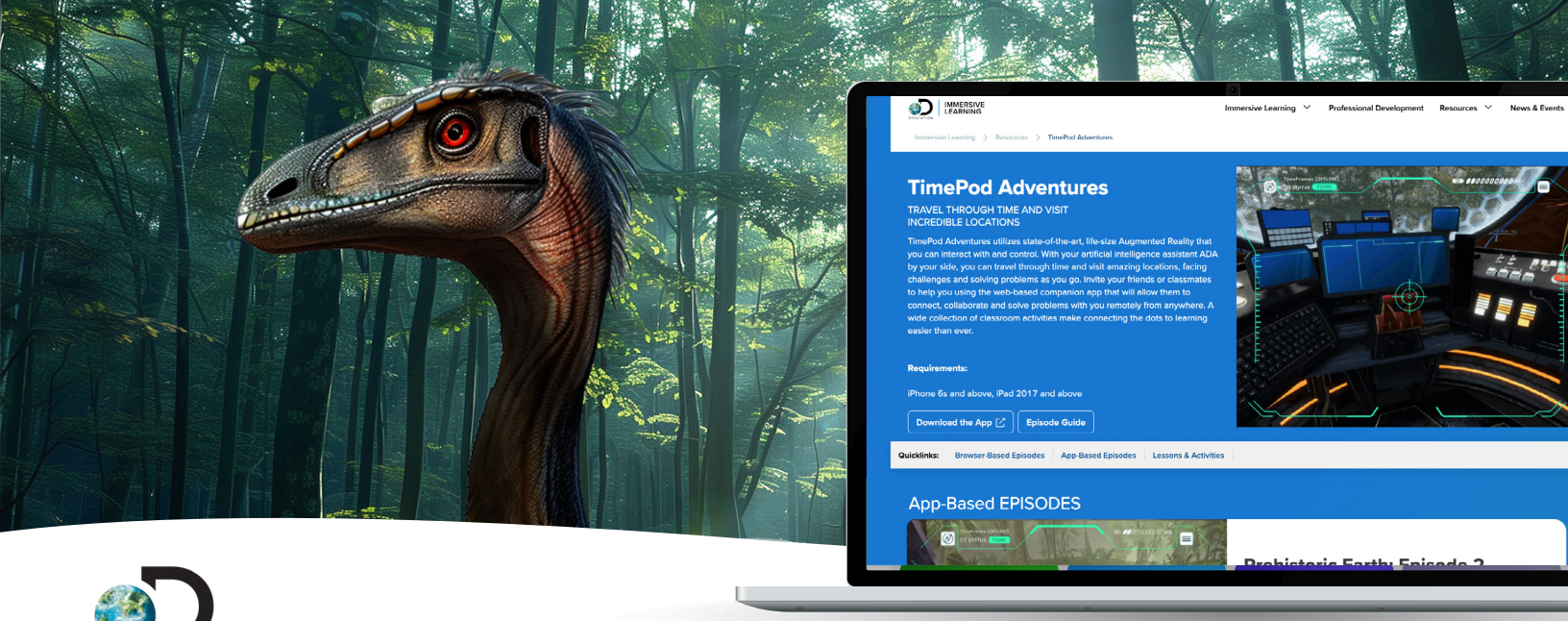

EDUCATION

Immersive Learning as an Instructional Game Changer

Unlocking the Full Potential of Instructional Technology in K–12

Executive Summary

This paper provides district leaders with a strategic roadmap for integrating immersive learning into K–12 instruction. Grounded in national surveys, peer-reviewed research, and global education policy, it showcases a scalable model that elevates engagement, broad access, and instructional relevance, and also provides clear guidance for embedding immersive technologies strategically and sustainably.

Key Takeaways

- Immersive learning boosts student engagement, comprehension, and real-world connection.
- The 2025 Immersive Technology Survey revealed strong educator confidence in immersive technology's potential, with 84.1% agreeing it can improve student engagement and understanding of content. While 66.5% of respondents had not yet used immersive technology in the classroom, they indicated they would if it were available, signaling untapped demand.
- When embedded into instruction, immersive tools transform screen time into active, inquiry-driven learning.
- Educators are ready to adopt immersive tools but need aligned curriculum, support, and training.
- The Verizon–Discovery Education model provides standards-aligned immersive content that is easy to access and integrate.
- Resources include virtual field trips, augmented reality experiences, and interactive 3D content built for classroom use.
- Districts that act now are well-positioned to lead the shift toward future-ready instruction grounded in both innovation and broad access.

What Is Immersive Learning?

Immersive learning integrates interactive, technology-enabled experiences that go beyond lecture-style instruction, encouraging active participation, critical thinking, and real-world application. Immersive learning often refers to instructional experiences that use advanced technologies to place learners in interactive, multisensory environments where they can explore, experiment, and learn by doing. Unlike traditional screen-based lessons, immersive learning creates simulated or enhanced experiences that promote deeper engagement, contextual understanding, and active learning.

Immersive learning integrates interactive, emotionally engaging, and cognitively stimulating experiences into instruction, going far beyond lecture-style or screen-based teaching. It's not defined by any single technology. Instead, immersion is a feeling; a state of focused attention and deep involvement in which learners lose track of their surroundings because they are cognitively, emotionally, and sensorially engaged. Most people have experienced immersion while playing a game, solving a puzzle, or getting lost in a good story.

In education, immersive learning leverages this phenomenon to enhance focus, memory, and meaning-making. Drawing on principles from cognitive psychology, immersive learning activates what researchers call "cognitive attractor states," moments when attention is so strongly engaged that the brain filters out distractions and locks into learning. When this happens, new information is more likely to be retained, linked to prior knowledge, and made personally relevant.

Importantly, immersive learning doesn't require headsets or futuristic hardware. While it can be enabled by emerging technologies like virtual reality (VR) and augmented reality (AR), it can also be achieved through game-based experiences, scenario-driven learning, storytelling, simulations, and other inquiry-based digital formats, all of which can run on the devices schools already have.

While immersive learning is grounded in pedagogy, not just tools, the following technologies can deepen its impact:

- **Game-Based Learning**: Uses challenges, competition, and narrative to drive motivation, spark curiosity, and support mastery through repetition and feedback loops. While external motivators like points or rewards can spark initial engagement, the real power of game-based learning lies in nurturing intrinsic motivation: the inner drive to learn for the sake of mastery, curiosity, or enjoyment. Intrinsic motivation is more powerful and longer lasting, and games fuel it by creating experiences where learners feel autonomy, purpose, and satisfaction from their own progress.
- **Virtual Reality (VR)**: Simulates a fully digital environment that learners can explore, enhancing spatial awareness and contextual understanding. Because the real world is completely replaced with a digital one, VR is the fastest way to create an immersive moment. With no competing visual input, learners are instantly transported into a new environment, making it easier for the brain to accept the illusion as real. This, along with feeling the ground beneath their feet as they turn and explore, leads to stronger connections and longer-lasting memories.
- **Augmented Reality (AR)**: Layers digital content onto the real world to highlight connections between abstract concepts and physical surroundings. Viewing 360-degree objects and environments in AR allows learners to walk around and explore from every angle, which helps them understand scale and perspective more effectively. Provided the illusion doesn't break no matter which way they look at the image, the brain can invest fully in the learning moment due to the autonomy and the inclusion of their senses.
- **Mixed Reality (MR)**: Combines real and virtual environments in real time, allowing for interactive and adaptive experiences. Learners can manipulate digital objects as if they were physical, fostering hands-on exploration and collaboration with peers in the same environment. This blend of physical and digital makes the experience feel more dynamic and authentic, and the ability to manipulate objects mirrors the real world, creating new experiential learning opportunities.
- **Extended Reality (XR)**: Encompasses the full range of immersive tech across different platforms. It provides educators with flexibility to choose the right level of immersion for their goals, whether that's a quick AR interaction or a fully immersive VR field trip.
- **Artificial Intelligence (AI)**: Powers adaptive feedback, real-time language translation, and intelligent tutoring to personalize learning pathways. The more natural, real, and personalized the interaction feels, the more believable the scenario becomes. AI-driven responses avoid a "scripted" feel that can break immersion, keeping learners engaged in authentic and meaningful ways.

At its best, immersive learning transforms passive screen time into active cognitive engagement. Instead of simply reading about photosynthesis, students manipulate it. Rather than just hearing about historical events, they explore cause and effect through dynamic simulations. Whether through VR or rich digital storytelling, immersion helps students connect more deeply to content and build the focus, curiosity, and persistence needed for real-world problem-solving.

From Access to Impact

K–12 education stands at a pivotal moment. Districts face growing pressure to accelerate learning, boost student engagement, and prepare young people for a rapidly evolving, innovation-driven world. With technology now a regular part of most classrooms, the conversation is shifting toward how best to use these tools to drive deeper learning and meaningful outcomes. The focus is on delivering relevant, hands-on, and real-world–connected instruction that meets rigorous academic standards while engaging students in authentic problem-solving.

Immersive learning provides a clear, evidence-based path forward. Technologies such as virtual and augmented reality transform screen time into meaningful engagement, turning passive consumption into active exploration. Early adopters of high-quality immersive learning are leading the way toward a reimagined academic experience that breaks down subject silos and helps students integrate knowledge more deeply. In these environments, students engage with cross-curricular academic content aligned to rigorous standards while exploring a wide range of virtual settings, many of which mirror real-world scenarios. As districts incorporate immersive learning into their instructional programs, they are forging a new kind of K–12 experience that reflects the demands of today's world and prepares students for the challenges ahead.

Immersive Learning as a Core Instructional Strategy

Immersive learning is emerging as a transformative approach to K–12 instruction, aligning with pedagogical goals to deepen engagement, build critical skills, and close persistent learning gaps. Unlike surface-level digital content, immersive experiences enable students to construct knowledge by interacting with authentic, context-rich environments. While empirical studies have focused largely on higher education, the pedagogical principles they affirm, such as embodiment, situated cognition, and sensory engagement, are foundational to learning at any age.

Engagement, Retention, and Readiness

Engagement is a powerful predictor of student well-being and future confidence: the most engaged students are more than four times as likely to strongly believe they have a great future ahead and ten times as likely to feel prepared for it. The 2024 *Gallup-Walton Family Foundation Voices of Gen Z* study reveals a troubling decline in school engagement among Gen Z students, with fewer than half strongly agreeing that their coursework challenges them or reflects their strengths and interests. These findings underscore that when students feel interested, challenged, and supported, especially through hands-on, real-world learning, they not only engage more deeply but also build the optimism and readiness needed to thrive.[1]

Immersive learning is a critical lever in facilitating deep engagement in learning. As students navigate 3D cell models, simulate tectonic shifts, or manipulate molecules in real time, they aren't simply consuming content—they're actively constructing knowledge. This kind of presence, agency, and interaction leads to deeper learning and long-term retention.

Strong Outcomes from K–12 Classrooms

A growing body of research confirms the effectiveness of immersive learning in K–12 education both as a catalyst for engagement and a driver of student achievement. Research in K–12 STEM environments has shown that immersive technologies positively impact student engagement and performance in STEM education, with many studies highlighting benefits such as improved comprehension, motivation, and collaboration.[2] A systematic review of 117 empirical studies found that VR/AR technologies in K–12 STEM education improved academic achievement, motivation, and self-efficacy, particularly for elementary students. Most effective strategies included situated, task-based, and game-based learning.[3] Research also demonstrates that immersive technologies enhance learning and motivation in both K–12 and higher education by enabling first-hand, experiential learning.[4]

Immersive digital environments were found to have a strong positive impact on student outcomes when applied to STEM instruction. A meta-analysis of 49 studies specific to the use of immersive technologies in K–12 settings showed a large positive effect on academic achievement and a moderate effect on student perceptions of STEM learning, with the strongest gains seen among elementary students learning science. VR and AR technologies, along with inquiry-based pedagogical approaches, were especially effective in improving students' perceptions.[5]

In a classroom-specific example, one study showed that middle-school students who took a VR-based field trip to Greenland as part of a climate change module showed significantly greater presence, enjoyment, and both immediate and long-term learning gains compared to peers who watched the same content in 2D, highlighting how immersive media can enhance affective engagement and retention when embedded within inquiry-driven instruction.[6]

Reinforcing Principles from Higher Education

While the most robust K–12 evidence is emerging, complementary research in higher education reinforces the pedagogical foundations of immersive learning. One study found that engineering students in VR-based simulations reported higher learning efficacy and stronger presence compared to those using traditional digital tools.[7] Another similarly showed that embodied VR environments led to significantly greater gains in comprehension and retention than non-embodied VR formats.[8] In the healthcare domain, an analysis synthesizing findings from immersive medical education found that virtual-, augmented-, and mixed-

1 Gallup and Walton Family Foundation. Voices of Gen Z: Year 2 Annual Survey Report. Gallup, 2024. https://www.gallup.com/analytics/506663/state-of-students-research.aspx.

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4 Di Natale, A. F., Repetto, C., Riva, G., & Villani, D. (2020). "Immersive Virtual Reality in K12 and Higher Education: A 10year Systematic Review of Empirical Research." British Journal of Educational Technology, vol. 51(6), pp. 2006–2033. https://doi.org/10.1111/bjet.13030.

5 Geng, X., & Su, Y. S. (2024). "Enhancing K–12 Students' STEM Learning Through the Integration of the Metaverse into Online and Blended Environments: A Meta-Analysis." International Journal of Science and Mathematics Education, vol. 22 (Suppl 1), pp. 111–143. https://doi.org/10.1007/s10763-024-10484-0.

6 Makransky, G., & Mayer, R. E. (2022). "Benefits of Taking a Virtual Field Trip in Immersive Virtual Reality: Evidence for the Immersion Principle in Multimedia Learning." Educational Psychology Review, vol. 34(3), pp. 1771–1798. https://doi.org/10.1007/s10648-022-09675-4.

7 Lin, W., Chen, L., Xiong, W., Ran, K., & Fan, A. (2023). "Measuring the Sense of Presence and Learning Efficacy in Immersive Virtual Assembly Training." International Journal of Mechanical Engineering Education, https://doi.org/10.1177/03064190241308659.

8 Perez, R. P., & Keleş, Ö. (2025). "Immersive Virtual Reality Environments for Embodied Learning of Engineering Students." DOI:10.48550/arXiv.2503.16519.

reality tools consistently improved learner performance, particularly in skill-based tasks like surgical training.[9]

These higher-education findings affirm that immersive technologies activate core learning mechanisms such as embodiment, active engagement, and spatial interaction, making them valuable not just for specialized training but also for general education, where deep understanding and transferable skills are essential. They show how immersive tools can simulate high-stakes, real-world environments with fidelity, an approach now increasingly accessible to K–12 learners.

A Powerful Lever for Access

While immersive learning has been shown to improve engagement and achievement, its most transformative potential may lie in its ability to advance opportunities for all. When thoughtfully implemented, immersive technologies can serve as powerful tools to expand access to high-quality learning experiences for students who have historically been underserved.

The Organization for Economic Co-operation and Development (OECD) emphasizes this potential, noting that immersive tools can enhance service delivery and educational access for students in remote areas, learners with disabilities, and those without consistent opportunities for in-person collaboration. By reducing barriers tied to geography and physical infrastructure, immersive learning can bring more students into meaningful, interactive learning environments.[10]

The World Bank echoes this view, describing immersive technologies as a digital strategy capable of radically increasing access to advanced content across varied educational systems. Students in under-resourced schools can now engage in virtual science labs, explore global landmarks, or experience complex scientific and historical simulations that were once only available in well-funded settings.[11]

Both organizations stress that broad deployment must be deliberate. Access is not a by-product of technology adoption; it must be a central design and policy goal. When immersive learning is supported by strong infrastructure, inclusive practices, and systemic planning, it becomes not just a tool for engagement, but a means of ensuring that high-quality instruction reaches every learner.

Closing the Readiness Gap: What Educators Say They Need

To ensure that any roadmap for immersive learning responds to the realities of today's classrooms, **Verizon and Discovery Education launched the 2025 Immersive Technology Survey**. The survey was intentionally designed to move beyond anecdotal enthusiasm and capture three critical insights straight from the field:

1. **Current Perception and Definitions of Immersive Learning:** How do educators describe immersive experiences and where do they see them fitting into day-to-day instruction?
2. **Barriers and Enablers of Adoption:** What concrete resources, professional learning, and infrastructure do teachers say they need to bring immersive learning from occasional novelty to routine practice?
3. **Impact Aspirations:** Which student outcomes—engagement, equity, real-world readiness—do educators most hope immersive tools will advance?

By grounding our partnership strategy in educators' voices, the survey equips Verizon and Discovery Education to align product design, professional learning, and policy recommendations with the supports teachers actually need—transforming promising technology into effective, future-ready instruction for all students.

Despite widespread interest in immersive learning, teacher readiness remains a critical barrier to implementation. Findings from the 2025 Discovery Education Immersive Technology Survey reveal a system full of potential, but still in the early stages of adoption. The survey gathered responses from 240 PreK–12 educators across 38 states, with representation across subject areas and grade levels. These insights offer a clear window into both the mindset and the needs of today's educators when it comes to immersive technologies.

Most respondents described immersive learning as a set of interactive, hands-on experiences that include virtual and augmented reality. While this reflects part of the picture, it also reveals a common misconception: immersive learning is not defined by technology alone. Immersive learning is best understood as a pedagogical approach grounded in principles like active engagement, emotional connection, and contextual relevance—elements that can be achieved with or without advanced tools. In fact, many highly immersive experiences are delivered using standard classroom technology.

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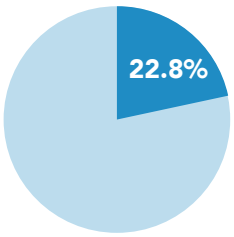
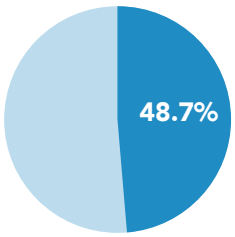
9 ang, Y. M., Chau, K. Y., Kwok, A. P. K., Zhu, T., & Ma, X. (2022). "A Systematic Review of Immersive Technology Applications for Medical Practice and Education: Trends, Application Areas, Recipients, Teaching Contents, Evaluation Methods, and Performance." Educational Research Review, vol. 35, 100429. https://doi.org/10.1016/j.edurev.2021.100429.

10 Organisation for Economic Co-operation and Development. An Immersive Technologies Primer. OECD Digital Economy Papers, No. 373, OECD Publishing, Paris, 2025. https://doi.org/10.1787/cf39863d-en.

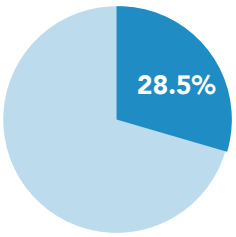
11 World Bank. (2024). Digital Pathways for Education: Enabling Greater Impact for All. https://openknowledge.worldbank.org/server/api/core/bitstreams/3c779ab9-1652-4a91-ac17-495d5c23dca3/content.



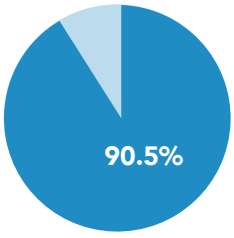
Percentage of educators surveyed reported knowing how to apply immersive technologies instructionally



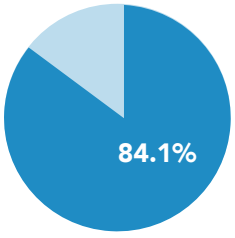
Percentage of educators surveyed reported familiar with tools like VR or AR but unsure how to translate them into effective learning



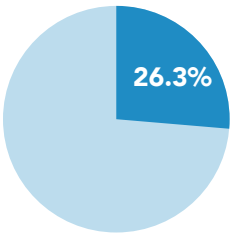
Percentage of educators surveyed reported were unfamiliar with the tools entirely



Percentage of educators who said immersive technologies could increase student engagement



Percentage of educators who cited improved content understanding as a benefit



Percentage of educators who reported using immersive tools in class—and most of those did so infrequently

Only 22.8% of educators surveyed reported knowing how to apply immersive technologies instructionally, and nearly half (48.7%) were familiar with tools like VR or AR but unsure how to translate them into effective learning. Another 28.5% were unfamiliar with the tools entirely, highlighting a need not just for exposure to technology, but for deeper understanding of how immersive learning actually works.

Adoption remains low. Although 90.5% of educators said immersive technologies could increase student engagement, and 84.1% cited improved content understanding as a benefit, only 26.3% reported using immersive tools in class—and most of those did so infrequently. The most commonly cited barrier was lack of devices for teachers (38.5%), followed by a lack of professional training and support (33.2%), and insufficient student devices (25.7%). Educators repeatedly voiced a willingness to adopt immersive tools if they had access to equipment and implementation support.

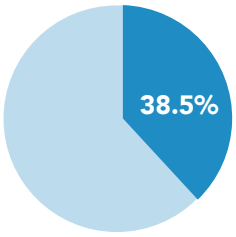
These findings echo and extend those from Discovery Education's 2022 survey of 234 STEM teachers. That earlier study found that 89% of educators believed digital tools improved student engagement and over 90% observed better content understanding. Yet even then, educators cited inadequate professional development and technology access, especially at home for students, as core constraints.[12]

Recent research corroborates these patterns. A multinational study found that teachers' willingness to adopt new technology, including AI and immersive tools, is strongly shaped by their self-efficacy and institutional support, not simply access alone.[13] Another study of preservice teachers in Ghana, found that even brief exposure to immersive tools fostered enthusiasm and instructional vision, but gaps in infrastructure and training significantly hampered long-term adoption.[14]

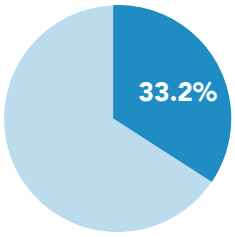
Promisingly, professional development models exist to close this gap. Teacher-led training using an adapted cascade model in which trained educators mentor peers across schools can significantly improve motivation, confidence, and adoption of digital tools at scale.[15] Furthermore, the integration of immersive learning into teacher education has borne pedagogical effectiveness, deepened content knowledge, and built confidence in real-world teaching scenarios.[16]

Taken together, these findings outline a clear path forward: educators are ready for immersive learning in principle but need systemwide strategies, sustained coaching, and supportive infrastructure to translate vision into practice.

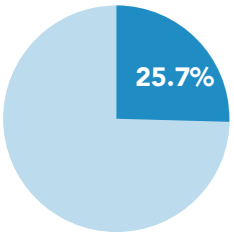
The most commonly cited barriers for teachers:



lack of devices for teachers



lack of professional training and support



and insufficient student devices.

12 Discovery Education (2025). Immersive Technology Survey Results.

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Overcoming Infrastructure Challenges: Outlook and Opportunity

Infrastructure remains a foundational barrier to broad and scalable implementation of immersive learning. Even among educators eager to adopt new tools, many reported insufficient access to VR/AR headsets, outdated classroom technology, or inadequate bandwidth to support high-quality simulations.[17]

However, the outlook is becoming more promising. OECD notes that immersive learning is increasingly viable due to improvements in device design, cost, and delivery. Stand-alone VR headsets no longer require high-powered PCs, and many augmented reality platforms can now run on standard school devices such as Chromebooks and tablets.[18]

of immersive technologies with AI, 5G connectivity, and extended-reality tools is enabling more personalized, adaptive, and collaborative learning environments, unlocking new educational possibilities when supported by the right infrastructure and system design.[21]

A Scalable Model for District-Wide Immersive Learning

Immersive learning holds enormous potential, but most districts still face barriers to adopting it at scale. Challenges like limited device access, insufficient training, and fragmented implementation strategies continue to stall progress even as interest grows. Educators consistently

TimePod Adventures series

Interactive 3D Virtual Field Trips

Instructional Activities

The World Bank identifies immersive technology as a high-impact strategy for expanding access to advanced content. Its guidance stresses that successful deployment depends on strategic infrastructure investments, institutional alignment, and embedded support for educators. Examples from high-performing education systems demonstrate how strong infrastructure planning can enable immersive education to reach scale.[19]

In contexts with even greater resource constraints, innovation is bridging the gap. One study documented how teacher education programs in Ghana successfully integrated VR lessons using entry-level smartphones and off-the-shelf viewers. This low-bandwidth, mobile-first approach shows that immersive learning can be both effective and scalable in under resourced environments.[20]

Moreover, immersive learning is increasingly tied to broader digital transformation goals. The convergence

express enthusiasm for immersive tools but emphasize the need for aligned curriculum, practical support, and leadership guidance to make them work in real classrooms.

The Verizon–Discovery Education partnership addresses these needs head-on. By combining Verizon's commitment to bridging the digital divide with Discovery Education's instructional expertise, the partnership delivers immersive learning resources that are classroom-ready, curriculum-connected, and easily integrated. Rather than adding isolated tech tools, the program provides standards-aligned experiences—such as virtual field trips, AR content, and 3D simulations—designed to deepen engagement and support inquiry-driven instruction.

A Partnership Rooted in Expanding Opportunities, Innovation, and Impact

Launched through Verizon Innovative Learning, the partnership with Discovery Education was created to expand access to high-quality immersive content,

17 Discovery Education (2025). Immersive Technology Survey Results.

18 Organisation for Economic Co-operation and Development. An Immersive Technologies Primer. OECD Digital Economy Papers, No. 373, OECD Publishing, Paris, 2025. https://doi.org/10.1787/cf39863d-en.

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especially in under-resourced schools. Through this initiative, participating educators gain access to Discovery Education's Immersive Learning Hub, a growing collection of standards-aligned resources including the TimePod Adventures series, interactive 3D virtual field trips, and instructional activities for core subject areas.

The partnership focuses on making immersive learning both accessible and actionable. Resources are built for use with common classroom devices such as Chromebooks and tablets, minimizing infrastructure barriers. Educators receive classroom-ready materials that support daily instruction and are aligned with grade-level expectations, helping them bring digital learning to life without needing specialized hardware or complex implementation plans.

Why This Model Works

Many immersive learning efforts struggle because they lack cohesion, offering scattered tools without meaningful instructional support. The Verizon–Discovery Education model succeeds because it offers an integrated approach: content that aligns with what teachers already teach, platforms that work with existing technology, and learning experiences that elevate rather than disrupt instruction.

What sets this model apart is its blend of practicality and depth. Lessons are designed to fit within existing units, with no extra technical burden. Immersive experiences promote student agency, inquiry, and cross-disciplinary exploration, allowing teachers to personalize learning while meeting standards. For example, students might drive a robotic drill across the surface of Mars in a standards-aligned science module or explore animal adaptations through augmented reality. These kinds of activities help students build both content knowledge and a deep understanding of the content.

As school systems seek models to guide their digital learning strategies, the Verizon–Discovery Education partnership offers a clear, scalable pathway. It reflects what teachers ask for most: tools that work, content that matters, and support that respects their time and expertise.

What the Verizon–Discovery Education Partnership Delivers

- Standards-aligned immersive learning experiences
- Interactive 3D content and augmented reality tools
- Curriculum-connected resources for core subject areas
- Virtual field trips and Video Topic Series that deepen real-world connections
- Classroom-ready supports to simplify integration
- Tools designed to enhance student engagement and inquiry

Strategic Recommendations for District Leaders

Immersive learning is not a passing trend. It is a practical instructional approach that can drive engagement, deepen understanding, and expand opportunity. To implement it effectively, districts must align adoption with instructional priorities, educational goals, and sustainable systems.

1. **Lead with instruction**. Start with instructional goals, not devices. Use immersive tools to advance district priorities such as STEM, real-world learning, and broad access to advanced content. Ensure alignment with standards, curriculum, and professional development. Ask: What immersive experiences can we create using the technology we already have? True immersion doesn't require headsets or high-end hardware. Engaging, emotionally resonant learning can take place with just a Chromebook or no technology at all.
2. **Assess Infrastructure**. Evaluate broadband access, device readiness, and teacher support. Identifying gaps early ensures broad access and sustainable implementation.
3. **Define Long-Term Success**. Look beyond initial enthusiasm. Measure outcomes like content mastery, instructional alignment, and long-term student engagement as part of your system improvement strategy.
4. **Invest in Teacher Capacity**. Support all educators, not just early adopters. Provide coaching, modeling, and planning time to help teachers integrate immersive tools into everyday instruction.

Conclusion: Lead with Purpose and Vision

Immersive learning offers a clear, evidence-backed strategy to meet today's challenges. It promotes active learning, builds real-world skills, and reengages students in meaningful ways—especially those historically underserved. But success depends on thoughtful implementation: aligned curriculum, robust professional learning, and broad access. The Verizon–Discovery Education model brings these elements together, offering classroom-ready tools and instructional support. For districts ready to lead, the path is clear and the time is now.

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