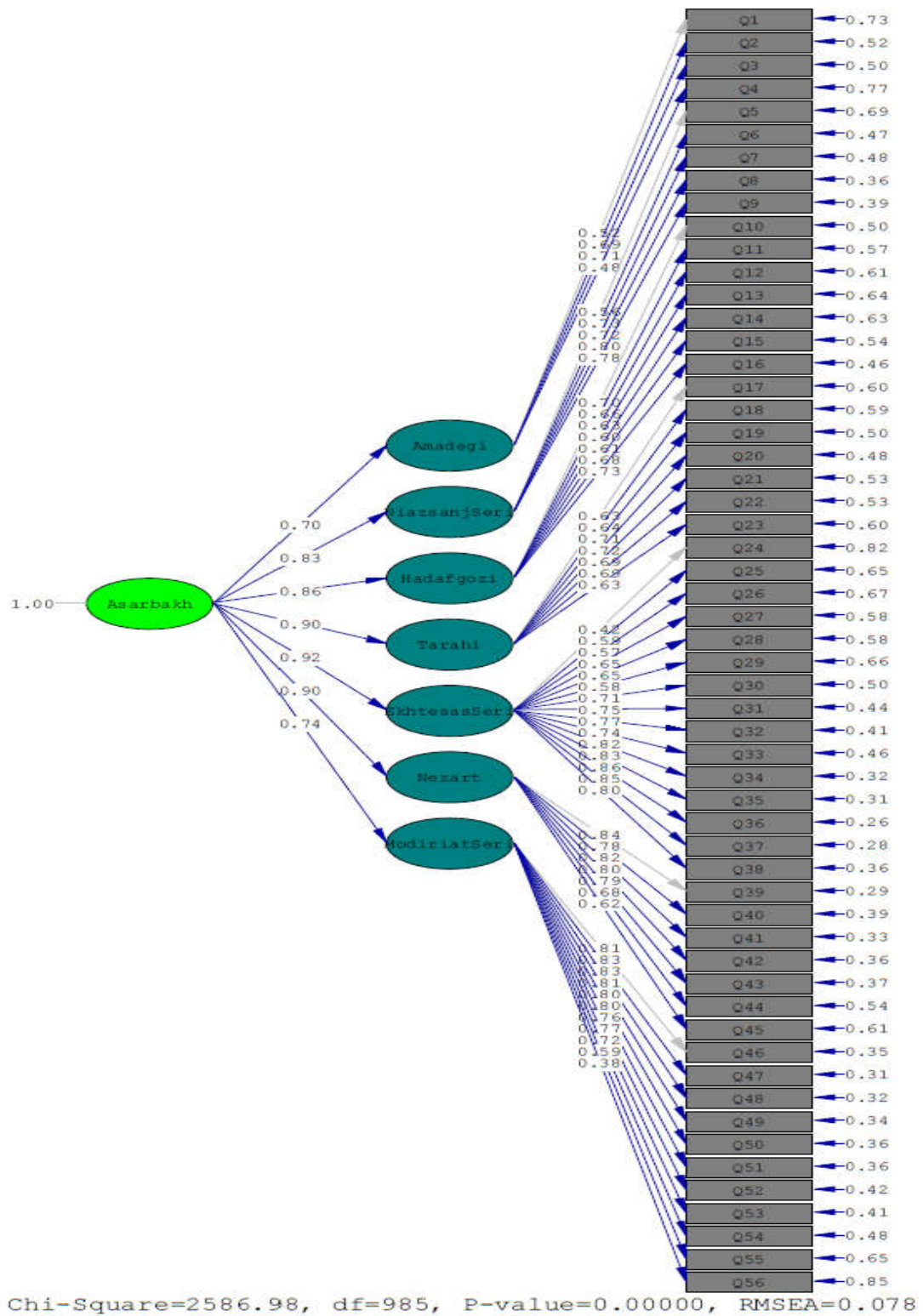


Figure 4. Output of the Second-Order Factor Analysis for the Variable of the Educational Effectiveness of the Governance Organization Employees

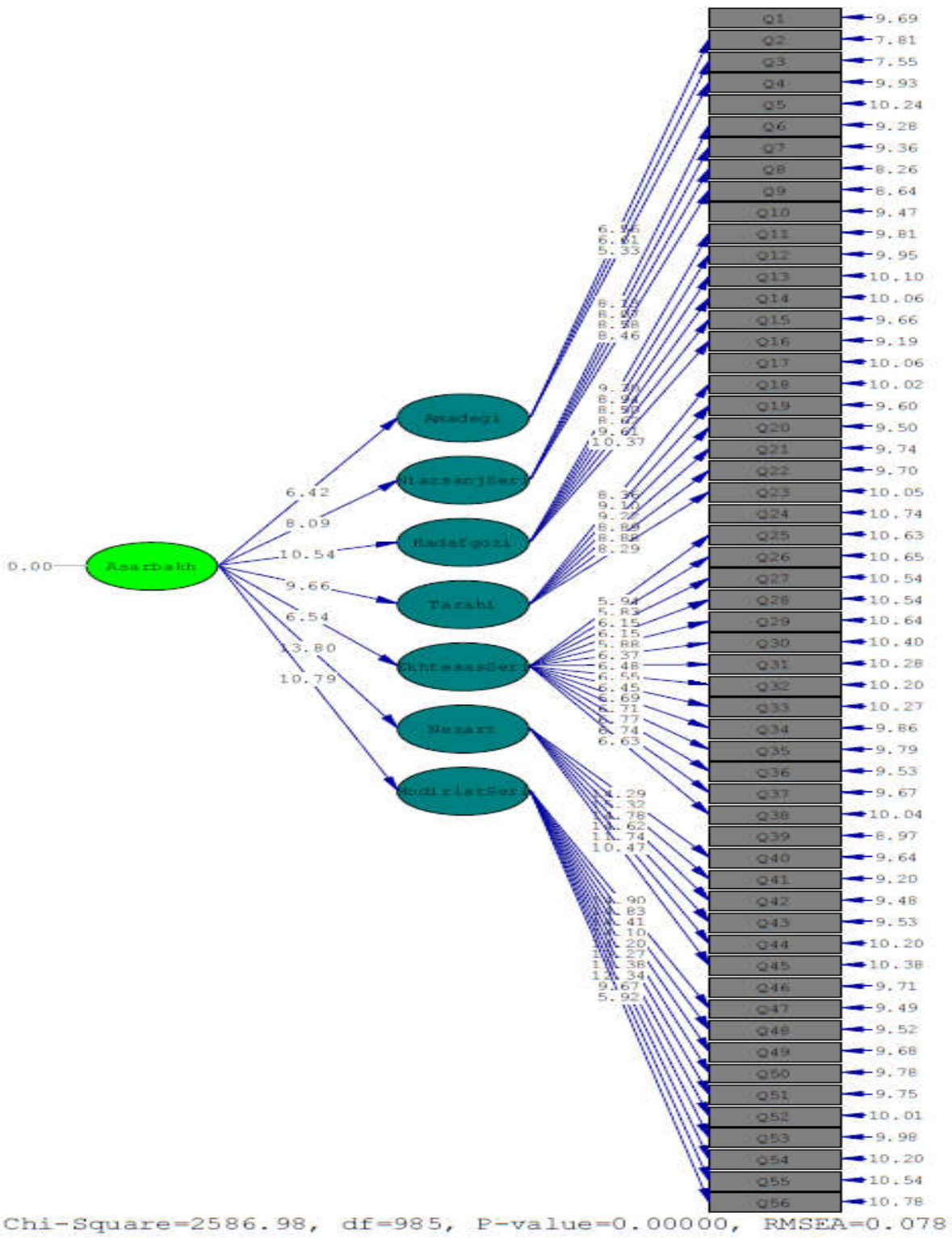


Figure 5. Output of T Coefficients of Second Order Factor Analysis for the Variable of Educational Effectiveness of the Governance Organization Employees



The results of the (Figure 5) indicate the appropriateness of the factor loads of the indicators (questions) related to each component in predicting the capacity of the variable of educational effectiveness of governance organization employees and also the appropriateness of the factor load of each component as an indicator of the variable of educational effectiveness of governance organization employees in predicting this variable, that the factor loads and T coefficients of the components have been

reported in (Figure 3) and (Figure 4). As it is observed in (Figure 5), the t-coefficients of all factors are higher than 2.58, which indicate that all factors at the level of 0.01 affect the variable of educational effectiveness of governance organization employees. In the following (Table 4), 19 measurement model fit indices related to the variable of educational effectiveness of governance organization employees have been reported.

Table 4. General Fit Indicators of the Tested Model of the Variable of Educational Effectiveness of the Governance Organization Employees

Index	Estimate
Chi-Square Ratio to Degree of Freedom (χ^2 / df)	2.65
Root Mean Square Error of Approximation (RMSEA)	0.078
Goodness of Fit Index (GFI)	0.95
Adjusted Goodness of Fit Index (AGFI)	0.92
Comparative Goodness of Fit Index (CFI)	0.99
Normed Fit Index (NFI)	0.94

The fit indices of the measurement model according to the results (Table 4) show that the model has a very good fit.

Discussion

According to the general purpose of the research, the main themes were extracted and in the final analysis of the initial concepts, by acquiring sufficient awareness of what various themes are, how they fit together, and the whole story they tell about the data, it was tried to draw a satisfactory map of themes. Based on the interview, the themes of learner's readiness, training need assessment, training targeting, training program design, resources and equipment allocation, course monitoring and evaluation, and training course management were extracted.

Based on performed interviews with 13 experts, 56 factors affecting the educational effectiveness of governance organization employees were suggested. The method introduced by Bojadžiev has been used to obtain the fuzzy mean and also for the mean defuzzification. In the second stage, a questionnaire was prepared. In this questionnaire, the suggested options, along with each individual's previous point of view and the ratio of their difference with the views of other experts (defuzzified mean), were resent to the expert group members. The research results showed that the model of educational effectiveness of the governance organization employees has two parts: the main factors and their indicators. This model has been composed of indicators that are the core and heart of this model and are the basis for evaluating the educational

effectiveness, which are called effective factors. The model of educational effectiveness of the governance organization employees has 7 main factors: learner's readiness, training need assessment, training targeting, training program design, resources and equipment allocation, course monitoring and evaluation and training course management, which includes 56 indicators composing them.

Univariate t-test was used to investigate the status of research variables. The results showed that the calculated t for learner's readiness (11.11), educational need assessment (4.03), training targeting (10.96), training program design (12.69), resource and equipment allocation (8.44), course monitoring and evaluation (3.87), and training course management (10.30) of the critical t (1.96) at the 99% confidence level are higher and also the significance level (bilateral) is lower than 5%. The research findings in this field are consistent with the researches results of Babaei (2017), Bani Davoodi and Atabi (2017), Ali Pourian (2016), Thomas (2018), Thabit et al. (2016) and AlYahya (2013).

Conclusion

According to the research findings and the confirmation of learner's readiness as one of the elements of the educational effectiveness model, it is suggested that the inclusive motivation to participate in courses in order to acquire skill be promoted and financial and non-financial incentive mechanisms be considered for active presence of employees. According to the research findings and the confirmation of training need assessment as one of the elements of educational effectiveness model, it is suggested that courses be designed according to the needs and realities of the organization and training

and learning be compatible with job training needs, and duplicate trainings are avoided.

According to the research findings and the confirmation of training targeting as one of the elements of the educational effectiveness model, it is suggested that training courses be in line with organizational goals and the objectives of holding training courses for employees should be clearly stated and the organizational goals based on the type of defined services should be considered in accordance with the rules and regulations.

According to the confirmation of training program design as one of the elements of the educational effectiveness model, it is suggested that appropriate educational content be compiled and a proportion is created between programs and job opportunities.

According to the confirmation of the resources and equipment allocation as one of the elements of the educational effectiveness model, it is suggested that the necessary welfare and hospitality facilities are provided and the economic, technology, administration and support infrastructures are strengthened.

According to the confirmation of course monitoring and evaluation as one of the elements of the educational effectiveness model, it is suggested that approaches, models and methods and new management technologies be used to implement and evaluate the training and the strengths and weaknesses of the training courses are evaluated and the weaknesses are removed and positive points are strengthened. According to the confirmation of the training course management as one of the elements of the educational effectiveness model, it is suggested that incentive levers and awarding points be used to persuade employees to participate in the trainings and the course instructors should be evaluated to ensure their mastery. Less research can be



done that is without limitation, so it is worthwhile for the researcher to identify in advance the possible limitations related to the research he/she is going to do in order to be able to identify as much as possible the ways to overcome them, while being aware of the obstacles existing in the way to conduct research, and manage the research design and implementation process in a way that it is less affected by limitations. Undoubtedly, any kind of specific study and research activity at the time of implementation is not free from various challenges and problems. This research is no exception either, and has faced various limitations and problems at the time of doing it. Among these problems and limitations are: The statistical population of the research has been limited only to the governance organization employees, the categories obtained in the qualitative part of the research is taken from the experts and senior managers of the governance organization and their perception of the subject, while if another person has examined the interviews, other categories and subcategories might be obtained. In the research process, disturbing and intervening variables may have affected the research results that were not controlled.

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