IMPACT OF TECHNOLOGY IN IMPROVING THE QUALITY OF EDUCATION AND HUMAN RESOURCE DEVELOPMENT

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Abstract. Education and human resource development have an important role in the progress of a country. In the era of globalisation and the information technology revolution, rapid changes in technology have created a variety of new opportunities and challenges in the education and human resource development sectors. The purpose of this study is to analyse the impact of technology in improving the quality of education and human resource development. This research uses a qualitative methodology in the form of a literature review, which implies that the research will examine and explain data by utilising information and textual content from various sources. The study results show that the influence of technology in improving the quality of education and human resource development has considerable weight. Changes in learning methods have sparked various developments in the education domain, including distance learning, online learning platforms, and entertainment-oriented learning models that encourage learning to be more engaging and collaborative.

Keywords: Technology, Education, Human Capital

INTRODUCTION

Education and human resource development play a central role in driving a country's progress. Amidst the turmoil of globalisation and the information technology revolution that has swept the world, the rapid changes in the technological domain have opened new doors and challenged education and human resource development (Zarqan, 2017). Technology has now deeply permeated all stages of the learning process, shaping new paradigms in the way education is organised and shaping the dynamics of individual development in honing their skills and knowledge (Păunescu et al., 2022). More than just a tool, technology has become an integral element in a holistic view of education, shaping a paradigm that is more inclusive, dynamic and responsive to the needs of individuals and society as a whole (Azzaakiyyah, 2023; Wahyoedi et al., 2023). The influence of technology is not only reflected in learning methods and platforms, but also in its profound influence on motivation, learning styles, and the development of individual talents and potentials (El-Sabagh, 2021). Therefore, an in-depth understanding of the impact of technology in improving the quality of education and human resource development is not only relevant, but also crucial in formulating the direction of improvement and development of the education system in the future.

Globally, technology has opened the door to unlimited access to education, providing the power to overcome geographical and financial barriers. Online platforms, online courses, and the variety of interactive learning tools available have brought about a more inclusive and democratic education paradigm (Coman et al., 2020). It is no longer the privilege of a lucky few, but rather an opportunity accessible to all walks of life around the world. People can access quality education from reputable educational institutions without being limited by distance or geographical boundaries. What's more, technology enables deeper personalisation of education. This means that educational approaches can be tailored to individuals' learning styles, interests, and their specific needs. With technology, learning can be a more efficient and relevant experience, accommodating individual diversity and ensuring that education truly meets personal and professional development goals (Dwivedi et al., 2023).

At the national level, technology-based education transformation has become a kind of revolution in an effort to improve the quality of education and human resource development. Countries around the world have taken the initiative by adopting technology in their education systems (Jhurree, 2005). These initiatives involve integrating technology in school and college curricula, creating technology-based learning opportunities and developing e-learning platforms that support distance teaching (Suherlan, 2023). In the process, technology has opened up wider access to knowledge and learning, stretching the education network to remote
areas that were previously limited by geographical and infrastructural challenges (Garlinska et al., 2023). Not just limited to the learning environment, technology is also used to manage education data, provide training and professional development for educators, and improve the accessibility of education at the national level. This includes the implementation of technology-based school management systems, which assist in the monitoring and evaluation of school performance and provide critical information used for data-driven decision-making (Rijal, 2023; Sari, 2023). At the same time, technology has provided facilities for educators to continuously update and improve their competencies through online training and internet-based resources (Haleem et al., 2022). This further intensifies the role of technology in human resource development, creating opportunities for educators to improve their teaching quality and meet the growing challenges in education.

While technology has made a tremendous contribution to advancing education and human resource development, it cannot be ignored that there are still a number of issues that need to be addressed. One of the main issues is the technology access gap, where some groups of people, especially those in remote or low-income areas, may not have equal access to technological resources (Sanders & Scanlon, 2021). This can create inequalities in education, where some individuals or groups have fewer opportunities to utilise the potential of technology in their learning and development. In addition, issues related to data privacy and security are also important concerns in the use of technology in educational contexts. With more and more data being collected and used in education, there needs to be strong protection of students’ and educators’ personal data. Data loss or privacy breaches can have a serious impact on individuals and educational institutions (Mello, 2018; Said Ahmad et al., 2023). Finally, concerns about the social and psychological impacts of using technology in learning also need to be addressed. This includes considerations about the long-term effects of technology use on social interactions, technology addiction and individual psychological well-being (Wanof, 2023). In embracing technology in education, it is important to consider the social (Ausat, 2023), ethical and well-being impacts on individuals and seek solutions to minimise potential risks that may arise.

It is in this context that research on "The Impact of Technology in Improving the Quality of Education and Human Resource Development" becomes relevant. This research will explore how technology has influenced the education and human resource development processes, as well as its positive and negative impacts. By understanding the impact of technology in depth, we can identify ways to maximise the benefits of technology in education while addressing the challenges (Sutrisno, 2023). This research is also important as it contributes to our
understanding of how technology can be used effectively to improve the quality of education and human resource development, which in turn will have a positive impact on the social, economic and cultural development of a country.

**METHOD**

This research involves conducting a thorough qualitative examination of the existing literature. Its main aim is to comprehensively review and clarify the available data by referencing a wide range of sources. The primary objective of this qualitative literature review is to gather, evaluate, and integrate the existing body of knowledge on the topic in focus, specifically concentrating on the influence of technology in enhancing the quality of education and the development of human resources. Data will be collected from various relevant sources, including academic journals, books, research reports, and other scholarly articles, covering the period from 2005 to 2023. This timeframe enables the researcher to observe the changes and development of the subject, identify trends, and note alterations that have occurred during this period. The application of qualitative methodology in this literature review enables researchers to delve deeply into the intricate and multifaceted aspects of the subject (Elo et al., 2014). This approach facilitates the assimilation of a variety of information sources and the exploration of a wide range of perspectives, thereby enhancing the analysis and bolstering the credibility of the findings. The process of data collection encompasses rigorous textual analysis, data retrieval, and the organization of pertinent information related to the research topic. As a result, the researcher will categorize this data, compare and combine insights from different sources, and identify recurring patterns, themes, and trends within the collected data. An important advantage of employing a qualitative literature review is its flexibility in comprehending and explaining complex phenomena, as it is not confined by numerical or statistical limitations (Rahman, 2016). This approach also allows researchers to gain profound insights into the subject's evolution over time, as well as the development of concepts and perspectives associated with the subject over the years. In the pursuit of this research, it is crucial to assess the reliability and credibility of the sources used and critically evaluate the compiled information. When adopting a qualitative approach, the researcher must present findings in an unbiased and reflective manner, provide clear and concise interpretations, and acknowledge the limitations of the methodologies and data sources employed (Bradshaw et al., 2017).
RESULTS

In the contemporary landscape, we find ourselves engulfed in an era defined by the rapid and ceaseless waves of digital transformations that have become intrinsic to our daily lives. The permeation of technology into every nook and cranny of our existence is nothing short of remarkable. However, it is in the realm of education and the cultivation of human capital that the profound and pervasive impacts of technology become most discernible. The fundamental shift it has instigated in the dynamics of learning, teaching, and the acquisition of knowledge is undeniable, giving rise to its status as an omnipresent force within the educational panorama.

In the ensuing discourse, we embark on a comprehensive exploration of the profound influence technology wields in the enhancement of education quality and human resource development. The spotlight will be cast upon the revolutionary changes brought about by contemporary technological advancements in these domains. With technology serving as an enabler, education has transcended traditional classroom boundaries. Virtual learning environments, online resources, and interactive tools have reshaped the educational experience, making it more accessible and engaging.

Moreover, technology has not only altered how knowledge is disseminated but also redefined the role of educators. Teachers now assume the role of facilitators, guiding students through a wealth of digital resources and fostering critical thinking skills. The integration of Artificial Intelligence (AI) and machine learning has enabled personalized learning paths tailored to individual needs, ensuring that no student is left behind. This shift in pedagogy has the potential to unlock previously untapped potential in learners, catering to diverse learning styles and abilities.

Beyond the classroom, technology is a driving force in human capital development. The job market is increasingly competitive and dynamic, demanding a continuously evolving skill set. Here, technology plays a pivotal role in upskilling and reskilling the workforce. Online courses, e-learning platforms, and digital credentials have become essential tools for career advancement. Organizations now prioritize technology-driven training and development programs, fostering a culture of continuous learning. This not only enhances employee competence but also serves as a retention strategy, as individuals are more likely to stay with employers invested in their professional growth.

The era of rapid digital transformations has ushered in a new educational and professional paradigm, where technology reigns supreme as a catalyst for change. Its influence is undeniable, reshaping the way we learn, teach, and develop our human capital. This ongoing
transformation promises a future where education and career development are more inclusive, adaptable, and attuned to individual needs and global demands.

**DISCUSSION**

In the realm of education, significant changes have been introduced by technological developments. The emergence of online learning software, online learning platforms and digital libraries has brought a wide array of educational tools, enabling students and adult learners to access learning resources more equitably (Ausat, 2022). Not only that, a key change that has been brought about is the ability to tailor learning approaches to each individual's level of understanding, leading to more individualised teaching that focuses on the unique needs of each learner. In addition, technology has also inspired a transformation in the way achievement is assessed and measured (Sutrisno et al., 2023). Innovations such as computer-based testing, learning data analytics, and online evaluation tools have changed the paradigm of learning assessment. This allows teachers and instructors to monitor student progress more accurately and thoroughly, thereby designing more effective learning strategies. Overall, technology has opened the door to the possibility of a more inclusive and responsive education, which can help to better meet the needs of diverse learners.

Technology has also opened the door to seemingly unlimited access to information and knowledge. Thanks to the internet, students and adults today can access millions of books, articles, videos, and other educational resources with incredible speed. Its impact has been monumental in streamlining the learning process by enabling rapid and almost limitless access to relevant and up-to-date educational materials (Mahmud et al., 2021). As such, learning is no longer shackled by the limitations of conventional textbooks, and students can explore new insights and interact with diverse sources that help shape a richer and deeper understanding. In addition, technology has inspired the creation of online education platforms that engage students in a more interactive and dynamic learning process (Cook & Sonnenberg, 2014). Technology-based learning tools allow students to learn in a more exploratory way, using simulations, interactive videos and other multimedia elements (Khamparia & Pandey, 2017). This not only brings learning material to life, but also stimulates deeper understanding and contributes to the development of critical thinking skills and creativity. In other words, technology has brought education into an era where wider access and more colourful learning experiences have become the cornerstones of effective and dynamic learning.
In addition, technological developments have opened up extensive opportunities to improve the quality of learning through a more attractive and interactive approach (Abdulrahman et al., 2020). With the development of educational technology, such as the use of simulations, educational games, and learning videos, students have been given the opportunity to learn in a more exciting way and at the same time be actively involved in the educational process. In this way, comprehension of the subject matter as well as the ability to retain the information taught tends to increase significantly, as students are engaged in a more interesting learning experience and are directly involved in the subject matter they are learning. In addition to acting as a game-changer in learning methods, technology also brings opportunities for the personalisation of education. With the help of advanced technological devices, teachers can identify the unique needs of each student and devise individually tailored learning programmes (Grassini, 2023). This allows for a more adaptive approach to education, ensuring that students receive help and challenges that are appropriate to their level of understanding. Thus, technology has opened the door to education that is more focused on individual needs, which in turn can produce more qualified graduates who are ready to face the challenges of the rapidly evolving modern era.

Not only in the realm of education, the crucial role of technology also extends to the development of digital skills. The unfamiliarity of these skills has seen a significant rise in importance in the rapidly evolving modern workplace. The utilisation of technology in education opens up valuable opportunities for students and professionals pursuing additional education, allowing them to hone and deepen critical digital skills such as data management, problem-solving, and programming mastery (Vodă et al., 2022). In this innovative context, they are able to not only acquire these skills, but also experience practical applications in real-life situations involving the use of technology. As a result, they become better equipped to face competitive challenges in a changing job market that requires ever-higher levels of digital skills. In addition, technology also plays a key role in facilitating more equitable access to digital skills-related training and education. With online learning platforms, distance training and online learning resources available, individuals looking to develop their digital skills can do so with greater flexibility, without being bound by geographical limitations or traditional schedules (Geith & Vignare, 2008). By facilitating this access, technology is helping to bridge the digital skills gap and expand opportunities for individuals from diverse backgrounds to increase their competitiveness in a competitive job market.

The COVID-19 pandemic has emphasised the irreplaceable role of technology in providing the necessary support to run distance learning. The world of education, including
schools, colleges and various training institutions, has been forced to adapt quickly to online learning in response to the challenges of the pandemic (Aini et al., 2020). In addition to playing a role in keeping students and staff safe, this transition also provides a valuable lesson that technology has the capacity to inspire innovations in education that are not only relevant in emergency situations, but also have the potential to expand access to education for those who are constrained from attending physical classes. More than a temporary solution, technology is becoming a key pillar in supporting distance learning, opening a window of opportunity for inclusive education and more equitable access. Technology-based education initiatives have provided more democratic access to education, removing geographical barriers and facilitating participation in education for individuals from diverse backgrounds. The pandemic has emphasised that technology is an important catalyst in making education more flexible and adaptable to challenges that may arise, enabling education to survive even in crisis situations (Dhawan, 2020).

Last but not least, the utilisation of technology in education also involves data analysis and monitoring of student progress. Learning management systems and various monitoring software have paved the way for teachers and instructors to follow each student's progress individually (Suriaman et al., 2023). With a deeper understanding of the achievements and difficulties faced by each student, educators can provide more specific feedback and design learning strategies that better suit unique learning needs. In other words, technology has helped shift education from a one-size-fits-all approach to a more adaptive one, ensuring that every student can reach his or her full potential. With increasingly sophisticated data analysis and monitoring tools, education is becoming more transparent and evidence-orientated. Teachers and instructors can access deeper insights into student progress, as well as identify trends and challenges that may arise. In learning management, this data becomes an important foundation for making informed decisions and designing more effective learning programmes. In addition, technology also enables students to monitor their own progress, providing opportunities for them to take control of their education and develop skills related to self-monitoring and responsibility in the learning process (Stehle & Peters-Burton, 2019). Thus, technology not only facilitates more personalised learning, but also empowers students and educators to achieve higher levels of educational excellence.

As a comprehensive conclusion, the positive role of technology in improving the quality of education and empowering human capital has been a significant transformational catalyst. The use of technology has opened the door for more inclusive education, by enabling more affordable and adequate access to education, regardless of geographical location. More than
just providing freedom of access, technology also provides a more interactive learning landscape, allowing students to engage more actively in their learning. Moreover, a personalised approach, enhanced by technology, underscores the importance of aligning education with individual needs, helping students pursue their interests and develop according to their potential. This includes not only the utilisation of technology in learning methods, but also in the development of skills that match the demands of this era, making it relevant to life in the 21st century. As the development of technology continues, we can optimistically anticipate that its positive impact will continue to grow. Technology will continue to advance the field of education and human resource development in increasingly innovative ways, creating new opportunities for more efficient and quality learning. Moreover, technology enables education to continue even in emergency situations such as a pandemic, demonstrating much-needed resilience and adaptability. Innovation continues to colour education and human capital development, helping individuals and society as a whole to excel in this increasingly connected and complex era.

CONCLUSION

The impact of technology in improving the quality of education and human resource development is significant. The transformation of learning methods has brought about various innovations in the education process, such as online learning, e-learning platforms and game-based learning that allow for a more engaging and interactive learning experience. In addition, technology provides unlimited access to information through the internet, helping students and educators to explore deeper knowledge. Moreover, technology also enables the development of digital skills that are crucial in the modern era. With distance learning facilities, education becomes more flexible and accessible to those in various geographical locations. Moreover, continuous data analysis monitors student progress and assists educators in identifying areas that require improvement. All of this has changed the landscape of education, making it more affordable, personalised and effective, and providing wider access to knowledge.

RECOMMENDATIONS

These suggestions cover various aspects that are crucial to improving education through the use of technology. In an effort to achieve optimal results, several steps can be taken: Firstly, educational institutions should focus more on integrating technology in their curriculum. This involves training teachers and instructors so that they can use technology effectively in teaching, creating a richer learning experience. Next, it is necessary to ensure that stable and
affordable internet access is available to everyone, regardless of their economic background. This will enable online education to be more inclusive. The security of students' personal data must be considered when student data is collected and analysed. Strong regulations and best practices are needed to protect student privacy. In addition to digital skills, educational institutions should focus on developing "soft" skills such as creativity, collaboration and problem-solving. These skills are essential in the ever-changing world of work. Teachers and instructors also need to receive appropriate training to teach online and utilise technology in the learning process. It is important to encourage research and innovation in the use of technology in education. This will help in improving existing technologies and learning methods. Collaboration between educational institutions and other stakeholders is also very important. They need to work together, share experiences and resources to effectively integrate technology in education. With wise and sustainable implementation, technology can be the key to improving the quality of education and human resource development. This will create opportunities for education that is more inclusive, relevant and responsive to the demands of the 21st century.

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