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DIGITALISATION IN VOCATIONAL EDUCATION: ENHANCING SKILLS AND JOB READINESS IN DEVELOPING COUNTRIES

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Abstract

Digitalisation in vocational education plays an important role in improving skills and work readiness in developing countries. Through the application of digital technology, access to more varied and quality learning resources becomes easier, and more interactive learning methods can be implemented. This approach not only strengthens learners' theoretical understanding but also provides practical experience needed in the industrialised world. The integration of technology tools and applications used in real industries into the vocational education curriculum ensures learners' readiness to face the evolving world of work. Technology-based training such as virtual simulations and e-learning platforms contribute significantly to learners' adaptability to technological changes and industry developments. In addition, digitalisation opens up wider collaboration opportunities between educational institutions, industry and government, creating a supportive ecosystem for innovation and knowledge transfer. Through technology-based internship programmes and partnerships with technology companies, learners can gain relevant work experience and direct feedback from the industry. Overall, digitalisation in vocational education strengthens the link between education and the world of work, preparing learners with the necessary skills and competencies to compete in the global job market.

Keywords: Digitalisation, Vocational Education, Skills, Job Readiness, Developing Countries.

Introduction

In the current era of globalisation and information technology, digitalisation has become one of the main drivers of change in various sectors, including the education sector. Digitalisation is the process of integrating digital technology in various aspects of learning and teaching with the aim of improving the effectiveness, efficiency and accessibility of education. This process includes the use of hardware and software such as computers, tablets, e-learning applications, learning management platforms (LMS), and various other digital tools and technologies to support teaching and learning

activities (Hapinas et al., 2025) ; (Komari & Aslan, 2025) ; (Judijanto & Aslan, 2025) . Digitalisation enables the development of interactive and dynamic learning materials, provides flexibility in learning time and place, and facilitates the application of more personalised and collaborative learning methods. In addition, digitisation also contributes to the wider dissemination of information and educational resources, empowering students and teachers to access knowledge more easily and innovatively (Arbaugh & Benbunan-Fich, 2006) .

Developing countries face significant challenges in their efforts to improve the competencies of their workforce to compete in an increasingly integrated global marketplace. Vocational education, which focuses on practical and technical skills training, plays a crucial role in the creation of a work-ready and competent workforce (Garrison & Vaughan, 2008) .

Vocational education has a very important role to play in developing countries as it directly contributes to the development of practical and technical skills that are in high demand in the labour market. Developing countries often face challenges in terms of unemployment and a lack of skilled labour ready for the needs of industry (Siemens, 2005) . Vocational education provides training pathways that focus on specific skills, such as engineering, manufacturing, information technology, as well as other sectors relevant to the needs of the local economy. As such, vocational education graduates have a greater chance of securing employment and contributing productively to the economy (Brindley et al., 2009) .

In addition, vocational education also supports economic growth and improves the welfare of people in developing countries. Through relevant and appropriate skills training, vocational education helps reduce the gap between the skills of the workforce and the needs of the industry. This not only improves the competitiveness of local labour in the domestic labour market but also opens up employment opportunities in the international market (Garrison & Vaughan, 2008) . Good vocational education can drive industrial modernisation, increased productivity, and adaptability to technological and market changes. With the right policy support and investment in adequate training facilities, vocational education can be a key pillar in developing countries' efforts to achieve sustainable and inclusive economic development (Herrington & Reeves, 2001)

However, vocational education in developing countries is often faced with various obstacles such as limited resources, inadequate training facilities, and a curriculum that does not always keep up with industry developments. Moreover, conventional learning methods are often unable to respond to dynamic and technology-based labour market needs (British Council, 2017) .

Digitalisation in vocational education is a potential solution to overcome these challenges. By using digital technology, the learning process can become more flexible, interactive and relevant to the needs of modern industry. The use of digital tools such as e-learning platforms, computer-based simulations, and learning management

applications can help develop essential technical and non-technical skills for students (UNESCO, 2018) .

On the other hand, the adoption of digitalisation in vocational education also raises important questions: How can digitalisation be effectively integrated in vocational education systems in developing countries? Are all stakeholders, including students and teachers, ready to make the transition to a more technology-based learning method ? How does digitalisation impact the job readiness and competitiveness of vocational education graduates?

This research aims to explore and analyse the impact of digitalisation on vocational education in developing countries, with a focus on improving students' skills and work readiness.

Research Methods

The study in this research uses the literature method. The literature research method, or literature review, is an approach that involves collecting, critically reviewing, and synthesising information from various written sources, such as books, journal articles, research reports, and other scholarly sources relevant to the topic being researched. The main purpose of this method is to understand recent developments, existing concepts, theories, and findings, and to identify gaps and opportunities for further research (Hart, 2001) ; (Jesson et al., 2011) . This process includes systematic steps, including the determination of search keywords, selection of relevant sources, evaluation of the credibility and validity of sources, and analysis and interpretation of the information obtained. Literature research helps researchers build a strong theoretical foundation and develop a fundamental framework before carrying out empirical research or field studies (Rossi et al., 2004) .

Results and Discussion

The Impact of Digitalisation on Vocational Education

Digitalisation has had a significant impact on vocational education in various aspects. First of all, digitalisation has expanded access to learning and training resources. Through e-learning platforms and online courses, learners can access training materials from various sources, including leading educational institutions and industries around the world (Sitopu et al., 2024) ; (Guna et al., 2024) ; (Iksal et al., 2024) ; (Fawait et al., 2024) . This means that students are no longer limited to the local curriculum or physical infrastructure of vocational institutions, but can access a wider and more diverse range of learning resources. In addition, the use of digital devices allows for more flexible learning, where students can learn according to their own pace and schedule (World Bank, 2020) .

Second, the integration of technology in vocational education enables a more interactive and practical learning experience. The use of computer simulations, virtual reality (VR), and augmented reality (AR) in training vehicles allows students to practice technical skills in a safe and controlled environment before diving into real work situations (GIZ, 2019) . For example, machine technicians can learn how to repair engines through VR simulations without the risk of damaging expensive equipment or potentially jeopardising their safety. In this way, students can gain a better understanding and be more confident in applying their skills in the workplace (Salmon, 2000) .

Thirdly, digitisation is also driving the introduction of more effective methods of evaluating and measuring learning progress. Computer-based learning systems can track student progress in real-time, provide quick and accurate feedback, and customise training materials according to individual needs. This creates a more adaptive and personalised learning environment, increasing student engagement and motivation. For example, adaptive learning algorithms can adjust task difficulty based on student performance, so that each student gets the right challenge for their skills (Swisscontact ., 2018)

Fourth, digitalisation has strengthened the partnership between vocational education institutions and industry. Through easier and faster digital communication, educational institutions can more effectively collaborate with companies to design curricula that match the latest industry needs. Digital platforms also facilitate internship and job placement programmes, connecting students with suitable career opportunities. This provides a double benefit; students gain relevant real work experience, while companies can identify and recruit skilled young talents according to their needs (Dziuban et al., 2005) .

Fifth, the impact of digitalisation on vocational education can also be seen in the improvement of students' digital literacy. In today's digital age, almost every job requires at least some level of technological understanding and digital skills. Through technology-integrated vocational education, students not only learn traditional technical skills but also acquire digital capabilities such as the use of specialised software, data analysis and basic programming. This strong digital literacy will be an important plus for graduates when they enter the job market (Parker, 2003) .

Finally, while digitalisation offers many benefits, there are challenges that need to be addressed, including the digital divide. Not all students have equal access to technology and adequate internet. Vocational education institutions should endeavour to provide equitable and inclusive access to digital devices and internet connectivity. In addition, training and support for teachers is also important so that they can utilise technology effectively in the teaching process. With the right support, digitalisation can strengthen vocational education and prepare students to succeed in an increasingly technology-integrated world of work.

Benefits of digitalisation in improving skills and work readiness

Digitalisation has many benefits in improving workers' skills and work readiness. Firstly, with the adoption of digital technologies, individuals can access a wide and diverse range of learning resources. E-learning platforms such as Coursera, Udemy, and Khan Academy offer online courses in a wide range of fields, from information technology to management skills (World Bank, 2020) . Through these platforms, individuals can learn at their own pace and needs, allowing them to continuously develop new skills relevant to the changing labour market (Harasim, 2017) .

Secondly, digitalisation also allows for more interactive and hands-on training. Simulation tools and augmented reality (AR) and virtual reality (VR) technologies give workers the opportunity to experience real situations without any real risks. For example, an engineer can practice his skills in handling heavy machinery or a surgeon can practice performing complex medical procedures using VR technology. In this way, workers can gain invaluable practical experience before actually going into the field (Syakhrani & Aslan, 2024) ; (Irwan et al., 2024) ; (Judijanto & Aslan, 2024) ; (Sartika & Fransiska, 2024) .

Third, digitalisation supports more effective collaboration and communication in the workplace. The use of online collaboration tools such as Slack, Microsoft Teams, and Zoom allows teams to work together efficiently from different locations. With these technologies in place, workers can collaborate on projects, share ideas, and solve problems together without having to be in the same room. It also helps in improving communication and teamwork skills that are essential in the modern world of work (EdTech Hub, 2021) .

Fourth, digital technology drives efficiency in daily work through automation. Automation software, such as automated bookkeeping and project management, reduces manual workload and allows employees to focus on more strategic and analytical tasks. This not only increases productivity, but also provides an opportunity for workers to develop data analysis and problem-solving skills that are increasingly important in today's world of work (Pachler et al., 2010) .

Fifth, digitalisation has also played a role in improving skills related to data and analytics. The ability to process data and derive insights from data is becoming an invaluable skill in almost all industries. Analytics platforms such as Google Analytics, Tableau and Power BI provide the tools and training needed to hone these skills. With this ability, workers can make better, data-driven decisions, ultimately improving the efficiency and effectiveness of Company operations (Chen & Shaw, 2006) .

Finally, digitalisation provides wider and more flexible career opportunities. Workers are no longer limited by geographical location in their job search. With online work platforms such as Upwork, Freelancer, and LinkedIn, individuals can work from anywhere in the world and collaborate with companies from different countries. In

addition, the trend of remote working driven by digitalisation also gives workers greater flexibility in managing their time and work-life balance. Thus, digitalisation not only improves skills and job readiness, but also opens up new opportunities that were previously impossible (Davis, 2012) .

As such, digitalisation brings a range of significant benefits in enhancing individuals' skills and work readiness. With easy access to online learning resources, technology-based interactive training, and efficient collaboration tools, workers can continuously develop their capabilities as per industry needs. In addition, automation and data analysis help improve productivity and better decision-making. Digitalisation also provides greater flexibility and career opportunities, allowing workers to adapt quickly to changes in the job market. Overall, these benefits of digitalisation play an important role in preparing a more competent workforce that is ready to face the challenges of the future.

Conclusion

Digitalisation in vocational education in developing countries plays a crucial role in advancing learners' skills and work readiness. The application of digital technology in vocational education facilitates access to more diverse and quality learning resources, and provides more interactive and challenging learning methods. This enables learners to gain a deeper and more practical understanding of the areas of expertise they are studying.

Furthermore, digitalisation strengthens the vocational education curriculum by integrating technological tools and applications used in real industries. Thus, learners can be better prepared for the evolving and digitalised world of work. Technology-based training, such as virtual simulations and e-learning platforms, provide experiences that are relevant to current labour market needs, and improve learners' adaptability to technological changes and industry developments.

In addition, digitalisation also opens up opportunities for greater collaboration and networking between vocational education institutions, industry and government. This creates an ecosystem that supports continuous innovation and knowledge transfer. Technology-based internship programmes and partnerships with technology companies allow learners to gain real work experience and direct feedback from the industry. Overall, digitalisation in vocational education strengthens the link between education and the world of work, ensuring that learners not only have the necessary technical skills but are also ready to compete and thrive in the global job market.

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