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Future-Focused:

Educating in an Era of Continuous Change

From resistance to resilience: A proposed study for supporting VET educators in Virtual Reality Adoption through inclusive professional development

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Virtual Reality (VR) technology is transforming Vocational Education and Training (VET) by providing immersive and engaging learning experiences. However, its successful integration depends not only on technological adoption but also on fostering resilience and adaptability among educators and learners in the face of rapid technological change. This proposed study will explore strategies for upskilling VET educators in VR, focusing on resilience, social-emotional well-being, and supportive professional development (PD). Using a mixed methods approach, this research will combine quantitative surveys and qualitative interviews to examine how VET educators can develop resilience and adaptability in VR-based training and assessments. The study will examine digital competency in Australia's VET workforce by analysing survey data, mapping VR tools for trainers' PD, and evaluating existing VR training opportunities. The study will contribute to strategies ensuring VET professionals equipped with the knowledge and skills needed to thrive in the digital age and the VET sector remains responsive to industry demands to prepare the learners to be part of a dynamic workforce.

Keywords: Virtual Reality (VR), Vocational Education and Training (VET), VET educators, Professional Development (PD)

Introduction

Virtual Reality (VR) technology has significant potential for enhancing training and assessment in the Vocational and Education Training (VET) sector (Freina & Ott, 2015) and can offer VET educators a powerful tool for delivering immersive, engaging, and effective training experiences that enhance learning outcomes and prepare learners for success in diverse industries. This means that VET educators in Australia are increasingly required to integrate digital technologies into their teaching practices, and in order to effectively utilize VR technology for training and assessment, the VET educators need to undergo specific upskilling and training initiatives tailored to VR-based instructions, which may include familiarising with VR technology, understanding the principles of instructional design for VR-based training, technical troubleshooting and pedagogical strategies and instructional approaches that leverage the unique affordances of VR technology (Misha & Koehler, 2006; Pellas et al., 2021). However, existing research indicates that digital competency among VET educators varies considerably, which is a critical factor influencing their acceptance and adoption of new technologies (Antonietti et al., 2023). This variation is influenced by factors such as industry background, prior experience, and access to targeted professional development (PD) (Joyce, 2019).

This proposed study aims to discuss the potential strategies and actions could be implemented to assist building VET educators' capability and competency to effectively utilize VR technology for training and assessment. It will address the research question "What is the position of VET trainers with low-technological-literacy in VR-based vocational training, and how can they be effectively upskilled/reskilled?". The authors will

begin by exploring the current challenges in the Australian VET workforce, discussing the reasons behind each key challenge, and analysing the data from the surveys and interviews conducted on a focus group of VET

trainers and assessors in the VR-based environment. The findings will conclude with a series of strategic recommendations to facilitate a transition from technological resistance to digital resilience, including the implementation of structured digital competency frameworks, VR-enhanced PD programs, and strengthened peer-learning networks for VET educators and identifying their roles in VR-based training environments.

Background

The National Centre for Vocational Education Research report (Wilbrow et al., 2020) found that many VET educators use basic digital tools such as Learning Management Systems and video conferencing, with few trainers proficient in advanced technologies like VR, AI or data analytics. Australian Skills Quality Authority (ASQA)'s 2022 Strategic Review noted that some trainers struggle with pedagogical integration of digital tools, not just technical skills and Joyce (2019) found that older trainers and those in traditional trades like construction and automotive face greater challenges adapting to digital tools and skills in delivery.

Several factors contributed to this digital proficiency gap. The VET workforce has an experienced demographic profile, with 68% of Vocational Education Teachers aged over 45 (Australian Bureau of Statistics [ABS], 2021). While age alone is not determinant of digital capability, Joyce (2019) suggests that older educators and those in traditional trades such as construction and automotive often report lower confidence and greater resistance to adopt immersive technologies compared to younger peers or those in fields like healthcare.

In response, the Australian Digital Skills Organisation's (DSO) framework and the VET Workforce Blueprint (Department of Employment and Workplace Relations [DEWR], 2023) emphasizes mandatory digital upskilling for VET professionals. Pouliou (2024) appeals emergency of the micro-credentials in digital literacy for VET educators, and ASQA has incorporated digital competency into their latest accreditation standards reviews.

Despite these efforts, many VET educators still lack proficiency in advanced digital tools such as Virtual Reality (VR), Artificial Intelligence (AI) and Learning Management System (LMS) which are needed in the training delivery. The NCVER had conducted multi-year studies tracking trends in Australian VET workforce. The NCVER (2023) reported only 32% of trainers felt "confident" using advanced technologies such as VR and data analytics in 2023, despite 89% using basic LMS tools. These statistics show the challenges that VET educators are facing to cope with the rapid growth of digital technologies in their daily training and assessment activities.

Furthermore, access to relevant PD is limited although PD is one of the mandatory requirements for VET educators to maintain their vocational currencies and VET competencies. ASQA (2022) found that only 34% of Registered Training Organisations (RTOs) provided mandatory digital PD for trainers and Productivity Commission (2021) criticized that the national standards for trainer PD were currently lacking. According to NCVER findings, only 44% of VET trainers accessed annual PD and 68% of them reported their time for PD was constrained. These low PD participation rates imply another negative effect that sustains resistance to digital competency development by VET educators.

These factors indicate that there is a continuing need for targeted support. This study focuses on how inclusive PD can address these challenges, specifically enabling VET educators to effectively adopt VR technology.

Theoretical Framing and Methodology

VR as an effective training tool has been adapted in many industries in the VET sector, providing valuable immersive training experiences for learners (Freina & Ott, 2015). It also can be an effective method to assist the VET educators with their currency and PD to fulfill the regulatory requirements while addressing digital competency gaps (Mikropoulos & Natsis, 2011). To evaluate this proposition, this study will adopt a mixed-methods design, aligning with the framework of technological pedagogical content knowledge (TPACK)

(Mishra & Koehler, 2006), which emphasizes the intersection of technology, pedagogy, and subject-specific expertise in educator training.

The digital capacity gap among VET educators emerges as a critical barrier to effective VR implementation, as highlighted by Xu et al. (2024) in their study on VR-enhanced assessment design. Their work-in-progress research demonstrated that successful VR adoption requires trainers and assessors to develop dual competencies of technical proficiency in navigating immersive environments and pedagogical expertise in adapting assessment principles to virtual contexts. This aligns with the TPACK framework (Mishra & Koehler, 2006), which emphasizes the intersection of technological, pedagogical, and content knowledge. Xu et al.'s (2024) findings particularly underscored VR's potential to address ASQA's principles of Assessment through enhanced authenticity and flexibility, while simultaneously revealing challenges in VET educators' readiness. Their research substantiated the claim that targeted PD programs must address not only skill deficits but also institutional barriers to technology integration, thereby informing this proposed study's focus on developing inclusive and practice-oriented PD solutions.

Building on Xu et al.'s (2004) mixed-methods approach, this study will employ a three-phase design while expanding its scope to address PD relevant challenges. The authors will conduct qualitative interviews with the trainers who work in the VR-based environment to identify pain points in technology adoption, particularly focusing on their reported struggle which hold back their digital competences and hinder their participation and completion of the related PD sessions. The study will extend beyond assessment design to investigate broader PD accessibility factors through quantitative surveys measuring trainers' preferences for PD program duration, delivery modes, frequency and institutional support needs. Xu et al.'s (2024) proposed *VR-Assessment Alignment Matrix* will be adapted to evaluate how PD programs can bridge competency gaps across TPACK domains, with added emphasis on resilience-building strategies for low-digital-literacy educators. Where Xu et al. (2024) primarily examined assessment validity, this research will contribute insights into scalable PD models that align with both ASQA standards and the realities of time-constrained VET educators, thereby addressing their theoretical findings.

Research Design

The research design comprises three phases:

- **Phase One:** Collecting data from Semi-structured interviews with 5-10 VET trainers experienced in VR-based instructions to explore digital competency needs for VR-enabled teaching such as 3D environment navigation and data analytics, and barriers to PD programs participation including time constraints, or lacking institutional support (Guskey, 2002).
  Conduct a Likert-scale survey distributed to 50 -100 VET trainers to assess the preferences for PD duration, delivery modes and accessibility (Desimone, 2009), and perceived utility of VR for their own upskilling (Davis, 1989)

- **Phase Two:** Analysing data the interview transcripts with thematic analysis (Braun & Clarke, 2006) to identify common technical challenges. Survey data will be analysed using descriptive statistics for example mean scores for PD preferences and regression analysis to predict engagement drivers.

- **Phase Three:** Drawing on the framework synthesis and mapping the findings with VR's affordances to VET trainers' PD needs.

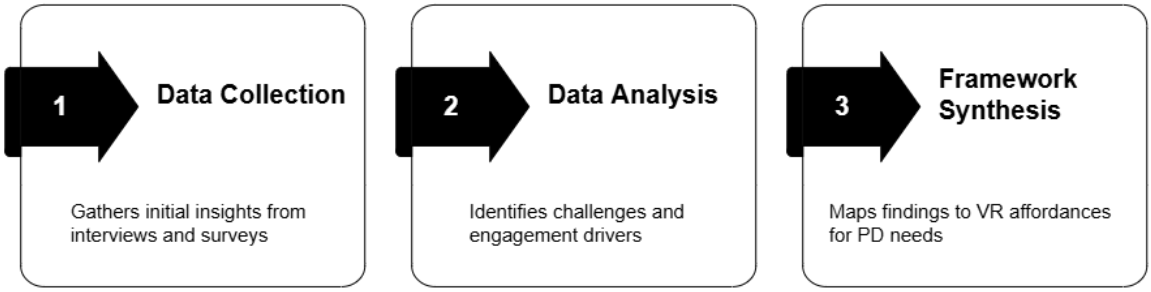

Figure 1: Research phases from exploration to application of findings

Data Analysis

The study will employ a sequential mixed-methods approach to analyse both qualitative interview data and quantitative survey responses, guided by the TPACK framework (Misha & Koehler, 2006). Thematic analysis will be conducted on interview transcripts to identify key patterns in VR-related training competencies and PD barriers. An inductive coding process will be utilized to surface emerging themes related to technological skills like VR environment navigation, pedagogical approaches for immersive learning and content-specific implementation challenges. These qualitative findings will inform the interpretation of quantitative survey results examining VET educators' preferences for PD program structure, delivery methods, and perceived value of VR technology for their professional growth.

The statistical analysis on the responses of survey will include both descriptive techniques to summarize PD preference trends and inferential methods to examine relationships between variables such as trainer's demographics, digital literacy levels, and VR adoption rates. The integrated findings will be mapped to the three TPACK knowledge domains, revealing how VR can address specific competency gaps while accommodating diverse PD needs. This dual analysis approach will yield both qualitative insights about implementation challenges and quantitative evidence about optimal PD design. Findings from both methods will be triangulated to map VR's affordances against VET educators identified needs and highlight how immersive technologies can address PD inclusivity and flexibility challenges. The outcome will provide answers to the question of how VR can serve as both a training tool for learners and a transformative PD platform to foster digital resilience among VET educators.

Conclusion and Future Work

This study emphasizes the critical need to support VET educators from resistance to resilience in adopting VR technology through inclusive, tailored professional development programs. While VR offers transformative potential for immersive and engaging vocational training, it also has significant limitations that can hinder its effectiveness. The effective implementation of VR technologies in VET educators' PD programs requires financial consideration for installation expense and ongoing maintenance, blended PD programs with VR modules and in-person mentoring and partner with industry to co-develop modules. Future efforts in the study will research on accessible and hands-on training solutions that address both technical and cultural barriers to ensure VR integration align with the diverse needs of Australia's VET workforce.

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