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The Paradigmatic Model of Virtual Education in the Islamic Azad Universities of Sistan and Baluchestan: Identification of Key Factors and Optimization Strategies

Aqil Naseripour[1], Fereshteh Kordestani[2]*, Mehdi Shariatmadari[1], Fatemeh Hamidifar[1]

[1] Department of Educational Management, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
[2] Department of Educational Management and Higher Education, Central Tehran Branch, Islamic Azad University, Tehran, Iran (Corresponding author).

*** Corresponding author email address**: fe.kordestani92@gmail.com

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A B S T R A C T

Purpose: The aim of this research is to present a paradigmatic model for virtual education in the Islamic Azad Universities of Sistan and Baluchestan province.
Methods and Materials: Considering the nature of the subject and the objectives, this study adopts an interpretive paradigm with a qualitative approach. The research method is grounded theory, and the study population consists of experts and specialists in the fields of educational management and virtual education. Purposeful qualitative sampling and criterion-based and snowball selection techniques were employed, resulting in a sample size of 20 participants. Semi-structured interviews were used as the research instrument. Data analysis was conducted using MAXQDA software. This study identified six categories, 25 concepts, and 142 codes, which were organized into a paradigmatic model.
Findings: The findings revealed that due to factors such as innovation, creativity, ease of access, promotion of educational equity, foresight, and achieving competitive advantage (causal factors), virtual education should focus on dimensions such as the application of various virtual education methods, the characteristics of teaching methods, and the evaluation of education (central phenomenon). These should be addressed through strategies such as enhancing purposeful educational quality, improving communication and interaction between instructors and students, fostering a culture of online trust, and improving technical infrastructure. The characteristics of instructors, students, and educational content (contextual factors), alongside family, psychological-personal, cultural-social, financial and legal, management, educational, and infrastructural challenges (intervening factors), influence virtual education, leading to both positive and negative outcomes.
Conclusion: This study highlights the complexities of virtual education, emphasizing the need for innovative strategies, improved infrastructure, and continuous evaluation to enhance its quality, accessibility, and alignment with educational goals.

Keywords: *Education, Virtual Education, Islamic Azad University, Sistan and Baluchestan, Paradigmatic Model*

1. Introduction

Education is the cornerstone of any advanced society and acts as a primary driver of societal progress. A robust educational system has the potential to cultivate an enlightened and perceptive population, serving as a benchmark for measuring a country's development level (Siew et al., 2021). Consequently, information technology, which has rapidly emerged as a solution in recent decades, plays a pivotal role in addressing these challenges and has introduced the concept of "virtual education." (Delghandi et al., 2024; Por Jafari shir Joposht et al., 2024; Shariati et al., 2024).

Virtual education, as defined by Al-Freihat et al. (2020), is the technology employed in the learning process. It is an information system that integrates various educational materials through email, discussions, quizzes, assignments, live sessions, and chat rooms (Al-Fraihat et al., 2020). Virtual education can also be described as a learning method that occurs through interactions. Compared to traditional classroom methods, virtual education offers a broader range of educational materials, thereby enhancing learning and teaching. It reduces the spatial and temporal constraints inherent in traditional teaching methods (Brika et al., 2022; Liu et al., 2007).

With the rapid advancement of technology and the increasing digitalization of industries and professions, universities must align their educational systems with the new demands of the job market. Virtual education enables universities to deliver up-to-date curricula synchronized with technological developments, acquainting students with new tools and skills (Ally, 2021). Universities are no longer confined to local students. With globalization expanding, many universities aim to attract international students. Virtual education allows universities to reach students worldwide without geographical limitations, broadening their educational programs on a global scale (Perkins et al., 2022).

Today's world demands educational models capable of quickly adapting to changes and new requirements. Virtual education offers universities significant flexibility, allowing courses to be modified and updated easily to meet varying conditions, such as disease outbreaks, crises, specific occupational needs, or individual student requirements (Bates, 2022). Universities often face physical limitations, such as a lack of space, facilities, and staff. Virtual education can alleviate these issues. Since online education is conducted remotely, universities can accommodate more students and offer diverse courses without needing to construct new buildings or expand physical infrastructure (Allen & Seaman, 2023).

Global events such as pandemics, natural disasters, or specific socio-political conditions can lead to university closures or restrictions on in-person classes. In such scenarios, universities require a model that ensures uninterrupted education. Virtual education enables universities to continue their activities during emergencies and crises without disrupting the educational process (Molina et al., 2021).

To attract more students and compete with other higher education institutions, universities must adopt innovative strategies. Virtual education models allow universities to offer online courses globally, attracting a higher number of international students and establishing their presence in the international arena (Carnevale et al., 2023).

In many societies, access to higher education is limited due to economic, geographical, or social factors. Virtual education can serve as a tool to reduce these inequalities, providing access to quality education for individuals in various regions. This model ensures that students with differing economic conditions have equal educational opportunities (Villarreal et al., 2023).

In today's world, where technology and digitalization permeate all economic and social sectors, the workforce needs digital skills. Universities, as centers of knowledge and skill production, must actively participate in developing digital competencies among their students. Virtual education and online platforms help universities instill these skills in their students (Johnson & Veletsianos, 2023).

Individuals must possess lifelong learning abilities in the modern era. Virtual education enables people to continuously access educational opportunities without being confined to specific academic levels or periods. Universities must provide online courses and necessary support for those who are working or unable to attend in-person classes for various reasons (Moore & Dickson-Deane, 2023).

The literature on virtual education reflects an extensive exploration of its opportunities and challenges in diverse contexts. Miller and Parker (2024) investigated the challenges of quality and evaluation in university virtual education, identifying issues such as inaccurate assessments and lack of direct interaction between instructors and students, which affect the precision of evaluations (Miller & Parker, 2024). They recommended innovative methods like self-motivated assessments and digital evaluation tools to address these challenges. Similarly, Williams and Patel

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(2023) examined access disparities and the digital divide in virtual education, highlighting inequities in technology access and resources between students in developed and developing countries, and proposed financial support and infrastructure development as solutions (Williams & Patel, 2023). Akoth Odero (2021) evaluated the effectiveness and challenges of online learning in Kenya's public universities, identifying barriers like limited internet access, inadequate resources, and lack of faculty preparedness (Akoth Odero, 2021). Lassoued and Alhendawi (2020) focused on barriers to quality in distance education during the COVID-19 pandemic, finding issues related to technical problems, unequal technology access, communication gaps, and insufficient training for educators and students (Lassoued & Alhendawi, 2020). Fernández et al. (2020) analyzed the management of e-learning environments in the UAE, reporting that while e-learning positively influenced academic outcomes, challenges such as technical issues, inadequate preparation, and limited personal interactions hindered effectiveness (Fernandez et al., 2022). Similarly, Makela et al. (2020) examined the abrupt shift to online learning during the COVID-19 crisis, noting both opportunities like flexibility and digital resource access, and challenges such as technological infrastructure gaps, lack of readiness, and access issues (Mäkelä et al., 2020). Al-Balas et al. (2020) studied distance medical education in Jordan, emphasizing challenges such as unstable internet, inadequate infrastructure, and low student engagement, while recognizing online education as a forward-looking tool (Al-Balas et al., 2020). Al-Freihat, Jou, and Sinclair (2017) identified success factors in implementing virtual education, such as technology access, faculty training, course design, and student engagement, stressing the need for continuous evaluation and feedback for improvement (Al-Fraihat et al., 2017). Similar findings have been reported in Persian studies (Haji Zadeh et al., 2021; Monavarian et al., 2021; Sadati & Colleagues, 2021) which explored challenges, strategies, and influential factors in virtual education in Iran. Overall, virtual education has been widely studied as a flexible and accessible mode of learning, particularly during crises like pandemics, offering significant benefits while facing persistent challenges such as quality assurance, limited instructor-student interaction, and infrastructural deficiencies. Continuous examination of experiences and institutional needs is crucial for aligning virtual education with long-term educational objectives and enhancing its quality and effectiveness.

In Sistan and Baluchestan province, due to geographical constraints, limited educational infrastructure, and restricted access to educational resources, the need for a specialized virtual education model for universities is strongly felt. This province faces challenges such as a dispersed population, harsh geographical conditions, and inadequate educational facilities, making access to quality education difficult for many students. Moreover, considering the cultural and linguistic diversity in the province, a localized virtual education model could help address these issues, enabling students to access education using modern technologies and enhancing the quality of education in the region.

This model could serve as a practical guide for educational managers and policymakers to improve infrastructure, methods, and processes in the virtual education space. Given these considerations, this research aims to answer the question: What is the paradigmatic model of virtual education for the Islamic Azad Universities of Sistan and Baluchestan?

2. Methods and Materials

This study adopts a qualitative, exploratory approach and employs the grounded theory method. The research population includes all experts and specialists in the fields of educational management and virtual education. The sampling method is purposeful qualitative sampling, utilizing criterion-based and snowball selection techniques. Selection criteria included having one or more of the following qualifications: being a university faculty member in educational management or having experience teaching online courses, conducting research in the field of educational studies or virtual education at universities, and having at least three academic publications in this area.

The sample size was determined based on data saturation. The researcher identified data saturation after the 18th interview but continued until the 20th interview to ensure reliability. Data were collected through semi-structured interviews, scheduled in advance, lasting 30–70 minutes, conducted in person, and audio-recorded.

The collected data were analyzed using Strauss and Corbin's (2008) grounded theory approach, which includes open coding, axial coding, and selective coding. The analysis was conducted alongside data collection using MAXQDA software. To ensure trustworthiness, the study adhered to Lincoln and Guba's (1985) four criteria: credibility, transferability, dependability, and confirmability. Additionally, to verify the accuracy of

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coding and categorization, one interview coded by the researcher was provided to an expert in educational management and virtual education for independent coding. The coding agreement between the expert and the researcher, calculated using MAXQDA, was 85%, indicating a high level of consistency between the two coders.

3. Findings and Results

Based on the methodology described, the open coding of interviews was conducted. Due to the volume of material, only a small portion is provided as an example (Table 1).

Table 1

Example of Qualitative Analysis

Codes	Source Codes (Participants)	Interview Text (Excerpt)
Technology Development	I1, I10, I11, I12, I13, I16, I17	"Previously, I held virtual classes as well, but now with new tools, the process has improved significantly, enabling better education."
Crises like COVID-19	I2, I3, I4, I5, I6, I17, I18, I19, I20	"When the coronavirus outbreak occurred in 2019, we had no idea how to continue education. Virtual education became the only option, and we invested significant time to establish it."
High Inclination Toward Virtual Spaces	I7, I8, I9, I10, I11, I14, I18, I19	"Young people today spend most of their time in virtual spaces. It would be better to use this time for education rather than other activities."

Subsequently, axial coding was conducted on the identified codes to develop concepts. Tables below display the results of open coding, the concepts derived from axial coding, and the categories identified through selective coding.

Table 2 presents the selective coding of the central phenomenon.

Table 2

Selective Coding of Central Phenomenon

Category (Selective Coding)	Concept (Axial Coding)	Codes (Open Coding)
Central Phenomenon	Adoption of Various Virtual Education Methods	Collaborative virtual education, Problem-based virtual education, Learner-centered virtual education, Role-playing virtual education, Modeling-based virtual education, Project-based virtual education
	Characteristics of Teaching Methods	Flexibility in teaching methods, Diversification of virtual education programs, Personalization of education for students
	Evaluation of Education	Continuous evaluation of instructors and students, Utilization of diverse evaluation methods (e.g., exams, projects)

Following selective coding, the central phenomenon category was identified with three concepts and 11 codes.

Table 3 presents the selective coding of causal factors.

Table 3

Selective Coding of Causal Factors

Category (Selective Coding)	Concept (Axial Coding)	Codes (Open Coding)
Causal Factors	Innovation and Creativity in Education	Use of multimedia tools, Transition from rote memorization to exploratory learning, Advancement toward lifelong learning
	Accessibility and Educational Equity	Easy access at any time and place, Wide accessibility for all learners, Equitable distribution of education, Simultaneous access to knowledge resources
	Foresight	Academic empowerment of students, Transition from traditional educational systems, Preparedness for future crises
	Competitive Advantage	Rapid change and easy flexibility, Student satisfaction, Expansion of educational services, Adaptability
	Social Changes	Technological development, Crises like COVID-19, Increased use of virtual spaces

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As shown in Table 3, the category of causal factors was identified with five concepts and 17 codes.

Table 4 presents the selective coding of contextual factors.

Table 4

Selective Coding of Contextual Factors

Category (Selective Coding)	Concept (Axial Coding)	Codes (Open Coding)
Contextual Factors	Instructor Characteristics	Instructors' familiarity with virtual education, Professional ethics, Commitment and responsibility, Technical expertise, Positive attitude toward virtual education, Pedagogical skills, Communication skills, Specialized skills
	Student Characteristics	Interest and positive attitude toward virtual education, Technological skills, Teamwork skills, Communication skills
	Content	Up-to-date materials, Useful content, Tailored to students' needs, Standardized, Diverse formats (e.g., documents, audio-visual materials), Contributions from various producers such as instructors and content creators

Through selective coding, the category of contextual factors was identified with three concepts and 18 codes (Table 4).

Table 5

Selective Coding of Strategies

Category (Selective Coding)	Concept (Axial Coding)	Codes (Open Coding)
Strategies	Enhancing Targeted Educational Quality	Preparing the educational platform, Preparing faculty members, Developing clear guidelines
	Improving Communication and Interaction	Enhancing communication and interaction with the virtual education system, with instructors, and among learners
	Building Trust	Creating a positive attitude toward virtual education, Motivating virtual education usage, Ensuring system security
	Cultural Development	Creating a suitable cultural and social foundation for virtual education, Raising awareness and collaboration among faculty and students, Defining ethical and value criteria for students, Designing specific cultural programs for virtual students, Replacing traditional education, Strengthening religious beliefs, Assisting identity formation, Familiarity with virtual education regulations, Developing suitable content and curriculum plans
	Improving Technical Infrastructure	Increasing internet speed, Enhancing hardware and software infrastructure, Simplifying virtual education processes

Through selective coding, the category of strategies was identified with five concepts and 21 codes (Table 5).

Table 6

Selective Coding of Intervening Factors

Category (Selective Coding)	Concept (Axial Coding)	Codes (Open Coding)
Intervening Factors	Family Issues	Noisy environment and lack of suitable study space, Changing family expectations, Family-imposed psychological pressure
	Psychological and Personal Issues	Resistance to change, Lack of belief in the effectiveness of virtual education, Fear of technology, Lack of motivation, Low self-confidence, Lack of ethics, Reduced responsibility, Negative attitudes of students and instructors toward virtual education
	Cultural and Social Issues	Lack of social interaction, Resistance to new educational systems, Ambiguity in defining virtual education, Weak interactions among instructors and students, Lack of teamwork, Lack of independence
	Educational Issues	Lack of English proficiency, Low-quality virtual education content, Poor implementation of courses, Weak evaluation processes, Limited Q&A opportunities, Disparity in students' digital literacy, Home distractions, Difficulty taking notes in certain subjects, Unsuitability for practical courses, Learning difficulties, Lack of

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		appropriate feedback, Inadequate teaching methods, Overemphasis on education while neglecting development, Lack of instructors' skills
	Financial and Legal Issues	High costs (e.g., virtual course fees, internet expenses), Absence of clear policies and regulations, Lack of essential tools (e.g., advanced smartphones, laptops)
	Infrastructure and Technical Issues	Shortage of specialized and experienced staff, Insufficient access to hardware and software, Lack of technical support, Unfamiliarity with required software, Audio problems, Overdependence on technology, Internet connectivity issues, Failure to install necessary software, Insufficient familiarity with virtual education technology, Absence of responsive systems, Incompatibility of educational content
	Managerial Issues	Lack of comprehensive planning, Poor time management, Lack of strategic thinking, Inefficient policies, Reduced supervision by instructors over students

Through selective coding, the category of intervening factors was identified with seven concepts and 50 codes (Table 6).

Table 7

Selective Coding of Outcomes

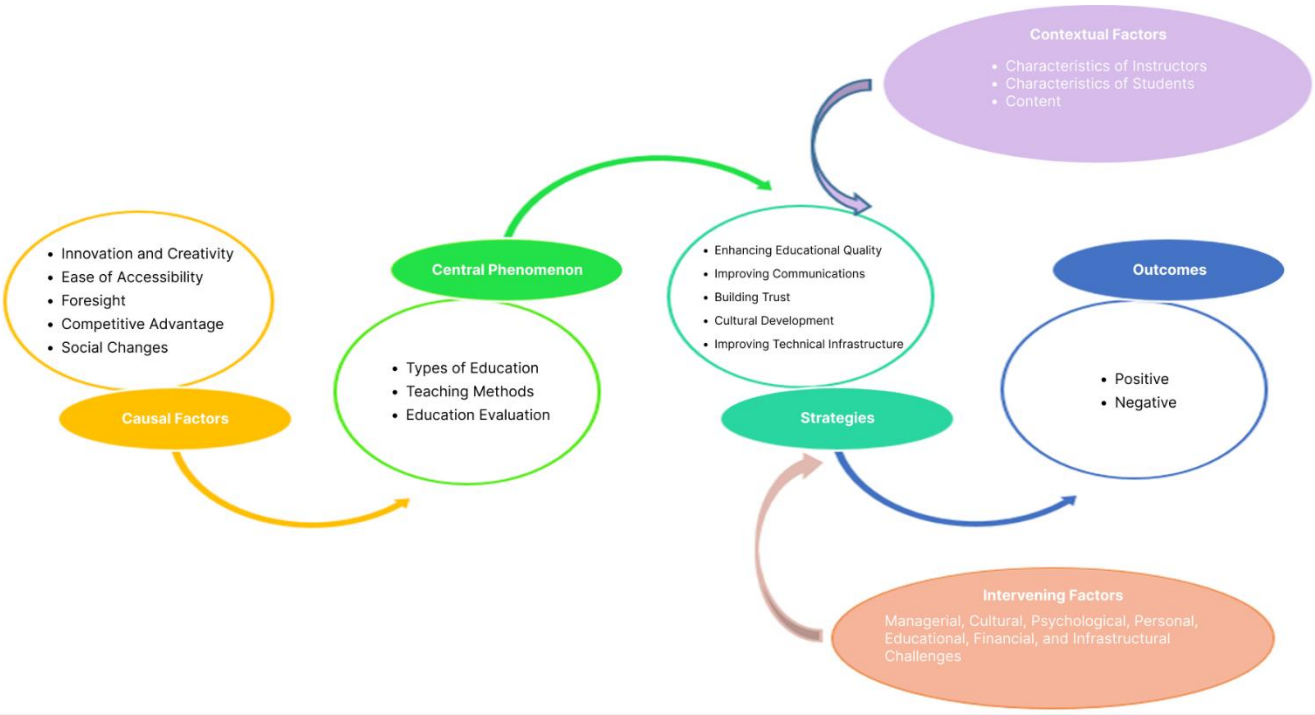
Category (Selective Coding)	Concept (Axial Coding)	Codes (Open Coding)
Outcomes	Positive Outcomes	Time-saving, Reduced student costs (e.g., transportation, materials, clothing), Accident reduction, Inclusion of diverse student groups (e.g., employed, disabled), Knowledge production and dissemination, Expansion of virtualization, Increased access to education, materials, and resources, Flexibility in education, Enhanced learning quality and retention, Development of media literacy skills among students and instructors
	Negative Outcomes	Reduced social interaction, Physical health issues, Boredom, Virtual addiction, Time wastage, Access to unethical resources, Weakening of religious beliefs, Social isolation, Decline in family connections, Lack of innovation, Reduced efficiency and instructor burnout, Academic underperformance, Increase in unproductive behavior, Reduced education quality

Through selective coding, the category of outcomes was identified with two concepts and 25 codes (Table 7).

As a result, the paradigmatic model of the study is presented in the following:

Figure 1

Paradigmatic Model of the Study



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4. Discussion and Conclusion

The proposed paradigmatic model of virtual education provides a comprehensive and complex analytical framework for understanding and analyzing various dimensions of this form of education. From a paradigmatic perspective, this model seeks to identify and connect different categories and indicators within the virtual education system, focusing on the interaction between these categories to explain the processes and outcomes associated with virtual education.

In this model, the central phenomenon is considered the core of the framework, comprising three main components: the adoption of various types of virtual education, the characteristics of teaching methods, and the evaluation of education. These components emphasize the significance of educational methodologies in virtual environments, particularly the design and selection of online educational tools tailored to learners' needs and the features of virtual environments. The evaluation of education also holds special importance in assessing the effectiveness of the provided instruction and ensuring its continuous improvement. The central phenomenon highlights the importance of educational structures and processes in virtual settings, which can significantly impact the quality of learning and student experiences.

The causal factors in this model, including innovation, creativity, ease of accessibility, educational equity, foresight, and competitive advantage, point to elements that can either facilitate or complicate the processes of virtual education. Innovation and creativity are crucial for the dynamism of online educational systems, as innovative content, methods, and educational technologies can enhance interaction and engagement among learners. Moreover, ensuring educational equity and ease of access is essential for guaranteeing quality and equal access to educational resources for all students, particularly in societies with prominent economic and social disparities.

Contextual factors refer to other key characteristics that influence the effective implementation of virtual education, such as the attributes of instructors, students, and educational content. These factors include instructors' skills and experiences in using technology, students' psychological and social characteristics in online learning, and the quality and relevance of educational content to learners' needs. Therefore, the implementation environment and conditions for virtual education must be carefully considered for both instructors and students to ensure a high-quality and effective learning process.

Intervening factors, including family, psychological, cultural, social, financial, legal, managerial, educational, and infrastructural challenges, highlight various obstacles that can affect the quality of virtual education. Family or psychological issues may hinder students' focus and effective interaction with course materials. Cultural and social challenges, especially in societies with limited access to educational technologies, can negatively impact students' learning. Infrastructural and technical problems also pose significant challenges, affecting access to virtual classrooms and the reliability of online communication.

The strategies proposed in this model include measures to improve the quality of virtual education, such as enhancing targeted educational quality, improving communication and interaction between instructors and students, fostering trust and cultural development in online environments, and upgrading technical infrastructure. These strategies specifically address existing challenges and aim to improve implementation conditions.

Finally, the outcomes in this model include both positive (e.g., increased access to education, development of online skills and competencies) and negative (e.g., access issues, technical problems, and inequalities) effects. These outcomes can have a direct impact on educational results and the overall state of education in different societies.

The virtual education model proposed in this study aligns with several scientific theories in the field of learning and online education. These theories address learning processes, educational interactions, and socio-technical conditions, providing a framework for analyzing the model.

Vygotsky's (1978) social constructivism theory emphasizes the importance of social interactions in learning. Elements such as instructor-student interaction and the categories of "trust-building" and "cultural development" in the virtual education model align with Vygotsky's concept of the "Zone of Proximal Development" (ZPD) (Vygotsky, 1978). Bandura's (1977) social learning theory underscores the role of observation and modeling in learning. In this model, students can share experiences and learn new skills through videos, discussion forums, and group activities (Bandura, 1977). Zimmerman's (2002) self-regulation learning theory highlights students' ability to regulate their learning processes. Components such as "education evaluation" and "ease of accessibility" in the model support self-regulated learning (Zimmerman, 2002). Davis's (1989) technology acceptance model focuses on the impact of

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system characteristics on user acceptance. Factors such as "ease of accessibility" and "technical infrastructure" in the model relate to this theory (Davis, 1989). Habermas's (1984) dialectical theory emphasizes the importance of dialogue and free interactions in learning processes. This theory is reflected in the components of "cultural development" and "communication" in virtual education (Habermas, 1984). Csikszentmihalyi's (1990) flow theory stresses the creation of immersive psychological experiences in learning. Components like "targeted educational quality" can help create flow experiences and deep learning (Csikszentmihalyi, 1990).

Moreover, many studies (Akoth Odero, 2021; Al-Balas et al., 2020; Al-Fraihat et al., 2017, 2020; Goli et al., 2022; Lassoued & Alhendawi, 2020; Mäkelä et al., 2020; Miller & Parker, 2024; Monavarian et al., 2021; Mosayabi et al., 2021; Sadati & Colleagues, 2021; Williams & Patel, 2023) support the findings of the present study.

Thus, the proposed paradigmatic model of virtual education, which identifies 142 different indicators to analyze all aspects of online education, comprehensively and accurately illustrates the complexities, challenges, and recommended strategies for improving this form of education. This model not only identifies factors influencing the quality and effectiveness of virtual education but also serves as a practical guide for educational managers and policymakers to enhance infrastructure, methods, and educational processes in virtual environments.

Future studies are recommended to examine each component of the virtual education model independently. Additionally, diverse populations (e.g., faculty members, university administrators) should be studied, and other qualitative methods such as phenomenology and ethnography should be employed.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Each participant received an informed consent form to understand the study's objectives.

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