

## Validation of the Evaluation Model of the Quality of Combined Education in Higher Education Based on the CIPP Evaluation Approach

Azam Paripour<sup>1</sup>, Faezeh Nategi<sup>2\*</sup>, Mohamad Reza Sarmadi<sup>3</sup>, Mozghan Naeni<sup>4</sup>

1. PhD Student, Department of Planning, Islamic Azad University, Arak Branch, Arak, Iran.
2. Associate Professor of Curriculum Planning, Islamic Azad University, Arak Branch, Arak, Iran.
3. Associate Professor of Philosophy of Education, Islamic Azad University, Arak Branch, Arak, Iran.
4. Assistant Professor of Curriculum Planning, Islamic Azad University, Arak Branch, Arak, Iran.

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### Abstract

**Purpose:** The objective of the present study was to validate the evaluation model of the quality of combined education in higher education based on the CIPP evaluation approach.

**Methodology:** The present study was applied in terms of objective, and cross-sectional in terms of method and data collection. The statistical population included students of the Islamic Azad University of Tehran in 2020 and 140 students participated in this study by power analysis sampling method. A researcher-made questionnaire on a 5-point Likert scale including 9 main categories, 20 sub-categories and 83 items was used for data collection. Convergent validity, divergent validity and Heterotrait-Monotrait Ratio (HTMT) were used to validate the questionnaire and a value greater than 0.7 was obtained from all categories. The reliability of the questionnaire was investigated using Cronbach's alpha, composite reliability and Rho coefficient and calculated greater than 0.7 in all categories. Also, the total Cronbach's alpha of the questionnaire was 0.891. In order to investigate the conceptual model of the research, the partial least squares and Smart PLS software version 2 have been used.

**Findings:** The results showed that the use of appropriate evaluation methods leads to students' increasing knowledge and skills. Finally, this growth will lead to satisfaction with the quality of education, practicality and field of study.

**Conclusion:** According to the study results, it was found that the appropriate selection of managers by increasing the capability and utility of their role will pave the way for appropriate methods of evaluation.

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\* Corresponding author: [f-nateghi@iau-arak.ac.ir](mailto:f-nateghi@iau-arak.ac.ir)

## 1. Introduction

Today, the world is witnessing extensive and rapid developments and changes in the social and economic fields. Increasing competition, lack of references and increasing knowledge-based economy provided new conditions and ground for society and the university. Until now, the mission of universities has included education and research, which currently due to developments and based on the mission and commitment of the university to society, the growth of the university gradually moves away from its traditional method and by expanding cooperation in economic and social development has a new mission to improve the quality of education (Martin, et al, 2016; O'Reilly, et al, 2019). With the change in the higher education scenario towards globalization and class-world recognition, the issue of service quality has become a major concern. Each higher education institution needs to take the necessary steps to ensure that the quality of services provided to all levels of satisfaction to all stakeholders of the relevant higher education institution ensures that the Ministry of Education's objective of transferring education departments can be achieved in a short period of time. There are many hypothetical stakeholders for higher education and according to literature review, the quality of services and its dimensions should be determined by the stakeholders of the higher education organization such as students, parents and their families, faculty members, administrative staff and society (Wiley, 2019).

Today, Higher Education provides university courses in the form of non-in-person, in-person, online or a combination of them. Higher education, as the main institution for specialized development of human references, plays a critical role in achieving sustainable development based on globalization considerations and is one of the important fields of decision making (Rud Saz, et al, 2017). One of the types of higher education systems is e-learning that has grown significantly by advances in technology. In recent years, students have shown a greater interest in e-learning than in-person education. The reason for this increase can be sought in the provision of e-learning facilities by many higher education institutions to meet the demand of students (Mukred et al., 2010). The world is constantly changing and the most important skill and ability of contemporary man is to be prepared to face these changes. These developments are not limited to a specific field and subject and are present in all fields of human life. Hence, the change in the educational system leads to the economic, social and cultural development of society. For this reason, in the developed countries of the world, the subject of education and teaching and learning methods is among the main and central priorities, policies and programs. Among all educational systems, the higher education system is one of the largest and most important systems within society that determines the fate of society in the long run (Barbara, 2010).

Darma (2019) believed that this view cannot be a complete view of combined education. Because this view simply refers to technology being "stuck" with traditional courses with technology used as an add-on to teach difficult concepts or add additional information. According to ... combined education should be used as an opportunity to redesign new education methods in which traditional class courses are planned and presented through a combination of online and in-person education. Accordingly, Sharma and Jones (2019) considered combined education as the fundamental coordination of online and traditional methods and technologies and the intelligent selection of the two together for better learning. In this regard, Martínez et al. (2018) considered combined education as a dynamic, responsive and growing process that is considered from a pedagogical perspective as a basis for designing and developing the teaching-learning process. Hence, in academic centers, combined education is considered as a model of deliberate integration of traditional and online education experiences through using various technologies appropriate to the teaching-learning process, and to justify combined education, believed that focus should be shifted from teacher-oriented to student-oriented, from content-oriented to experience-oriented, and from technology-oriented to technique-oriented (Martínez, et al, 2018).

Bukit et al. (2019) believed that strategic combined education is transformational by which individuals make changes in their framework i.e. organized transformational education based on combined education is in fact a process through which higher education makes significant changes in the framework of changing

learners' attitudes around organizational leadership. Hence, Lee, et al (2019) considered combined education as the best opportunity for organizational education. Using new information and communication technology such as the Internet, intranets and multimedia systems as tools to improve the quality of education and learning, and providing facilities for easy access to educational references and mechanisms such as distance interaction and cooperation combined education has facilitated the teaching-learning process. The explosive growth of information technology and new developments and advances in learning science has provided opportunities for meaningful, distributed, facilitated, well-designed, and inclusive education (Lee, et al, 2019). In other words, combined education is active and intelligent that while evolving the teaching-learning process, expands, deepens and stabilizes the culture of information and communication technology in the world (Nasirian, et al, 2019). In fact, combined education is a set of teaching and learning methods that through the electronic media, the Internet, computer networks, satellite broadcasts and multimedia software, simultaneously and asynchronously provides and distributes knowledge and information. In recent years, e-learning has been proposed as one of the important applications of information and communication technology in the world (Hemmati, et al, 2018). Considering the mentioned advantages, combined education can be considered as a new organizational strategic approach in the teaching-learning process. The strategic approach in combined education is a risky plan that is framed by a purposeful structure. In this approach, thematic experts and educational designers are executive experts of the strategic part of the teaching-learning process. Also, this educational approach has been provided with a view to transforming courses aimed to design, redesign and rethink online courses (Bukit, et al, 2019).

Combined education by definition includes a set of teaching and learning methods in which a combination of various media and electronic facilities for learning is introduced and promotes learners' learning. These multimedia tools simultaneously and asynchronously provide and distribute knowledge and information (Naderzadeh, et al, 2019). The learning process is very complex to be confined to the classroom. Recent studies suggest that the combination of face-to-face and e-learning provides a more flexible approach to education. In the combined method, education is provided with a holistic attitude towards the learner and consequently by considering individual characteristics such as attitude, belief, perspective, knowledge, skill and mental ability (Rud Saz, et al, 2017). With the introduction of new communication technologies in education, the method of action research has received more attention. The efforts of some creative professors to apply new technologies in educational activities and investigate effects on the learning outcome of students are not evidence of this claim (Zolfaghari, et al, 2010).

Improving the performance of the education system requires correctly identifying its strengths and weaknesses. Evaluation of programs allows making effort to take advantage of opportunities and take steps to improve organizational performance (Behnke, 2012). Each educational institution should develop in accordance with the social, economic and cultural developments of the country, and upgrade its objectives, missions and plans in accordance with the needs of learners, society and global developments. In order to achieve this, it is necessary to know the scope of activities; by evaluation results, information can be obtained that indicates what objectives have been achieved in order to achieve success and what objectives have not been achieved. In this regard, the importance of educational evaluation is that the results are re-injected into the educational program in the form of feedback in order to make the necessary and fundamental changes in the text of the program (Han and Ellis, 2019).

Undoubtedly, evaluation should be a continuous process and an integral part of educational programs, as well as the interaction and connection of all factors of an educational program (input, process, and product). Thus, educational evaluation is a continuous and dynamic method for identifying errors and shortcomings in the teaching-learning process (Yeh, et al, 2019). It is clear that the development of educational systems is not possible without the quantitative and qualitative development of the implementation platform of educational programs of institutions as the most appropriate programs will not be implemented due to the weakness of educational units. One of the reasons for this is the lack of attention

to an efficient evaluation system. By objective, evaluation is monitoring and data collection to improve the programming process. Unfortunately, in recent years, a one-dimensional and sometimes unscientific view of evaluation and improper use of results has led to suspicious attitudes toward evaluation, especially in educational systems (Zhang, 2019).

One of the approaches to educational evaluation arises from the approach based on CIPP management developed by Stufflebeam and Coryn. CIPP is derived from the first letters of context, input, process and product. In order to facilitate the decision-making of managers, CIPP is developed and presented and is a holistic and comprehensive model that can systematically and comprehensively review a program at all stages of beginning, implementation and end. A study by the American Association for Education and Development has shown that CIP was superior to others for evaluating educational programs. One of the most important factors affecting proper evaluation is an effective tool that can properly evaluate a program (Shahshahani, et al, 2014).

Since the Electronic Unit of the Islamic Azad University of Tehran offers combined education, evaluating the quality of combined education in this unit, based on the CIPP evaluation approach, is a central issue in this study. It is expected that the results of this study can be effective in raising the quality level of combined education of the Islamic Azad University of Electronic Unit and in the competitive environment between universities, to attract more students, increase the motivation of volunteers to study in this university unit. Although several studies have been conducted in the field of validation of the quality evaluation model of combined education in higher education based on the CIPP evaluation approach in different parts of the world, so far few studies by a fundamental approach in the field of e-universities have been conducted in the country. Combined education is still associated with many ambiguities in the country's e-learning system, and no detailed and codified study in this field has been conducted in the country. Therefore, the present study attempted to fill the gap of previous studies and provide promising results in order to validate the quality evaluation model of combined education in higher education based on the CIPP evaluation approach.

## 2. Methodology

This study is applied in terms of objective and cross-sectional in terms of the method and period of data collection. The statistical population of the study included students of Islamic Azad University of Tehran in 2020. Since the proposed sample size in partial least squares is based on the OLS regression, the Power Analysis by Cohen (1988) can be used. Accordingly, the partial least squares regression can be used with small samples (Azar and Gholamzadeh, 2019). Using power analysis at 95% confidence level with coefficient of determination of 25%, a sample of 140 students was selected. For sampling, the non-probability and simple random method was used so that all students have an equal chance to be selected.

The main tool of data collection, in addition to the form of demographic information including gender, age and education level, is a researcher-made questionnaire on a five-point Likert scale. This questionnaire includes 9 main categories, 20 sub-categories and 83 items. The main categories of the questionnaire are: selection of managers, ability of professors, students, increasing knowledge and skills, satisfaction, evaluation method, content, references and facilities, and role of managers. There are also three general questions about students' gender, age and level of education.

Content validity (opinion of expert) was used to investigate the validity of the questionnaire and its validity was confirmed. Cronbach's alpha of the questionnaire obtained from a pilot study was 0.891. After distributing the questionnaires in the selected sample, the validity of the questionnaire will be investigated by three methods of structural validity (external model), convergent validity (AVE) and divergent validity. The value of AVE for all variables should be greater than 0.5. In order to calculate the reliability, the composite reliability (CR) and Cronbach's alpha coefficient of each factor have been calculated. The composite reliability and Cronbach's alpha of all dimensions should be greater than 0.7 (Amani, 2012; Davari Rezazadeh, 2013). HTMT was used to assess validity. This replaces Fornell- Larcker method. HTMT

limit is 0.85-0.9. Divergent validity is acceptable if its values are less than 0.9 (Henseler, et al, 2015). Divergent validity is another measure of the fit of measurement models in PLS method. The divergent validity matrix is presented in Table 2.

In order to test the research hypotheses, the partial least squares regression and Smart PLS software version 2 have been used. This method includes two external model (measurement) and internal model (construct). After confirming the measurement model through reliability test, convergent validity and divergent validity, the results of the external model can be provided.

### 3. Findings

The present study has been applied among the students of Islamic Azad University of Tehran. A total of 140 students participated in this study. 63 students (45%) were male and 77 students (55%) were female. In terms of age, 47 students (34%) were less than 25 years old. 52 students (37%) were between 25 and 30 years old and 41 students (29%) were over 30 years old. In terms of education, 19 students (14%) had associate degree. 82 students (59%) had a bachelor's degree. 39 students (28%) were also graduates.

The descriptive statistics related to research constructs showed that 140 correct data about research variables have been collected. The average of the data fluctuates between 3.2 and 4. The range of data changes is large and close to 4. The median and mode showed that most students have chosen the option of high and very high (4 and 5) and the average number is between moderate (3) to very high (5). In order to investigate the model, first the external model was used to measure the relationships between hidden variables and their measurement items. The measurement model or confirmatory factor analysis was used to prove that the concepts were well measured. The strong relationship between the factor (hidden variable) and the visible variable is indicated by the factor load. The factor load is a value between zero and one. If the factor load is less than 0.3, a weak relationship is considered and ignored (Foster, 2005). The factor load between 0.3 and 0.6 is acceptable, and if it is greater than 0.6, it is very desired (Klein & Manning, 2002). The minimum acceptable factor load mentioned in some references is 0.2, but the main measure is t-statistic. If the test statistic i.e. t-statistic, is greater than the critical value of  $t_{0.05}$  i.e. 1.96, then the observed factor load is significant.

**Table1.** Measurement model and measurement fit indicators

item	factor load	t-statistic
proper selection of managers	0/781	8/578
ability of managers	0/869	6/93
utility of managers' role	0/873	7/291
proportion of students and facilities	0/906	6/918
proportion of education to students' abilities	0/913	6/763
access to referenes	0/913	7/255
equal referenes and facilities	0/844	6/653
adequate referenes and facilities	0/873	6/774
proper educational content	0/881	6/689
proportion of educational content and objective	0/804	6/064
relevance of professors' principles	0/873	6/944
use of technologies by professors	0/694	5/828
familiarity of professors with e-learning	0/766	10/132
student participation by professors	0/740	8/661
considering students' comments and suggestions	0/754	8/467
proper evaluation methods	0/796	11/985
students' increasing knowledge and skill	0/693	6/759
satisfaction with the quality of teaching	0/709	6/626
satisfaction with practical curricula	0/778	7/156
satisfaction with discipline	0/665	4/548

According to the results of the measurement model in Table 1, the observation factor load in all cases had a value greater than 0.3, indicating a good correlation between the observable and hidden variables. Also, according to the results of the measurement model, the value of bootstrap (t-statistic) in all cases was greater than the critical value of 1.96, indicating a significant correlation between the observable and hidden variables. Therefore, it can be concluded that each main variable has been measured correctly. Table 2 shows the results of convergent validity and reliability of research constructs.

**Table2.** Results of convergent validity and reliability of research constructs

construct	AVE	CR	Cronbach's alpha	rho
selection of managers	0/563	0/770	0/794	0/781
ability of professors	0/529	0/736	0/897	0/747
students	0/551	0/759	0/834	0/769
increasing knowledge and skill	0/530	0/835	0/706	0/748
satisfaction	0/572	0/865	0/806	0/790
evaluation method	0/516	0/761	0/743	0/734
content	0/793	0/920	0/870	0/1011
references and facilities	0/548	0/857	0/796	0/766
managers' role	0/777	0/874	0/712	0/995

According to Table 2, the convergent validity (AVE) for all constructs was greater than 0.5. Cronbach's alpha and composite reliability were also greater than 0.7. Finally, the values of HTMT for measuring divergent validity are also presented in Table 3.

**Table3.** Divergent validity based on HTM

	C01	C02	C03	C04	C05	C06	C07	C08	C09
selection of managers	0/750								
ability of professors	0/217	0/727							
students	0/630	0/297	0/742						
increasing knowledge and skill	0/540	0/344	0/586	0/728					
satisfaction	0/358	0/142	0/178	0/307	0/756				
evaluation method	0/429	0/317	0/391	0/671	0/618	0/719			
content	0/579	0/272	0/619	0/483	0/226	0/375	0/891		
references and facilities	0/401	0/345	0/474	0/419	0/168	0/323	0/434	0/740	
managers' role	0/641	0/288	0/715	0/542	0/126	0/378	0/571	0/493	0/881

According to Table 3, the value of HTMT in all cases was less than 0.9. So, divergent validity was confirmed. According to the results, we can test the research hypotheses. The relationship between the studied variables in each of the research hypotheses was tested based on a causal structure by PLS partial least squares regression. In the general research model, which is shown in Figure 2, the relationship between the main research variables is presented. The t-statistic for measuring the significance of relationships is also shown in Figure 3.

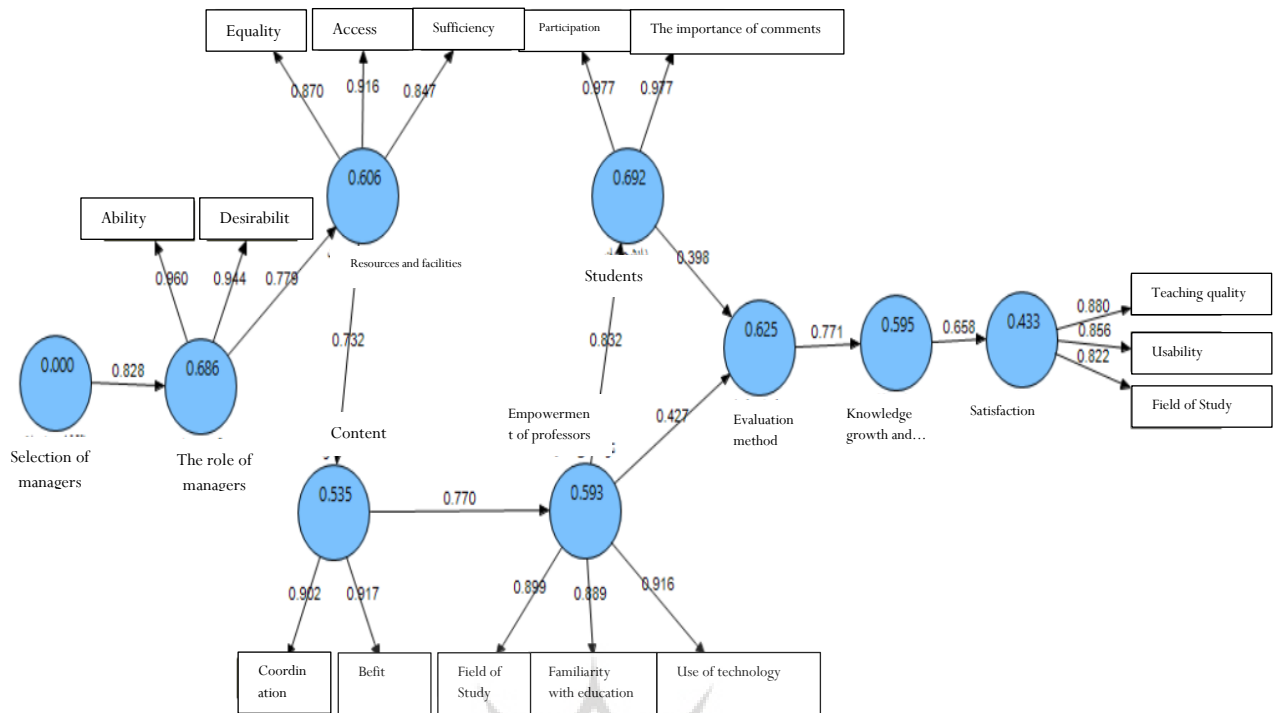


Figure 1. Model evaluation results in standard estimation state

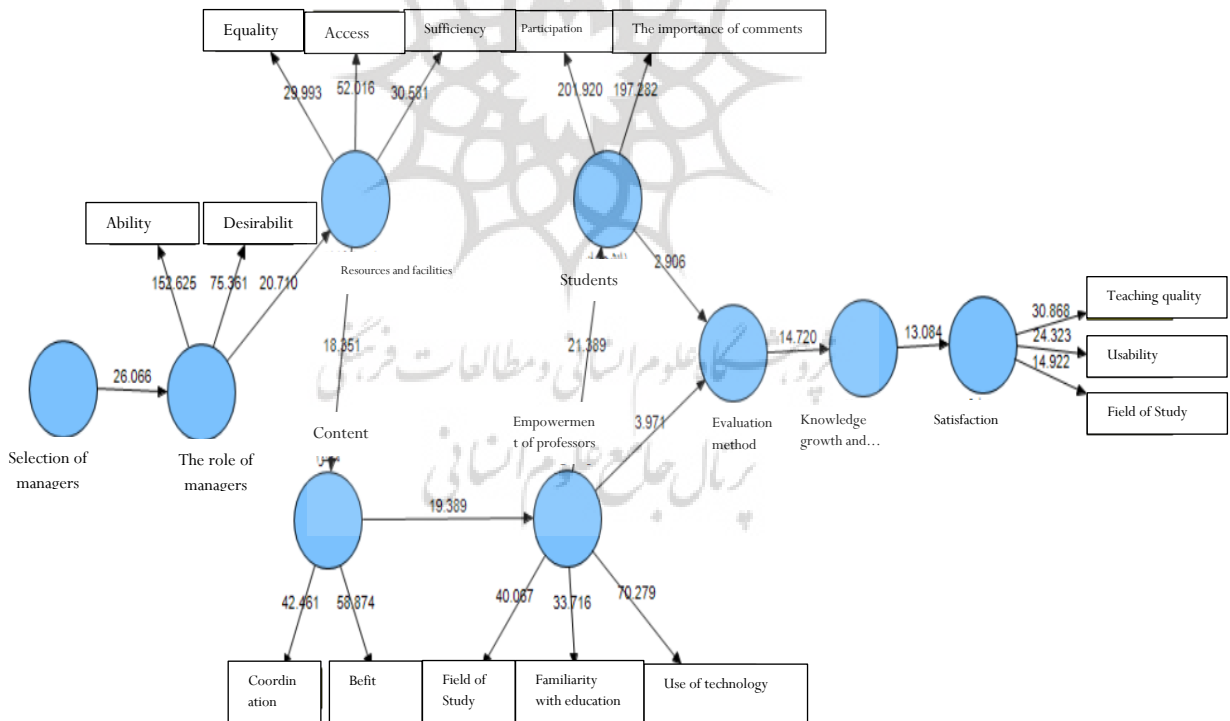


Figure 2. Results of evaluation of model significant effects (bootstrapping)

Table 4 summarizes the test results of the research hypotheses:

**Table 4.** Summary of test results of research hypotheses

Hypothesis	independent variable	dependent variable	factor load	t-statistic	result
1	selection of managers	managers' role	0/828	26/066	confirmed
2	managers' role	references and facilities	0/778	20/710	confirmed
3	references and facilities	content	0/732	18/351	confirmed
4	content	ability of professors	0/770	19/389	confirmed
5	ability of professors	students	0/832	21/389	confirmed
6	ability of professors	evaluation method	0/427	3/971	confirmed
7	students	evaluation method	0/398	2/906	confirmed
8	evaluation method	increasing knowledge and skill	0/771	14/720	confirmed
9	increasing knowledge and skill	students' satisfaction	0/658	13/084	confirmed

According to Table 4, it was found that: The effect of managers' selection on the role of managers is 0.828. Also, the value of t-statistic is 26.066, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of managers' role on references and facilities is 0.778. Also, the value of t-statistic is 20.710, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of references and facilities on the content is 0.732. Also, the value of t-statistic is 18.351, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of content on the ability of professors is 0.770. Also, the value of t-statistic is 19.389, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of professors' ability on students is 0.832. Also, the value of t-statistic is 21.389, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of professors' ability on the evaluation method is 0.427. Also, the value of t-statistic is 3.971, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of students on the evaluation method is 0.398. Also, the value of t-statistic is 2.906, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of evaluation method on increasing knowledge and skills is 0.771. Also, the value of t-statistic is 14.720, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

The effect of increasing knowledge and skill on student satisfaction was 0.658. Also, the value of t-statistic is 13,084, which is greater than the critical value of 1.96. Therefore, it can be said that at 95% confidence level, we have a positive and significant effect.

Finally, the structural fit of the model has been investigated. In Table 5, the structural fit of the model is investigated using the coefficient of determination, the Stone-Geiser ( $Q^2$ ), and finally GOF statistic.

The value of  $R^2$  is given only for the endogenous variables of the model and is zero for exogenous constructs. The higher the value of  $R^2$  for the endogenous constructs of the model, the better the fit of the model. Chin (1998) defined the three values of 0.19, 0.33 and 0.67 as the criterion values for the weak, moderate and strong values of the structural fit of the model by the coefficient of determination. The value of  $R^2$  is reported in Table 5. The selection of managers is an exogenous independent variable, so its coefficient of determination has not been measured. Other constructs had a moderate to strong determination coefficient.



Also,  $Q^2$  determines the predictive power of the model. The positive numbers indicate the proper quality of the model. As shown in Table 5, these values for all research constructs were positive. Also, the values of the variables are generally in the range of 0.15-0.35 or greater than 0.35. Therefore, the predictive power of research constructs is moderately to strongly estimate.

**Table 5.** Structural fit of the model

construct	CV-COM	CV-RED	R <sup>2</sup>	GOF
Selection of managers	0/410	0/374	-	0/515
Ability of professors	0/376	0/340	0/593	
students	0/398	0/362	0/692	
Increasing knowledge and skill	0/377	0/341	0/595	
satisfaction	0/419	0/383	0/433	
Evaluation method	0/363	0/327	0/625	
content	0/640	0/604	0/535	
References and facilities	0/395	0/359	0/606	
Role of managers	0/624	0/588	0/686	

It should be noted that the most important index of model fit in the partial least squares regression is GOF. The coefficient of determination and GOF are reported in Table 5. The goodness of fit in this study is equal to:

$$GOF = \sqrt[3]{0.596 \times 0.445} = 0.515$$

According to Table 5, GOF is 0.515, so the model has a good fit.

#### 4. Discussion

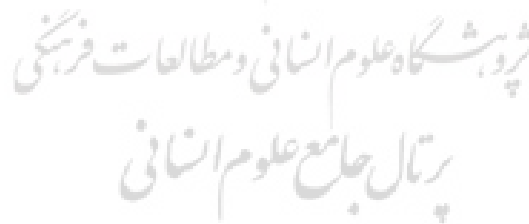
In general, the country's higher education has developed significantly in recent years. However, improving its quality requires the use of evaluation. The objective of the present study was to validate the quality evaluation model of combined education in higher education based on the CIPP evaluation approach. The study results proved the effect of managers' selection on the role of managers. This is also mentioned in the study results of Willy (2019) and from this perspective is consistent with the results of the present study. Also, the effect of managers on the references and facilities and the effect of references and facilities on the content were proved. This is consistent with the study results of O'Reilly et al. (2019) and Rud Saz et al. (2017). Also, the effect of content on the ability of professors and the effect of professors' ability on students was determined, which is consistent with the study results of Hemti et al. (2015).

The study results of showed the effect of professors' ability and students on the evaluation method, mentioned in the study results of Bukit et al. (2019) and Zhang (2019) consistent with the results of the present study. In addition, according to the study results, the effect of the evaluation method on increasing knowledge and skills and the effect of increasing knowledge and skills on student satisfaction were proven, and this is consistent with the study results of Han and Ellis (2019).

Among the existing evaluation models, the validation model with internal and external stages has features that can be used to improve the quality of combined education in higher education. With the advancement of science and the more complex factors affecting the evaluation of the quality of combined education in the Electronic Unit of the Islamic Azad University in the present era, caused changes in operational approaches and, consequently, affected their performance and activities. In such a situation, it is necessary for the Electronic Unit of the Islamic Azad University to organize its professional and supervisory activities consistent with these changes. According to the results and confirming the hypotheses of the present study, the selection of managers correctly and taking into account the meritocracy in these centers, had a significant effect on improving the role playing of managers. In this regard, the effective role of managers on references and facilities has been proven and references and facilities will also affect the content of courses provided in these centers.

This study has also some limitations. Lack of cooperation of some members of the statistical population in completing and collecting the research questionnaire in due time (the time desired by the researcher) is one of the limitations of this study. Also, the time and cost limitations for the researcher is another limitation of the present study.

According to the study results, it is suggested to provide the necessary platform to achieve objectives of increasing the quality of combined education of the Electronic Unit of Islamic Azad University by increasing the quality of educational services for the abilities of students in the field of computer use in proportion of students who have advanced to higher education. It is also suggested to provide educational programs for the ability of managers consistent with their specialization to increase the utility of the role and ability of managers. In addition, it is suggested that managers should participate in scientific workshops, seminars, and conferences. Finally, the ability of managers should be evaluated to identify the weaknesses of managers. In addition, it is suggested that the managers of the Electronic Unit of the Islamic Azad University of Tehran should focus more on their weaknesses with low performance in this center to improve the quality of educational services of this university. By developing appropriate programs to adapt education to the expectations of society and education to be appropriate to the knowledge of professors, they will be able to take an important step to increase the quality of combined education in the Electronic Unit of the Islamic Azad University of Tehran. It will also be helpful if professors are familiar with e-learning methods and use new educational technologies in the teaching process. Professors should contribute to students' satisfaction with their field of study and their future career by involving students in the teaching process. It is also suggested that by strengthening the scientific and executive ability of managers in achieving the educational and research objectives of the Electronic Unit and increasing the number of reference and scientific books, computers connected to the Internet, and etc. to help develop knowledge and specialized skills of students.



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