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THE DIGITAL LEADERSHIP IN KP SCHOOLS OVER DIGITAL TRANSFORMATION: EVIDENCE FROM EMERGING ECONOMY

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ABSTRACT

Leadership skills that are particularly important in digital era include the ability to think strategically, drive change and foster culture of innovation. Bases on the detailed literature it is the first ever study to investigate digital leadership based on various characteristics proposed by (Karakose, Polat, & Papadakis, 2021) the qualitative study conducted in the work context of turkey. Based on the literature it is concluded that digital leadership is diverse phenomena and it cannot be measured by just defining concept and tries to measure it by limited number of items as most of the previous researchers. Based on detail literature it is evident that digital leadership is phenomena that is based on many attributes namely (digital technology usage aim and reasons), for or against (digital transformation in schools), reasons for and against (technological based professional development), reason for and against (digital learning culture) & digital leadership skills/ abilities as well as characteristics. The results offered valuable information in reaching the conclusion and making certain recommendations to policy makers & future researchers.

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INTRODUCTION

Digitalization refers to the process of converting traditional analog information and processes into a digital format (Alenezi, 2021). This can encompass wide range of activities, from digitizing paper-based documents, to automating manual business processes, to developing new technologies that take advantage of digital capabilities. The goal of digitalization is to improve efficiency, increase accessibility, and enhance overall experience for users (Nielsen, 2019). With the rise of internet and mobile devices, digitalization has become increasingly important aspect of modern society, shaping way we work, live, & interact with each other (Benavides, Tamayo Arias, Serna, Bedoya, & Burgos, 2020). Digitalization is transforming the way we work and nature of employment. As technology

continues to advance and automate many tasks, demand for workers with digital skills is increasing, while traditional jobs are becoming obsolete (Ziadlou, 2021). This shift is leading to creation of new types of jobs, such as data scientists, software developers, and digital marketing specialists (Coelho Rodrigues, 2022). It is changing the way we think about work, with an emphasis on skills that are transferable across different industries and rise of gig economy and flexible working arrangements (Benavides et al., 2020).

However, digitalization has its downsides, as it can lead to job displacement and income inequality. To address these challenges, it's important to invest in reskilling and education programs that help workers acquire the digital skills they need to compete in the changing job market (Benavides et al., 2020). Throughout this context, digitalization may change the style of employment in addition to requirements and work load (Kazim, 2019). The processes involved in reforming a company are thought to present the biggest challenge to senior management and leadership (Antonopoulou, Halkiopoulos, Barlou, & Beligiannis, 2021). On the other hand, the authors assert that businesses that have been effective in the electronic era have developed excellent leadership characteristics (Nalda, Emeterio, Ortiz, & Oliva, 2020). Management is responded to changing in this situation by using their leadership skills. Effective leadership is crucial for businesses to thrive in the digital era (Antonopoulou et al., 2021). Companies that have successfully navigated the transition to a digital business model are characterized by strong leadership that is able to adapt to change, embrace new technologies, and foster culture of innovation. Effective leaders in digital age able to understand impact of technology on industry and make strategic decisions that leverage these advancements to achieve their goals.

Leadership skills that are mainly important in digital era include ability to think strategically, drive change, and foster culture of innovation (Biahmou, Emmer, Pfouga, & Stjepandić, 2016). The leaders must be able to recognize opportunities and take calculated risks, while also ensuring that their organization is prepared to respond to the challenges posed by new technologies (Contreras, Baykal, & Abid, 2020). Effective leaders in the digital era must also be able to attract and retain top talent, as the competition for the skilled workers in the tech sector is fierce. They must create an environment that values creativity, collaboration, and continuous learning, and be able to develop a strong brand that appeals to both customers and employees (Wang & Yang, 2022). In conclusion, strong leadership is a key factor in success of businesses in digital era, and leaders who are able to adapt to changing circumstances, embrace new technologies, and foster a culture of innovation are likely to be successful (Contreras et al., 2020; Karakose et al., 2021; Gelder, Veldhoven, & Voorde, 2022; Wang & Yang, 2022). In Pakistan, KP province is trying to adopt modern techniques to digitalized government departments over introducing KP digital policy (2018-2023) by introducing digital biddings, digital payment of the sales tax, promoting digital economy through enhancing digital skills of youth.

Public education has been regarded by researchers as Pakistan's main tool for addressing societal inequality issues. In order to ensure that the goals of ESEA 1965 are met, principals must ensure that all students have access to an equitable education that includes educational technology. In order to lead in constantly changing technological culture, principals must create and implement

technology integration strategies that address the widening digital divide in access to and usage of technology in schools. Identifying essential leadership characteristics in technology can help school districts build institutions where kids are given access to digital capital, which is "vital to personal fulfilment in terms of realizing academic & professional success. By filling in knowledge gaps and utilizing technology leadership standards to gauge the principal technology leadership behaviors, this study improves the body of knowledge on principle technology leadership. The results of study will be helpful for social scientist, researchers, educationalists and policy makers to implement enhance principal skills through the digital skills for promoting modern skills and knowledge at primary education level that will try to fill gap between developing and developed world classrooms.

Research Questions

1. To investigate the importance of digital leadership for school principals in KP, Pakistan.
2. To identify the foremost attributes of the school's principal digital leadership attributes.
3. To recommended suggestion for policy makers as well as the future research researchers.

LITERATURE REVIEW

Digital Leadership Characteristics

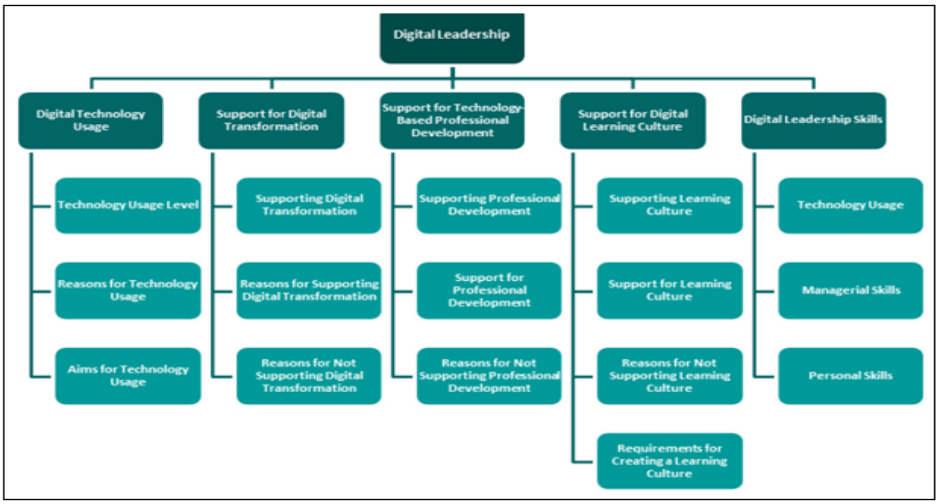
Staff should adopt a fresh tactical approach and mindset defined as "digital leadership" in order to improve education, learning and governance while establishing and upholding strong relationship with all crucial stakeholders (Abbu, Mugge, Gudergan, & Kwiatkowski, 2020). The present study split the participating instructors' perceptions of the school admins' digital leadership qualities into 3 groups: Technology use, managerial skills, and personal skills (Karakose et al., 2021). According to (Abbu et al., 2020), corporate executives are expected to possess digital literacy in addition to their standard leadership traits. In this connection, management is responded to changing in this situation by using their leadership skills. The qualitative research conducted by (Karakose et al., 2021) express different five different attributes of the digital leadership (digital technology use, support for digital technology , professional development through technological approach, support for the digital learning culture and digital leaders attributes, skills and required characteristics as depicted in figure (1).

Usage of Digital Technology

Digital technology refers to the use of electronic devices and Internet to access, process, and store information. In today digital age, digital technology has become ubiquitous and has had a profound impact on many aspects of our lives, including way we communicate, work, and access information (Solomon & van Klyton, 2020). There are many different types of digital technology, including. The definition of using the tech in just this setting included possessing technical skills, supporting digital media, remaining current with new tech, and developing a digital school culture. Overall, digital leadership is about creating an environment where all members of organization can thrive, learn, and contribute to organization's success in digital age. Smartphones and tablets are examples of mobile devices that allow individuals to access Internet, email, and other digital services on go. Social media platforms, such as Facebook (Saif & Shaheen, 2022), Twitter, and Instagram, allow

individuals and organizations to connect and share information with large audience (Alam, Saif, Khan, & Ali, 2023).

Figure 1 Digital Leadership Concept (Karakose et al., 2021)



Technology Usage Level

The level of technology usage can vary greatly between individuals and organizations. Some people and organizations are early adopters and are quick to embrace new technologies, while others may be slower to adopt and may be more cautious about use of technology (Giordani, Polese, Mezzavilla, Rangan, & Zorzi, 2020). There are factors that can influence level of technology usage. The level of technology usage can vary greatly amid individuals & organizations. Some people, organizations are early adopters and are quick to embrace new technologies, while others may be slower to adopt and may be cautious about use of technology. Younger generations tend to have a higher level of technology usage compared to older generations, as they have grown up with technology and are comfortable using it in daily lives (Durak, 2019). People with higher levels of education are likely to be comfortable using technology and have higher level of technology usage. Individuals and organizations with higher incomes tend to have greater access to technology and have higher level of technology usage.

The level of technology usage can vary depending on location, with urban areas typically having higher levels of technology usage compared to rural areas. Industry: Certain industries, such as the technology industry, tend to have a higher level of technology usage compared to other industries (Naqvi, Li, Jiang, & Naqvi, 2020). Organizations with a culture that values and supports the use of technology are more likely have higher level of technology usage compared to those with culture that is less supportive of technology It's important to note that technology usage can also change over time as new technologies become existing & older technologies become obsolete. Firms that have successfully navigated transition to a digital business model are branded by strong leadership that is able to adapt to change, embrace new technologies, foster culture of innovation. As a result, individuals and organizations need to continually assess technology usage and make adjustments

as essential to ensure that they are effectively leveraging technology to achieve goals (Aldahdouh, Nokelainen, & Korhonen, 2020).

Reasons for Technology Usage

There are many reasons why individuals and organizations use technology, including; Technology make many aspects of daily life convenient, such as online shopping, banking & communication (Farooq, Saif, & Shaheen, 2022; Molino et al., 2020). Technology can automate many tasks and processes, saving time, increasing efficiency. Technology provides instant access to vast amounts of information, making it easier for individuals and organizations to stay informed and make informed decisions. Technology has revolutionized way we communicate, making it possible to communicate with others instantly and from anywhere in world. Technology help individuals and organizations to be productive, as they can accomplish more in less time. Technology can provide competitive advantage, as organizations that adopt new technologies are often better positioned to meet the demands of the marketplace (Karjaluoto, Shaikh, Leppäniemi, & Luomala, 2020). Technology can provide access to real-time data and analytics, allowing individuals and organizations to make more informed decisions. The use of technology has become an essential aspect of modern life, and it continues to transform way we live, work, and interact with the world around us. Technology can be used to enhance customer experiences, like over online shopping, personalized marketing, and improved customer service.

Digital Technology Role in Providing Access to Information

Digital technology plays a crucial role in providing access to information in schools. Here are a few ways that digital technology helps improve access to information. Schools can provide students with access to digital libraries, can be accessed from anywhere, at any time. This allows students to easily find and access the information they need for their studies (Fasae, Adekoya, & Iwari, 2021). Digital technologies, such as search engines and online databases, provide students with access to a vast amount of information that can be used for research and learning (Saif, Khan, & Khan, 2020). Many schools are now using digital textbooks, which updated more easily and provide students with interactive and multimedia content. This makes easier for students to learn, retain information. The teachers and students can access online resources, such as educational videos, simulations, and interactive quizzes, to supplement learning (Vargo, Zhu, Benwell, & Yan, 2021). Digital technology can provide students with virtual tours of museums, historical sites, and other important locations, allowing them to experience and learn about these places without leaving the classroom. Digital technology helps to increase access to information in school by providing students and teachers with a wealth of digital resources and tools that can be used to support learning and research (Fasae et al., 2021; Vargo et al., 2021).

Aims of Technology Usage

The aims for technology usage vary between individuals and organizations, but some common goals include: Increased efficiency and productivity, improved communication, collaboration, enhanced decision making and Competitive advantage. For instance, many individuals and organizations use technology to automate tasks, streamline processes, and increase their efficiency and productivity (Mercan et al., 2021). Technology has revolutionized way we communicate and collaborate, making

it possible to work with others from anywhere in the world. Technology can provide access to real-time data and analytics, allowing individuals, organizations to make informed decisions (Farooq et al., 2022). Technology provides instant access to vast amounts of information, making it easier for individuals, organizations to stay informed and make informed decisions (Alam, 2021). Technology help organizations to reduce costs by automating tasks and processes, reducing the need for manual labor, and improving efficiency. Technology drive novelty by enabling individuals, organizations to develop new products, services, and models that were previously not possible (Burström, Parida, Lahti, & Wincent, 2021). These are just a few examples of many aims for technology usage. Specific goals, objectives of technology usage will depend on individual or organization and their specific needs and circumstances.

Communication with Employees

Technology has revolutionized the way businesses communicate with their employees. Here are some of the common technology tools used for communication with employees: Email is one of most widely used tools for communicating with employees. Technology can be used to enhance customer experiences, such as over online shopping, personalized marketing, and improved customer service. Organizations that adopt new technologies are often better positioned to meet the demands of the marketplace and gain a competitive advantage over their rivals. It provides a quick and easy way to send messages and share documents. Many schools are using digital textbooks, which updated more easily and provide students with interactive and multimedia content. Instant messaging apps like Slack, Microsoft Teams, and WhatsApp offer real-time communication platform for employees to share information (Omidi & Dal Zotto, 2023), have dialogs and collaborate on projects. Video conferencing tools like Zoom, Skype, Google Meet enable remote and in-person teams to meet & communicate face-to-face (Aguiar et al., 2022). It is useful for virtual team meetings, remote work, and remote interviews.

News and Announcements

Many schools use LMSs, like Blackboard/Canvas, to manage online classes (Aldiab, Chowdhury, Kootsookos, Alam, & Allhibi, 2019). These systems often have the section for announcements and news, making it easy for teachers and administrators to reach the students in one central location. Schools may use social media platforms, such as Facebook, Twitter, or Instagram, to share news and announcements (Bordalba & Bochaca, 2019). This can be a great way to reach a wide audience quickly and easily. Some schools use mass messaging systems, such as text messaging or automated phone calls, to quickly send announcements and news to students, parents, and staff (Heppen, Kurki, & Brown, 2020). Teachers can use virtual meetings to offer further instruction, answer questions, and give feedback on assignments. Students can also participate in group discussions, presentations, and other activities that further help to build their teamwork and communication skills (Linden & Gonzalez, 2021). The use of technology for news and announcements in schools has many benefits, including increased communication and accessibility, convenience, and the ability to reach a wide audience quickly.

Meetings (Zoom)

Virtual meetings, such as those held on Zoom, can be an effective way for school teachers, principals, and students to communicate and collaborate (Singh et al., 2020). For teachers and principals,

virtual meetings provide a convenient way to discuss school-related matters, such as lesson plans, student progress, and school policies. They can also be used to conduct professional development sessions or to share updates and information with wider school community (Wuryandani, Zubaidah, Herwin, & Jhon, 2021). For students, virtual meetings can be a valuable tool for staying engaged with their education and receiving support from their teachers (Hz & Daulay, 2021). To ensure that virtual meetings are productive and effective, it's important to follow some best practices, such as setting clear agendas, being on time, muting microphones when not speaking, and using screen-sharing features to share information and presentations to quickly send announcements and news to students, parents, and staff (Karl, Peluchette, & Aghakhani, 2022). Additionally, it's important to be mindful of virtual meeting etiquette, such as avoiding interruptions, being respectful to others, and dressing appropriately.

Management Process

Technology plays a significant role in managing various processes in an organization. Here are some examples of how technology is used in many management processes (Badakhshan, Conboy, Grisold, & vom Brocke, 2020). Technology can be used for creating and storing digital versions of plans, creating project schedules, and tracking progress in real-time. Tools such as project management software, spreadsheets, and collaboration tools can help managers with planning and execution (Lee & Lee, 2021). Data analytics and business intelligence tools can be used to gather and analyze data, can be used to inform, support decision-making (Ranjan & Foropon, 2021). Technology can facilitate communication and collaboration among team members, support virtual meetings and training, and help managers to keep track of team performance. Tools like instant messaging, video conferencing, and team collaboration software can help managers to lead their teams effectively (Turesky, Smith, & Turesky, 2020). For example, the performance management systems, monitoring tools, and dashboards help managers to control various processes and measure their success (Nica, Chiriță, & Ionescu, 2021). Technology plays an important role in supporting and improving various management processes, and can help managers to be more efficient, effective, and data-driven in their decision-making.

Communication with Parents

There are several technologies that schools and educational institutions can use for communicating with parents. Many schools have developed their own mobile apps that allow parents to keep track of their child's progress, receive notifications and communicate with teachers. Schools can send text messages to parents for reminders or important announcements (Wuryandani et al., 2021). Video conferencing platforms such as Zoom, Skype or Google Meet can be used for virtual parent-teacher conferences or meetings. Schools can use social media platforms like Facebook, Twitter or Instagram to communicate with parents and keep them updated on school events & news (Singh et al., 2020). Technology help streamline organizational processes by automating tasks, reducing manual labor, and increasing efficacy. Scheduling software, time, attendance systems & document management systems help with organizing and managing work processes (Badakhshan, Conboy, Grisold, & vom Brocke, 2020). A secure online portal where parents can access their child's grades, assignments, attendance and information. These technologies allow for effective communication amid schools

and parents, providing them with access to important information and updates in a timely manner (Linden & Gonzalez, 2021).

Communication with Teachers

There are several technologies that can be used for communication between teachers: Email is a simple and efficient way for teachers to communicate with one another. It is easily accessible from anywhere and can be used to send messages, attachments, and files. Video conferencing platforms like Zoom, Skype, or Google Meet allow teachers to have virtual meetings and collaborate in real-time (Linden & Gonzalez, 2021). Many schools use LMS such as Blackboard, Canvas, or Moodle to communicate with teachers and offer them with resources and materials. Group chat applications like Slack, Microsoft Teams, Google Chat allow teachers to communicate and collaborate in real-time with one another (Lu, 2022). Technology can be used for monitoring, evaluating performance of many processes and systems, for making necessary adjustments to improve results. Cloud-based file sharing platforms like Google Drive, Dropbox, OneDrive allow teachers to share documents, and files. Teachers can use social media platforms like Twitter or LinkedIn to connect with teachers, share resources, ideas, and participate in online discussions (Greenhow, Staudt Willet, & Galvin, 2021). These technologies provide teachers with tools they need to communicate effectively, which can lead to better outcomes for students and improved professional relationships between teachers and school leaders.

Official Documents Sharing

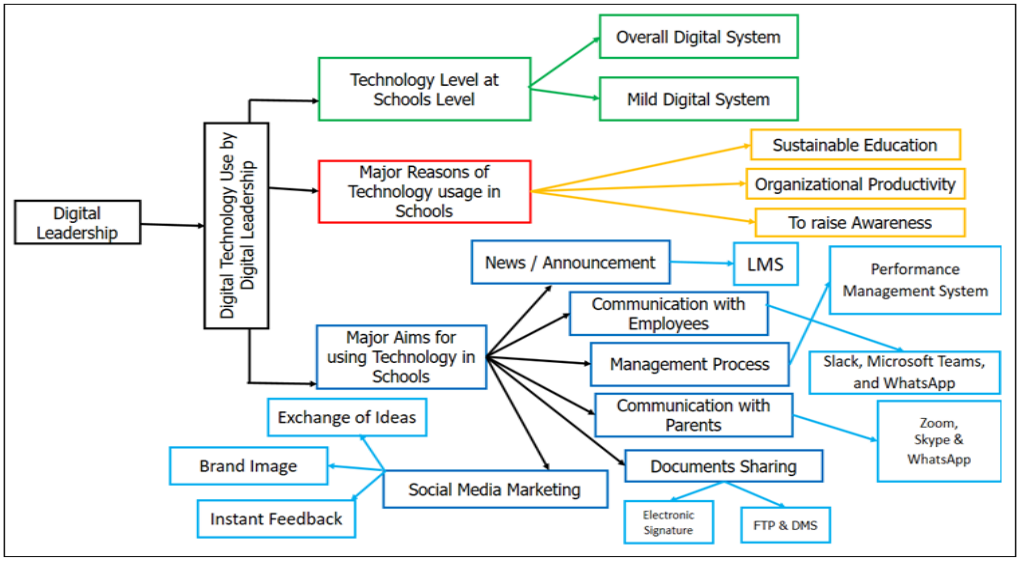
There are several digital media technologies that can be used for sharing official documents: Cloud storage platforms like Google Drive, Dropbox, or OneDrive allow for secure and easy sharing of the large files and documents. These platforms allow for real-time collaboration and version control (Yang, Xiong, & Ren, 2020). File Transfer Protocol (FTP) sites are websites that allow for the transfer of large files from one computer to another. These sites commonly used by businesses & organization for sharing large files and official documents (Rocha, Dias, & Psaras, 2021). Electronic signature services like DocuSign, Adobe Sign, or HelloSign allow for secure and efficient signing of official documents without the need for paper (Belwal, Al Shibli, & Belwal, 2021). Secure file sharing services like Hightail, Box, or WeTransfer offer encrypted the file sharing and storage for sensitive official documents (Jinlong, Cui, Li, Ruan, & Zhai, 2020). In conclusion, promoting a school on social media can provide numerous benefits and help the school build a strong, positive image and engage with its stakeholder. Document management systems like Microsoft SharePoint, Google Workspace or Alfresco allow for the organization, management, and sharing of official documents (Boella, Di Caro, & Leone, 2019).

Promotion of School on Social-Media

Promoting a school on the social media can bring many benefits, including: Social media platforms have a large user base, which can help schools reach a wider audience and increase their visibility (Kostygina et al., 2020). This can help attract students and their families to school. By showcasing their campus, programs, and achievements on social media, schools can build a positive image and establish strong brand presence (Tien, Minh, & Dan, 2019). According to (Stathopoulou, Siamagka, & Christodoulides, 2019) Social media help schools engage with their communities by providing a platform for communication and exchange of ideas. The study of (Hodges, Kerch, & Fowler, 2020)

depict that by using social media to promote their school, schools can reach prospective students and their families, providing them with information about school and helping them make informed decisions about their education. Social media platforms provide a way for schools to receive instant feedback from students, parents, and the community, which can help them make improvements and tailor their programs to meet needs of their stakeholders (Longmuir, 2021). Compared to traditional forms of marketing, promoting a school on social media is often more cost-effective and can reach a wider audience (Susanto et al., 2021). Based on above detail arguments the following diagram is designed to understand that what are major attributes of digital technology by digital leadership in school environment.

Figure 2 Digital Technology Attributes used by Digital Leadership



RESEARCH METHODOLOGY

The methodology employed for this study entails systematic and comprehensive approach (Arham, et al., 2022). Initially, extensive search of academic databases, including but not limited to, Scopus, SSCI, SCI, and Google Scholar, was conducted using relevant keywords such as "digital leadership," "education sector," "construct redesign," and "KP Pakistan." Inclusion criteria were focus on studies published within last decade, written in English, and directly related to digital leadership reforms in education (Karakose & Tülübaş, 2023), possible publication in context of Khyber Pakhtunkhwa, Pakistan. Following this, retrieved articles were undergoing a rigorous screening process based on title, abstract, and full text, ensuring their alignment with research objectives. Selected studies were critically analyzed, comparing and contrasting many viewpoints on digital leadership models and implementation challenges within education sector (Rahmati Karahroodi et al., 2020). Synthesis of these findings was then contributed to a comprehensive exploration of the need for, and strategies involved in, redesigning digital leadership construct to suit specific socio-cultural and educational context of KP, Pakistan.

FINDINGS & DISCUSSIONS

Reasons for Supporting Digital Transformations

The major reasons for supporting digital transformation are based on providing Effective Learning environment for students, Teachers, and Professional Development. It is also based on Effective Time Management, sustainable communication, and quality access to information's. Digital tools and platforms provide students with the opportunities to collaborate and communicate with classmates, teachers, and other students from around the world (Gelder et al., 2022). Digital technologies allow students to access course materials, engage in online discussions, and complete assignments from anywhere, at any time, providing flexible convenient learning experience (Karakose et al., 2021). According to (Abad, Zamar, Moro, & García, 2020), interactive technologies like gamification, simulations, and virtual reality engage students and increase their motivation to learn. With help of Digital technologies one can bridge digital divide, making education more accessible to students in remote and underserved areas (Karakose et al., 2021; Ziadlou, 2021). Digital transformation has the potential to revolutionize education and provide students with a more effective and engaging learning environment.

Effective Learning Environment for Teachers

The digital transformation can provide effective learning environment for teachers. With the use of technology and widespread availability of internet, teachers have access to a wealth of resources and tools that can help them improve teaching and make it engaging for the students. For example, digital tools like the learning management systems, educational videos and interactive multimedia content can make it easier for teachers to deliver lessons and for students to understand complex concepts (Aldiab et al., 2019). Online collaboration tools can enable teachers to work together, share resources and provide feedback to each other, even when they are not in the same physical location. Digital transformation can help teachers keep up with latest teaching methods and trends, as well as stay connected with other educators around world (Benavides et al., 2020). This can help foster a sense of community and support among teachers (Karakose et al., 2021), which can be invaluable in the fast-paced and ever-changing world of education (Trenerry et al., 2021).In summary, digital transformation has the potential to revolutionize the way teachers teach and learn, by providing them with tools and resources they need to be more effective and efficient in work (Antonopoulou et al., 2021; Biahmou et al., 2016; Coelho Rodrigues, 2022; Kazim, 2019; Meyerhoff Nielsen, 2019; Ziadlou, 2021).

Professional Development

The digital transformation can play significant role in professional progress for variety of industries, including education. Here are a few ways that the digital transformation can support professional development: The widespread availability of the internet and the increasing use of technology has made it easier for individuals to access online learning resources (Omidi & Dal Zotto, 2023), such as online courses, webinars, and online communities (Hz & Daulay, 2021; Wuryandani et al., 2021). This makes it easier for individuals to continue their professional development, regardless of their location or schedule. This allows individuals to quickly find and access the information they need to enhance their knowledge and skills in their respective fields (Contreras et al., 2020). This allows individuals to share their experiences and knowledge, and to learn from one another, helping to

further their professional developments (Boella et al., 2019). According to (Hz & Daulay, 2021; Omidi & Dal Zotto, 2023; Wuryandani et al., 2021) with the use of technology, individuals can now customize their professional development experiences to fit their individual needs and goals (Benavides et al., 2020) by providing individuals with increased access to information, resources, better collaboration, networking opportunities (Kazim, 2019) and personalized learning experiences (Alenezi, 2021).

Sustainable Communication

The use of digital technologies can help the organizations and individuals to reduce their carbon footprint and create more environmentally friendly communication practices (Kunkel & Matthess, 2020). With rise of digital tools and platforms, it's now possible for people to work and collaborate from anywhere, reducing the need for travel and commuting, which are significant contributors to carbon emission (Aujoux, Kotera, & Blanchard, 2021). According to Zhao (2023), digital transaction and e-commerce can replace paper-based transactions and reduce use of paper, which is a finite resource and contributes to deforestation. The digital content, such as e-books, webinars, and online training programs, can reduce need for physical printing and distribution of materials (Broadhurst, Dale, & Harper, 2022). Data centers, which are critical components of digital communication, consume significant amount of energy. Implementation of green data centers that use renewable energy sources can help to reduce their carbon footprint (Jayalath, Chathumali, Kothalawala, & Kuruwitaarachchi, 2019). In conclusion, the digital transformation can help promote sustainable communication by reducing waste, increasing efficiency, and reducing the carbon footprint of the communication practices.

Effective Time Management

Digital transformation can play a significant role in improving time management and productivity (Benavides et al., 2020; Nalda et al., 2020). With the right tools and techniques, individuals and organizations can streamline their processes and work more efficiently (Antonopoulou et al., 2021; Kazim, 2019; Trenerry et al., 2021; Ziadlou, 2021). Here are ways in which digital transformations can support effective time management. Digital project management tools, such as Trello (Horváth, 2019) and Asana, can help individuals and teams keep track of tasks, deadlines, progress, leading to better time management and increased productivity (Evangelista, Sofianti, & Baskoro, 2022). Storing data in the cloud can allow for easy access and collaboration from any device, reducing the time spent searching for files as well as transferring data (Al-Malah, Aljazaery, Alrikabi, & Mutar, 2021). Collaboration platforms, like Slack (Stray & Moe, 2020) and Microsoft Teams, can improve communication and reduce time spent in meetings, allowing individuals and teams to work more efficiently (Hu, Bansal, & Kaabouch, 2020). Mobile devices, like smartphones and tablets (Hu et al., 2020), provide the individuals with access to digital tools and information on-the-go, allowing them to be productive and manage their time more effectively (Saif et al., 2020). Thus, the digital transformation helps individuals and organizations to better manage their time by providing access to tools and techniques.

Digital Learning Culture

DLC consist of digitally supported learning environment, Digital Media, technological classrooms, electronic books, online examination system (Gelder et al., 2022). A digital learning environment

refers to a system or platform where teaching and learning activities are conducted through digital means. This include online courses, virtual classrooms, e-learning platforms, educational software, and other forms of digital media used for education (Benavides et al., 2020; Broadhurst et al., 2022; Coelho Rodrigues, 2022; Hai, Van, & Thi Tuyet, 2021; Trenerry et al., 2021). The use of technology in education offers several advantages, such as greater flexibility and convenience. Digital media has transformed way communicate and access information, and significant impact on many aspects of our lives, including education, entertainment, and workplace. In education, digital media can be used for a variety of purposes, delivering instructional materials, providing chances for interaction, collaboration, and allowing for personalized, adaptive learning experiences (Bordalba & Bochaca, 2019). Susanto et al. (2021), digital media can also be used for assessment and evaluation, providing teachers and instructors with valuable data and insights into student performance and progress. Digital media has potential to enhance educational experience and make learning more engaging, accessible, and effective.

Digital Media & E-Books

The digital media has transformed the way we communicate and access information, and has had a significant impact on many aspects of our lives, including education, entertainment, and workplace. In education, digital media can be used for a variety of purposes, such as delivering instructional materials, providing opportunities for interaction and collaboration, and allowing for personalized and adaptive learning experiences (Bordalba & Bochaca, 2019). According to (Susanto et al., 2021), digital media can be used for assessment and evaluation, providing teachers and instructors with valuable data and insights into student performance and progress. Digital media has the potential to enhance educational experience and make learning more engaging, accessible, and effective. E-books present numerous advantages compared to traditional books, like portability, accessibility, and the capacity to store a vast collection of books within a compact space (Sari, Rahim, Sundari, & Aulia, 2022). Many e-books offer interactive features, such as hyperlinks, multimedia content, and search capabilities, making it easier to find specific information (Sari et al., 2022). According to (Sari et al., 2022), e-books have also made it easier for independent authors and publishers to reach a wider audience, as they can publish their works directly to e-book platforms without the need for traditional distribution channels. E-books offer a convenient and accessible way to read and enjoy books in digital age.

Technological Classroom

A technological classroom is an educational setting where technology is seamlessly integrated into the teaching and learning process, as described by Contreras et al. (2020). This can include variety of different technologies, such as computers, tablets, interactive whiteboards, projectors, and other digital devices (Bordalba & Bochaca, 2019). The use of technology in classroom can offer several benefits, including increased engagement, motivation for students, greater openness to information, educational resources, and opportunities for collaboration and interactive learning (Trenerry et al., 2021). In technological classroom, teachers can use technology to present, distribute information (Karakose et al., 2021), facilitate student-led discussions and activities, and assess student learning and progress. Students (Segura et al., 2020) use technology to research, create, share information, collaborate with classmates, and access educational materials from anywhere at any time (Gelder

et al., 2022). It is vital to note that technological classroom is not simply room filled with technology, but rather a learning environment where technology is used to support and enhance teaching and learning process (Contreras et al., 2020). The effective integration of technology in the classroom requires development of appropriate pedagogical plans & change of digital literacy skills for both teachers and students.

E-Examination System

An e-examination system, also known as an online examination system, is a computer-based system for administering and grading tests. It is designed to replace traditional, paper-based examination methods and provide efficient, secure, and convenient way of conducting exams (Sari et al., 2022). Exams can be taken from any location with an internet connection, making it more convenient for students (Sari et al., 2022). The system automatically grades exams, eliminating need for manual grading and reducing the possibility of errors (Aldriye, Alkhalaf, & Alkhalaf, 2019). The system includes security measures to prevent cheating, such as timed exams, random question order, and IP tracking. Students receive instant feedback on exam results, allowing them to see their strengths and weaknesses and improve performance (Ifenthaler, 2022). Exams (Shokri, Halupka, & Pauwels, 2021) can be customized to meet specific needs of each course or subject, allowing for flexibility in the design and delivery of exams. Popularity of e-books has been on rise in recent years, and many major publishers now offer digital versions of books. E-books can be purchased from online retailers such as Amazon and Barnes & Noble, from many public libraries. The e-examination systems offer a efficient and secure way of conducting exams, and provide students with the more convenient and effective testing experience.

Requirements for DLE (Encouragement)

The digital learning environment can promote encouragement for education by providing learners with engaging, interactive and accessible education experiences (Hai et al., 2021). Use of technology in the education can provide students with opportunities to explore and learn at their own pace, to collaborate with classmates and teachers, and to receive instant feedback and support (Trenerry et al., 2021). Digital learning environments can also provide students with access to a wide range of educational resources, including multimedia content, simulations, and educational games, which can make learning more dynamic and enjoyable (Benavides et al., 2020). Additionally, the use of technology in education as depicted by (Abad-Segura et al., 2020) can also provide students with increased motivation and engagement as they are able to interact with material in new and exciting ways. The ability to personalize learning experiences and receive immediate feedback can increase student motivation and engagement, as students are able to see results of their efforts and receive recognition for their achievements Ability to understand and use digital technologies effectively (Kazim, 2019). Overall, a digital learning environment has the potential to create a more positive and supportive learning experience, which can help to promote encouragement for education and lifelong learning.

Innovative Approach

Digital learning environment can promote an innovative approach to education (Alenezi, 2021). By leveraging technology, digital learning environments can provide students with new exciting

ways to engage with educational content, to collaborate with peers, and to receive feedback and support (Ziadlou, 2021). For example, digital learning environments can offer students the ability to access a wide range of multimedia content, such as videos, animations, and interactive simulations (Karakose et al., 2021), which can help to bring subjects to life in new and innovative ways (Kazim, 2019). Ability to analyze and interpret data, and to use data to inform decision-making processes (Wang & Yang, 2022). In addition to meeting the needs of students, a digital learning environment can also support the needs of educators by providing them with new and innovative ways to deliver instruction & assess student learning (Broadhurst et al., 2022). Ability to understand & use digital technologies effectively to support organization goals and objectives (Abbu et al., 2020). This help to foster a more student-centered approach to education, where students are empowered to take control of their own learning and to pursue their interests and passions. Innovative use of technology in education has potential to transform way students learn and to promote a dynamic and engaging learning experience.

Digital Leadership Skills

Digital leadership skills refer to the abilities and competencies that are needed to effectively lead and manage in a digital age (Alenezi, 2021). As technology continues to shape world and transform the way organizations and businesses operate, it's becoming increasingly important for leaders to have strong understanding of digital tools, technologies and how to use them to drive innovation, collaboration, and growth (Antonopoulou et al., 2021; Kazim, 2019; Ziadlou, 2021). Some of the key digital leadership skills include: The ability to understand and implement digital transformation strategies, including the adoption of new technologies and integration of digital processes across an organization(Trenerry et al., 2021). Ability to effectively collaborate and communicate using digital tools, platforms, include videoconferencing, project management tools, social media (Antonopoulo et al., 2021). Ability to understand and manage digital security (Ziadlou, 2021) and privacy risks (Abbu et al., 2020), and to implement measures to protect sensitive information and assets. Digital leadership skills are vital for leaders who want to stay ahead of curve in today's rapidly evolving digital landscape. Leaders can better equip themselves and their organizations for success in digital age (Abad-Segura et al., 2020; Abbu et al., 2020; Contreras et al., 2020; van Gelder et al., 2022; Wang & Yang, 2022).

Financial Support

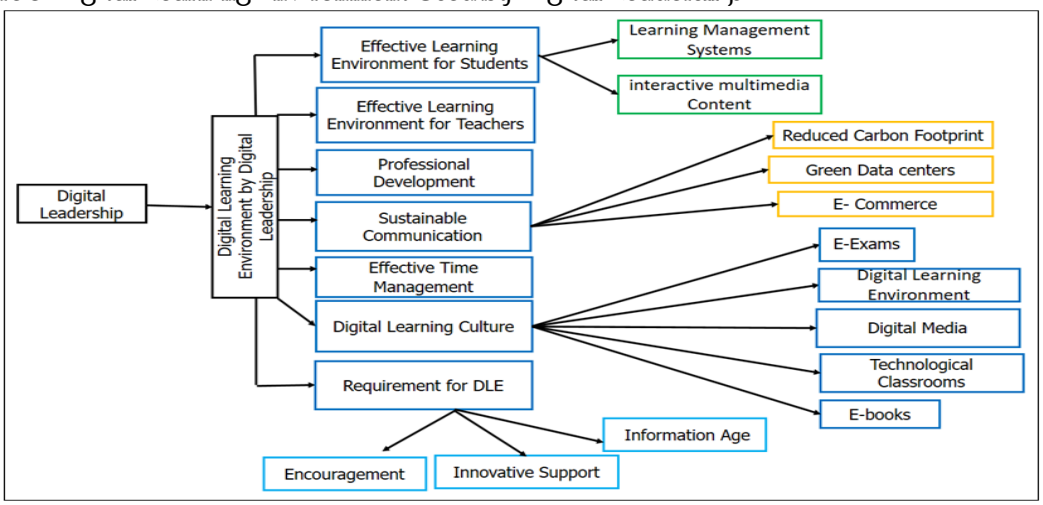
Implementing digital learning environment often requires significant financial investment. Digital technologies and devices can be expensive, and many schools & educational institutions may need to purchase equipment, software, and other resources to support the transition to a digital learning environment. Schools may need to hire additional staff, IT specialists or instructional designers, to support implementation and maintenance of a digital learning environment (Kazim, 2019). While initial financial investment required for a digital learning environment can be substantial (Heng & Sol, 2021), many schools and educational institutions believe that long-term benefits, including increased student engagement and motivation, improved learning outcomes, and greater access to educational resources, justify the investment (García-Morales, Garrido-Moreno, & Martín-Rojas, 2021). It is important to note that some countries have recognized the importance of digital learning environments and have made significant investments in technology (Stathopoulou et al., 2019)and

digital resources to support transition to digital education (Karjaluoto et al., 2020). In some cases, schools & educational institutions may need to seek alternative sources of funding, such as grants or enterprises with technology companies, to support application of digital learning environment (Hai et al., 2021).

Requirement for Information Age

Digital learning environment is becoming increasingly important in the Information Age. With the rapid spread of technology and growing availability of digital resources, students are increasingly expecting a more personalized, engaging, and interactive learning experience (Morales et al., 2021). By developing digital literacy skills and gaining experience using digital technologies, students can better equip themselves for success in digital age (Karakose et al., 2021; Wang & Yang, 2022). In addition to meeting needs of students, a digital learning environment can also support the needs of educators by providing them with new advanced ways to deliver instruction & assess student learning (Broadhurst et al., 2022). Digital tools (Benavides et al., 2020) and technologies(Hodges et al., 2020) can help to facilitate personalized and adaptive learning experiences (Karakose et al., 2021), to support collaboration and communication between students and teachers (Farooq et al., 2022; Saif et al., 2020). Digital learning environment is becoming increasingly essential in today's world, where technology is changing way we live, work & learn. By offering students and teachers with access to digital resources (Farooq et al., 2022), digital learning environment can help to support the needs of Information Age (Benavides et al., 2020) and to prepare individuals for success in digital world.

Figure 3 Digital Learning Environment Used by Digital Leadership



CONCLUSION

Bases on detail literature it is the first ever study to investigate digital leadership based on various characteristics proposed by (Karakose et al., 2021) the qualitative study of conducted in the work context of turkey. Based on literature it is concluded that digital leadership is diverse phenomena (Bolte, Dehmer, & Niemann, 2018; Bresciani, Ferraris, Romano, & Santoro, 2021) and it cannot be

measured by just defining the concept and tries to measure it by limited number of items as most of the previous researchers (Abbu et al., 2020; Antonopoulou et al., 2021; Kazim, 2019; Meyerhoff Nielsen, 2019; Mihardjo, Sasmoko, Alamsjah, & Elidjen, 2019; Susanto et al., 2021; Trenerry et al., 2021) conducted study in various organizational frame work. Before explaining core capabilities of the digital leadership, it is mandatory to understand the requirement of institutions and critically analyzing its application is the selected work structure. For instance, if someone tries to understand the concept of digital leadership based upon the skills requirement, then it is not an appropriate strategy, because digital leadership is detailed phenomena that based on the various attributes namely (digital technology usage aim and reasons), reasons for or against (digital Transformation in schools), reasons for and against (Technological based Professional Development), reason for and against (Digital Learning Culture) and Digital leadership abilities/skills as well as characteristics (Karakose et al., 2021).

In the current study digital technology use and aims are discussed in detail and various features associated with concept area also elaborated in the work context of digital leadership in schools. For instance, Digital Technology use is explained with supporting arguments through sustainable education, mass awareness and organizational productivity prospective. Major aims of using digital technology in schools is explained through the communication with teachers, parent, students and other stake holders, effectiveness in the management process is explained through the performance evaluation of employees, news and announcement related to school's activities are explained with the help of using WhatsApp, LMS and online meeting. Similarly, the documents sharing with all stakeholders through DMS and electronic communication to reduce carbon footprints, while social media marketing (SMM) is used to portray the positive image of the school through stronger brand image as well as intent feedback and exchange of idea for social upgradation. On the other side creating the digital learning environment (DLE) is explained through different characteristics i.e. (effective learning environment for students, teachers, workable education, real time management, creating digital learning environment). These characteristics are further explained with the help of supporting literature by examine its importance in aligning digital leadership abilities in school work context.

Sustainable education is explained through explaining the importance of e commerce (Contreras et al., 2020; Zhao, 2023) and green data centers through digital transformation. Similarly digital learning culture is expressed through electronic examination (Essel, Butakor, & Nortey, 2019) (e-Exams) and e-books (Tuah, Herman, & Maknun, 2019; Wijaya, Cao, Weinhandl, & Tamur, 2022) and digital media in class room environment. Based on the detail discussion it is recommended for future researchers that current study explore dynamic attributes associated with digital leadership characteristics (digital technology use and support for digital transformation) as expressed by the study of (Karakose et al., 2021), however future researcher may investigate other attributes of digital leadership (support for technology based professional development and support for digital learning culture) in the work context of schools. Future researcher may try to develop construct for measuring these attributes of digital leadership in work context of schools. Future researchers may examine managerial and personal skills required for digital leadership in the school work context

aligning with concept of (Karakose et al., 2021) qualitative approach, and validate construct over reliability and validity.

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