

3D Printing for Accessible Education and Mapping: A Collaborative Project in Australia and New Zealand

Leona Holloway Monash University, Australia

Presentation overview

- About the project
- Highlights
- Where to find further information



ARC Linkage Project Investigating 3D printing for touch readers

- 3 year project October 2018-2021
- Funded by Australian Research Council
- Administered by Monash University with linkage partners:
 - Round Table on Information Access for People with Print Disabilities Inc. (with support from South Pacific Educators in Vision Impairment)
 - Department of Education and Training, Victoria
 - Royal Institute for Deaf and Blind Children
 - Guide Dogs Victoria
 - Royal Society for the Blind, Adelaide

Areas for Investigation

Research goals:

- Touch methods for accessing 3D printed models
- Design recommendations
- Supporting uptake of 3D printing in the community

Application areas:

- Education (Tactile Literacy and STEM)
- O&M (Mapping)



Publications



- Holloway, L., Butler, M., & Marriott, K. (2018). Accessible Maps for the Blind: Comparing 3D Printed Models with Tactile Graphics. Paper presented at the CHI '18: CHI Conference on Human Factors in Computing Systems, Montréal, QC, Canada.
- Holloway, L., Marriott, K., Butler, M., & Reinders, S. (2019). 3D printed maps and icons for inclusion: Testing in the wild by people who are blind or have low vision. Paper presented at the The 21st International ACM SIGACCESS Conference on Computers and Accessibility, Pittsburgh, USA.
- Holloway, L., Marriott, K., Butler, M., & Borning, A. (2019). Making Sense of Art: Access for Gallery Visitors with Vision Impairments. Paper presented at the CHI 2019 Conference on Human Factors in Computing Systems, Glasgow, Scotland, UK.
- Reinders, S., Butler, M., & Marriott, K. (2020). "Hey Model!" Natural User Interactions and Agency in Accessible Interactive 3D Models. Paper presented at the CHI Conference on Human Factors in Computing Systems, Honolulu, HI, USA.
- Stephens, K., Holloway, L., Butler, M., Marriott, K., & Goncu, C. (2020). Smooth Sailing? Autoethnography of Recreational Travel by a Blind Person. Paper presented at the ASSETS, Virtual Event, Greece.

Key findings

- What to print?
- 3D symbols are easier to recognise
- Principles for touch reading 3D printed models



What to print?

- Too small, big, dangerous, rare, expensive, conceptual
- Not readily available or accessible in another form
- In education
 - Curriculum materials
 - To support tactile literacy
 - Bespoke accessibility tools for the classroom













3D printed symbols

- 3D printed symbols are easier to recognise
 - Reduces need for key
 - Easier to find
- Good 3D symbols are:
 - Simple
 - Distinct
 - With main features on top









Principles for touch reading 3D prints

- 1. Know what to expect
- 2. Gain an overview first
- 3. Use appropriate touch
- 4. Use reference points
- 5. Explore the detail



http://printdisability.org/about-us/accessible-graphics/3d-printing/touch

Next steps

- Touch testing!
 - Textures
 - 3D printed street crossings
 - Interactive models for education
- Guidelines



Contact details

- Leona Holloway Leona.Holloway@monash.edu @LeonaHolloway20
- Monthly project updates at <u>http://accessiblegraphics.org/research/3dprints/arc/updates/</u>
- Guidelines published at <u>http://printdisability.org/about-us/accessible-graphics/</u>
- ANZAGG facebook group at <u>https://www.facebook.com/groups/ANZAGG</u>
- Blind & Low Vision 3D Printing <u>https://www.facebook.com/groups/blv3p</u>