Original Article

Investigating the components of virtual education development based on the four-frame model of organizational development

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Abstract

Background & Objective: The development of virtual education is one of the important needs of universities and one of the main policies of higher education. The present research was conducted based on Bolman and Deal's four-frame model (1991) to compare the existing situation and the importance of the components of virtual education development (structural, human resources, political, and symbolic) from faculty members' perspectives.

Materials & Methods: This descriptive survey study was conducted in 2019-2020. The research community was the faculty members of Shiraz University of Medical Sciences in 2019 with at least one year of experience (700 people). The sample size was calculated at 220 cases using Cochran's formula, and 156 participants provided complete questionnaires. The research tool was a researcher-made questionnaire consisting of 32 items in four domains- structural, political, human resources, and symbolic (cultural). Form and content validity were confirmed from the perspectives of 10 experts, and construct validity was confirmed with KMO=0.944. Bartlett's Sphericity index was P<0.001, and reliability was reported with Cronbach's alpha of 0.973. Data were analyzed in SPSS software (version 24) using paired t-test, independent t-test, ANOVA, and Pearson's correlation.

Results: There was a significant difference between the existing situation and the importance of the components (favorable) (P<0.001). Based on the four-frame model, the mean scores of human resources, symbolic, structural, and political components were reported as 3.44±0.86, 3.13±1.10, 3.11±0.92, and 2.93±1.07, respectively. There was no significant difference in the mean of the components by gender and years of employment (P>0.05); nonetheless, it was different by academic rank, disciple, and faculty (P<0.05). There was a significant correlation among the components (P<0.01).

Conclusion: As evidenced by the obtained results, the development of virtual education requires close attention to organizational, cultural, human, and political variables. Furthermore, the development is also affected by the culture of the discipline; therefore, a comprehensive examination is needed in the analysis of issues and provision of solutions.

Keywords: Development, Faculty members, Human resources, Political, Structure, Symbols, Virtual education

Introduction

Despite the rapid development of new technologies, virtual education is still associated with traditional structures. This newly emerged phenomenon, which is sometimes referred to as web-based education, online education, and e-Learning (1), has received much attention from all universities across the globe (2).

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The flexibility of online education with no constraints on time or space is one of its notable advantages (3). Virtual education has also been effective in reducing the costs of higher education and providing more access to disadvantaged areas (4). Furthermore, we are witnessing a sharp rise in the number of applicants for higher education, and traditional education is not able to meet the high demand for university candidates. Therefore, close attention to the capabilities of information technology and the global Internet network as a golden opportunity, as well as the development of electronic courses, has been highlighted (5).

addition, these days, universities experience a diverse and multi-generational environment. In particular, we are facing a new community of students known as the digital generation. That is, technologies are an integral part of their daily; accordingly, modern technologies in education are more aligned with their characteristics and expectations and are one of the requirements of education and learning in the new era (6). Nevertheless, the evidence shows that numerous problems are presented with the development of virtual education around the world, especially in developing countries (7,8). Some problems, such as weak network infrastructure, content development problems (9,10), and weak information technology knowledge (7-11), are among the challenges that have been reported, especially in developing countries.

Attitudinal and cultural barriers sometimes hinder the development of virtual education despite its critical importance (12). Therefore, it seems that various factors can affect the development process of virtual education. Volery and Lord have considered technological factors, the role of teachers, and the level of familiarity and use of virtual education by learners as effective in this regard (13). In his proposed model, Khan & Badii introduce a systematic set of educational, technology, educational design, management, human resource support, organization, and evaluation factors as effective in the development of virtual education (14).

The study by Selim demonstrated that the development components are affected based on the characteristics of the teacher, learner, and technology (15). In addition to the factors that directly affect teaching-learning processes, the development of virtual education is also important from the perspective of management and organizational development. Richard Beckhard defines organizational development as an effort planned, organization-wide, and managed from the top to increase organization effectiveness and health through planned interventions in the organization's "processes," using behavioral-science knowledge. (16, 17). Bolman and Deal, among the pioneers of organizational development, believe that leaders observe the world of organizations according to their intellectual frameworks and choose infrastructures and development tools based on this worldview. (18)

Bolman and Deal have presented a four-frame model of structural, human resources, political, and symbolic (cultural) as the axis of organizational development (18,19). In this approach, the structural component is defined as official and planned infrastructure. Moreover, the organization is considered a "Machine" that can be designed, targeted, structured, and planned. Managers define goals, determine roles and responsibilities, and coordinate activities with policies, procedures, and chains of command in organizational hierarchies and administrative processes (19,20). In the approach of human resources, the organization is deemed as a "Family." Managers attach importance to people's knowledge, skills, attitudes, emotions, and relationships. They believe that the organization should meet its needs by facilitating the support and empowerment of organizational members (18,19). In the political approach, the organization is considered a " Jungle," and the focus is placed on the elements of authority, and independence, as well as individual and group interests and conflicts. In the political approach, since resources are limited, leaders' negotiation skills are important to attract resources, defend the rights of the organization, and resolve its challenges (20,19). Nonetheless, the symbolic approach pays attention to the culture and identity of the organization. In this view, the organization is considered a "Temple," and values and culture are important. In this approach, managers create a common mission and identity for the organization to shape people's behavior and lead the organization by creating enthusiasm and modeling, as well as inducing charisma and aligned activities. Symbols manifest themselves in the form of objects, events, customs and rituals, people or stories that exist to communicate through missions and values to create integration, convergence, and a common vision in the organization. (18-21). Among the organizational development models, Bolman and Deal's four-frame model has been widely studied in the management and organizational development of universities due to its comprehensive view. The development of virtual education is also a multi-dimensional phenomenon that can be analyzed and investigated from the perspective of infrastructure,

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human resources, structural and administrative factors, as well as cultural elements.

Although virtual education has received assiduous attention in the last few decades all over the world, especially in developed countries, it is expected that this trend will be increased due to flexibility and access to information and resources for everyone. In universities of medical sciences in Iran, since 2015, the Ministry of Health's macro policy has focused on the transformation and innovation of education, which was one of the main axes in this virtual education plan (22). Until 2014, the measures taken in virtual education development were often optional and limited to actions based on individual or group interests. No clear policy had been made regarding the development of virtual education in universities, except for the development of some virtual courses.

However, the emergence of the COVID-19 pandemic in 2019 and the fundamental changes that this phenomenon caused in all aspects of life led all universities and educational institutions to regard virtual education not as a possible option but as the only strategy to face the education crisis during the pandemic (12, 23, 24). Of course, this trend is not limited to the pandemic era, and the use of new technologies in education both before and after the pandemic crisis is a necessary phenomenon for the survival and development of universities. Therefore, universities must examine the infrastructure of virtual education. In light of the aforementioned issues, the present study aimed to compare the existing situation and the importance of the components of virtual education development (structural, human, symbolic, and political) from faculty members' perspectives.

Materials & Methods

Design and Setting (s)

This descriptive survey study was conducted based on the viewpoints of faculty members at Shiraz University of Medical Sciences.

Participants and Sampling

The statistical population included all faculty members working in the teaching departments of Shiraz University of Medical Sciences in 2019 with at least one year of work experience (n=700). Based on Krejcie & Morgan's table (25) and Cochran's formula (26) with a specified number of statistical populations and based on the ratios extracted from the study by Ahmadi et al. (27), the sample size was estimated at 220 people cases. They were selected by the random sampling method from among the list of faculty members' emails. The stratified random sampling method was carried out proportional to different faculties.

$$n=\frac{\frac{Z^2pq}{d^2}}{1+\frac{1}{N}\left(\frac{Z^2pq}{d^2}-1\right)}$$

Tools/Instruments

The data measurement tool was a researcher-made questionnaire based on past theories and investigations, especially Bolman and Deal's classification (18-21), and interviews with three educational specialists. Bolman and Deal are experts in the field of organizational development who categorized infrastructures and development requirements into four factors: human resources, structural, political, and cultural. To conduct this research, there was no standard tool to measure the development of virtual education. Therefore, based on theoretical foundations and interviews with three experts in e-learning and educational management, the items of the questionnaire were initially extracted. Thereafter, the similar items were summarized, and finally, the research questionnaire consisted of 32 items rated on a 6-point Likert scale ranging from completely agree = 6 to completely disagree = 1 in the four areas of structural (9), human resources (8), cultural (9) and political (6) components.

The components were measured in the two dimensions of the existing situation and the importance of the issue. The score ranged from 1-6, and the cut line or acceptable score was 3.5. In addition, an open question also discussed the professors' free comments on the components of virtual education development and the issues that may not have been mentioned in the questionnaire. The face and content validity of the questionnaire was reviewed by 10 faculty members of the Medical Education, Educational Management, and e-learning. To determine the content validity, the Content Validity Index (CVI) (28) and Content Validity Ratio (CVR) were used (29). Based on the Lawshe formula, the items were rated in the range of 1-3 with a minimum score of 0.625 for CVR (29).

In this study, the CVR for each item was 60%-100%, and the total CVR was obtained at 0.83. Regarding the CVI index, the three components of relevance, clarity, and simplicity were 0.988, 0.919, and 0.916, and the total CVI was 94.1. Moreover, given that the questionnaire was designed and used for the first time, its construct

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validity was also determined by exploratory factor analysis. The KMO index was approved as 0.944, and Bartlett Sphericity was confirmed with a significant level of <0.0001. Finally, 32 items were confirmed with four factors. The reliability of the questionnaire, based on the internal consistency analysis of the questions, was also reported rendering a Cronbach's alpha of 0.973.

Data collection methods

The questionnaire was designed electronically. A total of 220 cases from different faculties were selected by stratified random sampling from the list of faculty members of Shiraz University of Medical Sciences in 2019 who had at least one year of work experience, and the electronic questionnaire link was sent to them via email. Given that the questionnaires were online, it was possible that one person could potentially complete the questionnaire more than once. Nonetheless, since the participants' IP and the timing of completion of the questionnaire were recognized in the output excel form, the questionnaires which were completed at the same time and had the same demographic characteristics were excluded. In the sample review, there was no evidence of repeated questionnaires by one participant. Finally, 156 complete questionnaires were returned (71%). Construct validity validity and KMO test also confirmed the sufficiency of the sample size, and the K=0.944 indicated that the sample was sufficient for factor analysis.

Data analysis

Data were analyzed in SPSS software (version 24.) The significant level was 0.05, and the confidence interval was considered 0.95. The paired t-test was used to compare participants' views on the existing situation and the importance of the issues. An Independent t-test was used to investigate the mean score of each component based on gender, and an ANOVA test was applied to examine the mean scores based on the nature of the discipline, years of occupation, and the faculty. The relationship among the components was assessed using the Pearson correlation test. Participants' comments were also assessed to support and approve the findings of the qualitative section.

Results

Demographic characteristics: As evidenced by the obtained results, 156 questionnaires were returned (71%). In terms of gender, 42.6% of cases were male, and 57.4% were female. The majority of subjects had a work experience of 1-9 years (n=75; 50.3%), were Para-Medical Sciences (n=45; 28.8%), with an academic rank of Assistant professor (n=80; 51.3%). The participants' demographic characteristics are displayed in Table 1.

Table 1. Participants' demographic characteristics

Demographic characteristics		Frequency	Percentage
Gender	Male	66	42.6
	Female	89	57.4
Years of occupation (experience)	1 ≤ Year ≤ 9	75	50.3
	10 ≤ Year ≤ 19	27	18.1
	20 ≤ Year	47	31.5
Nature of disciplines	Clinical (Medicine/ Dentistry)	33	21.2
	Medical Basic Sciences	44	28.2
	Para-Medical Sciences	45	28.8
	None Medical Sciences	34	21.8
Academic rank	Instructor	18	11.5
	Assistant Professor	80	51.3
	Associate Professor	39	25.0
	Professor	19	12.2
Faculty	Medicine	38	24.5
	Dentistry	19	12.3
	Pharmacy	12	7.7
	Nursing	13	8.4
	Para-medicine	19	12.3
	Rehabilitation Sciences	25	16.1
	Health and Nutrition	12	7.7
	Management and medical Information	12	7.7
	Others	5	3.2

To compare individuals' views on the importance and situation of the components, the paired t-test was used, and the results pointed to a significant difference between the importance of each component and the situation of all components and in the total mean (P<0.0001). Moreover, given that the cut line is 3.5, Table 2 shows that the existing situation of all components is less than acceptable. The highest and lowest scores pertained to human resources (3.86±0.86) and political components (2.92±1.07) (Table 2).

The situation of each of the items is illustrated in Table 3. Among the items related to the existing situation, the lowest mean was related to the ability of educational managers of department/faculty to attract financial resources and generate revenue (2.28±1.23), signifying the independence of educational departments in decision-making and financial management. Furthermore, transparent mechanisms in the maintenance of individuals' intellectual property in virtual education, the festivals hold to present the best virtual education activities, funding and financial

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resources, material, and spiritual by-laws and incentives, as well as the lack of common perspective in the organization obtained the scores of 2.65±1.24, 2.45±1.45, 2.75±1.20, 2.92±1.25, and 2.92±1.32, respectively (Table 3).

Table 2. Comparison of the importance and situation of virtual education development components

Components	Index	Mean	Std. Deviation	t	P-value
Human Resource	Importance (Favorable)	5.30	0.69	23.11	< 0.0001
	Current situation	3.44	0.86		
Structural	Importance (Favorable)	5.32	0.77	26.86	< 0.0001
	Current situation	3.11	0.92		
Political	Importance (Favorable)	5.09	0.94	20.71	< 0.0001
	Current situation	2.92	1.07		
Symbolic	Importance (Favorable)	5.08	0.88	21.22	< 0.0001
	Current situation	3.13	1.10		
Total Mean	Importance (Favorable)	5.18	0.74	25.62	< 0.0001
	Current situation	3.15	0.86		

Table 3. Comparison of the importance and current situation of virtual education development items

	Items	Importance		Current situation	
		Mean	Std	Mean	Std
Human resource	Empowering professors and experts in the field of virtual education and working with educational software	5.49	0.77	3.58	1.14
	The rich scientific content of the educational courses held on the topic of e-learning	5.41	0.87	3.52	1.18
	Access to educational resources for the development of concepts and knowledge of e-learning	5.06	1.04	3.10	1.27
	Team working and cooperative decisions making for virtual education development	5.19	0.93	3.18	1.23
	Appropriate interaction of experts and faculty members in conducting virtual education activities	5.38	0.85	3.59	1.31
	Proper communication of the virtual education center of the university (virtual college) with educational groups	5.36	0.96	3.54	1.36
	The interaction of academic staff members in the exchange of knowledge and experience of virtual education	5.17	1.03	3.32	1.41
	Answering and supporting the university's virtual learning center from schools and groups	5.45	0.91	3.72	1.30
Structural	Allocation of budget and financial resources to support online education activities	5.27	1.12	2.75	1.20
	The existence of basic electronic infrastructure for the development of virtual education (LMS/ virtual class…)	5.58	0.84	3.33	1.35
	Availability of space and basic equipment in the university (studio room, for content development and …)	5.47	0.82	3.12	1.54
	The existence of technical and educational experts helping in virtual education in schools	5.42	0.94	3.48	1.36
	Existence of structure and mechanism in the university to support virtual activities	5.31	1.12	3.55	1.37
	Existence of regulations and clear guidelines for equalization and evaluation of virtual education activities	5.20	1.11	3.30	1.31
	Existence of supportive and encouraging regulations in the field of virtual education	5.17	1.05	2.92	1.27
	Existence of transparent mechanisms in maintaining the intellectual property of people in virtual education	5.28	0.99	2.65	1.24
	Existence of criteria, indicators and standards for the production of software and e-contents	5.30	0.99	2.94	1.36
Political	The ability to negotiate and bargain for educational managers in virtual education development meetings.	5.13	1.03	2.94	1.28
	Communication of educational managers of department/faculty and senior officials in creating opportunities	5.19	1.00	2.95	1.29
	The ability of educational managers of department/faculty to reach a win-win agreement in joint meetings	5.06	1.10	3.05	1.31
	The ability of educational managers of department/faculty to attract financial resources for virtual education	5.06	1.13	2.58	1.23
	Having authority and independence of the department/faculty in planning and decisions making	5.16	1.05	3.04	1.46
	The presence of powerful and influential persons in the department/faculty for virtual education development	5.00	1.23	3.07	1.53
Symbolic	The existence of a vision and strategic plan in the field of e-learning amd virtual education development.	5.13	1.11	2.92	1.32
	Supportive approach of department/faculty educational managers for virtual activities development	5.23	1.03	3.50	1.45
	Holding of festivals and rites of recognition and introduction of superior virtual education activities	4.58	1.28	2.74	1.45
	Existence of interested and pioneer people in receiving virtual education in the department/university	4.92	1.14	3.14	1.50
	Department/faculty convergence in welcoming educational innovations	5.11	1.00	3.34	1.39
	Positive attitude towards the development of virtual education among the faculty members	5.32	0.96	3.29	1.40
	The belief and general belief of academic faculty members regarding virtual education as a developing factor	5.22	1.02	3.13	1.44
	The existence of empathy and team cooperation culture in virtual education activities in the university	5.18	1.08	3.04	1.45
	Alignment of virtual education activities with upstream programs and other academic planning	5.11	1.11	3.11	1.36

Differences in participants' viewpoints based on underlying variables

Gender: In analyzing the mean existing situation and the importance of the components of virtual education development, the mean score of the general opinions and subcomponents showed no significant difference based on gender (P> 0.05).

Years of occupation: Participants' viewpoints of the existing situation and the importance of components of virtual education development were not significantly significant based on work experience (P> 0.05).

Academic rank: The faculty members with different academic ranks had various opinions on the existing situation (P=0.04) and human resources component (P=.008). The instructors obtained lower scores than others; nonetheless, no significant difference was observed in other components. The assessment of the importance of each component and the academic rank demonstrated a significant difference. In the mean of

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total comments (P=0.020), the faculty members with different academic ranks had various opinions on human resources (P=0.010) and structural components (P=0.024). The differential study of the viewpoints using the Tukey exam showed the greatest difference between the instructors and other ranks, especially associate professors (P=0.04). The instructors obtained lower scores than others-that is- they felt the problems more deeply.

Nature of disciplines: Regarding the existing situation, the mean score of clinical disciplines was lower in the human resources component (P=0.027). Participants' views on the importance of the components in total mean (P<0.001), human resources (P=0.002), structural (P=0.001), political (P=0.007), and cultural (P=0.009) components were affected by the nature of disciplines.

Faculty: In any of the components of virtual education development and the total mean of opinions, the type of faculty did not affect the viewpoint of the faculty members, and participants' viewpoints did not differ significantly based on the faculty (P= 0.28). Nonetheless, the mean political component score at the School of Health Management and Information Sciences was somewhat higher than the rest of the faculties. The cultural component score was higher in the School of Rehabilitation Sciences than in the rest of the faculties. However, regarding participants' views on the importance of components, the mean scores were significantly different based on faculty (Figure 1).

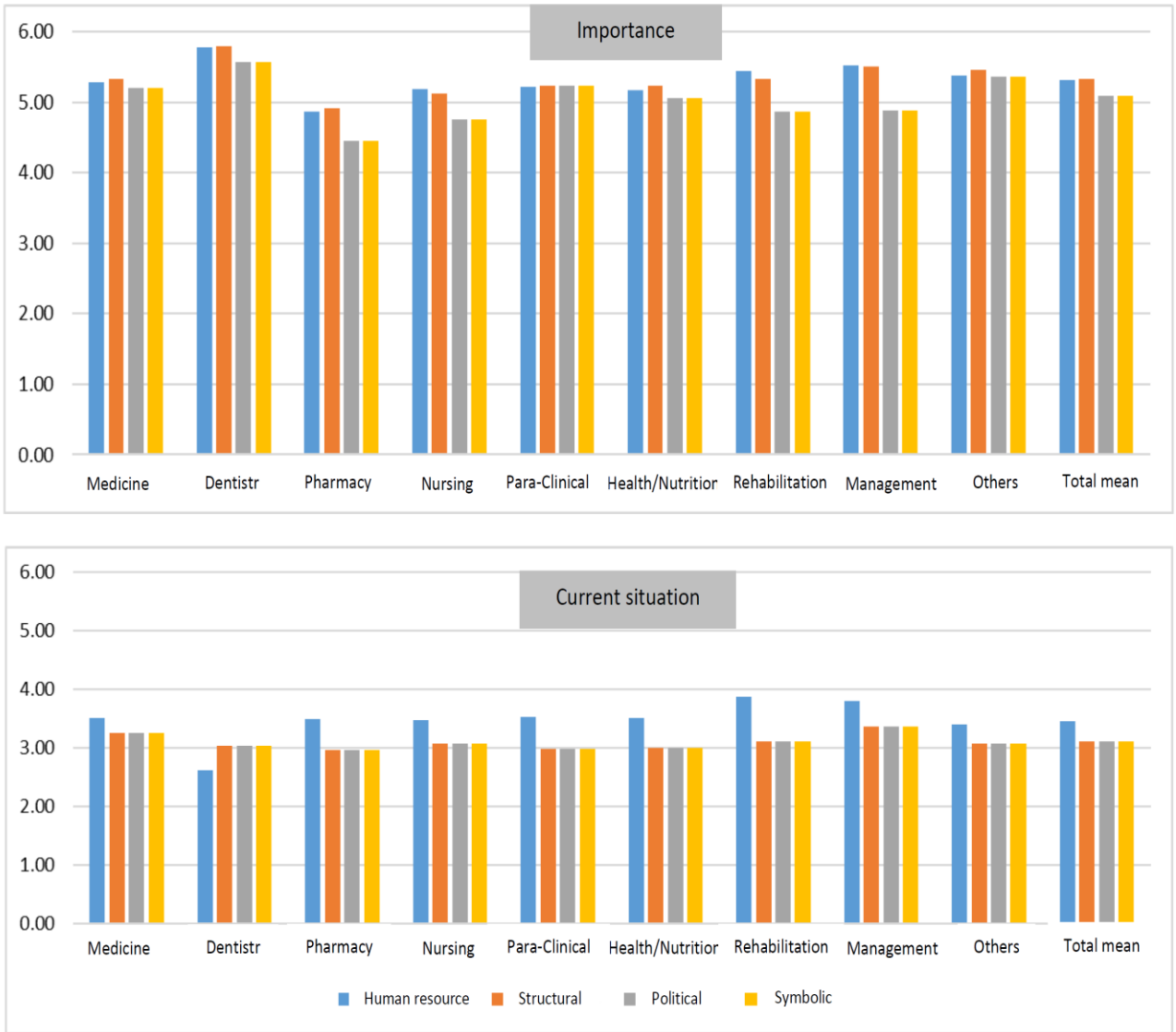

Figure 1. Comparison of importance and situation of the virtual development components by the faculty

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Table 4. Correlation between the components of virtual education development

R	Human resource	Structural	Political	Symbolic
Human resource	1			
Structural	0.833**	1		
Political	0.639**	0.772**	1	
Symbolic	0.664**	0.773**	0.759**	1

The Pearson correlation test illustrated a significant relationship among the components of virtual education development. The strongest correlation was observed between structural and human resources (r=0.833), structural and symbolic (r=0.773), structural and political (r=0.772), political and symbolic (r=0.759), human resources and symbolic (r=0.664), and human resources and political components (r=0.639). The significance level was P <0.01 in all cases.

Results of comments in the final section of the questionnaire

In addition to quantitative data, the following general item was added to the end of the questionnaire "if there are other factors that are important to you, please express them." Here are some of these comments:

A faculty member (female/ basic medical sciences)

"*There is no support system for conducting e-learning activities in educational departments. Sometimes it seems that the professors who use electronic content in the classroom use this method for their convenience. Virtual education is especially difficult and time-consuming at the beginning*."

A faculty member (male/ clinical surgical sciences)

"*We are often in the operating room and have less opportunity to participate in virtual education training programs. If tutorials are recorded or video files, we can study them in our free time*."

A faculty member (female/ nursing)

"*There is an interest in our college to implement virtual education practices in the classroom, and my colleagues and I have had different experiences in this area, but for innovative activities, more financial support is needed*."

Discussion

The comparison of the existing situation and the importance attached to the components of virtual education development demonstrated that the mean situation in all components was lower than the cut line. Among the components, the highest and lowest mean scores pertained to human resources and political components. It should be noted, however, that the data of this research were compiled before the COVID-19 pandemic; that is to say when the faculty members did not have much experience in virtual education and virtual activities in universities were limited to people who were only interested in virtual education.

Nonetheless, although the score of the situation of the human resources component was less than expected, it obtained the highest mean scores among the components. This can be attributed to the fact that numerous courses have been held on e-learning at Shiraz University of Medical Sciences over the past ten years; accordingly, faculty members have been relatively knowledgeable in this regard. However, the development of empowerment courses seems necessary for enhancing e-teaching skills among faculty members.

In agreement with the findings of the present research, the results of the studies by Mirsaidi et al. (30), Mousavi et al. (31), Karimian et al. (12), Lee et al. (32), and O'Doherty et al. (33) suggested that the empowerment of faculty members is one of the main components in the development of virtual education. Another component of virtual education development at the university is the structural component. Weakness of network infrastructure, facilities and equipment, content production challenges, and support are referred to in many studies (7-11).

Consistent with the present research, the findings of the studies by Ahmadi et al. (27), Khademi et al. (34), O'Doherty et al. (33), Almaiah et al. (35), and Regmi et al. (36) also emphasized the need to pay attention to organizational and structural components. The development of material and spiritual by-laws and incentives is also one of the other structural and organizational subcomponents, exerting a great impact on the development of virtual education.

In line with the results of the data analysis of the research questionnaire, in the comments section of the questionnaire, faculty members emphasized the necessity of incentive and supportive by-laws, providing and strengthening technical infrastructure and support. The importance of by-laws lies in orienting the activities of virtual education since individuals usually adjust their behaviors with transparent expectations and reward mechanisms. The results of some studies have demonstrated that since medical faculty members

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shoulder many responsibilities, they strive to adjust their educational, research, and executive activities with their promotion requirements (37).

Another important component in the development of virtual education at the university is the cultural component. Despite the importance of this component, like other components, there was a wide gap between the existing situation and the importance of the component. Among the items of this component, the "appreciation and introduction of top virtual education activities" and "having a common perspective" had the lowest means. In other words, it seems that the cultural atmosphere is not yet suitable for encouraging virtual activities, and activities are often based on individual interests without having a group perspective and organizational value system.

In agreement with the current research, the studies by Lieff (38), Farrell (39), and Hadavand and Kashanchi (40) assessed the importance of cultural components in organizational development in universities. The results of participants' comments also confirmed this, and in the result section, a faculty member denoted that sometimes negative attitudes are taken toward e-learning. Another component of development in this study was the political component. The political component refers to independence, as well as the authority of managers and educational departments to negotiate and resolve organizational conflicts.

The studies by Lieff (38), Farrell (39), Bajis (41), and Kolomitro (42) also highlighted the importance of political factors in the development of educational and health institutions. According to the results of the present study, despite the importance of this component in all faculties, its situation is not desirable. The comparative study of faculties indicated that the mean score of the political skills of managers at the School of Health Management and Information Sciences was more than that in other faculties. This may be because most university administrators were from the Faculty of Medicine.

The population power of faculty members at this faculty can also help its political power in deciding and attracting resources. In the case of the Faculty of Management, given the nature of this discipline, higher negotiation and bargaining skills are expected. However, the notable point is the perceived gap between the existing situation and the importance (desirable expectation). Since the present research data was compiled before the COVID-19 pandemic and faculty members had not yet recognized the necessity of virtual education, the cultural context was not prepared for virtual education development. Moreover, the relationship among the components is also important.

The findings of the study by Asghari et al. pointed out that although cultural components were the most daunting challenge presented to virtual education development, the impact of cultural and structural factors is also important. The results of the stated study illustrated that when in educational departments, the cultural context is not yet prepared for the development of virtual education, faculty members are not comfortable with electronic methods and are not able to follow virtual teaching (43). In other words, the components are not separate but influence each other.

The results also demonstrated that instructors obtained a lower mean score in the existing situation of the human resources component compared to other academic ranks. Regarding the importance of the components, instructors obtained lower scores in both human resources and structural components. This may be because e-Learning courses are obligatory for newly employed faculty members. This confirms the need to consider organizational-structural infrastructure, such as attention to the obligatory and incentive by-laws.

In line with the present research, the study by Karimian et al. showed that faculty members' opinions about the obstacles presented to research activities are affected by the nature of the discipline, the academic rank, and the faculty (44). Regarding participants' viewpoints based on the nature of the discipline, it was observed that in the human resources component, although clinical disciplines (physicians and dentists) recognized the importance of components, they obtained lower scores in the existing situation. It can be ascribed to their busy schedule and less participation in empowerment courses. In the political component, clinical physicians expressed the most critical importance; that is to say, they emphasized the sources of power. Regarding the faculty component, a significant difference was detected between various faculties. The effect of faculty and discipline has been approved in multiple studies (44-47). Biglan believes that different disciplines have different cultures; therefore, these differences need to be taken into account in organizational planning (48).

Limitations

The data of this study were collected in the pre-pandemic era, which is different from the pandemic or post-pandemic era. It should also be noted that this study was conducted at a medical university, and the results of the

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research could have been affected by the research environment.

Conclusion

As evidenced by the obtained results, the development of virtual education seems to be affected by a set of organizational, cultural, human, and political factors. Faculty members' perceptions of the situation of virtual education and the importance of the components are very important since they orient individuals' perceptions, as well as their behaviors and performance. Given the wide gap between the existing situation and the importance of the components (expectations), it is necessary to pay closer attention to strengthening formal infrastructure, such as establishing by-laws, determining quality standards, and developing technical infrastructure.

Improving the cultural atmosphere of educational departments in the application of virtual education, reinforcing and empowering the skills, knowledge, and attitudes of faculty members, and especially integration and the creation of common views can be of great help. Moreover, educational managers play a critical role in establishing communication and provision of resources and interactions in facilitating development trends. It should be noted that the developmental atmosphere is affected by the nature of the discipline, and we should devote close attention to the needs and expectations of different faculties and disciplines.

Ethical considerations

This article was extracted from a master's degree in e-learning in the medical sciences. It has been approved by the Research Deputy of the University of Medical Sciences. The ethical considerations of this research have been confirmed by the National Ethics Committee for Biomedical Research (IR.sums.rec.1398.902). All participants were aware of the research goals and signed the informed consent form. The questionnaires were collected, analyzed, and the final report was provided to the relevant authorities for use in future planning.

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Disclosure

The authors declare that they have no conflict of interest.

Authors' contribution

Maria M. was involved in writing the proposal, examining texts, data collection, and determining the validity of the questions. Zahra K. was responsible for the design the research, creating the questionnaire and determining the validity and reliability of the research tool, data analysis, and writing the article. Manoosh M. was involved in the editing the proposal and the review of the article. All authors were involved in a critical review of the article.

Data availability statement

Access is permitted upon request.

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