

Incorporating Immersive VR Into Source-Based Writing: Perceived Affordances and Observed Effects on Source Integration Content and Forms

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ABSTRACT

Previous research into source-based writing by undergraduate post-novice L2 writers mainly focused on source integration techniques and perceived challenges. This study examined the effects of incorporating VR technology in practicing multi-modal source-based writing, using a pre-experimental study with 12 university student participants. Survey and interview results showed that most students regarded 2D and 3D VR as helpful for enhancing their writing motivation and learning effectiveness, with 3D VR regarded as more helpful; long-term benefits on source engagement, selection, and categorization were perceived, along with drawbacks of limited applicability to specialist content. Text analysis of the two tests revealed that nearly 70% of students improved competence in selecting relevant sources, accurately presenting source information, and summarizing source information. However, VR seemed to have little impact on developing students' ability to analyze source information.

KEYWORDS

Virtual Reality, Immersion, Source-Based Writing

INTRODUCTION

In the realm of academia, English writing competence plays a vital role. English often serves as the medium of instruction, making the ability to integrate sources in academic writing a reflection of a student's academic literacy and an essential skill for effective scholarly communication (Du, 2019; Galloway & Uccelli, 2019). Source integration is a multifaceted process that encompasses different skills such as reading comprehension, notetaking, summarizing, paraphrasing, and citing, all of which are fundamental to the development of a robust academic argument (Pecorari, 2003; Shi, 2004). Effective source integration in academic writing requires the writer to comprehend, evaluate, and synthesize information from multiple sources. The capacity to adeptly utilize sources is crucial to the quality of writing in second-language contexts and serves as a strong predictor of academic success

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in higher education (Homayounzadeh et al., 2019; Plakans & Gebril, 2013; Weigle & Parker, 2012). In addition, the ways students engage with source materials, such as the amount of text borrowing from source texts and their processing of the content, can predict performance on reading-to-write tasks (Plakans & Gebril, 2013). It is thus crucial to investigate how students use source materials in academic writing and their implications for writing quality.

However, the journey to mastering source integration is fraught with challenges for both native and nonnative English speakers. These challenges often stem from a lack of understanding of academic conventions, limited language proficiency, and inadequate instructional support (Cumming et al., 2016; Liu et al., 2016). In the context of second-language writing, these challenges are further magnified by the need for second-language writers to navigate additional linguistic and cultural subtleties (Leki & Carson, 1994, 1997). They must cultivate a profound understanding of the rhetorical strategies and discourse conventions that govern academic writing in English while also grappling with the technicalities of citation and paraphrasing (Shi, 2012).

Traditional pedagogical approaches to teaching source integration, such as focusing on techniques of paraphrasing and summarizing, have their merits but may not fully cater to the diverse needs of students. Notably, most activities aiming at teaching source use are text-based and rarely involve the use of visual and spatial resources, while the need to integrate visual and multimodal information is pressing in the future academic writing domain (Jin et al., 2025). Source-use competence needs to be continuously developed even for post-novice writers, and they need to move beyond linguistic and formulaic dimensions, incorporating multimodal activities and engaging in writing holistically (Wette, 2017).

With the rapid evolution of technological tools and platforms, there is a growing interest in adopting innovative educational tools to enhance learning experiences. An early study by Britt and Aglinskias (2002) highlighted how the Sourcer's Apprentice, a computer-based tutoring system designed to enhance students' source-use ability, improved students' competence in sourcing, contextualization, and integration, leading to more citations. More recently, virtual reality (VR) stands out for its potential to offer immersive and interactive learning experiences, which provides important scaffolds for multimodal source-based writing and potentially addresses the weaknesses of traditional teaching methods in source-based writing. Specifically, the visual and spatial resources afforded by VR offer a concrete, engaging alternative to abstract, text-only source materials, thereby enhancing source comprehension and potentially reducing the cognitive load typically associated with synthesizing complex sources (Y. Chen et al., 2019; Ebadijalal & Yousofi, 2022; Shen et al., 2025). The literature highlights that VR-based learning environments and immersive experience can extensively boost student engagement, promote independent learning, and increase motivation among language learners. These features may benefit experiences of source-based academic writing as well, which are usually regarded as difficult and monotonous. Currently, there remains a research gap in exploring VR's role in facilitating students' source use in academic writing, which called for further research in this area.

This paper, therefore, aimed to explore the potential of VR in facilitating source integration in academic writing, with a focus on the role of instructional interventions in enhancing students' writing experience, especially motivations, technology usefulness, and source-use competence. This paper discusses implications for pedagogy and future development of innovative learning strategies that can better prepare students for the demands of academic writing in the digital age.

LITERATURE REVIEW

Theoretical Basis: Technology Acceptance Model and Cognitive Affective Model of Immersive Learning for VR-Enhanced Education

To establish the foundation for this study, it was necessary to first situate the use of immersive VR within the broader landscape of language-learning technologies. VR has been implemented in

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