

Making tactile diagrams accessible for all

George Rhodes

What's the research about?

Tactile diagrams are still a requirement in many situations for blind and partially sighted people however their production has dropped, and traditional methods are expensive.

3D printing offers opportunities to improve the quality of tactile diagrams and reducing entry barriers for creators to make tactile diagrams available for wider audiences.



George Rhodes

All Able, Director
University of Westminster,
Digital Accessibility Lead

Part 1: What are tactile diagrams

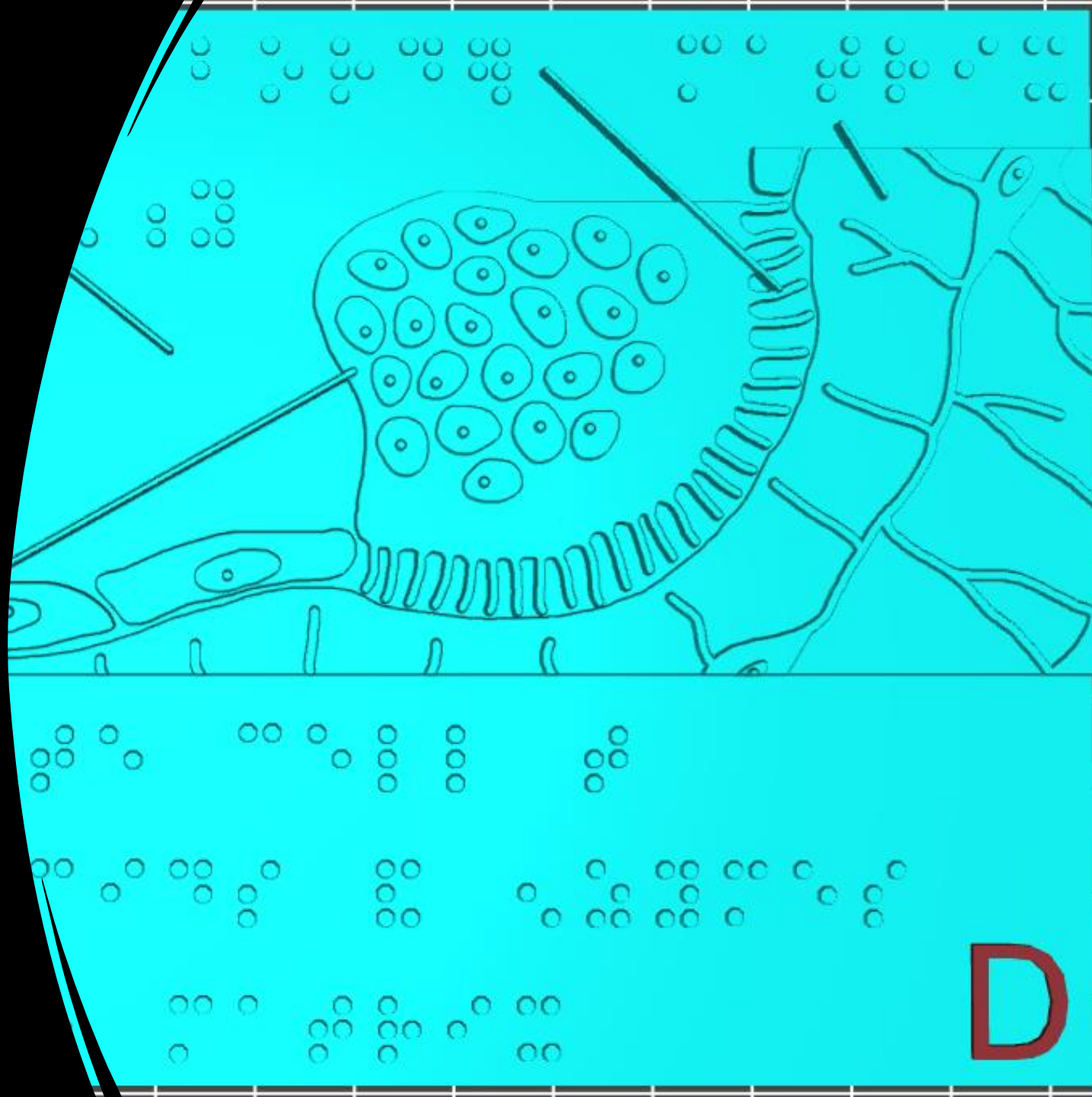
What are tactile diagrams?

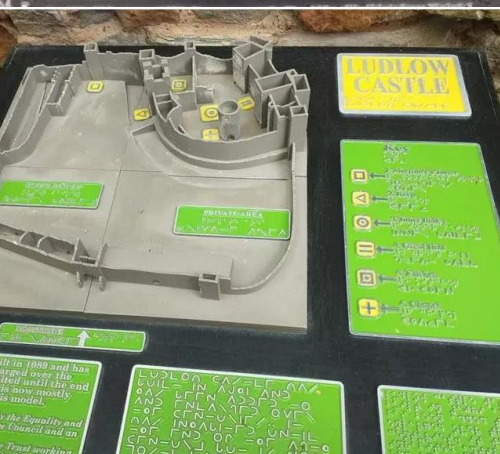
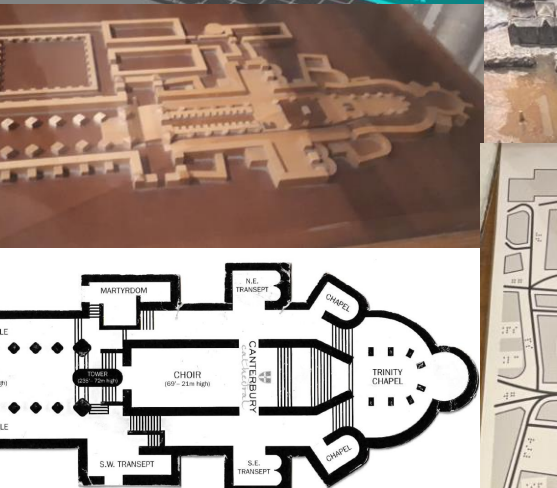
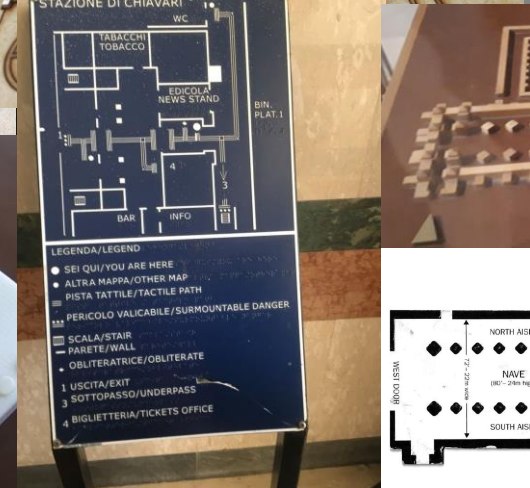
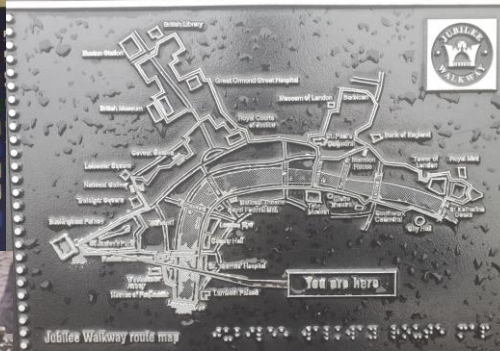
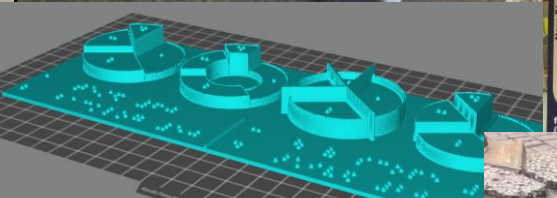
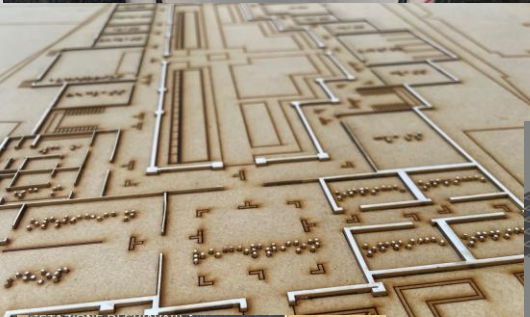
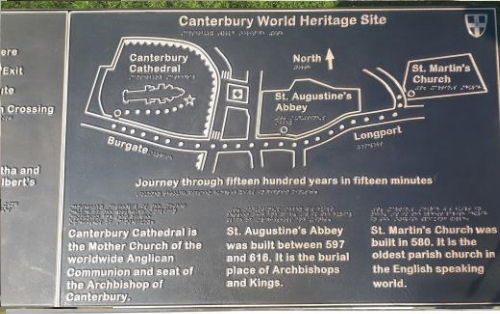
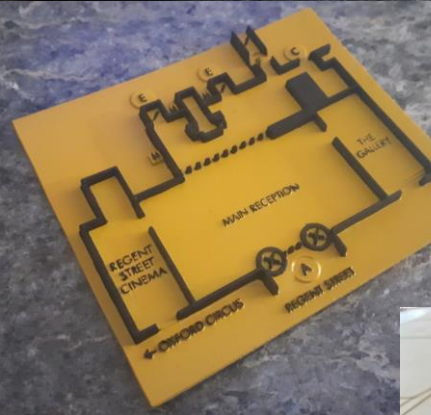
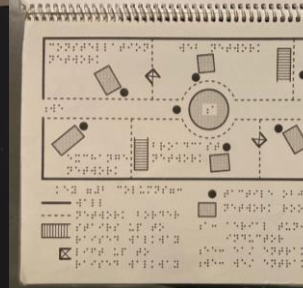
- Tactile diagrams are an alternative format for those that use touch instead of sight.
- They come in many formats for both individual and public use.



Where are tactile diagrams used?

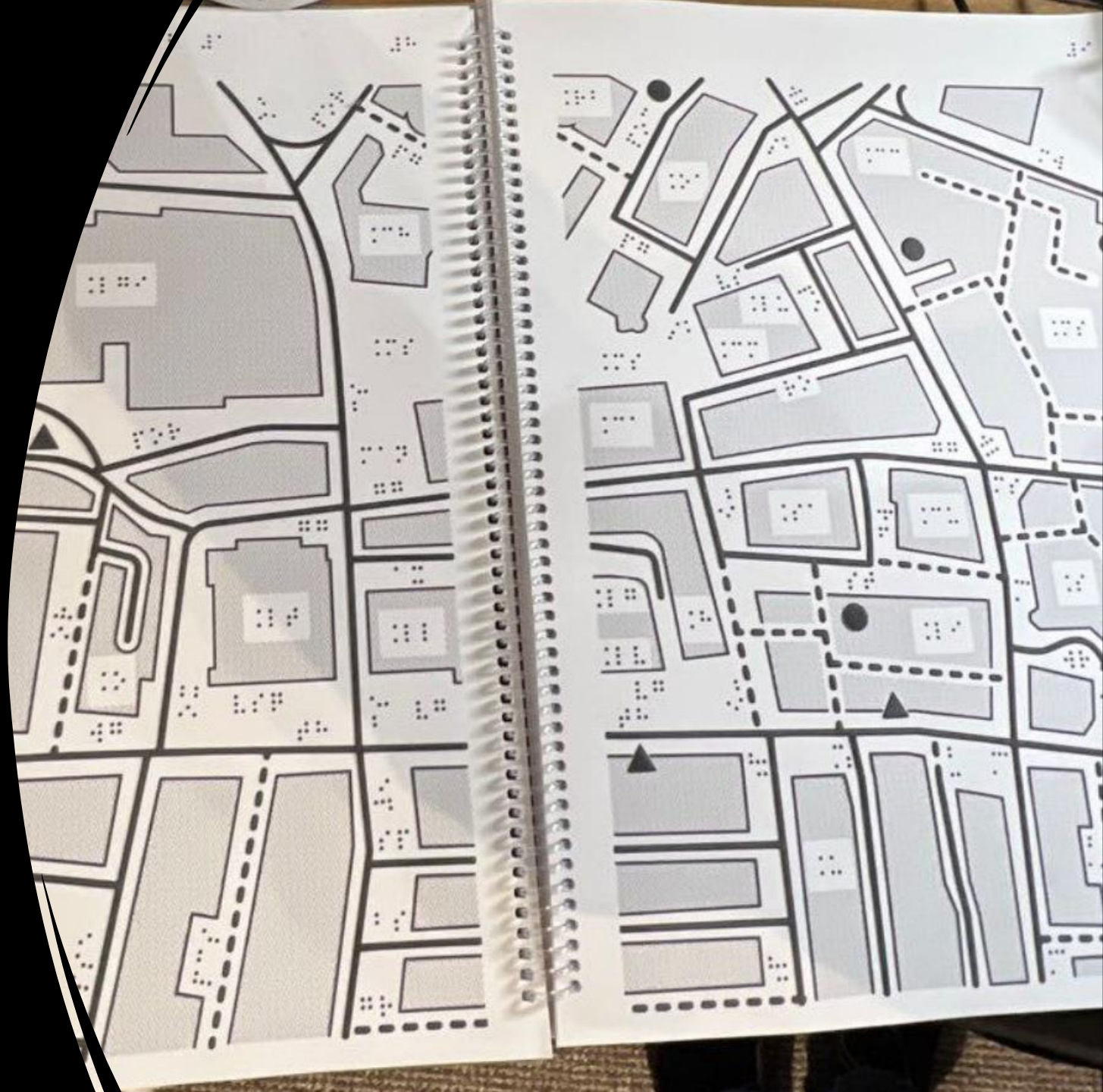
- Education
- Tactile graphics
- Museums
- Navigation
- Travel nodes
- Tourist attractions





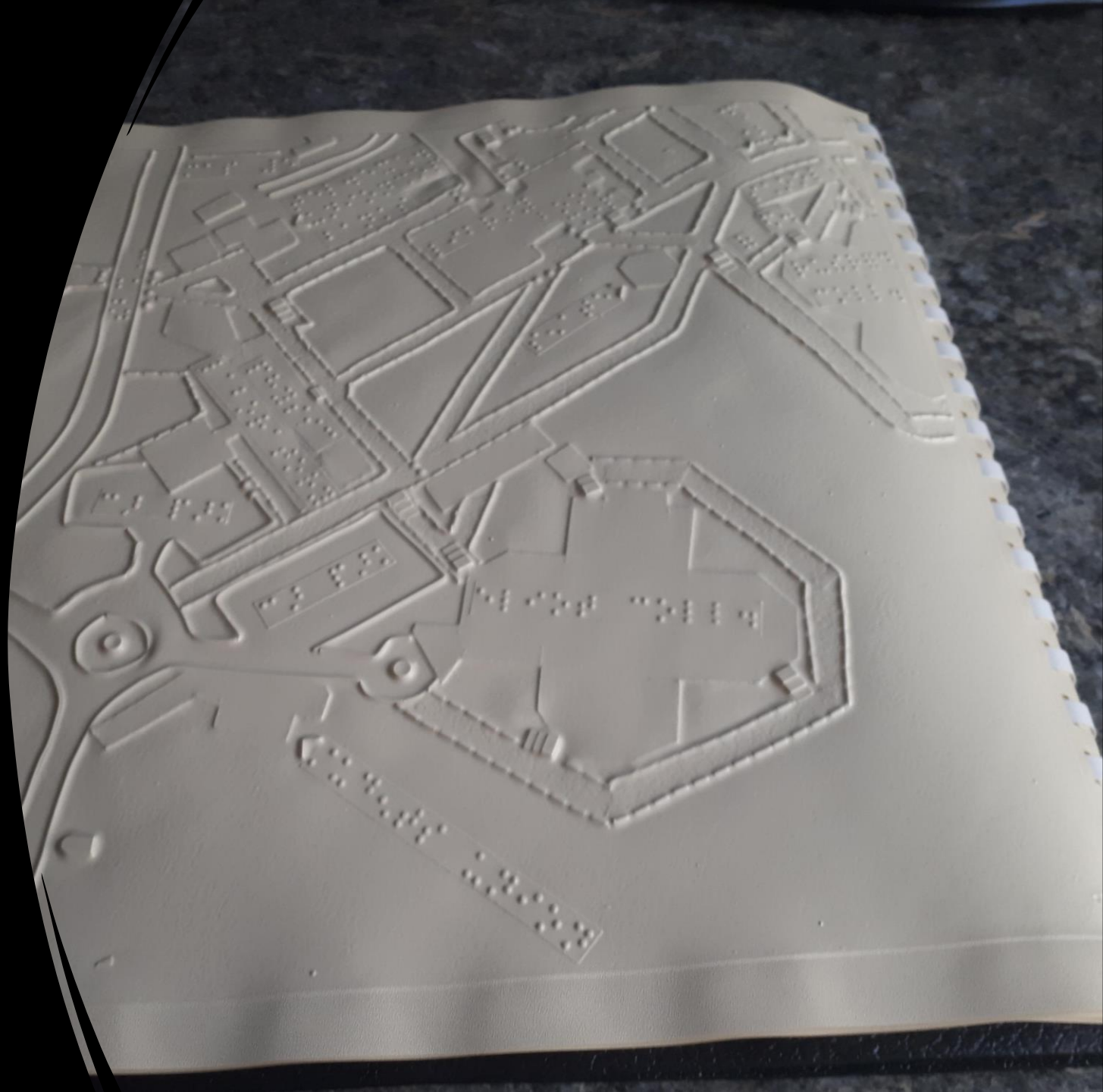
Traditional production methods

- Thermoform
- Microcapsule
- Swell paper
- Braille printers
- Brass pedestal
- Wood



Traditional problems

- Long wait times
- Expensive products
- Specialist training for creators
- Specialist printing equipment
- High setup costs



Dynamic Braille displays

- Very expensive
- Compromises between Braille layout and grid layout
- Resolution challenges
- Issues can emerge with orientation
- Are often limited in height presentation options



Part 2: Touch and memory

Lets get academic

Research aims:

1. To better understand the methods blind and partially sighted people use to understand spatial information
2. To better understand how to customise map production to best align with user behaviour
3. To improve production methods to offer a more accessible method for creating tactile maps



Touch and Humanity

And yet by the very fact that it attests the not-me more than any other sense, touch involves my own subjectivity more than any other sense. When I feel this objective something 'out there' beyond the bounds of my body, I also at the same instant experience my own self. I feel other and self simultaneously". - **Walter Ong**



Experiencing places

- Multi sensory experience of architecture more human
- Better remembrances come from a multi sensory experience
- Linked to synaesthesia
- Projection



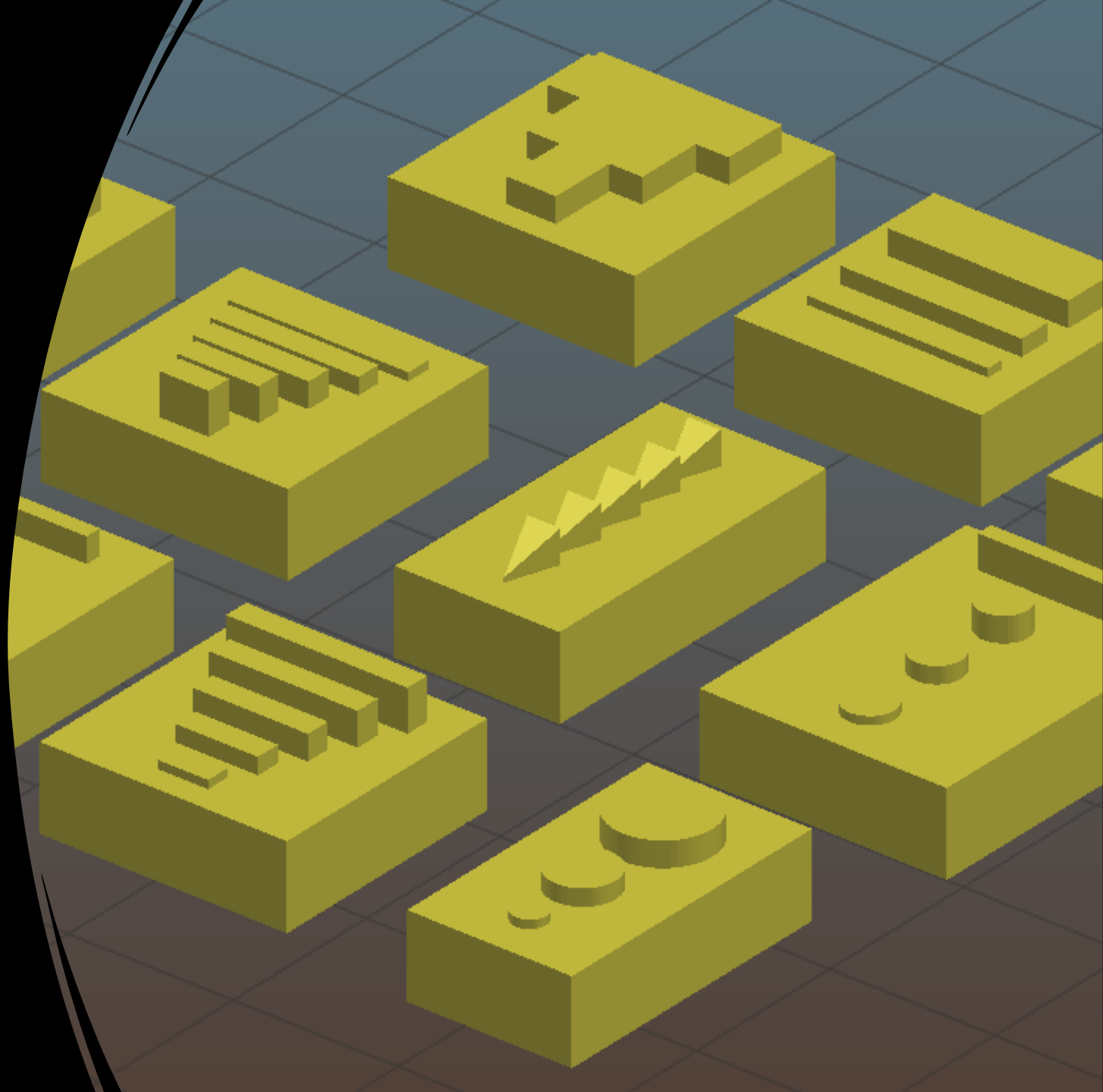
Great Memory

- London taxi drivers with “the knowledge” have enlarged parts of brain responsible for spatial awareness
- Spatial awareness and recollection strongly linked with multi sense / non-visual recollections



Semiotics

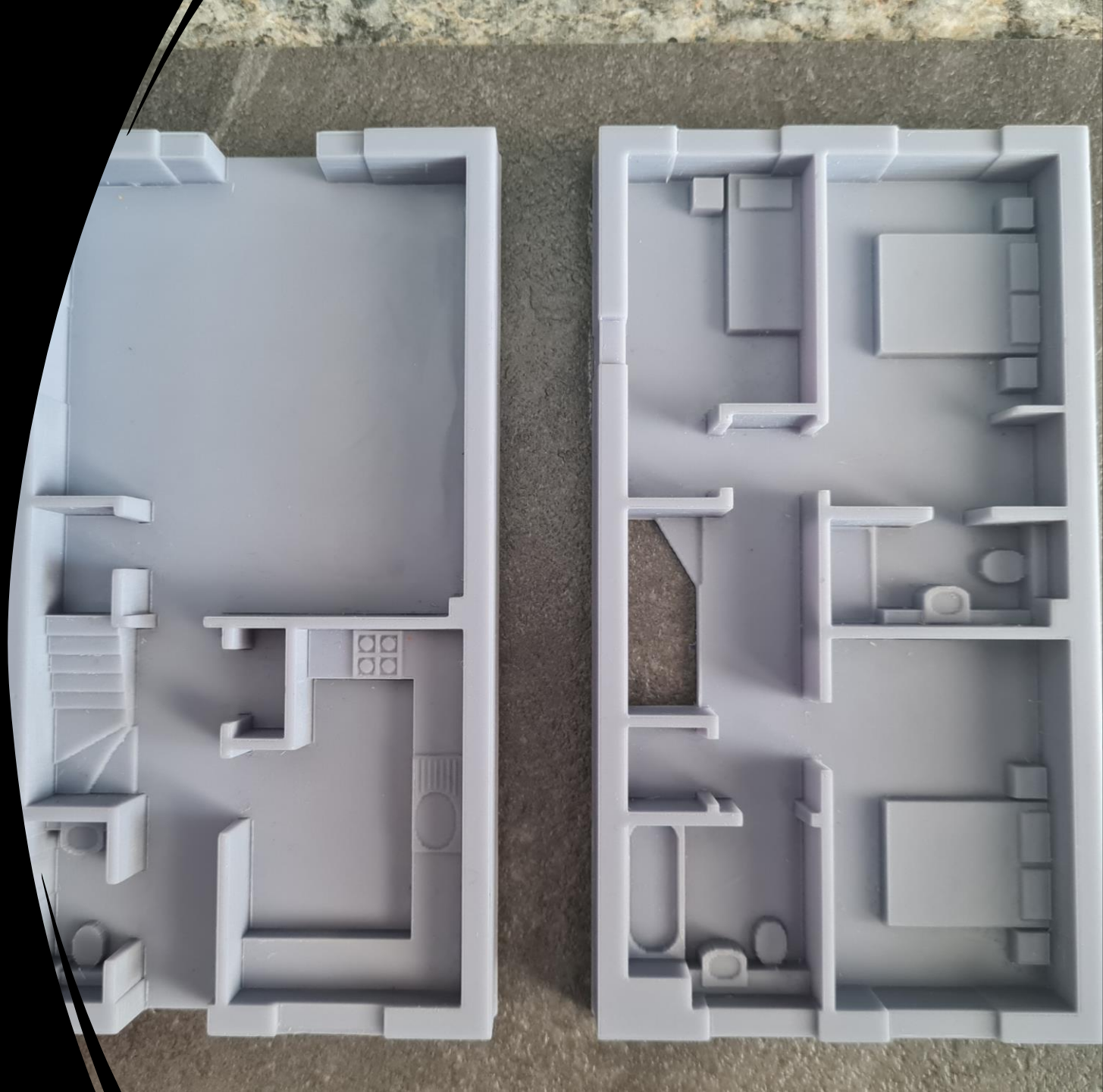
- Signs are the “thing” that conveys information from an object to you the receiver
- Signs can be anything at all, verbal, written, touch, a smell, conceptual, anything



Part 2: The new method

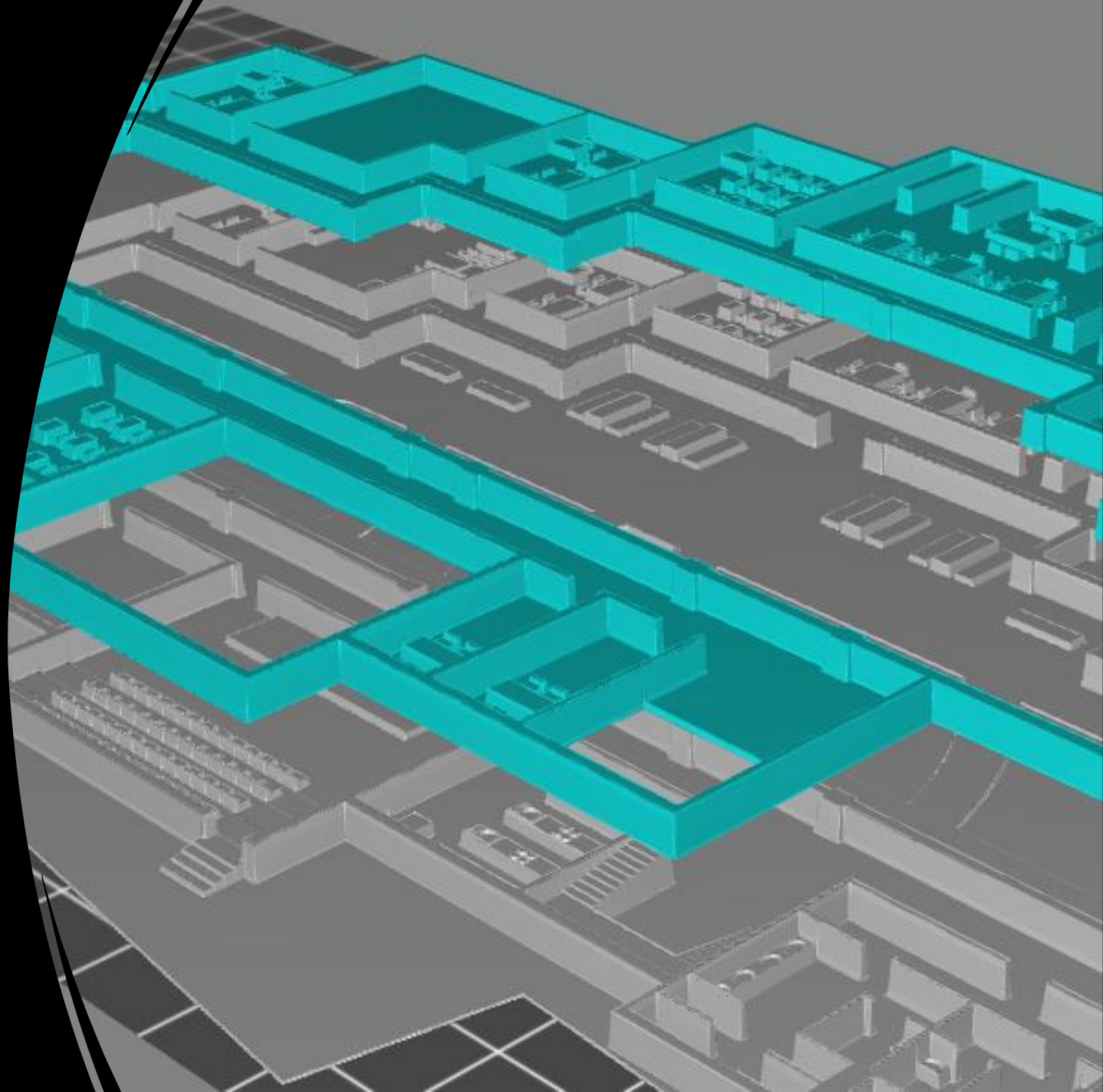
What 3D printing offers

- True multi-height
- Wider variety of shapes
- More universal access to printing and wider community group support
- Cheaper entry costs
- Viable print times for independent creators



New production methods

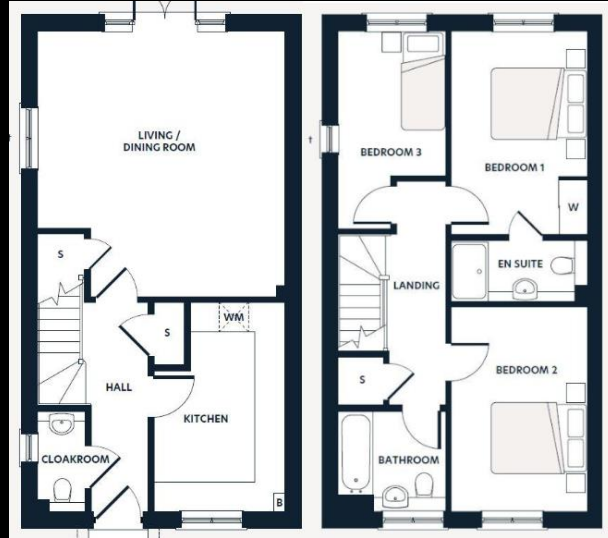
- No specialist software
- Cheap production and setup costs
- No 3D modelling skills required
- Can't give full recipe until PhD is published



Floorplan conversion example

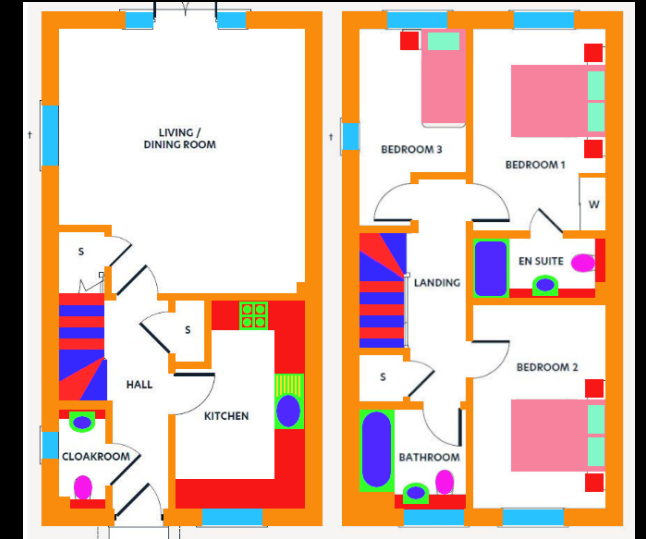
Step 1

Get original
2D image



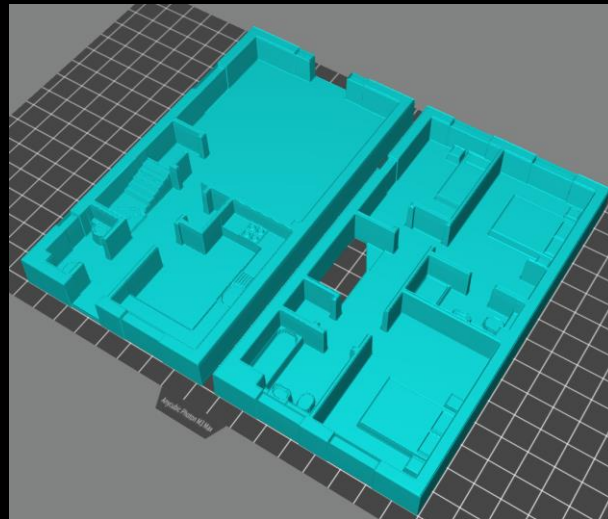
Step 2

Tag image
for 3D
conversion



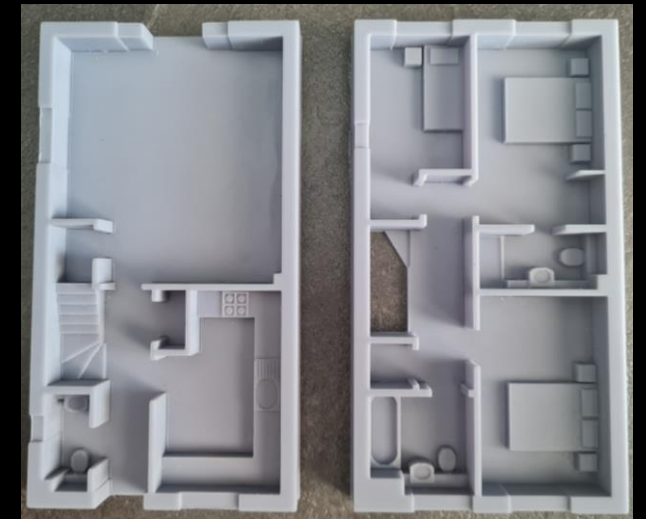
Step 3

Convert to
3D model



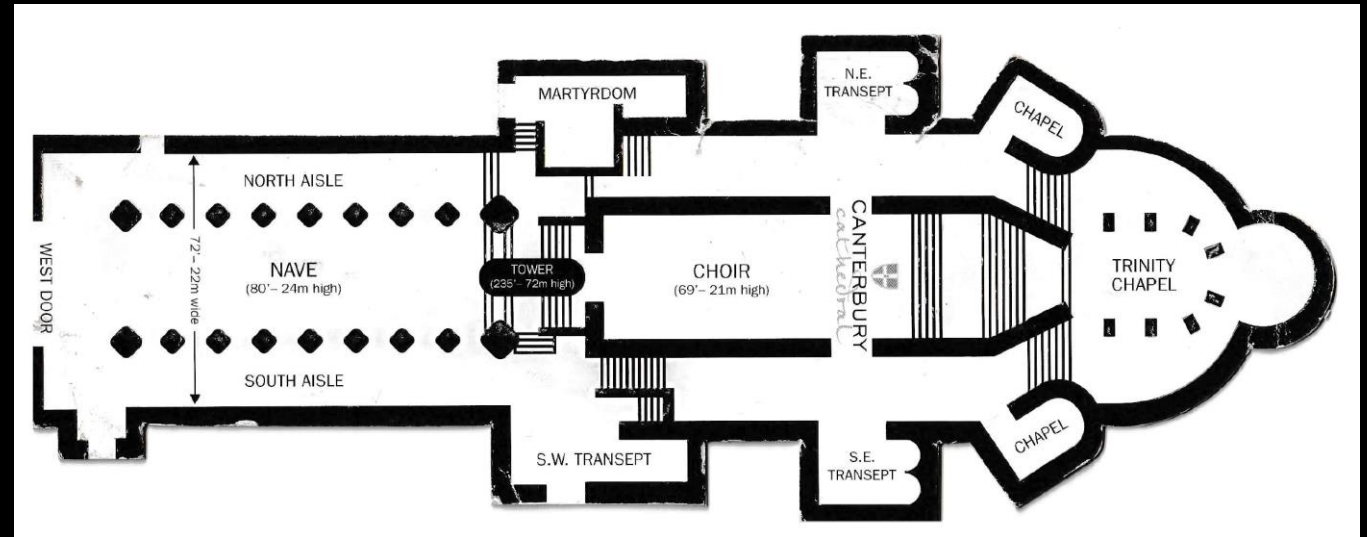
Step 4

Print final
tactile map



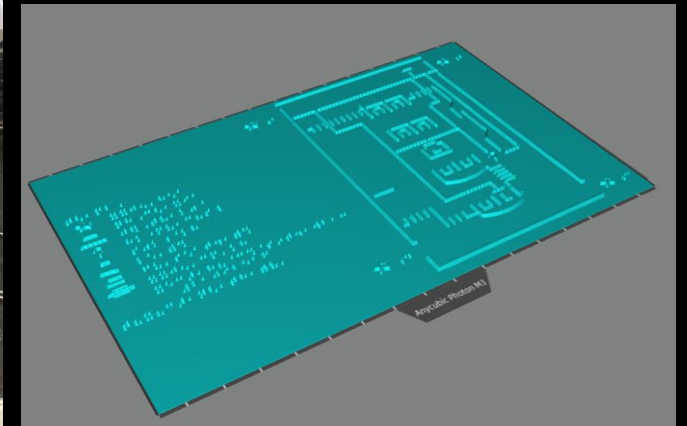
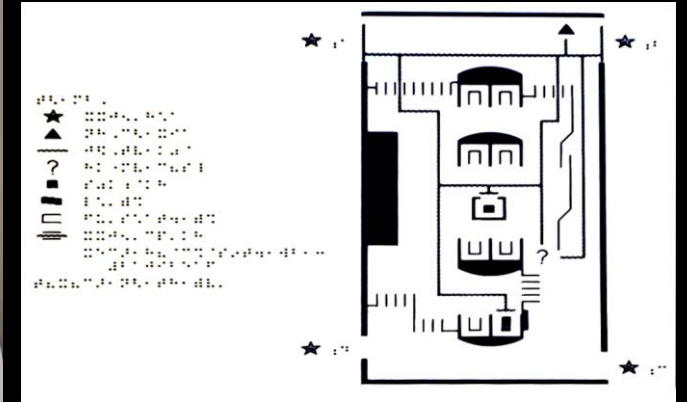
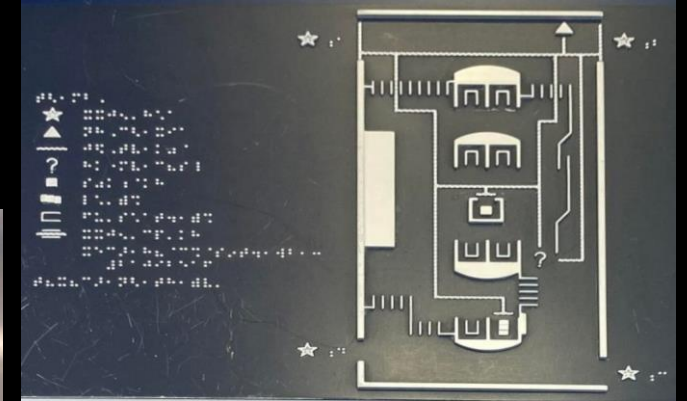
Canterbury Cathedral

- Conversion from an existing paper handout
- Significant scale up
- Still includes original raised letter labelling but could be replaced with Braille.



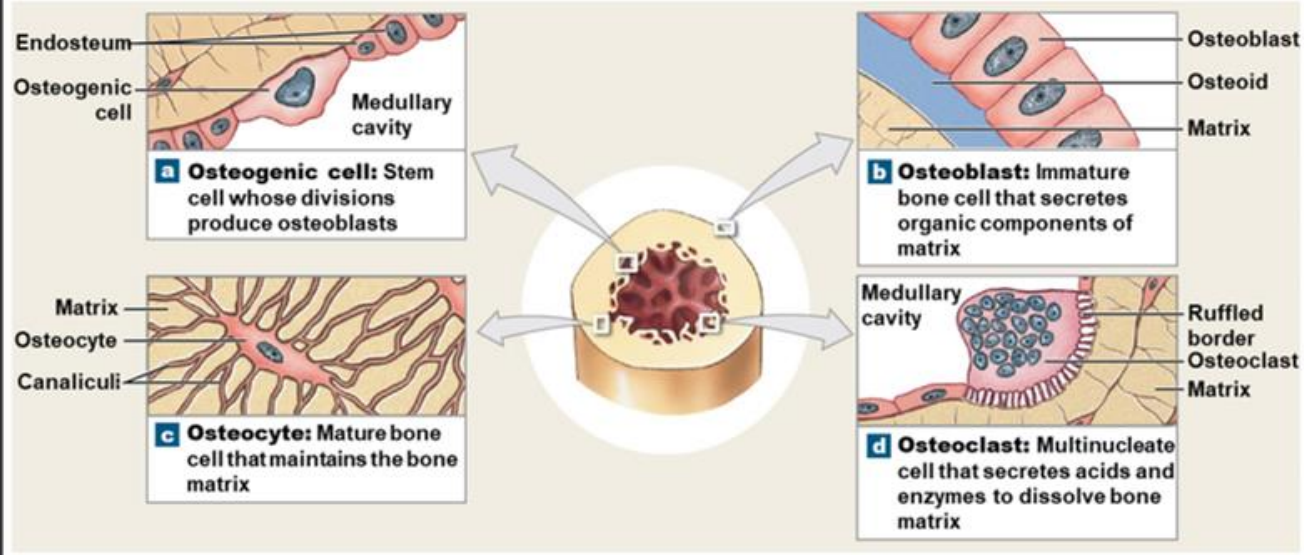
Tung Chung Station

1. Conversion from a photo of the original pedestal map taken at an angle
2. Adjust the photo to get a better alignment
3. Tag up for conversion
4. Generate model



Osteopathy Pilot

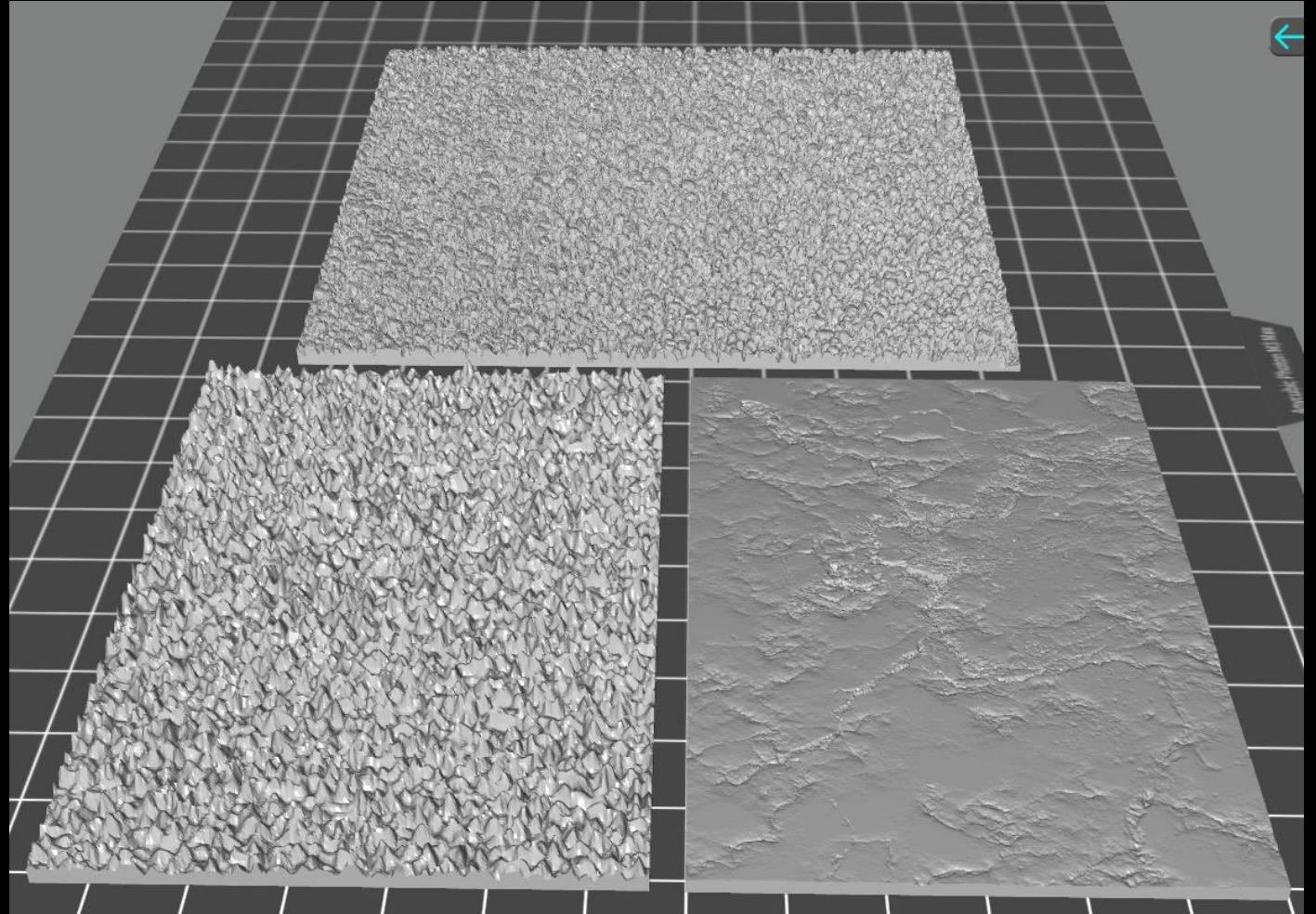
Types of bone cells



Latest developments

Wider variety of tactile textures

- Grass
- Pebbles
- Stone



Get in touch

info@allable.co.uk

www.allable.co.uk

[@Access_Rhodes](#)

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