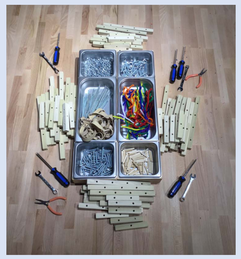
Creating Accessible Makerspaces at Museums and Colleges through Soaring Socks: A Catapult Tinkering Challenge

Lila Teenyanoff

Background

- Tinkering can provide meaningful learning experiences for all participants.
- Challenges to learning inside the space and the outside community space must be considered.
- Tinkering has the potential to mitigate inequalities in education and STEM careers.

Engaging in a personally relevant challenge, participants designed a catapult to create soaring socks into the laundry basket. The activity included low-tech and high-tech tools. After tinkering, participants were invited to complete a survey to assess tinkering self-efficacy.



Participants

Participants included students at the Montshire Museum of Science in Vermont; Whole Children, an inclusive community center in Massachusetts; and undergraduates at Mount Holyoke College, a women's college in Massachusetts. The activity was constructed in collaboration with the Montshire Museum of Science and the Mount Holyoke College Makerspace.

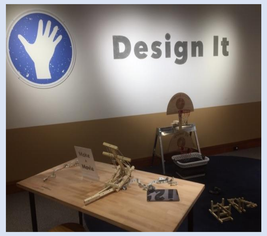
Objectives

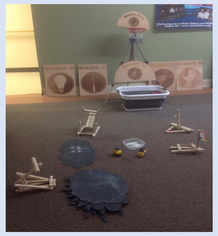
How do we create accessible, inclusive, and equitable STEAM learning experiences for students at informal learning settings?

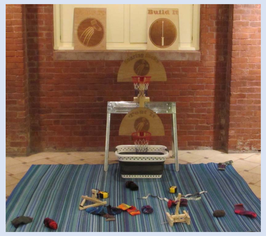
- Create a mobile tinkering activity
- Implement accessible facilitation techniques
- Improve tinkering self-efficacy of elementary school and college students

Tinkering Spaces

Montshire Museum | Whole Children | Mount Holyoke College





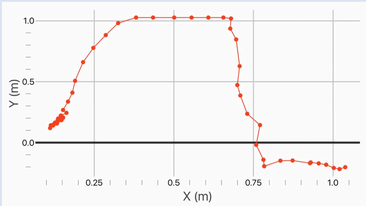


Evaluation

- After tinkering, participants were invited to complete a survey to assess their tinkering self-efficacy on a computer.
- Total activity participants for six events: 126
- Total survey responses: 54

Tinkering with Tech

Vernier Video Physics App

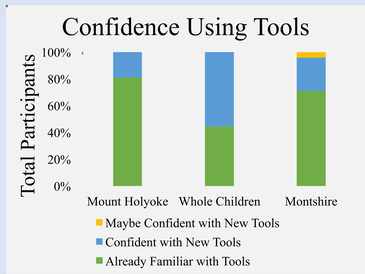


Participants build upon others prior work, in both analog and digital mediums.

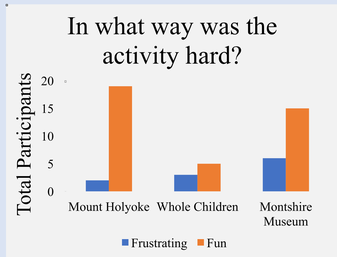
Collaboration in Tinkering

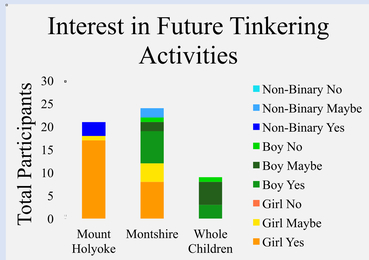
- Social learning experience across participant groups.
- Facilitation questions were open-ended and process-oriented.

Results



Learning Process





Conclusions

- Open-ended facilitation and emphasis on process make this activity accessible and successful for three very different populations.
- Young learners access mobile spaces. Adaptations to the activity are necessary to meet their developmental learning.
- All STEAM and non-STEAM majors at Mount Holyoke College reported confidence using new tools and interest in future tinkering activities.
- Project relevance, multiple entry points and pathways to success correlate to participants' self-reports of confidence in tinkering.
- Accessible makerspaces must consider their greater community, project relevance and facilitation techniques to engage all students, including those traditionally excluded from makerspaces.

Acknowledgements

- Rachel Donegan, Rebecca Haynes, Greg DeFrancis, and Lorenz Rutz at the Montshire Museum
- Amy Grillo, Becky Packard, Luke Jaeger, Shani Mensing, and Donnie Cotter at Mount Holyoke Amanda Kent and Tracy McNaughton at Whole Children
- Montshire Museum Explainers and tinkering facilitators
- Funded by Mount Holyoke College and local businesses

References

- Vossoughi, S., Hooper, P. & Escudé, M. "Making Through the Lens of Culture and Power: Toward Transformative Visions for Educational Equity." *Harvard Educational Review*, vol. 86, no. 2, June 2016, pp. 206–232., doi:10.17763/0017-8055.86.2.206.
- Bevan, B., Gutwill, J., Petrich, M., Wilkinson, K. "Learning Through STEM-Rich Tinkering: Findings From a Jointly Negotiated Research Project Taken Up in Practice." *Science Education*, vol. 99, no. 1, 25 Nov. 2014, pp. 98–120., doi:10.1002/sce.21151.