



Electronic Education and Its Role on The Performance of Faculty Members During the Corona Pandemic

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ARTICLE INFO	ABSTRACT
<p>Article History: Received 12 May 2020 Received in revised form 8 July 2020 Accepted 1 September 2020 Available online 13 September 2020</p> <p>Keywords: E-Learning; Performance; Faculty Members; Corona Pandemic</p>	<p>The Corona virus caused many changes at the level of societies, organizations, social activities and businesses since its beginning and then its epidemic. Universities were among the organizations that quickly turned to the use of electronic methods in performing activities, including providing educational services to students. The purpose of this research was to investigate the effect of e-learning on the performance of faculty members in Mazandaran University during the Corona pandemic. The sample consisted of 130 professors of the aforementioned university who were randomly selected. Data collection was done through standard questionnaires with valid validity and reliability. Data analysis was done by structural equation modeling method using smart pls3 software. The results of the research showed that the use of electronic education in the studied course had an impact on the performance of the faculty members of Mazandaran University. According to the results, it is recommended that even if the corona crisis is completely resolved, university administrators should use electronic education at least as a supplement. Use the face-to-face method, that is, the combined method (using both face-to-face and electronic methods).</p>

1. INTRODUCTION

Since its inception and subsequent epidemic, the Corona virus has caused many changes at the level of societies, organizations, social activities and businesses. Universities were among the organizations that quickly turned to the use of electronic methods in carrying out activities, including the provision of educational services to students. Communication and information technology, as a new approach, complements education and does not replace it, the purpose of its development is to improve and make more efficient educational resources, especially human resources. The expansion of information technology and the use of new tools and concepts provide the basis for the expansion of information and easy and low-cost access for learners, including students and professors online, and

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enable rapid exchange of information and cultural interactions. In fact, professors who use technology to teach have more interaction than their peers. For this reason, an important part of a teacher's performance today is measured by their skills and abilities in using new technologies. Thus, effective teachers are known as people who have the competence and ability to use new technological tools in their teaching methods [1]. The impact of information technology on human life is huge and its role in education cannot be reduced. In the current scenario of the COVID-19 pandemic, the contribution of information technology has increased due to the closure of educational institutions, which poses a challenge to student learning. In this era of quarantine, information technology through innovative systems and learning management helps to solve the continuous education process and provides this opportunity for professors to implement information technology solutions for teaching as well as evaluation to complete the training course of students. has done.[2]

Worldwide, most professors and students are using e-learning due to the closure of universities. Faculty members at prestigious universities around the world have received online teaching credentials to provide electronic education to their students. At the same time, faculty and staff are learning how to use online learning platforms. Previously, they only used face-to-face training. However, the shift to online mode has raised many questions about the quality of education [3]. The trend of using e-learning as an educational tool is now expanding rapidly. Many professors and researchers had high hopes for electronic education, believing that this method would create more access to information and communication, and ultimately lead to a new revolution in education. Electronic education using modern technology not only changes education and makes it accessible, but also brings important challenges for teachers and learners. E-learning environments are increasingly serving as important infrastructure features of universities, allowing professors to present their knowledge in a different way and increasing interaction between professors and students.[4]

Undoubtedly, the higher education system plays a fundamental role in the development of society. Education and training of specialized human resources and conducting research are among the important tasks and responsibilities of universities and scientific and cultural centers. Therefore, considering the important role of these institutions in various dimensions, it is an undeniable necessity to ensure the optimal quality of the performance of each of their functions in order to prevent the waste of material and human capital. Therefore, attention to the performance of faculty members has a special place. In the current era, the production of science and scientific mobility are completely mixed with the prosperity and progress of technology. The performance of professors largely depends on how technology is used. In all the studies on the performance of teachers in the country's universities, it has always been emphasized that the two functions of research and teaching should be considered at the same time. Information and communication technology is used as an efficient tool to improve the quality of education and research, therefore, paying attention to the capabilities of using technology in education and research, and determining its role in the performance of faculty members has been the attention of researchers.[5]

Since its beginning and then its epidemic, the Corona virus caused many changes at the level of societies, organizations, social activities and businesses. Universities, including Mazandaran University, were among the organizations that inevitably and quickly turned to the use of electronic methods in carrying out activities, including providing educational services to students. Considering that the resolution of this crisis from society is likely in the medium term future, and on the other hand, monitoring and evaluating the effectiveness of this method of education for the post-corona period can help policymakers and managers in improving the quality of higher education, since a special research in This has not been done, therefore, the effect of the use and application of this type of technology on the quality of faculty members' performance is one of the important issues in this area. In light of this, the purpose of this research is to investigate the effect of electronic education on the performance of faculty members in Mazandaran University in the course It was a corona pandemic.

2. THEORETICAL FOUNDATIONS

2.1. E-Learning

Lara et al. (2020) introduced e-learning as web-based education, digital learning, interactive education, computer-assisted learning, and internet-based learning, primarily providing information and expertise through technology among educators and learners [6]. E-learning refers to education via the internet and provides a flexible and

personalized platform for individuals. It can be considered an innovative approach to delivering excellent educational services to learners through electronic information, with the aim of continuously enhancing their knowledge, skills, and other outcomes [7].

The widespread shift towards e-learning is clearly driven by the numerous advantages it offers. However, computers never completely replace human instructors and other forms of teaching. According to Bernards (2003), obstacles to the implementation and acceptance of e-learning can be related to personal, technical, or organizational issues. Personal obstacles mostly include time management issues, insufficient proficiency in international languages, and users' attitudes toward e-learning. Technical barriers involve the lack of infrastructure and inadequate access to educational tools, as well as the absence of uniform internet speed and bandwidth during e-learning [8]. Mark (2007), in his examination of e-learning strategies, pointed out some of the advantages of e-learning: flexibility in time and location, providing opportunities for relationships between educators and learners through discussion forums, overcoming obstacles to participation such as the fear of speaking with others, cost-effectiveness, considering each individual's differences, and allowing each learner to study at their own pace, whether fast or slow [9].

Several studies have shown that the implementation of e-learning systems in higher education institutions in developing countries has not always been successful. Many challenges, mainly due to the lack of infrastructure, lack of appropriate computer skills among teachers and students, and unreliable slow internet speed, have been identified [10].

2.2. Performance

Performance arises from the execution of tasks for which someone is employed and strives to increase success according to the guidelines. Performance is mostly divided into two types. In-role performance is based on how a faculty member can employ their knowledge and skills to impart knowledge and enhance the skills of their students. This is more of a mechanical activity than a mental one, involving the repetition of tasks to achieve a certain level of mastery. On the other hand, extra-role performance pertains to discretionary outcomes based on faculty members' choices, not explicitly stated in job descriptions but considered a crucial factor in efficient and effective organizational performance [11].

Appropriate and effective employee performance is one of the keys to organizational success. Good performance implies productivity, quality, profitability, and customer orientation. That's why successful organizations worldwide make significant efforts to identify and manage factors influencing employee performance and behavior [12].

Some, such as Griffin and Moorhead (2003), consider performance as the manner of fulfilling assigned tasks and responsibilities, encompassing the process and outcome of a set of activities. Performance includes job-related behaviors that individuals demonstrate; educational performance refers to the quantity and quality of training provided by an individual or training group [13].

The quality and effectiveness of university performance are largely dependent on the performance of its faculty members. Researchers believe that, to improve the performance of faculty members, attention to leadership behavior and its effectiveness is essential. The educational performance of professors includes meeting expectations and achieving a desirable status in components such as mastery of the subject, setting specific goals, course design and organization, scientific and human interaction, interest and enthusiasm for teaching, learner-centered teaching, and evaluation. According to the promotion regulations (1389), educational performance refers to the set of activities of a faculty member who must employ a contemporary and effective approach to education and training students to maintain and improve the quality of education and the transfer of desirable concepts.[14]

2.3. Performance Evaluation

Performance evaluation is the measurement of performance by comparing the current status with the desired or ideal state based on predefined criteria that possess specific characteristics. In general, the performance evaluation system can be considered a process of assessing, measuring, and comparing the level and method of achieving the

desirable situation with specific criteria and a certain perspective in a defined domain and scope, using specific indicators and within a specific time period. The goal is continuous review, correction, and improvement [15].

One of the most important actions that human resource management in any organization pursues is the analysis and evaluation of performance, followed by decision-making regarding the future fate of human resources. This can transparently outline the career path and training needs of employees or identify underperforming individuals and change how they are managed [16].

Faculty members play a fundamental role in achieving the goals of the higher education system. Evaluating the performance of faculty members as the core of higher education is a sensitive and complex subject. On the other hand, assessing their capabilities and performance is one of the key tasks of managers, impacting issues related to faculty members such as salaries, promotions, official employment, and creating opportunities for their professional growth. The performance of faculty members is assessed and evaluated in four areas: a) Cultural-Educational-Social Performance, b) Educational Performance, c) Research-Technological Performance, and d) Scientific Executive Performance [17].

Self-assessment can be another source of data in evaluating professors. Self-assessment should be the most important and recurring form of evaluation so that professors can improve their teaching. Self-assessment is a fundamental step in evaluating the performance of professors because it provides an opportunity to discover weaknesses in teaching and improve them. However, some argue that this method can deceive professors towards self-excellence and may hide their shortcomings, not reflecting a realistic attitude towards their teaching. Without a doubt, the arguments mentioned about the self-assessment mechanism are valid. Still, if the data are collected accurately in a coordinated manner and interpreted logically, self-assessment can be the main source of information in the evaluation process.[18]

2.4. Faculty Members

Faculty members are considered one of the most crucial elements in the educational process, to the extent that one can claim the success and achievements of other elements or departments in education depend on the success and performance of faculty members. Faculty members are also the vital asset and main pillar of any university or educational institution, so much so that it has been stated that the heart of every university or higher education institution lies in its faculty members [19].

3. RESEARCH BACKGROUND

Suleimani et al. (2009) conducted a study aimed at investigating the impact of Information and Communication Technology (ICT) on the educational and research performance of faculty members at Ferdowsi University of Mashhad. The research population included all faculty members of Ferdowsi University. The results indicated a positive (direct) relationship between the faculty members' use of ICT and their educational and research performance. As the level of ICT usage increased, the educational and research activities of the members also increased and became more up-to-date.

Sharifi and Davoudi (2012) conducted research titled "The Relationship between the Level of ICT Use and the Performance of Teachers in the Educational Process." The research population included all female high school teachers in Tehran. The sample size was estimated at 375 individuals using Cochran's formula and was randomly selected from the statistical population. The data were analyzed using SPSS statistical software. The results showed a significant relationship between teachers' use of ICT and their performance in the educational process.

Nami et al. (2014) conducted a research study titled "The Relationship between the Level of ICT Use and the Educational Performance of Faculty Members in the Faculty of Psychology and Educational Sciences at the University of Tehran." The research employed a descriptive-analytical method with a correlational approach. The sample size included 30 faculty members from two faculties of the University of Tehran. The results indicated that faculty members moderately utilized information technology, and their educational performance was at a desirable level. No significant differences were observed among educational groups in terms of the level of ICT usage.

Additionally, a significant relationship was found between the level of ICT use and the educational performance of faculty members.

4. Amini and Nasr-Esfahani (2017) conducted a research study titled "A Comprehensive Analysis of the Impact of Information and Communication Technology Application on the Educational and Research Performance of Faculty Members in Universities." The research sample included all studies conducted until 2017 on the relationship between the use of information technology and the educational and research performance of faculty members in Iran. The research tool was a checklist for the technical and psychological assessment of research studies. The meta-analysis model in this study followed the combined approach of Hunter and Schmidt, and Cohen's approach was used to interpret the results. The results indicated a significant impact of the application of information and communication technology on the educational and research performance of professors.
5. Mahdavi and Zare (2014) conducted a research study titled "Comparison of the Evaluation of Educational Performance of Faculty Members by Students with Their Self-Evaluation." This descriptive-analytical study was carried out at Lorestan University of Medical Sciences. A total of 31 faculty members and 310 students participated in data collection. The data were analyzed using SPSS software and independent t-test. The results showed that, in line with improving the educational performance of professors, in addition to the evaluation by students, the use of self-evaluation by professors as a complementary method is recommended.
6. Abbaspour and Bazargan (2018) conducted a research study titled "Exploring the Quality of Performance of Faculty Members; Providing a Conceptual Model." This research, with an applied goal and falling under qualitative studies, was inspired by grounded theory. A total of 20 faculty members of Alzahra University with the academic ranks of assistant professor, associate professor, and professor participated as samples in semi-structured interviews. The data obtained from the interviews were analyzed through the three-stage coding process of grounded theory, and ultimately, a conceptual model for improving the quality of performance of faculty members was developed. The research results indicated that improving the quality of performance of faculty members requires adopting a systemic and harmonious approach to factors affecting academic quality.

Abdollahi (2013) conducted a research study titled "Analysis of the Mechanism of Evaluating the Educational Performance of Faculty Members: A Case Study of Allameh Tabatabai University." The research method used was field research, employing structured interviews and questionnaires. The statistical population of the study included all faculty members of Allameh Tabatabai University, from which a sample of 200 individuals was randomly selected using stratified random sampling. The findings indicated the inefficiency of the current mechanism for evaluating educational performance and the dissatisfaction of faculty members with it.

Suleimani et al. (2010) investigated the relationship between the level of Information and Communication Technology (ICT) usage and demographic characteristics of faculty members at Ferdowsi University of Mashhad. They demonstrated that gender had an impact on the level of ICT usage and performance of individuals. Specifically, women had a higher average use of computers and software, internet and internet services, and the overall use of ICT in educational functions. On the other hand, men had a higher level of ICT usage in research-related activities.

Sintema (2020) conducted a research study titled "The Impact of the Coronavirus Disease on the Performance of High School Students." This qualitative study utilized a case study approach, involving semi-structured interviews with three teachers from a school. The results of the study indicated that if the COVID-19 pandemic is not controlled in the shortest possible time, there is a possibility that the pass rate of high school students in national examinations this year will decrease.

Abdolmanam and Shabaki (2019) conducted a research study titled "The Relationship between E-Learning Strategies and the Efficiency of Educational Performance in Universities: A Perspective from Senior Management." This research, utilizing a descriptive-analytical approach, relied on questionnaires as the primary data collection tool. The study's population consisted of senior managers, with a sample size of 206 randomly selected senior managers from the target universities. Stratified random sampling was employed, and the data were analyzed using the Social Sciences Statistical Package (SPSS). The findings revealed a significant meaningful relationship between e-learning strategies and the enhancement of educational performance efficiency in universities.

Asari and Widartono (2020) conducted a research study titled "The Impact of Knowledge Management Integration on the E-Learning System Performance of Lecturers in Academic Institutions." This study, based on a survey and document analysis, involved 83 participants who were lecturers from Malang State University in Indonesia. The results indicated that knowledge management indirectly affects the performance of lecturers. Additionally, personal knowledge significantly influences work processes, with information technology being the most influential factor on their performance.

Franklin and Nahari (2018) conducted a research study titled "The Impact of E-Learning on the Performance of University Staff: A Preliminary Study at Malik Khalid University." The sample included 163 respondents who self-evaluated their performance. Structural Equation Modeling (SEM) was used to assess the impact of exogenous variables on endogenous variables. SEM was also employed to test the hypothetical model. Technical competence indirectly influences the performance of university staff. Moreover, the acceptance of e-learning has a direct impact on the performance of university staff.

Pravati and Pakawaru (2020) conducted a research study titled "How Organizational Factors Influence Mastery of Knowledge Management and E-Learning Performances in State Universities?" This study distributed questionnaires to 150 lecturers from various faculties of Tadulako University. The questionnaires were distributed via Google-connected platforms, including WhatsApp. The study showed that knowledge transfer plays a crucial role in attracting knowledge management and e-learning performances. Additionally, it demonstrated that an individual's intention to share knowledge and experience supports the adoption of knowledge management and e-learning performances.

Arna (2016) conducted a research study titled "Effectiveness of E-Learning Coordinators: Perspectives of Faculty Members." For the opinions and feedback of faculty members, a questionnaire was prepared and distributed among 390 male and female faculty members in scientific and humanities faculties at Najran University. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). The results indicated a moderate level of effectiveness of e-learning coordinators. The findings also revealed no significant statistical differences in terms of gender, educational qualifications, and type of faculty, while there was a statistically significant difference based on the type of department.

4. RESEARCH CONCEPTUAL MODEL

The purpose of this research is to investigate electronic education and its impact on the performance of the faculty members of Mazandaran University during the COVID-19 pandemic. Electronic education is selected as the independent variable, and the performance of faculty members is chosen as the dependent variable. The conceptual model of the research is illustrated in Figure (1).

Research Hypothesis: Examining the effect of electronic education on the performance of faculty members of the university.

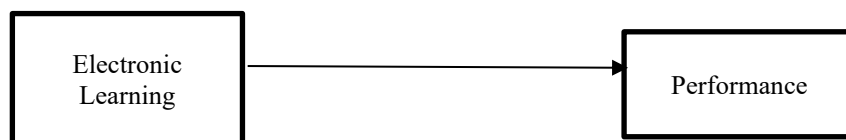


Fig. 1. Conceptual research model

5. RESEARCH METHODOLOGY

The current research, in terms of its objective, is applied, and in terms of methodology, it employs a combination of descriptive-survey and model-based research with structural equation modeling. To collect the necessary information, two types of questionnaires were used: one assessing the impact of electronic education and the other evaluating performance. The aim of this research is to investigate the influence of electronic education on the performance of faculty members of Mazandaran University during the pandemic.

The sample consisted of 130 randomly selected faculty members from the aforementioned university. Data collection was conducted using standardized questionnaires with valid and reliable measures. The data were gathered through the administration of standard questionnaires.

For data analysis, statistical software such as SPSS and Partial Least Squares (PLS) was utilized. The combination of descriptive-survey methods and structural equation modeling allows for a comprehensive examination of the research variables, facilitating a nuanced understanding of the relationship between electronic education and the performance of university faculty members during the pandemic.

6. DATA ANALYSIS

In this section, the assessment of Cronbach's alpha and composite reliability, convergent and discriminant validity, as well as the evaluation of factor loadings, has been addressed and is described as follows.

6.1. Reliability of Research Variables

6.1.1. Cronbach's Alpha and Composite Reliability

Cronbach's alpha is a classic measure for assessing reliability and is a suitable indicator for evaluating internal consistency (internal harmony) and stability. Internal consistency indicates the degree of correlation between a construct and its related indicators. A Cronbach's alpha value above 0.7 indicates acceptable reliability.

Composite Reliability (CR), introduced by Werts and colleagues (1947), is superior to Cronbach's alpha as it calculates the reliability of constructs not in absolute terms but based on the correlation of their constructs with each other. When the CR value for each construct is above 0.7, it signifies suitable internal stability for the measurement model, while a value below 0.6 indicates a lack of reliability (Hair et al., 2014).

Table 2. Reliability coefficients of the questionnaire

Combined reliability 0.7<CR	Cronbach's alpha a> 0.7	variable
0.958	0.960	e-learning
0.940	0.944	performance

6.1.2. Convergent and Discriminant Validity

The Average Variance Extracted (AVE) is a measure indicating the average shared variance between each construct and its indicators. In simpler terms, it reflects the level of correlation between a construct and its indicators, suggesting that higher correlation leads to a better fit. The critical value for this measure is 0.5, meaning that a value above 0.5 indicates acceptable convergent validity (Fornell & Larcker, 1981).

Table 3. Convergent validity (AVE)

AVE	Variable
0.564	Electronic education
0.520	Performance

The meaning of discriminant validity is that items or indicators related to a variable should only measure that specific variable and should not correlate with other variables. In Partial Least Squares (PLS) analysis, according to Fornell and Larcker (1981), the square root of the Average Variance Extracted (AVE) for a variable should be greater than its correlation with other research variables.

Table 4. Divergent validity

Performance	Electronic education	
	0.751	Electronic education
0.721	0.541	Performance

6.2. Assessment of Factor Loadings

Factor loadings are calculated by determining the correlation between indicators of a construct and that construct. If this value is equal to or greater than 0.4 (Holland et al., 1994), it indicates that the variance between the construct and its indicators is more significant than the variance attributed to the measurement error of that construct. This suggests acceptable reliability regarding the measurement model.

It is crucial to note that if a researcher encounters factor loadings between constructs and their indicators with values less than 0.4, adjustments should be made to those indicators (questions in the questionnaire) or they should be excluded from the research model.

Assessment of Factor Loadings: The evaluation of factor loadings for each measurement model in the research is illustrated in the figure below.

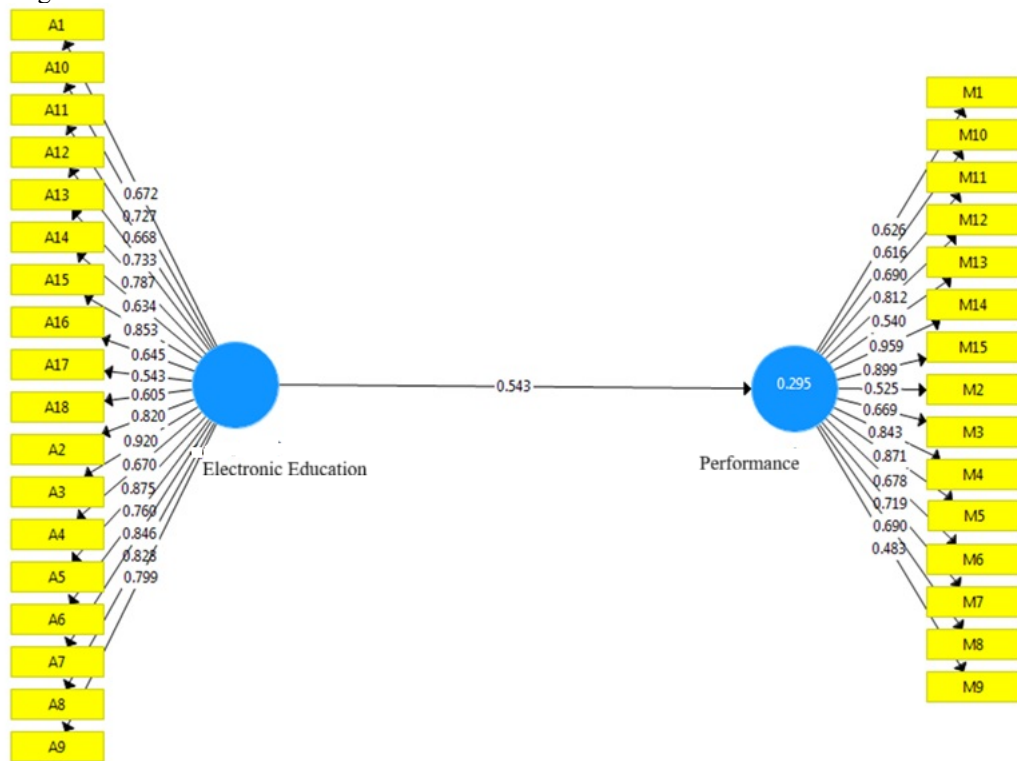


Fig. 2. Research measurement model

6.3. Structural Equation Model of the Research

In this section, we delve into the structural equations of the research model. We examine the model in a meaningful numerical state, aiming to investigate the significance of hypotheses (confirm or reject the hypotheses).

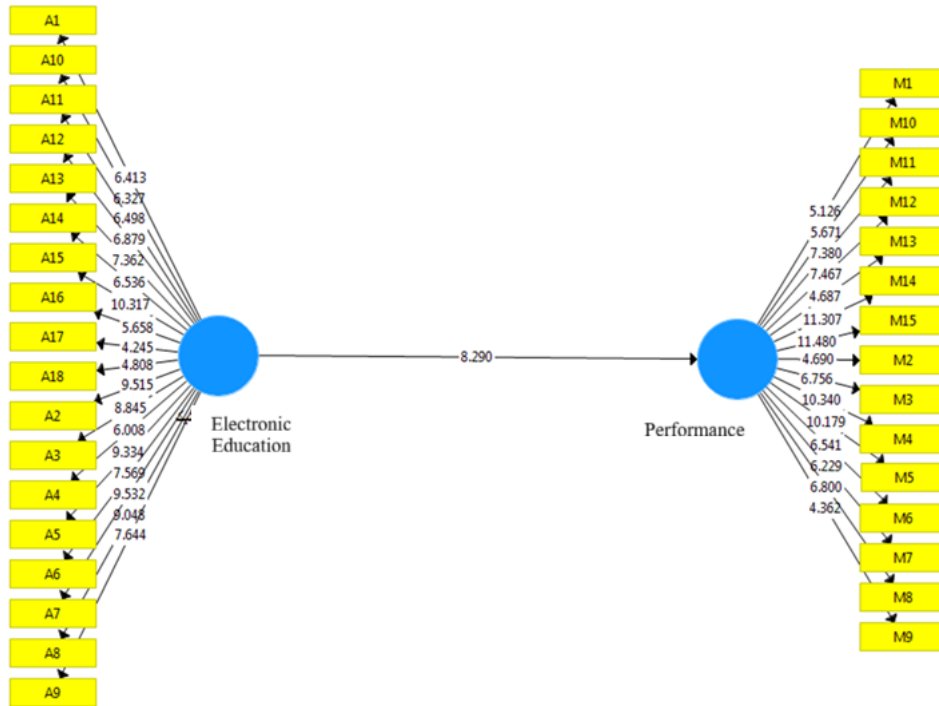


Fig. 3. Model in meaningful numbers mode

As depicted in the above figure, at a confidence level of 95%, the significance should be greater than 1.96 to confirm the hypothesis. As evident in the model, electronic education is statistically significant in relation to performance.

6.4. Hypothesis Testing

As mentioned in the preceding sections, the aim of this research is to investigate the impact of electronic education on the performance of faculty members at Mazandaran University. The summarized results of hypothesis testing are presented in Table (5).

Table 5. Research hypothesis

Test result	Standard path coefficient	T-VALUE	Research hypothesis	
Confirmation	0.543	8.290	Performance	← Electronic education

According to the structural model of the research, in the case of significance coefficients, it is observed that the t-statistic between the two variables of electronic education and performance is outside the range (-1.96 to 1.96), and therefore, the hypothesis is accepted. The correlation coefficient is also equal to 0.543.

7. DISCUSSION AND CONCLUSION

In the hypothesis of the research, the impact of electronic education on the performance of university faculty members was examined. The results indicated that electronic education leads to an improvement in the performance of faculty members. Therefore, at a 95% confidence level, the research hypothesis is confirmed. The effect size of electronic education on the performance of faculty members is 0.543. This means that electronic education can influence faculty members' performance by 54%.

The findings of this research are largely in line with other studies, such as Zareandi and Mazdabadi (2013), Amini and Nasresfahani (2019), Bazargan and Mahdian (2012), Sharifi and Davoudi (2012), Erdogan Tachi (2008), and

Rajesh Kumar (2010). In general, based on the obtained results, it can be stated that the use of electronic education instead of traditional education can be one of the essential factors in enhancing the performance of university faculty members. Considering the results, the following recommendations can be made:

- Utilizing appropriate electronic education tools such as multimedia tools (video, audio, and electronic documents) instead of paper to reduce time and costs.
- Using electronic education to save costs related to travel, class organization, etc.
- Conducting training classes for faculty members to use electronic education tools.
- Providing certain incentives to encourage faculty members to adopt electronic education.
- Assessing the performance of faculty members based on the number of hours of electronic training.

In conclusion, as the research results demonstrate, the use of electronic education during the studied period had a significant impact on the performance of university faculty members in Mazandaran. Even after the resolution of the COVID-19 crisis, it is recommended that university administrators continue to use electronic education as, at the very least, a complementary method alongside traditional methods—a hybrid approach (simultaneous use of traditional and electronic methods).

Transparency Statement

The data supporting this study are available upon reasonable request to the corresponding author, subject to ethical and confidentiality considerations.

Acknowledgments

We would like to express our gratitude to all individuals who contributed to this project.

Declaration of Interest

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

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