

Journal Article

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From Slate to Screen: Primary Learning Building Interactive Heritage Resources through 360° and Green Screen tools

Julian Ayres and Monty Kennard

Abstract

This case study outlines the implementation of 360° cameras, green screen and online immersive space tools helped a Welsh primary school in collaboration with Wrexham University and the National Slate Museum in Llanberis as part of the Welsh Collaborative for Learning Design (WCLD) group funded by the Welsh Government to create an online heritage time capsule tool during the museum's three-year restoration closure. The ambition of the project being to utilise new and emerging technologies to help engage the learners in furthering their connection to their local history whilst developing skills as part of the Digital Competence Framework (DCF).

Keywords: Immersive Technology, Education, Curriculum for Wales, Digital Competence Framework, Digital Skills, Pedagogy, Teaching.

Introduction

The Welsh Collaborative for Learning Design (WCLD) has been established to enhance the capacity of education settings to integrate digital tools effectively within teaching and learning (Welsh Government, 2022). This remit aligns with national priorities set out in the Curriculum for Wales guidance (Welsh Government, 2020) and the DCF (Welsh

Government, 2018), which emphasise digital innovation as central to developing learners who are creative, confident, and ethically informed citizens.

This project was developed in partnership with the National Slate Museum in Llanberis, Wales, during its closure for restoration, and with staff at Wrexham University. Funded through the WCLD, it involved collaboration with a local primary school to create an online "time-capsule" virtual-reality tour resource. This resource integrated students' digital outputs such as Welsh-language songs, artwork, and presentations with immersive technologies, including 360-degree cameras and interactive platforms.

In doing so, the initiative not only promoted digital engagement but also celebrated Welsh language, history, and culture, supporting the Welsh Government's ambition for an integrated, holistic approach to curriculum design (Welsh Government, 2024).

Literature and Theoretical Context

In the Welsh educational context, immersive technologies align seamlessly with the Curriculum for Wales, which emphasises creativity, collaboration, critical thinking, and problem-solving through digitally enhanced experiences (Welsh Government, 2020).

Immersive technology, defined as technology that seeks to emulate aspects of the physical world through digital simulation and sensory engagement (Pavithra et al., 2020), has been widely recognised for its value in enhancing learners' engagement, motivation, and confidence in working with new and emerging technologies (Best et al., 2024; Tenorio and Chua, 2025; Tene et al., 2024).

In the Welsh educational context, these technologies align with the Curriculum for Wales, which prioritises creativity, critical thinking, and problem-solving through

digitally enhanced experiences (Welsh Government, 2020). The Digital Competence Framework further underscores the need for learners to develop digital proficiency to navigate a technology-driven society (Welsh Government, 2018).

Collaborative learning, a cornerstone of effective pedagogy, fosters group interaction and knowledge exchange helping to enhance digital competencies critical for modern education (Best et al., 2024; Tenorio & Chua, 2025). Within the Welsh educational framework, collaborative practice is emphasised as vital for developing learners' critical and analytical skills (Welsh Government, 2024). Grounded in constructivist theory, which positions learners as active creators of knowledge, this approach aligns with digital pedagogy to integrate immersive technologies into culturally relevant education (Welsh Government, 2020). By utilising immersive technology tools such as 360° cameras and interactive platforms, this framework bridged theoretical principles with practical application, enabling learners to construct meaningful, context-driven knowledge that reflects their cultural heritage and community identity (Welsh Government, 2018).

Methodology and Project Design

The project was conducted in partnership with a primary school local to the museum with the aim of positioning pupils as co-creators and documenters of their own heritage, while also encouraging them to recognise and value the significance of their local area. The design emphasised both technological engagement and creative participation, ensuring that pupils developed technical competencies alongside opportunities for cultural expression. By situating the project in their own community context, pupils were able to see their surroundings as meaningful sites of learning,

memory, and creativity. Technology was treated not as an end but as a mechanism for child-led, multidisciplinary learning.

The methodology centred on the use of 360° cameras (Insta360 X3), the platform 'ThingLink' and open-source 360° web tools, enabling the development of the immersive, interactive environment. Learners were introduced to the technical processes of capturing 360° imagery and green screen video and were supported in producing original creative artefacts, including songs, artwork and presentations that could be embedded within the digital space. This combination of technical practice and creative contribution promoted digital literacy, engagement with heritage themes and reflective decision-making.

The project workflow included curating and editing visual and audio materials, integrating them into navigable 360° environments, and customising interactive hotspots to reflect learner contributions (See Image 1).



Image 1: Home screen and contents of the National Slate Museum VR tour

Ethical considerations shaped every stage of the project. Safeguarding measures included producing two versions of the time capsule: one restricted, containing children's creative outputs for school-use only and one public, free of identifying content. This approach safeguarded participants while ensuring their contributions remained central to the resource. Additionally, parental permission for filming was sought throughout the process with data stored securely and used for the clearly defined, original intention.

By combining immersive technologies with learner-developed content, the project demonstrated how primary learners can move from passive engagement to become active facilitators of their own learning where technology drives a passion for culturally relevant investigation. The project illustrates the potential for partnerships between schools and cultural institutions to generate interactive, sustainable, and ethically grounded educational resources.

Findings and Reflections

The project generated high levels of motivation and engagement among pupils. For many, the most meaningful aspect was not in the novelty of the technologies but the opportunity to create, to collaborate, and to showcase their knowledge in new and expressive ways. This sense of ownership highlights a central finding: immersive tools function best as enablers of creativity rather than as goals in themselves.

In terms of digital literacy, pupils gained practical skills in using 360° cameras and green screen technologies. However, they had less involvement with the editing processes and the integration of multimodal content into the interactive environment, which limited their understanding of the full production process. Alongside technical skills,

learners also developed key transferable skills, including teamwork, problem-solving, and reflective evaluation.

Despite an initial positive engagement, recognising that the project clearly aligned with primary curriculum content and offered opportunities for cross-curricular learning and heritage preservation, some teachers became disengaged during the final processes due to workload and scheduling conflicts, resulting in challenges surrounding summative organisation and communication.

Despite these challenges, the multi-phase approach provided a concrete means of linking curriculum content with creative media and resulted in opportunities for cross-curricular learning and heritage preservation for all those who engaged. The project showed how creative media can extend classroom learning into broader community contexts, both geographically and across time.

Technical barriers also occurred. Green screen work was constrained by lighting, space, and equipment limitations, while digital platform selection raised concerns regarding cost, usability, and safeguarding. Affordable tools often lacked user-friendliness, while subscription-based platforms created problems around sustainability and privacy.

These issues underline the importance of secure, accessible platforms for future projects. Though the software 'ThingLink' was initially selected for its accessibility and features, it presented challenges related to privacy and cost. We therefore shifted to open-source alternatives, which reduced subscription barriers, but relied heavily on technical expertise which limited both children and the teacher's direct involvement in the digital construction due to the need for technologically specific training being required.

The benefits of the use of immersive technology in this context, from an experiential point of view are clear. Pupils responded with enthusiasm and instinctive adaptability, suggesting that exposure to such tools lays a foundation for navigating an increasingly digital world. At the same time, reflection is needed on how far immersive technologies should shape formal education, given concerns around privacy, dependency, and wellbeing.

Discussion

This project effectively bridged theoretical frameworks such as digital pedagogy and constructivism with practical classroom implementation. Rooted in constructivist principles, it positioned the pupils as active co-creators of knowledge, using immersive technologies like 360° cameras and 'ThingLink' to construct meaningful representations of their local Welsh heritage.

By situating technology within community contexts, the initiative aligned theory with practice, enabling pupils to recognise their surroundings as sites of cultural significance and personal expression, rather than treating tech as an isolated tool.

For emerging educator-researchers in digital and immersive tools, the project offered valuable insights into balancing technological novelty with pedagogical depth. It highlights practical challenges like platform usability and teacher engagement, urging future studies to prioritise ethical safeguards and inclusive workflows. Researchers can build on its findings to explore scalable models that enhance motivation through ownership, while addressing limitations in full-cycle involvement to deepen understanding of immersive technology's role in constructivist education.

Conclusion and Future Directions

This project significantly enhanced learner motivation, digital literacy, and skills such as collaboration and problem-solving, positioning pupils as active documenters of Welsh heritage (Welsh Government, 2020). Teachers benefited from cross-curricular opportunities integrating creative media with curriculum goals (Welsh Government, 2024), though challenges in engagement highlight the need for targeted professional development. The wider community gained a sustainable, interactive resource preserving local cultural sites, fostering intergenerational connections and regional identity.

The project's framework demonstrates scalability for other Welsh heritage sites, such as castles or industrial landmarks, through school partnerships. Future directions also include embedding the time capsule in museum exhibits for ongoing engagement, supported by community-driven updates.

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