Digital technologies and artificial intelligence: A catalyst for the transformation of traditional work-integrated assessment in higher education

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ABSTRACT

Traditionally, assessment of work-integrated learning (WIL) is conducted face-to-face, with the assessor physically in the same place as students to evaluate their acquisition of professional knowledge, skills, and competencies. However, the rapid technological advancements, changing workplace practices, and disruptions such as the COVID-19 pandemic highlighted the need for more flexible and innovative assessment strategies. Virtual WIL assessment (VWA), which leverages digital technologies, artificial intelligent tools, and virtual simulations, arose out of this need. In the discourses on VWIL, some scholars have theorised about the transformative potential of digital technologies and AI to enhance flexibility, access, collaboration, and reflective practice without explicitly demonstrating how this phenomenon occurs or has occurred. This study investigated the potential of digital technologies and AI tools to transform traditional WIL assessment (TWA) in higher education. The research question was "How can digital technologies and AI tools contribute to the transformation of TWA? The objective was to (i) explore digital technologies and AI tools employed to virtually assess WIL and (ii) to examine how these strategies can transform TWA. Guided by the interpretivist paradigm and underpinned by transformative learning theory, the study adopted a qualitative case study design. Semi-structured open-ended interviews were used to collect data from 15 purposively selected participants and analysed using colour-coding to identify emergent themes. The rationale for the study stemmed from the growing demand for technology and AI-enabled assessment practices that are compatible with the changing world of work. Results revealed that these tools can foster empowerment, autonomy, and independence and unleash innovation and creativity while enhancing meaningful engagements. The study concludes that these tools have a significant potential to transform TWA by expanding opportunities for authentic, inclusive, and sustainable assessment in higher education. It is recommended that universities invest in digital infrastructure, develop capacity, and integrate virtual assessment models into WIL policies to promote student employability and meet the demands of the twenty first century and the fourth industrial revolution.

Keywords: Work-integrated learning, virtual work-integrated assessment, artificial intelligence, digital technologies, transformation

INTRODUCTION

Traditionally, students enrolled in courses with a practical component are placed in work-integrated learning (WIL) sites to acquire authentic, real-workplace experiences (Hondonga, Chinengundu, and Maphosa 2022). WIL placements provide students with an opportunity to connect the theory and practice. They also help students to develop problem-solving skills, professional competence, and industry-relevant capabilities that prepare them for the workplace. Traditional WIL assessment (TWA) is conducted face-to-face, with the assessor physically at the WIL site to evaluate students' acquisition of professional knowledge, skills, and competences. The strategies commonly used in TWA include observations, students' practical demonstrations of competences, and paper-based rubrics and portfolios.

The rapid advancements in technology and artificial intelligence (AI), hybridisation of the workplace, shifting employability skills, and disruptions such as the COVID-19 pandemic highlighted the need for more flexible and innovative assessment models. These developments have contributed to the adoption of virtual WIL (VWIL) and virtual WIL assessment (VWA), which complement the way WIL has traditionally been administered and assessed. There are many definitions of VWIL. Schuster and Glavas (2017) define digital work-integrated learning (or VWIL) as organised and structured teaching practice where pre-service teachers engage in professional learning through online, virtual, or hybrid workplace environments. VWIL is characterised by digital placements that include online or virtual lesson delivery, remote classroom observation, online assessment practices, and digital supervision by university lecturers and mentor teachers (Czerniewicz 2018). VWIL leverages digital technologies, AI tools, and virtual simulations to create authentic and interactive environments in which WIL is administered and assessed remotely (Wood, Zegwaard, and Fox-Turnbull 2020).

VWIL can provide a solution to several problems. For example, limited industry placements pose a big challenge for higher education institutions, including TVET colleges (Nduna 2026). The Australian Government Department of Education (2024) cites the challenges of students with disabilities, and those working or having financial constraints who may encounter challenges with reaching WIL sites. The COVID-19 pandemic is another example that made VWIL indispensable. Bell et al (2021) note that students from disadvantaged backgrounds have found VWIL inclusive and providing them with opportunities to collaborate on authentic projects with students from diverse backgrounds. Similarly, industry benefits from being virtually connected to a high number of students.

The use of digital technologies in assessment is not new. Newhouse (2011) states that postulations about integrating digital technologies in assessment date as far back as the 1960s.

He argues that digital technologies provide pedagogical support in assessment. However, he notes that in the 1960s, research that focused on the assessment of WIL portfolios did not include digital portfolios. Advancements in technology have seen a surge in digital assessments. The COVID-19 pandemic saw a proliferation of these assessments.

Rabah (2015) outlines the benefits of digital technologies in education, that (i) they capture the attention of students, thus enhancing student engagement, (ii) visual-conferencing tools such as MS Teams, Zoom, and Skype globalise the classrooms by connecting local and global citizens without travelling to other countries. Students can access education virtually using these digital tools, (iii) they enhance the learning process. For example, students can utilise digital graphic software and tools to create learning materials (e.g. PowerPoint presentations, posters, lesson plans, etc.), conduct research for project-based learning projects and assignments, access internet to conduct research and learning, and so forth.

Whereas digital technologies have been used in assessments for decades, the integration of AI in WIL assessments is relatively new (Shambare 2026). Shambare (2026) conducted a bibliometric analysis in which he found that, dating from 2015 to 2025, there was a surge of 234 per cent in WIL-AI publications in 2020. This rise might suggest that the COVID-19 pandemic intensified AI adoption in WIL assessments.

Existing literature cites many benefits of integrating AI tools in WIL. Candel et al (2026) cite personalised support, content creation, and assessment automation as benefits of AI integration in teacher education. Tijani et al (2026) mention that integration of AI-enabled platforms in WIL can facilitate reflective observation, provide real-time feedback, automate assessments, and ensure equitable access to laboratory experiences. Meanwhile, Saychenko (2026) and Sujin et al (2026) highlight that AI algorithms provide meaningful monitoring, support, and mentoring to students. They benefit students by optimising educational results, improving student engagement, enhancing cooperation and collaboration among students, promoting self-efficacy, and improving motivation and learning achievement for students (Saychenko 2026, Sujin et al 2026).

Integration of digital technologies and AI tools in VWIL is aligned with the rapid developments in technology, students' employability needs, and the rapidly changing world of the workplace. This alignment might justify the need to transform TWA that has become unsustainable to address the demands created by these rapid developments. The next section presents the problem statement and purpose of this study.

PROBLEM STATEMENT AND PURPOSE

VWA has emerged as a promising alternative to TWA by incorporating digital technologies, virtual simulations, and artificial intelligence (Mogoale et al 2025, De Villiers, Degenaar, and Banda 2024). In the discourses on VWIL, some scholars have theorised about the transformative potential of digital technologies and AI to enhance flexibility, access, collaboration, and reflective practice without explicitly demonstrating how this transformation occurs or has occurred (Chanda 2023, Haipinge, Kadhila, and Josua 2022, Olurinola (No date), Nhlumayo 2026, Shambare 2026, Tijani et al 2026). Consequently, a need arises to close this gap by investigating how digital technologies and AI can transform TWA in higher education.

Against this backdrop, this article examined the transformative potential of digital technologies and AI-enabled tools on TWA within higher education. The main research question was "How can digital technologies and AI tools contribute to the transformation of TWA? The objectives were (i) to explore digital technologies and AI tools participants have employed to assess WIL virtually and (ii) to examine how these strategies can transform TWA. The next section presents the context of this study.

CONTEXT OF THIS STUDY

This study was conducted at a South African university's Faculty of Education that offers three four-year initial teacher education programmes (ITEPs) at Bachelor of Education (B.Ed) degree and two two-year programmes at the Technical and Vocational Education and Training (TVET) diploma and Postgraduate Certificate in Education (PGCE) levels. In the B.Ed programmes, second to fourth year students undertake WIL during the first and second semesters while in one of these programmes, final-year students spend six months in schools. TVET and PGCE students visit schools twice a year for WIL. During the COVID-19 lockdowns, VWA was conducted through a range of digital technologies, AI tools, and simulations. This approach was different from how TWA was ordinarily administered and assessed, as presented earlier. In this article, the terms evaluation/assessment and evaluator/assessor are used interchangeably. In the next section, the theoretical framework adopted in this study is presented.

THEORETICAL FRAMEWORK

This article was underpinned by the transformative learning theory (Mezirow 1978). According to this theory, transformation does not occur in a vacuum but is triggered by a disorienting dilemma. In the context of this article, this dilemma was caused by rapid technological

developments, evolving workplace demands, and the COVID-19 pandemic which threatened the "normal" WIL assessment (TWA).

This theory assumes that individuals can transform their meaning structures/schemes or frames of reference by critically reflecting on their existing assumptions or beliefs, then consciously making and implementing plans that lead to new ways of perceiving the world. In the context of this article, during the COVID-19 pandemic, teaching practice evaluators were disoriented about how to assess their students' WIL in an authentic and inclusive manner that resembled the real world.

The next stage was self-examination, where evaluators consciously thought about how their existing assessment experiences connected and could be applied during the COVID-19 pandemic. As they learned about virtual assessments, they entered the third stage- critical assessment of assumptions, at which they critically reviewed their assumptions about "normal" assessments and became more open to new ones- virtual authentic assessments. The acceptance of new options resulted in perspective transformation, which involved planning the course of action (Mezirow 1991). In the context of this article, this stage involved WIL evaluators deciding on the skills they needed to assess WIL effectively through virtual platforms. The next stage involved acquiring knowledge and skills through capacity development and assistance from peers to carry out the new plan. During the final phase, lecturers explored and tried new roles of virtually assessing WIL, as shown in the results of this article.

Mezirow's (1978,1991) transformative learning theory is relevant to this article, as it outlines the stages that evaluators traversed to finally adopt VWA. It is important to note that students, on whom VWA was administered, also underwent the phases of transformative learning. Without this change in their perspectives, they might not have coped with the challenges and strain brought about by the COVID-19 pandemic on VWA.

LITERATURE REVIEW

The literature review comprises three themes: (i) Understanding authentic assessment (ii) Integration of artificial intelligence in work-integrated learning, and (iii) Practical scenarios of virtual work-integrated learning.

Understanding authentic assessment

Authentic assessment has its roots in Piaget's (1964) theory of cognitive development which emphasises students' interaction with their environment, and Vygotsky's (1978) social constructivist theory which underscores students' social interaction with others as the source

of knowledge. In either case, students' active engagement in knowledge construction overshadows passively absorbing information. Authentic assessment is also rooted in situated learning theory (SLT) (Lave and Wenger 1991), which posits that learning is most effective when it happens within the context in which it is used, and that students learn best through participation in social and real-life activities that are collaborative and relevant to their future roles.

Authentic assessment develops students' knowledge and lifelong skills (Schultz et al 2022), prepares graduates for a transforming world (Ajjawi et al (2023), and "protect[s] the integrity of the discipline by ensuring the attainment of student competencies" (Salim et al 2024, 58). They also provide students with the opportunity to link the theory with practical authentic knowledge (Ruthanam 2023) and to acquire soft skills and apply values, knowledge, complex practices, attitudes, and skills of the profession (Egan et al 2018, Du Plessis 2019). The rapid expansion of technology and the changing needs of students and the workplace necessitated the need to shift to VWIL which integrates AI tools and digital technologies. The next section presents the integration of AI tools in VWIL.

Integration of artificial intelligence in work-integrated learning

Existing literature on AI integration in WIL has immense impact on preparing students for the world of work. For example, Saychenko (2026) conducted a quantitative study to investigate the effectiveness of AI-powered mobile education in Russian corporate universities, using a structured questionnaire administered to 280 employees. Her findings identified the impact of AI personalisation as having the strongest impact on learning engagement. This suggests that AI personalisation can deliver personalised, engaging and socially relevant learning that is vital in modern corporate education.

Shambare (2026) and Tijani et al (2026) articulate how AI-powered analytics can track and monitor student performance in real-time, and provide support and mentoring, thus complementing the human element of the WIL supervisor. This claim is supported by Sujin et al (2026), who assert that AI algorithms offer adaptive educational environments that provide individualised learning experiences for students, evaluate and interpret learner information/data and behaviour, analyse student performance, identify areas that need improvement, provide real-time targeted or individualised feedback, and suggest alternative pathways and resources or appropriate learning materials. Although technology can never replace a human being, AI-powered analytics technically perform the functions of the human WIL supervisor. In a study that Chanda (2023) conducted to investigate how the use of AI

promoted WIL at a South African TVET college during the COVID-19 pandemic, he found that these tools promote communication among students, assessors, coordinators, and employers. He also found that they promote a sense of community and connection despite the physical distance during COVID-19 pandemic.

Although AI has been touted as an effective tool to enhance WIL through virtual simulations, adaptive feedback, and scalable learning support, Khitsane et al (2026) raise social justice issues, noting that not much attention has been paid to how educators engage with and navigate AI-enhanced WIL in underprivileged contexts. Khitsane at al. (2026) investigated this phenomenon using a collaborative autoethnographic design comprising a questionnaire and interviews with five ICT lecturers and two WIL coordinators. Results indicated ambivalence and emotions in the responses, reconceptualisation of pedagogy, a workload paradox, systemic constraints, and context-sensitive strategies for ethical and inclusive AI integration. The researchers recommend that institutions develop clear institutional frameworks that guide ethical and pedagogical AI use. Shambare (2026) raises the same concern, that the upward trajectory in WIL-AI research must be strengthened with policies that interrogate sticky issues such as ethics and inclusiveness. The next section presents integration of digital technologies in VWIL.

Integration of digital technologies in work-integrated learning

This section of the literature review presents the practical scenarios of how VWIL was administered and assessed in different contexts. In most cases, one strategy was used in combination with the others.

Salim et al (2024) report on a simulation in which students virtually diagnosed patients, took a history, and performed patient assessment using their family members as simulated patients. They video-recorded interviews with patients and assessed any two patients' systems, including heart, lungs, eye, and muscular skeleton and shared interviews with faculty team. After watching the videos, lecturers used a checklist to assess students and provided feedback and virtual debriefing via voice messages. In another scenario, Salim et al (2024) report on how students reached cyberpatients virtually, examined them, recorded their history, and diagnosed their problems based on the examinations. Assessment criteria included students' understanding of the disease process, scientific justifications, and how they planned to manage the patients' problems. Assessment was conducted through virtual meetings with lecturers or via recorded videos of all the processes. As part of VWA, students answered critical questions on the nursing processes about the patient cases.

In a Zoom e-practicum micro-teaching classroom, six of the 25 pre-service teachers taught lessons using their peers as simulated learners (Ersin, Atay, and Mede 2020). Learners and university-based e-mentors provided feedback. Students reflected on their e-practicum and e-mentoring experiences. In a different scenario, Aghar and Quirke (2023) address a preservice teacher e-practicum in which students were virtually assessed based on their virtual shadowing and observation of school-based mentors. After documenting their observations and reflections in an e-portfolio, they received support, guidance, and mentoring virtually from school and university-based mentors.

Other scenarios involved students' observations of English teachers' TV lessons (Özkanal et al 2020) that were accompanied by reflection-on-action (Schön 1987) reports. Students also presented micro lessons on Zoom platform, using their peers as simulated learners, after which they received virtual mentoring and feedback. Jin (2023) presents an e-practicum in which students virtually taught classes, after which they wrote reflection reports on the strategies used, learning outcomes, challenges encountered, and improvements needed. They developed an eBook and recorded video footage of each lesson on which they received feedback from instructors. Students addressed their challenges in Zoom Breakout Rooms and Zoom meetings, which provided them with opportunities to collaborate and share ideas, thus forming a community of practice (Lave and Wenger 1991). Hondonga et al (2022) report on how institutions offering vocational education in Botswana transformed TWA approaches by developing new tools such as videos, YouTube, blogs and discussion forums, video-conferencing tools, simulators, and virtual or augmented-reality tools.

The scenarios presented in this section demonstrate ways in which VWIL was employed in different contexts using various strategies. Virtual simulations and virtual self-reflections are central in these scenarios. However, where mentorship was mentioned, no details were provided on how it was done. Moreover, although these scenarios entail practical examples of how VWA was administered using digital technologies during the COVID-19 pandemic, the word "transformation" was hardly mentioned. The implication could be that the researchers who conducted these VWAs did not perceive the transformative potential of VWA on TWA. This is the gap that this article seeks to close by investigating the transformative power of digital and AI technologies on TWA.

RESEARCH METHODOLOGY

This study adopted a qualitative case study design. The design was appropriate, as this study was conducted in the context in which VWA was employed (Coombs 2022) to produce insights

(Ugwu and Eze, 2023) on how digital technology and AI-powered tools can transform TWA. The interpretivist paradigm was adopted (Smith and Osborn 2008), as the researcher intended to interpret participants' accounts of how these tools can transform TWA.

Finding participants presented challenges. Most of the potential participants claimed to have forgotten about the strategies they had used during the COVID-19 lockdowns, as they had reverted to TWA. Other lecturers made excuses about heavy teaching workloads that left them exhausted. Consequently, the researcher adopted the principle of less is more, settling for 15 participants selected from three ITEPS. The researcher believed the selected participants would provide her with detailed accounts of the digital and AI technologies they had used to assess WIL virtually.

Data were collected through semi-structured, open-ended individual interviews via WhatsApp, MS Teams and Zoom. With open-ended interviews, the researcher could probe to get better clarification on the responses. The interviews were conducted between five and seven o'clock in the evening to avoid distracting participants from their daily business. During the interviews, the researcher took down copious notes. To balance quantity and quality, each interview lasted for approximately two hours within a span of two weeks. Interviews were audio-recorded with the participants' permission.

Data were analysed using Braun and Clarke's (2006) six-phase steps: (i) reading and re-reading raw data to achieve familiarity, noting emergent initial ideas and patterns (ii) generating initial codes by sifting through data and colour-coding meaningful features (iii) grouping identified codes into broader patterns and themes (iv) reviewing themes for coherence and reviewing which themes to merge, split or discard (v) refining themes, ensuring that each theme was aligned with the data to be presented under it, and (vi) presenting the results using emergent themes. During data analysis, the researcher observed that some data were irrelevant to the objectives of this article and had to be discarded.

Ethical considerations were made. Participants were informed about their decision to participate or withdraw from the study at any time. They were also informed that the study did not pose any risks to participants and that data collected from them would be stored safely. They were further informed that their names would not be disclosed but that they would be represented with the word "Participant" plus number (e.g., Participant 2), and particulars of the institution would be kept confidential.

RESULTS

Participants addressed the research questions by first addressing the digital and AI technologies they have used to virtually administer and assess WIL, followed by an explanation of how these tools can foster transformation of TWA. Participants have implemented some of these strategies in micro-teaching, while they have employed others during the COVID-19 lockdowns. Data analysis generated two themes: (i) Fostering empowerment, accountability, and autonomy through technology and artificial intelligence tools, (ii) Unleashing innovation and creativity through technology and artificial intelligence.

Fostering empowerment, accountability, and autonomy through technology and artificial intelligence tools

This section presents how participants have administered and assessed WIL virtually using digital technology and AI-powered tools, and how these tools can foster empowerment, accountability, and autonomy, which signals a shift from TWA.

Participant 7 described the virtual WIL strategies that she said she used during the pandemic lockdown as follows:

> "When the pandemic hit, I had to rethink everything about how I would assess my students. I adopted these four strategies: MS Teams or Zoom for shadowing and feedback, WhatsApp voice-note check-ins to understand their daily struggles, e-portfolios with weekly video diaries for reflection, and Zoom breakout rooms."

Asked how this multi-dimensional strategy can transform TWA, she responded:

> **"**This approach can transform traditional WIL evaluation in several ways. I shifted from physically visiting a student once or twice to continuously shadowing them digitally, so I could see their weekly growth. I moved from grading refined products that might have been AI generated to grading reasoning and critical thinking. Because I could not verify physical execution through a screen, I weighted their reflective thinking more heavily.

Other participants reported how they used different LMSs to assess WIL virtually during the COVID-19 lockdown. For example, Participant 2 described various LMSs she used in conjunction with AI-powered tools to provide individual student's learning analytics. She explained how this strategy works:

> "To monitor students' engagement during COVID-19 lockdown, they had to regularly check into Moodle or Blackboard platforms at least twice a week to reflect on their experiences. These tools analysed their engagement in VWIL and provided immediate feedback. I monitored their progress

> through these LMSs. The learning analytics provided them with feedback and alternative resources and pathways, which stimulated their learning and provided support. However, I also intervened by calling students when they started to fall behind. I also used MS Teams with Moodle plug-in to mentor students remotely and identify their problems before they escalated."

Explaining how these tools can transform TWA, Participant 2 responded that,

> "When students and assessors are both in schools, it is easy to identify if WIL goals are met and the kind of support they need. AI tools that generate learning analytics have the benefit of providing students with immediate feedback and of acting as a couch and mentor."

Other participants advocated for peer-assessments and video recordings in VWA, which involved students assessing one another's performance and recording their peers' lesson presentations. Participant 8 described how he motivated students to help and support one another during VWA:

> "I encouraged my students to help and support one another to develop lesson plans and teaching materials, and to use Canvas AI to develop slides and posters for teaching. They also did peer-assessments and recorded each other's presentations."

These activities reflect the collaborative environments created by VWA, which likely helped students not to feel isolated but instead to feel as part of a community. Participant 1 presented the strategies she used during the COVID-19 lockdown thus:

> "Students livestreamed their lessons and uploaded them on Blackboard. I observed these lessons and assigned marks. The advantage was that we did not have to travel to the different schools. We could observe and assess students' performance even if we were away from our provinces. This way, we saved time and money we would have spent on getting to the WIL sites. However, we sometimes experienced challenges with students who had network problems. Their alternative was to submit video recorded lessons via email."

Describing how these strategies can potentially transform TWA, Participant 1 stated thus:

> "Employing digital technology and AI tools gives us the convenience and flexibility that we don't enjoy in TWA. We have the flexibility to watch lesson presentations and conduct assessments anywhere and anytime. We save time and money and get the freedom to decide how much time to spend assessing each lesson. With TWA, there is no flexibility. Instead, one is always time and space bound."

Nor et al (2024) define debriefing as a time-bound conversation that occurs immediately after the end of an event to ascertain if stated goals were met. In WIL, this process is related but different from reflection which takes place before, during, and after the event (Schön 1987).

Participant 14 highlighted the importance of debriefing and explained how it was remotely conducted during the COVID-19 lockdowns:

> "Before students went out to WIL, I exposed them to various digital and AI tools, including mobile Apps and video-conferencing tools such as Microsoft (MS) Teams and Zoom. Since WIL assessments are often accompanied by debriefing, I used these tools and deliberated on their self-assessment scores. I found that students were more vocal in virtual rather than face-to-face debriefing."

The scenarios presented in this section demonstrate different forms of empowerment and autonomies and accountabilities. For example, assessment of higher order skills could empower students with employability skills they need in the modern workplace, while LMSs empowered them with support, immediate feedback, and mentorship that would have lacked during the COVID-19 lockdowns. When students check into the LMSs and reflect on their experiences, they take accountability and ownership of their growth and development. In addition, VWA could empower assessors and students with the flexibility and autonomy that is not common in TWA.

Unleashing innovation and creativity through technology and artificial intelligence

This section presents how the use of digital technology and AI tools in VWA unleashed innovation and creativity in the participants and students. Participant 10 reported that during the COVID-19 lockdown, she used a combination of technologies and simulations to virtually assess WIL.

> "I used MS Teams, Zoom, and Google Meet to interact with students, because they needed a lot of support and guidance when technology was central to social interaction during the lockdowns. For VWA, I sent them Google meeting links. They livestreamed their lessons and uploaded them on Blackboard."

When Participant 10 was asked how these strategies can transform TWA, she mentioned that,

> "As you can see, a lot of innovation and creativity goes into virtually assessing WIL. Technology and AI-powered tools play an immense role in all the VWIL processes. This is a big shift from TWA with its limited integration of AI technologies."

Simulations appear to be a strategy that is widely adopted in VWA. One of the simulations that is commonly used in VWIL is the Mursion Teaching Simulator, which Ferguson and Sutphin

(2022) define as a virtual reality platform used as part of micro-teaching to allow a small group of students to practise teaching virtually while focussing on a specific aspect of a lesson. The challenge for many WIL evaluators is that it requires a commercial operating license. Participant 6 mentioned that during the lockdown, he used his creativity and imagination to improvise this simulator:

> "I developed avatars using AI because our institution does not have a license for the Mursion simulator software. Although my simulator was not perfect, students were able to practise micro-teaching using an AI-generated tool and I could observe and assess their performance."

Describing how this simulation can transform TWA, he explained that,

> "Students experimented with novelty. I improvised the tool using my imagination and creativity. Its success demonstrates the power of AI and how AI can unleash infinite potential. The creativity and novelty of this tool have manifested themselves in a student's comment, that "I never thought I could use "*opopayi*" (cartoons) to teach." This shows that one can learn from anything if people are willing to stretch their imagination. This just shows that AI has the power to encourage educators discover new ways of creating simulations without depending on commercialised ones."

In a simulation shared by Participant 12, students presented Zoom micro-lessons to simulated learners selected from their immediate communities. To simulate real-life context, learners had to be enrolled in a specific grade and subject taught, even though they attended different schools. Each micro-lesson had to have a maximum of eight learners. Participant 12 explained that,

> "I forced myself to come up with creative methods. An example was a simulated classroom in which each student taught a small group of learners drawn from their immediate communities. I posted the simulation instructions on Google Classroom. Students presented and recorded their lessons on Zoom or MS Teams, which learners and I connected to via mobile smartphones, laptops, or tablets. Students presented only one skill and sent reflective reports via Blackboard, email, or WhatsApp. I allowed them to use any digital or AI tool to obtain ideas but warned them about plagiarism."

Regarding the potential for transformation of TWA, Participant 12 mentioned that,

> "Creativity is stimulating for students. Virtual simulations have not been widely explored in TWA, yet they are a change we so desperately need in today's evolving learning and work environments."

Participant 4 explained that in the Sciences, they use the "Alternative to Practical" simulation, which she described as follows:

> "Students present detailed descriptions of the science scenarios in virtual simulated micro classrooms using diagrams and props to simulate science laboratories. These presentations demand high levels of subject matter, innovation, and creativity from students, and a lot of imagination from learners. Learners solve problems as if they learned in a real-life science laboratory. After assessments of video recordings, I provide students with feedback via email, Blackboard, or Google Classroom."

Participant 13 who had also mentioned the "Alternative to Practical" simulation explained the transformative potential of this simulation thus:

> "Unlike TWA where students have the privilege to use equipment in the labs in cases where these resources are available, with this simulation, students dig deep into their creative and innovative capacities. This is good because the 21st century industry requires employees who can think critically, creatively, and innovatively."

The scenarios presented in this section have uncovered a wide array of innovation and creativity that assessors put into VWA. This shows that participants go to great lengths to stretch their imaginative, creative, and innovative capacities to develop VWA strategies capable of transforming TWA.

DISCUSSION

To understand the transformative potential of VWA on TWA, one must look at what the integration of digital technologies and AI in VWA has achieved that TWA could not. During the COVID-19 pandemic, digital technologies and AI became viable tools leveraged in VWA to solve the disorienting dilemma (Mezirow 1978) created by the COVID-19 pandemic in WIL assessment. There is ample evidence in these results to demonstrate the potential for these tools to transform TWA. As reflected in the results of this study, the employment of these tools in VWA empowered participants and students alike.

In TWA, the dominant assessor assesses powerless students' work while they (students) passively receive those scores (Freire 1980). However, during the lockdowns, students used a wide range of digital technologies and AI tools to conduct self- and peer-assessment, which developed their human agency (Bandura 2006) and autonomy (Knowles 1975) to control the assessment processes. The flexibility in VWA, coupled with students' decision-making, reflective skills, and collaboration in peer-assessment, has a potential to transform TWA (Chanda 2023, Nhlumayo 2026, Shambare 2026, Tijani et al 2026). Peer-assessment also grants

students an opportunity to collaborate, thus developing them into a community of practice. Millar (2018) asserts that collaboration is a force for empowerment that promotes creativity, a sense of belonging, and critical and problem-solving skills, all of which can transform TWA.

The use of digital technologies and AI tools in VWA appear to have created many autonomies that TWA did not. In TWA, the omnipresence of the assessor stifles students' autonomy, independence and decision-making whereas their absence in VWA gives students autonomy to score themselves freely. This process reflects two power shifts: (i) A balance of power between students and assessor whereby they share an equal role as assessors, and (ii) A power shift where the assessor relegates his/her dominant role and becomes a guide on the side (facilitator) rather than a sage on stage (King 1993). In addition, students have freedom to ask questions and make comments during virtual debriefing and are more vocal than they normally are in TWA (Participant 14). Moreover, the autonomy of not being physically on WIL sites and of evaluating WIL asynchronously, that is, anywhere and anytime (Participant 1) cannot be equated with the inconvenience of having to be at the WIL sites at a stipulated timeframe associated with TWA. These autonomies, shifts of power, and students' voice embedded in VWA suggest social inclusion and freedom of speech/expression that are not readily available in TWA. These virtues make VWA a just cause that can transform TWA.

To understand what is assessed and how it is assessed in TWA is important. TWA assesses "refined products" whereas in VWA, participants assess high-order skills such as reasoning, and reflective and critical-thinking skills (Participant 7) using an amalgam of digital technologies and AI tools. This shift signals the potential for VWA to transform TWA. Because virtual assessment systems collect learning analytics using AI, students are assessed through objective performance data (Chanda 2023), with a potential to transform the subjectivity inherent in TWA.

Moreover, as shown in the results presented in this article, the creativity and innovation unleashed by digital technologies and AI-generated tools are unparalleled. Without doubt, TWA falls short of the novelty of simultaneously integrating digital technologies and AI tools. It is this novelty in VWA that can revolutionise TWA. As future employees, students need digital technology and AI-driven WIL environments so that they can transfer these skills to the technology-dominated 21st century workplaces. This fact is emphasised by Shambare (2026, 2) when he aptly states that "The accelerating diffusion of artificial intelligence (AI) across industries is reshaping contemporary work."

The empowerment gained from the application of various digital technology and AI tools, coupled with the innovations and creativity employed in VWA, attest to the extent to which

digital technologies and AI can transform TWA. In support of this argument, Shambare (2026) acknowledges that AI substantively transformed (work)place-based WIL.

CONCLUSION

Evolving workplace demands have created opportunities for reimagining TWA. This article has demonstrated that digital technologies and AI make VWA a viable alternative to TWA. VWA provides alternative pathways and broadens access to authentic learning experiences required in today's digital and hybrid workplace. By leveraging technological and AI platforms, virtual simulations, cooperative and collaborative online environments, and autonomy and flexibility, students can gain meaningful assessment experiences and skills that resemble those needed in the contemporary and complex industry.

Digital technologies and AI tools are here to stay. As the higher education, workplace, and students' needs continue to evolve, embracing innovative assessment tools will be indispensable to produce autonomous, accountable, and technologically savvy graduates who can think critically and creatively, solve problems, and cope with the demands of increasingly digital and hybrid work environments and the challenges of the 4IR. This is different from producing graduates who can regurgitate facts. In the final analysis, VWA that leverages technology and AI should not be regarded as a substitute for TWA, but as a catalyst for its transformation.

Universities and policymakers can benefit from this study by formulating WIL assessment policies that prioritise the adoption of digital technologies and AI, and by advocating for technology and AI-enhanced work-integrated learning and assessment models. To be socially inclusive, universities must develop policies that guide the ethical and pedagogical principles of utilising these tools. This study recommends that to fully adopt VWA without leaving students from disadvantaged backgrounds behind, universities must minimise the persistent digital divide. This inclusivity promises to open employability opportunities for all and sundry, and not just for a select few privileged students.

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