



Reaching for The Virtual Horizon

A Vision for Immersive Learning Adoption Across Scottish Education

Executive Summary

Scotland's education system has long championed excellence, equity, and innovation. From the Curriculum for Excellence to ongoing efforts in digital inclusion and closing the attainment gap, Scottish schools and universities continually adapt to prepare young people for a rapidly changing world.

Today, as digital technologies reshape every sector, immersive learning—powered by virtual reality (VR), augmented reality (AR), extended reality (XR), and metaverse-like environments—stands out as one of the most promising frontiers.

This report proposes a compelling vision for widespread adoption of immersive technologies across Scottish education, grounded in emerging evidence, existing Scottish initiatives, and practical pathways forward.

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National Strategy for Immersive Learning

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The Promise of Immersive Learning

Immersive technologies transport learners beyond the confines of textbooks, screens, or even physical classrooms.

Students can “visit” ancient Rome, explore the human body at a cellular level, dissect virtual frogs safely, or walk through Iron Age Scottish brochs. These experiences create a powerful sense of presence and agency that traditional methods struggle to match.

Research consistently highlights key benefits:

- **Enhanced engagement and motivation:** VR lessons often generate higher positive emotions, time-on-task, and enjoyment compared to textbooks or videos.
- **Improved knowledge retention and skill development:** Meta-analyses show advantages in knowledge acquisition and practical skills, particularly when using head-mounted displays (HMDs).
- **Equity and accessibility:** Immersive tools can level the playing field for rural, remote, or disadvantaged learners by providing virtual field trips and simulations that would otherwise be logistically or financially impossible. They also support diverse needs, including experiential learning for those with mobility challenges.
- **Preparation for future skills:** Exposure to XR builds digital literacy, spatial reasoning, collaboration in shared virtual spaces, and creativity—skills increasingly valued in Scotland's green economy, tech sector, and care industries.

In Scottish contexts, early adopters already demonstrate potential. The University of Glasgow has integrated VR into life sciences programs, including multi-user suites for undergraduate and postgraduate teaching, with dedicated research into VR-by-proxy simulations for disease diagnostics.

Secondary schools, such as Forfar Academy, have explored metaverse tools to build

workplace-relevant skills. Broader initiatives like the Scoping Extended Educational Realities (SEER/XRed) project at the University of Glasgow have produced white papers outlining transformational opportunities alongside realistic roadmaps for 2030s classrooms.

Alignment with Scotland’s Educational Priorities

Scotland’s policy landscape provides fertile ground for immersive learning. The National Improvement Framework emphasizes digital technology to enhance learning and teaching, tackle inequality, and build a digitally skilled workforce—explicitly referenced as Outcome 7.

Work is underway on a refreshed digital strategy for school education in partnership with COSLA and stakeholders, with infrastructure, devices, connectivity, and workforce skills as core pillars.

These align closely with immersive technologies:

- Closing the attainment gap through engaging, personalized experiences that particularly benefit disengaged or disadvantaged learners.
- Learning for Sustainability and Scotland’s natural capital via virtual explorations of the Highlands, marine environments, or climate scenarios.
- Health and wellbeing, where controlled VR can support mindfulness, empathy-building, or safe practical training (e.g., healthcare pathways with 360-degree NHS simulations).
- Teacher professionalism and innovation, supported by new hubs like the Scottish Government-funded Digital Education and AI Hub, which can extend to immersive pedagogies.

Scotland’s rural geography and commitment to equity make immersive tools especially relevant. Virtual field trips reduce transport costs and carbon footprints while giving every pupil—whether in the islands, Highlands, or urban estates—access to world-class experiential learning.

Current Momentum and Pioneering Efforts

Scotland is not starting from zero. Projects using ClassVR and similar platforms have appeared in various schools, while metaverse explorations allow persistent 3D worlds for collaborative building and role-play.

The University of Glasgow’s XR deployments in both higher education and secondary/primary pilots offer valuable lessons on classroom management, equity, health considerations, and teacher preparation.

Initiatives like e-Sgoil demonstrate Scotland’s capacity for innovative digital delivery across dispersed communities, providing a model that immersive technologies could scale further. Broader digital infrastructure efforts—devices, connectivity upgrades, and the eventual successor to Glow—will form the backbone for immersive rollout.

Challenges on the Path to the Horizon

Widespread adoption faces real hurdles that must be addressed head-on:

1. **Cost and infrastructure:** Headsets, content development, and reliable high-speed connectivity remain expensive, especially for smaller or rural schools. Budget constraints and competing priorities are common barriers.
2. **Teacher confidence and training:** Many educators lack familiarity with immersive tools or time to integrate them meaningfully. Pedagogical integration (Technological Pedagogical Content Knowledge) requires targeted professional learning.
3. **Equity and inclusion:** Ensuring devices and experiences do not widen gaps; addressing health/safety concerns (e.g., motion sickness, screen time); and providing technical support.
4. **Content and standards:** High-quality, curriculum-aligned Scottish-relevant content is needed, alongside evaluation frameworks to measure impact.
5. **Change management:** Rapid technological evolution can outpace policy and practice; clear roadmaps and risk mitigation (from the XRed report) are essential.

These are not insurmountable. Evidence from early implementations shows that structured training, shared national resources, and phased pilots can build momentum while managing risks.

A Practical Vision and Roadmap for Scotland

To reach the virtual horizon, Scotland should pursue a coordinated, ambitious yet pragmatic strategy:

- **National Framework for Immersive Learning:** Integrate XR into the forthcoming digital strategy for schools, with clear goals for adoption by 2030, aligned to Curriculum for Excellence.
- **Infrastructure Investment:** Prioritize equitable device and connectivity access, exploring shared regional VR hubs or “VR-by-proxy” models that reduce per-school hardware needs.
- **Teacher Empowerment:** Expand professional learning through the Digital Education and AI Hub and Education Scotland, including hands-on XR modules in Initial Teacher Education (ITE) and ongoing CPD. Develop communities of practice for sharing immersive lesson designs.
- **Content and Partnership Ecosystem:** Commission or incentivize Scottish-produced immersive content (e.g., Highland history, marine science, climate action). Partner with universities (Glasgow, Edinburgh, Strathclyde), industry (tech firms, creative sector), and organizations like ClassVR or Soluis.
- **Phased Implementation:** Start with targeted pilots in STEM, history, geography, and vocational pathways (healthcare, construction). Evaluate rigorously for engagement, attainment, and wellbeing outcomes. Scale successes while iterating on challenges.
- **Equity and Ethics First:** Embed inclusive design, data protection, online safety, and accessibility standards. Address digital poverty and ensure immersive experiences complement—not replace—human connection and outdoor learning.

- **Monitoring and Research:** Leverage Scottish universities' strengths in XR research to track long-term impacts and inform policy.

Illustrative future scenario (inspired by XRed visions): In 2035, a mixed primary-secondary class in a rural Highland school explores Iron Age Scotland.

Some pupils wear lightweight XR headsets to “walk” a reconstructed broch; others collaborate in a shared virtual space from tablets; the teacher facilitates discussion linking archaeology, sustainability, and local heritage. All contribute to a class-created digital twin of their landscape.

Conclusion: Seizing the Moment

Scotland has the policy vision, research expertise, innovative spirit, and commitment to equity needed to lead in immersive education.

Reaching the virtual horizon will not happen overnight, but with coordinated action—investing in infrastructure, empowering teachers, developing relevant content, and learning from pioneers—we can transform learning experiences for every child and young person.

The horizon is not a distant dream; it is within reach. By embracing immersive technologies thoughtfully and inclusively, Scottish education can ignite curiosity, deepen understanding, and equip future generations to navigate and shape an increasingly complex world. The time to reach for it is now.

This vision draws on ongoing developments as of early 2026. Continued collaboration across government, local authorities, educators, universities, and industry will be key to turning potential into reality.