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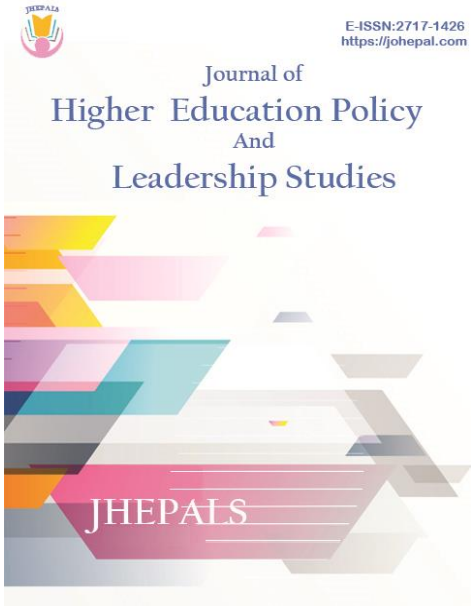
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Empowering Leaders for Human-Centered Digital Transformation: A Strategic Framework for Establishing Digital Universities



Zohre Khajoueinejad [1]
Shahid Beheshti University, Tehran, IRAN
& Visiting Graduate Student,
University of Calgary, CANADA
Email: zohre.khajoeinejad@ucalgary.ca

Gholamreza Shams [2]
Department of Education, Faculty of Education and Psychology, Shahid Beheshti University, Tehran, IRAN
Email: gh_shams@sbu.ac.ir
https://orcid.org/0000-0003-4233-3850

Farhad Seraji [3]
Department of Methods and Curriculum Planning, Faculty of Psychology and Education, University of Tehran, Tehran, IRAN
Email: fseraji@ut.ac.ir
http://orcid.org/0000-0003-1479-5919

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Zohre Khajoueinejad
Gholamreza Shams *
Farhad Seraji

Abstract

Digital transformation in Higher Education (HE) enhances efficiency, academic experiences, and innovation but faces challenges like resistance to change, fragmented technology, and a lack of integrated frameworks in Iran's Higher Education Institutions (HEIs). This study examines academic leadership's role in overcoming these challenges through Human-Centered Design (HCD). Using a mixed-method approach, 19 qualitative interviews explored university managers' perspectives, viewpoints, and challenges while a questionnaire with 63 participants assessed the feasibility of a strategic framework. Qualitative data were analyzed using Strauss and Corbin's model, while quantitative data employed descriptive statistics to assess the feasibility and relevance of the proposed strategic framework, evaluate its alignment with institutional goals, and measure stakeholder perceptions of its applicability. The research discovered a strategic framework for integrating leadership development into HCD transformation toward creating digital universities. By prioritizing the needs of managers, the framework demonstrated its applicability within the context of HE in Iran. The results also offer dynamic and innovative operational strategies for HEIs seeking to navigate the complexities of HCD transformation effectively.

Keywords: Digital Transformation; Higher Education; Human-Centered Design (HCD); Leadership Development; Strategic Framework

* **Corresponding author's email:** gh_shams@sbu.ac.ir

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Introduction

HEIs face a significant turning point and unprecedented challenges in adapting to rapid technological advancements and evolving social expectations. Digital transformation has emerged as a vital mechanism for educational institutions to enhance operational efficiency, improve academic experiences, and strengthen innovation in research and teaching (Holmes et al., 2019; Selwyn, 2016a). For instance, universities have utilized advanced Learning Management Systems (LMS) and cloud-based solutions to optimize administrative operations, demonstrating digital transformation's tangible impact in achieving these objectives.

However, despite significant technological investments, many universities fail to meet the expectations of students, faculty, and staff for being transformed into cultural and human-centered aspects of a digital environment (Selwyn, 2016B). These challenges often stem from fragmented implementation of teaching-learning strategies and neglect of human-centered aspects, such as organizational culture and working together (Zhu & Engels, 2014; Sy et al., 2024), when HEIs need to emphasize these aspects by following an HCD. This research defines HCD as a design that emphasizes a human-centered approach to digital transformation in EHIs.

In Iran, following the relatively successful efforts of large public universities and some smaller private institutions during the COVID-19 pandemic in delivering virtual education, legitimate questions have emerged: 'Has the time come not only to adopt virtual education but also to contemplate the establishment of a digital university at a higher level of transformation'?, 'Can we introduce the digital university establishment plan as a fundamental change in the current form of Iranian HE, built on a classical style, as a topic of significant interest for HE leaders'?

University leadership plays a pivotal role in guiding digital transformation programs and initiatives. Effective leadership styles, such as a distributed one, can create new organizational routines and structures that transform the institute culture, when a democratic leader creates an inspiring shared vision, and strengthen interpersonal collaboration (Goleman, 2014; Spillane, 2005). Transformational leadership can help motivate and empower individuals to embrace change (Shields, 2017). Participative leadership enhances collaboration and shared ownership of initiatives (Lussier & Achua, 2022), while servant leadership focuses on addressing faculty and staff needs and ensuring alignment with institutional goals (Blanchard & Hodges, 2003). Leadership and all its styles center on human aspects of organizations and play a role in building trust and commitment in the HEIs.

A critical aspect of any transformation in HE, especially the establishment of a digital university, is attention to leadership and its development to ensure the readiness of the HE system to launch this significant transformation. Leadership development in HEIs is often characterized by short management courses and limited efforts to strengthen technical expertise. Approaching leadership development in this manner impedes the realization of the university's transformative objectives. Moreover, traditional leadership development models frequently require comprehensive strategies integrating technological capabilities with human-centered approaches (Maduforo et al., 2024).

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Existing literature emphasizes the importance of leadership in any transformation, including digital transformation. However, it simultaneously indicates that we need a framework to support managers in developing effective leadership tailored to the specific dynamics of HE in this transformation. These dynamics include the necessity of moving towards decentralized governance and emphasizing academic freedoms. Diverse stakeholder groups in HEIs, such as faculty, staff, and students, often have conflicting priorities that traditional frameworks do not effectively address. While interdisciplinary, international studies occasionally highlight appropriate frameworks (Bolman & Deal, 2017; Kezar, 2018; Beerkens & van der Hoek, 2022), they often lack the context-specific features needed to address the complexities of HEIs that apply to Iranian HE. Furthermore, despite their potential to enhance digital project inclusivity and effectiveness, HCD transformation design principles have been less explored in academic environments.

This study aims to create a strategic framework for empowering university leaders to guide HCD transformation in HEIs. Specifically, the research seeks to:

1. Develop a strategic framework for integrating leadership development for HCD transformation toward creating a digital university; and
2. Provide practical recommendations as the success factors for HEIs to develop leadership capacity in an HCD space.

By advancing a comprehensive framework tailored to the context of the Iranian HE system, this study seeks to bridge the theory-practice divide, offering practical insights for university leaders and policymakers navigating the complexities of digital transformation in HEIs.

Literature Review

The emergence of digital technologies has profoundly transformed the global HE landscape, creating new opportunities for innovation in all aspects of work (Orlikowski & Scott, 2021). Digital transformation in HE signifies the strategic integration of technology across all university dimensions to improve performance, enhance student experience, and ensure long-term sustainability. For instance, adopting LMS has revolutionized course content delivery, enabling personalized learning pathways and real-time performance tracking (Henderson et al., 2017; Colbert et al., 2016). Moreover, advanced data analytics and Artificial Intelligence (AI) tools are increasingly employed to predict student success, optimize resource allocation, and streamline administrative workflows (Annuš, 2024; Gierl et al., 2012; Rahmati Karahroodi et al., 2020).

Emerging technologies like generative AI and virtual learning environments are transforming education by enabling adaptive, personalized learning and enhancing accessibility—key to digital universities (Essa et al., 2022; Bower et al., 2015; Díaz-García et al., 2022). However, universities face challenges such as resistance to change, financial constraints, and weak strategic alignment (Henderson et al., 2011; Fleaca et al., 2022).

Digital transformation requires more than technological adoption; it demands a cultural and institutional shift. This involves integrating digital tools with a university's mission, long-term goals, and human-centered values. Yet, inconsistent governance and fragmented decision-making hinder effective implementation (Broek et al., 2017; Rivera-Gutiérrez et al., 2024; Beetham & Sharpe, 2013).

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University leadership is crucial in HCD transformation (Niță & Guțu, 2023), fostering vision, commitment, and collaboration (Onan, 2024). However, HE leaders face societal challenges (Bolden et al., 2008), as decentralized governance and faculty traditions often withstand centralized decisions (Hsieh, 2023; Bleiklie & Kogan, 2007). Short presidential terms further hamper long-term policy implementation (Kalebar et al., 2024). Leaders must align technological advancements with human-centered strategies to ensure institutional cohesion.

HCD prioritizes user needs, ensuring inclusivity and effectiveness in digital universities (Ahmad et al., 2020; Gumport, 2000). It emphasizes iterative, participatory design, engaging faculty, students, and staff to enhance digital tool integration (Disterheft, 2015).

HCD in HE digital transformation extends beyond technology, emphasizing institutional and cultural reinforcement through collaboration, feedback, and continuous improvement (Garcia-Lopez et al., 2020; Giacomin, 2014). Prioritizing marginalized voices, particularly students, enhances relevance and inclusivity (O'Byrne, 2019). Student surveys and focus groups help identify adoption barriers and optimize digital tool design (Cleveland-Innes et al., 2024). Universities using HCD achieve more sustainable digital transformation (Shirbhate et al., 2023). Generative AI accelerates prototyping, while virtual learning environments enable real-time testing and refinement, ensuring user-centered solutions (Raghu et al., 2024).

Large-scale HCD implementation in universities requires robust frameworks and stakeholder engagement. A key question arises: What leadership characteristics and approaches best support digital transformation? Case studies highlight the impact of effective leadership and HCD. Arizona State University (ASU) exemplifies digital innovation, using adaptive learning and predictive analytics to boost first-year retention by 15% and graduation rates by 20% over five years (Crow & Dabars, 2015; Lin et al., 2024). ASU's leadership prioritized an integrated vision, stakeholder engagement, and continuous evaluation.

Southern New Hampshire University (SNHU) successfully adopted a competency-based education model, leveraging digital tools to reduce administrative processing time by 25% and increase student satisfaction by 30%. Its leadership prioritized faculty and staff development, emphasizing the role of human capital alongside technology (Pluff & Weiss, 2022; Díaz-Garcia et al., 2023). While global successes exist, many HEIs struggle to replicate these models due to governance, resource, and institutional differences. A flexible, context-specific framework integrating leadership development and HCD is essential, particularly for Iranian HEIs to adapt models aligned with national policies.

The literature review revealed that while digital transformation has created immense potential for HE, its success depends on integrating a human-centered approach with leadership development. In the following sections of the article, we present a strategic framework specifically designed to empower academic leaders in planning and implementing HCD transformation.

Research Methodology

This study employed a mixed-method approach, integrating qualitative and quantitative methods to explore leadership development for establishing an HCD university. The

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qualitative component included 19 semi-structured interviews with academic staff from Shahid Beheshti University (SBU) to examine leadership strategies, digital adoption challenges, and perceptions of HCD. Thematic coding using MAXQDA-2020 identified five key components: leadership development, digital mindset, cultural transformation, technological infrastructure, and collaboration mechanisms.

The quantitative component involved a questionnaire distributed to 63 faculty members with managerial experience at Shahid Bahonar University of Kerman (SBUK) to assess the feasibility of the proposed strategic framework. Likert-scale questions evaluated stakeholder readiness, perceived applicability of leadership practices, and alignment of digital tools with institutional goals. Data analysis included descriptive statistics and correlation analysis, with statistical significance set at 0.05.

To ensure validity, participant selection bias was minimized through purposeful sampling of diverse faculty roles. Anonymity was maintained to reduce response bias. The framework was theoretically validated through comparative analysis with existing models and nine expert reviews, confirming its coherence, relevance, and applicability to Iranian HEIs.

Results

The results are presented as separate parts of quantitative and qualitative findings. Subsequently, the study's key findings, the comprehensive strategic framework, are introduced based on a mixed-method approach.

Qualitative Findings

Insights

Before presenting the strategic framework, the insights derived from the interview analysis could prove that the academic leaders in the field had a comprehensive perspective on the transformation. The analysis revealed the following insights:

One. Impact of Leadership Development:

Based on the academic leaders' perspectives, leadership preparation is critical in shaping an HCD university and fostering collaboration and teamwork. One participant stated

> "Leaders should not only be empowered to lead in a vibrant academic space with rapid technological changes impacting teaching and research, but also empower leaders to guide the cultural transformation of universities. As university managers, we must understand how to align our strategic goals with digital innovations in this environment." (Participant #11)

Two. Cultural Alignment:

Participants emphasized the importance of enhancing engagement and acceptance of technological innovations in building a digital university. They believed this transformation requires transparent communication and comprehensive planning processes within a supportive or receptive culture. A department head remarked,

> "Being involved in the planning phase of HCD makes me feel valued in my work environment in a newly established environment. This sense of value motivates

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> me to participate in the transformation towards a digital university actively." (Participant #6)

Three. Technological Readiness:

Academic leaders highlighted that robust training programs and clear guidelines significantly reduce resistance to adopting the newly established environment. They stressed that without readiness among university members, even the most advanced technologies will not effectively transform a traditional university into a digital one. A faculty vice-dean noted,

> "During the COVID-19 pandemic, we realized the critical role of faculty and student preparedness over the mere availability of technology for virtual learning. Similarly, in a digital university, preparing the human resources should precede technological advancements." (Participant #5).

Proposed Strategic Framework

As stated in the introduction, the primary goal of this study was to develop and propose a comprehensive strategic framework to support universities in navigating HCD transformation. Qualitative analysis aligning three key insights revealed a five-component framework. Each component addresses critical dimensions of organizational transformation from existing to digital universities.

Leadership Development

Effective leadership is the cornerstone of successful digital transformation. University leaders must possess unique skills and attributes to inspire change, pay attention to the cultural aspects of transformation, manage resistance, and align institutional goals with technological advancements. Key areas of focus include:

- Visionary leadership: Cultivating the ability to articulate a clear and compelling vision for digital transformation.
- Change management: Equipping leaders with strategies to navigate resistance and foster a culture of innovation.
- Collaborative skills: Enhancing interpersonal and negotiation skills to build stakeholder consensus.
- Continuous learning: Encouraging leaders to stay informed about emerging trends and technologies through professional development programs.

Digital Mindset and Skillset

Leaders and staff must develop a digital mindset and the requisite skill sets to lead and sustain digital transformation. This component includes:

- Advanced training modules: Designing tailored programs on digital tools, analytics, and leadership in the digital age.
- Digital literacy initiatives: Ensuring basic proficiency in digital tools and advancing machine learning and cloud computing expertise.
- Experiential learning opportunities: Providing direct engagement with advanced technologies, such as virtual environments for research and education.
- Outcome tracking systems: Implementing robust metrics to monitor progress in adopting digital tools.

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Cultural Transformation

Cultural alignment is essential for embedding digital transformation within the university. Strategies include:

- Stakeholder engagement: Involving faculty, staff, and students early in planning and implementation.
- Communication campaigns: Promoting the benefits of digital transformation through transparent and consistent communication.
- Incentive programs: Recognizing and rewarding individuals who champion digital initiatives.
- Feedback mechanisms: Establishing channels for continuous feedback to ensure alignment with stakeholder needs.

Technological Infrastructure

Strong and scalable technological infrastructure is critical to successful digital transformation. Key priorities include:

- System integration: Ensuring seamless interoperability between existing and new technologies.
- Cloud-based solutions: Leveraging cloud platforms for flexibility and cost-efficiency.
- Data security: Implementing stringent cybersecurity measures to protect sensitive institutional data.
- Regular upgrades: Developing roadmaps for periodic updates to maintain technological relevance.
- Emerging technologies: Exploring the potential of advanced innovations such as generative AI and quantum computing.

Collaboration Mechanisms

Intra and inter-organizational collaboration are vital for fostering innovation and ensuring sustainability in digital transformation. Strategies include:

- Cross-functional teams: Establishing task forces comprising diverse stakeholders to oversee digital initiatives.
- Industry partnerships: Collaborating with technology providers and industry leaders to access expertise and resources.
- Shared service models: Implementing frameworks to optimize resource utilization across departments.
- Academic networks: Participating in consortia to exchange best practices and accelerate the adoption of successful strategies.

Quantitative Findings

The quantitative findings were derived from a structured questionnaire distributed to the 63 participants. The primary objective was to assess the feasibility and alignment of the proposed strategic framework for HCD transformation within the university context. Key findings are summarized as follows:

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Leadership Development:

Approximately 72% of respondents agreed that the proposed leadership development strategies, such as visionary leadership and change management, are relevant and applicable to their institution. However, 58% emphasized the need for additional training programs to enhance leaders' digital literacy and change management skills.

Digital Mindset and Skillset:

60% of participants rated their institution's current digital readiness as moderate or low. A significant majority (75%) supported the implementation of advanced training modules and experiential learning opportunities to develop the necessary digital skills among faculty and staff.

Cultural Transformation:

68% of respondents identified stakeholder engagement as critical for successfully implementing digital initiatives. Furthermore, 62% supported integrating transparent communication campaigns and incentive programs to foster a collaborative and innovation-driven culture.

Technological Infrastructure:

70% of respondents indicated that existing technological infrastructure could support only basic operational needs. Over 65% recommended prioritizing the development of scalable solutions, such as cloud-based platforms and enhanced cybersecurity measures, to align with the framework's requirements.

Collaboration Mechanisms:

The majority (74%) agreed that fostering intra- and inter-departmental collaboration is essential for successful digital transformation. However, only 50% reported current practices as sufficient, highlighting a need for more structured collaboration mechanisms, such as cross-functional teams and industry partnerships.

These findings enforce the managerial insights into the framework's feasibility and highlight areas requiring further focus and enhancement to ensure successful adoption. The results underscore the importance of targeted leadership development, strategic investment in digital infrastructure, and fostering a culture of continuous improvement to support HCD transformation effectively.

Implementation Roadmap

To operationalize the proposed strategic framework, the following phased adoption model is recommended:

- Phase 1: Assessment and planning – Conduct comprehensive institutional audits to identify current capabilities and gaps.
- Phase 2: Pilot and feedback – Launch pilot projects to design and launch a leadership development plan to support HCD initiatives in a controlled environment.
- Phase 3: Full-scale implementation – Roll out digital transformation initiatives across the institution.

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- Phase 4: Continuous improvement – Establish mechanisms for regular evaluation and refinement of the strategic framework.

Key Success Factors

The study recommends several critical success factors for achieving HCD transformation in HEIs, which include:

1. Holistic leadership development – Programs integrating change management, visionary leadership, and continuous learning are essential.
2. Stakeholder engagement – Early and sustained involvement ensures alignment with institutional goals of the main academic activities for the teaching-learning process and research projects.
3. Scalable infrastructure – Investments in interoperable systems and cybersecurity measures provide a strong foundation.
4. Iterative feedback mechanisms – Regular feedback loops allow continuous refinement of strategies.
5. Recognition and rewards – Incentive programs motivate active participation in human-centered digital initiatives.

These findings indicate that the proposed strategic framework can address the key challenges of digital transformation and support HEIs in achieving sustainable and inclusive innovation.

Discussion

The findings of this study align with and extend the existing body of literature on digital transformation in HE. Previous studies have emphasized the importance of leadership and stakeholder engagement in facilitating organizational change (Kezar, 2018; Bolden et al., 2008; Maduforo et al., 2024). The results from this study further reinforce these concepts, demonstrating that developing effective leadership for HCD transformation is a critical component of establishing a digital university. Results highlight the feasibility of implementing the proposed framework and its alignment with stakeholders in Iranian HE. These findings affirm the practical applicability of the proposed framework. The results emphasize the critical role of HCD in shaping digital universities. HE policymakers and senior university leaders must prioritize stakeholder needs and actively involve them in decision-making. Aligning with the previous studies, the data revealed strong support for transparent communication campaigns and incentive programs to encourage stakeholders, underscoring the importance of fostering a culture of collaboration and innovation (Tegtmeier et al., 2022; Whelan-Berry & Somerville, 2010). Furthermore, the findings highlight the need to address digital readiness and infrastructure gaps. While most respondents endorsed advanced training modules to enhance digital skills, a smaller percentage rated their institution's current digital readiness as adequate. This discrepancy underscores the urgent need for technological solutions and capacity-building initiatives to empower leaders and support the successful implementation of the proposed framework. When guided by human-centered approaches, operating in a digital environment will not

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undermine the intrinsic values and significance of the teaching-learning process for faculty or students (Bower, 2017).

On the contrary, by integrating empathy and co-creation, the proposed framework can enhance engagement, satisfaction, and institutional outcomes (Greenhow & Lewin, 2016; NLEC, 2021; Castro Benavides et al., 2020). The strategic framework created in this research shows the value of focusing on context, emphasizing communication, and improving collaboration. The main message from this framework is that the provision of infrastructure and digital tools is a small part of the transformation of HCD, and it emphasizes that stakeholders' preparation through the development of university leadership guarantees the establishment of a digital university.

Conclusion

This study provides a comprehensive examination of how HEIs can navigate the complexities of digital transformation through a structured HCD. The findings emphasize the critical role of leadership development, stakeholder engagement, and adaptive infrastructure in driving successful digital transformation. The study identified specific success factors in shaping a HCD university, such as iterative feedback mechanisms, incentive programs, and tailored implementation guidelines. The research findings fill existing gaps in the literature by providing a comprehensive framework that integrates leadership, culture, and technology within the perspective of a fundamental transformation in HE, ensuring adaptability across diverse institutional contexts.

The empowerment of academic leaders emerged as a central theme throughout this study. Effective leadership can foster cultural alignment, enhance collaboration, and reduce resistance to change. Leadership development programs that combine technical skills with change management competencies are essential for equipping leaders to navigate the challenges of digital transformation. By promoting a clear vision and engaging stakeholders at all levels, academic leaders can create an environment where innovation thrives, and institutions remain agile in the face of evolving demands. Effective leadership can translate strategic objectives into measurable outcomes. As demonstrated in this study, leadership is a facilitator and the primary driver of sustainable transformation in HEIs.

HEIs should prioritize HCDs that align technological advancements with stakeholder needs and institutional goals to establish a digital university. Investing in leadership education and development, fostering a culture of continuous improvement, and creating advanced technology infrastructure are critical steps in achieving digital transformation. By applying the insights from this study, HEIs can position themselves as innovators and leaders in the evolving educational landscape. Moreover, the framework's emphasis on leveraging cutting-edge technological infrastructure alongside the engagement of trained and prepared stakeholders within a transformative cultural context can contribute to the successful implementation of this framework.

This study offers a roadmap for HEIs to embrace digital transformation while maintaining a human-centric focus. By understanding the intricate interplay of leadership, culture, and technology, institutions can effectively navigate the complexities of the digital age and create a more dynamic and responsive learning environment.

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Broader Implications for HEIs

The implications of this study extend beyond the validation stage, offering valuable results for HEIs preparing for digital transformation in Iran and globally:

1. Investment in Leadership: Institutions should prioritize leadership development programs that integrate technical expertise with change management skills, preparing leaders to guide digital transformation initiatives effectively.
2. Prioritizing Stakeholder Engagement: Active and early involvement of all stakeholders in the planning and validation phases of digital transformation is crucial to ensure alignment and a sense of shared ownership.
3. Investment in Scalable Infrastructure: Institutions should plan for and invest in scalable technologies that can adapt to evolving demands within the HE sector.
4. Fostering a Culture of Continuous Improvement: Universities should adopt a forward-looking mindset, viewing digital transformation as an opportunity rather than a challenge. Establishing regular feedback mechanisms within and across institutions can foster a culture of collaboration and innovation, enabling institutions to stay ahead in an increasingly dynamic educational landscape.

Declaration of Conflicting Interests

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Human Participants

The authors confirm that research involving human participants, or personal data complies with all legal and ethical requirements and other applicable guidelines.

Originality Note

The authors confirm that the manuscript is their original work, and if others' works are used, they are properly cited/quoted.

Use of Generative AI/ AI-assisted Technologies Statement

The author(s) claimed that there is "No Use of Generative AI/ AI-assisted Technologies" in preparing this research.

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Ms. Zohre Khajoueinejad is a PhD student in Educational Administration, Shahid Beheshti University, Iran. She is also a Visiting Graduate Student at the University of Calgary. Her research focuses on the leadership development needs of leaders in digital universities. She has experience teaching and administration in Iran's education system.

Dr. Gholamreza Shams is an associate professor at the Department of Education, Faculty of Education and Psychology, Shahid Beheshti University. He holds a Ph.D. in Educational Management and specializes in educational leadership, organizational behavior, and educational/training evaluation.

Farhad Seraji, Ph.D in e-Learning and Curriculum, is a full professor at the Department of Methods and Curriculum Planning, University of Tehran. His research focuses on blended learning, supporting systems in online learning, artificial intelligence in personalized learning, and formative assessment in online learning.

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