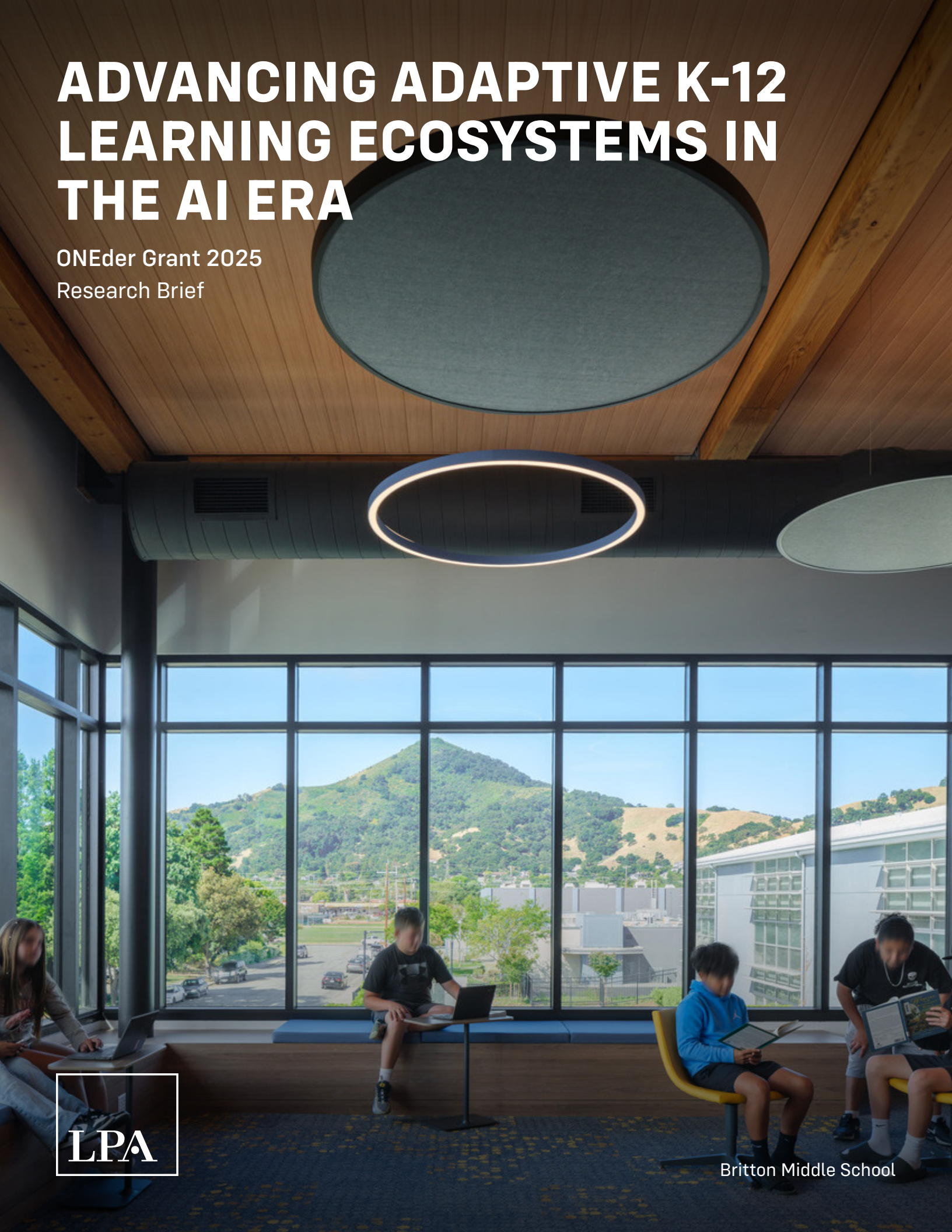
ADVANCING ADAPTIVE K-12 LEARNING ECOSYSTEMS IN THE AI ERA

ONEder Grant 2025

Research Brief



LPA

Britton Middle School

RESEARCH QUESTIONS

This study explored two primary questions at the intersection of artificial intelligence, educational practices, architectural design, and the future of work.

Together, these questions examine how spatial design can support emerging AI learning practices, while maintaining human interactions.

How are educators using AI in K-12 settings to develop industry-aligned student competencies, and how might that impact the learning experience?

What adaptive design strategies can help K-12 learning environments accommodate AI-enabled personalized learning and human-AI collaboration while maintaining essential human social connections?

eSTEM Academy | Eastvale, CA

Executive Summary

Research has long established the important connection between effective learning environments and positive student outcomes in K-12 education.[1,2,3,4] As the adoption of artificial intelligence (AI) accelerates across industries, questions emerge about how evolving workplace competencies will reshape what students learn and how they learn it.[5] These changes extend beyond curriculum and have direct implications for how learning environments are designed and used. As schools increasingly integrate artificial intelligence (AI) tools such as personalized learning platforms, AI tutors, and immersive digital technologies, the role of the physical environment becomes even more critical. Space, pedagogy, and technology—including AI tools— must be considered together to shape whether schools enrich human learning or unintentionally diminish it in an AI-enabled world.[6,7] As AI transforms education, schools face a critical question: How do we evolve our teaching and learning environments to harness the impact of AI while preserving the irreplaceable human elements of teaching and learning?

Funded in part by a One Workplace ONEder Grant, LPA Design Studios embarked on a study to understand how K-12 school design can adapt to the growing presence of AI in education. Synthesizing insights from literature, educators, technology and design professionals, students, and a space audit, our study reveals a misalignment between emerging learning needs and conventional approaches to K-12 classroom design. Rather than reinforcing traditional classrooms with added technology, the evidence suggests a continued shift to more adaptive learning environments that function as interconnected ecosystems supporting inquiry, creation, critique, and reflection. Our study findings further indicate that AI-enabled learning environments cannot be designed as isolated classrooms. Instead, just as research around communication and collaboration has demonstrated, they must enable seamless transitions between analog and digital work, while intentionally prioritizing human connection over digital dependency.[6] As a result, this study proposes a practical framework to guide the design of learning spaces where AI amplifies, rather than replaces, what makes learning deeply human.[8]

LPA ONEDER GRANT TEAM

RESEARCH TEAM

KIMARI PHILLIPS
Research Manager
KPhillips@LPADesignStudios.com

RACHEL NASLAND
Senior Design Researcher
RNasland@LPADesignStudios.com

INSIGHT COACHES

DAVID JAKES
Education Leader & Author
David@DavidJakesDesigns.com

KATE MRAW
Principal, Director of K-12
KMraw@LPADesignStudios.com

JOSH NIEDERMAN
Market Development Manager
Learning Environments
JNiederman@OneWorkplace.com

SONAL BHIDE
Creative Lead
SBhide@OneWorkplace.com

Spectrum of Immersive Technologies

Artificial Intelligence (AI)
Systems that simulate human intelligence by learning from data to recognize patterns, make decisions, or generate output, such as large language models, chatbots, and intelligent navigation tools. [widely used in school software]

Augmented Reality (AR)
Immersive technology that overlays digital content onto the physical environment, enabling users to experience and interact with virtual elements within real-world settings through devices such as smartphones or wearable displays. [some experimentation within schools]

Virtual Reality (VR)
Fully immersive, computer-generated environments that replace the physical surroundings, typically experienced through head-mounted displays and motion-enabled devices. [not widely seen in schools]

LEAST IMMERSIVE >>> MOST IMMERSIVE

Spectrum of AI Learning Environments

AI-Enabled Learning
Low intensity – AI is used as a tool to support existing teaching methods and assist or enhance specific educational tasks (e.g., personalized tutoring integrated AI chatbots, using Claude.ai for lesson planning).

AI-Integrated Learning
Medium intensity – AI tools are embedded into current educational processes and environments to help educators efficiently provide engaging, tailored educational paths for diverse learners.

AI-First Learning
High intensity – AI is used strategically, fundamental at the core of an educational experience or process, not just an add-on (e.g., using generative AI to create dynamic, real-time learning paths).

LEAST IMMERSIVE >>> MOST IMMERSIVE

INTRODUCTION

As artificial intelligence (AI) becomes increasingly integrated in K-12 classrooms, the physical spaces where learning happens need to evolve in tandem.[9] Funded in part by a One Workplace ONEder Grant, LPA Design Studios embarked on a study to explore how adaptive learning environments can be designed to support the emerging AI tools that are reshaping how students learn and teachers teach as well as the collaborative, human-centered pedagogy that remains essential to education.[8]

CURRENT K-12 DESIGN CHALLENGES

The Spatial-Pedagogical Mismatch

- Education continues to transition from one-size-fits-all instruction to include more personalized, self-directed, technology-driven learning.
- Teachers' roles are evolving from instructors and lecturers to learning facilitators, guides, and mentors.
- Schools are investing in technologies—including AI tools—at a faster rate than they are updating physical learning environments.
- We are not aware of any comprehensive frameworks that currently exist for designing K-12 learning spaces optimized for AI-enabled personalized learning.
- Students risk being underprepared and lacking necessary social and technical skills for an AI-integrated future if learning environments do not evolve along with technology.

Abram Agnews Elementary | Santa Clara USD

BACKGROUND

THE RISE OF AI IN K-12 EDUCATION

The COVID-19 pandemic catalyzed technology integration in schools, normalizing the use of e-learning platforms, digital resources, and virtual tools.[5,10] AI tools, specifically, have rapidly moved from pilot programs to mainstream use.[11] Adaptive platforms and intelligent tutoring systems shift learning away from one-size-fits-all instruction by personalizing content in real time and targeting knowledge gaps.[12]

According to Stanford University researchers, technologies like artificial intelligence (AI), augmented reality (AR), virtual reality (VR), and others are expected to surge in classrooms to enhance learning, provide immersive experiences, and personalize lesson plans and feedback.[5,8,13,14] However, recent research reminds us that AI's impact on students depends fundamentally on implementation approach rather than technology itself.6 Although AI has potential to benefit students, current applications of generative AI often introduce risks related to student isolation and foundational aspects of learning and child development due to overreliance.[6,15]

> **"Designing no-tech zones and integrating nature are going to become critical in designing new facilities."**
>
> — industry voice

Mayfair Elementary School | Comal ISD

TEACHERS' EVOLVING ROLES

As AI reshapes K-12 education, the teacher's role is evolving from sole source of knowledge to learning facilitator and guide. Educators are increasingly leveraging AI to monitor student learning, design meaningful experiences, and provide targeted interventions.[16,17,18,19] A Gallup survey of the 2024-2025 school year found 60% of U.S. K-12 public school teachers using AI tools for their work. Among the 28% using AI at least monthly, the most common uses were planning and preparing lessons (37%), creating worksheets, assignments, or activities (33%), modifying materials to meet student needs (28%), and doing administrative work (28%).[20]

Although adoption is growing, many educators report feeling unprepared for responsible classroom integration, with concerns of plagiarism and misinformation.[18,19,21] With rapid adoption of AI technology outpacing pedagogical clarity and ethical standards, AI integration demands new teacher competencies.[8,9,21,22] A 2025 SRI International report defines AI literacy in K-12 as multi-dimensional, spanning technical fluency, hands-on creation, and ethical awareness, emphasizing the need for professional development and clear curriculum standards.[19,21,23] As information becomes more accessible and automated, the educator's contribution shifts towards shaping how students think, question, and apply knowledge—making mentorship, ethical guidance, and the cultivation of critical thinking central to the profession.[5,24,25,26]

Dolores Huerta Middle School | Santa Clara USD

LEARNING SPACE DESIGN WITH EVOLVING PEDAGOGIES AND TECHNOLOGIES

Over the past two decades, school design has increasingly responded to shifts in pedagogy and technological integration.[4,8,27] Research on innovative and flexible learning environments has emphasized aligning spatial configuration with instructional practice, student agency, and varied learning modalities.[1,4,28] Although many K–12 classrooms continue to reflect spatial models historically organized around teacher-fronted instruction and synchronized pacing, more recent design approaches have introduced adaptable layouts, breakout zones, and differentiated settings intended to support collaboration and project-based learning.[4,8,27,28]

Advances in digital technologies introduce an additional dimension within this ongoing evolution.[6] As classrooms are increasingly expected to accommodate concurrent digital engagement, collaborative interaction, and teacher facilitation, questions arise regarding how inherited spatial typologies manage these potentially competing demands.[8,27] Practitioner publications have proposed spatial adaptations in response, including modular furniture and expanded technological infrastructure such as integrated displays and hybrid-ready audiovisual systems.[27,29,30,31] However, comparatively limited attention has been given to the specific spatial implications of AI-enabled instruction in K–12 contexts. Understanding how AI reshapes classroom dynamics, teacher mobility, and student peer interaction is essential for determining whether and how spatial design should adapt in response.

STUDY AIM & RESEARCH QUESTIONS

STUDY AIM & RESEARCH QUESTIONS

This mixed-methods research set out to bridge the gap between emerging AI-integrated learning practices and the physical environments needed to support them and to develop a practical design framework for creating adaptive K-12 learning spaces (see description of the study methodology on pages 10, 12 and 13). Through surveys, interviews, focus groups, and a space audit, we explored the research questions below to understand how students and teachers are using AI tools in current K-12 learning environments to prepare students for the future of work and how spatial configurations enable or constrain that use.

1. How are educators using AI in K-12 settings to develop industry-aligned student competencies, and how might that impact the learning experience?
2. What adaptive design strategies can help K-12 learning environments accommodate AI-enabled personalized learning and human-AI collaboration while maintaining essential human social connections?

Insights from our breadth of data are intended to inform planning, programming, and design decisions by school educators and administrators, learning space planners and designers, and furniture manufacturers and dealers. Collaboration across these disciplines is key to creating environments that support both human connection and thoughtful technology integration—spaces that enhance rather than replace the irreplaceable elements of great teaching.

> **"Human connection is still so very important to all of us, and I think that's a big part of balancing AI too."**
>
> — student voice

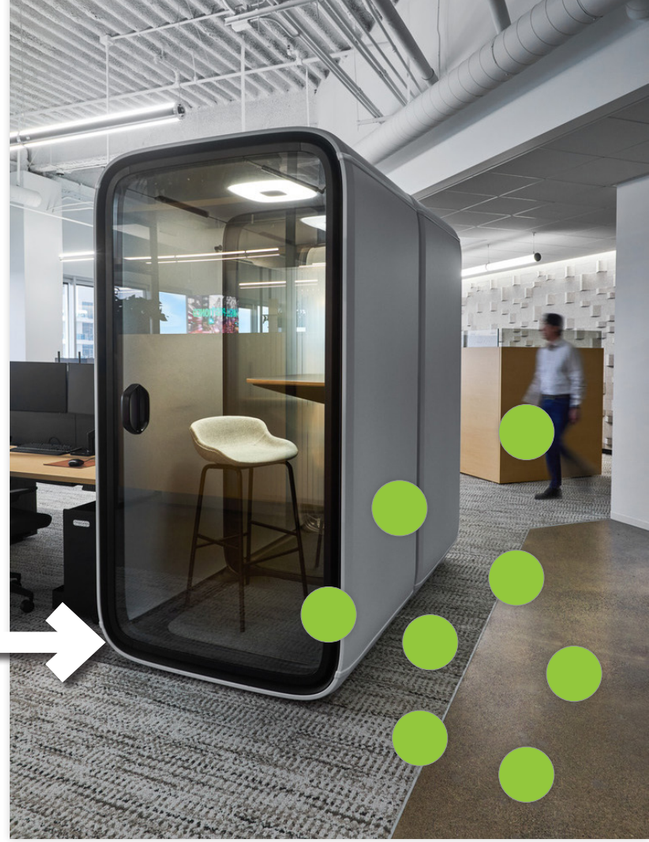
TVT Community Day School | Irvine, CA

STUDY METHODOLOGY

Our mixed-methods research approach included a comprehensive literature review, online surveys, semi-structured interviews, focus groups, a workshop, and a space audit. To better understand the use of AI tools and the allocation and use of technology in learning spaces, we engaged the voice and perspectives of those designing learning experiences (educators), those experiencing them (students), and those shaping them (technology and design industry professionals).

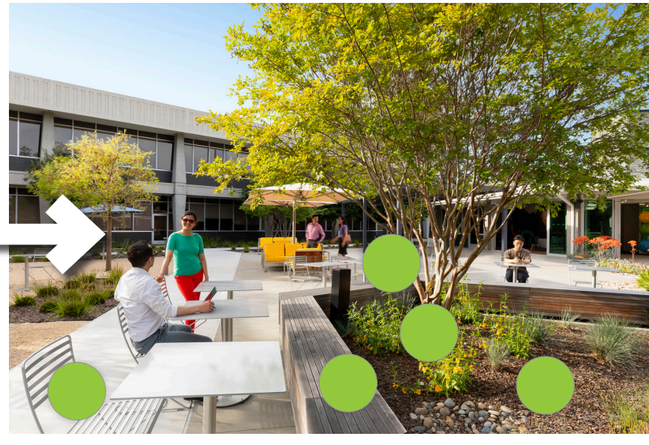
Twelve students participated in a visual preference workshop to identify their ideal AI-supportive learning spaces. Using a dot-voting system with over 30 images, students placed green stickers on spaces and design elements they liked most and red stickers on those they liked least — covering environmental features, layouts, furniture, aesthetics, and overall design. An informal discussion followed, giving students the opportunity to explain the factors behind their choices.

Students liked the roll-up garage door but not the rows of tables and chairs.



Students liked the sense of acoustic privacy for individual focused work.

Students didn't like the sterile feeling or bar-height seating.



The outdoor setting was very well-liked by students.

Although red dots indicate spaces the students didn't favor for AI-enabled learning, they are spaces that work for today's teaching. But, as pedagogies evolve and teaching shifts, learning space design needs to reassess and adapt with additional access to nature, privacy, and accommodations for other spatial needs.

BY THE NUMBERS

9
SEMI-STRUCTURED INTERVIEWS WITH EDUCATORS

3
FOCUS GROUPS (16 STUDENTS TOTAL)

1
LEARNING SPACE VISUAL PREFERENCE WORKSHOP (12 STUDENTS TOTAL)

2
FOCUS GROUPS WITH INDUSTRY PROFESSIONALS (5 PARTICIPANTS TOTAL)

60+
PUBLICATIONS REVIEWED

67
ONLINE SURVEYS OF EDUCATORS

1
SPACE AUDIT OF AN AI-FIRST SCHOOL

4
SEMI-STRUCTURED INTERVIEWS WITH INDUSTRY PROFESSIONALS

15
ONLINE SURVEYS OF TECHNOLOGY INDUSTRY PROFESSIONALS

WHAT WE LEARNED AT THE INTERSECTION OF EDUCATORS, STUDENTS, AND INDUSTRY

This research brings together perspectives from educators, students, and industry professionals to understand how artificial intelligence is reshaping both work and learning, and what that shift implies for educational environments. While these groups engage with AI from different roles and points of view, their experiences converge around a consistent set of themes that clarify both opportunity and risk. Together, these insights illuminate what is changing, what remains essential, and where design has the greatest leverage.

EDUCATORS

Educators report growing personal use of AI alongside uncertainty about classroom integration. Many describe using AI for lesson planning, drafting communications, brainstorming activities, or reducing administrative workload, while simultaneously hesitating to allow independent student use due to concerns about academic integrity, over-reliance, and developmental appropriateness. Overall, educators are navigating a clear gap between personal comfort and instructional clarity around use of AI.

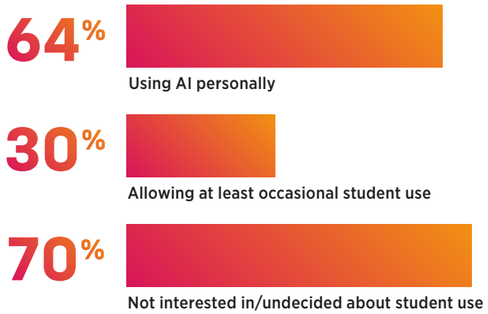
> **"There are a lot of great things this technology can do, but nothing will ever replace human connection. Spaces need to be designed with that in mind."**
>
> — educator voice

STUDENTS

Students demonstrate a range of fluency with AI and describe using it as a flexible, on-demand support rather than a default solution. They are aware of the risks of overuse and can articulate the negative consequences of relying too heavily on AI. Students often choose to avoid using AI in order to understand or complete something on their own first, especially when learning new concepts. Despite their comfort with technology, students position AI as a tool they choose to engage with, not a replacement for learning or relationships.

> **"If it's something new, I like to try it myself first."**
>
> — student voice

Gap Between Educators' Personal Comfort and Instructional Clarity Around Use of AI



INDUSTRY

Industry perspectives consistently frame AI as an amplifier of workflow and human capability embedded into everyday practice. Effective use is described as iterative and reflective, requiring users to question outputs and apply judgment. AI is positioned as a teammate or sounding board that reduces friction around repetitive tasks, creating time and capacity for creativity, problem solving, and higher value work.

> **"The most effective [workplace] environments strike a balance between flexibility, focus, and intentional opportunities for connection."**
>
> — industry voice

Study-Related K-12 Education Terms

PERSONALIZED LEARNING
Empowering students through customized learning experiences to fit the needs, strengths, skills, and interests of the individual student.

PRODUCTIVE STRUGGLE
The cognitive effort of working through confusion and reasoning through a difficult learning task that enables deeper learning and long-term retention, while fostering persistence, critical thinking, and a growth mindset.

SELF-DIRECTED LEARNING
Allowing each student to choose different activities during a lesson or unit (e.g., playlist, centers, stations).

KEY THEMES

RATHER THAN REDUCING THE NEED FOR THINKING, AI RAISES EXPECTATIONS FOR IT

The strongest triangulated finding is that thinking quality matters more, not less, in AI-enabled environments.

AI is not viewed as a replacement for learning, teaching, or professional work, but as a redistributive force that shifts where effort is applied. Students consistently articulate that AI is useful when it supports understanding and harmful when it replaces thinking. Students describe using AI to brainstorm, generate study supports, or check work after an initial attempt, but avoid it when it undermines efforts to understand or retain new concepts. Educators echo this concern in terms of academic integrity and over-reliance, emphasizing the importance of protecting productive struggle in the learning process. Industry perspectives mirror this shift, emphasizing that uncritical or shortcut-driven AI use undermines professional credibility.

As access to information and content generation becomes easier, human value increasingly lies in framing problems, evaluating outputs, and applying knowledge thoughtfully in context. Across industry workflows, AI does not reduce effort, but redistributes it toward deeper critical thinking and problem solving.

HUMAN RELATIONSHIPS ANCHOR LEARNING IN AI-RICH SYSTEMS

Human relationships remain foundational to learning, even as tools evolve

Despite frequent and confident AI use, learning and work remain fundamentally relational. Across all data, AI is most accepted when it strengthens relationships and most resisted when it attempts to replace them. Students strongly prefer human teachers, mentors, and peer discussion over automated systems, positioning AI as a support within a human-led learning ecosystem rather than a substitute. Educators reinforce this perspective, describing AI as a way to reclaim time for individual student support and guidance rather than replace instruction. Industry perspectives align closely, emphasizing that empathy, collaboration, and shared sensemaking are increasingly critical skills in AI-enabled workplaces. This convergence reframes AI's role as an assistive tool that amplifies, rather than diminishes, human interaction.

AI AMPLIFIES LEARNER AGENCY & INITIATIVE

Across contexts, AI functions as a force multiplier, accelerating learning and performance for those who actively engage with it.

Industry professionals consistently identify motivation, curiosity, and initiative as stronger predictors of success than credentials alone. Over half of industry respondents report using AI for independent learning or skill development, and student focus groups emphasized that AI disproportionately benefits those who actively seek to learn. Students who take initiative to teach themselves how to use and "train" AI tools demonstrate greater comfort, curiosity about how systems work, and clearer discernment about when AI should or should not be used.

While student interest in formal AI instruction varies, both educators and industry suggest structured guidance could strengthen AI literacy and how learners use AI as a purposeful, personalized tool. Across contexts, AI does not create engagement or replace learning. It accelerates both, embedding exploration and refinement into the process.

AI CHALLENGES HOW UNDERSTANDING IS RECOGNIZED AND VALIDATED

Across stakeholders, credibility is increasingly tied to process, not polish.

As AI becomes embedded in learning and work, a shared tension across stakeholders is the challenge of distinguishing real understanding from AI-assisted output and establishing reliable ways to validate it. By making exploration, iteration, and autonomous knowledge access easier, AI shifts learning away from linear progression. Final outputs no longer reliably signal understanding, as the reasoning behind them becomes less transparent.

Educators increasingly recognize that this shift will likely change their role, with more time spent guiding interpretation and process rather than delivering content alone. Yet this evolution is unfolding without established guardrails for how to implement it and systems to evaluate reasoning and process at scale. Survey data reflects this strain with 60–65% of educators believing AI undermines traditional assessments, and over half express interest in performance-based or process-based alternatives, even as many remain unsure how to implement them. This misalignment between emerging learning behaviors and legacy assessment systems remains a key source of hesitation in formally integrating AI into instruction. Industry reinforces a similar concern, emphasizing the difficulty of deciphering credibility when outputs can be generated rapidly.

COGNITIVE DEMAND IS RISING, MAKING THE ENVIRONMENT A CRITICAL LEVER

As AI increases cognitive load, the environment becomes an active condition for learning rather than a passive backdrop.

AI-enabled learning and work require sustained attention, complex reasoning, and frequent transitions between modes of thinking. AI expands access to information and increases the number of decisions learners must navigate. Educators report challenges related to device saturation, engagement, and fatigue, while industry professionals note rising cognitive intensity and digital exhaustion. While educators and industry identify rising cognitive demands that heighten the importance of environment, students explicitly noted physical features that shape whether sustained thinking can endure.

Students strongly associate effective AI-enabled learning with environments that feel calm, comfortable, human-scale, and psychologically safe. Conversely, students expressed that environments that feel performative or overly institutional don't cultivate the creativity and reflection needed for AI-enabled learning. Together, these insights reinforce the need for spaces that reduce distraction and support sustained reflection to enable deeper thinking.

e3 Civic High School | San Diego, CA

> **"It's going to be facilitating, it's going to be coaching, it's going to be reflection and more personalized interactions."**
>
> — on the educator's role shifting

LEARNING IS SHIFTING FROM LINEAR COMPLETION TO ITERATIVE DEVELOPMENT

TRADITIONAL LEARNING MODEL

AI-ENABLED LEARNING MODEL

A FRAMEWORK FOR DESIGNING AI-ENABLED LEARNING ENVIRONMENTS

Building on research in social and emotional learning environments and informed by insights from students, educators, and industry professionals, the following framework translates these findings into spatial principles.

To ground the research in physical context, the study incorporated a **site audit of an AI-first school** and a **student visual preference workshop** to identify consistent environmental patterns. While not prescriptive, these observations converged **to inform a design framework**, clarifying spatial conditions that support AI-integrated and human-centered learning.

Magellan International School | Austin, TX

REGULATE SENSORY LOAD

AI increases cognitive demand and decision load. Environments must reduce sensory friction to protect attention, emotional regulation, and sustained mental effort.

Design Moves:

- Warm, neutral color palettes
- Natural materials and visual softness
- Human-scaled rooms and contained nooks within larger volumes
- Visual privacy that reduces exposure and distraction
- Dropped ceiling heights and sound-absorptive finishes that minimize noise and echo
- Reduction of visual clutter and device saturation
- Natural light and views to nature

West Valley College SOPS | Saratoga, CA

SUPPORT CRITICAL AND CREATIVE THINKING

AI expands access to ideas. Human value lies in how those ideas are shaped, questioned, and extended. Space should support clarity of thought and creative exploration without visual distraction.

Design Moves:

- Visually interesting lighting that introduces depth and contrast
- Small booths or focus rooms that support deep concentration
- Access to outdoor or alternative work environments for creativity and mental reset
- Café-height tables and lower lounge seating that allow shifts in posture and perspective

Britton Middle School | Morgan Hill, CA

ENCOURAGE HUMAN INTERACTION AND AUTONOMY

AI expands student independence, and spatial clarity must increase alongside it. Allow fluid transitions between individual and collective learning while supporting autonomy without chaos.

Design Moves:

- Clustered collaborative zones within larger studios
- Partially enclosed team areas that provide spatial definition without full isolation
- Clear differentiation between focus and collaboration zones
- Access to outdoor or semi-outdoor learning environments
- Movable boundaries and furnishings that allow spaces to expand and contract

Conceptual rendering of an AI-enabled classroom (OpenAI)

INTEGRATE TECHNOLOGY SEAMLESSLY

Technology should support cognition without dominating space. Enable future-forward capability while preserving human-centered aesthetics.

Design Moves:

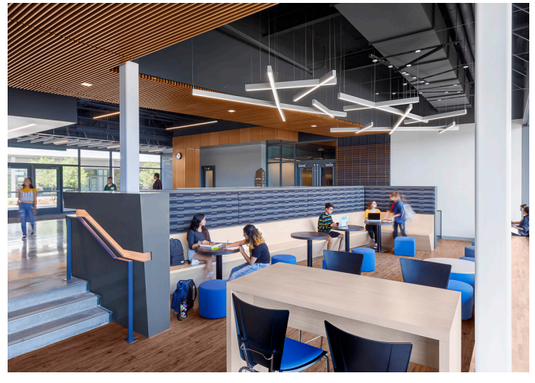
- Integrated audio-visual (AV) systems designed to support both small-group and whole-group configurations
- Interactive wall surfaces that can transition between analog and digital use
- Ceiling-integrated cameras and microphones to support recording, hybrid learning, and potential future analytics
- Distributed power and data access within floors, ceilings, and millwork to eliminate device clustering
- Accessible conduit pathways and modular AV systems to allow future upgrades without demolition
- Minimal exposed hardware, cabling, or rolling tech carts
- Adjustable lighting and acoustics for immersive digital exploration with AR and VR

SPACE TYPOLOGIES IN AN AI-ENABLED LEARNING ECOSYSTEM

An AI-enabled school provides a learning ecosystem that organizes space around modes of thinking and interaction. The four space typologies here form a dynamic, adaptable, interconnected ecosystem that supports formal and informal learning, focus, collaboration, guidance, and regulation.

FOCUS PODS

Acoustically controlled, visually calm, and spatially contained environments designed for sustained attention and complex reasoning. Full to partial enclosure, sound-absorptive finishes and embedded technology support deep thinking without visual distraction.



COLLABORATIVE COMMONS

Open, shared environments embedded within larger studios that support dialogue and collective reasoning. Clustered group zones, movable furnishings, and integrated audio-visual systems allow the commons to flex between small-team and larger group engagement.

MENTORSHIP STUDIOS

Semi-private environments designed for coaching and process-based feedback. Side-by-side seating, integrated video conferencing and display capabilities, and visual connection to adjacent learning areas support fluid educator guidance and oversight.

REST AND RESET SUITES

Low-stimulation environments that restore attention and emotional regulation. Soft seating, reduced sensory input, and natural light provide opportunities for mental reset and reflection on learning.

CONCLUSION

Across students, educators, and industry, AI represents a structural shift in how thinking, learning, and work unfold. While AI accelerates execution, it elevates the value of human judgment, preserves the centrality of relationships, and reshapes learning into a more iterative and process-driven experience. These shifts place new demands on pedagogy, assessment, and physical space. The role of design, therefore, is not to showcase technology, but to support the cognitive, social, and developmental conditions that AI cannot replace. The future of learning in AI-rich environments will not be defined by automation, but by how deliberately human capacities are strengthened, amplified, and sustained.

CALL TO ACTION

Learning space design now stands at a critical juncture. The design decisions schools make today will either unlock or permanently limit the transformative potential of educational AI. Schools require environments that align spatial configuration, pedagogy, and technology to support evolving instructional practices and cognitive demands.

About LPA Design Studios

LPA is a multi-discipline firm focused on collaboration, inclusion, and an integrated design process that connects building performance and design excellence. Founded in 1965, the firm's mission is to deliver timeless, sustainable designs that benefit the environment, generate lasting value, enrich the human experience and ensure a better future. With seven studios in California and Texas, LPA's team includes more than 500 in-house architects, master planners, engineers, interior designers, landscape architects, and research analysts working across a wide array of sectors. In 2025, LPA was honored with the national AIA Architecture Firm Award, the nation's highest honor for an architectural practice. For more information, visit lpadesignstudios.com.

About One Workplace

One Workplace creates new ways of working by helping companies bring their brands and cultures to life. As the West Coast's leading interior solutions provider, One Workplace brings construction, technology, furniture and services under one roof to create better spaces, build powerful brands, and empower stronger cultures from the inside out. For more information, visit oneworkplace.com.

ACKNOWLEDGEMENTS

This research was conducted by LPA Design Studios, funded in part by a One Workplace ONEder Grant with additional funding support from LPA.

The research team would like to acknowledge the many valuable contributors who made this study possible: David Jakes for his expert guidance, encouragement, and prolific interviewing; Josh Neiderman and Sonal Bhide for their generous support and guidance as LPA's One Workplace ONEder Grant Coaches; Kate Mraw for inspiring us to apply for the ONEder Grant and co-developing the study topic and research questions;; TGR Learning Lab for graciously hosting in-person student focus groups in California; Lake Mary Preparatory School for hosting a virtual focus group with students in Florida.

REFERENCES

1. Barrett, PS, Davies, F, Zhang, Y, and Barrett, LC. (2015). The impact of classroom design on pupils' learning: Final results of a holistic, multi-level analysis. Building and Environment, 89, 118-133. https://doi.org/10.1016/j.buildenv.2015.02.013
2. Rusticus, SA, Pashootan, T, and Mah, A. (2022). What are the key elements of a positive learning environment? Perspectives from students and faculty. Learning Environments Research, 26(1), 161-175. https://doi.org/10.1007/s10984-022-09410-4
3. Scott-Webber, L, Konyndyk, R, French, R, and French, J. (2018). Significant results. Space makes a difference increasing student academic engagement levels. European Scientific Journal, 14(16), 61. http://dx.doi.org/10.19044/esj.2018.v14n16p61 https://files01.core.ac.uk/download/pdf/328026313.pdf
4. Talbert, R and Mor-Avi, A. (2019). A space for learning: An analysis of research on active learning spaces. Heliyon, 5(12), e02967. https://doi.org/10.1016/j.heliyon.2019.e02967
5. Hutson, J and Ceballos, J. (2023). Rethinking education in the age of AI: The importance of developing durable skills in the industry 4.0. Journal of Information Economics, 1(2), 26-35. https://doi.org/10.58567/jie01020002
6. Burns, M, Winthrop, R, Luther, N, Venetis, E, and Karim, R. (2026). A new direction for students in an AI world: Prosper, prepare, protect. Brookings Institution Center for Universal Education. https://www.brookings.edu/articles/a-new-direction-for-students-in-an-ai-world-prosper-prepare-protect/
7. Dergaa, I, Saad, HB, Glenn, JM, Amamou, B, Aissa, MB, Guelmami, N, Fekih-Romdhane, F, and Chamari, K. (2024). From tools to threats: A reflection on the impact of artificial-intelligence chatbots on cognitive health. Frontiers in Psychology, 15, 1259845. https://doi.org/10.3389/fpsyg.2024.1259845
8. Cleveland, B and Mahat, M. (2026). Learning spaces in schools: A pedagogic research agenda. Pedagogies: An International Journal, 1-13. https://doi.org/10.1080/1554480X.2025.2609436
9. Bordwell, R. (2026). How AI is driving the future of school design. Essentials Magazine. EDmarket. https://essentials.edmarket.org/2026/01/how-ai-is-driving-the-future-of-school-design/
10. Wang, S, Wang, F, Zhu, Z, Wang, J, Tran T, and Du, Z. (2024). Artificial intelligence in education: A systematic literature review. Expert Systems with Applications, 252(Part A), 124167. https://doi.org/10.1016/j.eswa.2024.124167
11. Alfarwan, A. (2025). Generative AI use in K-12 education: A systematic review. Frontiers in Education, 10. https://doi.org/10.3389/feduc.2025.1647573
12. Sheedy, C. (2020). New intelligent science stations change maker spaces. July 28. Carnegie Mellon University News. https://www.cmu.edu/news/stories/archives/2020/july/intelligent-science-stations.html
13. Spector, C. (2024). How technology is reinventing education. Stanford Report. https://news.stanford.edu/stories/2024/02/technology-in-education
14. Stebbins, L. (2025). How AI and AR/VR are transforming the digital classroom. EDspaces. https://ed-spaces.com/stories/how-ai-and-ar-vr-are-transforming-the-digital-classroom/
15. Kulesa, AC, Mission, M, Croft, M, and Wells, MK. (2025). Productive struggle: How artificial intelligence is changing learning, effort, and youth development in education. Bellwether Report. June. https://bellwether.org/publications/productive-struggle/?activeTab=1
16. Foster, J. (2024). Perspective: An educator's journey through personalized learning to AI integration. EducationNC. February 26. https://www.ednc.org/educators-journey-personalized-learning-artificial-intelligence-ai-integration/
17. Gates, B. (2024). My trip to the frontier of AI education: First Avenue Elementary School in Newark is pioneering the use of AI tools in the classroom. Gates Notes Newsletter. July 9. https://www.gatesnotes.com/work/provide-quality-education/reader/my-trip-to-the-frontier-of-ai-education
18. Létourneau, A, Martineau, MD, Charland, P, Karran, JA, Boasen J, and Léger PM. (2025). A systematic review of AI-driven intelligent tutoring systems (ITS) in K-12 education. NPJ Science of Learning, 10(1), 29. https://doi.org/10.1038/s41539-025-00320-7
19. Youngstown State University (YSU). (2025). From homework to higher ed: Artificial intelligence usage, ethics and impact in today's classrooms. September 11. https://online.ysu.edu/degrees/education/msed/ai-teaching-statistics-usage-and-trends/
20. Ash, AM. (2025). Three in 10 teachers use AI weekly, saving six weeks a year. Gallup. June 25. https://news.gallup.com/poll/691967/three-teachers-weekly-saving-six-weeks-year.aspx
21. OECD. (2025). Results from TALIS 2024: The state of teaching. Teaching and Learning International Survey (TALIS), OECD Publishing. https://doi.org/10.1787/90df6235-en
22. Croft, M, Kulesa, AC, Mission, M, and Wells, MK. (2025). Measuring artificial intelligence in education. Bellwether Report. October. https://bellwether.org/publications/measuring-ai-in-education/?activeTab=1
23. Mission, M, Croft, M, and Kulesa, AC. (2026). Built for learning: Lessons from emerging artificial intelligence solutions and approaches. Bellwether Report. January. https://bellwether.org/publications/built-for-learning/?activeTab=1
24. Gerlich, M. (2025). AI tools in society: Impacts on cognitive offloading and the future of critical thinking. Societies, 15(1), 6. https://doi.org/10.3390/soc15010006

25. Jakes, D. (2025). Leading schools in the Age of AI: The pursuit of enduring value. David Jakes Designs LLC. November 10. https://davidjakesdesigns.com/ideas/2025/11/10/leading-schools-in-the-age-of-ai-the-pursuit-of-enduring-value
26. Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: The relevance of AI literacy, prompt engineering, and critical thinking in modern education. International Journal of Educational Technology in Higher Education, 21, 15. https://doi.org/10.1186/s41239-024-00448-3
27. Piratova, DAQ, Duarte, MM, Chiappe, A, and Delgado, FMS. (2025). Intelligent classrooms: How AI and IoT can reshape learning spaces. European Journal of Education Research, Development and Policy, 60(1), e70000. https://doi.org/10.1111/ejed.70000
28. California Department of Education (CDE). (2016). Flexible learning environments. CDE School Facilities and Transportation Services Division. https://www.cde.ca.gov/ls/fa/documents/bestpracticeflex.pdf
29. Smith System. (2025). Designing flexible learning spaces for ed tech integration. Part Three in Smith System blog series. March 25. https://smithsystem.com/smithfiles/designing-flexible-learning-spaces-for-ed-tech-integration/
30. AI Spaces. (2025). Future of educational space design: 2 trends shaping learning environments in 2025. March 21. https://aispaces.ai/blog/internal/future-educational-space-design-trends-2025
31. Allied USA. (2025). Designing the future: Essential furniture and teaching strategies for AI programming classrooms. May 19. https://www.alliedusa.com/blog/ai-programming-classrooms/

ADDITIONAL RESOURCES

- Bernal, R. (2025). How education can adapt to prepare learners for tomorrow's demands. World Economic Forum Annual Meeting. January 17. https://www.weforum.org/stories/2025/01/future-of-education-and-skills/
- Charbauski, R, Bujak, K, Carrol, J, Kim, A, and Miller, S. (2025). AI Supercycle. Steelcase Research – Work Better. https://www.steelcase.com/research/articles/ai-supercycle/
- Jakes, D. (2022). The design thinking classroom: Using design thinking to reimagine the role and practice of educators. IMPress. https://davidjakesdesigns.com/my-book
- Kim, J, Lee, H, and Cho, YH. (2022). Learning design to support student-AI collaboration: Perspectives of leading teachers for AI in education. Education and Information Technologies, 27, 6069-6104. https://doi.org/10.1007/s10639-021-10831-6
- Terada, Y and Merril, S. (2023). The science of classroom design. Edutopia. November 2. https://www.edutopia.org/article/the-science-of-
- University of Illinois Urbana-Champaign Office of Communications, College of Education. (2024). AI in schools: Pros and cons. https://education.illinois.edu/about/news-events/news/article/2024/10/24/ai-in-schools--pros-and-cons
- World Economic Forum. (2020). Schools of the future: Defining new models of education for the Fourth Industrial Revolution. World Economic Forum Report. https://www3.weforum.org/docs/WEF_Schools_of_the_Future_ Report_2019.pdf

STUDY LIMITATIONS

This study's findings should be interpreted within several important limitations.

- The small sample size and voluntary participation model introduce self-selection bias and limit generalizability across diverse K-12 contexts. This is an exploratory study and is not intended to represent all teachers and students.
- Geographic locations of participants may not reflect the full range of school settings, resource levels, and community contexts in which AI integration is occurring.
- As a cross-sectional study, findings capture perspectives at a single point in time in a rapidly evolving technological landscape. Consequently, recommendations may evolve as AI tools and pedagogical practices develop.
- The design framework represents a synthesis of student experience, practitioner wisdom, readily available publications, and emerging research, and many studies to date on educational technology lack rigorous, long-term assessment of learning outcomes. Therefore, the framework and associated "design moves" should be applied with attention to local context, resources, and community values.

Throughout the drafting of this report, the authors used generative AI tools such as Anthropic's Claude.ai, Microsoft's Co-pilot, and OpenAI's ChatGPT. These tools were used, in limited cases, to summarize research articles, locate sources, and condense and edit text. The outputs were reviewed and revised for factual accuracy and checked for plagiarism by the authors prior to publication. The AI tools did not contribute any original ideas to the report.

APPENDICES

A. SurveyMonkey Questions

B. Semi-Structured Interview Questions

C. Focus Group Questions / Discussion Prompts

D. Space Audit Questions

E. Select Survey Data Charts

Appendix A

Education Perspectives on AI-enabled K-12 Learning Environments

Your voice is important to inform future learning space design! Please complete this survey to help reimagine K-12 learning spaces for AI-enabled learning and social-emotional development.

This study will establish scalable design principles to help create learning spaces nationwide that support the use of AI tools. Results will be shared through www.oneworkplace.com.

The survey will take about 15 minutes to complete, and your answers will remain confidential.

Thank you for participating!

* *[Asterisk symbol]* indicates questions that require a response in order to limit the number of selections for some questions or to take you to the next relevant question.

* 1. Do you agree to participate in this survey knowing you can skip any question or stop at any time?

- ◯ Yes
- ◯ No

About You

These questions will help us compare survey responses across different variables and take you to the next page of questions most relevant to you.

2. What generation/age group are you? (based on your birth year)

- ◯ Traditionalist / Silent (1925-1945)
- ◯ Baby Boomer (1946-1964)
- ◯ Gen X (1965-1980)
- ◯ Millennial / Gen Y (1981-1996)
- ◯ Gen Z (1997-2012)
- ◯ Gen Alpha (2013-2028)

* 3. What is the name of the school where you work? (Enter the school district name if you work for a district rather than a school)

4. In what city and state is the school or district where you work?

City

State

5. What is your role?

- ☐ Teacher
- ☐ Paraeducator
- ☐ Library / Media / Technology Specialist
- ☐ School Leadership (e.g., Principal, Head of School, Director, Assistant Principal, etc.)
- ☐ Other (please specify)

6. What grade level(s) of students do you currently work with? *(select all that apply)*

- ☐ TK/PreK (Transitional/Pre Kindergarten)
- ☐ Kindergarten
- ☐ Elementary/Primary School
- ☐ Middle/Intermediate/Junior High School
- ☐ High School
- ☐ Other (please specify)

7. In which curriculum and instruction subject area(s) do you currently work with students? *(select all that apply)*

- ☐ Career Technical Education (CTE)
- ☐ Health
- ☐ History & Social Science
- ☐ Mathematics
- ☐ Physical Education
- ☐ Reading / Language Arts
- ☐ Science
- ☐ Visual & Performing Arts (VAPA)
- ☐ World Language / Foreign Language
- ☐ Other (please specify)

* 8. Does your work with students involve them using AI technology?

- ◯ Yes, regularly
- ◯ Yes, occasionally
- ◯ No, not yet, but I am interested
- ◯ No, I am not interested

Educators Using AI With Students

For purposes of this survey, we are using the following definitions

Personalized Learning: *customizing the learning experience to fit the needs of the individual student*

Self-directed Learning: *allowing each student to choose different activities during a lesson or unit (e.g., playlist, centers, stations)*

AI-integrated Learning: *integrating use of artificial intelligence tools into current educational processes and environments*

Augmented Reality (AR): *technology that overlays computer-generated content (e.g., images or sounds) onto the real-world physical environment for enhanced experiences*

Virtual Reality (VR): *fully immersive experiences with completely simulated environments experienced through special electronic equipment, such as headsets or gloves with sensors*

9. What motivated you to begin incorporating AI into your work with students? *(select all that apply)*

- [ ] To save time on lesson planning, grading, and administrative tasks
- [ ] To better support personalized learning and/or self-directed learning
- [ ] To promote increased student engagement
- [ ] To explore innovative teaching and learning methodologies
- [ ] To meet school leadership/district expectations or policies
- [ ] To guide students already using it
- [ ] To help students understand how to use AI appropriately
- [ ] Other (please specify)

10. So far, how do you believe the use of AI has impacted the following?

	Significantly decreased	Somewhat decreased	No change	Somewhat increased	Significantly increased	Too soon to tell	I am unable to assess given my role
Your workload	○	○	○	○	○	○	○
Your students' classroom performance	○	○	○	○	○	○	○

11. Based on your knowledge and experience, how do your students use AI technology for your classes/courses? *(select all that apply)*

- [ ] Working independently
- [ ] Working collaboratively
- [ ] Assisting in writing and composition
- [ ] As a personalized learning tutor
- [ ] Completing homework assignments
- [ ] Brainstorming and idea generation
- [ ] Creating imagery, pictures, or graphics
- [ ] Role playing and simulations
- [ ] Other (please specify)
- [ ] I am unsure

12. How confident do you feel in your ability to facilitate AI-integrated learning?

Not at all	A little	Somewhat	Very	Extremely
○	○	○	○	○

13. In which subject area(s) do you use AI technology tools/ resources to support your work with students? *(select all that apply)*

- [ ] Career Technical Education (CTE)
- [ ] Health
- [ ] History & Social Science
- [ ] Mathematics
- [ ] Physical Education
- [ ] Reading / Language Arts
- [ ] Science
- [ ] Visual & Performing Arts (VAPA)
- [ ] World Language / Foreign Language
- [ ] Other (please specify)

- [ ] None of the above

14. What, if any, elements of your current learning spaces at your school make it challenging to use AI effectively in your work with students? *(select all that apply)*

- [ ] Limited charging/power access for technology tools
- [ ] Weak or inconsistent Wi-Fi access
- [ ] Inflexible classroom designs and layouts that limit technology use
- [ ] Limited quiet/small group collaborative spaces for focused AI use
- [ ] No designated innovation or tech-enabled spaces for trying new AI tools
- [ ] Other (please specify)

- [ ] None of the above

* 15. How often do you use AI-integrated learning as part of your work with students?

- ○ Daily
- ○ A few times a week
- ○ About once a week
- ○ A few times a month
- ○ About once a month
- ○ Less than once a month
- ○ Never
- ○ Prefer not to state

Educators Not Using AI With Students

16. What are the reasons you have not used AI in your work with students?*(select all that apply)*

- [ ] Lack of access to AI tools/technology
- [ ] Lack of AI training or knowledge
- [ ] Concern about accuracy or reliability of AI-generated responses
- [ ] Concern about academic integrity (cheating, plagiarism using AI)
- [ ] Concern about equity/access of AI tools for students
- [ ] AI use is not permitted by school or district policy
- [ ] I don't see value of using AI for my subject/grade level
- [ ] Concern about students developing an over-reliance on AI
- [ ] Other (please specify)

17. Do you anticipate using AI in your work with students in the future?

- ○ Yes, definitely
- ○ Possibly, depending on resources/training
- ○ I'm unsure
- ○ Not at all

18. How ready do you feel about adopting AI-integrated learning in your work with students?

- ○ Not at all, I'm not ready to adopt it
- ○ A little, I'm weighing the benefits versus costs/barriers of adopting it
- ○ Somewhat, I'm prepared to experiment with it
- ○ Very, I'm starting to experiment with it occasionally
- ○ Extremely, I'm ready to adopt it

19. How confident do you feel in your ability to start using AI-integrated learning in your work with students?

Not at all	A little	Somewhat	Very	Extremely
○	○	○	○	○

20. How important is it to you to start integrating AI into your work with students?

Not at all	A little	Somewhat	Very	Extremely
○	○	○	○	○

21. How important do you feel it is for your students to understand and use AI effectively for their future?

Not at all	A little	Somewhat	Very	Extremely
○	○	○	○	○

AI Integration

For purposes of this survey, we are using the following definitions

Personalized Learning: *customizing the learning experience to fit the needs of the individual student*

Self-directed Learning: *allowing each student to choose different activities during a lesson or unit (e.g., playlist, centers, stations)*

AI-integrated Learning: *integrating use of artificial intelligence tools into current educational processes and environments*

Augmented Reality (AR): *technology that overlays computer-generated content (e.g., images or sounds) onto the real-world physical environment for enhanced experiences*

Virtual Reality (VR): *fully immersive experiences with completely simulated environments experienced through special electronic equipment, such as headsets or gloves with sensors*

22. Which, if any, of the following technology tools/resources are currently available in one or more learning environments at your school? *(select all that apply)*

- ☐ Artificial Intelligence (AI) tools (adaptive learning software, AI tutors, etc.)
- ☐ Augmented Reality (AR) applications
- ☐ Virtual Reality (VR) applications
- ☐ Various educational software applications, including online training tools
- ☐ Laptops for students
- ☐ AI-powered collaborative tools and interfaces (e.g., Miro, Mural, Zoom, MS Teams)
- ☐ Voice-activated assistants
- ☐ Projector & screen
- ☐ Headsets/microphones for individual learning
- ☐ Interactive movable whiteboards / "smart" boards (e.g., Promethean)
- ☐ Other (please specify)

  [ ]

- ☐ None of the above

23. In your opinion, how well is AI integration currently supported in the following learning spaces at your school?

	Not at all	A little	Somewhat	Very	Extremely	N/A
The classroom(s) you use	◯	◯	◯	◯	◯	◯
Shared indoor spaces on campus	◯	◯	◯	◯	◯	◯
Shared outdoor spaces on campus	◯	◯	◯	◯	◯	◯

* 24. What do you see as the primary advantages of AI integration in K-12 learning environments? *(select up to 3)*

- ☐ Personalized tutoring experiences through an AI agent
- ☐ Real-time assessment and feedback as students progress through course or class learning goals
- ☐ Reduced teacher workload and administrative tasks
- ☐ Enhanced data analytics for understanding student performance and progress
- ☐ Assisting and promoting the development of student creativity
- ☐ Prompting unique insights (e.g., when students blend their ideas and those of AI)
- ☐ Enriched collaborative classroom experiences
- ☐ Enhanced problem-solving experiences developed through student-AI collaboration
- ☐ Other (please specify)

  _____

- ☐ I am unsure

* 25. What do you see as the biggest challenges to successfully implementing AI-integrated learning environments at scale? *(select up to 3)*

- ☐ Teacher training and professional development needs
- ☐ Ensuring equitable access to AI tools and resources
- ☐ Rapidly changing technology requiring frequent updates
- ☐ Resistance to change
- ☐ Data privacy and security
- ☐ Uncertainty about the effectiveness of AI improving student outcomes
- ☐ Concerns about how AI agents have been developed (training bias, environmental concerns, etc.)
- ☐ Other (please specify)

  _____

- ☐ I am unsure

26. How concerned are you about AI integration negatively impacting any of the following, which contribute to student social development?

	Not at all	A little	Somewhat	Very	Extremely
Reduced face-to-face interaction and communication skills	◯	◯	◯	◯	◯
Decreased empathy and emotional intelligence	◯	◯	◯	◯	◯
Over-reliance on AI technology for problem-solving	◯	◯	◯	◯	◯
Weakened collaborative skills and teamwork abilities	◯	◯	◯	◯	◯
Decline in human mentorship and guidance relationships	◯	◯	◯	◯	◯

27. How do you personally use AI technology, if at all? *(select all that apply)*

- ☐ Generating text or proofreading
- ☐ Writing communications to parents or the community
- ☐ Generating or editing images/media
- ☐ Planning lessons / developing curriculum
- ☐ Grading student assignments
- ☐ Analyzing student performance data
- ☐ Gathering information/research
- ☐ Analyzing/visualizing data
- ☐ Building my skills / professional development
- ☐ Personal uses outside my professional role (e.g., travel recommendations, medical questions, etc.)
- ☐ Other (please specify)

  _____

- ☐ None of the above

Looking Ahead

* 28. Which school environment features are most important for supporting AI-integrated learning? *(select up to 3)*

- [ ] Flexible room configurations (movable walls/panels)
- [ ] Writable surfaces and digital displays throughout spaces
- [ ] Multipurpose spaces that support quick activity transitions
- [ ] Quiet zones and study stations for focused individual work (e.g., carrels)
- [ ] Active zones that allow noise and movement for dynamic teamwork
- [ ] Maker spaces and hands-on collaborative areas
- [ ] Adaptable furniture (varied sizes of seating, comfort features, etc.)
- [ ] Other (please specify)
- [ ] I am unsure

* 29. Which school technology features are most important for supporting AI-integrated learning? *(select up to 3)*

- [ ] Shared equipment storage
- [ ] Virtual/hybrid learning platforms (school-specific)
- [ ] Voice-enabled private/semi-private AI interaction spaces
- [ ] Dedicated AI workspaces for teachers (optimized for particular AI applications)
- [ ] Robust digital infrastructure (high-speed connectivity, charging stations, device access campus/site-wide)
- [ ] Specialized immersive technology labs (AR/VR)
- [ ] Extended digital access to outdoor areas
- [ ] Technology-rich libraries and media centers
- [ ] Other (please specify)
- [ ] I am unsure

30. How do you think AI integration will change the way students learn, if at all? *(select all that apply)*

- [ ] Increased use of personalized/self-directed learning
- [ ] Increased use of collaborative/project-based learning
- [ ] Greater reliance on AI and other digital tools for learning
- [ ] Increased use of simulations/immersive experiences (e.g., AR/VR)
- [ ] Increased use of blended learning (mix of in-person and online/AI-enabled work)
- [ ] More learning outside the school campus (virtual/remote, hybrid, extended campus, community-based)
- [ ] More immediate feedback on their work from AI-supported tools
- [ ] More assistance developing the ability to be expressive and creative
- [ ] Other (please specify)
- [ ] I am unsure

31. How do you think AI integration will change your role in the next five years, if at all?

32. What skills or support would you need to help you integrate AI effectively into your work with students?

33. How much do you agree or disagree that the following will improve recruitment and retention of educators in the profession?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Increased use of technology in the classroom (such as AI, AR, VR tools)	○	○	○	○	○
Reimagined learning space designs	○	○	○	○	○

(Optional) What are some of the reasons you agree or disagree?

34. Please provide any additional comments or ideas you want to share about AI-enabled K-12 learning environments:

Industry Perspectives on AI-enabled K-12 Learning Environments

Your voice is important to inform future learning space design! Please complete this survey to help reimagine K-12 learning spaces to enable AI-integrated learning and social-emotional development.

We want to know your perspective on how learning space design can maximize the educational impact of AI tools. This study will establish scalable design principles to help create learning spaces nationwide that support the use of AI tools. Results will be shared through www.oneworkplace.com.

The survey will take about 5 minutes to complete, and your answers will remain confidential.

Thank you for participating!

* *[Asterisk symbol]* indicates questions that require a response in order to limit the number of selections for some checkbox questions.

* 1. Do you agree to participate in this survey knowing you can skip any question or stop at any time?

- ◯ Yes
- ◯ No

2. How do you personally use AI technology, if at all? *(select all that apply)*

- ☐ Generating text or proofreading
- ☐ Generating or editing images/media
- ☐ Planning projects / developing work plans
- ☐ Gathering information/research
- ☐ Analyzing/visualizing data
- ☐ Building my skills / professional development
- ☐ Personal uses outside my professional role (e.g., travel recommendations, medical questions, etc.)
- ☐ Other (please specify)

  _____
- ☐ None of the above

3. How do you think AI integration will change your role in the next five years, if at all?

_____

* 4. What skills and competencies do you see most lacking in early-career employees in the tech industry? *(select up to 3)*

- ☐ Written and oral communication
- ☐ Project and time management
- ☐ Critical thinking and problem solving
- ☐ Cross-disciplinary collaboration and teamwork
- ☐ Creativity and innovation
- ☐ Technology and digital tools literacy
- ☐ Flexibility in dynamic environments
- ☐ Curiosity and learning agility
- ☐ Other (please specify)

  _____
- ☐ I am unsure

5. Which of the following technology tools/resources are currently available in one or more work environments at your company? *(select all that apply)*

- [ ] Artificial Intelligence (AI) tools (AI tutors, ChatGPT, Claude.ai, Otter.ai, etc.)
- [ ] Augmented Reality (AR) applications
- [ ] Virtual Reality (VR) applications
- [ ] Various educational software applications, including online training tools
- [ ] Laptops for employees
- [ ] AI-powered collaborative tools and interfaces (e.g., Miro, Mural, Zoom, MS Teams)
- [ ] Voice-activated assistants
- [ ] Other (please specify)

- [ ] None of the above

6. How have current workplace environments helped/hindered employee innovation, creativity, and/or productivity?

For purposes of this survey, we are using the following definition

AI-integrated Work: *integrating use of artificial intelligence tools into current work processes and environments*

* 7. Which workplace environment features are most important for supporting AI-integrated work? *(select up to 3)*

- [ ] Flexible room configurations (movable walls/panels)
- [ ] Writable surfaces and digital displays throughout spaces
- [ ] Multipurpose spaces that support quick activity transitions
- [ ] Quiet zones and work stations for focused individual work
- [ ] Active zones that allow noise and movement for dynamic teamwork
- [ ] Maker spaces and hands-on collaborative areas
- [ ] Adaptable furniture (varied sizes of seating, comfort features, etc.)
- [ ] Other (please specify)

- [ ] I am unsure

* 8. Which workplace technology features are most important for supporting AI-integrated work? *(select up to 3)*

- [ ] Shared equipment storage
- [ ] Virtual/hybrid work platforms
- [ ] Voice-enabled private/semi-private AI interaction spaces
- [ ] Dedicated AI workspaces (optimized for particular AI applications)
- [ ] Robust digital infrastructure (high-speed connectivity, charging stations, device access campus/site-wide)
- [ ] Specialized immersive technology labs (AR/VR)
- [ ] Extended digital access to outdoor areas
- [ ] Other (please specify)

- [ ] I am unsure

For purposes of this survey, we are using the following definition

AI-integrated Learning: *integrating use of artificial intelligence tools into current educational processes and environments*

* 9. What do you see as the primary advantages of AI-integrated learning in K-12 education? *(select up to 3)*

- [ ] Personalized tutoring experiences through an AI agent
- [ ] Real-time assessment and feedback as students progress through course or class learning goals
- [ ] Reduced teacher workload and administrative tasks
- [ ] Enhanced data analytics for understanding student performance and progress
- [ ] Assisting and promoting the development of student creativity
- [ ] Prompting unique insights (e.g., when students blend their ideas and those of AI)
- [ ] Enriched collaborative classroom experiences
- [ ] Enhanced problem-solving experiences developed through student-AI collaboration
- [ ] Other (please specify)

- [ ] I am unsure

10. Please provide any additional comments or ideas you want to share about AI-integrated working/learning environments:

About You

These questions will help us compare survey responses across different variables.

11. What is your role?

- [ ] Data & Analytics
- [ ] Executive Leadership
- [ ] Finance & Legal
- [ ] Operations & Support
- [ ] Product & Design
- [ ] Research & Innovation
- [ ] Sales & Marketing
- [ ] Software Engineering & Development
- [ ] Other (please specify)

12. In what city and state do you work?

City

State

13. *(Optional)* What is your company name?

Company Name

14. How would you describe your company's primary/core products or services?

15. What generation/age group are you? (based on your birth year)

- ( ) Traditionalist / Silent (1925-1945)
- ( ) Baby Boomer (1946-1964)
- ( ) Gen X (1965-1980)
- ( ) Millennial / Gen Y (1981-1996)
- ( ) Gen Z (1997-2012)

Appendix B

Interview Questions About AI and Space Design

Education Professionals

1. How are you using AI?
   Can you describe specific ways you are currently using AI in your professional work or how you've seen educators use it in teaching and learning?

2. What are your perspectives on AI in education?
   What excites you, concerns you, or surprises you most about the integration of AI into educational practice?

3. From your perspective, how has AI changed the human experience of teaching and learning—for teachers and for students?
   In what ways has it reshaped relationships, workflow, or the sense of purpose in learning?

4. Based on what you've seen or experienced, how might the design of learning spaces evolve to support a more human-AI collaborative experience in teaching and learning?
   What kinds of spatial, technological, or cultural shifts might be needed to make that collaboration authentic and meaningful?

5. How do you think AI changes what it means to "learn"?
   Does it redefine what students should know, how they learn it, or how we assess understanding?

6. What do you think educators need most to thoughtfully and responsibly integrate AI into their practice?
   Are there specific supports, mindsets, or conditions that make that integration successful?

Design Professionals

1. **How are you using AI?**
   Can you describe specific ways you are currently using AI in your professional work or how you've seen educators use it in teaching and learning?

2. **What is your perspective on the desired school experience, broadly speaking?** (i.e., with or without AI)
   What kind of culture and experience should K-12 learning spaces cultivate and support? How is AI shaping teaching and learning, school experiences, and future career readiness?

3. **What are your perspectives on AI in education?**
   What excites you, concerns you, or surprises you most about the integration of AI into educational practice? What are the essential elements of a school experience with Ai-integrated tools?

4. **As a designer, how do you now think about creativity, authorship, and originality when AI can generate text/ideas so easily?**
   How do you help others navigate this new creative landscape?

5. **Based on what you've seen or experienced, how might the design of learning spaces evolve to support a more human–AI collaborative experience in teaching and learning?**
   What kinds of spatial, technological, or cultural shifts might be needed to make that collaboration authentic and meaningful? What types of spaces or furnishings are needed?

6. **How do you think AI changes what it means to "learn"?**
   Does it redefine what students should know, how they learn it, or how we assess understanding? What complexities and opportunities are added when we add AI in the equation?

7. **How do you envision ideal future learning environments?**
   What kinds of spatial, technological, or cultural shifts might be needed? What types of spaces or furnishings are needed?

Technology Industry Professionals

1. **How are you using AI?**
   Can you describe specific ways you are currently using AI in your professional work or how you've seen educators use it in teaching and learning?

2. **What is your perspective on the desired school experience, broadly speaking?** (i.e., with or without AI)
   What kind of culture and experience should K-12 learning spaces cultivate and support? How is AI shaping teaching and learning, school experiences, and future career readiness? What are the essential elements of a school experience with AI-integrated tools?

3. **How is critical thinking impacted by AI?**
   There is a fear in education that AI may reduce students' critical thinking or eventually replace human jobs and experiences. Do you see that happening?

4. **How might learning spaces be designed to best support the use of AI?**
   What types of spaces or furnishings are needed? What does an AI-enabled learning space look like?

5. **How do you envision ideal future learning environments?**
   What complexities and opportunities are added when we add AI in the equation?

6. **What adaptive skills are needed in AI and other STEM-focused occupations?**
   What skills should be prioritized to prepare students for industry roles, especially in technology?

7. **How have current environments helped/hindered employee innovation, creativity, and productivity?**
   Do you see an increasing reliance on AI among job candidates and employees?

8. **What do AI-enabled workplaces look like?**
   What type of environments best support AI-based work or technology-heavy work?

9. **How do you envision ideal future work environments?**
   How can K-12 learning environments be designed to best prepare students for tech industry work environments and roles?

Appendix C

Focus Group Questions / Discussion Prompts About AI and Space Design

Students

Experience Using AI

1. On a scale of 1-10, where 1 is a beginner and 10 is an expert, what is your experience level with AI? How would you rate your ability?

2. How long have you been using AI? Where did you or are you learning how to use AI? How do you use it in school? Do you use it for other things outside of schoolwork?

3. Are you ever using AI in groups? Would you envision the need for all members of a group to see the same screen, or would there be pods with everyone individually tinkering?

4. Are there risks or dangers preventing you from using AI more?

5. Has AI impacted social interactions for you?

The School Learning Experience

6. Tell us about your school learning experience and how AI is supporting that. When would you use AI? When wouldn't you use AI? Are any assignments explicitly using AI?

7. What is the best thing about learning? What do you think learning is *for*, and does AI help you move closer to that purpose or farther away?

8. In what ways does AI not support learning? When would you not use AI for learning?

9. How would you define "personalized learning"?

10. As educators, we often talk about the productive struggle of learning. Does AI eliminate or reduce that, in your opinion?

11. Does AI help you understand yourself better as a learner, or does it sometimes replace your own thinking?

12. Do you want to work with an AI Tutor, yes or no, and why or why not? If you had a choice between an AI tutor or human tutor, which would you choose and why?

Learning Spaces

13. When you are at school, where do you like to spend time? Where is your favorite place to learn at your school? Where do you learn best?

14. Where is collaboration happening at your school? Only in classrooms? In hallways?

15. What are the general characteristics of school spaces that resonate with you? What are some characteristics of spaces that help you learn?

16. Are there specific things about your learning spaces that could be improved or designed to create more effective AI use? How do you feel about the following types of spaces?
    a. Independent study areas for focused work with AI?
    b. Collaborative space with voice-activated AI throughout the room?
    c. AI Design Studio for prototyping ideas? Like a lab with things you need to build your ideas *(like rubber bands, sticks and other materials to prototype and use AI)*
    d. An AI Data and Insight Bar in a library to help with AI use or interpretation, guidance?

17. Are there any places on campus where AI should not be used for learning? Places where it's off limits or would feel/be inappropriate?

18. How do you design spaces that are distinctly human and inspire human-to-human interaction?

AI and the Future

19. How important is AI for your future / how are you learning about AI?

20. What will the school experience look like in 5-10 years with use of AI?

21. What part of learning do you hope AI *never* replaces, and why is that part essential?

Technology and Design Industry Professionals

Experience Using AI

1. How are you using AI?

2. How have you seen AI shift in your work in the last 10 years?

The Learning Experience

3. What are the skills (technical or not) or mindsets that students need to have when they leave school to position themselves well for careers and entering the workforce? What should students be equipped with when they come out of school?
    a. Is it different based on industry (e.g., technology, design, or other industry)?
    b. How do you see this shifting learning?

4. How should educators be using AI or trying to teach students how to use it?

5. In terms of teaching the foundational fundamentals or building blocks of knowledge for understanding complex concepts and fostering critical thinking, how do you see that shifting?

6. Do you see it as a concern that students can fast-track through or cheat when completing assignments using AI like ChatGPT? How, if at all, does it differ from past methods students used, like CliffsNotes study guides, internet searches, Chatbots, classmate doing the work for them, etc.?

7. When should students completely avoid using AI?

8. Do students need guidance to get them started using AI? What is the best balance between human and AI tutors?

9. Do you ever use AI in group settings, or do you primarily use by yourself or as personal admin support?

Learning Spaces

10. How do you see the use of AI shifting the way learning spaces are used or the types of spaces needed for teaching and learning with AI tools? Is there a need for more private spaces for individual work or more interactive, disconnected from digital technologies?

Appendix D

Space Audit Questions and Observations of an AI-First School

Layout & Furniture / Equipment

1. How are physical spaces designed to support AI-driven learning versus collaborative learning?
    a. If you could add anything to the spatial layout or capacity of the school, what would that be?
    b. What spaces resonate most with students and why?

2. Are there zones for quiet focus, collaboration, tech-heavy work, and presentation?
    a. Do layouts support whole-group instruction and small, AI-supported breakout work?
    b. Are group areas reconfigurable?

3. Are there mostly desks or tables—and are they movable?

4. Are there different seating types (soft seating, high stools, pods)?

5. Are there digital walls, dashboards, or flexible displays of student work?

Student Learning Experience

6. Are students using laptops/tablets 1:1, shared carts, desktops, or mixed?

7. Are students switching between AI tools, notebooks, and physical materials?

8. Are students moving freely between spaces or staying mostly in single classrooms?

Educator Role & Classroom Experience

9. What is the educator role during the AI-assisted learning parts of the day?
    a. How has AI changed the daily teaching experience at the school?

10. Are educators primarily circulating, coaching, or giving direct instruction?

11. What spaces do educators use to prepare AI-assisted lessons?

Use of AI for Teaching & Learning

12. What are the *most* effective contributions or benefits of AI at the school?

13. What are the *least* effective aspects or limitations of AI at the school?

14. How do you find balance between individualized AI-assisted work and group/collaborative learning?
    a. Do the periods of independent AI-assisted work feel isolating to students?

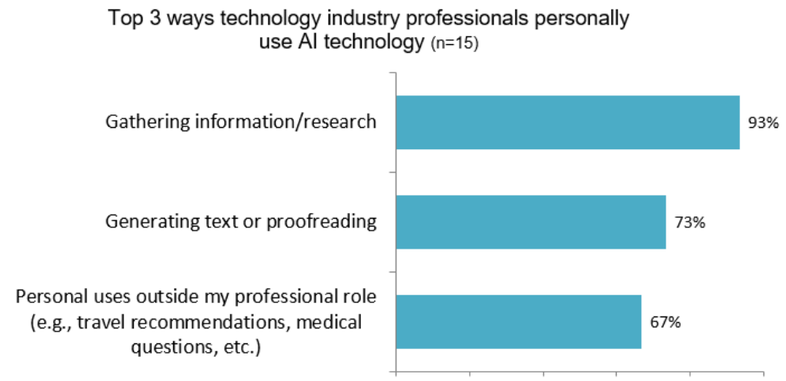
15. How is each student's interests, prior knowledge, and ability level incorporated into the AI-assisted learning components of the school?
    a. Does the AI platform adjust pacing and instructional methodology in real time based on the individual student's progress through the mastery experience?
    b. What software platforms are used?

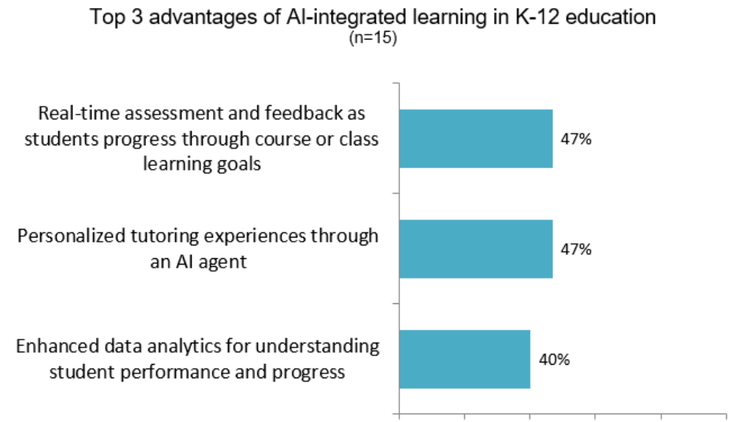
16. Is there an on-site "help desk" or tech support model?

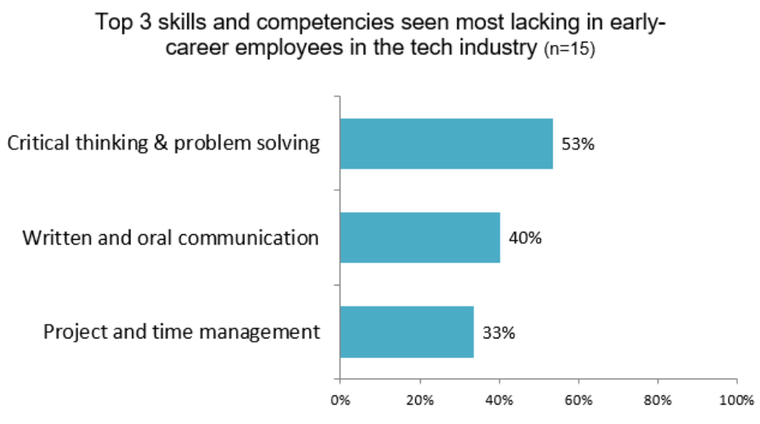
Appendix E

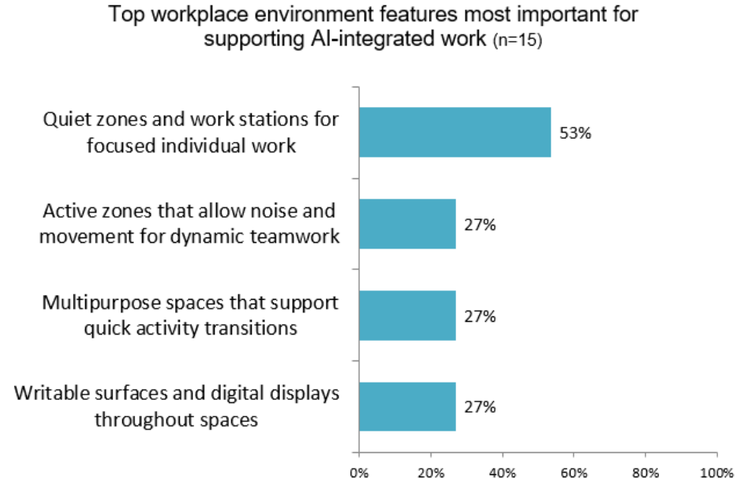
Select Survery Data Charts

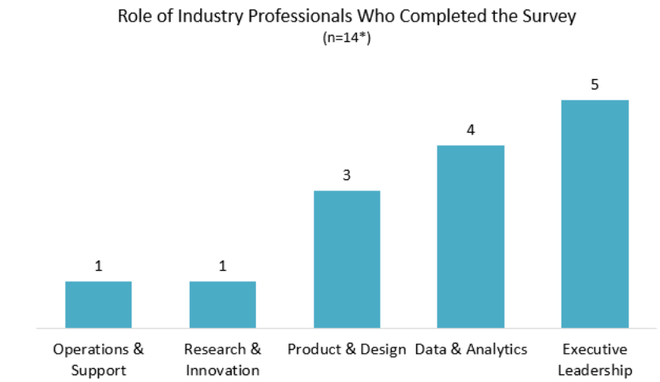
INDUSTRY Perspectives on AI-enabled K-12 Learning Environments





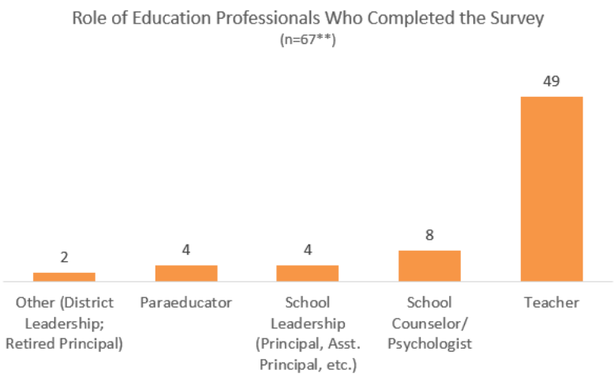






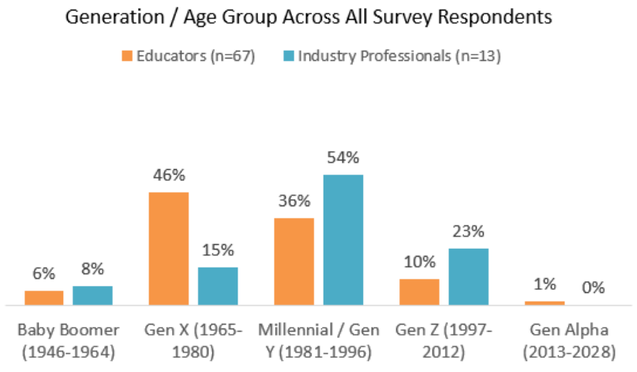
*9 work in California; 2 in Texas; 2 in the United Kingdom; 1 did not state

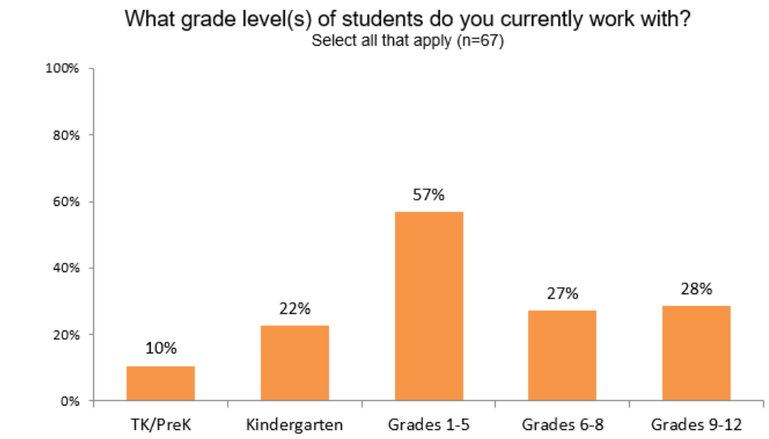
---

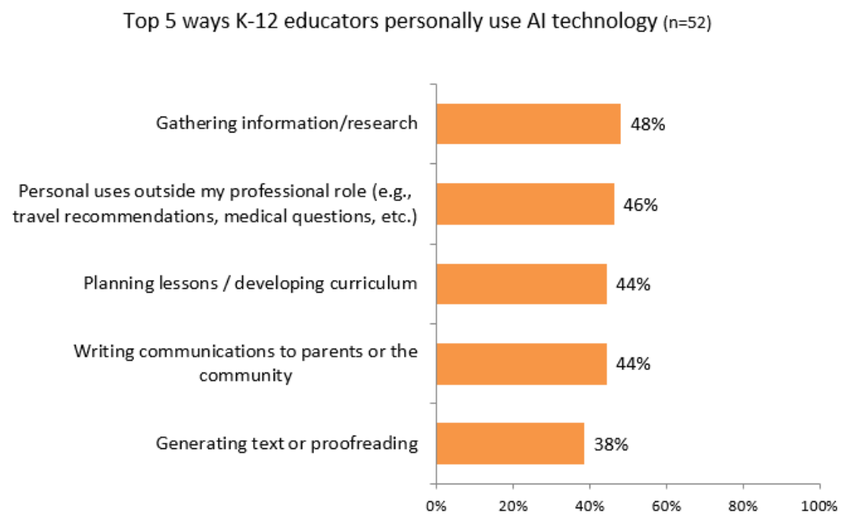


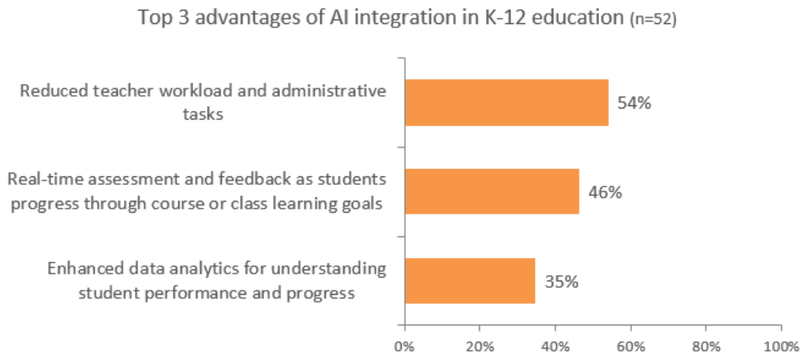
**38 work in California; 19 in Texas; 5 in Colorado; 4 in Other States (IN, RI, WA, WI); 1 did not state

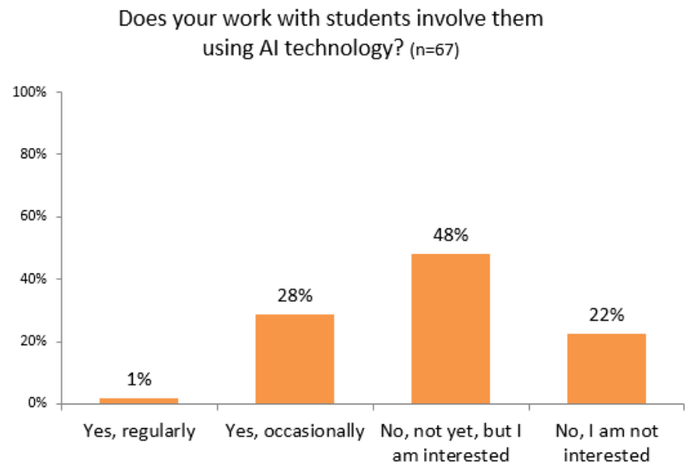
---

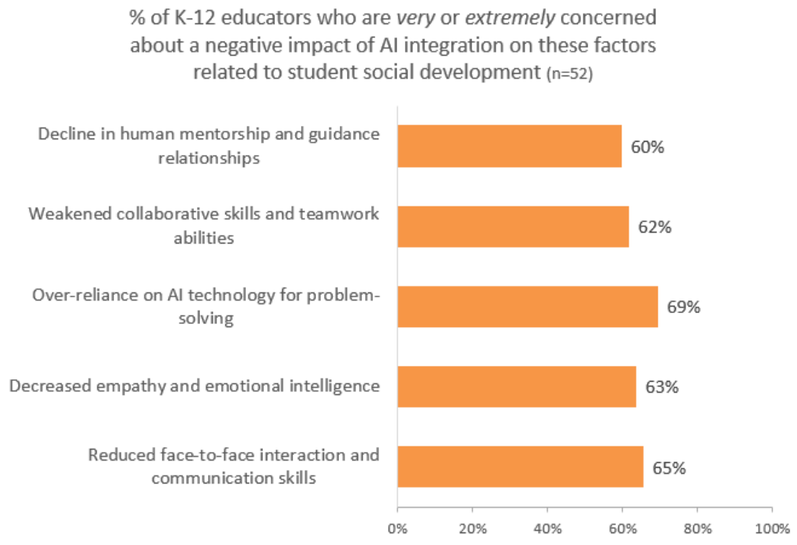




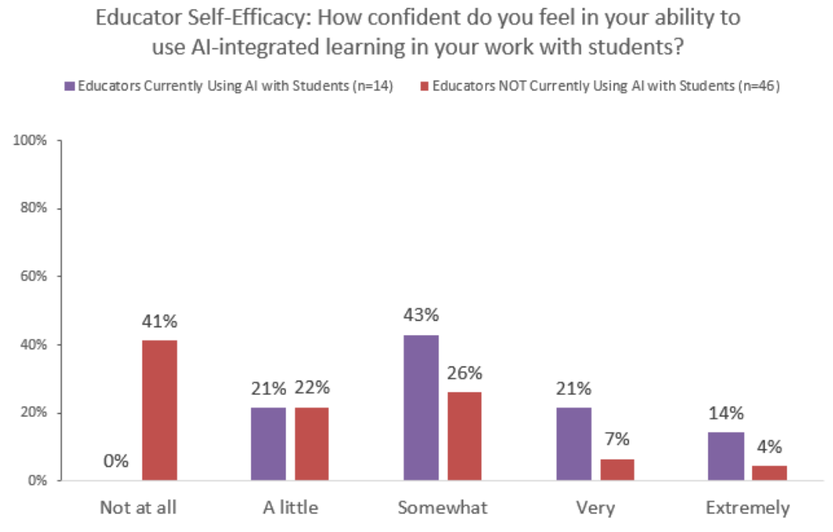




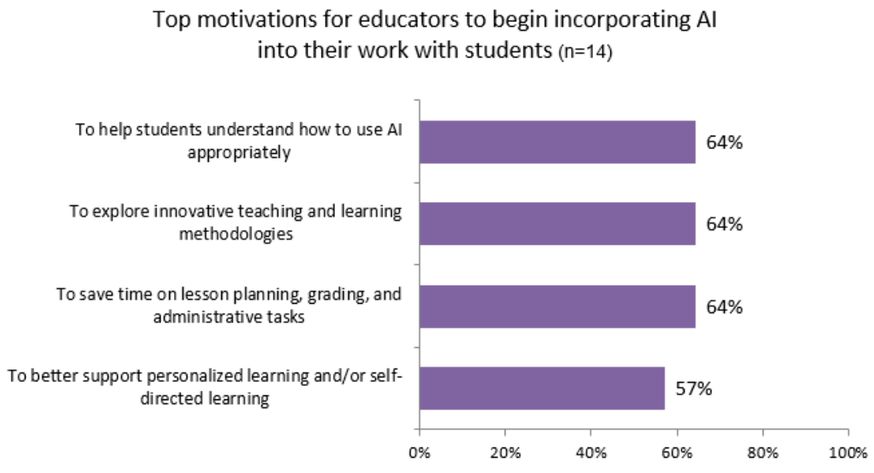


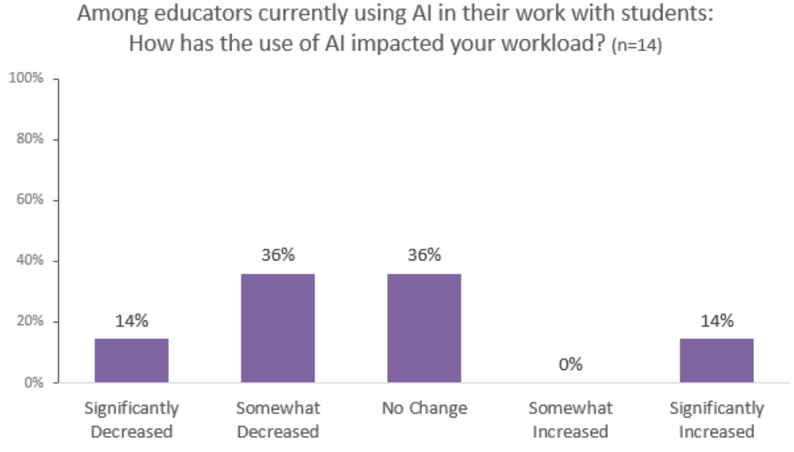


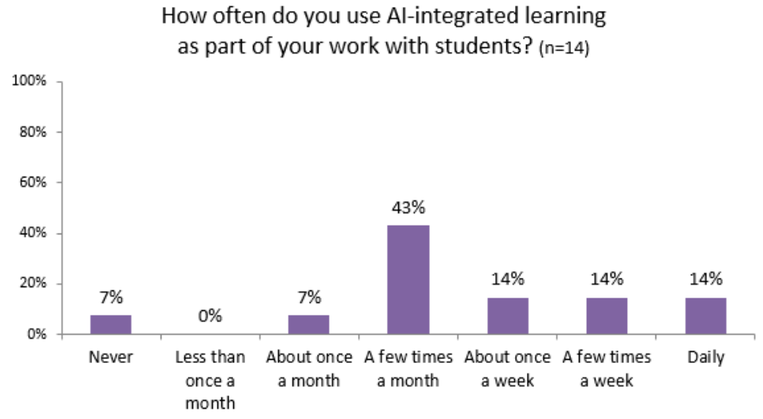
Educators Currently Using AI in Their Work with Students Compared to Those Who Are Not



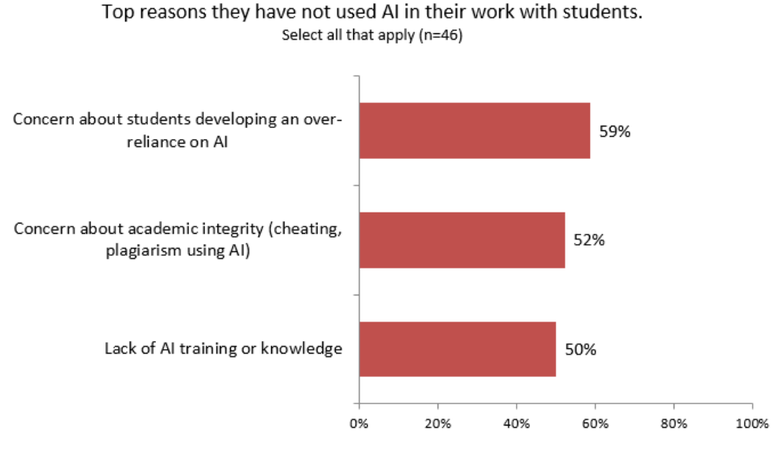
Educators Currently Using AI in Their Work with Students

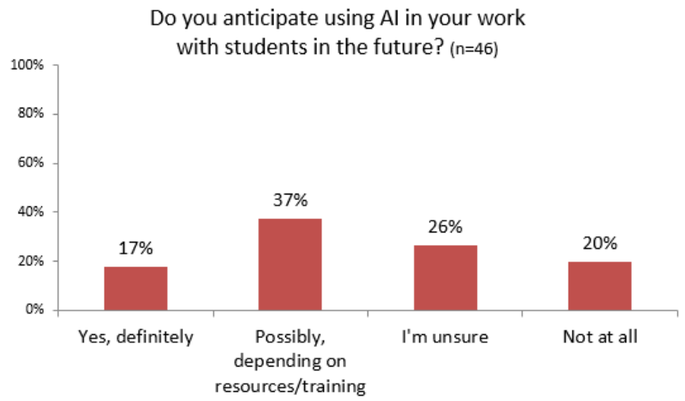


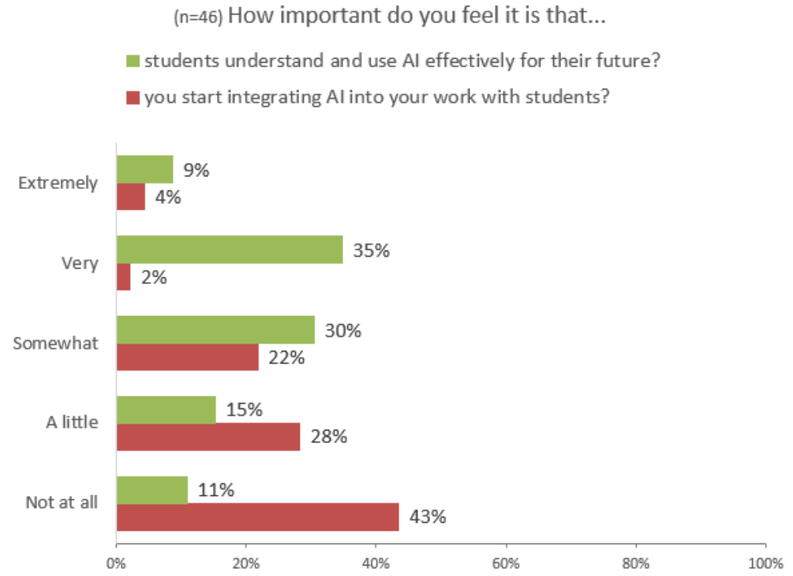


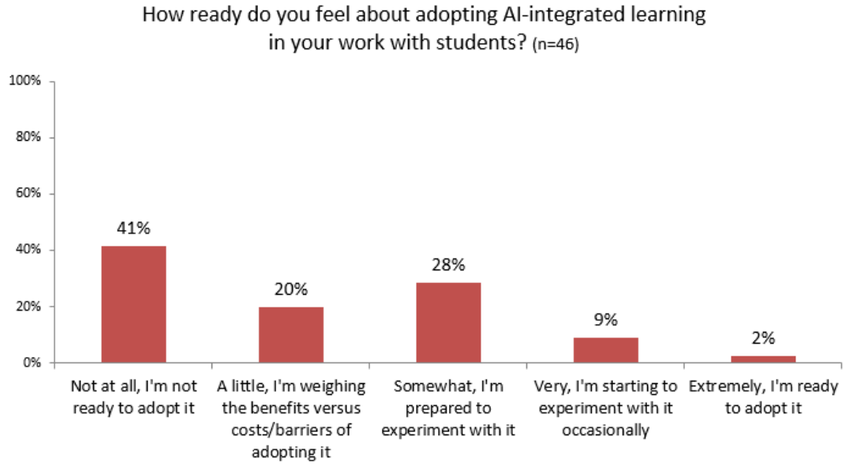


Educators NOT Currently Using AI in Their Work with Students

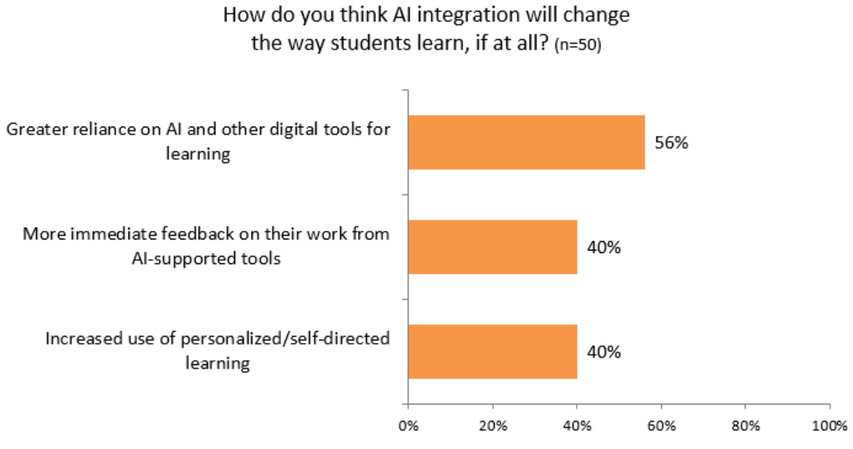




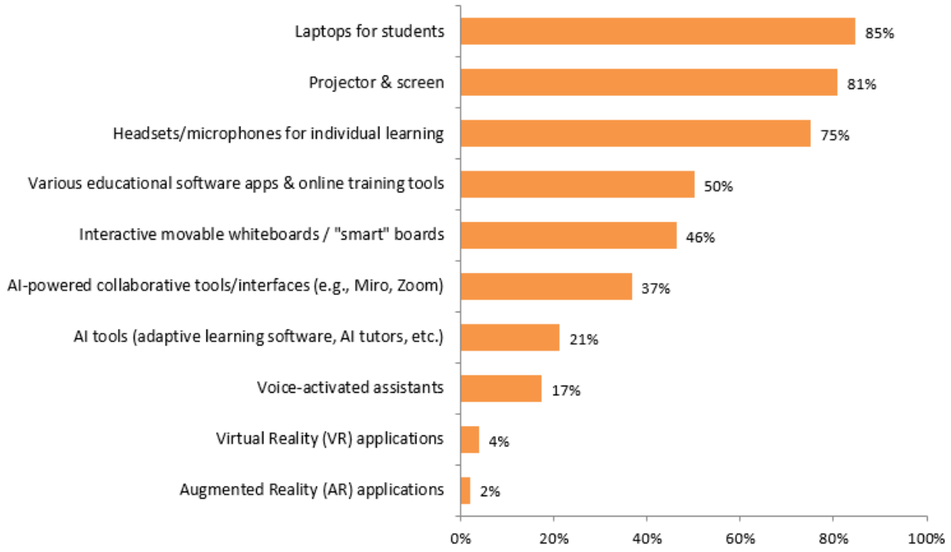




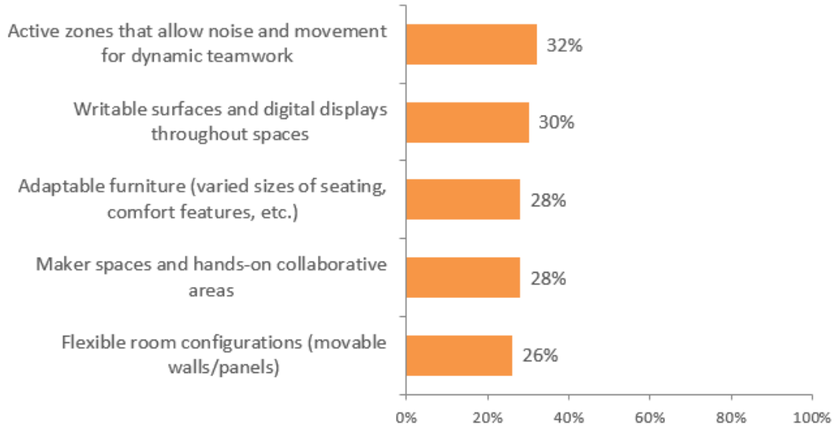
Learning Experience, Spaces & Resources



Technology tools/resources currently available in one or more learning environments at school (n=52)



Top school environment features most important for supporting AI-integrated learning (n=50)



Top school technology features most important for supporting AI-integrated learning (n=50)