Space for All: Creating Accessible Technology-Rich Makerspaces and Learning Activities for Youth and Young Adults with Autism

Collaborative grants 2415505 and 2415506

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Andrew Coy, Digital Harbor Foundation

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UMBC

MNA

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Introduction

- Investigating how to include youth and young adults with autism in the design and evaluation of accessible makerspaces, technology-rich learning experiences, and DIY assistive technologies
- Creating three accessible makerspaces in Baltimore and including approximately 90 youth and young adults with autism and 20 educators and experts in hands-on learning activities
- Developing a design framework with guidelines, lessons learned, research findings, and an educator training module

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Approach

- Engaging multiple stakeholders and community partners
- Informing research from a Universal Design for Learning (UDL) perspective
- Using co-design and other qualitative methods (interviews, focus groups, observations) to understand and synthesize insights from learner, educator, and expert perspectives

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Achievements (so far!)

- Collected insights from stakeholders on strategies and tensions in increasing accessibility and supporting belonging for disabled learners
- Established partnerships with community makerspaces and youth learning programs committed to accessibility
- Shared research outcomes with the public at multiple community events

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Stakeholder Insights

- Using visual and environmental cues to structure learning environments
- Supporting engagement through technology, multimodality, and predictable routines
- Contextualizing assistive technologies through collaborative stakeholder engagement
- Supporting personalized regulation through movement, flexible seating, and outdoor connections
- Supporting belonging by avoiding tokenism and designing equitable, welcoming spaces
- Sustaining inclusive learning programs through community, culture, and creativity

Zhang, K., Sakowicz, M., Wingeart, E., Hamidi, F. 2026. Belonging in the Making: Investigating Inclusive Makerspace Design for Youth with Autism. ACM CHI conference on Human Factors in Computing Systems, accepted.

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Partnerships

- Built relationships with Maryland Assistive Technology program to fabricate and distribute 3D printed Do-it-Yourself Assistive Technology (DIY-AT); distributed 300+ devices to residents with disabilities
- Started partnerships with seven Baltimore-area organizations serving youth and young adults with disabilities
- Connected to Arecibo Research Center in Puerto Rico to inform the envisioning and design of an on-site accessible makerspace

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Space for All – Public Events

“They are very hands-on and engaging for the kids.”

A 3D printed tactile puzzle and other 3D printed assistive technologies.

“These hands-on activities were AWESOME! We learned about circuits, painted with yeast, made paper circuit cards, learned how to use the 3D drawing pens, and learned about the art installation and UMBC’s great 3D printing program.”

A 3D printed tactile campus map co-designed with blind and low-vision students.

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Next Steps

- Space modifications to reflect findings so far in three community makerspaces to increase accessibility
- Co-design of learning activities with youth and young adults with autism
- Evaluating the impact of space modifications and activities on learners

Thanks!

Questions or comments?

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