Cómo referenciar este artículo / How to cite this article

El-Sayed Ashria, I. H., Mahgoub, Y. M., Aziz Altalib, M. A., Al-Saud, K., & AlAli, R. (2026). E-learning Platforms' Impact on the Development of University Students' Digital Self-leadership Abilities: The University of Khartoum As A Model. *Espacio, Tiempo y Educación, 13*(1), pp. 82-102. doi: http://dx.doi.org/10.14516/ete.13105

E-learning Platforms' Impact on the Development of University Students' Digital Self-leadership Abilities: The University of Khartoum As A Model

Ikhlas Hassan El-Sayed Ashria
Department of Educational Psychology, Faculty of Education, University of Khartoum, Khartoum, Sudan
e-mail: dr.ikhlas_ashria@outlook.com

Yasir Mohammed Mahgoub
Department of Art Education, College of Education, King Faisal University, Al-Ahsa, Saudi Arabia
e-mail: yhamed@kfu.edu.sa

Mohamed Abdel Aziz Altalib
Department of Psychology, Faculty of Arts, Omdurman Islamic University, Sudan
Director of Al-Ruwwad Center for Training and Human Development
e-mail: mo.altalib1996@gmail.com

Khaled Al-Saud
Department of Art Education, King Faisal University, Al-Ahsa, Saudi Arabia
e-mail: kmsoud@kfu.edu.sa

Rommel AlAli*
The National Research Center for Giftedness and Creativity, King Faisal University, Saudi Arabia
e-mail: ralali@kfu.edu.sa

Abstract: This study aimed to examine the impact of e-learning platforms on the development of digital self-leadership skills among students in the Faculty of Education at the University of Khartoum. This study used analytical method approach to meet its objectives. The data was gathered from 185 students studying different academic programs. Online questionnaire was developed for the collection of data. Results of the study showed that digital self-leadership skills of students are high, and their ability to develop learning activities was higher than awareness regarding future path. In terms of e-learning skills, students ranked self-learning skills as highest. In the end, students demonstrated stronger teamwork and self-regulation as compared to content development and competitive skills. Overall, the results indicate that students tend to develop personal and self-directed learning skills more than social and creative skills, highlighting the need to enhance collaborative and innovative learning practices. The study recommends providing further technical training for students and faculty, strengthening academic advising, and addressing

technical challenges. Future study on e-learning ethics is suggested.

Keywords: Digital Self-leadership, E-learning, Skill Development, Educational Platforms, Universities.

Received: 02-09-2025
Accepted: 04-02-2026

1. Introduction

E-learning is one of the integral parts of higher education that has transformed the way knowledge is assessed delivered and accessed. It provides flexibility to students as students from any corner of the world are able to access the learning materials (Yadav, 2023). Digital platforms also facilitate students in the form of real-time feedback, and collaborative learning that enhances learning and engagement outcomes (Das & Malaviya, 2025). E-learning also provides support to personalised instructions by data driven insights and technology driven insights. For higher education institutions, it provides continuity during disruptions, scalability and cost effectiveness.

The primary factor influencing future generations' capacity to adapt, innovate, renew, produce, and learn at rates that enable them to compete worldwide is the educational process (Javed, 2025). As a result, enhancing education is a key goal that nations aim to accomplish. Because of the significance that e-learning systems have achieved, one of the biggest issues associated with them is guaranteeing the quality of learning (Culduz, 2024). Given that quality is a major criterion that educational institutions worldwide strive to attain, this guarantees the provision of quality and consistency in e-learning programs conducted by educational institutions. Teachers' interest in this subject has grown recently as e-learning has emerged as a system that helps alleviate some of the issues with traditional education. This is because of its special qualities that make it a trustworthy method of resolving issues in conventional schooling (Mhlongo et al., 2023).

E-learning quality is crucial and a must for the educational process to be successful (Elansari & Laachach, 2024). It is important that international acceptable standards are followed by e-learning quality. Studies showed that there is need to develop and construct e-learning properly to get its maximum and optimum benefits. Therefore, it must be developed on the basis of international specifications and standards. On the other hand, quality of education can decline globally. Distance learning by the platforms of e-learning is important in present technology age (Atanasova, 2025). Students are able to access study materials and lectures from anywhere by using different technologies. E-learning provides chance to students to directly interact with different stakeholders of universities. Moreover, time of students is saved when they use digital tools for e-learning. It shows that e-learning boosts academic efficiency and productivity of students. Through a range of innovative and varied teaching techniques, such as interactive movies, simulations, and educational games, it engages students and motivates them to participate and interact more with the courses (Adnan & Anwar, 2020).

E-learning platforms are now a popular option for both individuals and educational institutions, having completely transformed the world of education and learning (Bashir & Lapshun, 2025). The world has seen and is still experiencing a digital revolution, which has both major benefits and drawbacks. One of the elements and instruments of the digital revolution is digital platforms, which come in a variety of forms and applications

(O'Lemmon, 2024). Nowadays, it is impossible to envision a nation or its citizens surviving without technology in general and without using digital platforms specifically.

Abilities of digital self-learning are important for higher education as teachers and students use technology to interact (Zhang & Wu, 2025). These abilities show the capacity of individuals to direct, motivate and regulate the learning process, goals and behavior by using digital platforms and tools. Digital self-leadership improves adaptability, accountability and autonomy that enables individuals to manage learning demands online, achieve academic objectives in effective manner and maintain engagement (Anwar & Saraih, 2024). It also provide support to critical skills such as self- development (Ossiannilsson, 2025), self-discipline and self-decision making. Therefore, the aim of this study is to determine the degree of digital self-leadership among students at the University of Khartoum's Faculty of Education who use the educational platform, and to determine the barriers that students at the University of Khartoum's Faculty of Education face when attempting to use the educational platform to develop self-leadership.

2. Literature of Study

The goal of education is to provide people with the information, abilities, and competence they need to solve society problems and alter the course of events for a better life (Kaya-Capocci et al., 2025). The foundation of Japan's comprehensive rejuvenation plan, which was put into effect in 1976 and aimed to achieve technological advancement by the year 2000, was the educational system (Tiwari et al., 2021). Schools have been affected by the changes brought about by the digital revolution. There are now terms pertaining to the necessity of comprehending and mastering the educational system and 21st-century skills. One of the best strategies for developing 21st-century skills so that people may lead themselves is self-leadership (Iksal et al., 2024). Being an intelligent leader involves a strategy shift that combines current decision-making tools with a positive vision, rather than merely modernizing a traditional job. With the speed at which technology is developing, digital resilience has become essential for leaders who must be able to quickly adjust and use digital analytics and artificial intelligence to produce successful results (Oluwaseyi et al., 2025).

2.1. Digital Self Leadership

Information and communication technologies are commonly employed as a social influence technique with the goal of creating virtual connections and drastically altering the attitudes, thoughts, feelings, actions, and output of people, groups, and organizations (Walter, 2024). Among its duties are educating the community and introducing them to new ICTs and resources that support their objectives. ICT is a technology of procedures and resources for structural leadership. It also refers to leaders' capacity to guide teams and accomplish organizational objectives in a dynamic digital environment by utilizing digital tools and technologies (Mwawasi, 2014). This skill enhances data-driven decisions, establishing a culture of innovation and ongoing learning, possessing a comprehensive understanding of technology and its impact on the workplace, and effectively collaborating with teams via digital platforms (Antonopoulou et al., 2021).

Digital leadership is the process of social influence using information technology that affects behavior, attitudes, sentiments, and performance online. It also dominates most educational institutions and piques academic interest in the majority of Arab countries

(Antonopoulou et al., 2021). The "digital leadership" refers to the conduct and actions of leaders who make use of digital tools and resources, including social media, web-based communication platforms like Zoom, video conferencing, and conferences. Being proficient in the upkeep, use, and problem solving of technology tools and applications is not a prerequisite for digital leadership (Pundt et al., 2025). Instead, it talks about how to keep up with the most recent technical advancements so that you can effectively guide and influence staff members to reach objectives. Digital leadership is a crucial tactic that aims to take advantage of the digital revolution in order to get a competitive edge and guarantee success in the impending digital transformation (Türk, 2023). A digital leader organizes duties with an emphasis on information sharing with staff members and motivates them at any time and from any location (Al-Kandari, 2024).

According to Rüth and Netzer (2020), the following principles define the digital leadership style i.e. Trust entails having faith in one's social and professional abilities and giving them the freedom to assume accountability and control. Networking is one of the most crucial responsibilities of leadership in the digital age, creating a variety of social media channels and venues for interpersonal contact. In order to promote interdisciplinary collaboration and open the door for the sharing of experiences and knowledge, leadership must create networks at all levels, both internally and externally (Beeson, 2025). Openness means a digital leader must be transparent and communicate openly. Workers can continuously behave in the organization's best interests and provide services in the most efficient and effective manner possible. Workers should proactively share information with digital leaders and be aware of needs. Being open entails promoting knowledge sharing and exchange between managers and employees (Dehghani Soltani et al., 2021). Agility is the capacity to quickly adjust to changes in the environment and gain knowledge from experiences. It serves as an indicator of how well and quickly one can adjust to changes (Syamsir et al., 2025).

When it comes to categorizing the dimensions of digital leadership, researchers have differing opinions. For example, digital expertise and insight are the dimensions of digital leadership (Lin, 2024). There are four dimensions that represent the aspects of digital leadership: digital vision, digital knowledge, digital innovation, and participation and cooperation (Brunner et al., 2023). Since they are the most widely accepted among researchers and best suited to the goals, in identifying the dimensions of digital leadership, which include the digital innovation dimension, the digital knowledge dimension, and the participation and cooperation dimension.

Digital Innovation is the readiness to confront both the familiar and the unexpected while introducing new concepts through innovation. This can affect business models and the organization, ranging from automated production processes to paperless offices and home offices (Xie et al., 2022). One of the traits of a digital leader is the ability to break free from inflexible structures and to start new projects, develop them, and carry them out with a certain amount of creativity that aids in achieving objectives and overcoming obstacles to the digital transformation and goal realization (Hastiti et al., 2025). The use of information and communications technology to enhance services and goods in novel and creative ways is associated with digital innovation.

Digital Vision has the capacity to plan, see through the mists, and then alter it. This entails changing an outdated vision into something fresh, and you can actually influence what that vision ought to be. A digital leader has a clear vision of the digital

Espacio, Tiempo y Educación, v. 13, n. 1, January-June / Enero-junio 2026, pp. 82-102.
ISSN: 1698-7802

transformation process and organizes goals by making sound, comprehensive plans for action, leaving no room for chance. It is crucial for company executives (Rüth & Netzer, 2020). According to Haddawi et al. (2024), employing digital vision is a crucial component of success, and accomplishing it calls for creative methods. Business and IT leaders can achieve IT domination by understanding the underlying technology and using it creatively. Vision, invention, and knowledge are the three magic triangles. A drastic change is the digital transition. By deliberately rethinking what a drastically altered digital future will look like, leaders may assist in navigating this shift. Leaders must first specify the advantages they want to obtain from digital technology in order to start developing this vision (Buonocore et al., 2024).

Digital knowledge in technological advancements and digitization have become crucial elements that have a direct influence on management procedures. Organizations can make decisions with more flexibility thanks to newly developed technological advancements than those that have not gone digital (Massa et al., 2023). Knowledge management is one of the components that creates competitive advantages through tactics and strategies like launching new products, ongoing development to streamline operations, and replicating processes to meet the demands of rival companies (Trivedi & Srivastava, 2022).

2.2. The Digital Platform

According to recent research, digital platforms are hardware or software that runs on an operating system and program format that employs a set of generalizations for a particular central processing unit (CPU) and depends on applications or services (Pauli et al., 2021). A collection of information systems, repositories, procedures, analytical tools, and information visualization tools make up this complex organizational and technological group. Another name for it is a collection of computer programs that support education and growth. A collection of information systems, repositories, procedures, analytical tools, and information visualization tools make up this intricate organizational and technological group (Mandic et al., 2012).

2.3. E-learning Platforms

In actuality, digital learning environments are no longer an extravagance. With the great and rapid technical breakthroughs that are taking place all over the world, especially in the education sector, which is the foundation and main driver of every country's renaissance and growth, they have become an urgent necessity. E-learning platforms are defined as "Spaces for displaying work and everything related to e-learning, including e-courses and the activities they offer" (Al Saydawawy & Ahmed, 2021). E-learning platforms are digital applications and systems that rely on the Internet. Using an integrated, interactive, multi-source online educational software system, digital learning platforms allow students to access programs, activities, curricula, and learning resources either synchronously or asynchronously, at any time, from any location. Another definition of a digital learning platform is a blended learning-based digital education system (Dewi et al., 2018). Using an integrated, interactive, multi-source online educational software system, digital learning platforms allow students to access programs, activities, curricula, and learning resources either synchronously or asynchronously, at any time, from any location. Another definition of a digital learning platform is a blended learning-based digital education system (Sergeev et al., 2021). Digital educational platforms combine

aspects of social media sites and electronic content management systems to create an interactive learning environment (Antonopoulou et al., 2021).

The learner can access the required courses and educational programs through them. The administration of the educational institutes uses them to deliver courses and educational programs in the form of a multi-source system. It is also regarded as an interactive instructional software system that is platform integrated (Raj, 2025). Notwithstanding some of the obstacles to teaching with academic and administrative competencies, the educational institutes demonstrate scientific leadership in communicating with professors and students, preparing students to successfully finish their studies under the extraordinary circumstances (Baziukė et al., 2025). In order to improve and enhance the educational process, digital educational platforms are essential. They aid in the development of an interactive, semi-integrated learning environment that is founded on a range of information sources, interaction, experience sharing, two-way learning, etc. (Alshammary & Alhalafawy, 2023). It includes a variety of activities that help and improve the learning process. Whether uploading pre-made content or producing fresh content, it saves time and effort. It continuously updates courses, curriculum, and information to keep up with scientific and academic advancements. It helps students strengthen their critical and creative thinking skills and offers a digital library with educational materials for scholarly subjects (Ndibalema, 2025). It addresses the subject of private education by employing contemporary teaching methods to create fresh answers to problems. It helps to store information so that students can access it whenever they want (Anghelo et al., 2023).

In a nutshell, the benefits of the digital educational platform include a discussion and debate forum, a virtual meeting location where assignments are turned in and tracked, tests are made and given, grades and ratings are shown, and a range of presentations, data tables, audio, and video are available(Tong et al., 2022). Moreover, it is versatile and free. Teachers and students being able to communicate academic knowledge and discuss ideas and perspectives facilitate achieving targeted educational goals with high quality (Junaid Athar et al., 2025). Among the most well-known and extensively utilized online learning environments are Google Classroom, Google Meet, Zoom, Moodle, Microsoft Teams, and Edmodo (Muslem et al., 2024).

Given the rapid pace of technological advancement, e-learning platforms play a critical role in developing university students' digital self-leadership abilities by enabling them to adapt quickly and effectively to digital environments (Durnali, 2020). Through integrated tools such as learning analytics, automation, and artificial intelligence (AI), these platforms foster digital resilience, which is essential for self-directed learning and long-term career planning. Embedded AI in e-learning systems enhances students' ability to analyze data, anticipate future skill demands, and make informed academic and professional decisions. By shifting learners from intuition-based choices to data-driven decision-making, e-learning platforms improve the speed, accuracy, and quality of students' self-regulatory actions (Alotaibi, 2024).

Moreover, personalized learning paths, adaptive assessments, and automated feedback strengthen students' autonomy, accountability, and motivation key dimensions of digital self-leadership (Nguyen et al., 2024). In this context, leadership extends beyond technical proficiency to include flexibility, collaboration, and innovation within virtual learning communities. However, effective digital self-leadership also requires ethical awareness, ensuring that technological competence is balanced with responsible and

Espacio, Tiempo y Educación, v. 13, n. 1, January-June / Enero-junio 2026, pp. 82-102.
ISSN: 1698-7802

human-centered decision-making (Shal et al., 2024). Globally, organizations such as Amazon and Microsoft demonstrate how AI-driven digital systems enhance productivity and foresight, while projects like Saudi Aramco illustrate the strategic value of advanced analytics (Al Sulaity et al., 2025). Similarly, e-learning platforms equip university students with the skills to lead themselves effectively in an AI-driven academic and professional landscape.

2.4. E-learning Platforms and Digital Self-leadership Abilities

Researchers have determined that education policies are the broad framework that comprises the pillars upon which the education system is built, and they aim to improve certain aspects of the system through legislation and decisions pertaining to the development of the pre-university education stage (Zaki Ewiss, 2021). The process of quickly integrating digital technology into different institutions and spreading it via timeless and space less electronic networks within an administrative framework that allows for evaluation, accountability, and social engagement is known as digital transformation (Zabalawi et al., 2024). The importance of E-learning as a supportive tool for traditional university education has been confirmed by Gubiani et al. (2020). The existence of obstacles that may hinder the achievement of the objectives of university E-learning are determined by Qashou (2022). Hadullo et al. (2017) have demonstrated that there is a significant need to have clear policies in higher education institutions to ensure the quality of E-learning.

According to the studies, the two most important advantages of learning management systems are creating electronic evaluations and becoming proficient in the application of the distance learning system. Selecting suitable teaching techniques for online classes was one of the most significant teaching-related advantages (Fageeh, 2024). The most notable improvements, according to the educational technology axis, were increased understanding of the value of utilizing technology to enhance the learning process. The most significant benefits associated with the technical support axis were the enhancement of members' proficiency in using new computers and electronic programs and systems (Sharma & Singh, 2024). Cooperation and the sharing of best practices between practitioners and members were the most significant social support-related advantages. The report suggested building on these successes by integrating them into member training initiatives, advancing their proficiency in remote learning, and allocating funds to strengthen the university's distance learning initiatives as a future course (Acharya et al., 2024). Studies also suggested carrying out further research on distance learning and applying the findings to enhance results and cut expenses (Rad et al., 2021).

Uzman and Maya (2019) conducted a quantitative study to ascertain the degree to which university students' self-leadership practices predict their level of life satisfaction and self-esteem. According to their analysis, self-leadership methods—both behavioral and cognitive-constructive—have a strong positive correlation with life happiness and self-esteem, with behavior-focused strategies being the best predictors. Zakir et al. (2023) examines the connection between students' academic success at public universities and their level of self-leadership. Results from a survey of 326 students revealed a significant and favorable relationship between academic achievement and self-leadership. This study investigates whether students who enrolled in leadership courses and those who did not apply different self-leadership techniques. This suggests that self-leadership can

be improved through individualized leadership training.

Hence, it can be determined that there is a statistically significant relationship between academic achievement and the level of benefit from e-learning (Rasheed et al., 2022; Zolochevskaya et al., 2021). Also, there is a statistically significant relationship between digital leadership skills and the level of benefit from the digital platform (Senadjki et al., 2023). Empirical research demonstrates that e-learning platforms significantly enhance university students' academic achievement by fostering self-directed learning, autonomy, and effective use of digital resources (Maphalala & Nkosi, 2025). Digital transformation in higher education enables students to plan, monitor, and evaluate their learning processes independently, which directly contributes to improved academic outcomes. Within e-learning environments, instructors increasingly function as facilitators and mentors, guiding students in goal setting, time management, and reflective learning, core elements that support both academic achievement and digital self-leadership development (Nazyrova et al., 2025).

Evidence from Deep et al. (2025) highlights that students' engagement and learning outcomes in online education are strongly influenced by instructors' motivational and incentive strategies. When effective motivational mechanisms are implemented, students demonstrate higher participation in collaborative online activities, improved self-regulation, and greater responsibility for learning tasks. These behaviors not only enhance academic performance but also strengthen digital self-leadership skills, such as initiative, accountability, and confidence in managing digital learning environments (Yuan et al., 2024). Conversely, the absence of structured incentive strategies limits students' engagement, reducing their academic gains and leadership development in digital contexts (Brugliera, 2024).

However, empirical studies also indicate that the extent to which students benefit from e-learning platforms depends on institutional readiness and technological infrastructure. Brugliera (2024) report that inadequate digital infrastructure, limited access to modern devices, insufficient training, weak technical support, and slow internet connectivity significantly hinder students' effective use of digital platforms. These barriers restrict students' ability to fully benefit from e-learning systems, thereby negatively affecting both academic achievement and the development of digital leadership skills. When students face technical difficulties or lack institutional support, their engagement, confidence, and learning outcomes are substantially reduced (Nyongesa & Van Der Westhuizein, 2025).

Previous studies have primarily focused on digital transformation policies and technological integration in education (Adnan & Anwar, 2020), with limited emphasis on student-cantered outcomes. Building on this empirical evidence, it can be concluded that students' level of benefit from e-learning platforms plays a critical role in shaping learning outcomes (Rafiq et al., 2024). Hence, it can be determined that there is a statistically significant relationship between academic achievement and the level of benefit from e-learning (Daryazadeh et al., 2022). Also, there is a statistically significant relationship between digital leadership skills and the level of benefit from the digital platform (Senadjki et al., 2023).

On the basis of above literature, it is hypothesized that:

1. The level of benefit among the students of the College of Education who use the educational platform is moderate.
2. The level of digital self-leadership among students are generally sufficient and high.

Espacio, Tiempo y Educación, v. 13, n. 1, January-June / Enero-junio 2026, pp. 82-102.
ISSN: 1698-7802

3. There is a statistically significant relationship between academic achievement and the level of benefit from e-learning.

There is a statistically significant relationship between digital leadership skills and the level of benefit from the digital platform.

3. Methodology

To meet the objectives and answer the questions of the study, this research adopted descriptive analytical approach. This analytical approach is important to achieve goals of study that includes analyzing the self-leadership traits of the Faculty of Education at the University of Khartoum students who use the educational platform. The study involves recording different responses from the study population. The population of study was students from 14 department enrolled in BS degree programs at the stage of 3rd year. To reach these students, simple random sampling was used. Sample size of students was 200 students. Study got usable responses from 184 students. Table 1 of the study shows the percentages and frequency according to specialization and age group of students. Moreover, SPSS was used as a tool to answer the proposed hypothesis of the present study.

Table 1: Shows the Frequencies and Percentages of the Study Sample According to Gender and Specialization.

Variable	Gender	Specialization
Frequency	15	170
Percentage	8%	92%
Total	185	185

4. Results and Discussion

First Hypothesis: *The level of benefit among the students at the College of Education who use the educational platform is moderate.*

Table 2 below shows the result of Chi-square test that determines the overall level of benefit from the digital platform.

Table 2: The Chi-square Test Result Determines the Overall Level of Benefit From the Digital Platform.

Utilizing the digital platform				Chi-Square	df	Sig.	Conclusion
Benefit Level	Observed Value	Expected Value	Residuals				
Low	22	61.7	-39.7	-96.854	2	.000	Lower than expected
Moderate	124	61.7	62.3				Higher than expected
High	39	61.7	-22.7				Lower than expected
Total	185	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 61.7.					

Table 2 shows the Chi-square goodness-of-fit test results indicate that the distribution of benefit levels from the digital platform is not equal among the three categories, where the Chi-square value reached 96.854 with a significance level less than .01. The standardized residuals revealed that most students had a *moderate* level of benefit, while the low and high levels were less than expected. These results indicate that the students' benefit from the digital platform is generally *moderate.*

Second Hypothesis: *The level of digital self-leadership among students is generally sufficient and high.*

Table 3 below shows the result of Chi-square test for digital self-leadership levels

Table 3: The Chi-square Test Result for Digital Self-leadership Levels.

Utilizing the digital platform				Chi-Square	df	Sig.	Conclusion
Benefit Level	Observed Value	Expected Value	Residuals				
Basic	4	37	-33	-96.919	2	.000	Lower than expected
Moderate	42	37	5				Higher than expected
Good	77	37	40				Higher than expected
Very Good	51	37	14				Higher than expected
Excellent	11	37	-26				Lower than expected
Total	185	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.0.					

Table 3 shows the results of the Chi-Square goodness-of-fit test indicated that the distribution of digital self-leadership levels among the users of the educational platform from the College of Education students was not equal, as the Chi-Square value reached (96.919), with a significant level of < .01. The standardized residuals revealed that the majority of students fell within the *Good* and *Very Good* levels, while the proportions of students in the *Basic* and *Excellent* levels were lower than expected. These findings indicate that students possess an acceptable level of digital self-leadership when using the platform, with an opportunity to increase the number of students reaching the *Excellent* level.

Third Hypothesis: *There is a statistically significant relationship between academic achievement and the level of benefit from e-learning.*

Table 4 below shows the relationship between academic achievement and platform.

Table 4: The Relationship between Academic Achievement and Platform Benefit Level the Digital Platform.

Variables	Utilizing the digital platform						Chi-Square Tests		
Rate	Low		Medium		High		Pearson Chi-Square	df	Sig.
	Number	%	Number	%	Number	%	12.764		.002
(1–2)	16	15.8%	73	72.3%	12	11.9%	a. 0 cells (0.0%) have expected count less		
(3–4)	6	7.1%	51	60.7%	27	32.1%	than 5. The minimum expected count is 9.99.		

Table 4 shows that there is a statistically significant relationship between academic achievement and the level of benefit from the platform, where students with higher academic averages (3–4) were more likely to achieve *high* benefit levels, while those with lower averages tended to benefit moderately. This suggests that higher academic performance is associated with greater benefits from the digital platform.

Fourth Hypothesis: *There is a statistically significant relationship between digital leadership skills and the level of benefit from the digital platform.*

Table 5 below show the Relationship between digital leadership skills and benefit level

Espacio, Tiempo y Educación, v. 13, n. 1, January-June / Enero-junio 2026, pp. 82-102.
ISSN: 1698-7802

Table 5: Relationship between Digital Leadership Skills and Benefit Level.

Variables	Level of utilization of the online platform						Chi-Square Tests		
Digital leadership skills	Low		Medium		High		Pearson Chi-Square	df	Sig.
	Number	%	Number	%	Number	%	33.428a	8	.000
Basic	2	50.0%	1	25.0%	1	25.0%			
Moderate	11	26.2%	27	64.3%	4	9.5%	a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .48.		
Good	6	7.8%	60	77.9%	11	14.3%			
Very Good	3	5.9%	31	60.8%	17	33.3%			
Excellent	0	0.0%	5	45.5%	6	54.5%			

Table 5 shows that there is a clear positive relationship between digital leadership skill level and platform benefit. As digital leadership skills increase, the likelihood of high benefit also increases. Table 6 below shows the Frequencies and percentages of acquired basic e-learning skills.

Table 6: Frequencies and Percentages of Acquired Basic E-learning Skills.

Skill	Frequency	Percentage
Collaboration and Participation	9	4.9%
Innovation	20	10.8%
Self-efficacy	51	27.6%
Self-vision	9	4.9%
Self-learning	96	51.9%

Table 7 below shows the Frequencies and Percentages of the Dimensions of Basic E-learning Skills Acquired.

Table 7: Frequencies and Percentages of the Dimensions of Basic E-learning Skills Acquired.

No.	Dimension	Item	Frequency	Percentage
1	Self-learning	Time Management	67	36.2%
		Self-regulation	118	63.8%
2	Self-vision	Developing Learning Abilities	153	82.7%
		Awareness of Future Career	32	17.3%
3	Self-efficacy	Care for Content	73	39.5%
		Preparing You as an Entrepreneurial Teacher	112	60.5%
4	Innovation	Adding More than What You Receive	65	35.1%
		Creativity in Understanding Content	120	64.9%
5	Collaboration and Participation	Ability to Compete	53	28.6%
		Teamwork Spirit	132	71.4%

The results of Table 6 and Table 7 indicate that the basic e-learning skills acquired by the students varied in their levels of acquisition. Self-learning ranked first at 51%, followed by self-efficacy 27.6%, then innovation 10.8%, while collaboration and participation, as well as self-vision, were low 4.9% each. When analyzing the dimensions of each skill, it was found that self-learning showed superiority in self-regulation 63.8% compared to time management 36.2%. Self-vision was notably high in developing learning abilities 82.7% compared to awareness of future career paths 17.3%. Self-efficacy showed greater acquisition in preparing students as entrepreneurial teachers 60.5% compared to caring for content 39.5%. Innovation was more creative when it came to understanding content 64.9% than when it came to adding more than 35.1%. As for collaboration and participation, students demonstrated stronger performance

in teamwork spirit, 71.4% compared to the ability to compete with 28.6%. The results of the study indicate that self- and personal-directed skills that are acquired by the students are stronger than creative skills and social skills. These results reflect the importance of improving innovative and interactive aspects in e-learning programs.

Figure 1. The Percentages of Students' Acquisition of E-learning Skills Across their Various Dimensions.

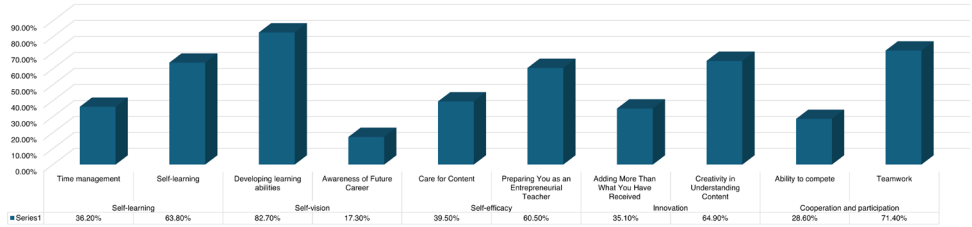

Figure 1 shows the percentage of students who are acquiring e-learning skills in different dimensions. These statistics show the percentage of students who are acquiring e-learning skills in different dimensions. These results represent clear variation in the acquisition level of skills among students. Figure 1 shows that self-regulation skill is acquired by 63.8% of students. Whereas only 36.2% of students have focused on acquiring time management skills. These results indicate that students focus on the acquisition of independent learning. In terms of self-vision, figures show that students have ability to learn by 82.7% which is higher than the awareness to students regarding career paths, showing 17.3%. These results show that students are giving priority to improve their existing skills over the strategic ones required for their profession in future.

From the perspective of self-efficacy, the number of students who are getting prepared for teachers of entrepreneurship is 60.5%, which is more than caring for the content, i.e. 39,5%. These results reflect the ability among students to apply knowledge in real life rather than limiting the content of learning. From the point of view of innovation, students have strong understanding of creativity within 64.9% as compared to adding more than the content received that is 35.1%. These results show that students show deeper interpretation and comprehension but need support to generate new knowledge and to be creative. In the end, participation and cooperation skills among students were moderate. Students have ability to compete, that is 28.6% and teamwork is 71.4%. This result shows that learning culture gives value to collaboration, rather than competition.

These findings also show that different technical factors in the form of power outages and weak connectivity of internet show the most key barriers of e-learning that are followed by environmental and organizational factors. Whereas motivation and skill related factors have lower impact. It shows that there is need to develop technical infrastructure, enhance technical and training support and provide suitable environment of learning. The results of Table 8 show the percentage and frequencies of barriers to using digital platforms as per the responses of students.

Espacio, Tiempo y Educación, v. 13, n. 1, January-June / Enero-junio 2026, pp. 82-102.
ISSN: 1698-7802

Table 8: Frequencies and Percentages of Barriers to Using the Digital Platform According to Students' Responses.

No.	Barriers	Frequency	Percentage (%) of Total Responses (374)	Percentage (%) of Total Respondents (185)	Rank
1	Weak internet network	167	44.7%	90.3%	(1)
2	Power outage	116	31.0%	62.7%	(2)
3	Lack of proficiency in usage skills	26	7.0%	14.1%	(4)
4	Lack of motivation for e-learning	13	3.5%	7.0%	(5)
5	Lack of a suitable place for usage	52	13.9%	28.1%	(3)

The results given in Table 8 show that vital barriers that students face while using different digital platforms was connectivity of internet. Students ranked it highest as 90.3% of the students mentioned it as a problem. It shows that technological infrastructure is important to ensure success of process of e-learning. The second importance given by the students was impact of service and environmental related factors on the continuation of learning by using different digital platforms, that is 62.7%. Students mentioned lack of proper place to use platforms is ranked third, i.e. 28.1%. This result shows the influence of different living conditions on the ability of students to get engaged in process of learning. Whereas lack of proficiency in using different platforms is ranked as 14.1%. It is followed by low level of motivation as the fifth place with 7% responses only. The results mentioned in Table 8 show the service and technical related factors have more influence than different personal factors. Overall, the results show the success of different digital platforms-based learning need to enhance infrastructure of communication and provide support to learning environments before even focusing on motivation and skills of the students. Figure 2 of the study shows the percentage distribution of samples identifying barriers of e-learning.

Figure 2: The Percentage Distribution of the Sample's Identification of E-learning Barriers.

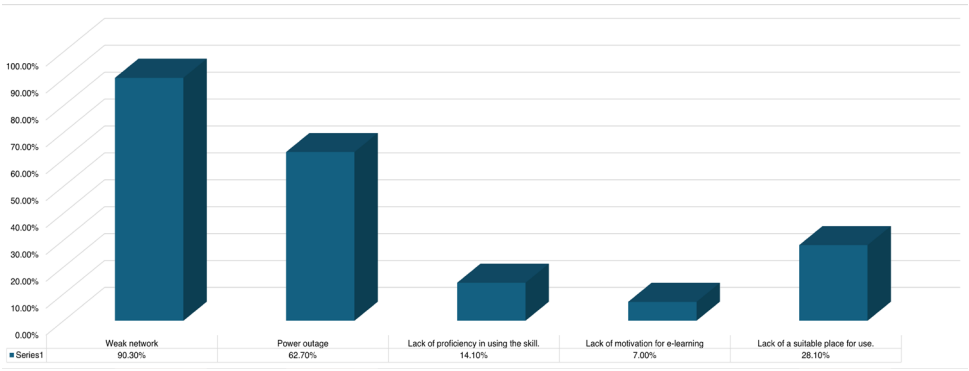

Figure 2 of the study illustrates the percentage distribution in terms of barriers of e-learning. The results are similar to the findings of Table 8, revealing 90.3% of the respondents showing weak internet connectivity as the first ranked barrier. It indicates that network infrastructure regularly shows a major threat of e-learning. It shows that internet connectivity should be improved to enhance e-learning among students. Moreover, 62.70% of the respondents mentioned power outage as second key factor as barrier of e-learning. These findings illustrate that environmental and technical elements are vital obstacles that create hurdles in digital learning.

Whereas 14.10% of the students revealed lack of proficiency to use e-learning. Findings suggest that some students need technical support and training with purpose of utilizing and navigating e-learning tools in an effective manner. Furthermore, around 7% of respondents revealed lack of motivation towards e-learning as barrier to using e-learning. The findings indicate that barriers are of behavioral and psychological importance that are linked to willingness and readiness to learn in virtual environment. In the end, around 28.10% of the students demonstrated lack of suitable place to study as potential barrier of e-learning. These findings reflect the way environmental conditions or households have the potential to affect ability of students to engage and concentrate in e-learning activities. Thus, the success of e-learning is dependent on factors like creating motivating and suitable learning environments, providing technical support and training programs to students, ensuring stable power sources and improving digital infrastructure.

The outcome of study revealed that students studying in college of education shows moderate level of benefit from digital platforms of education. Whereas these students showed acceptable level of digital self-leadership. There is potential for further development, especially for those who are not proficient yet. These findings demonstrate that positive association between benefits of e-learning, digital leadership skills and academic achievement. These outcomes suggest that students having higher academic performance will show greater value to digital environment of learning. Moreover, the analysis if e-learning skills showed students prefer to acquire personal learning skills and self-directed skills as compared to socially interactive and creative skills. These results highlighted the need for different instructional strategies to foster reflective future planning, innovation and collaboration. Likewise, the results highlighted different technical barriers. These results showed power outages on frequent basis and weak connectivity of internet as vital obstacle of e-learning. Collectively, results focus on the success of e-learning depend upon availability of platforms, and combination of learning empowerment, pedagogical support and infrastructure readiness.

5. Conclusion

E-learning is one of the vital steps to improve standard of education and to make education applicable in digital age. There is need to establish learning environments that can adapt the required changes through investment in infrastructure of technology, providing support to students and teachers and to develop engaging courses. In future, new dimensions will be given to digital learning through technical breakthroughs. These innovations are predicted for the substantial development in the platforms of e-learning. One of the advancements of technologies is virtual reality and augmented reality that enable students to participate through realistic simulations. These technologies will provide more interactive and engaging learning opportunities to students that increase the understanding of course. Moreover, different AI technologies are also offering individualized learning experiences that are crucial for the success of students. Different AI systems are able to evaluate performance of students and provide personalized learning experiences on the basis of unique abilities and requirements. So, the education will become customized and success rate of students will increase. Moreover, it is expected that using self-assessment techniques and computerized performance measurement will increase with the passage of time. It will give students and teachers precise feedback. With the addition of these tools, students will be able to control their shortcomings.

Espacio, Tiempo y Educación, v. 13, n. 1, January-June / Enero-junio 2026, pp. 82-102.
ISSN: 1698-7802

5.1. Limitations and Suggestions

This study has few limitations that are mentioned in this section. This research adopted cross sectional research approach. It is suggested that studies may use longitudinal research design in future. Moreover, students who were respondents of study were third year students at University of Khartoum's Faculty of Education. It is suggested to include students of junior category as well in future studies. Percentages and graphs were used for the analysis of data. It is proposed to use other tools of SPSS like Process Macros for the analysis of collected data. In the end, directional hypothesis should be a part of upcoming studies of similar nature.

5.2. Contribution of Study

This study contributes theoretically and managerially. From the theoretical perspective, the results show the importance of the college education stage for College of Education students and their leadership development in the context of technical and digital advancements. This study also highlights the significance of weighing the benefits and drawbacks of enhancing university students' performance and promoting clear communication. From the managerial perspective, the results provide support to people in charge of creating educational systems and policies to raise and improve performance. Putting the benefits of e-learning and the revolution in artificial intelligence into practice.

6. Funding

This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia [Grant No: KFU260883]

References

Acharya, B., Sigdel, S., & Poudel, O. (2024). Analysis of Effectiveness of Collaborative Pedagogy Practices. *NPRC Journal of Multidisciplinary Research, 1*(4), 172-186. https://doi.org/10.3126/nprcjmr.v1i4.70965

Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology, 2*(1), 45-51. https://doi.org/10.33902/JPSP.2020261309

Al-Kandari, H. A. (2024). The reality of digital leadership in the distance learning experience from the perspective of teachers in primary schools in the State of Kuwait. *Journal of Educational Sciences–Qatar University, 24*(1). https://doi.org/10.29117/jes.2024.0156

Al Saydawawy, G. R. A. H., & Ahmed, Z. I. (2021). The Impact of The Use of Educational Platforms on The Attitudes of Students of The College of Basic Education in The Subject Of Mathmatics. *Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12*(13), 4213-4226. https://doi.org/10.17762/turcomat.v12i13.9424

Al Sulaity, I., Yourston, D., Khassawneh, O., & Darwish, T. K. (2025). Driving digital transformation in the oil and gas sector: unlocking AI's potential in the UAE. *International Journal of Organizational Analysis.* https://doi.org/10.1108/ijoa-01-2025-5145

Alotaibi, N. S. (2024). The Impact of AI and LMS Integration on the Future of Higher Education:

Opportunities, Challenges, and Strategies for Transformation. *Sustainability, 16*(23), 10357. https://doi.org/10.3390/su162310357

Alshammary, F. M., & Alhalafawy, W. S. (2023). Digital Platforms and the Improvement of Learning Outcomes: Evidence Extracted from Meta-Analysis. *Sustainability, 15*(2), 1305. https://doi.org/10.3390/su15021305

Anghelo, J., Bedoya-Flores, M. C., Mosquera-Quiñonez, E. F., Mesías-Simisterra, Á. E., & Bautista-Sánchez, J. V. (2023). Educational Platforms: Digital Tools for the teaching-learning process in Education. *Ibero-American Journal of Education & Society Research, 3*(1), 259-263. https://doi.org/10.56183/iberoeds.v3i1.626

Antonopoulou, H., Halkiopoulos, C., Barlou, O., & Beligiannis, G. N. (2021). Associations between traditional and digital leadership in academic environment: During the COVID-19 pandemic. *Emerging Science Journal, 5*(4), 405-428. https://doi.org/10.28991/esj-2021-01286

Anwar, S., & Saraih, U. N. (2024). Digital leadership in the digital era of education: enhancing knowledge sharing and emotional intelligence. *International Journal of Educational Management, 38*(6), 1581-1611. https://doi.org/10.1108/ijem-11-2023-0540

Atanasova, I. (2025). Managing distance e-learning knowledge in the digital age. *Knowledge Management Research & Practice, 23*(6), 677-689. https://doi.org/10.1080/14778238.2024.2418627

Bashir, S., & Lapshun, A. L. (2025). E-learning future trends in higher education in the 2020s and beyond. *Cogent Education, 12*(1), 2445331. https://doi.org/10.1080/2331186X.2024.2445331

Baziukė, D., Rupšienė, I., Kesylė, K., & Norvilienė, A. (2025). How e-Learning Platforms Are Addressing Project-Based Learning: An Assessment of Digital Learning Tools in Primary Education. *Applied Sciences, 15*(23), 12422. https://doi.org/10.3390/app152312422

Beeson, J. (2025). *Network Leadership: Promoting a Healthier World Through the Power of Networks*. Cambridge University Press. https://doi.org/10.1017/9781009392242

Brugliera, P. (2024). The effectiveness of digital learning platforms in enhancing student engagement and academic performance. *Journal of Education, Humanities, and Social Research, 1*(1), 26-36. https://doi.org/10.70088/xq3gy756

Brunner, T. J., Schuster, T., & Lehmann, C. (2023). Leadership's long arm: The positive influence of digital leadership on managing technology-driven change over a strengthened service innovation capacity. *Frontiers in Psychology, 14*, 988808. https://doi.org/10.3389/fpsyg.2023.988808

Buonocore, F., Annosi, M. C., de Gennaro, D., & Riemma, F. (2024). Digital transformation and social change: Leadership strategies for responsible innovation. *Journal of Engineering and Technology Management, 74*, 101843. https://doi.org/10.1016/j.jengtecman.2024.101843

Culduz, M. (2024). Benefits and Challenges of E-Learning, Online Education, and Distance Learning. In L. E. Gray & S. D. Dunn (Eds.), *Incorporating the Human Element in Online Teaching and Learning* (pp. 1-27). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-4131-5.ch001

Daryazadeh, S., Yavari, M., Madani, S.-R., Taghavi-Ardakani, A., Azadchahr, M. J., & Shayeghi, F. (2022). Correlation Between the E-learning Attitude and Academic Achievement of Medical Students in Clinical Levels. *Educational Research in Medical Sciences, 10*(2), e120391. https://doi.org/10.5812/erms.120391

Das, A., & Malaviya, S. (2025). Digital Platforms and Leveraging Technologies to Enhance Learner Engagement. In T. Choudhury, A. Kumar, R. Tomar, S. Balamurugan, & A. Vishnoi (Eds.), *Cyber-Physical Systems for Innovating and Transforming Society 5.0* (pp. 211-231). Scrivener Publishing LLC. https://doi.org/10.1002/9781394197750.ch10

Deep, P. D., Chen, Y., Ghosh, N., & Rahaman, M. S. (2025). The Influence of Student–Instructor Communication Methods on Student Engagement and Motivation in Higher Education Online Courses During and After the COVID-19 Pandemic. *Education Sciences, 15*(1), 33. https://doi.org/10.3390/educsci15010033

Dehghani Soltani, M., Mesbahi, M., & Darvish, M. (2021). The Impact of Transformational Leadership and Transparent Communication on Employees' Openness to Change by Explaining the Mediating Role of Organizational Trust. *Organizational Behaviour Studies Quarterly, 10*(2), 77-104. https://obs.sinaweb.net/article_244954.html

Dewi, K. C., Ciptayani, P. I., Surjono, H. D., & Priyanto, P. (2018). Modeling vocational blended learning based on digital learning now framework. *TOJET: The Turkish Online Journal of Educational Technology, 17*(2), 89-96. https://repository.pnb.ac.id/id/eprint/5291

Durnali, M. (2020). The effect of Self-Directed Learning on the relationship between Self-Leadership and Online Learning among university students in Turkey. *Tuning Journal for Higher Education, 8*(1), 129-165. https://doi.org/10.18543/tjhe-8(1)-2020pp129-165

Elansari, H., & Laachach, A. (2024). Exploring factors influencing perceived e-learning quality in foreign language education: insights from Morocco. *Quality Assurance in Education, 33*(3), 393-409. https://doi.org/10.1108/qae-09-2024-0198

Fageeh, A. I. (2024). Maximizing learning management systems in online college English education: Views from France and Saudi Arabia. *Social Sciences & Humanities Open, 9*, 100868. https://doi.org/10.1016/j.ssaho.2024.100868

Gubiani, D., Cristea, I., & Urbančič, T. (2020). Introducing E-learning to a Traditional University: A Case-Study. In J. L. Sarasola Sánchez-Serrano, F. Maturo, & Š. Hošková-Mayerová (Eds.), *Qualitative and Quantitative Models in Socio-Economic Systems and Social Work* (pp. 225-241). Springer International Publishing. https://doi.org/10.1007/978-3-030-18593-0_18

Haddawi, K. H., Al-Ziaydi, A. G., & Al-Khalidi, F. A. A.-K. (2024). The role of adipokines and ghrelin in interactions and clinical implications in childhood obesity. *Journal of Education and Health Promotion, 13*(1), 40. https://doi.org/10.4103/jehp.jehp_972_23

Hadullo, K., Oboko, R., & Omwenga, E. (2017). A model for evaluating e-learning systems quality in higher education in developing countries. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 13*(2), 185-204. http://ijedict.dec.uwi.edu/include/getdoc.php?id=7291&article=2311&mode=pdf

Hastiti, A. P., Subiyanto, D., & Hadi, S. (2025). Digital Leadership in Driving Work Innovation: The Role of Creativity, Motivation, and Gender. *Journal The Winners, 26*(1), 43-57. https://doi.org/10.21512/tw.v26i1.12572

Iksal, I., Hayani, R. A., & Aslan, A. (2024). Strengthening character education as a response to the challenges of the times. *Indonesian Journal of Education (INJOE), 4*(1), 761-774. https://felifa.net/index.php/INJOE/article/view/233

Javed, F. (2025). Preparing for Tomorrow: Evaluating and Innovating Educational Systems for Future Competence. In M. D. Lytras, P. Ordóñez de Pablos, & T. Aldosemani (Eds.), *Fostering Teacher Skills and Critical Thinking in Modern Education* (pp. 43-78). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-1692-5.ch003

Junaid Athar, K., Sajid, A., Yaseen, u., & Azhar, K. (2025). The Role of Artificial Intelligence in Knowledge Management through Digital Transformation: A Systematic Review. *Journal of Management Science Research Review, 4*(2), 355-371. https://jmsrr.com/index.php/Journal/article/view/143

Kaya-Capocci, S., Pabuccu-Akis, A., & Orhan-Ozteber, N. (2025). Entrepreneurial STEM Education: Enhancing students' Resourcefulness and Problem-solving Skills. *Research in Science Education, 55*(1), 103-134. https://doi.org/10.1007/s11165-024-10189-y

Lin, Q. (2024). Digital leadership: a systematic literature review and future research agenda. *European Journal of Innovation Management, 28*(6), 2469-2488. https://doi.org/10.1108/ejim-07-2023-0522

Mandic, D., Pelemis, M., Pasalic, S., & Lalic, N. (2012). Computer-based information system in education. In *Proceedings of the 11th WSEAS international conference on Artificial Intelligence, Knowledge Engineering and Data Bases* (pp. 231-236). ACM. https://dl.acm.org/doi/abs/10.5555/2183067.2183106

Maphalala, M. C., & Nkosi, N. (2025). Strategies for Enhancing Self-Directed Learning in Open Distance and E-Learning (ODEL) Contexts. *E-Journal of Humanities, Arts and Social Sciences, 6*(8), 1640-1654. https://doi.org/10.38159/ehass.20256827

Massa, S., Annosi, M. C., Marchegiani, L., & Messeni Petruzzelli, A. (2023). Digital technologies and knowledge processes: new emerging strategies in international business. A systematic literature review. *Journal of Knowledge Management, 27*(11), 330-387. https://doi.org/10.1108/jkm-12-2022-0993

Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon, 9*(6), e16348. https://doi.org/10.1016/j.heliyon.2023.e16348

Muslem, A., Mustafa, F., & Rahayu, R. R. (2024). The Preferred Use of Google Classroom Features for Online Learning in Indonesian EFL Classes. *Electronic Journal of e-Learning, 22*(8), 76-92. https://doi.org/10.34190/ejel.22.8.2896

Mwawasi, F. M. (2014). Technology leadership and ICT use: Strategies for Capacity Building for ICT integration. *Journal of Learning for Development, 1*(2), n2. https://doi.org/10.56059/

jl4d.v1i2.24

Nazyrova, A., Miłosz, M., Bekmanova, G., Omarbekova, A., Aimicheva, G., & Kadyr, Y. (2025). The Digital Transformation of Higher Education in the Context of an AI-Driven Future. *Sustainability, 17*(22), 9927. https://doi.org/10.3390/su17229927

Ndibalema, P. (2025). Digital literacy gaps in promoting 21st century skills among students in higher education institutions in Sub-Saharan Africa: a systematic review. *Cogent Education, 12*(1), 2452085. https://doi.org/10.1080/2331186X.2025.2452085

Nguyen, T. T. T., Harrip, J., & Tran, T. N. (2024). The Roles of Personalized Learning and Service Learning in Developing Students' Self-Leadership and Global Citizen Education. In T. Minh Tung (Ed.), *Adaptive Learning Technologies for Higher Education* (pp. 1-34). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-3641-0.ch001

Nyongesa, W. J., & Van Der Westhuizein, J. (2025). The impact of digital teaching tools on student engagement and learning outcomes in higher education in Africa. *International Journal of Innovative Research and Scientific Studies, 8*(4), 264-280. https://doi.org/10.53894/ijirss.v8i4.7777

O'Lemmon, M. (2024). The worst mistake 2.0? The digital revolution and the consequences of innovation. *AI & Society, 39*(3), 1359-1368. https://doi.org/10.1007/s00146-022-01599-5

Oluwaseyi, J., Lewis, E., & Amola, M. (2025). AI-Driven Digital Leadership and Predictive Analytics for Enhancing Organizational Learning and Operational Resilience in Healthcare and Supply Chains. *Research Gate.* https://www.researchgate.net/publication/392335333

Ossiannilsson, E. (2025). The role of ethical leadership in improving education through open education, digital inclusion and seamless learning. *AI for Seamless Education.* https://pressbooks.pub/aiforseamlesseducation/chapter/the-role-of-ethical-leadership-in-improving-education-through-open-education-digital-inclusion-and-seamless-learning

Pauli, T., Fielt, E., & Matzner, M. (2021). Digital Industrial Platforms. *Business & Information Systems Engineering, 63*(2), 181-190. https://doi.org/10.1007/s12599-020-00681-w

Pundt, L., Dietrich, M., & Kuron, U. (2025). Leadership Toolbox: Digital Support in Everyday Leadership. In J. Felfe & R. van Dick (Eds.), *Handbook of Leadership: Applied Business Psychology for Managers* (pp. 797-816). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-70444-8_48

Qashou, A. (2022). Obstacles to effective use of e-learning in higher education from the viewpoint of faculty members. *Turkish Online Journal of Distance Education, 23*(1), 144-177. https://izlik.org/JA44TB59SG

Rad, F. A., Otaki, F., Baqain, Z., Zary, N., & Al-Halabi, M. (2021). Rapid transition to distance learning due to COVID-19: Perceptions of postgraduate dental learners and instructors. *PloS One, 16*(2), e0246584. https://doi.org/10.1371/journal.pone.0246584

Rafiq, S., Iqbal, S., & Afzal, A. (2024). The Impact of Digital Tools and Online Learning Platforms on Higher Education Learning Outcomes. *Al-Mahdi Research Journal (MRJ),*

5(4), 359-369. https://ojs.mrj.com.pk/index.php/MRJ/article/view/342

Raj, A. A. (2025). The Effectiveness of Online Learning Platforms: A review of effectiveness and efficiency concerns. *Research Gate.* https://doi.org/10.13140/RG.2.2.29128.64004

Rasheed, H. M. W., He, Y., Khalid, J., Khizar, H. M. U., & Sharif, S. (2022). The relationship between e-learning and academic performance of students. *Journal of Public Affairs, 22*(3), e2492. https://doi.org/10.1002/pa.2492

Rüth, R., & Netzer, T. (2020). The key elements of cultural intelligence as a driver for digital leadership success. *Leadership, Education, Personality: An Interdisciplinary Journal, 2*(1), 3-8. https://doi.org/10.1365/s42681-019-00005-x

Senadjki, A., Au Yong, H. N., Ganapathy, T., & Ogbeibu, S. (2023). Unlocking the potential: the impact of digital leadership on firms' performance through digital transformation. *Journal of Business and Socio-economic Development, 4*(2), 161-177. https://doi.org/10.1108/jbsed-06-2023-0050

Sergeev, A., Kulikova, N., Danilchuk, E., & Borisova, N. (2021). Online Educational Platform as a Web Content Management System in the Organization of Student-Teacher Interaction. In R. Silhavy, P. Silhavy, & Z. Prokopova (Eds.), *Data Science and Intelligent Systems* (pp. 846-856). Springer International Publishing. https://doi.org/10.1007/978-3-030-90321-3_70

Shal, T., Ghamrawi, N., Abu-Tineh, A., Al-Shaboul, Y. M., & Sellami, A. (2024). Teacher leadership and virtual communities: Unpacking teacher agency and distributed leadership. *Education and Information Technologies, 29*(12), 15025-15042. https://doi.org/10.1007/s10639-023-12446-5

Sharma, R., & Singh, A. (2024). Use of Digital Technology in Improving Quality Education: A Global Perspectives and Trends. In V. Nadda, P. K. Tyagi, R. Moniz Vieira, & P. Tyagi (Eds.), *Implementing Sustainable Development Goals in the Service Sector* (pp. 14-26). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-2065-5.ch002

Syamsir, S., Saputra, N., & Mulia, R. A. (2025). Leadership agility in a VUCA world: a systematic review, conceptual insights, and research directions. *Cogent Business & Management, 12*(1), 2482022. https://doi.org/10.1080/23311975.2025.2482022

Tiwari, P. S., Karnatak, H., Agarwal, S., Pandey, K., Vishwakarma, J., Ghildiyal, A., & Chauhan, P. (2021). Distance Learning Experience During Covid-19 Period in Higher Education for Space Application. *Journal of the Indian Society of Remote Sensing, 49*(10), 2549-2558. https://doi.org/10.1007/s12524-021-01407-5

Tong, D. H., Uyen, B. P., & Ngan, L. K. (2022). The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane. *Heliyon, 8*(12), e12657. https://doi.org/10.1016/j.heliyon.2022.e12657

Trivedi, K., & Srivastava, K. B. L. (2022). The role of knowledge management processes in leveraging competitive strategies to achieve firm innovativeness. *The Bottom Line, 35*(2-3), 53-72. https://doi.org/10.1108/bl-06-2021-0071

Türk, A. (2023). Digital leadership role in developing business strategy suitable for digital transformation. *Frontiers in Psychology, 13*, 1066180. https://doi.org/10.3389/fpsyg.2022.1066180

Uzman, E., & Maya, İ. (2019). Self-Leadership Stategies as the Predictor of Self-Esteem and Life Satisfaction in University Students. *International Journal of Progressive Education, 15*(2), 78-90. https://doi.org/10.29329/ijpe.2019.189.6

Walter, Y. (2024). Digital Psychology: Introducing a Conceptual Impact Model and the Future of Work. *Trends in Psychology.* https://doi.org/10.1007/s43076-024-00408-w

Xie, X., Zhang, H., & Blanco, C. (2022). How organizational readiness for digital innovation shapes digital business model innovation in family businesses. *International Journal of Entrepreneurial Behavior & Research, 29*(1), 49-79. https://doi.org/10.1108/ijebr-03-2022-0243

Yadav, S. (2023). E-Learning in Education: Transforming Teaching-Learning in Twenty-First Century. *A Peer Reviewed International Refereed Journal, 11*(1), 28-36. https://researchreinforcement.com/document/English-May-2023/E-28-36.pdf

Yuan, X., Rehman, S., Altalbe, A., Rehman, E., & Shahiman, M. A. (2024). Digital literacy as a catalyst for academic confidence: exploring the interplay between academic self-efficacy and academic procrastination among medical students. *BMC Medical Education, 24*(1), 1317. https://doi.org/10.1186/s12909-024-06329-7

Zabalawi, I., Kordahji, H., & Aftimos, S. (2024). Digital Transformation in Universities: Strategic Framework, Implementation Tools, and Leadership. In A. Badran, E. Baydoun, S. Hillman, & J. Mesmar (Eds.), *Higher Education in the Arab World: Digital Transformation* (pp. 145-210). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-70779-7_8

Zaki Ewiss, M. A. (2021). Management of pre-university Egyptian education: politics, issues and trend. *Journal of Humanities and Applied Social Sciences, 5*(1), 35-58. https://doi.org/10.1108/jhass-04-2021-0079

Zakir, S., Khan, S., & Siraj, D. (2023). Relationship between Self-Leadership and Academic Performance of Students: Empirical Evidence from Public Sector Universities in AJ&K. *Pakistan Journal of Humanities and Social Sciences, 11*(4), 4598-4604. https://doi.org/10.52131/pjhss.2023.v11i4.1914

Zhang, J., & Wu, Y. (2025). Impact of university teachers' digital teaching skills on teaching quality in higher education. *Cogent Education, 12*(1), 2436706. https://doi.org/10.1080/2331186X.2024.2436706

Zolochevskaya, E. Y., Zubanova, S. G., Fedorova, N. V., & Sivakova, Y. E. (2021). Education policy: the impact of e-learning on academic performance. *E3S Web of Conferences, 244*, 11024. https://doi.org/10.1051/e3sconf/202124411024