



maker learning affinity group report

March 2024

introduction

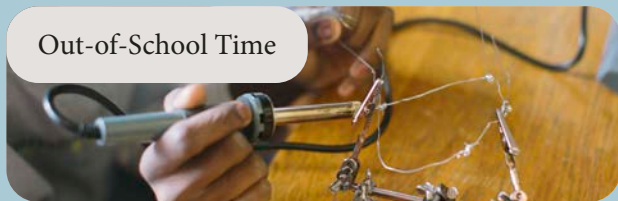
From Pittsburgh’s bustling steel town origins to its recent emergence as a regional hub and global model for innovation and creativity, an enduring spirit of making continues to flourish in southwestern Pennsylvania.

In February 2023, with the support of the [Grable Foundation](#) and partnership of [Digital Promise](#), Remake Learning’s Maker Learning Collaborative convened its members and published *The State of Maker Learning in Southwestern Pennsylvania* (remakelearning.org/maker2023). Through the publication of this foundational document, the Maker Learning Collaborative presented an analysis of the region’s existing maker learning ecosystem and offered recommendations for how to move closer to its vision of **“robust, accessible maker opportunities in every community, which empower people to pursue creative pathways and positively impact their own lives and the broader community.”** By bringing together maker educators from throughout the region, a dominant theme was unearthed: there is a need for greater, more intentional collaboration to move the work forward.

We know that no one person or organization alone can actualize this vision—that collaboration across K-12 education, higher education institutions, industry partners, and out-of-school programs is essential to cultivate the regional ecosystem and to make this a reality. By harnessing the collective expertise and passion of our stakeholders, we can cultivate a more inclusive, impactful, and sustainable maker learning ecosystem for generations to come.

To that end, in April 2023 the working group began preparations for the launch of Maker Learning Collaborative **Affinity Groups**—four distinct groups led by and composed of stakeholders from each of the aforementioned areas who would dig into the work of how they could work together to reach the Collaborative’s vision.

affinity groups



During their first meeting, affinity groups had the opportunity to look internally at how their respective affinities show up in the broader maker learning ecosystem and discuss the implications of those noticings. Each affinity group broke out on their own to identify their group's goals, assets, needs, problems of practice, and what they can contribute to other affinity groups and the regional ecosystem. They then came back together to discuss their findings, identify additional areas of strength and need, and potential solutions to improve collaboration across affinities and the entire ecosystem. Over the course of several months, this work connected the dots within and between K-12, higher education, out-of-school time, and industry. This report shares each affinity group's findings and commitments to collaborating across the maker learning ecosystem in service of their goals and the broader Maker Learning Collaborative vision.

affinity group leads



K-12
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Falk Laboratory School



Out-of-School Time
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Industry
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Catalyst Connection

k-12



goals

Realistic maker learning sustainability models

“Replicable” school makerspaces and maker learning initiatives are a fallacy in the sense that you can’t take one model and directly implement it in another school. While successful replication is unlikely, creating realistic, sustainable models for maker learning that can be modified and repurposed is critical. These models can serve as a starting point for starting, relaunching, or redirecting maker learning initiatives.

Community representation in school makerspaces

Schools sit at the heart of communities as vital hubs for their families. As such, school makerspaces should also serve their communities. This includes, but is not limited to, cultural representation and relevancy in the school’s physical makerspaces, the types of maker modalities used and taught in the school, and creating the conditions for students to see themselves in makerspaces as makers.

assets

Community reach

Schools are the central node of communities for the vast majority of people within their geographic boundaries, even for community members who do not have school-aged children. K-12 organizations have the ability to bring together maker learning advocates around the learners in their schoolhouses, furthering collaborative efforts and providing direct opportunities to a large portion of the community.

Horizontal and vertical articulation

Through school districts and intermediate units, K-12 education can ensure consistent access to resources and opportunities across schools. The K-12 experience is also the natural core of maker learning pathways due to the number of learners directly reached and the structures that see learners through the K-12 experience, allowing for intentional design of curricula and resource allocation.

growth areas

Curriculum and school culture integration

There is a need for maker learning to be more intentionally woven throughout the K-12 experience. Curricula that emphasize project and problem-based learning aligns with maker learning's connections to constructivism and constructionism. A school culture that embraces making creates opportunities for artistic and individual expression, addressing the need for a greater emphasis on social-emotional learning and supports. The oft-open-ended nature of maker learning also lends itself to better addressing learner variability: the fact that all learners have differences that impact how they learn. Ensuring maker learning's inclusion in the curriculum also ensures that these learning opportunities are not limited to schools that already have a maker champion.

“Educator’s voices are integral in developing makerspaces and should be amplified throughout the design and implementation process.”

Samantha Schmitt



Building internal maker learning capacity

The demands of the schoolhouse can make it difficult to develop and apply maker skills and mindsets, leaving many educators feeling as though they are not equipped to effectively facilitate maker learning experiences. While maker learning theories like constructivism, constructionism, and situated learning are taught in teaching programs, educators are not always provided with the time and resources to continue to develop the required skills and learning protocols.

collaborative commitments

Community co-design of maker vision and modalities

From its unique position at the center of many communities, K-12 can be a convener, bringing together representatives from those who live in the community and other maker learning stakeholders. By developing these relationships and bringing the community together, everyone can take part in co-designing the local maker learning experience.

Symbiotic relationships with other affinity groups

With K-12 schools serving nearly all adolescent learners, they are uniquely situated to work with each of the other affinities to create collaborative opportunities and access points for the entire community. For example, K-12 schools hiring independent teaching artists and makers for assemblies and residencies brings expertise into the building while providing employment opportunities for freelancers. Higher education and industry partners can serve as field trip locations, as well as content and skill experts who, in turn, inspire learners and promote their schools and companies while strengthening pathways for learners to become college and career ready.



out-of-school time

goals

Making that meets multiple needs

A holistic approach to maker learning can meet the needs and broader goals of the different affinity groups and the ecosystem as a whole. Maker learning should be a mechanism for learning the skill sets and concepts covered in K-12 curricula, as well as a tool for social-emotional learning, personal growth, and community collaboration and development.

Shift the cultural narrative of how humans learn

Maker learning experiences provide an opportunity to demonstrate and highlight what powerful learning can and should look like. It challenges traditional educational paradigms by emphasizing hands-on, experiential learning over passive absorption of information and by empowering learners to explore, create, and innovate. Through maker learning, we can create and engage in learning experiences that are personal and accessible, authentic and challenging, collaborative and connected, and inquisitive and reflective.

assets

High demand for “third spaces”

As we continue to shift further from the height of the COVID-19 pandemic response, the demand for third spaces—gathering spaces that are not home (first space) or work/school (second space)—has increased significantly. Places like museums, libraries, and makerspaces are serving as spaces in which creativity is sparked and connections are forged.

Flexible and relational

The flexibility of out-of-school time organizations and offerings has allowed for a great deal of experimentation with metacognition, shifting the focus from learning content to learning how to learn and other skills. Out-of-school time organizations are also not bound by many of the systems and structures that the other affinities work within while also being the one maker learning affinity that serves community members for their entire lives.

growth areas

Resource availability

Out-of-school time organizations offering maker learning experiences grapple with resource scarcity, not only in terms of materials and equipment but also in terms of support for the human resources within these organizations. Limited funding often translates to limited professional development opportunities and staff training. Regional, national, and even global economic challenges can more severely negatively impact smaller organizations and those operating as independent contractors. Despite these challenges, organizations strive to maximize the impact of available resources, both material and human, to foster innovation and skill development in participants.

“Much of the work up until this point has been about rearranging the spice cabinet. Now it’s time to start mixing and using the spices.”

Zena Ruiz



Navigating bureaucracy

Board policies, background checks, independent contractor forms. Out-of-school time organizations and educators face a constant barrage of red tape. Complex approval processes and institutional protocols can slow down communication and decision-making, impeding the timely implementation of collaborative initiatives. Despite the potential for enriching partnerships, navigating these hurdles requires patience and strategic planning to ensure effective collaboration and the realization of shared goals. With streamlined communication channels and proactive efforts to establish clear collaboration frameworks, out-of-school time organizations and independent contractors have the potential to cultivate robust partnerships with K-12 and higher education institutions, as well as industry partners, facilitating the expansion of innovative educational opportunities.

collaborative commitments

Regional equipment sharing

Equitable access to a wide range of equipment and materials can propel the regional maker learning ecosystem to new heights. Out-of-school time maker learning organizations have the potential to take the lead in developing regional equipment sharing opportunities, which could significantly enhance resource utilization and broaden access to costly equipment. By connecting the existing working group network while also forging new community partnerships, these organizations can lay the groundwork for shared access models that enable community members to explore diverse maker tools and technologies despite individual organizational constraints.

Knowledge sharing and co-teaching

Due to their flexibility and relational position, out-of-school time organizations and educators have the potential to lead collaborative efforts aimed at knowledge sharing among the different affinity groups. This can include organizing professional learning field trips and actively initiating and facilitating partnerships between diverse entities. Engaging in these knowledge-sharing experiences will unearth valuable insights and networking opportunities while encouraging participants to reflect on and apply their learnings in their specific contexts, fostering innovation across all participating sectors.



higher education

goals

Improved understanding of making and maker learning

Higher education institutions seek to improve the understanding of making and maker learning. They can serve as connectors across the maker learning ecosystem, leading the charge in improved understanding of these concepts while creating space to expand how we talk about this work. In addition, by more deeply integrating maker learning experiences and pedagogies in teacher training programs, graduates will enter the teaching force better equipped with the skills and knowledge to implement these experiences.

Greater inclusivity in academia

Higher education institutions have a reputation for being inaccessible due to financial barriers, geographic and infrastructural limitations, and socio-cultural factors. Greater access to and inclusivity within academia will contribute greatly to the democratization of maker learning.

assets

Global leaders in academia

As the home to world-renowned learning institutions, Pittsburgh is positioned to include brilliant thought leaders from the local, national, and global maker learning ecosystems. Their participation in the Maker Learning Collaborative is critical in connecting the Maker Learning Collaborative to the broader worlds of academia and making.

Access to resources and opportunities

World-renowned higher education institutions inject a wealth of resources and opportunities into southwestern Pennsylvania's maker learning ecosystem. Through state-of-the-art facilities, cutting-edge research, esteemed-faculty expertise, and global connections, these institutions can offer invaluable support to local makerspaces, educational programs, and industry partners.

growth areas

Outside access to resources and opportunities

Higher education must dismantle barriers and implement inclusive practices to make the resources and opportunities at its disposal more accessible to historically and systematically excluded communities. By prioritizing equity and openness, higher education institutions can foster innovation and growth in the Pittsburgh region and create a model for broader adoption of this approach, empowering individuals from all backgrounds to participate in maker learning ecosystems around the world.

**“Makerspaces
bridge the gap to
opportunities in
higher ed.”**

John Balash



Reimagine silos

Silos will always exist, which is why the Maker Learning Collaborative has leaned into being intentional about connecting and convening. The working group has focused its efforts on creating space for affinity groups to come together on their own and to connect their efforts with and for the benefit of other affinity groups and the greater regional ecosystem. Growth in this area means shifting away from “breaking down silos” to determining “how silos can achieve their own specific goals while also intentionally working together to uplift the entire region.”

collaborative commitments

Uplifting and amplifying champions

Higher education must serve as a powerful amplifier for maker learning champions and innovators, elevating their work and stories by providing platforms for recognition, dissemination, and collaboration. Adjunct faculty, with their unique position bridging academia and industry, enrich the educational landscape by infusing practical insights and fostering connections between theory and application. Engaging diverse stakeholders, particularly those from historically and systematically excluded backgrounds, within higher education institutions amplifies the impact of maker education initiatives, creating inclusive spaces where the voices and contributions of innovators are celebrated and integrated into institutional narratives of excellence and progress.

Create intentional opportunities for access and inclusion

By forging meaningful partnerships with K-12, out-of-school time, and industry organizations and co-creating programs that address their specific needs and challenges, higher education can ensure that maker learning becomes a platform for empowerment and inclusion at all educational levels. Through targeted outreach efforts, community co-designed and co-facilitated experiences, and the provision of tailored resources and support, institutions can foster an inclusive environment, paying dividends and enriching the maker learning experience for all stakeholders in the ecosystem.



industry

goals

A more diverse maker workforce

For many, adult life and industry serve as the ultimate destination points for maker learning pathways. While maker learning should be a lifelong opportunity and endeavor, one of the primary goals of this work is a diverse, inclusive workforce. This includes an increase in minority- and women-owned maker businesses and in industry leadership roles.

Increased and improved touch points throughout the ecosystem

Industry leaders aim to enhance and expand engagement throughout southwestern Pennsylvania's maker learning ecosystem. By actively collaborating with educational institutions and community organizations to provide resources, mentorship, and real-world opportunities, industry partners can have a lasting impact and create on-ramps for learners and makers, cultivating a vibrant ecosystem that drives innovation, supports local talent, and fosters economic growth across the region.

assets

Field expertise

Insights and knowledge from industry representatives can inform curriculum development, ensuring alignment with real-world industry needs and trends. Additionally, industry professionals can provide mentorship, networking opportunities, and hands-on experiences that bridge the gap between classroom learning and practical application, preparing learners for successful careers in the field.

Political and capital resources

Industry members bring significant political and capital assets that can greatly contribute to the overall health of Pittsburgh's maker learning ecosystem. Industry-led advocacy efforts can influence policy decisions to prioritize funding and support for maker education initiatives. Their financial investments can provide essential resources, such as equipment, technology, and infrastructure, that enhance the quality and accessibility of maker learning programs.

growth areas

Access and opportunity for historically and systematically excluded populations

Many individuals face barriers due to limited access to quality maker learning experiences, lack of exposure to STEM-related fields, and inadequate support systems to pursue careers in industry. Systemic biases and discriminatory practices within recruitment, hiring, and advancement further perpetuate underrepresentation.

Match interests and aptitudes to emerging technologies and fields

Industry partners can collaborate with organizations in the other affinity groups to map student interests and skill sets to potential careers in emerging technologies and fields. This involves establishing programs that provide hands-on experiences, mentorship opportunities, and industry-relevant projects, while ensuring a focus on reaching and creating opportunities for historically and systematically excluded people.

“Developing meaningful connections between industry and maker education drives innovation, and creates accessible pathways to coveted skills.”

Nate Broadus



collaborative commitments

Industry immersion

Working through the Maker Learning Collaborative, industry representatives can lead the charge in creating and facilitating new and exciting opportunities for learners of all ages to better engage with local, national, and global industry. A “Meet the Maker” series can bring together learners and talented professionals. Ecosystem members from industry who have navigated the pathway from K-12 to the workforce are in a position to contribute to the collective knowledge and experience that can propel new generations of maker learners forward.

Grant partnerships

In addition to offering grant opportunities to maker learning organizations and educators, industry organizations can work alongside stakeholders from other affinities to seek joint funding to catalyze deeper industry-education partnerships.



remake learning®

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