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Exploring Digital Agility and Digital Transformation Leadership:
A Mixed Method Study

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ABSTRACT

This study aims to explore and examine an integrated model predicting digital agility in higher education institutions. In the exploratory phase, semi-structured interviews were conducted with the heads of the institutions to understand their challenges in ensuring digital agility at work in higher education institutions. In the second phase, the integrated model derived from codes taken from interview responses was developed. The first study round identified factors affecting digital agility from word cloud and thematic analysis using grounded theory. Based on the common codes, themes were developed, and an integrated model comprising digital transformational leadership, internal branding, and digital self-efficacy was developed. Then, established measures were taken to test the model, while a novel scale was developed to measure digital agility. Hierarchical regression analysis indicated that digital transformational leadership impacts digital agility with intervening roles of internal branding and digital self-efficacy.

KEYWORDS

Branding Behavior, Digital Agility, Digital Leadership, Digital Self-Efficacy, Digitally Agile, Faculty Agility, Higher Education Agility, Internal Branding, Organizational Agility

INTRODUCTION

With increased demands from students and ranking institutions, preparing to fulfil future needs has become an ongoing activity in higher education institutions (Srivastava et al., 2020; Neuwirth et al.,

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2021; Srivastava & Chavare, 2023). Leaders, decision-makers, faculty members, staff, and students are all involved in making rapid decisions and adapting technological changes to meet deadlines and course plans (Neborsky et al., 2020). Traditionally, teaching and learning were related to classroom experience. However, post-pandemic, the emphasis on continuous development and evolvement of the teaching fraternity in higher education has become the key to sustainability and personal branding. Faculty members are specifically training themselves for technology upgradation, helping them to have better classroom interactions, awareness of novel and innovative pedagogies with technological involvement, and improved student learning experiences (Benavides et al., 2020; Menon & Suresh, 2022; Ramsay et al., 2019). Even though students are in the offline classroom, faculty and leaders continuously explore ways to make the in-class experience more expressive and conducive to long-lasting learning using technology, surpassing their age and experience barriers. This highlights that faculty members in higher education institutions have become agile in adopting digital technologies (Goulart et al., 2022).

Agility refers to an individual's capacity to adapt and respond to changing needs and new challenges (Park & Park, 2021; Ivanov, 2022). It involves swift and graceful movement, creative thinking, and flexibly and effectively maintaining coordination, balance, and timely reactions to address concerns (Cegarra-Navarro et al., 2016). In line with its true essence, digital agility is a term that describes an individual's ability to adapt and respond to constant transformations in digital technology and the environment (Grover, 2022). It encompasses quickly learning and proficiently adopting novel platforms and tools (Seale et al., 2010).

Scholars have recognized the relevance of digital agility in an era where technology is altering various aspects of life, including work, thinking, learning, collaboration, and communication, all aimed at remaining competitive and relevant in the surrounding context (Salmela et al., 2022; Troise et al., 2022). Overall, possessing digital agility is essential in today's fast-paced digital world, offering an advantage in navigating the ever-shifting digital landscape (Troise et al., 2022; Jayawardena et al., 2023). However, there are three main gaps in the literature:

- Most studies have focused on qualitative understanding.
- Statistical investigations were simple cross-sectional studies, lacking generalizability and causal effects (Akkaya & Tabak, 2020)
- Few studies have employed mixed-method approaches to evaluate the factors affecting digital agility in non-business contexts.

Hence, the primary objective of this study is to employ a mixed-method approach to explore and examine the factors influencing the digital agility of faculty members in the context of higher education institutions.

In enhancing digital agility in higher education, the significance of tech-savvy leaders and faculty members' confidence in adapting to digital changes is evident. Research shows that faculty members who skillfully embrace technology contribute significantly to their institution's ability to adapt swiftly (Instefjord & Munthe, 2017). Similarly, leadership plays a role in determining how quickly changes are accepted and put into practice. The way leaders support the well-being of their teams, both physically and mentally, and their adept use of technology is crucial (Ismail et al., 2021). Leaders who willingly offer unwavering support to their teams, even during challenging times like the pandemic, demonstrate transformative leadership qualities, strengthening the long-term sustainability of higher education institutions (Morland et al., 2019; Brix, 2017).

Moreover, the evolving role of faculty members adds another layer. They adopt virtual and blended teaching methods and shoulder administrative tasks and research responsibilities online to uphold institutional commitments to students and stakeholders. This dynamic shift further enhances their agility by showcasing principles of internal branding. This transformative process requires significant adjustments in traditional teaching and learning practices. In sum, the interplay of technology-oriented

leadership and faculty's adaptability, along with leaders' support and transformative qualities, shapes the agility of higher education institutions. Additionally, the evolving role of faculty in embracing online responsibilities cements this agility and reflects a changing educational landscape.

In this context, the dynamic capabilities theory is a practical approach to evaluate how institutions create and maintain a competitive advantage in the digital age (Teece, 2012; Macher & Mahoney, 2016; Prajogo & Ahmed, 2019). This theory emphasizes developing and utilizing dynamic digital capabilities with robust digital leadership to equip institutions to adapt to changes. However, limited literature has applied this theory in non-business contexts like education, hindering its generalizability to other domains. Similarly, despite the acknowledged relevance of leadership, it remains an under-researched area in the literature (Andriopoulos & Lewis, 2009; Lee & Rhee, 2020; Helfat & Martin, 2015). Moreover, few studies have analyzed the theory using mixed methods research designs.

Thus, to address these research gaps, this study seeks to explore and examine the significance of digital transformational leadership concerning digital agility within the context of higher education institutions context. Furthermore, the study aims to evaluate the mediating role of digital self-efficacy and internal branding between digital transformational leadership and the digital agility construct through mixed method analysis.

This paper contributes to the ongoing literature on digital dynamic capabilities, digital leadership, and digital agility. The study also supports the development of a scale to measure digital agility in higher education institutions. It extends the understanding of the relationship between digital transformational leadership and digital agility, including its intervening factors.

The paper commences with an introduction, followed by the theoretical framework and literature review for hypothesis development. Subsequently, the methodology and findings are presented, followed by a discussion of implications and the scope for future research (Brix, 2017; Morland et al., 2019).

THEORETICAL FRAMEWORK

Dynamic Capabilities Theory (DCT)

The dynamic capabilities theory originated from established strategic management theories like the resource-based view and core competencies theory. Professor Teece introduced this theory to elaborate on how organizations can attain and sustain competitive advantages. Teece (2017) categorized dynamic capabilities into three aspects:

a. The ability to sense and influence market opportunities and threats.
b. The ability to capitalize on opportunities by utilizing resources and competencies.
c. The ability to progressively transform an organization's capabilities to outpace competitors.

This theory extended the strategic approach by embracing a more adaptable and responsive perspective, emphasizing the capacity of individuals or institutions to develop and employ capabilities to adapt to market changes. The Dynamic Capabilities Theory (DCT) expounds on establishing and upholding competitive advantages through cultivating and utilizing dynamic capabilities, including adjusting to dynamic market conditions, learning new technologies, and adapting to environmental shifts. The theory underscores the notion that dynamic capabilities can be nurtured by leveraging strategic resources such as knowledge, skills, and technologies to innovate and attain competitiveness. It encompasses capabilities that involve technology and digital transformation practices to navigate digital shifts effectively.

Furthermore, the theory accentuates the pivotal role of robust digital leadership in facilitating the proficient development of dynamic digital capabilities, which can foster digital agility. Digital leaders possess the ability to discern the potential of emerging digital technologies and practices.

They adeptly mobilize their teams to embrace changes and integrate them harmoniously to achieve common objectives in their operations, thus ensuring an agile response to digital technologies.

LITERATURE REVIEW

Digital Transformation Leadership (DTL)

Digital transformation leadership (DTL) revolves around function-based leadership in which leaders assume the role of change agents within the digital landscape. In simpler terms, DTL drives organizational change by strategically implementing digital technologies and methodologies, which demands a higher-level understanding of the importance and application of these technologies, enabling leaders to leverage them for achieving desired business outcomes. This understanding empowers leaders to conceive new opportunities and equips them with the skills to effectively communicate and inspire others to embrace transformative change (McCarthy et al., 2021).

In higher education, effective DTL involves a willingness to take calculated risks and experiment with innovative ideas to enhance the student experience, which encompasses creating inventive learning management systems, using data analytics for informed decision-making, and pioneering technology-integrated pedagogical methods. DTL must remain committed to ongoing learning and refinement, navigating the evolving digital landscape while fostering a culture of innovation. Striking a balance between the demand for innovation and the imperative to maintain academic rigour and quality demands a comprehensive understanding of how technology can complement, rather than replace, traditional teaching approaches (Ly, 2023).

On the digital transformation journey, DTL leaders demonstrate proficiency in navigating complex organizational structures, cultivating strong relationships with stakeholders and departments, and building consensus on strategic direction and transition timelines, which requires interpersonal dynamics and teamwork skills and the ability to navigate ambiguity and uncertainty. It involves defining precise objectives, coordinating resource allocation and priorities, managing risks and interdependencies, and remaining adaptable to changing circumstances (Khalid et al., 2023; Wang et al., 2022).

Digital Agility

Digital agility refers to an individual's ability to adapt to shifting environmental or institutional demands by effectively utilizing digital technologies (Salmela et al., 2022; Zhang et al., 2023). In higher education, digital agility encompasses an institution's skill in leveraging digital technologies and processes to advance its core mission of educating students, conducting research, and serving the community (Seale et al., 2010). This involves embracing new digital tools and platforms and nurturing an innovative and experimental culture to facilitate continuous learning and growth (Choudhury et al., 2021).

For instance, implementing online learning platforms and tools enabled remote student engagement amid the pandemic, which required not only training faculty in technology use but also developing new pedagogical strategies to effectively leverage these tools, thus exemplifying digital agility (Sethi et al.,2021; AlNuaimi et al., 2022; Kamdjoug et al., 2023). Similarly, digital agility comes to the forefront when digital technology is harnessed to accomplish various objectives, including initiating research and scholarly pursuits through data analytics. It extends to preparing students to navigate rapidly evolving digital landscapes and competitive higher education markets. It fosters a proactive approach to learning and experimentation with emerging technologies to adapt to digital shifts and improve student learning outcomes. Moreover, it involves staying well-informed of the latest developments in educational technology to maintain a leading edge in effective teaching methods.

Implementing blended, experiential, and virtual learning pedagogies further underscores digital agility, resulting in interactive and engaging educational experiences, which extends to creating

captivating courses that incorporate multimedia, interactive simulations, games, and proficient organization of course content. In addition, digital agility encompasses effective communication with students, monitoring individual progress, and delivering real-time feedback within classroom discussions. Analytics tools also play a crucial role in enhancing precision and efficiency in assessment administration, enabling educators to refine their teaching approaches. Beyond the student level, digital agility facilitates faculty professional development and fosters collaborative opportunities. Furthermore, it underscores the commitment to establishing an inclusive learning environment that is accessible to all students, ensuring equitable educational experiences for everyone involved. Digital agility is deeply integrated into various facets of higher education institutions.

Digital Transformation Leadership and Digital Agility

Research has indicated that digital transformation leadership can inspire employees to adopt, experiment with, and proficiently utilize digital technologies with agility (Khalid et al., 2023). In higher education, notable initiatives led by deans and department heads, such as implementing tools for online collaboration, data analytics, learning management systems, and internet connectivity, stand as examples (Thurab-Nkhosi, 2018). These initiatives showcase the tangible benefits of present-day technologies in both professional and personal spheres, effectively influencing their teams.

Hence, digital leaders collaborate closely with students, faculty, staff, alums, and industry partners to identify emerging trends and technologies (Pucciarelli & Kaplan, 2016). This collaboration is the foundation for developing innovative solutions that enhance the institution's reputation and relevance (Wang et al., 2022). Flexibility and adaptability can respond to market shifts, legal frameworks, and evolving student needs (Henderson et al., 2018). Encouraging cross-functional collaboration among various departments and units facilitates the exchange of ideas and the dissemination of best practices (Lin et al., 2015).

Thus, digital leadership, in essence, assumes the role of a positive example by adopting effective digital practices, which encompasses utilizing collaborative tools, leveraging data for informed decision-making, and embracing emerging digital trends. Such leadership also entails providing access to cutting-edge tools, technology, mentorship, and training programs (Wang et al., 2022; Lin et al., 2015).

The strategic initiatives leaders undertake to streamline infrastructure and resources while concurrently comprehending the augmentative role of technology in traditional teaching methods can significantly strengthen faculty members' confidence in digital technology usage for teaching and research. Empowering employees, nurturing innovation, and embracing new digital technologies and work methodologies foster an environment where taking calculated risks is encouraged without the specter of failure, thereby boosting elevated digital self-efficacy.

Scholars have conceptualized digital self-efficacy as an individual's confidence in comprehending and mastering emerging digital technologies (Francisco, 2019). Improved self-efficacy engenders trust in leadership and the organization, culminating in a heightened sense of belonging (Srivastava & Dhar, 2019), in which heightened self-efficacy motivates individuals to harness technology with assurance, driving career growth and personal advancement. Trust and self-efficacy are founded on a harmonious alignment with organizational identity. This alignment drives voluntary behaviour that upholds corporate values, mission, and objectives, thus demonstrating internal branding behaviour (Srivastava et al., 2020), which interlaces stakeholders with the institution's culture through branding principles, fostering clarity of purpose and direction (Srivastava et al., 2019). Internal branding nurtures a culture of digital agility and facilitates the seamless assimilation of new technologies and swift adaptation to the digital landscape.

Although this behaviour may not directly affect digital agility, it boosts the intricate connection between digital self-efficacy and digital agility. A robust internal branding strategy fosters innovation and experimentation, reinforcing faculty members' belief in their capacity to learn and wield digital

technologies. Faculty members recognize the institution's investment in their skills, thus enhancing their inclination to cultivate their digital agility and apply digital tools to augment their roles.

In conclusion, the interplay between digital transformation leadership, internal branding, and digital self-efficacy collectively influences the institution's digital agility, which leads us to delve deeper into our central research query: "Does digital transformation leadership play a pivotal role in fostering digital agility within higher education institutions in India?"

Based on this question, the examined theory, and the available data, we propose that-

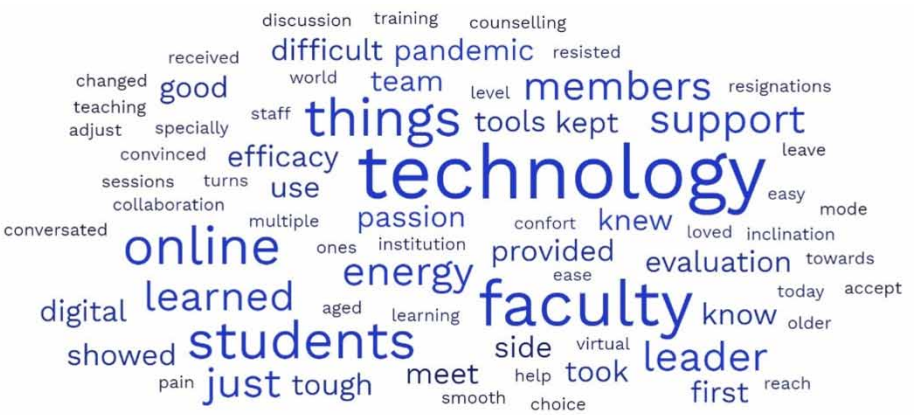
Hypothesis 1: Digital transformation leadership predicts digital self-efficacy
Hypothesis 2: Digital self-efficacy affects digital agility
Hypothesis 3: Internal branding acts as a moderator between digital self-efficacy and digital agility.

The conceptual model (see Figure 1) shows the hypothesis of the current study.

RESEARCH METHODOLOGY

The researchers employed a sequential exploratory design to investigate the relationship between digital transformational leadership and digital agility. This design allowed for a comprehensive exploration of the phenomenon by sequentially combining qualitative and quantitative data collection and analysis methods (Cresswell, 2009; Dewasiri & Abeysekera, 2022), which was initially designed considering six components of a research design: the aim of the study, investigation types, interference of the researcher, analysis unit and time perspective (Sekaran, 2003). The qualitative phase involved in-depth interviews to gather rich insights into the experiences and perceptions of leaders and faculty members regarding digital transformation. The quantitative phase utilized surveys to quantify digital transformational leadership's impact on faculty members' digital self-efficacy and agility. The main limitation of the sequential exploratory design was its time-consuming nature, resource intensiveness, and interpretation complexities. The researchers minimized the methodological limitations by having more diverse resources and skill sets in the research team. As strengths, integrating qualitative and quantitative methods provided a holistic understanding, enhancing the robustness and depth of the research findings while aiding in developing and refining measurement tools by identifying relevant items and constructs that can be further tested quantitatively (Dewasiri et al., 2018).

Figure 1. Conceptual model of the current study
Source: Authors



Phase 1: Semi-Structured Interviews

Respondents' Criteria and Demographics

We collect data for the first phase from a population of heads (like directors and deans) and faculty and staff members in higher education institutions through a semi-structured interview method (See Table 1) based on two primary criteria as given below.

1. The institution should have an experience of managing talent during remote learning of students;
2. Institution should come under NIRF top 50 ranking.

The National Institutional Ranking Framework (NIRF) is a system of rankings developed by the Indian government to assess higher education institutions throughout the nation based on numerous factors, including teaching, research, and infrastructure. The value of the NIRF rating comes from the fact that it aids parents and students in selecting a higher education institution by providing them with information they can use to make educated selections. The ranking also serves as a benchmarking tool for institutions, helping them spot areas where they can improve and raise the caliber of their operations. Additionally, it encourages academic institutions to strive for excellence in all performance areas by fostering healthy competition among them.

Further, prospective respondents were identified using the following criteria –

1. Have a work experience of more than five years.
2. Have monitored/contributed to institution building during the pandemic phase/ remote teaching and learning phase.

SAMPLE SELECTION

The study sample is from the population of higher education institutions through the purposive sampling technique. In qualitative analysis, purposive sampling is crucial because it enables the selection of participants who are most likely to contribute rich and pertinent material for analysis. Using this sampling strategy, the researcher can target particular people or groups with experiences or knowledge relevant to the research issue, making finding themes and patterns in the data more accessible. The institution code number and the respondent's initials were coded with the names of all respondents chosen for data collection to protect anonymity. For instance, if the institution code was one and the respondent's initial was KR, the code would be 1_KR (See Table 1).

DATA COLLECTION

First, a literature review on the variables influencing digital agility was conducted to gain a strategic perspective on this field's potential new directions. Then, utilizing a semi-structured questionnaire,

Table 1. Respondent demographics for phase 1 data collection

Respondents	Average Work Experience	Education Qualification (Highest)	Average Age (in Years)	Gender
Heads (deans/ directors)	Approx. 8.3 years	PhD	39.2	5 male 3 females (8)
Teachers	Approx. 6 years	PhD	31.5	11 females 3 male (14)
Staff	Approx. 9 years	Graduation	35	6 female 7 male (13)

Source: Authors

we conducted personal online interviews to collect personal data. All respondents were contacted conveniently via online meeting platforms (such as Google Meet and Microsoft Teams). The authors shared the online meeting link and set the timeslots with the respondents. Respondents were asked to use coded names only for interviews to maintain anonymity. The research topic was initially explained to them, and they were assured that their answers would be kept personal and utilized solely for academic and research purposes. Each interview lasted between 25 and 40 minutes, and with the subjects' permission, it was recorded or photographed. The responses of the respondents were then examined and re-asked for clarification. This method was used to understand respondents' viewpoints on digital agility in higher education institutions.

The data saturation threshold was established where "no new data, no new themes, no new coding, and the ability to replicate the study" existed (Fusch & Ness, 2015; p. 1409). Additionally, the data's thickness (i.e., the number of data about its population) and richness (i.e., how many layers, complex details, comprehensiveness, and nuanced) were assessed (Dibley, 2011; Burmeister & Aitken, 2012; Guest et al., 2006). 13 heads of higher education in leadership positions from 4 institutions were thus considered for the data-gathering process, after which the data was saturated. In the final round, member-checking was conducted, where participants were allowed to review the extracted themes and confirm their accuracy.

THEMATIC ANALYSIS

Thematic analysis is used to find patterns or themes in data. Coding is a multi-step procedure in a theme analysis, as given below.

1. Create codes to label significant data segments after becoming familiar with the data.
2. Create a codebook by grouping codes into probable topics, reviewing, refining, and naming themes.
3. Review and amend codes, apply the codebook to the remaining data, and
4. Then, analyses the themes to derive learnings and inferences from the data.

Investigators must be open to fresh perspectives and adjust the analysis as necessary because the process might be iterative.

ANALYTICAL APPROACH

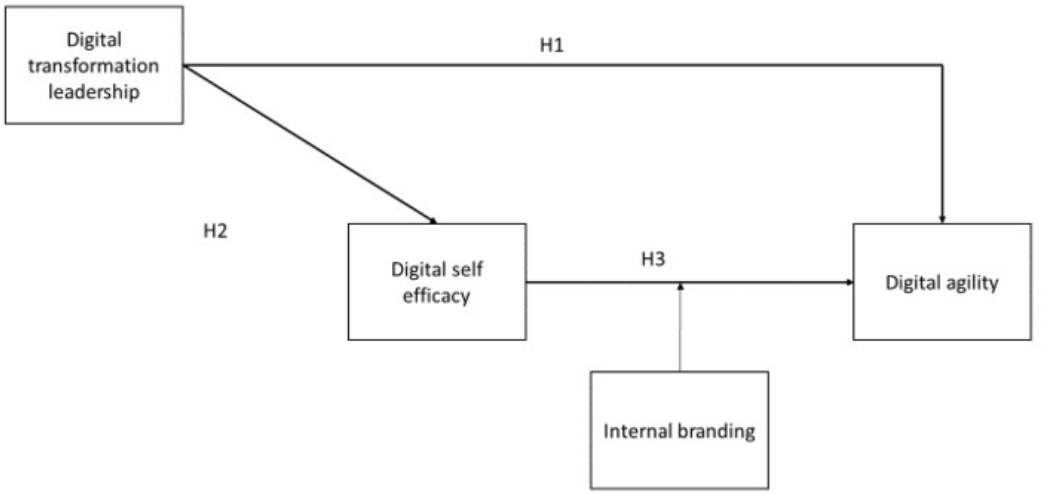
IPA is a qualitative research approach focusing on how people interpret their experiences. The procedure entails conducting in-depth interviews, going over the data to look for trends and themes, and understanding the interpretations and meanings that participants give to their experiences. It is a valuable tool for academics to comprehend people's subjective experiences(see Figure 2).

Based on this analysis, four broad themes were identified –

Digital transformation leadership – "Our directors put much effort into sustaining a strong sense of connection and community inside their institutions, even in a virtual setting. They comprehend the significance of encouraging a sense of engagement and belonging."

Digital agility- "Our deans effectively pushed their staff to be innovative and think beyond their comfort zones, developing an innovation culture within their organizations, which required developing an open climate which fosters experimentation and risk-taking and accepting and honouring innovative ideas and activities."

Figure 2. Word cloud
Source: Authors



Digital self-efficacy- "We had little experience with digital tools but improved our familiarity with them through online training, MOOCs, and counselling. The university offered technical assistance, instructional manuals, and online training sessions".

Internal branding- "There were times when we struggled to fully understand the advantages of what was required of us, and we might not have fully appreciated the importance of building the institution's reputation internally. We acquired knowledge, educated ourselves, and discovered as the process continued. Additionally, universities were not fully putting employee engagement at the front of their priorities as things were changing."

Phase 2: Quantitative Analysis

Sample Criteria and Selection

In the second phase, we gathered data regarding overarching concepts, which originated from the themes identified in the initial stage. We acquired this data directly from the heads of the institutes and the respective faculty members. The selection of institutions for this phase adhered to distinct criteria: the establishment of the institution must have occurred a decade ago, it should have secured a position among the top 50 in the NIRF 2022 ranking, maintenance of staff levels should have been upheld throughout the pandemic, and incorporation of online, virtual, and blended teaching approaches for students between 2019 and 2022 was imperative.

Based on these criteria, four universities operating in Maharashtra, India, were chosen for the subsequent data collection process. Faculty members were selected based on the following criteria: having a teaching experience of more than three years, having worked before and during the pandemic, and having familiarity with at least two distinct digital teaching and learning pedagogies. Meanwhile, leaders were selected using the same criteria as applied in the first phase of this study. The demographic details are provided in Table 2.

Collecting data entailed using questionnaires, where we employed Google Forms to distribute these forms among the chosen participants. Each questionnaire came with a consent form serving as a cover letter. This cover letter explicitly delineated the study's objectives and its extent. Furthermore, respondents were assured that exclusively consolidated data would be employed strictly within academic and research objectives. Numerical codes were allocated to faculty and leaders within

Table 2. Respondents demographics for the phase 2 data collection

Respondents	Average Work Experience	Education Qualification (Highest)	Average Age (in Years)
Heads (deans/ directors)	Approx. 10.9 years	PhD	41 (approx.)
Teachers	Approx. 6.3 years	PhD	34 (approx.)

Source: Author's own

each university to safeguard anonymity and confidentiality; utilizing a 7-point scale, all respondents submitted their inputs.

MEASURES

The "Digital Agility Measure" was developed for this study. The scale for assessing the digital agility of higher education institutions was constructed following Churchill's well-established scale development methodology (1979) and Hinkin's scale development and improvement plan (1995). The scale development process encompassed stages of scale generation, refinement, purification, and validation. The foundation for the development of items for digital agility was drawn from the workforce agility scale proposed by Breu et al. (2003) and Muduli (2016). This study incorporated workforce agility's adaptive, developmental, flexible, competent, collaborative, speedy, and informative attributes.

The items for the scale were generated based on insights collected from the literature review and interviews conducted during the first phase. Key concepts and variables related to digital agility were identified for measurement, ensuring they were neither redundant nor overlapping. Subsequently, these items were transformed into a Likert scale format. A total of 17 instructors from two institutions in Pune, India, were randomly selected to evaluate the questions based on their understanding of agility in digital transformation. Following this screening, 21 questions were retained for the refining stage.

The refining stage involved gathering input from faculty members employed by private business schools. A total of 39 teachers were randomly chosen to participate. Respondents were prompted to reflect on the procedures they and their teams had used to incorporate technological interventions into blended, virtual, and online lessons for remotely enrolled students. They were required to rate these procedures on a scale from 1 (strongly disagree) to 7 (strongly agree). As the form was distributed online, a 100% response rate was achieved, and there were no missing values. The responses were collected methodically to lessen any response bias. Most of the respondents were females within the age range of 30 to 38.

The scale was refined using an item-to-total correlation test, following Churchill's approach (1979). Items with low correlations to the total were eliminated, resulting in 17 out of the initial 21 questions being retained. Exploratory Factor Analysis (EFA) was conducted on 72 instructors, using Promax oblique rotation and maximum likelihood estimation. EFA aimed to determine the dimensionality of the primary construct. Kaiser-Meyer-Olkin (KMO) reported satisfactory sample adequacy (KMO = 0.924), and Bartlett's sphericity test indicated the suitability of the measures (chi-square = 1804; df = 55, p = 0.000) (Kaiser, 1974). The factor analysis revealed 11 components converging onto a single factor (Table 3).

Finally, to validate the 11-item scale, independent data were collected from a sample of 81 faculty members, and the scale's reliability was assessed. The sample had an average age of 34 and an average educational level of a Ph.D. The calculated Cronbach's alpha reliability coefficient was 0.978, signifying a high level of consistency in the responses provided to the questionnaire.

Table 3. Factor loadings from EFA for digital agility

Items	Loadings
I can quickly adapt and respond to the changing digital landscape	0.872
I have the ability to rapidly and proactively respond to market changes, student needs, and emerging trends	0.652
I can leverage digital tools and technologies to automate manual tasks	0.926
I can leverage digital tools and technologies to enable collaboration across teams	0.962
I can quickly learn and adapt to new technologies, processes, and best practices	0.987
I can support institutions to remain competitive and enhance student experiences	0.978
I can quickly shift to online or hybrid learning models	0.986
I can experiment with new technologies and teaching methods	0.977
I take the shortest possible time to develop my skills, adjust to new environment, and collect information	0.980
I take a personal interest in collecting information about my organization and other related organization	0.973
I have the potential to transform the way we teach and learn	0.975

Source: Authors

Digital transformation leadership: In this study, digital transformation leadership was measured through an adapted scale provided by Weber, Krehl, & Büttgen (2022);

Digital self-efficacy was gauged through an adapted scale primarily provided by Ulfert-Blank & Schmidt (2022);

Internal branding was gauged on a modified scale initially provided by Punjaisri & Wilson (2007) and Aurand, Gorchels, & Bishop (2005).

Exploratory factor analysis was conducted to check each measure's compatibility in our context. All the questionnaires were examined on a scale of 1 to 7, with one as strongly disagree and seven as strongly agree.

ANALYTICAL APPROACH

A comprehensive set of tests that covered internal consistency, validity, and reliability evaluations was executed using SPSS version 20 To assess the appropriateness of each measurement within the study's specific context. The reliability of each size was determined using the Cronbach's alpha reliability test. To evaluate the validity of each measure concerning the current sample, discriminant and concurrent validity tests were implemented. The assessment of internal consistency for each scale involved examining factor loadings and calculating Average Variance Extracted (AVE) estimates.

Furthermore, correlation tests were employed to gauge the extent of association among the variables in the hypothesized model. A confirmatory factor analysis was executed using AMOS software to evaluate the model's overall fit. Additionally, hierarchical regression analysis followed the guidelines outlined by Baron and Kenny (1985) using SPSS to scrutinize variables' direct and indirect effects.

The mediation effect or indirect effect was tested as per the instructions of Baron and Kenny (1986). The initial phase of this process included analyzing the impact of the Independent Variable (IV) on the Dependent Variable (DV), the IV on the mediator, and the mediator on the DV. Following Baron and Kenny's guidance, complete mediation is established if the effect of the IV on the DV becomes non-significant after the mediator's introduction. In cases where the impact of the IV on the DV remains significant even as its strength diminishes, this indicates partial mediation by the mediator.

To investigate the moderation effect, the regression analysis included the interaction term between the independent and intervening variables, which was regressed against the dependent variable.

The independent variable was subjected to standardization to address potential concerns related to multicollinearity. Furthermore, multicollinearity was assessed using the Variance Inflation Factor (VIF) test. The VIF test evaluates the possible increase in estimated variances of regression coefficients due to linear relationships among independent variables (Neter et al., 1996). As Pare and colleagues (2007) outlined, VIF values equal to or exceeding 5 indicate a substantial likelihood of multicollinearity within the proposed model (p. 344). In the current model, the VIF results ranged from 1.107 to 1.453, demonstrating a favourable association between the factors and effectively alleviating concerns related to multicollinearity.

RESULTS

The Cronbach's alpha reliability test was performed to compute the average correlation among all the items within each measure, aiming to assess the reliability of each variable. The estimates obtained from the Cronbach's alpha reliability test were consistently above 0.7 (Cronbach, 1951), as depicted in Table 4. The Average Variance Extracted (AVE) and Composite Reliability (CR) were calculated to assess the scale's convergent validity. These metrics were utilized to measure the degree to which the items within the scale converge toward the fundamental construct under consideration. Notably, the obtained estimates exceeded the established benchmark of 0.5, signifying satisfactory convergent validity (Hair et al., 2010). This outcome underscores that all measures demonstrated convergent validity, indicating that the items within each scale effectively evaluate the same underlying construct.

Moreover, a cross-loading matrix was generated for the measurement model, and items demonstrating cross-loadings within each measurement were excluded. Only objects with loadings surpassing 0.50 were retained, taking into account the size of the sample. These controlled items significantly underscored the individuality of each measurement and their compelling portrayal of distinct concepts, as evidenced in Table 5.

We used the square root of the Average Variance Extracted (AVE) for each construct juxtaposed with the correlations between the constructs to evaluate discriminant validity. Notably, the correlation coefficients between the constructs were lower than the square root of AVE for each construct, indicating robust discriminant validity for the measures, as depicted in Table 4. Furthermore, internal consistency for each measurement was assessed based on factor loadings exceeding 0.4 and AVE estimates surpassing 0.5, in line with the criteria set forth by Hair et al. (2010).

Table 4. Descriptive analysis results

Variables	Mean (Standard Deviation)	AVE	CR	Cronbach Alpha	Correlation			
					DTL	Digital Efficacy	Digital Agility	Internal branding
Digital efficacy	2.17 (1.09)	0.732	0.980	0.978	**0.855**	.489	.378	.039
Digital transformational leadership	1.81 (0.98)	0.713	0.975	0.977		**0.844**	.497	.289
Digital agility	2.11 (1.01)	0.641	0.951	0.947			**0.801**	.170
Internal branding	2.77 (1.19)	0.612	0.934	0.938				**0.782**

Note: Discriminant validity- the correlation value must be less than the square root of AVE (given in diagonal) (Fornell and Larcker, 1981),
** p<0.01
Source: Authors

Table 5. Factor loadings and cross loadings

Pattern Matrix[a]					
	Component				
	1	2	3	4	5
EFF1	**.688**	.077	-.017	-.123	.002
EFF2	**.899**	-.072	-.013	.075	.069
EFF3	**.867**	-.036	-.113	.061	-.042
EFF4	**.705**	.029	-.019	-.045	.062
EFF5	**.934**	.062	-.063	-.016	.069
EFF6	**.939**	-.105	.005	.039	.066
EFF7	**.984**	-.033	-.061	-.006	.044
EFF8	**.927**	-.052	-.080	.013	-.035
EFF9	**.932**	.003	.009	-.044	-.085
EFF10	**.870**	.051	.044	-.012	-.053
EFF11	**.907**	.040	.047	-.035	-.079
EFF12	**.835**	-.098	.004	-.003	-.145
EFF13	**.890**	.005	.099	-.017	-.067
EFF15	**.877**	.028	.098	-.027	-.048
EFF16	**.816**	.126	.021	-.007	.170
EFF17	**.764**	-.069	.060	.018	.063
EFF18	**.907**	.036	-.024	.026	.077
EFF19	**.783**	.007	-.069	.106	-.030
DTL1	.045	**.779**	.118	.052	.025
DTL2	.086	**.697**	.064	.130	-.105
DTL3	.023	**.805**	.022	.060	-.108
DTL4	.084	**.802**	.053	-.035	.020
DTL5	-.002	**.783**	.113	-.013	-.047
DTL6	.111	**.827**	-.035	-.075	-.276
DTL7	-.010	**.895**	-.018	-.086	.385
DTL8	-.004	**.900**	-.031	-.073	.384
DTL9	-.021	**.930**	-.020	.007	.164
DTL10	.006	**.948**	-.104	-.066	-.180
DTL11	-.055	**.934**	-.047	.056	.200
DTL12	-.104	**.959**	-.013	.052	.066
DTL13	-.103	**.958**	-.006	.060	.070
DTL14	-.040	**.940**	-.087	-.019	-.166
DTL15	-.025	**.847**	-.003	-.004	.452
DTL16	.111	**.764**	.022	-.004	.427

continued on following page

Table 5. Continued

Pattern Matrix[a]					
	Component				
	1	2	3	4	5
AG1	.064	-.104	**.681**	-.022	.134
AG2	-.129	-.072	**.822**	-.209	-.060
AG3	-.073	.074	**.889**	-.057	.043
AG4	-.005	-.048	**.903**	-.010	.015
AG5	.039	.048	**.892**	.035	.026
AG6	.033	-.072	**.797**	.098	.236
AG7	-.091	-.115	**.942**	.151	-.014
AG8	-.020	.077	**.718**	.002	-.167
AG9	.158	.146	**.753**	-.035	-.016
AG10	.071	.162	**.753**	-.053	-.028
AG11	-.047	.018	**.833**	.068	-.009
IB1	.011	.210	.027	**.745**	-.065
IB2	-.082	.130	-.059	**.873**	-.003
IB3	.039	-.004	-.021	**.773**	-.140
IB4	.064	-.069	-.040	**.811**	.013
IB5	-.065	-.026	-.047	**.882**	.015
IB6	.025	.007	.017	**.820**	.095
IB7	.009	-.078	.053	**.778**	.139
IB8	.066	-.025	.019	**.769**	-.012
IB9	-.032	-.013	.021	**.903**	-.051

Source: Authors

Confirmatory factor analysis demonstrated a favourable fit for the model. Modification indices were employed to refine the model fit. Key fit indices included the Comparative Fit Index (CFI) at 0.914, Incremental Fit Index (IFI) at 0.914, Tucker-Lewis Index (TLI) at 0.905, Normed Fit Index (NFI) at 0.872, and Root Mean Square Error of Approximation (RMSEA) below 0.077. Additionally, the ratio of chi-square to degrees of freedom was 2.743 (CMIN/DF < 3), further affirming the model's sound fit (chi-square = 3535.112; df = 1289), following Hu and Bentler (1999).

The hierarchical regression analysis revealed a positive and significant impact of Digital Transformation Leadership (DTL) on digital agility and self-efficacy supporting H_1. Furthermore, digital self-efficacy was identified as a partial mediator between DTL and digital agility (partially supporting H2). Upon introducing digital self-efficacy into the regression equation, DTL's effect remained significant but decreased, as Baron and Kenny (1985) outlined. Sobel test results and bootstrapping findings, both upper and lower-level non-zero estimates, corroborated the significance of the indirect effect of internal branding. A notable shift in variance further indicated the importance of each variable's contribution.

However, contrary to Hypothesis 3, the analysis demonstrated an insignificantly negative effect of internal branding on strengthening the association between digital self-efficacy and digital agility (refer to Table 6). In essence, the interaction effect between internal branding and digital self-efficacy negatively impacted digital agility.

Table 6. Hierarchical regression analysis results

Dependent Variable	Digital Efficacy		Digital Agility					
Variables								
Intercept	1.013	0.160	1.409	0.599	0.570	1.044	1.062	1.105
Control variables								
Age_faculty	0.085	0.119	-0.131	-0.099	-0.121	-0.161	-0.161	-0.168
Experience _faculty	-0.144	-0.013	-0.317	-0.192	-0.190	-0.265	-0.280	-0.291
Age_leaders	-0.096	-0.044	-0.067	-0.018	-0.009	-0.032	-0.032	-0.030
Experience_leaders	-0.163	-0.065	-0.089	0.007	0.019	-0.027	-0.025	-0.028
Step 1								
DTL		0.489***		0.465***	0.374***			
STEP 2								
Digital efficacy (A)					0.186**	0.360***	0.353***	0.375***
STEP 3								
Internal branding (B)							0.167**	0.185***
STEP 4								
*INTERACTION (A*B)*								-0.047
R Square	0.022	0.246	0.069	0.271	0.297	0.196	0.224	0.226
F Value	1.759	20.530***	5.863***	23.414***	22.100***	15.373***	15.095***	13.047***

Note:
*** represents p<0.000;
** represents p <0.05;
*represents p<0.5
Source: Authors

DISCUSSION

The primary research objective of this study was to comprehensively understand, explore, and analyze the impact of digital transformation leadership on digital agility. To achieve this aim, a mixed-methods analysis incorporating qualitative and quantitative approaches was employed to assess the predictability of Digital Transformation Leadership (DTL) on digital agility.

The study's qualitative phase highlighted that the capacity to transform challenges into opportunities was recognized within higher education institutions. Regardless of the staff size or the leadership approach taken before the pandemic, it became apparent that evolution is an ongoing and essential process within higher education. On one hand, leaders who embraced technology as the future motivated their staff to upgrade their skills. On the other hand, leaders who adopted technology primarily for market sustainability encouraged their staff to align with students' and market demands. In both scenarios, the integration of digital technology was enforced upon faculty members, fostering a state of readiness for significant technological shifts in the educational landscape.

In alignment with Hypothesis 1, the study revealed a positive and significant influence of digital transformation leadership on digital self-efficacy. This finding underscores the notion that leaders who embrace a digital mindset can empower their staff and followers to build confidence in utilizing digital tools to surmount operational challenges and streamline routine tasks. Transformational leaders are recognized for cultivating a shift in work culture, fostering a mindset of assurance and confidence. In this environment, followers are encouraged to take risks and enhance their skill sets. Similarly, within higher education institutions, digital transformation leaders can foster an atmosphere of innovation and trust, which, in turn, nurtures a sense of heightened efficacy among faculty members. This

conducive culture ultimately influences faculty and staff members' intentions to remain committed to the institution, upskill themselves, and contribute to its growth. It also cultivates a perception among faculty that the institution values their expertise and knowledge, prompting them to embrace continuous learning. The example set by leaders instills confidence in digital technologies, motivating others to utilize them without apprehension.

Following the hypotheses, the findings demonstrated that digital self-efficacy is pivotal in driving digital agility among faculty members. This insight elucidates a fundamental principle: higher self-efficacy among educators leads to cultivating a proactive attitude towards learning. Teachers are more inclined to expand their subject expertise and integrate technology into the classroom. The initial perception of technology use as a lack of familiarity among faculty members has evolved. Contemporary digital technologies, propelled by the pandemic, have transformed digital self-efficacy into a personal strength for educators.

Consequently, faculty members are motivated to diversify their learning sources, incorporate real-world examples into teaching, engage students through social media trends, and stay committed to effective and lasting learning experiences. This pattern also implies that faculty members with lower digital self-efficacy tend to resist technological changes within their professional sphere. Their performance gains traction when they enhance their efficacy in utilizing digital technology for teaching, research, and administrative tasks, thus fostering digital agility.

Contrary to expectations, internal branding directly, positively, and significantly impacted digital agility rather than functioning as a synergic moderator. This observation can be attributed to job nature, resistance to change, and siloed perspectives. Teaching inherently balances spontaneity with specialized knowledge. The role necessitates a humanistic approach toward students and related activities. Frequent directives from higher authorities to adopt digital technologies might influence educators' enthusiasm, subsequently impacting their teaching effectiveness and inclination toward digital agility.

Furthermore, educators have witnessed many pedagogical shifts and technological advancements since the onset of the pandemic. As they recognize the improvement in their digital efficacy, the urgency for pursuing new learning experiences diminishes. Additionally, the academic domain thrives on specialized knowledge, requiring a tailored understanding of technologies based on individual subjects handled by educators. The existence of such functional divisions leads educators with robust internal branding to exhibit behaviour in line with institutional expectations, which may inadvertently hinder their agility from embracing new learnings.

The study further extends the application of dynamic capabilities theory in the context of higher education. This application is grounded in institutions' need to continually scan their environment for opportunities and threats. Developing dynamic capabilities, seizing, and transforming—allows institutions to effectively integrate new technologies into their classrooms for enhanced teaching and learning experiences. Moreover, they must leverage technology to bolster research collaborations, forge partnerships, and build networks to support innovation—a sentiment endorsed by previous research (Yu & Zhang, 2021; Balaji & Khong, 2020; Li et al., 2021).

Theoretical Implications

The study's findings offer significant theoretical implications by supporting the formulated hypothesis, which confirms the positive relationship between digital transformation leadership (DTL), digital self-efficacy, and digital agility, consistent with prior research by Ertmer et al. (2020). However, these results contrast with the perspective of Kim and Lee (2020), who suggested that the efficacy of transformational leadership in fostering digital agility could be hindered or even reversed within bureaucratic organizational cultures. Most Indian academic institutions often exhibit bureaucratic characteristics to ensure resource management, decision-making efficiency, and communication effectiveness. Thus, the findings suggest that even in bureaucratic institutions, transformational leadership can pave the way for positivity and agility. Moreover, this finding challenges the assertions

by Nieves and Hall (2018) and Laumer et al. (2016), who posited that transformational leadership might adversely impact digital agility within organizations grappling with resource constraints and regulatory limitations. Many academic institutions face challenges from reduced government funding or limited external financial resources, potentially curtailing their ability to conduct research, offer comprehensive student support services, and deliver high-quality education. Additionally, the adherence of educational institutions to regulations governing finances, curriculum, accreditation, and other aspects can restrict their autonomy and decision-making latitude. However, the study showed that even in such an environment, the motivation to attain common goals and provide quality education overcomes the negative impact of transformational leadership.

The study's findings further extend the existing body of knowledge by theoretically validating the positive impact of DTL on digital self-efficacy. This alignment with prior research (Kwon & Wen, 2021; Kim & Lee, 2019) underscores the role of digital leadership in fostering digital skills and a growth mindset, motivating individuals to explore new avenues and maintain creativity and innovation at work. The study aligns with Wang, Liang, and Li's (2020) findings, showcasing that transformational leadership has a more pronounced effect on digital behavioural outcomes than transactional leadership. Similarly, the study builds upon Zhou, Zhang, and Jiang's (2021) conclusions, which emphasized that individuals driven by a strong learning orientation experience a more significant impact of DTL on digital competence and innovation performance. Confident educators initially hesitated to adopt technology for remote teaching and learning in higher education, mainly due to factors like age and experience (Kim & Kim, 2021). However, the study demonstrates that educators rapidly adapted their courses and assignments, leveraging digital tools to embrace new teaching techniques and enhance the student learning experience. This significant increase in digital self-efficacy among faculty members highlights the positive effect of DTL, as leaders inspire faculty to embrace technology in the classroom, promote interactive discussions in remote learning, and incorporate multimedia elements to make presentations engaging and effective.

The study's positive findings regarding the influence of digital self-efficacy on digital agility align with Tondeur et al. (2017), who proposed that instructors' ability to integrate technology into future teaching practices effectively is contingent upon their level of digital self-efficacy. Additionally, the study extends the work of Wang et al. (2011), showcasing the positive correlation between higher digital self-efficacy levels, increased computer usage, and improved job performance. Furthermore, the study advances the research exploring how digital self-efficacy predicts technological pedagogical content knowledge, shaping pre-service teachers' attitudes toward computers and their engagement in collaborative learning activities (Lin & Chen, 2012; Teo et al., 2008; Barak & Rafaeli, 2004). By providing a comprehensive scale to measure digital agility among faculty members, the study contributes to understanding digital agility's relevance in non-business contexts.

While limited literature exists on the connection between internal branding and digital agility, the study extends the work of Lourenço and de Moura (2021), who posited that internal branding's impact on skill depends on the type of agility and competitive context. The study's delineation between operational and strategic agility and acknowledging that internal branding's influence might vary presents practical insights for organizations aiming to enhance their skill.

CONCLUSION AND PRACTICAL IMPLICATIONS

The study explored and evaluated factors affecting digital agility in higher education. The study examined the effect of digital transformation leadership, digital self-efficacy and internal branding on digital agility. The study provided a collective approach to address the research problem regarding digital agility through mixed method analysis. In qualitative research, the study explored major themes through thematic analysis and provided the concepts, which were then evaluated through statistical tests in the quantitative research phase. The study added value to theoretical pursuits on digital leadership in higher education. It highlighted the relevance of dynamic capabilities theory, thus

allowing the generalizability of theory in the higher education context. The study further provided a comprehensive scale to measure digital agility. Moreover, the study found that DTL significantly impacts digital agility via intervening roles of digital self-efficacy and internal branding.

The study's findings also carry practical implications for various stakeholders. The developed digital agility scale for faculty members can be an effective tool for assessing agility levels and identifying areas for improvement. Based on these outcomes, targeted training and counselling sessions can be designed to address specific needs. Additionally, focus on leadership competencies training can be heightened, equipping leaders to drive digital transformations by developing skills such as visionary thinking, strategic planning, innovation, and effective change management. Emphasizing investments in enhancing self-efficacy among employees and clear and regular communication of shifts in values and objectives can foster an environment conducive to internal branding within higher education institutions. Lastly, the study's findings and the dynamic capability model can be leveraged to design and develop educational programs and courses that support cultivating digital leadership competencies and agility among faculty and students.

Moreover, the study validates the utility of dynamic capabilities theory within mixed-method analyses, aligning with the findings of Khan and Lew (2018) on the value of dynamic abilities, such as strategic flexibility, learning orientation, and customer focus, in enhancing organizational innovation and performance. Additionally, the study explores the applicability of dynamic capabilities theory in a multi-level model. While dynamic capabilities have traditionally been examined individually, this study exemplifies their relevance within a multi-level framework. The study demonstrates how institutional factors at national and industry levels can impact the development of dynamic capabilities at the subsidiary level.

Finally, the study utilizes dynamic capabilities theory to underpin the hypothetical model, wherein digital transformation leadership impacts digital agility, mediated by digital self-efficacy and internal branding. As no prior study has adopted this approach, the present research introduces a novel strategy for achieving digital agility. It illustrates that when leaders inspire their followers to cultivate dynamic capabilities, the benefits extend beyond organizational growth to the personal development of individuals. Leader motivation can catalyze followers to embrace new technologies, enhance their efficacy in their daily roles, and prepare themselves to navigate the digital future with agility.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

However, this study has a specific limitation that can pave the way for future research. Since the study was cross-sectional, the findings lack a causal relationship; future researchers can conduct a longitudinal study to understand the changes in digital agility due to DTL. Next, since the data was taken from the top 50 B-schools, it may apply to the specific institutions and participants chosen. Scholars can explore the model at different levels of institutions for better generalizability. Next, comparative studies can be conducted between HEIs in India and those in other countries to understand the best practices and areas for improvement. Third, pure conceptual or qualitative studies can be undertaken to explore the perceptions of different stakeholders, as the survey majorly considered faculty perceptions. Next, impact studies can be conducted evaluating the impact of DTL on student learning outcomes and other academic and behavioural outcomes. Lastly, process-based research can be performed to examine how DTL can implement technology in the workplace.

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