A Systematic Review of Digital Academic Leadership in Higher Education

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Abstract

Digital academic leadership (DAL) in higher education has been recognised as an important aspect in the enhancement of academic development in the stage of new normal and the academic achievement of academic members and learners across higher education contexts. DAL is seen as leadership that integrates the portfolio of technologies and instruments such as e-platforms (webinars) and social media in academic settings. A systematic literature review was employed in this study to map the relevant literature on the topics of 1) what is DAL? 2) what are the core dimensions of digital academic leadership? The source database includes 39 English articles related to the topics of DAL published between January 2003 and June 2023 in high-indexed journals. This review provides theoretical-conceptual and empirical contributions to the DAL literature. This study synthesises the related theories and conceptual frameworks for elucidating the concept of DAL. The results imply the need and how to enhance DAL in higher education contexts.

Keywords: academic leadership, digital leadership, digital awareness, higher education

1. Introduction and Main Concepts

The shift towards digitalization in education demands leaders who are not only skilled in traditional leadership, but also with a strong grasp of digital tools and their potential to drive innovation. Without effective digital academic leadership (DAL), institutions risk falling behind in a world where technology is central to academic success, operational efficiency, and student satisfaction (Shrivastava & Shrivastava, 2022). However, as the global educational ecosystem continues to embrace online learning, data analytics, and digital communication, the absence of strong digital academic leadership can lead to missed opportunities, inefficient resource utilization, and a lack of alignment with contemporary educational trends (Bharadwaj et al., 2013; Haddock et al., 2022; Pedro & Teixeira, 2021; Shrivastava & Shrivastava, 2022). In addition, leaders in higher education (HE) are not immune to these changes; they must be fully aware of the complex challenges associated with investing in well-trained employees, motivating them, and transforming from traditional leaders (Antonopoulou et al., 2020). Notably, they are engaged in the development and implementation of pedagogical strategies that improve student outcomes (Orcutt & Dringus, 2017).

This study is highly relevant because it addresses the intersection of leadership and technology, which is crucial for the future of education. By exploring the concept, traits, competencies, and practices of digital academic leadership, the study provides valuable insights into how institutions can cultivate leaders who are equipped to navigate the complexities of digital transformation. Additionally, understanding DAL helps in identifying the skills and competencies that current and future academic leaders need to develop to lead effectively in the digital age.

1.1 Concept of Digital Academic Leadership

Digital leadership in academia is a relatively new concept and has not yet been extensively researched. As described by Antonopoulou et al. (2020) and Ratajczak (2022), digital leadership in the academic setting involves the integration of various technologies and tools, such as e-platforms like webinars, the Internet of Things (IoT), social media, Big Data, artificial intelligence, and machine learning. Mohebi (2019) further defines digital leadership as the use of technological tools to create social impact by influencing the attitudes, emotions, thoughts, behaviours, and performance of individuals, groups, and organizations. This definition emphasizes that digital leadership extends beyond technology, focusing also on fostering connections among people (Salah, 2023). Karakose et al. (2022) add a more specific dimension, suggesting that digital leadership in academia is a social impact process facilitated by modern information technologies, which drives change and enhances performance across all stakeholder groups.

Accordingly, digital academic leaders can manage digital transformation processes consistently by using different leadership approaches. A recent study by Aldawood et al. (2019) defined digital academic leadership as setting direction, influencing stakeholders, accessing new information, creating sustainable environment and establishing good relationships and thus making important changes for future educational success, which is perceived as a key driver of innovative transformations in education. This definition emphasizes that digital academic leadership is more about the ability to lead by using information and communication technologies to reach the institutions' objective (Harbani et al., 2021). Thus, it inspires digital change but also encourages students, teachers, and all other stakeholders to actively participate in digital transformation (Salah, 2023).

1.2 Dimensions of Digital Academic Leadership

From this standpoint, literature regarding the key functions of digital academic leaders is steadily increasing. Scholars agree that the functions of digital academic leadership necessitate an open mindset to innovation and adaptability (Schwarzmüller et al., 2018). Thanks to the interconnected nature of the digital academic leadership environment, new networking opportunities are being facilitated by the pervasive integration of digital platforms (Avolio et al., 2014). Despite being a fundamental expectation to make social connections through digital platforms, effective digital academic leaders distinguish themselves through their specific skills in recognizing those relationships that result in tangible benefits (Cortellazzo et al., 2019; Harbani et al., 2021). In a recent study, Karakose and colleagues (2021) identified that the primary roles of digital academic leaders include (i) utilizing digital technology, (ii) driving digital transformation, (iii) encouraging technology-based professional development, (iv) cultivating a digital learning culture, and (v) exhibiting digital leadership skills such as technology proficiency, managerial abilities, and personal competencies. Cheng et al. (2024) further validated the importance of adopting technology and raising digital awareness, among other functions.

Given these changes and the nascent state of research on digital academic leadership, a systematic review study is urgently needed. This review will offer a detailed understanding of digital academic leadership and its fundamental components.

2. Methods

2.1 Research Design

The primary aim of this study is to synthesize the existing literature on digital academic leadership in higher education. The findings offer valuable insights for guiding future research on digital leadership within academic contexts. In this article, two key research questions were formulated:

RQ1. What is digital academic leadership?

RQ2. What are the key dimensions of digital academic leadership?

To address the research questions, a systematic literature review was conducted (Tranfield et al., 2003). This study primarily focuses on a qualitative literature review, utilizing content analysis to gain insights into the topic by synthesizing and identifying emerging themes. Following the approach of Hanelt et al. (2021) and Ratajczak (2022), the review process involved three main steps: (i) identification of relevant databases and data collection; (ii) data analysis; and (iii) synthesis.

2.2 Systematic Searching Strategies

A search strategy based on a PRISMA diagram (Moher et al., 2009) was adopted in the current study which consists of three main stages: identification, screening, included.

2.2.1 Identification

In the first stage, the research was conducted using Scopus and Web of Science databases, which are considered as the leading databases with advanced search features, analytic tools and high-quality published articles. Concerning the search procedure, "Title/Abstract/Keywords" was used to focus the results and find pertinent articles. The following keyword string was performed:

> "Digital leadership" OR "cyber leadership" OR "E-leadership" OR "online leadership" OR "virtual leadership" OR "leading in the digital age" OR "educational technology leadership" AND "higher education" OR "universities" OR "academic institutions" OR "academic settings"

Keywords were chosen following a thorough analysis of the body of literature and research team's final discussion. During this stage, database's sorting tool was also used to filter and narrow down the scope of articles. To that end, the study's time period was limited to 2003-2023. The main reason, as stated by Higgins and Green (2011), is the timeline's release need to be limited when the pertinent research could have been published over a certain period. Secondly, the selection of only empirical articles was applied in the current article, satisfying the second inclusion criterion. The third and final inclusion criterion was that only English-language articles were included in this study. A total of 1788 articles (1154 on Scopus and 634 on Web of Science) were found in the initial search.

2.2.2 Screening

In the screening stage, titles screening was implemented manually in which 989 irrelevant articles were eliminated as they were not the focus of the literature. Afterwards,748 articles were excluded due to duplication and not the focus of our study. A total of 51 articles were chosen for the full-text screening stage. To be eligible for inclusion, a study must focus on digital academic leadership and satisfy the following additional criteria: (1) address at least one of the following topics: (i) examine the conceptualization of digital academic leadership (DAL); (ii) explore an effective profile of digital academic leader; (2) Be conducted in HE settings. As a result, 12 full-text articles were eliminated as they did not meet additional criteria.

2.2.3 Included

Following the rigorous procedure of screening articles, 39 full-text articles, 11 articles from WoS (W) and 28 articles from Scopus (S), were selected for data analysis.

2.3 Data Abstraction and Thematic Analysis

Thematic analysis was employed to analyse data in accordance with Khaw et al. (2022), since this approach is helpful in identifying themes and sub-themes that are centred on trends, motifs, groupings and connections between patterns and themes. In order to do this, the analysis procedure involved two phases.

The first phase includes formulating themes based on the two research questions. The researchers looked for trends in the abstracted data from the selected articles. Microsoft Word and Microsoft Excel were utilized to document the data that was abstracted. Afterwards, additional sub-groups were identified following the same procedure, and these sub-groups developed into sub-themes in the article. The final step in the first phase included re-evaluating all the themes and sub-themes created to ensure validity and reliability. The second phase aimed to find suitable names for themes and sub-themes based on a consensus agreement within the research team. In this phase, the theme and sub-themes could be modified on the basis of any contradictions that were identified.

3. Results

3.1 What is Digital Academic Leadership? (RQ1)

The findings showed that not many articles discuss the concept digital academic leadership. Among 39 selected articles, there are about 15 articles discussed and conceptualised digital academic leadership. The results also revealed that the term digital academic leadership can be perceived in different ways. Based on our analysis, four themes emerged under the research question (see Table 1 in Appendix). The most common and simplest approach to define digital academic leadership is to consider digital academic leadership as strategic use of digital assets to achieve organisational goals (Msila, 2022; Yilmaz et al., 2020; Antonopoulou et al., 2019; Antonopoulou et al., 2020). Four articles used this definition in their studies. According to Antonopoulou et al. (2019), the definition was adopted from the marketing and

business field. For example, Antonopoulou et al. (2019) defined "e-leadership involves the strategic use of digital tools to advance an enterprise's marketing plans."

The second emerged theme is defining the concept digital academic leadership as a combination of digital/technology and leadership that enable organisations to succeed (Dimitriadi, 2019; Chang et al., 2022; Sharpp et al., 2019). Dimitriadi (2019) emphasized that the term "digital" underscores the need for leaders to have a clear understanding of the interplay between the problem-solving skills of human actors and the automation capabilities provided by non-human resources in digital processes. Going beyond the conceptualisation stage, Chang, et al. (2022) stated that there are four main factors/ characteristics that form the concept digital academic leadership that are: ICT and human resource by achieving goals, blending of electronics and traditional methods, offer benefit from high technology and lead to efficiency through technology, build socio-technical system.

Defining digital academic leadership based on traits/competencies of digital academic leaders is the third emerged theme. To be more specific, several articles conceptualised digital academic leadership as traits, competencies, or characteristics that the digital academic leaders possess (Hebert & Lovett, 2021; Harris, et al., 2013; Băeşu & Bejinaru, 2020; Van Wart et al., 2019; Kuscu & Arslan, 2016). For example, Hebert and Lovett (2021) stressed the three traits including building trust, team - building & collaboration, and communication. Along the same line, Harris et al. (2013) emphasised the importance of building trust and sharing purpose in a distributed way. Van Wart et al. (2019) and Kuscu and Arslan (2016) identified six key competencies: e-communication skills, e-team building skills, e-social skills, e-technological skills, e-change management skills, and e-trustworthiness.

The fourth emerged theme is to define digital academic leadership as leadership involving appropriate technology use in various aspects of workplace in HE (Caliskan & Zhu, 2021; Yokuş, 2022; Newland & Handley, 2016). These three articles mutually highlighted that digital academic leadership refers to people's knowledge and levels of using technology in particular subject and work. Newland and Handley (2016) also stated that "when it comes to the HE context, digital academic leadership can be reflected on different aspects: in learning and teaching, communication and collaboration, administration, research" (Newland & Handley, 2016).

3.2 What are the Key Dimensions of Digital Academic Leadership? (RQ2)

Based on the findings, 12 out of the 39 selected articles discussed the core dimensions of Digital Academic Leadership (DAL). Through our analysis, five key dimensions of DAL were identified in response to the research question (refer to Table 2 in the Appendix). These dimensions include raising digital awareness, demonstrating a technology vision, adopting technology, fostering joint collaboration, and addressing challenges.

Firstly, raising digital awareness (Van Wart et al., 2019) and cultivating a digital culture (Chang et al., 2022; Ehlers, 2020; Van Wart et al., 2019) were identified as the initial dimensions. Secondly, having a clear technology vision (Ehlers, 2020; Yuting et al., 2022; Msila, 2022) is crucial for demonstrating technological foresight and applying a digital strategy (Van Wart et al., 2019; Ehlers, 2020; Chang et al., 2022). Additionally, initiating technological changes (Hebert & Lovett, 2021; Msila, 2022; Yilmaz et al., 2020) and predicting potential adverse outcomes (Van Wart et al., 2019; Msila, 2022) are also emphasized.

Thirdly, the adoption of technology underscores the importance of digital academic leaders possessing relevant digital skills (Lalani et al., 2021; Akcil & Bastas, 2021). Furthermore, joint collaboration emerged as a significant dimension, highlighting responsibilities at different leadership levels (Hebert & Lovett, 2021; Yuting et al., 2022), the integration of academic and management competencies in guiding technology use (Van Wart et al., 2019; Ehlers, 2020), empowering others (Dimitriadi, 2019) and virtual communication (Chang et al., 2022). Finally, addressing challenges (Chang et al., 2022; Msila, 2022) was also identified as a vital dimension.

4. Discussions

This review research tackles the question of how digital academic leadership is conceptualized, the profile of digital academic leader through a literature review and the development of new theoretical frameworks. The following paragraphs summarise and discuss the findings regarding respective research questions in this study.

4.1 Concept of Digital Academic Leadership (RQ1)

The current study comprehensively investigated how the notion of DAL in higher education context has been conceptualized in the available literature. The findings illustrate that although there has been a rise in research interest in digital academic leadership in academic setting over the past 20 years, the concept digital academic leadership in academic setting has not been defined rigorously in previous studies. This is consistent with the findings of Karakose et al. (2022), who state that research on the thematic evolution of the field of digital academic leadership using a science

mapping technique has not been done rigorously. Hence, our study attempted to identify different approaches when defining the concept of digital academic leadership in academic setting by reviewing previous studies in the available literature. Our findings reveal that four main themes were found to be among the main approaches of conceptualizing digital academic leadership.

In connection with the concept of e-leadership, the term digital academic leadership is simply conceptualized as strategic use of digital assets to achieve organisational goals in several selected articles (Msila, 2022; Yilmaz et al., 2020; Antonopoulou et al., 2019; Antonopoulou et al., 2020). Several articles also define digital academic leadership as a combination of the two concepts: digital/technology and leadership (Dimitriadi, 2019; Chang et al., 2022; Sharpp et al., 2019). In addition to this, our review found that in several studies, the term e-leadership is used as a broad term that encompass the two concepts including virtual leadership, e-leadership which are used interchangeably. This result is in line with Karakose et al. (2022)' findings.

The notion of DAL was also described as specific traits/ characteristics that an academic leader possesses (Hebert & Lovett, 2021; Harris et al., 2013; Băeşu & Bejinaru, 2020; Van Wart et al., 2019; Kuscu & Arslan, 2016). Of those, e-communication skills, e-technological skills, e-team building skills, and e-trustworthiness are among the utmost essential skills highlighted in previous articles. According to Antonopoulou et al. (2021), leadership and the leader's personality are crucial components of a successful university. For this reason, it is understandable that some traits/ characteristics acquired by an academic leader are underlined when defining the concept.

The fourth approach defined digital academic leadership as leadership involving appropriate technology use in various aspects of workplace in HE in order to achieve organisational goals (Akcil & Bastas, 2021; Yokuş, 2022; Newland & Handley, 2016). In line with the findings of Karakose et al. (2021), one of the basic qualities of digital leader is the use of digital technology. However, Karakose et al. (2021) also posit that digital academic leadership is not simply putting computers together and running them or being an expert programmer. Hence, digital academic leadership goes beyond the leaders' level of using technology. Not surprisingly, Karakose et al. (2021) found other basic qualities of digital leaders in their study including support for technology-based professional development, digital transformation, possessing digital academic leadership skills, and fostering a digital learning culture.

Karakose et al. (2021) state that in the digital age, traditional leaders, who can supplement their leadership with digital skills, play essential role to bring sustainable success for their institutions. Digital leaders in higher education are not exceptional. Our findings show that digital academic leadership in academic setting has been gained significant interests in the last 20 years. Based on our literature review on how the concept digital academic leadership in higher education context has been conceptualised, it is obvious that the notion academic digital academic leadership has been perceived and defined in different ways and there is a lack of a comprehensive definition that reflect different aspects of digital academic leadership and fit higher education context. Further research is needed to have a comprehensive definition of digital academic leadership that can be used widely in academic setting.

4.2 Key Dimensions of Digital Academic Leadership (RQ2)

Based on the findings, five key dimensions of Digital Academic Leadership (DAL) have been identified: raising digital awareness (Msila, 2022; Van Wart et al., 2019), demonstrating a technology vision, adopting technology (Akcil & Bastas, 2021; Dimitriadi, 2019; Lalani et al., 2021; Chang et al., 2022; Msila, 2022), fostering joint collaboration (Msila, 2022), and addressing challenges (Chang et al., 2022; Msila, 2022). This framework enhances the existing literature by offering a comprehensive understanding of the functions within digital academic leadership.

However, there is a noticeable gap in research, particularly regarding the roles of raising digital awareness and addressing challenges, especially in overcoming resistance to change during the implementation of digital strategies. Future studies should focus on these areas, exploring how to increase digital awareness and effectively combat resistance to change. A thorough understanding of DAL, along with the skills needed to strengthen it, is crucial for comprehending the impact of digital academic leadership on the success of academic staff, students, and the overall performance of educational institutions.

5. Conclusion and Implications

Through the overview of the literature on digital academic leadership, DAL is commonly defined as considering leadership as strategic use of digital assets to achieve organisational goals, including the combination of digital/technology and leadership, traits/competencies of digital leader and individual's level of technology usage. This review provides a comprehensive examination of the concept of digital academic leadership (DAL), underscoring its critical role in the evolving landscape of academia. By synthesizing existing literature, the paper highlights that DAL is not merely about integrating technology into leadership practices; it represents a strategic approach to leveraging

digital tools and resources to drive organizational success. The findings emphasize the multifaceted nature of DAL, encompassing the convergence of digital and leadership skills, the essential traits and competencies of digital leaders, and the varying levels of technology adoption among individuals. This review thus serves as a valuable resource for scholars and practitioners alike, offering insights that can inform the development of effective leadership strategies in a digitally-driven academic environment.

It is worth noting that DAL places great emphasis on the core process of raising digital awareness, adopting technology, adopting technology, demonstrating technology vision, and addressing challenges. This can be served as a framework for digital academic leadership, suggesting that DAL can be conceptualized as a framework where digital awareness, vision, technology adoption, collaboration, and problem-solving are central pillars. This aligns with leadership theories that emphasize the importance of vision and strategic action in guiding organizations through change. The emphasis on digital awareness and vision underscores the need for leaders to not only understand current technologies but also anticipate future trends, positioning DAL as a dynamic and forward-looking leadership model. The specific competencies, such as the ability to raise digital awareness and lead collaborative efforts, involved in DAL can be connected to competency-based leadership models, suggesting that effective digital leaders must cultivate specific skills and behaviors that are critical for navigating the complexities of digital transformation in academic settings.

This review emphasizes the importance of strategic development in educational institutions. Leaders must not only adopt digital technologies but also create an organizational culture that values digital literacy and continuous learning. By raising digital awareness and demonstrating a clear technology vision, leaders can foster an environment that is more adaptive and resilient in the face of digital disruption. Moreover, the emphasis on joint collaboration and addressing challenges indicates that DAL requires a collaborative approach, where stakeholders across the institution work together to implement digital initiatives. This has practical implications for how academic leaders engage with faculty, staff, and students, promoting a more inclusive and participatory decision-making process that enhances the effectiveness of digital strategies. In addtion, the practical focus on these core processes suggests that training programs for academic leaders should incorporate these elements, ensuring that leaders are well-equipped to manage digital transformation. Institutions may need to invest in professional development that emphasizes not just technical skills, but also the strategic and collaborative aspects of digital leadership.

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Appendix

Table 1. Emerged themes on defining the concept of digital academic leadership

Themes (Code level 1)	Sub-themes (Code level 2)	Segment	Articles
Defined as strategic use of digital assets to achieve organisational goals.		Strategic use of digital assets to achieve organisational goals	S31
		E-leadership is a concept of managing the group members and group processes using ICT tools and environments	S16
		E-leadership is the strategic use of digital tools in order to promote marketing plans of an enterprise	S17
		Integration of a portfolio of technologies, tools and instruments	S12
Defined as a simple combination of two concepts: Digital/technology + leadership.		Separate "leadership" and "digital". the author emphasizes the term "digital" which refers to importance for those leaders to have a clear understanding of the interconnection between the problem-solving expertise that human actors and the automation capabilities that non-human resources involved in digital processes can offer	S15
		Combination of ICT skills and leadership skills that enable organizations to succeed. It consists of 4 factors/ characteristics: ICT and human resource by achieving goals, blending of electronics and traditional methods, offer benefit from high technology and lead to efficiency through technology, build socio-technical system.	S19
		E-Leadership is a combined framework that encompasses both leadership and technology	W7
Defined as competencies /characteristics of a digital leader possesses.	Traits	Building trust; team building and collaboration, communication	S24
		Generating and transferring knowledge, trust and shared purpose in a distributed way.	S8
	Characteristics	Thought leader; creative leader; Global visionary leader; inquisitive leader; profound leader	W5
	Competencies	E-communications skills; e-social skills, e-team building skills; e-change management skills; e-technological skills; e-trustworthiness	S18
		Communication skills, motivation creating ability and technological competence level.	S6
Defined as leadership involving appropriate technology use in various aspects of workplace in HE		It is about a person's level of technology usage for a particular subject and work	S27
		People's knowledge about digital tools and their use, the correct use of the internet, the effort to reach the right information, and their behaviour about sharing the right information	S22
		Those competencies that fit an individual for living, learning and working in the digital society. When it comes to the HE context, digital leadership can be reflected on different aspects: in learning and teaching, research, communication and collaboration, administration	S1

Table 2. Dimensions of digital academic leadership

Themes (Code level 1)	Sub-themes (Code level 2)	Segment	Articles
Demonstrating Technology Vision	Technology Vision	Teachers act as technology facilitators for a shared ICT vision	S32
		Visionary leaders are prepared to change their purposes and behaviours as educators ... and they emphasize the value of technology	S31
		When there is lack of vision, institutions will struggle to implement technology	S31
		True digital leaders need digital vision and dexterity of a captain at sea who buoys the sinking ship through turbulent waters.	S31
		A digital vision and strategy were factors that would guide digital transformation	S31
		The leaders should always have the bigger picture of where the employees want to see their organization in future.	S31
		The vision is like a glue that makes us stick together especially in times of potential conflicts	S31
		Relevant dimensions for the creation of a vision and a corresponding strategy for the digital transformation	S14
		Digital visionary who supports emerging culture	S31
	Digital strategy	Digital strategy for digital transformation and leadership to be attained	S31
		Making sure leaders know how to use ICTs competently and blend them with traditional methods	S18
		Relevant dimensions for the creation of a vision and a corresponding strategy for the digital transformation	S14
		Digital leaders also need to look at the needs of African communities as they adapt the digital technologies to address the demands of the country	S31
		Strategy	S19
	Model for changes towards technology	Technology leaders act as models and drivers for changes in the increasing technology-enriched educational context, and adopt multiple leadership practices to motivate teachers' abilities and positive attitude towards ICT. "Leader's role is to clear the paths subordinates use to accomplish goals".	S32
		Commitment to digital transformation	S24
		E-leadership aims to change attitudes, feelings, thoughts, behaviors and performances of individuals or groups	S16
		Leaders must help their teams out of crisis as they ensure that the organization can deal with change.	S31
		Leading change;	S31
		Digital leaders should lead change and be in the forefront of advocacy. In a time when there is uncertainty, they must be able to	S31

		lead and give direction.	
		Connected learner.	S32
	Be wary of negative changing results	Leaders need to be wary of change for some digital initiatives may be bad for teaching	S31
		Whilst we talk of novel digital skills, we cannot forget the old skills are functional.	S31
		Blend them with traditional methods	S18
Raising digital awareness	Awareness	Preparation	S19
		Leaders must be aware of how change happens	S31
		Leaders' ought to be highly aware of all demanding challenges from investing in upskilled employees	S12
		Having basic awareness of technologies	S18
		Leaders of higher education institutions should understand the critical role of digital transformation and how this can affect the performance of these establishments.	S31
	Cultivating digital culture	No institution can contemplate a future strategy without thinking about the role of the digital cultures in supporting that future	S31
		Digital leaders must use an e-culture that would lead to positive university performance	S31
		The need for leader support and for the leader to create a supportive online environment is mentioned widely in the literature, in both team and dyadic contexts	S18
		Support the emergence of a transformation culture.	S14
		Culture	S19
		Involving either information technology or online environments	S18
Adopting technology	Technology leaders with digital skills	Leaders are expected to act as technology leaders	S32
		Managing the group members and group processes using ICT tools and environments.	S16
		Level of technology usage for a particular subject and work	S27
		Offer a way to merge digital literacies and digital citizenship practices	S15
		Learning how to integrate ICT into the leadership function	S19
		Behaviours of leaders have been posited as enablers of innovation and technological adoption in higher education learning and teaching	W17
		It would not be easy to guide digital transformation when leaders lack the digital skills.	S31
Joint collaboration	Responsibility of leadership in different	Various levels: the president, who has the highest authority to manage the institution and set technology directions; the vice-president... overall institutional technology climate; the vice-dean ... promote teachers' innovative collaboration within	S32

	levels	the faculty; head of the teaching and research department ... the academic issues and ICT-enriched teaching affairs within the department; and the director of ICT centres ... ICT-coordinated and technological issues. All these positions take responsibility for ICT usage and technology integration within the institution.	
		Digital transformation structures	S24
		Without cooperation amongst university colleges and university departments the digital technologies will flounder.	S31
		Communicating often across the institution;	S31
		Universities should educate, skill and empower the youth	S31
	Academic ability and management competencies in guiding technology use	The importance of creating trust	S18
		Practice	S19
		Builds a strong culture of trust, teambuilding and collaboration, and communication	S24
		Virtual communication	S19
		The combination of technological literacy, academic ability, and management competencies to select, exercise, and guide technology usage, which supports all education stakeholders to effectively deal with the exploration of technology-related tasks.	S32
		One aspect of team motivation is related to the proper structuring of teams related to task charges, introductory activities, encouragement	S18
		Change management involving either information technology or online environments.	S18
		Facilitates positioning an organization concerning its digital transformation	S14
		Collaborator who inspires;	S31
		Ability to manage chaos;	S31
		The best digital leaders will be those who are good communicators.	S31
		The leaders find human relationships important as well as the need to influence the course of transformation	S31
		Be in full control	S31
		Effective digital leaders have six traits, and these are digital knowledge and literacy, vision, customer focus, agility, risk-taking and collaboration.	S31
		Communication is a critical competency for effective online team management and for lead workers in team settings	S18
	Empower followers	Universities should educate, skill and empower the youth	S31
		Empower followers to understand, select, assess, utilize, and	S32

		manage technology and innovation effectively	
		Support staff if technology initiatives are to thrive	S31
		Providing constant support;	S31
		Ability to find and synthesise diverse sources of information, to manage self, and to empower others	S15
		Deeply know how to motivate and inspire them till the knowledge to break conventional leadership from task-oriented to project-oriented leading	S12
Addressing challenges	Fight resistance to change	Leaders' ought to fight fear, be in full control, and support staff if technology initiatives are to thrive	S31
		Leaders who are not intimidated by negativity; and advocacy	S31
		University teachers need benefits and ways to fight resistance to change	S31
		Overcoming barriers	S19