NAVIGATING THE FUTURE OF LEARNING
KEY CONSIDERATIONS FOR POLICYMAKERS

As technology continues to advance at an exponential rate over the next decade — and as related social, economic, environmental and political changes unfold — the accelerating rate of change will require us to redefine our relationships with one another, with our institutions and even with ourselves. Every facet of our lives, including the nature of work and how we teach and learn, will be influenced by the changes on the horizon.

Given the projected rate and scope of change, it will become increasingly important for education systems to create the conditions necessary to ensure all learners are ready for a complex and uncertain future. Education systems will need to play a central role in supporting the healthy development of young people and promoting both effective lifelong learning and community vitality. Education stakeholders, including policymakers, can become active participants in developing frameworks, structures and policies that support these goals and help states create futures of learning in which all students can thrive.

Exploring the future of learning today is an act of stewardship to our future communities and to the young people who will live in them.

USING THIS DISCUSSION GUIDE

This discussion guide is designed to equip policymakers with the knowledge and skills to lead conversations about future possibilities for learning, with a focus on frameworks and structures that effectively address student, educator and community needs. As states work to transform their education systems to embrace personalized learning, this guide will help policymakers consider how changes on the horizon could influence state-level visions for student success, presenting opportunities and challenges of the future.

First, this guide recaps the five drivers of change from *Navigating the Future of Learning* and considers what each driver could mean for education policymaking. Drivers of change are major societal shifts that will impact education over the next decade. They combine multiple trends, patterns, plans and developments to identify broad patterns of change.

To help education policymakers rethink the ways current education systems are structured and consider possibilities for the future, each driver of change is outlined as follows:

- Key characteristics of the driver of change
- Evidence of change today
- Possibilities for how the driver of change might manifest in the future
- Considerations for policymakers

The final section outlines additional questions to help guide state-level policy conversations. Overall this guide serves to provide initial framing for the future and provocations for policymakers to consider before engaging with KnowledgeWorks' *State Policy Framework for Personalized Learning.*
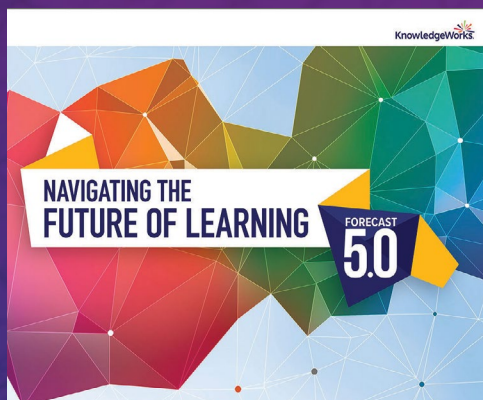
Every three years, KnowledgeWorks releases a comprehensive ten-year forecast exploring how changes external to education could impact learning. These forecasts and their related publications help education institutions and influencers develop an awareness of the drivers of change shaping the future, broaden their sense of what might be possible and consider how they might respond to the changing landscape. *Navigating the Future of Learning* is KnowledgeWorks' fifth comprehensive forecast on the future of learning.

POSSIBILITIES FOR THE FUTURE OF LEARNING: DRIVERS OF CHANGE

While many forces of societal change have the potential to influence or disrupt education, five will be critical in shaping education over the next decade.

AUTOMATING CHOICES
Algorithms and artificial intelligence are becoming increasingly embedded in our lives. They are automating many of our experiences, services and interactions with one another to achieve efficiency and personalization and are raising questions related to trust, bias and individual agency.

CIVIC SUPERPOWERS
Individuals, nonprofits and volunteer organizations are flexing their civic muscles. They are using participatory media, machine learning and data analytics to fill a growing governance gap, with hopes of reweaving the social fabric and redefining civic engagement.

ACCELERATING BRAINS
Rapid advances in technology and neuroscience are combining to transform our cognitive abilities in intended and unintended ways. They are shaping how we partner with digital tools, relate with one another and engage with our surroundings.

TOXIC NARRATIVES
The narratives and metrics of success and achievement that shape people's aspirations, choices and behaviors are becoming increasingly detrimental to individual and social health and are contributing to growing toxicity in systems and institutions.

REMAKING GEOGRAPHIES
Migration patterns, small-scale production and efforts to grow placed-based and cultural assets are combining to reshape community landscapes in response to economic transition and climate volatility.

AUTOMATING CHOICES

Automated interactions and transactions that are performed by artificial intelligence will become more ubiquitous and more powerful, providing greater convenience, efficiency and personalization in many areas of our daily lives. Already, automated recommendation software provides individuals with suggested articles to read, products to buy, courses to take and vacations to consider based on past online purchases, location, search history and other personal data.

EVIDENCE OF CHANGE
Municipal, business and consumer organizations are increasingly using artificial intelligence and predictive analytics to anticipate people's needs and direct them toward services. In some examples, financial service robot-advisors are creating personalized investment portfolios. Fire departments are making use of data analytics to recommend whether a medical emergency can be treated on-site or must be treated at a hospital. Judicial and law enforcement departments are using algorithms and predictive analytics to recommend sentencing and to identify potential perpetrators of future crimes.

LOOKING AHEAD
Though such tools are typically adopted in the name of efficiency, some uses have resulted in unintended negative consequences such as the over-monitoring of communities of color or the denial of loans to certain populations based on biased data. Looking ahead, if potential biases in underlying data, interpretive models and the values of algorithm designers are not transparent, tradeoffs for gains in personalization and efficiency could include constraints on human agency in decision-making and the illusion of free choice.

What challenges and opportunities might arise from the widespread use of artificial intelligence and automated systems in education?

KEY TERMS

ARTIFICIAL INTELLIGENCE (AI)
The capacity of computer systems or software to imitate or simulate intelligent human behavior. AI is increasingly seen as a utility embedded in services rather than as a general-purpose application with which users interact directly. For example, AI is used in automated online customer service applications, software-generated news articles and driverless cars.

DATA ANALYTICS
The science of drawing insights from raw information sources. Many of the techniques and processes of data analytics have been automated into mechanical processes and algorithms that analyze data and make it translatable for humans.

AUTOMATING CHOICES
CONSIDERATIONS FOR POLICYMAKERS

» As decision-making becomes augmented by or, in some cases, fully reliant on algorithms and data analytics, the biases of the people designing algorithms for education applications, such as career and postsecondary recommendations, course progression and curricular material, could lead to inequitable and misaligned learning experiences for students. To prevent that from happening, state policymakers might consider working with diverse groups of stakeholders to create ethical frameworks that assess the risks, benefits and challenges of utilizing algorithms in education.

» As an increasing number of ed-tech providers create platforms to help education systems automate decision-making processes, schools and districts may work with multiple providers. These platforms may have various levels of security and privacy and may require differing amounts of data from students. States might consider creating policies that safeguard student-level data from third-party data collection and data breaches, while also allowing students and their families to consent to expanded data collection and sharing.

? *What could this mean for your state?*

CIVIC SUPERPOWERS

In response to increasing political gridlock and a rise in corporate influence in areas of our lives that were once the exclusive purview of the public sector, engaged citizens and civic organizations are reasserting their power. They are using a range of technologies to develop more creative and empowering ways of raising awareness, mobilizing action and building relationships. Citizens, nonprofits and volunteer organizations are increasingly working to expand their access to and become more sophisticated in their uses of participatory media, data analytics, artificial intelligence and mobile technologies. Their goals include expanding channels of citizen voice and influence, creating more transparency in the public and private sectors and widening participation in local and regional decision-making processes.

EVIDENCE OF CHANGE

Already, citizens can leverage technology to automate massive waves of constituent communication to elected representatives. For example, the free ResistBot service turns text messages into letters that are faxed to elected officials. In addition, the New York City Police Department is piloting Elucd, a mobile polling application that helps build trust with residents by rapidly capturing their feedback about law enforcement strategies and by giving residents an opportunity to report on police behavior in their communities.

LOOKING AHEAD

Technology has the power to supercharge the influence of the civic sector, yet if technology creation and implementation is not inclusive of diverse organizations and populations, it will maintain or exacerbate an imbalance of power and provide an opening for the corporate sector to continue to shape conversations and solutions. Communities will need to consider who will create the guidelines necessary to ensure responsible use of and equitable access to civic engagement technologies.

? *How might tech-enabled civic engagement affect policymakers' relationships with education stakeholders?*

KEY TERMS

PARTICIPATORY MEDIA
Media in which the audience plays an active role collecting, reporting, analyzing and disseminating content.

CIVIC SUPERPOWERS
CONSIDERATIONS FOR POLICYMAKERS

» As more institutions and individuals use digital technologies to engage in the civic sphere, new, competing views around the purpose of education might arise. This development could lead to the loudest voices receiving the most attention, even if those voices are not representative of a community's beliefs. To ensure accurate understanding of stakeholders' many needs and aspirations, states might consider strategies and frameworks for deepening engagement with constituencies. States might also consider ways to build trust and increase transparency by communicating successes and challenges as they progress toward their visions for student success.

» Tech-enabled civic engagement could reshape educational governance and decision-making, bringing more people into the process and establishing new oversight structures. In anticipation of this possibility, state policymakers might consider ways in which they can creatively engage citizens via participatory media and other technologies, with the goal of increasing community involvement and leadership for school improvement, especially among students.

? *What could this mean for your state?*

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ACCELERATING BRAINS

Technology developers and neuroscientists are working together to create accessible tools to enhance brain performance, known as "cognitive enhancement tools." Entertainment technologies like video games, virtual reality and augmented reality are being used to leverage brain plasticity and enhance cognition. In addition, neuro-stimulation wearables are transforming approaches to training and practice.

As these approaches to intentional brain modification are growing, so are practices that unintentionally change brain function and performance. The universal presence of digital tools and media is creating an environment filled with distracting alerts, notifications and automated nudges that shape people's behavior. For example, repeated use of Google Search has been shown to stimulate short- over long-term memory in ways that may undermine critical thinking.

EVIDENCE OF CHANGE
Firms such as Akili Interactive are using cognitive enhancement technologies to create therapeutic, interactive social environments that treat brain-based conditions, including anxiety, depression and PTSD. Similarly, the wearable technology Halo Sport stimulates the motor cortex to make sports training and practice more efficient. Other kinds of neuro-stimulation products such as Xana use electrical pulses to stimulate nerves to relieve stress, improve sleep and enhance attention and focus.

LOOKING AHEAD
As people learn more about how the brain works, become increasingly immersed in smart environments and partner with digital tools to offload cognitive functions, they will continue to reshape their brains in intended and unintended ways. Learning how to anticipate and evaluate technologies' effects on the human brain will lead people to redefine notions of brain health and the ability for humans to shape brain health, as well as how humans develop sense of self.

? *What are the ethical and long-term health implications of using cognitive enhancement tools in educational settings?*

KEY TERMS

AUGMENTED REALITY
An enhanced view of reality created by integrating computer-generated sensory input, such as sounds, images, graphics and video, in real-time on top of a user's physical surroundings.

VIRTUAL REALITY
The computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment.

ACCELERATING BRAINS
CONSIDERATIONS FOR POLICYMAKERS

» As new opportunities emerge for students and educators to take advantage of advancements in neuroscience, it could be hard to evaluate when to use cognitive tools and practices and how much to design learning environments to reflect students' neurological needs. To ensure alignment and equity, states might consider developing frameworks for educators that consider best practices in neuroscience to guide the use of these types of technologies, as well as the design of curricula and the settings in which students learn.

» The availability of new tools that enhance cognitive function could create new expectations for performance in education, potentially introducing new equity gaps and exacerbating current ones. To help mitigate those potential inequities, states might need to reevaluate their accountability systems to consider new measures for addressing achievement gaps.

What could this mean for your state?

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TOXIC NARRATIVES

Current metrics of success in education, business and media often treat people as assets to be optimized and data to be commoditized. These sectors' economic models and underlying assumptions are contributing to chronic health conditions like hypertension, diabetes, fatigue, anxiety and depression. Given these stressors, people are susceptible to losing the positive social connections and relationships that usually provide buffers in times of uncertainty. Efforts to measure success in ways that emphasize connections and relationships will be instrumental in addressing these issues.

EVIDENCE OF CHANGE

Adults are struggling to adapt to demanding work schedules and the uncertainties of a transitioning economy with growing job insecurity and more gig-, task- and project-based work. The mental health of teens and young adults is declining as they face wide-ranging pressures like high-stakes testing, grueling college admission processes and student debt without the guarantee of employment. People are inundated by fake news and harmful echo chambers as media companies measure their own success in monetized numbers of clicks rather than through authentic public discourse. At the same time, however, efforts to measure success in different ways are emerging. Among them, a growing number of colleges and universities are implementing test-optional admissions policies, and the Mastery Transcript Consortium is developing a holistic alternative model for high school assessment, crediting and transcript generation.

LOOKING AHEAD

If left unchecked, current narratives and measures of success will exacerbate an epidemic of social pollution that will have profound impacts on public health and economic productivity. Such effects may be felt more acutely by people of color, women and low-income individuals, as they are already experiencing structural inequities. For new metrics to be successful in creating well-being at a systemic level and not simply to reinforce entrenched inequities, persistent challenges such as racism, sexism and economic inequality will need to be addressed.

? *How might education leaders collaborate with other stakeholder groups to create definitions of success that emphasize achievement and health for diverse populations?*

KEY TERMS

SOCIAL POLLUTION *(Nuria Chinchilla of IESE Business School)*
The increasingly stressful work life in industrialized countries, including long hours, lack of economic security, high cost of health care, exhaustion and lack of parental support.

TOXIC NARRATIVES
CONSIDERATIONS FOR POLICYMAKERS

» As education stakeholders respond to students' stressors and seek to fill the growing gap between current narratives of success and future needs, new measures of success might emerge. States could lead the way in enabling views of success that embrace a holistic and highly personalized view of students' full intellectual, emotional, social, physical, creative and civic potential.

» Educators are not immune from the effects of toxic narratives. Educator shortages could continue to increase in the face of funding uncertainty, long hours, relatively low pay and other factors. These factors could lead state policymakers to consider strategies to redefine working conditions for educators, as well as educator preparation and support systems.

What could this mean for your state?

REMAKING GEOGRAPHIES

Demographic shifts, the changing nature of work, industry transformations and climate volatility are causing more and more people to migrate in search of stable opportunities and livable communities. Many places are experiencing population changes as their residents make relocation decisions or are forced to move based on housing costs; job availability; tax rates; public services; personal values; or climate disruptions caused by flooding, fire and extreme weather.

As circumstances shift, many cities, towns and rural communities are exploring strategies to reinvent a unique sense of place and to translate it into sustainable platforms for community viability, health and wealth. They are also looking for ways to attract or retain residents by providing financial incentives and creating welcoming environments. Though many communities are pursuing traditional economic and community development approaches, those efforts do not always lead to long-term revitalization and often deepen inequity and marginalization. In response, some communities are seeking to grow in more sustainable and inclusive ways.

EVIDENCE OF CHANGE

The National Main Street Center and the Project for Public Spaces are partnering to support diverse efforts that integrate an appreciation for towns' and communities' deep historical and cultural heritage through artisanal production and networked employment structures, with a focus on inclusion and collaboration. In addition, Reimagining the Civic Commons is working in five U.S. cities to revitalize and connect the cities' assets, with the goal of increasing civic engagement, socioeconomic mixing and environmental sustainability.

LOOKING AHEAD

In the future, communities working to remake themselves will be able to tap into diversifying economic models and small-scale production networks. They will have the opportunity to consider new ways of engaging both their traditional and diversifying workforces and of creating economic resilience. Ongoing, inclusive dialogue and decision-making will be necessary to avoid further marginalizing vulnerable residents, who are often left out of plans for economic development and community revitalization.

How might education stakeholders play a leadership role in helping cities, towns and rural communities develop and identify what makes them unique?

🌐 REMAKING GEOGRAPHIES
CONSIDERATIONS FOR POLICYMAKERS

» As community revitalization efforts deepen, local visions for student success may diversify among communities. States could support that shift by purposefully broadening or redesigning state-level visions to reflect the needs of each community and which allow communities the space to enhance their visions based on local conditions. The creation and implementation of those visions could cultivate deep partnerships between school districts and other organizations and individuals across communities.

» To help ensure safety and support for students, new roles for community members and organizations may prove useful. These roles may serve to alleviate barriers to learning posed by factors such as community instability, family mobility and natural disasters. To provide students with buffers across such disruptions, states could consider strategies that enable the education system to engage partners across service sectors to consider ways partners can be enlisted to help students continue their education.

❓ *What could this mean for your state?*

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CONVERSATION STARTERS

An uncertain future requires policymakers to work together with broad stakeholder groups to approach policy and systems transformation in meaningful ways. The questions below are designed to help kickstart conversations in response to changes on the horizon. They are organized in four categories: building capacity, empowering student learning, cultivating systems change and ensuring quality. These categories are described more thoroughly in KnowledgeWorks' *State Policy Framework for Personalized Learning*.

BUILDING CAPACITY

» What are the characteristics of a successful high school and postsecondary graduate in today's world? What strategies can the state use to help communities respond to and build on these visions for student success, particularly leveraging unique local needs?

» How might classroom teaching roles, along with educator pre-service and professional development opportunities, need to evolve to respond to the rise in technology? What other roles might emerge for adults in the education system to assist with these changes?

» What guides or frameworks might help education decisionmakers navigate and work with an increasingly engaged civic sector and build trust with previously marginalized or disengaged groups?

EMPOWERING STUDENT LEARNING

» What additional services or programs might need to be created to meet new and emerging needs in communities across the state?

» In what ways could artificial intelligence, tools that enhance cognitive function and other technologies be used to support historically underserved students, both academically and through whole child supports?

» With a potential rise of mobile student populations, what types of collaborations between governmental agencies and community stakeholder groups might be needed to provide displaced students with continuity of access to the non-academic supports that schools provide, such as access to free and reduced-price lunch, transportation and wraparound services?

ENSURING QUALITY

» How might state standards and accountability and reporting systems evolve to address the knowledge and skills essential to human development and well-being?

» What new types of assessment and credentialing models could communities leverage to both support and evaluate learning? And what safeguards are needed to ensure quality and comparability across communities?

» What safeguards are necessary to ensure the ethical use and efficacy of automated tools in education? Who will bear responsibility if artificial intelligence and algorithms are proven to be biased or otherwise flawed?

CULTIVATING SYSTEMS CHANGE

» What types of flexibility could the state provide schools and districts to integrate emerging technologies into learning while ensuring students' experiences are high-quality and rigorous?

» How might the state's funding system need to adapt to enable students to have equitable access to new technologies and a diverse array of learning opportunities?

» What innovative strategies could the state, districts and communities create together to drive a more nimble and adaptive education system in the face of rapid change?

Policymakers are in a unique position to shape a future of learning such that all learners can thrive. Policymakers can identify where to intervene, harness or adapt policies to respond to the changing landscape while also pursuing policies that align to preferable future outcomes. Though we can never know how the future will unfold, we can expand our ideas about what might be possible and design strategies that leverage promise while mitigating challenge. We can, and should, deeply consider how thoughtful policymaking allows us to begin shaping the future of learning today.

LOOKING FORWARD

Statewide policy transformation is challenging and will require meaningful partnerships with national, state and local stakeholders. As you engage in this work, we hope you consider KnowledgeWorks as a resource. With nearly 20 years of experience exploring the future of learning, growing educator impact and working with state and federal policymakers, our team welcomes partnerships to grow a statewide approach to personalized learning.

We encourage you to also leverage **KnowledgeWorks** resources to deepen your understanding of personalized learning and to increase buy-in and urgency for a new approach to education. The following resources may be of particular interest as you partner with stakeholders toward statewide transformation.

An Introduction to Personalized Learning
Get an overview of personalized learning, learn about key concepts and get answers to frequently asked questions about personalized learning and competency-based learning.

State Policy Framework for Personalized Learning
Ready to ensure all students in your state benefit from high-quality personalized learning experiences? This framework provides policy opportunities to help states evolve from exploration, to replication, to statewide transformation.

Developing Shared Ownership for Personalized Learning
Learn how state policymakers can identify key partners and build shared ownership for systems transformation.

ONLINE ASSESSMENT Is your state ready for personalized learning? Find out what your state needs to do next. Take a short online assessment aimed to help state policymakers and partners get more information on ways to advance personalized learning across all 12 policy conditions. **Start your quiz at KnowledgeWorks.org/Policy-Quiz**

KnowledgeWorks is a nonprofit organization dedicated to advancing personalized learning that empowers every child to take ownership of their success. With nearly 20 years of experience exploring the future of learning, growing educator impact and working with state and federal policymakers, our passionate team partners with schools and communities to grow a system-wide approach to sustain student-centered practices so that every child graduates ready for what's next.

Get more resources to help make personalized learning a reality at **KnowledgeWorks.org.**

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