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Developing a Model for Evaluating the Effectiveness of Distance Education at Islamic Azad University (North Tehran Branch)

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ABSTRACT

Objective: The primary aim of the present investigation was to delineate a framework for assessing the efficacy of distance education within the Islamic Azad University, specifically the North Tehran branch.

Methods: A descriptive survey research methodology was employed in this study. The statistical population encompassed all personnel and academic staff affiliated with the Islamic Azad University, North Tehran Branch, from which a total of 295 individuals were systematically selected through stratified random sampling techniques. A questionnaire, specifically developed by the researcher, was utilized to assess the variables influencing the effectiveness of distance education.

Results: The findings indicated that the causal factors (such as current technology) exert a positive and statistically significant influence on the effectiveness of distance education, whereas the impact of a qualified instructor was found to be insignificant. The results further revealed that contextual factors (such as legal frameworks) positively and significantly affect the efficacy of distance learning; however, the diversity and applicability of content did not demonstrate a significant influence on its effectiveness. Additionally, the data indicated that the intervening factors (such as Internet bandwidth) have a negative and statistically significant impact on the effectiveness of distance education and its associated strategies; however, inappropriate educational content, Internet speed, and procrastination did not significantly influence the strategies of distance learning. The results also indicated that the assessment of distance education positively and significantly influences the implementation of strategies.

Conclusions: In conclusion, the findings indicated that strategies substantially and positively affect outcomes (enhanced access to education, cost savings, and improved teaching quality) and may serve as a foundational basis for the implementation of online instructional plans.

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Introduction

The abrupt emergence of the novel coronavirus in 2019 precipitated numerous immediate lockdowns globally, affecting various sectors, including the education sector. In light of the unprecedented circumstances engendered by the COVID-19 pandemic, the ramifications on educational frameworks and their constituents, such as schools, universities, educators, and students, have become a focal point of investigation for numerous scholars internationally (Azorín, 2020; Daniel, 2020; Habibpour, 2023). The scholarly inquiry into optimal and efficacious pedagogical methodologies and outcomes has constituted a fertile area of research (Al-Karaki et al., 2021). As the pandemic persists and its repercussions proliferate across the globe, an increasing volume of data is being amassed regarding the influence of prolonged institutional closures on pedagogical practices. Broadly speaking, online learning has historically been regarded as an alternative or supplementary mode to conventional learning methodologies (Al-Khaibri, 2022). In contemporary contexts, distance education has surfaced as a pivotal mechanism for training and economic advancement within organizational settings (Al Lily et al., 2020; Clark, 2020). The feasibility of learning in a flexible manner, at any location and time, is contingent upon its cost-effectiveness relative to traditional in-person training; only under such conditions can distance education become appealing and economically viable for organizations and academic institutions (Masalimova et al., 2022). Undoubtedly, this modality of e-learning can enhance the acquisition of knowledge and competencies. Nevertheless, if the administrators overseeing this form of e-learning neglect to adequately consider the application of established theories pertaining to adult education, the educational experience may prove to be arduous for the participants involved (Farzaneh, 2014). In contemporary discourse, the significance of universities in fostering a progressive and advanced societal framework is universally acknowledged. To realize this objective, there is a dual imperative: on one hand, to cultivate active, responsible, and democratic citizens, and on the other hand, to address cultural, social, economic, and industrial challenges while contributing to the advancement of scientific knowledge and the extension of academic frontiers; this dual mandate has been prioritized by nearly all universities and higher education entities across the globe. As articulated by Findler et al. (2019), the foundational elements of political and economic development within societies are established within the precincts of universities and higher education institutions. This is attributable to the fact that higher education

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systems, on one hand, serve as custodians and disseminators of societal cultural heritage and values, while on the other hand, they are tasked with responding to emergent social demands in light of knowledge and technological advancements (El Refae et al., 2021). However, in response to paradigm shifts within the economic and technological domains, coupled with the emergence of overarching trends, contemporary higher education systems are no longer confined to traditional classroom settings; instead, as a result of the growing integration of electronic tools, education is evolving away from its conventional modalities and progressing toward distance learning and education (Tas et al., 2021; Vajargah & Khoshnoodifar, 2013).

Currently, in light of the incipient state of distance education evaluation within Iran and the deficiencies discerned in its implementation, alongside the specialized planning and technological support associated with this educational modality, distance education appears to be exceedingly precarious (Minou, 2010; Vajargah & Khoshnoodifar, 2013). The resolution of this paradox necessitates systematic and principled planning, coupled with extensive research endeavors aimed at mitigating obstacles and formulating actionable strategies that exhibit sustainable efficacy within this uniquely characterized environment. A significant number of both domestic and international studies have scrutinized the phenomenon of distance education, specifically investigating its prevailing status and operational frameworks. Although certain investigations have explored the determinants influencing distance education (Farzaneh, 2014), each researcher has approached the subject from a distinct perspective. What differentiates the current inquiry from preceding studies is its focus on the evaluation of distance education through a data-driven model, which, to date, has not been identified either nationally or internationally as a comprehensive examination of this matter. It appears that earlier investigations have not adequately addressed this issue, tending instead to concentrate on the evaluation of distance education itself while neglecting the factors that influence this evaluation.

This research endeavor aspires to develop a model for assessing the effectiveness of distance education, thereby facilitating the acquisition of essential information regarding its efficacy, which can subsequently be disseminated to stakeholders, including students, administrators, and policymakers, to alleviate such concerns and to enhance informed decision-making processes. Furthermore, the current study has the potential to illuminate new avenues in the realm of distance education effectiveness evaluation models within the nation.

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Material and Methods

The statistical population pertinent to this investigation encompasses all personnel and academic staff affiliated with Islamic Azad University, North Tehran Branch. A sample comprising 300 individuals, with an error margin of 0.01%, a confidence level of 99%, a statistical power of 80%, and an effect size of 0.05, was procured utilizing Sample Power sampling software. Ultimately, from the 300 distributed questionnaires, 295 were retrieved and deemed suitable for analysis. The data analysis for this research was executed employing SPSS and Smart PLS statistical software, conducted at both descriptive and inferential statistical levels.

The primary methodology for data collection in the current study is field research, utilizing a questionnaire as the instrument for data acquisition. The questionnaire encompasses 106 items addressing contextual, interventional, causal factors, strategies, outcomes, and the variable of educational effectiveness, structured through a two-way scale. The scoring of this questionnaire is based on a five-point Likert scale, ranging from "I completely disagree" (1) to "I completely agree" (5).

Results

The validity and reliability metrics are delineated in Table 1. The indices pertaining to model fit and path coefficients of the research framework are encompassed in Table 2.

In light of the R^2 values recorded as 0.598, 0.720, 0.189, 0.146, and 0.046, it can be inferred that these values manifest a spectrum ranging from weak to moderate and high levels. The Q^2 statistic serves as an evaluative measure to ascertain whether the predictive quality is adequate to either substantiate or refute the aforementioned hypotheses. The benchmarks for this statistic are categorized as follows: a value of 0.2 is deemed weak, 0.15 is regarded as moderate, and 0.35 is classified as strong. Based on the findings of this investigation, the predictive quality significantly influences the research hypotheses, reflecting a moderate standard. To further substantiate the quality of the model, we now refer to the GOF test. The benchmarks for this statistic are established as follows: a value of 0.1 indicates weakness, 0.15 indicates medium strength, and 0.35 indicates strong performance. According to the outcomes of this study, which yielded a GOF value of 0.549, the overall quality of the model is categorized at a strong level.

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Table 1. Validity and reliability metrics of variables

Component	Variable	AVE	Cronbach @	Composite reliability
Causal conditions	Modern technology	0.622	0.798	0.868
	Perceived ease	0.708	0.708	0.837
	Appropriate educational software	0.559	0.702	0.792
	Qualified teacher	0.564	0.704	0.794
	Learner motivation and interest	0.641	0.726	0.843
Contextual conditions	Laws and regulations	0.595	0.770	0.854
	Appropriate technology infrastructure	0.685	0.770	0.867
	Support for distance learning	0.586	0.804	0.809
	Ability to work with information technology	0.680	0.701	0.809
	Variety and applicability of content	0.634	0.702	0.837
Intervening conditions	Internet speed	0.551	0.725	0.829
	Lack of skilled personnel	0.719	0.710	0.836
	Improper planning	0.609	0.702	0.823
	Lack of full access	0.730	0.723	0.844
	Improper educational content	0.550	0.725	0.829
	Neglect	0.635	0.724	0.838
Strategic conditions	Planning	0.784	0.724	0.879
	Resource analysis	0.566	0.715	0.796
	Facilities and equipment	0.615	0.790	0.864
Efficiency of distance learning	Training teachers and students	0.657	0.733	0.850
	Extent of access to distance learning	0.713	0.700	0.832
	Appropriate content	0.576	0.727	0.800
	Appropriate internet infrastructure	0.623	0.700	0.832
	Satisfaction with distance learning	0.584	0.763	0.849
	Proper evaluation system	0.835	0.803	0.910
	Attractive learning environment	0.656	0.751	0.848
Outcomes	Savings	0.703	0.713	0.825
	Better access to education	0.888	0.874	0.940
	Teaching quality	0.685	0.767	0.865

Table 2. The fitness indices

Effect	To the structure (direct effect)	R^2	Predictive correlation test (Q^2)	Overall model quality test
Modern technology	Efficiency of distance learning	0.598	0.297	0.549
Perceived ease				
Appropriate educational software				
Education				
Qualified teacher				
Learner motivation and interest				
Laws and regulations				
Appropriate technology infrastructure				
Support for distance learning				
Ability to work with information technology				
Variety and applicability of content				
Internet speed				
Lack of skilled labor				
Improper planning				
Lack of complete access				
Neglect of work				

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Improper educational content				
Laws and regulations	Strategies	0.720	0.352	
Appropriate technology infrastructure	Strategies			
Support for distance learning	Strategies			
Ability to work with information technology	Strategies			
Variety and applicability of content	Strategies			
Internet speed	Strategies			
Lack of skilled labor	Strategies			
Improper planning	Strategies			
Lack of complete access	Strategies			
Neglect of work	Strategies			
Improper educational content	Strategies			
Strategies	Savings	0.189	0.092	
Strategies	Better access to education	0.146	0.071	
Strategies	Quality of teaching	0.046	0.008	

The outcomes derived from the structural equation model elucidated that the causal conditions specifically modern technology, perceived ease, suitable educational software, and learner motivation and interest—exert a positive and statistically significant influence on the efficacy of distance education; conversely, the impact of a qualified instructor on distance education efficacy was found to be non-significant. The results of the current investigation further indicated that the contextual factors—namely laws and regulations, appropriate technological infrastructure, support for distance education, and proficiency in information technology—positively and significantly affect the efficacy of distance education; however, content diversity and applicability did not manifest a significant impact in this regard.

The findings additionally revealed that the intervening factors—including internet speed, shortage of skilled personnel, inadequate planning, lack of comprehensive access, unsuitable educational content, and procrastination—demonstrate a negative and statistically significant effect on the efficacy of distance education, although unsuitable educational content itself did not significantly influence this efficacy. Moreover, the study's findings elucidated that the contextual factors—laws and regulations, appropriate technology infrastructure, content diversity and applicability, and support for distance education—positively and significantly affect the strategies employed for distance education; however, proficiency in information technology and adherence to laws and regulations did not exhibit a significant influence on these strategies.

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Furthermore, the results indicated that intervening factors such as a shortage of skilled personnel, poor planning, lack of complete access, and unsuitable educational content have a negative and significant effect on the efficacy of distance education, while internet speed and procrastination did not significantly impact the strategies for distance education. Lastly, the evaluation of distance education at Islamic Azad University, North Tehran Branch, was found to positively and significantly influence the strategic approaches. Ultimately, the findings of this study demonstrated that the strategies employed yield a positive and statistically significant effect on outcomes including enhanced access to education, cost savings, and improved teaching quality.

Discussion

The results derived from the current investigation indicate that the causal variables (contemporary technological advancements; perceived simplicity; suitable educational software; the motivation and interest of learners) exert a positive and statistically significant influence on the efficacy of distance education; however, the impact of a qualified educator on the efficacy of distance education was found to be non-significant. In this regard, no prior research was identified that scrutinized factors analogous to the outcomes of this investigation, with only related studies being analyzed. Yaghoubi (2010) demonstrated in his research that pertinent educational content, the presence of an information and communication technology infrastructure, the application of software, and the judicious selection of educational media, as perceived by virtual students, constitute influential factors in the successful implementation of e-learning systems. Ahmadkhan Beigi et al. (2019), in their study entitled "Investigating the Effect of Distance Education on Motivation for Progress and Academic Progress and Quality of Life of Male High School Students in Alborz Province, Karaj," revealed a statistically significant difference between the quality of life measured in the pre-test and post-test assessments. Based on the findings, one can assert that a notable difference exists between the motivation for progress in the pre-test and post-test evaluations. The findings indicated that distance education positively influences the motivation for progress and academic achievement of students, not only for those who have discontinued their education but also serves as an alternative educational opportunity for all. Zamani et al. (2013) discovered in their

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research that the variables related to subjective perceptions of ease of use and usefulness, along with students' attitudes toward usage and their decision-making regarding usage, serve as effective attitudinal factors that positively affect the acceptance and utilization of mobile phones for educational purposes at the 0.01 significance level among students. Howell et al. (2004) in their empirical study delineate the principal strategies necessary for attaining the efficiency and effectiveness of distance education. These strategies encompass: 1- The accountability of faculties and departments in the execution of distance education, 2- The provision of essential information required for the successful implementation of e-learning, 3- The encouragement of faculty members to proficiently utilize information and communication technology, 4- The application of robust incentives for faculty involvement in distance education activities, 5- The enhancement of teaching and learning quality, 6- The establishment of coordination among faculty members, 7- The support and facilitation of research in the domain of distance education. The implementation of distance education through contemporary technological means has the potential to augment its effectiveness owing to perceived simplicity and the utilization of appropriate educational software. In this educational paradigm, it is imperative for the educator to possess the requisite qualifications to fully capitalize on this pedagogical approach.

In addition, the motivation and engagement of learners represent critical determinants in enhancing the efficacy of distance education. In contemporary society, propelled by technological advancements, there is a notable escalation in the implementation of diverse pedagogical approaches, notably distance learning facilitated through the Internet and educational software. The perceived simplicity and design of suitable educational software, coupled with enhanced Internet accessibility, render this educational modality capable of substantially augmenting educational efficiency. The results of the current investigation indicated that contextual factors (such as legal frameworks, adequate technological infrastructure, support mechanisms for distance learning, and proficiency in information technology) exert a positive and significant influence on the effectiveness of distance learning; however, the diversity and applicability of instructional content do not demonstrate a

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considerable impact on the efficacy of meaningful distance education. Within this framework, no prior research was located that specifically examined elements analogous to the outcomes of this study; only analogous studies were reviewed.

Zamani et al. (2013) ascertained in their investigation that the factors of perceived ease of use, perceived usefulness, students' attitudes toward utilization, and decisions to utilize as influential attitudinal variables possess positive effects on the acceptance and implementation of mobile phones for educational purposes at a significance level of 0.01 among students. Howell et al. (2004) elucidated in their research the essential strategies for attaining the efficacy and effectiveness of distance education. These strategies encompass: 1- Accountability of faculties and departments in the deployment of distance education, 2- Provision of requisite information for the successful execution of e-learning, 3- Fostering faculty members' effective utilization of information and communication technology, 4- Implementing substantial incentives for faculty engagement in distance education initiatives, 5- Enhancing the quality of teaching and learning processes, 6- Establishing collaborative synergies among faculty members, 7- Supporting and promoting research endeavors in distance education.

The influence of contextual conditions, including legal frameworks, suitable technological infrastructure, support for distance education, and proficiency in information technologies, can significantly affect the effectiveness of distance education. Systematic and coherent legal frameworks for this educational modality should be formulated and enacted to facilitate enhancements in educational quality. Furthermore, the establishment of adequate technological infrastructure and robust support for distance education can contribute to improved access to this form of education. Ultimately, proficiency in information and communication technology is also of paramount importance in determining the effectiveness of distance education.

The results of the current investigation revealed that the intervening variables (internet bandwidth, insufficient specialized personnel, inadequate planning, lack of comprehensive access, unsuitable educational materials, and procrastination) exert a detrimental and statistically significant influence on the effectiveness of distance education; however,

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unsuitable educational materials do not significantly impact the effectiveness of distance education. In this regard, no studies were identified that analyzed factors analogous to those uncovered in this investigation, and only comparable research was scrutinized. Insufficient internet bandwidth, inadequate specialized personnel, flawed planning, incomplete access, unsuitable educational materials, and procrastination may adversely affect the effectiveness of distance education. Insufficient internet bandwidth can diminish both the quality and speed of educational delivery. A deficiency of specialized personnel may also contribute to a decline in the quality and substance of educational offerings. Flawed planning and incomplete access can similarly impair the quality and substance of educational delivery. Unsuitable educational materials may further compromise the quality and substance of educational offerings. Ultimately, procrastination may also lead to a reduction in the quality and substance of educational experiences. Insufficient internet bandwidth can play a detrimental role in the effectiveness of distance education.

Considering that distance education frequently necessitates the downloading of videos and educational materials, insufficient internet bandwidth may hinder the downloading and viewing of educational content. This can adversely affect learners' focus and engagement with educational materials. Additionally, insufficient internet bandwidth may compromise the quality and fluidity of online training sessions, potentially resulting in a decline in educational quality and comprehension of the subject matter. Therefore, to enhance the efficacy of distance education, it is imperative to mitigate the issue of insufficient internet bandwidth. The results of the current investigation indicated that contextual factors (legislative frameworks, adequate technological infrastructure, varied and practical content, and support for distance education) positively and significantly influence distance learning strategies; however, proficiency in information technology and legislative frameworks do not significantly affect effective distance learning strategies. Within this context, no studies were identified that examined factors analogous to the findings of this investigation, and only comparable research is reviewed. Zamani et al. (2013) conducted a study which revealed that the constructs of perceived ease of use, perceived usefulness, student attitudes towards utilization, and decision-

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making regarding usage serve as significant attitudinal determinants that positively influence the acceptance and application of mobile phones for educational purposes at the 0.01 significance level among the student population. Howell et al. (2004) in their investigative endeavor elucidated the principal strategies essential for attaining both efficiency and effectiveness within the realm of distance education. These strategies encompass: 1- The accountability of faculties and departments in the execution of distance education, 2- The provision of requisite information vital for the successful deployment of e-learning, 3- The encouragement of faculty members to proficiently engage with information and communication technology, 4- The implementation of substantial incentives for faculty involvement in distance education initiatives, 5- The enhancement of the quality pertaining to teaching and learning processes, 6- The establishment of collaborative coordination among faculty members, 7- The endorsement and facilitation of research endeavors within distance education. The formulation of logical and transparent regulations governing distance education may enhance the strategies aimed at improving its efficiency.

A suitable technological infrastructure alongside support mechanisms for distance education is also instrumental in augmenting access to this educational modality. Proficiency in information technology is critically significant for the optimization of distance education efficiency. Furthermore, the provision of diverse and pragmatic content can likewise contribute positively to the enhancement of distance education efficiency strategies. The results of the current investigation indicated that intervening conditions such as the absence of skilled personnel, inadequate planning, incomplete access, and inappropriate educational content exert a negative and substantial impact on the efficacy of distance education; however, factors such as internet speed and procrastination do not significantly influence the strategies associated with distance education. Within this purview, no extant research was identified that scrutinized factors analogous to the findings of this study, leading to the review of only related research. Intervening conditions are capable of imposing detrimental effects on the strategies employed in distance education.

For instance, suboptimal internet speed may diminish educational quality, while a scarcity of skilled personnel can result in a decline in the quality of educational content. Additionally,

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inadequate planning and restricted access to educational resources can precipitate complications within the educational process. Moreover, inappropriate educational content can induce ambiguities and hinder students' comprehension of concepts, while procrastination may detract from student engagement and motivation to partake in the educational process. Nevertheless, these challenges can be effectively addressed through meticulous planning and the utilization of appropriate tools. For example, the deployment of high-quality educational tools, comprehensive planning, and unrestricted access to educational resources can significantly enhance educational quality. Furthermore, the creation of engaging and high-quality educational content, coupled with the implementation of suitable pedagogical methods, can improve students' understanding and learning outcomes.

The results of the current investigation indicate that the efficacy of distance education exerts a negative and statistically significant influence on the implementation of distance education strategies. In this regard, no scholarly work that addresses factors analogous to the findings of this research has been identified, and only research of a similar nature will be analyzed.

The results of the current investigation indicate that strategic approaches have a positive and statistically significant impact on educational outcomes (such as savings, enhanced access to education, and improved teaching quality) at a confidence level of 99%. In this regard, no scholarly work that addresses factors analogous to the findings of this research has been identified, and only research of a similar nature will be analyzed.

Ahmadkhan Beigi et al. (2019) demonstrated in their research that distance education positively influences students' motivation for academic advancement and achievement, benefiting not only those who have disengaged from formal education but also serving as a supplementary educational opportunity for a wider population. The efficacy of distance education programs can be influenced by various contextual factors, which in turn affect the quality and effectiveness of distance education strategies. For instance, suboptimal internet connectivity, a deficiency in skilled personnel, and insufficient planning may detrimentally impact educational quality, thereby diminishing the efficacy of distance education strategies. Conversely, the integration of high-quality educational tools and resources, as well as the

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utilization of appropriate educational content, has the potential to enhance both the quality and effectiveness of distance education strategies. Moreover, inadequate access, unsuitable educational content, and tendencies toward procrastination may further hinder student engagement with the material, thereby decreasing the efficacy of distance education strategies. In summary, to augment the efficiency of distance education strategies, it is imperative to focus on improving the educational environment and employing high-quality educational resources. Among the limitations inherent in the current study, it is noteworthy that the research did not exercise control over the demographic characteristics of the sample, and the study was conducted exclusively with personnel and faculty members from the Islamic Azad University of North Tehran Branch. Consequently, caution should be exercised when generalizing the results. It is thus recommended that future investigations consider the demographic characteristics of participants, such as age and gender, and extend the study to encompass other cities and universities within the country. In conclusion, it is suggested that to enhance the quality and effectiveness of distance education strategies, meticulous and systematic planning should be instituted, alongside the utilization of high-quality and appropriate educational tools to bolster the quality of education and the efficacy of distance education strategies.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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