May 2026

GEORGIA PATHWAYS

MAGAZINE

Embracing The Future of STEM Education

Cognitive Sovereignty

From Standards to Strategy

The Technology Association of Georgia Education Collaborative (TAG-Ed) strengthens the future workforce by providing students with relevant, hands-on STEM learning opportunities and connecting them to Technology Association of Georgia (TAG) resources.

Formerly the TAG Foundation, TAG-Ed is a 501(C)(3) non-profit organization formed by TAG in 2002. Later, the organization's name was re-branded to TAG Education Collaborative to facilitate our role as the leaders for K-12 STEM education in Georgia.

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Welcome to the May 2026 edition of Georgia Pathways Magazine – your source for innovation, learning, and the emerging technologies transforming the future of education and the workforce in Georgia and beyond.

In this issue, we explore how preparing learners for what's next requires an understanding of how knowledge is built, applied, and continually redefined. Embracing the future of STEM education means more than adopting new tools; it requires rethinking how technology can expand access, deepen understanding, and better align learning with evolving career pathways. As classrooms incorporate advanced digital capabilities, the focus shifts toward preparing students not just to use technology, but to innovate with it.

At the same time, Cognitive Sovereignty Under Compression raises important questions about how accelerated access to information is changing the learning process itself. While technology can deliver faster answers, it also challenges learners to preserve essential skills of investigation, analysis, and critical inquiry, the foundation of enduring knowledge.

Innovation is also reflected in the materials that frame our everyday lives. Breakthroughs in tough, reusable adhesives remind us that even familiar technologies are not fixed; everything can be improved through continued discovery.

TAG
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Equally important, The Value of Play in Education highlights how creativity, collaboration, and exploration remain essential drivers of learning. Play fosters imagination and problem-solving skills that translate into success in today's dynamic workforce.

Finally, From Standards to Strategy underscores a growing national shift: data and AI literacy are no longer specialized skills, but foundational competencies required across industries.

Together, these themes reflect a simple but powerful truth: innovation is not confined to one discipline. It is shaped by how we learn, how we question, and how we create every day, in every classroom, and across every pathway to opportunity.

Larry K. Williams
President
TAG / TAG-Ed

Larry K. Williams serves as the President and CEO of the TAG and the TAG Education Collaborative. TAG-Ed's mission is to strengthen Georgia's future workforce by providing students with relevant, hands-on STEM learning opportunities by connecting Technology Association of Georgia (TAG) resources with leading STEM education initiatives.

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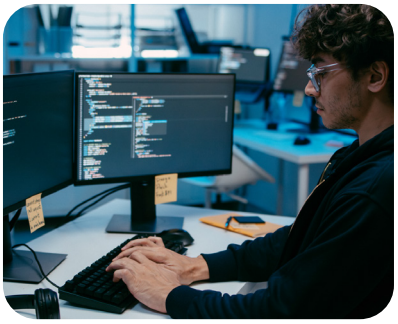

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To understand STEM...

...you must DEFINE STEM. You cannot define an acronym without defining each of the words the letters stand for.

Universities and organizations around the world continue to debate what a STEM career is, but there is no doubt that "every career" uses STEM skills and this observation remains the focus of STEM Magazine.

Science: "The systematic accumulation of knowledge" (all subjects and careers fields)

Technology: "The practical application of science" (all subjects and careers)

Engineering: "The engineering method: a step by step process of solving problems and making decisions" (every subject and career)

Math: "The science of numbers and their operations, interrelations, combinations, generalizations, and abstractions" (every career will use some form[s])

For a moment, set aside any preconceived notions of what you think a STEM career is and use the above dictionary definitions to determine the skills used in any career field you choose.

These definitions are the "real" meaning of STEM and STEM careers.

Embracing the Future of STEM Education:

A Technologist & Educator's Insight into AI and Advanced Learning Technologies in the Classroom

By Brandon Ellis

A Teacher's Journey into the Technological Renaissance

As an educator in the STEM field, I stand at the crossroads of a significant educational transformation. The integration of Artificial Intelligence (AI), simulations, and digital twins is not just a trend; it's a paradigm shift that is reshaping the landscape of learning and teaching. This article, drawn from my experiences and observations in the classroom, delves into how these technologies are revolutionizing STEM education, offering insights into their potential and their challenges.

Inadequacy of Traditional Educational Models

I've witnessed the growing disconnect between traditional educational methods and the needs of our digitally inclined students. Memorization and standardized testing, once the mainstays of education, are increasingly insufficient in a world driven by rapid technological change.

These methods fall short in engaging students and preparing them for the complexities of the modern world, highlighting the need for an educational overhaul. The traditional approach often fails to stimulate students' curiosity and interest.

This lack of engagement is a critical issue, as it can lead to lower academic achievement and reduced interest in learning. By incorporating more interactive and technology-driven methods, we can better engage students and make learning more appealing and relevant to their lives.

Personalized Learning through AI: A Classroom Transformation

Integrating AI into the classroom has been a transformative experience. AI's ability to tailor learning experiences to individual student needs has brought a new level of personalization and engagement to education. Students who once struggled with one-size-fits-all approaches now thrive, as AI adapts to their unique learning styles and paces. This shift has not only enhanced academic performance but also fostered a more inclusive and dynamic learning environment.

"*AI in education is like having a personal tutor for every student. It's incredible to witness how it adapts to each learner's pace, boosting their confidence and academic growth.*"

- High School STEM Teacher, Memphis, TN

Bridging Theory and Practice with Simulations

In my classroom, simulations have revolutionized the way students interact with complex STEM concepts. These tools have been instrumental in making abstract theories both tangible and engaging. For example students learning the intricacies of physics can use virtual models to examine how increasing force changes the velocity of a rocket in real time.

This interactive approach allows them to visualize phenomena that are otherwise impossible to observe in a traditional classroom setting. Similarly, in biology, simulations enable students to conduct genetic experiments in a virtual lab, providing a hands-on experience that deepens their understanding of genetics and molecular biology.

These simulated environments not only make learning more interactive but also help students connect theoretical knowledge with real-world applications, fostering a deeper appreciation for the subject matter.

"*Using simulations in the classroom makes me feel like Ms. Frizzle on the Magic School Bus. My students love getting up close and personal with topics I traditionally struggled to show them.*"

- Middle School Computer Science Teacher, Harrisburg, PA

Digital Twins: A Gateway to Real-World Learning

The introduction of digital twins in the educational sphere has been groundbreaking. As virtual replicas of physical systems, they offer students an unprecedented opportunity to explore and interact with complex models in a risk-free environment. In my teaching, I've utilized digital twins to bring real-world scenarios into the classroom.

For instance, students partner with local farms to learn how to build and design their own farms and farm controllers. In the students' simulations they can see and walk around their virtual farms, but interact with the real farm using their digital twin in the simulation.

With this technology, students can experiment with different scenarios, seeing the impact of their decisions in real-time. One outcome for our classroom has been the ability for our students to be able to collaborate across the state to work together with other schools to grow food for each other, all virtually. This approach not only enhances their learning experience but also develops essential skills such as critical thinking, collaboration, problem-solving, while preparing them for challenges they will face in their personal and professional lives.

One of the most rewarding aspects of integrating these technologies into the curriculum is the opportunity they provide for early career exploration. AI, simulations, and digital twins allow students to experience a variety of professional roles and environments virtually.

This exposure is invaluable in helping students discover their interests and potential career paths at an early stage. For example, a student interested in architecture can use digital twins to design and evaluate building models, gaining insights into the field long before they enter the workforce or use simulations to design and test engineering projects to get a taste of the iterative process that's at the heart of product development in tech industries.

This early exploration is critical in helping students make informed decisions about their future careers, setting them on a path to success and fulfillment.

"*Using AI and digital twins in my class has opened doors for my students to explore professions before even stepping foot into the workforce. It's career guidance in the most interactive and impactful way.*"

- Middle School Science Teacher, Lexington, TN

Partnerships between educational institutions and industries are becoming increasingly common, allowing students to work on real projects provided by companies. This collaboration gives students a clear understanding of industry expectations and the opportunity to apply their learning in meaningful, practical ways. It also allows industries to contribute to shaping the curriculum, ensuring that the skills taught are directly relevant to future career paths.

The integration of advanced technologies like AI, simulations, and digital twins has significantly altered my role as an educator. No longer the sole source of information, I now see myself as a facilitator and guide, helping students navigate through these interactive learning experiences.

This shift has required me to engage in continuous professional development, staying abreast of the latest technological advancements and pedagogical strategies. Embracing these changes is crucial for providing an education that is not only relevant but also effective in equipping students with the skills they need for the future.

The transition to interactive, technology-enhanced learning has significantly boosted student engagement and academic success. In my classroom, the integration of AI, simulations, and virtual models of real-world systems has noticeably increased students' motivation and curiosity.

Additionally, by updating traditional STEM kits to reflect real-world challenges and incorporating them with AI and digital simulations, these tools have evolved from simple educational aids into powerful gateways for real-world application and understanding. This heightened engagement encourages students to delve deeper into their studies, leading to a more profound comprehension of the material and improved academic performance as they dedicate more time and effort to their learning.

Integrating AI, simulations, and digital twins in STEM education isn't just about enhancing current curricula; it's about instilling a culture of continuous innovation and exploration. These technologies encourage students to think beyond traditional learning,

fostering a mindset geared towards innovation and creative problem-solving. In an environment where students are actively engaged with interactive and immersive tools, they're encouraged to ask questions, explore different scenarios, and come up with creative solutions.

Collaboration is a key skill in the modern workplace, and AI, simulation-based projects often require teamwork, mirroring the collaborative nature of many industries. In a tech-enhanced learning environment, students are often grouped to work on projects, where they learn to communicate effectively, delegate tasks, and combine their strengths to achieve common goals. This experience is invaluable in preparing them for the teamwork and interpersonal skills essential in most career paths.

Technology allows for collaboration beyond the classroom walls. Students can work on projects with peers from around the world, gaining exposure to different perspectives and cultures. This global collaboration not only enhances their learning experience but also prepares them for a workforce that is increasingly diverse and interconnected.

Our educational system should bolster its efforts to bridge the digital divide by continuing to invest in infrastructure, providing affordable devices, internet access, and training for both students and teachers. We need to ensure that every student has the opportunity to benefit from the advancements in educational technology, regardless of their background.

Continuous Professional Development

The effective integration of new technology in education hinges on the preparedness of educators. This technological shift necessitates an evolution in teacher training, where educators are equipped with the skills and knowledge to effectively use these tools in the classroom.

Embracing Global Perspectives and Cultural Competence

By engaging with global issues and collaborating with peers from different backgrounds, students develop a broader perspective and cultural sensitivity. These skills are essential in today's global society, where understanding and respecting diversity is crucial for personal and professional success.

Ethical Considerations in Tech-Enhanced Education

Ethical considerations must be considered as new tech matures.

Issues such as data privacy, the ethical use of AI, and the societal impact of technological advancements are topics that should be woven into the curriculum. Educating students on these aspects ensures they are not only technologically proficient but also ethically aware and responsible.

The future, the integration of AI, simulations, and other advanced technologies in STEM education represents a journey towards a landscape brimming with possibilities. These technologies are reshaping the educational experience, making it more relevant, engaging, and effective for the digital-native generation.

As educators and administrators, our role is to navigate this transformation with foresight and responsibility, ensuring that we equip our students with the tools, skills, and ethical understanding to thrive in a future that is increasingly shaped by technology. In embracing these advancements, we are not just facilitating learning; we are opening doors to new worlds of discovery, innovation, and global awareness.

About the author:

Brandon is a technologist, educator and scientist based out of Memphis, TN. Brandon has a passion for education and has taught a wide range of topics from indoor agriculture to computer science to K-12 students for the past 7 years.

Brandon is an advocate for providing opportunities to specifically underserved communities, and has been instrumental in ensuring students in these communities get college scholarships, internships, and job opportunities through the non-profit he has been affiliated with for the past 8 years. Brandon's hope is that one day all students can graduate school with confidence in knowing what they'd like to do for their careers and feel confident in knowing that they have the skills to succeed in that field.

Cognitive Sovereignty Under Compression

By Syd Malaxos

The Integration Gap

Your child can get any answer in seconds, but something important may be disappearing in the process. In my classroom I'm starting to see a new problem created by AI tools — not cheating, not automation, but compression.

Research, explanation, synthesis, and analysis can now happen instantly. The answers appear before students have had time to wrestle with the ideas themselves. When that happens, something subtle disappears: the space where understanding actually forms. I call this the integration gap — the difference between looking like you understand something and having actually built the mental architecture to support it.

What Compression Removes

- Technology has always compressed time.

- A raft compressed distance.

- A calculator compressed arithmetic.

- The internet compressed information retrieval.

- Artificial intelligence compresses cognition.

Research, synthesis, drafting, analysis, explanation — tasks that once required extended effort now occur in seconds. This compression is not inherently harmful, but is the natural trajectory of tool development.

But compression eliminates something we rarely named because we never had to defend it: integration space. When learning required time, friction was unavoidable. Questions remained open for days - drafts were rewritten slowly - confusion had to be endured. That friction was not inefficiency, but it was the environment in which durable understanding formed.

AI removes much of that friction. The central educational problem of the AI age is not automation, it is compression — and whether students can maintain cognitive sovereignty inside it.

The Integration Gap

Integration space is the cognitive interval between exposure and mastery. It is the period during which confusion stabilizes into structure. Students wrestle with a concept, attempt an application, encounter error, revise their reasoning, and slowly build coherence.

Compression narrows that interval. When answers arrive instantly, the struggle phase collapses into fluency. Students experience fluency without having constructed the underlying architecture that supports it. The result is a widening integration gap — a difference between apparent understanding and structurally grounded understanding.

When integration space disappears, unresolved conceptual conflicts accumulate as interaction debt — errors that remain invisible until a later concept depends on them. This is not hypothetical. In chemistry, a student can now generate a step-by-step explanation of molecular polarity within seconds.

The explanation may be correct. But if the student has not internalized electron distribution, electronegativity differences, and spatial geometry, the explanation does not integrate. It rests on structure that was never constructed.

The output looks like knowledge — the architecture remains incomplete. The same pattern appears in physics. A student asks AI to explain projectile motion. The response is clean — horizontal velocity is constant, vertical velocity accelerates due to gravity, the trajectory is parabolic. The student reads it, understands every sentence, and feels confident.

Then I change one variable. I ask what happens if the object is launched from a height instead of from the ground. The student freezes. They understood the explanation. They never built the reasoning. The AI gave them a completed structure. What they needed was the experience of constructing it — the slow, frustrating process of drawing the vectors, getting the signs wrong, realizing why the signs matter, and arriving at the parabola through their own effort.

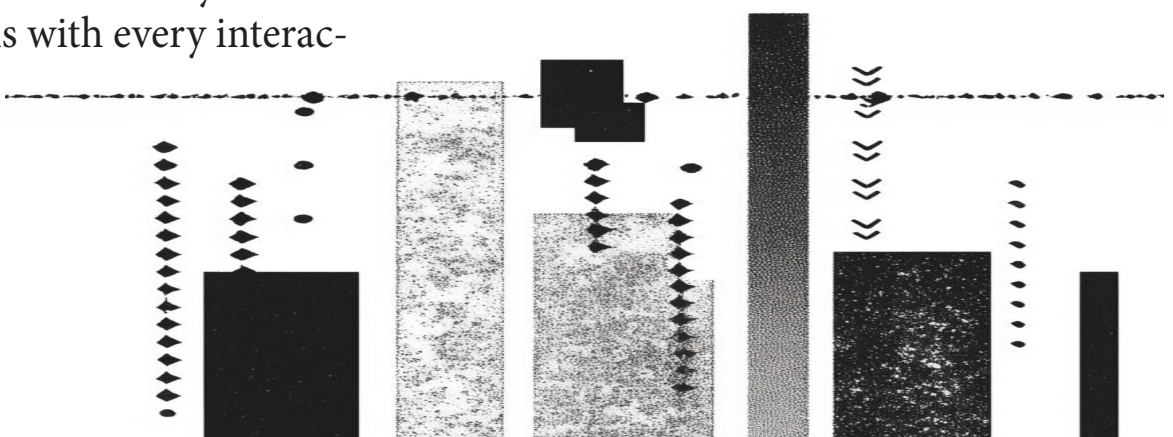
That construction process is integration space. When it is compressed away, the student receives a finished product and mistakes it for understanding. The gap between what they can recognize and what they can reason from widens with every interaction.

Outsourcing vs Ownership

Every tool outsources capacity. Writing outsourced memory. Calculators outsourced arithmetic. GPS outsourced navigation. Outsourcing is not inherently problematic — it often enables higher-order development. But outsourcing without ownership produces dependency.

AI enables students to outsource reasoning tasks at scale. The risk is not that AI will think for them, the risk is that students will lose the ability to detect when thinking has been outsourced.

Cognitive sovereignty requires ownership before extension. A student who understands stoichiometry can use AI to accelerate complex problems responsibly. A student who has never built stoichiometric reasoning internally cannot evaluate whether the AI's solution is coherent or flawed. Extension without ownership destabilizes — ownership before extension stabilizes, and sequencing matters.



Optimization vs Resistance

AI systems optimize for smoothness. Explanations are coherent. Language is clear — friction is minimized — growth rarely feels optimized. When a student uses AI to generate a lab conclusion that sounds polished but cannot explain their own data when questioned, that is optimization without resistance. The surface is smooth. The structure is hollow. I see this regularly.

A student submits a lab report with a conclusion that reads like a textbook — precise language, correct terminology, logical flow. I ask them one question: why did your data deviate from the theoretical yield? They look at me. They look at the paper. The conclusion they submitted addresses this exact point, but they cannot answer the question from their own understanding. They wrote nothing.

They submitted a reflection of competence produced by a system that has no idea what happened in their lab period. The optimization was perfect. The learning was absent. This is not a moral failing on the student's part. The environment made it frictionless to produce polished output without cognitive engagement. The path of least resistance led directly past understanding. Productive struggle, error correction, ambiguity tolerance — these are not defects in learning.

They are mechanisms through which durable cognition develops. When students inhabit environments that reduce friction at every step, resistance declines. Without resistance, cognitive musculature weakens. This is not alarmism. It is adaptation.

Capabilities that are not exercised atrophy. The brain strengthens along the pathways it uses repeatedly. If those pathways increasingly route through external systems rather than internal construction, internal architecture thins. The solution is not technological abstinence. It is architectural design.

About the author:

Syd Malaxos is a high school chemistry and physics teacher in Spencer, Massachusetts, and the founder of Thinking Labs by Temple Academy, a cognitive development program for students ages 12–17. He holds a master's degree from Brandeis University and has conducted research at Harvard.

His book Cognitive Sovereignty Under Compression is available on Amazon (https://a.co/d/0adownwx). He writes at smalaxos.substack.com.

OAK RIDGE National Laboratory

Tough, reusable adhesive can glue a variety of materials

By Dawn Levy / ORNL

"Mussel-inspired invention from waste polymers has reversible chemical hardener."

Researchers at the Department of Energy's Oak Ridge National Laboratory have invented a reusable adhesive from waste polymers that is tougher than commercial glues, works underwater as well as in dry environments, and bonds a variety of materials, including wood, glass, metal, paper and polymers. Inspired by the way mussels stick stubbornly to surfaces, the innovative adhesive contains reversible chemical crosslinkers that allow the hardened glue to soften, detach and be reused, unlike current glues, which set permanently after one use.

Today's projects typically require different glues for different material surfaces — white glue for grade-school art projects, polyvinyl acetates for bookbinding, polyurethanes for shoemaking, silicones for sealing windows and affixing electronic parts, and industrial epoxies for joining aircraft and automobile components. A single adhesive that performs well across many applications could simplify manufacturing and repair while reducing waste. This advance may create big economic impact for the global adhesives and sealants market, valued at approximately $87 billion and projected to reach nearly $119 billion by 2032.

"Most adhesives are made for one specific application," said Anisur Rahman, a research and development staff member at ORNL who led a study published in Science Advances with former ORNL postdoctoral researcher Mary Danielson, now a research assistant professor with the University of Tennessee-Oak Ridge Innovation Institute. "Our adhesive can be used for diverse applications, including structural or pressure-sensitive uses, and it performs reliably in both wet and dry environments," he said.

From left, Mary Danielson and Anisur Rahman, leaders of an ORNL project to invent a versatile reusable glue from polymer waste, examine its bonding performance. Credit: Carlos Jones/ORNL, U.S. Dept. of Energy

"None of the commercial adhesives can be used this way."

Beginning with common polymers from beverage bottles, fabric fibers and packaging films, the research team developed a process that saves materials, energy and money. "We took material destined for the landfill and turned it into something valuable," Danielson said. The researchers have applied for a patent for their versatile glue.

How the reversible bonds work

Traditional structural adhesives rely on permanent crosslinks that make removal difficult. "You apply traditional adhesives once; you cannot reuse them," Rahman said.

"You basically have to rip an assembly apart to debond it," Danielson added. "You've damaged both the part you're gluing to and the part you're gluing from. If you make a mistake when you're gluing something and you allow it to cure, it's done."

In the ORNL adhesive, crosslinkers act like reversible attachments, akin to Velcro. Heating breaks dynamic chemical bonds in the polymer, allowing the adhesive to release without damaging surfaces. As the material cools, the bonds reform.

"If something is damaged or misapplied, you're able to completely remove it and put it back on with full integrity," Danielson said. The team debonded and rebounded the adhesive more than 10 times with no loss in performance.

"Normally in the marketplace, structural adhesives typically have shear strength — a measure of adhesion — in the 7- to 10-megapascal range," Rahman said. "Our adhesives also stay well above that range but maintain reusability."

The researchers can also retrieve the glue chemically, using an excess of amine molecules to break the adhesive into its monomer subunits. "We can recover all chemicals used in this adhesive," Rahman said.

Mussel-inspired design

A polymer is a long chain or network made of monomers, or chemical subunits of one type. Using no solvents or catalysts, the scientists added amine, a nitrogen-containing chemical group, to the waste polymer and heated it to just below the polymer's melting temperature. Under these mild conditions, the amine broke the polymer down into monomers that each contained four amine groups.

Next, to design the adhesive, ORNL researchers mimicked mussel foot proteins, which contain both hydrophilic and hydrophobic components that enable strong adhesion even in wet environments.

"We used a crosslinker, or hardener, that has both water-loving (hydrophilic) and water-hating (hydrophobic) components together in the same molecule," Rahman said. "We mix the hardener and the monomer. It creates an adhesive resin that acts like a mussel foot protein."

"For any glue that is a cross-linked network of two components, it takes time to complete the reaction between the two components," Danielson said. "To repair boats, submarines and pipelines, our glue can be applied underwater using hand pressure until it sets." Curing happens when a large four-armed monomer interacts with the crosslinking hardener. The monomer's amine group reacts with the hardener's acetoacetate group to produce a resin, or matrix with hydrophilic and hydrophobic characteristics. Whether the protein sticks or releases depends on the balance of those properties.

"Our glue maintained strong adhesion across different environmental conditions, including seawater, extremely low temperature (100 degrees Celsius below zero), and both acidic and basic conditions," Rahman said.

National lab capabilities enabled the achievement

Rahman conceived the concept of transforming deconstructed polymer waste into an adhesive. He and Danielson designed and led experiments and drafted the paper. Chuyi Pan, a summer intern from the University of Pennsylvania, assisted in synthesizing the adhesive. Tomonori Saito of ORNL and the University of Tennessee, Knoxville, reviewed and edited the manuscript drafts.

ORNL researchers performed vital characterizations. Bobby Sumpter simulated the energies with which the adhesive bound to different surface materials. Catalin Gainaru used rheology to characterize its stress and relaxation. Honghai Zhang and Vilmos Kertesz performed mass spectrometry to quantify different molecules. Zoriana Demchuk's lifecycle analysis of the ORNL glue showed it was more energy-efficient to make than commercial adhesives.

Toward strong and weak bonding applications

The team has also explored using this pioneering chemistry to advance vehicles. ORNL's glue maintained strong adhesion between dissimilar substrates — a crucial requirement in automotive and aerospace applications, where joining composites to aluminum or steel presents notable challenges.

Next, the scientists aim to tune cross-linking to enable weaker, temporary bonds for removable labels, adhesive bandages, drug-delivery patches and other applications.

ORNL's versatile, high-performance glue is poised to make an impact that sticks in situations from the mundane to the extraordinary. Potential uses range from household items that require gentle removal, like press-on nails and price tags, to repairs in remote or extreme environments, including underwater or outer space — settings where specialty glues may be unavailable.

The DOE Office of Science supported the research. The work used resources of the Center for Nanophase Materials Sciences, a DOE Office of Science user facility at ORNL.

UT-Battelle manages ORNL for DOE's Office of Science, the single largest supporter of basic research in the physical sciences in the United States. The Office of Science is working to address some of the most pressing challenges of our time. For more information, please visit **energy.gov/science**.

PLAY, A Sacred Space

By Amber Pavey

After teaching, leading, guiding, parenting, and learning from children for the last 20 years I have spent countless hours facilitating and holding sacred space for play. It is no secret that play is foundational to the learning, growth and development of our youth. Play is truly a superpower.

Sadly, it is also one of the most underrated activities for many parents and educators. While the research is clear on the power of play, many parents, educators and government leaders still don't fully grasp the value and benefits that play has for our young learners.

Mental Health Matters

The drive for measurable success has never been more apparent. The demands on our kids have never been more present. The competition for our attention has never been more abundant. Everyone is feeling the pressure. Kids, parents, and educators are all yelling "FIRE", metaphorically that is, which is resulting in more stress, overwhelm and mental health issues than ever before.

In fact, many would even suggest that adults have lost their ability to play too, leading to more anxiety, depression, burnout and overwhelm for parents and educators. We ALL need more joy, play and unstructured time in our

lives. Play provides an opportunity to tap into our intrinsic wonder, interest, curiosity, connection, flow, and inspiration.

The Root of All Learning

Play should remain at the centre of all foundational learning especially for our youth. When play is encouraged and made sacred, learning happens organically. We know that learning isn't linear, however with more and more assessments, surveys, and curriculum rubrics we have inadvertently devalued and jeopardized the natural rhythm of learning. With more demands to measure the success of our youth we limit the time available to prioritize play.

When play is made sacred children feel safe to explore their innate talents and curiosity. They have time to wonder, inquire and explore. They access their inner leadership abilities and learn collaboratively from each other. They are also gifted with the opportunity to experience a flow state.

The world has changed, but the developmental needs of our youth have not. It is time to make play scared again. It is time to unschedule our lives and classrooms in order to rewild wonder. Ask any Elementary or Jr. High student what their favourite subject is and they are likely to tell you it is recess, lunch or gym. I have discovered this often true for all kinds of learners, regardless of their academic levels of success. These activities often allow for more unstructured time, opportunities for movement, laughter, connection and explorations. All kids want more play!

Obstacles to Play

Since the very nature of play can be messy, lead to conflict, or unfold into bigger projects, many adults attempt to keep play small, neat, tidy and within short timeframes to avoid these natural possibilities. However, the conflicts, mess and gigantic expansion of play has its epic rewards.

Each of these challenges provides both adults and children with an opportunity to see possibilities over problems. To be in the moment. To tap into the power of presence. To witness and be with the good, bad and indifferent of every exploration.

I would like to suggest that play is a possible antidote to our suffering, for all of us, young and old. When play is prioritized the benefits far out way the costs. The trick is we must become present to notice the benefits. This is because the benefits are often anecdotal and long term. In many ways play appears to be a nice to have, rather than a must have part of our lives.

Play is Ageless

Years ago, while visiting an incredible children's museum in South West Florida with my three young children I observed a man in his 70's playing at the elaborate water table. I didn't notice any grand kids, or family members with him. If they were there with him, they apparently went on to explore another area of the museum and he stayed back to enjoy the water feature. He seemed to be completely immersed in his own world of wonder. Totally unaware that I couldn't take my eyes off of him as he poured, maneuvered, manipulated, adjusted and watched intently as the water flowed from one ramp, dam, wheel, bucket and back again.

He was fully and completely engrossed in play. Curiosity, wonder and inquiry had pulled him deeply into play. Then he would stand back to observe, carefully plan his next move, calculate and adjust accordingly. It was enthralling and inspiring for me to watch this man engage with such rigorous play. He was clear, play was sacred in his world. He knew how to play and did so unapologetically. He was a master of his craft.

Something he clearly had practiced for many years. I couldn't help but wonder if he had been an engineer, educator, or architect in his younger years. I resisted the urge to approach him and ask as I knew it would interrupt his flow state.

My kids played alongside this man for some time, but then their curiosity pulled them elsewhere in the museum to explore play in other ways. I had a hard time leaving that water table, feeling honored to have been witness to such sacred play in action. All I could consider was what would happen if we made play so scared that we all valued it and prioritized for our entire lives. How many of our global challenges would shift from problems into possibilities?

That day I learned that curiosity and play do not have an age restriction. Wonder, trial and error, expiration, patience, observation, practice, risk taking, persistence, cooperation, creativity are all incredible by products of play that can't be measured in linear ways. My take away mantra from that day was, "Play Always!"

Play as a Mindful Activity

We all want to become more mindful. In many ways children naturally embody the ability to be present in their play. Simply watch how a young child plays freely, then be willing to emulate that same energy in your own life. Let them be your inspiration. Reconnect to your inner child and relearn how to

be curious. Relearn how to be fully in the moment. Welcome inquiry, wonder and some unstructured play in your own life. Get your hands dirty, make a mess, and play again.

10 Truths About Children & Play

I have complied a short list of observations I have made after 2 decades of working with children in various educational settings. These continue to guide my interactions.

1. Children need more free unstructured free time than you think.

2. Children thrive when their voices, input and ideas are heard.

3. Children are naturally creative beings. When given opportunities and space to create their own games, play, art and learning their development is enhanced.

4. Children are intuitive, connected and sensitive to the world around them. Time in nature helps them balance and ground their nervous systems.

5. Children do not need more rules, regulations and structure. They need adults who can facilitate and support their natural, curious and playful ways.

6. Children are incredible teachers and leaders when given the space and freedom to lead.

7. Children need time and space to be loud, messy, and permission to fully express the vastness of their emotions.

8. Children need many opportunities to move their bodies and connect with their breath.

9. Children learn to lead and support each other when grouped with diverse age groupings.

10. Children need choice, flexibility, autonomy and freedom in their play.

When sacred play is a priority, learning unfolds naturally. This is immensely beneficial to the students, but also alleviates unnecessary stress for the teacher. Educators and parents are best utilized as guides and facilitators of play. It is our job to simply hold space for this scared language that comes so natural to young learners. As adults we can re-learn how to play as well, bringing more joy and fun into our own lives.

How can you play today?

Amber Pavey is an experienced educator with certifications in mindfulness, yoga, and reiki. She is an author, speaker and the founder of Present Possibilities.

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From Standards to Strategy:
How National Math Standards Build Workforce AI Readiness

By Shelly A. Muñoz

Across the country, employers are sending a clear message: data and AI literacy are no longer specialized skills. They are foundational workplace competencies.

Yet national workforce research reveals a consistent and concerning gap. Leaders are not reporting a shortage of tools or access to data. What they report—again and again—is a shortage of judgment. Employees struggle to interpret outputs, evaluate reliability, communicate insights clearly, and translate analysis into defensible decisions. For educators and administrators, this is not simply a workforce issue. It is a standards issue, because the cognitive architecture required for AI readiness already exists inside our national math standards.

What Employers Actually Need

The modern workplace increasingly depends on professionals who can:

- Interpret dashboards and AI outputs
- Distinguish correlation from causation
- Evaluate claims with evidence
- Recognize bias and data limitations

- Translate analysis into defensible decisions

This is not advanced machine learning, it is applied statistical reasoning. And statistical reasoning lives squarely inside the Data & Statistics strands embedded in state standards aligned to frameworks such as the Common Core State Standards, the Standards for Mathematical Practice, and NCTM principles.

The question is not whether we have the standards. The question is whether we are implementing them with the depth they require.

A Shift in Expectations: A View from Minnesota

As someone working closely with state standards in Minnesota, I have had the opportunity to study the evolution of our mathematics benchmarks in depth. Minnesota's transition from its 2007 to 2022 standards offers a clear illustration of a broader national shift in expectations. Under the 2007 benchmark 9.1.1.9, the emphasis centered on:

- Interpreting linear models
- Describing slope and intercept in context
- Making predictions from graphs

The work was rigorous, but primarily procedural. Students calculated, represented, and described relationships. The 2022 revision deepens that expectation. Students are now required to:

- Evaluate whether a model is appropriate
- Assess assumptions and limitations
- Interpret variability and distributions
- Justify conclusions using statistical reasoning

The shift moves from "Can you calculate and describe?" to "Can you evaluate, justify, and defend?" While this example comes from Minnesota, the pattern is not unique. Across states revising their mathematics standards, we see a similar emphasis on reasoning, modeling, justification, and applied decision-making within Data & Statistics strands.

The movement is national: a transition from procedural fluency toward analytical judgment. That distinction mirrors precisely the skill gap employers identify. When AI systems generate predictions or trend lines, the critical issue is not whether someone can read a graph. It is whether they can assess the assumptions behind it, question the data that produced it, determine whether the relationship is causal or correlational, and judge how much confidence to place in the result. The revised standards cultivate that judgment.

The Hidden AI Framework Already in Our Standards

Across states, Data & Statistics expectations require students to analyze variability, make inferences from samples, understand bias in data collection, construct and critique arguments, and engage in mathematical modeling. The Standards for Mathematical Practice reinforce habits such as constructing viable arguments, critiquing reasoning, modeling with mathematics, attending to precision, and identifying structure.

These are not isolated competencies, but rather transferable cognitive habits. In the workplace, those habits become the ability to evaluate AI outputs, communicate findings clearly, challenge flawed conclusions, identify data bias, and apply tools responsibly. In other words, they become AI readiness.

The Real Gap Is Implementation

Workforce leaders consistently describe similar breakdowns: employees generate reports but cannot interpret implications; teams experiment with AI tools but fail to integrate them meaningfully; workers lack confidence evaluating reliability; organizations struggle with governance and data trust. These are not technical failures. They are reasoning failures. When statistics is taught primarily as calculation—

compute the mean, apply the formula, produce the answer—students develop procedural familiarity without decision-making fluency. AI-integrated environments require something deeper: comfort with ambiguity, understanding of variability, skepticism toward surface patterns, and the ability to communicate evidence with clarity and integrity. Our standards call for this depth. Instruction determines whether students experience it.

Rethinking Rigor in an AI Era

In an AI-integrated world, rigor is no longer defined by speed of calculation. It is defined by resilience of reasoning. Rigor now means asking better questions, evaluating uncertainty, revising models when evidence shifts, defending conclusions with data, and applying reasoning in unfamiliar contexts. For school leaders, this reframes curriculum conversations. Are students merely solving, or are they defending conclusions? Are they computing, or are they critiquing? The distinction matters.

"The workforce isn't asking schools to produce more programmers. It's asking for better decision-makers. That capacity is already embedded in our national math standards — if we implement them with depth."

— Shelly Muñoz

What This Means for Curriculum Leaders

AI readiness does not require adding new programs or layering additional initiatives onto already crowded systems. It requires strengthening implementation of existing Data & Statistics standards. Curriculum leaders should:

- Elevate modeling and real-world decision-making tasks
- Emphasize interpretation over computation
- Embed argumentation into assessments
- Align professional learning to conceptual depth

When curriculum, instruction, and assessment align around statistical judgment and real-world application, districts are not merely meeting standards—they are building durable cognitive skills that prepare students to navigate an AI-integrated economy with confidence and integrity.

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The Opportunity Before Us

AI readiness does not begin in a computer science lab. It begins when a student understands that correlation does not imply causation. It deepens when they must defend a statistical claim with evidence. It matures when they can explain why a model is limited. National math standards were never just about numbers. They were about thinking.

If we elevate Data & Statistics instruction from procedural compliance to applied reasoning, we close the AI literacy gap before it reaches the workforce. The blueprint already exists. The leadership challenge is implementation.

Learn More

The workforce insights referenced in this article are drawn from the 2026 State of Data & AI Literacy Report, based on survey responses from more than 500 U.S. and U.K. leaders. The report examines rising expectations for data and AI fluency, persistent skill gaps, and the organizational shifts required to build applied capability at scale.

To explore the full report—including executive findings, detailed skill gap analysis, case studies, and job market insights—visit:

www.datacamp.com/resources/reports/state-of-data-and-ai-literacy

Shelly A. Muñoz is a STEM educator and instructional leader dedicated to advancing innovative teaching practices in K–12 classrooms. With experience designing and implementing project-based learning, coding, robotics, and 3D design initiatives, she helps teachers integrate research-based strategies that promote critical thinking, collaboration, and real-world problem solving.

Shelly also works closely with administrators and instructional coaches to support evidence-based professional development and coaching cycles, ensuring that STEM education is engaging, equitable, and impactful for all students.

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AI Skills: The New Currency in Today's Job Market

The AI revolution is here. Ever since ChatGPT arrived on the scene in late 2022, artificial intelligence has been reshaping the way we live and work. What does that mean for tech professionals looking to compete in a changing labor market?

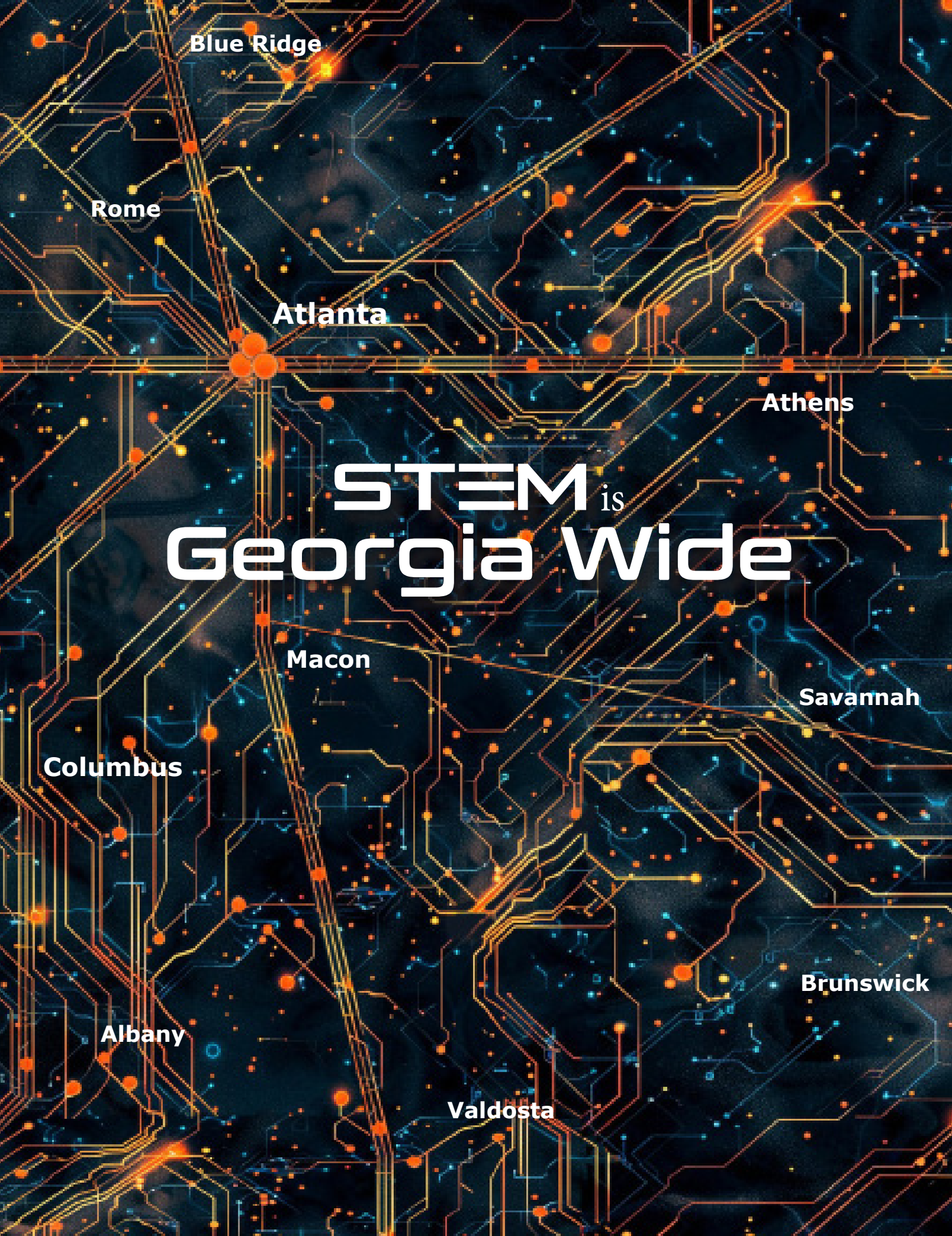
TV pundits and talking heads love to get riled up about whether robots are coming for our jobs — but the truth is that AI will probably create more jobs than it eliminates. And one thing's for sure: understanding how AI works, and mastering AI skills, will be the key to success in tomorrow's ever-changing world of work.

New research shows that a growing number of companies are asking for AI skills in job descriptions — including non-tech roles. And a survey of HR professionals released last month shows that job candidates with AI skills ask for more money during the interview process — and tend to get it once they're hired. Simply put, AI is going to be underpinning nearly every job out there. That's why staying ahead of the latest in AI development is so important.

Building AI skills doesn't just mean learning how to engineer prompts for ChatGPT. It's everything from programming to data modeling and analysis to mastering concepts like machine learning and natural language processing. And if there's anything certain in our fast-paced economy, it's that building AI fundamentals today will translate to career opportunities tomorrow and beyond.

That's where SkillStorm comes in. In partnership with TAG, we offer Microsoft Azure AI courses that are instructor-led, career-aligned tech certification courses and will help you build the AI skills that employers need. From the basics of AI and machine learning to a comprehensive understanding of how to design, deploy, and maintain AI solutions, you'll learn everything you need to accelerate a career in the economy's hottest fields.

It won't be long before all kinds of jobs, all across the economy, require AI skills. And starting now is the best way to accelerate your ascent up the career ladder. Build those skills today and you'll lay the foundation for opportunity for years to come — and set yourself up for success in an AI-driven future of work. Register today to get started with a career in tech.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