

AN ADAPTATION OF
KNOWLEDGEWORKS FORECAST 4.0

THE FUTURE OF LEARNING IN THE PITTSBURGH REGION

Positioning the Pittsburgh Region for a New Era

Ten years ago, educators in the Pittsburgh region were grappling with the issue of how to best connect with learners. As the digital revolution changed the ways in which learners pursued knowledge and sought support, educators were coming face to face with the need to adapt learning for a new landscape. The Remake Learning Network was born out of a desire to help educators both in- and out-of-school connect with youth by reimagining the face of learning in the Pittsburgh region. The Network activates project-based and future-facing educational practices, many of which harness technology as a tool relevant to this generation of students.

Since its creation, the Remake Learning Network has helped tens of thousands of educators, students, and their families become engaged in the process of remaking learning. Dozens of school districts have transformed their buildings, curricula, and teaching practices, and more youth than ever before are taking part in innovative out-of-school learning programs.

Looking ahead ten years, the pace of change will accelerate, creating an ongoing need to adapt learning for new contexts. Exponential advances in digital technology, combined with other drivers of change, are ushering in a new era in which education could look drastically different than it does today.

While it is tempting to be satisfied with the success that the Pittsburgh region has had in remaking learning, there is a growing urgency to consider what impacts new social norms, organizational approaches, economic models, and technologies could have on learning.

Drawing upon KnowledgeWorks' comprehensive ten-year forecast, *The Future of Learning: Education in an Era of Partners in Code*, this forecast for learning in the Pittsburgh region highlights ways in which changes on the horizon could shape the region's educational

landscape. Such changes could include the redefinition of wage labor, deeper insights into our brains, emotions, and biological systems, the emergence of new types of economies and notions of value, an emerging open culture movement, new models for conducting transactions, and increased environmental volatility. It invites community members, parents, educators, and other stakeholders to explore new possibilities for learning that promise to help learners and the region adapt to the emerging era.

The future is up to you. We invite you to imagine what learning might look like and to become an active agent of change in bringing new possibilities to life.

Share your ideas
@remakelearning
and at
remakelearning.org.

Learning in the New Era

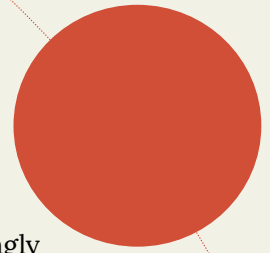
As KnowledgeWorks' forecast details, we are rapidly entering a new era in which our economy, our institutions, and our societal structures—indeed, the very bedrock of our lives—are shifting at an accelerating pace. This new era promises to change learning so dramatically that both the ways in which education prepares learners and the reasons why people pursue learning could look drastically different than they do today.

Central to this era shift, exponential advances in digital technologies are ushering in new partnerships with code. Over the next decade, our lives will become so inextricably linked with our digital companions that we will depend on them to help accomplish tasks both small and large. Such tasks will include navigating the sea of information at our finger tips, helping us to work smarter and more efficiently, and even managing our organizations. As our reliance on digital technologies continues to increase, the code that powers them will become increasingly ingrained in our lives. It will come to function as a sort of white noise in the background: always there and only noticeable when missing.

Signs of this shift are all around us. Our devices are becoming increasingly smaller, more efficient, connected, and affordable. We use, wear, and adorn ourselves with them. Data is captured in vast amounts, creating ever more detailed images of our realities, behaviors, and patterns. Increasingly sophisticated computational tools and algorithms are ushering in smart machines such as driverless cars and digital helpers that can think, learn, anticipate our needs and wants, and even create art.

Such developments are disrupting organizational and business models, reconfiguring civic relationships, and changing the role of employment in people's lives. They will also have a profound impact on how, when, and why people learn.

Given the many possible futures that could unfold, the next decade represents a critical window of choice. As the new era of partners in code takes shape, we need to be critically aware of and guide how such changes might support and shape daily life, work, society, markets, and institutions. More specifically, we have many choices to make about what learning might look like and whether education supports everyone in navigating rapidly changing landscapes.



Making Sense of Exponential Change

Legend has it that long ago, when shown the game of chess, the ruler of India was so pleased that he offered the inventor of the game a reward of his own choosing. The inventor, who was also a mathematician, told the ruler that he would like just one grain of rice on the first square of the chess board, two grains on the second square, four on the third, eight on the fourth, and so forth across the remaining squares on the chessboard.

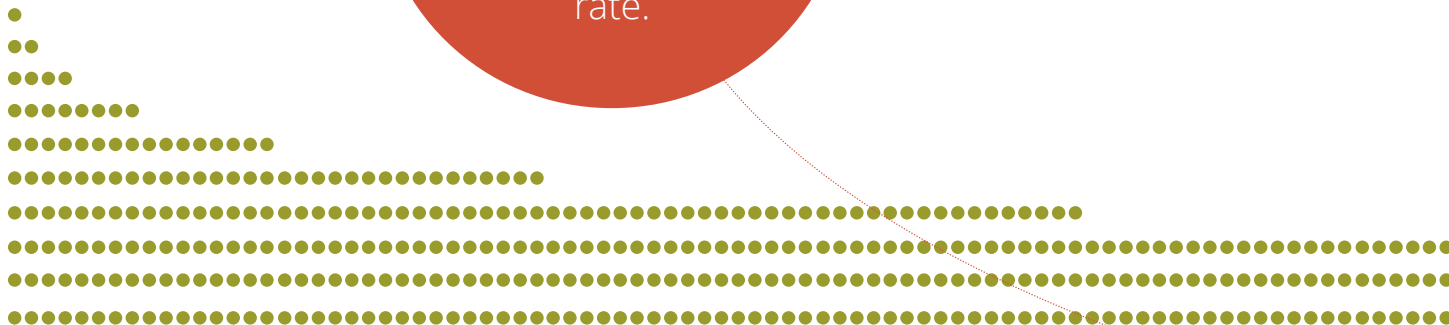
This request seemed reasonable to the ruler. He ordered his servants to bring the rice but then quickly realized that he would not be able to fulfill his promise to the inventor. At the 20th square, the ruler would have had to put down a million grains of rice. At the 64th square, he would have had to put down over 18 quintillion grains of rice, a pile big enough to dwarf Mount Everest.

This fable illustrates the power of exponential change. For the first few squares on the chess board, the calculations seem manageable. On the second half of the chess board, the calculations become so large that they become unfathomable.

This is the story of social, economic, and technological change in the 21st century. The rate at which new inventions, ideas, and marketplaces emerge and then become obsolete is accelerating at an exponential rate, yet we often still think of ourselves as advancing at a linear pace, simply adding a grain of rice to each square of the chessboard...

If education continues to advance at a linear pace, it will be buried under a mountain of change, unable to keep pace with the world for which it aims to prepare learners, just as the chess board was buried under a mountain of rice.

New inventions, ideas, and marketplaces are emerging and then becoming obsolete at an accelerating rate.





Exploring the **Future of Learning**

The future is not a fixed point, and the changes that will shape it are happening so quickly and in such complex ways that we could not predict it if we tried.

In face of such uncertainty, the map on the other side of this forecast provides glimpses into what the future of learning might look like in the Pittsburgh region. In so doing, it explores just a few of the provocations from KnowledgeWorks' Forecast 4.0.

These provocations are the result of observing present-day signals of change and imagining, "What if?" Each provocation outlines

possibilities for what learning could look like in the new era of partners in code. Two "What if?" statements illustrate specific images of the future, while three signals of change provide examples of how each provocation is beginning to play out in the Pittsburgh region today.

As you explore the map, notice what new questions, ideas, and inspirations emerge. Examine your assumptions, imagine alternative futures, and define your own plans for action. This is your opportunity to unleash your imagination about the future of learning in the Pittsburgh region and to consider what you can and want to create.



Shaping the Future of Learning

The provocations on the map present many possibilities for learners and learning in the Pittsburgh region. Some of those possibilities present opportunities or threats—or both at once—for different stakeholders. Others raise dilemmas that we will need to manage but might not be able to resolve. Some of the issues facing the region during this time of foundational change appear below.

THE PURPOSE OF EDUCATION WILL NEED TO ALIGN WITH NEW ECONOMIC REALITIES.

Over the past 30 years, the Pittsburgh region has seen its economy shift radically. Its once prominent steel industry has dwindled, giving rise to an economy focused on technology, higher education, and healthcare. How might education support learners in pursuing new forms of career readiness as the region's economy continues to shift and as the very notion of what it means to have a career gets redefined? Pursuing traditional ideals about education could cause established institutions to persist without truly meeting the needs of learners and society. As we redefine education for the emerging era of partners in code, deeply held societal narratives about education may need to change, and the purpose of education could vary for different learners.

EQUITY IS NOT A GIVEN AND WILL BE A MAJOR DESIGN CHALLENGE.

The coming decade will bring increasing challenges in making learning ecosystems equitable for all learners. New divides could emerge as technology-driven automation of work changes the relationship between humans and machines in the workplace and redefines careers. How might we ensure that all learners in the Pittsburgh region have access to educational opportunities that help them navigate and benefit from these new relationships?

LEARNERS AND THEIR FAMILIES WILL HAVE MORE OPTIONS BUT ALSO MORE RESPONSIBILITY FOR LEARNING.

As learning continues to expand beyond traditional institutions, learners and their families will have greater choice about how, when, and where to pursue learning. With that choice will come greater responsibility for evaluating and selecting options. In navigating potentially more rewarding but increasingly complex learning landscapes, learners and their families will need to advocate for access to the learning experiences, resources, and supports that best reflect their needs, interests, and goals. Regional providers will need to consider new ways of providing effective guidance and support so as to prevent splintering that could all too likely correspond with current socioeconomic divides.

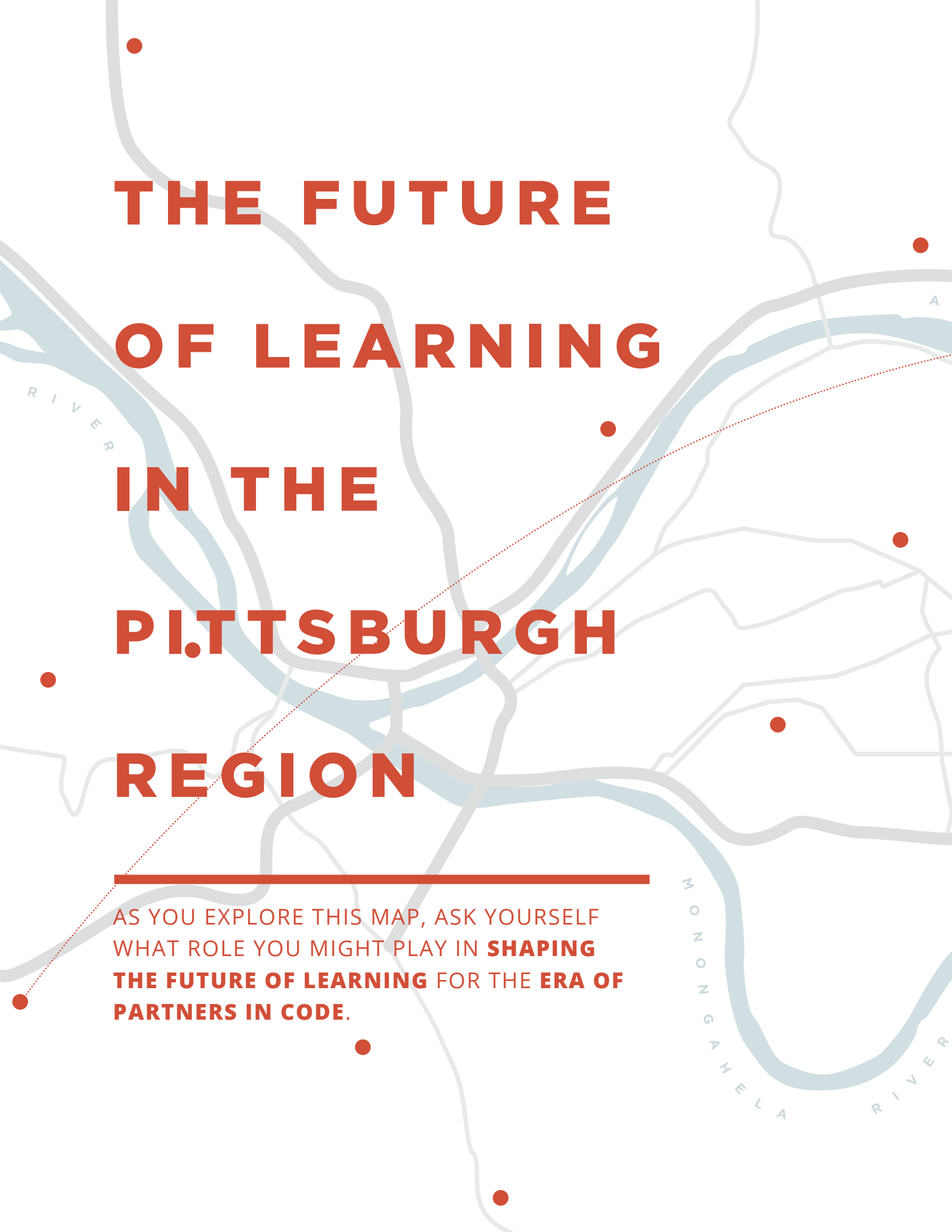
NEW CATALYTIC ROLES WILL BE NEEDED TO COMBAT INSTITUTIONAL INERTIA.

Today's educational institutions could struggle to adapt to the changing landscape, with many finding their value propositions out of sync with new realities or their resources misaligned with needs. How many of today's schools, colleges, and universities will close, and how will those that survive support learning, workforce development, and the communities in which they operate? How might new entrants fit into the region's learning ecosystem?

The Remake Learning Network has been playing a catalytic role for nearly ten years, helping institutions not only survive but thrive by supporting learning innovation through partnerships, funding, and storytelling. As we enter the new era of partners in code, the network's mission will change. Network members, organizations, and projects must also adapt.



What might the Remake Learning Network look like in 2026?



THE FUTURE OF LEARNING IN THE PITTSBURGH REGION

AS YOU EXPLORE THIS MAP, ASK YOURSELF
WHAT ROLE YOU MIGHT PLAY IN **SHAPING
THE FUTURE OF LEARNING** FOR THE **ERA OF
PARTNERS IN CODE.**

Responsive Learning Environments

Education innovation will focus on cultivating effective group learning cultures and customizing learning environments for individuals. Attention to factors such as emotional intelligence, social awareness, and the gender spectrum will contribute even as ubiquitous sensors and sophisticated feedback loops make it possible to optimize physical and digital environments for learning in response to individual needs. Augmented and virtual reality tools will increasingly meld those environments and enable learners to make use of new forms of immersive experience.

WHAT IF...

...**Learning pathway designers** helped learners cultivate their ideal learning conditions?

...**Smart learning environments** used data from wearable devices to tailor learners' surroundings and resources to their needs?

SIGNALS OF CHANGE:

SMALLAB:

This embodied learning environment uses a 3-D game interface involving a ceiling-mounted projector, motion-sensor cameras, and a computer to create movement-based learning environments for students.

Z SPACE LAB:

This virtual reality lab at Montour School District uses personalized 3D projection to enable students to dissect a Tyrannosaurus Rex, deconstruct a helicopter, and engage in immersive learning experiences around any subject.

NORILLA:

This ed-tech startup out of Carnegie Mellon University melds on- and off-screen learning by enabling young children to interact with a virtual gorilla whose gestures shake a real-world platform. If the tower constructed on the platform topples, the gorilla helps students correct the structure using tailored hints.

Authentic Mastery

As educators work to prepare learners for new economic realities, they will create assessments that measure applied mastery, real-world impact, and social-emotional development. Educators and learners will focus their interactions on realizing personal potential and demonstrating meaningful competencies. Purpose-driven learning will link classroom experiences to real-world challenges and authentic contexts and will elevate the role and status of students and educators in communities. Individuals will learn to evaluate their potential for unique contribution, which will be a key skill for navigating the complex mix of economic opportunities that they will encounter.

WHAT IF...

...Individuals and student teams earned **personal impact scores** for working to address real-world problems?

...**Contribution portfolios** demonstrating evidence of learners' development and passions were used as the primary assessment of learning?

SIGNALS OF CHANGE:

MESSAGE FROM ME:

This program enabling young children to communicate with parents about their daytime activities at child care centers through the use of digital technologies helps foster parent connection and supports educators in assessing language and speech development and socio-emotional growth in an ongoing, natural way.

DIGITAL PORTFOLIOS:

Remake Learning Network members from schools, universities, out-of-school organizations, and beyond are working together and with national organizations such as the Maker Education Initiative to understand how youth can demonstrate content mastery through online portfolios of their work rather than through standardized tests.

LEARN AND EARN:

This summer employment program enables youth from across Pittsburgh to earn digital badges to certify the knowledge, skills, and dispositions learned through their work experiences.

Artisanal Education

Learners and their families will be increasingly conscious consumers and architects of learning, seeking out educational approaches that fit their values and lifestyles. An abundance of options will proliferate, increasing pressure on public systems and challenging established approaches to quality assurance and funding. In addition, concern about sourcing and ethics will lead to increasing scrutiny of the origins of curriculum, the values of educators, and the interests of those who determine educational approaches and policies. Finding one's niche in the education landscape will become both more complex and potentially more rewarding.

SIGNALS OF CHANGE:

CHILDRENS INNOVATION PROJECT:

This slow space helps children find small, authentic discoveries inside something already known and reflect on themselves in relation to the materials that they explore. In approaching technology as raw material, it helps children gain access to the thinking of technology rather than just using it.

WHAT IF...

...Learning resources were **tagged by origin, values, and impact** the way grocery stores tag locally grown food today?

...**Educator guilds** cultivated craft learning experiences for small groups of learners?

ASSEMBLE:

This open space in Pittsburgh's Garfield neighborhood provides a space for artists, technologists, and makers of all kinds to collaborate and present experimental learning processes, with the goals of opening creative processes and inspiring confidence through making.

MCG YOUTH AND ARTS:

This after school program of Manchester Craftsmen's Guild creates a space for urban youth to self-direct their own exploration of art and design. It offers supplemental and apprenticeship programs in ceramics, photography, digital arts, and painting.

Educating for Impact

As landscapes become increasingly volatile, the need to help young people think innovatively and navigate complexity will become increasingly pronounced. This need will create a societal expectation that education should support learners in pursuing learning journeys that embrace complexity, lead to deep knowledge, and set them up to initiate and anticipate change. Students will come to be seen as innovators and problem solvers who actively shape the world around them as part of their education.

WHAT IF...

...Schools taught learners how to embrace complexity and approach **difficult problems** that can be managed but not necessarily resolved?

...**School social impact scores** became critical metrics for attracting funding, partnerships, and community engagement?

SIGNALS OF CHANGE:

YOUTH LEADING CHANGE:

This youth-led program helps students develop the knowledge and skills necessary to serve as leaders in their communities. Members are empowered to take a stand and to help educate others about community safety, peer pressure, and civic engagement.

HEAR ME:

This youth voice project supports learners in creating digital media around issues that are important to them in order to empower youth to share their ideas and create social change.

THE LEMONADE PROJECT:

This program enlightens and empowers youth through the use of science, art and activism. Using a digital apparatus to measure water quality, learners tested the drinking water in six of the Allegheny county's neighborhoods and publicized their findings in neighborhood lemonade stands to inspire concern about pollution in the area's water.

Educator Swarms

Personalized learning will move beyond tailoring pacing and curricular resources and toward dynamic curation of customized learning relationships with an expanding range of learning partners that encourage learner reflections and other metacognitive practices. Flexible configurations of human educators and mentors, along with digital learning coaches and companions, will be coordinated seamlessly to support learners' short- and long-term needs and help all students reach their goals. Lifetime personal learning bots will leverage artificial intelligence and machine learning to grow with their human partners, providing smart support and feedback.

WHAT IF...

...Every child had a **“learning pit crew”** of caring adults, peers, and personal machine/digital partners that responded to immediate needs while optimizing for long-term success?

...**Learning partner placement agencies** helped families of all socio-economic backgrounds find and develop supportive learning relationships?

SIGNALS OF CHANGE:

FINE ART MIRACLES:

This Social Robot Enhanced Learning program uses a social therapy robot, Romibo, as a classroom aide that helps teach young learners.

CREATE LAB SATELLITE NETWORK:

Outreach teams at four colleges of education in West Virginia and Pennsylvania are working collaboratively and with Carnegie Mellon University's Community Robotics, Engineering, and Technology Empowerment lab to share innovative programs with their communities in locally relevant ways.

DIGITAL CORPS:

This network helps youth develop digital literacy by recruiting and training technology guides from a wide range of professions and matching them with out-of-school learning sites throughout the city and county.

Label-Free Learning

A “no-labels learning” movement will rise amid growing recognition that the sub-categories once set up to help increase equity in education might actually act as barriers to making truly personalized learning available for all learners. As this movement pushes to put individual learners’ needs front and center, an abundance of granular data will provide new insights into patterns of behavior, making grade levels, sub-categories, ZIP codes, and some other types of predetermined identifiers recede in importance. Flexible student groupings will reflect real-time needs, and new forms of learner protections and quality assurance will emerge.

WHAT IF...

...Schools and families tailored learning to every aspect of a learner’s **self-defined identity**?

...Funding was customized to pay for each student’s **personalized learning pathway**?

SIGNALS OF CHANGE:

CARNEGIE LEARNING’S COGNITIVE TUTOR:

Drawing on artificial intelligence, cognitive psychology, and human computer interaction, this software for high school students provides highly personalized tutoring in math by customizing hints, feedback, and prompts for each problem based on individual learners’ needs.

REMAKE LEARNING BADGE-ENABLED PLAYLISTS AND PATHWAYS:

The Sprout Fund is encouraging multiple in- and out-of-school organizations to collaborate in designing learning experiences that build on one another so that students can advance along learning pathways after mastering a skill or competency regardless of where their learning takes place.

SOLE:

Educators in Pittsburgh are experimenting with self-organized learning environments (SOLES) that encourage learners to answer their own questions by using the Internet. Learners are largely in control of researching the answers, making learning highly personalized.

R I V



THE GRABLE FOUNDATION
dedicated to improving the lives of children

© 2016 KnowledgeWorks
and the Remake Learning
Network. All rights reserved.

Photography by
Ben Filio for The Sprout Fund

Design by Little Kelpie

Ready to experience
the future of learning?

Join us for
Remake Learning Days,
a weeklong celebration of learning
innovation with 150+ events throughout
the Pittsburgh region.

May 9-15, 2016

Learn more at remakelearningdays.org.
#RemakeDays

This adaptation of KnowledgeWorks' *The Future of Learning: Education in an Era of Partners in Code* was written by Jason Swanson of KnowledgeWorks and Sunanna Chand of the Remake Learning Network, with contributions and reviews from other colleagues. In particular, the authors would like to express their gratitude to Gregg Behr for his extraordinary leadership in supporting this publication, as well as to Nancy Arnold, Ryan Coon, Katie King, Anne Olson, Judy Pepler, Katherine Prince, Anne Sekula, and Matt Williams for their input into this project. Special thanks go to Justin Aglio, Temple Lovelace, Mary Murrin, Aileen Owens, Shaun Tomaszewski, and Dror Yaron for their participation in a signal identification workshop.

Remake Learning Network

The Remake Learning Network is a professional network of educators and innovators working together to shape the future of teaching and learning in the Greater Pittsburgh Region.

The Network represents more than 250 organizations, including early learning centers and schools, museums and libraries, afterschool programs and community nonprofits, colleges and universities, ed-tech startups and major employers, and philanthropies and civic leaders, that collaborative to inspire and empower a generation of lifelong learners in Pittsburgh, West Virginia, and beyond.

remakelearning.org

KnowledgeWorks

KnowledgeWorks is a social enterprise focused on ensuring that every student experiences meaningful personalized learning that allows him or her to thrive in college, career and civic life. By offering a portfolio of innovative education approaches and advancing aligned policies, KnowledgeWorks seeks to activate and develop the capacity of communities and educators to build and sustain vibrant learning ecosystems that allow each student to thrive. Our on-the-ground work includes partnerships with schools through competency education and EDWorks early college high schools, as well as with communities through StriveTogether. We also provide national thought leadership around the future of learning.

knowledgeworks.org/future-learning