Overview

- interested in producing tactile graphics?
- confused by the variety of methods, tools, and technologies?
- wonder how much time and expense are involved in each system?
  - foil
  - collage
  - embossed graphics
  - swell paper (puff-paper)

Tactile graphic methods

- Master diagrams for thermoforming
- Embossed paper diagrams
- Puff-paper diagrams
Master diagrams for thermoforming

- spurred & stamped foil or paper
  - lower resolution of areas and points on paper than on foil
- collage on paper
  - can include spurred lines as well as glued on points, lines, and areas

What is thermoforming?

Physically copying a tactile diagram master onto plastic

- place tactile graphic master right side up in thermoform machine
- place Brailon over diagram
- machine applies heat above the Brailon, softening it
- machine applies vacuum below diagram, causing it to reflect the shape of the master
- A good master can be copied hundreds of times

Embossed paper diagrams

- normal embosser with graphics capacity, QuickTac software
- Tiger embosser
- Embossed diagrams can be included directly in a book or thermoformed
- if enhanced with collage, then they need to be thermoformed
Puff-paper diagrams

- usually, the puff-paper is run through a copier or printer to get the image onto the puff-paper (don’t use laser printers!)
- then the diagram is "toasted" where a special light causes the black areas to swell or raise
- a special hot pen can be used in a classroom situation to quickly draw diagrams

Quick diagrams in class

- Wiki sticks (wax and thread bendable sticks which hold temporarily to paper)
- Felt board, yarn for lines, felt shapes
- Window screen mounted on a clipboard, draw with crayons
- screen can be mounted on a Wacom tablet allowing a blind child’s drawing to be imported into a computer as it is drawn with the pen tool

Quick diagrams in class

- Mylar film
  - Reizen Clip and Draw Tactile Drawing Kit with Clip, Lighthouse
  - Sewel Raised Line Drawing Kit, www.shopsftb.org
  - Draftsman Technical Drawing Board, APH
  - Tactile Colour, www.tactile.org
  - Add XYRON adhesive film (permanent or temporary) to make stickers
**Computer Generated vs "Hand-drawn"**

- Simple diagrams can be hand-drawn or collaged, such as simple circles and squares which can be cut from cereal boxes and simply placed on the braille page.
- More complex diagrams can be photocopied to the appropriate size, and the copy used as a guide in creating the diagram (I tape this photocopy to the back of the foil or braille paper and run the spur wheel right through both layers.)
- Some techniques (tiger embosser, puff-paper) require diagrams to be computer generated.
- We’ll talk about software later.

**What makes up a tactile graphic?**

- **Points** -- cities
- **Lines** -- rivers
- **Areas** -- forested
- **Braille** -- running head, page numbers, labels, …
  - Slate & Stylus
  - Perkins Brailler
  - Embosser

**Spurred & stamped foil or paper**

- Emboss running head, page numbers, and braille text onto braille paper **OR**
- Print them reversed onto thin paper, and use a slate and stylus to put the braille on the foil
- Plan the diagram, sketch it onto the back of the diagram, "draw" the lines with the appropriate spur wheel
- Create area fills and point symbols with APH tools
Spurred & stamped foil or paper

Costs:
- $249 Tactile Graphics Kit, APH
- 4 textures
- 7 line types
- 8 point symbols
- 1 rubber mat
- $0.10 per page for braille paper
- $0.80 per page for foil

Advantages:
- Some of the best diagrams I have ever seen (and made) were made with foil
- Foil allows solid lines as well as spurred (dotted or dashed) lines

Disadvantages:
- Adding braille to foil takes time and strong wrists
- Edges of thick/high objects need to be “sharpened” which takes time
- Paper doesn’t take the APH area and point symbols as well as foil does, so collage is often necessary
- It takes me about 3-4 times as long to produce a map with foil as it does with a computer graphics program and puff paper
- Some agencies won’t accept full sheets of foil, but will allow a smaller foil diagram taped to a braille paper page
## Collage

- plan tactile graphic
  - use braille software to lay out braille
  - emboss braille (running head, page numbers, and braille text)
  - use photocopy machine to scale graphic
- sketch graphic on the back of the page OR
- place photocopy behind the page and work with a light box
  - "draw" the lines with the appropriate spur wheel
- create area fills and point symbols with APH tools
- use slate and stylus as necessary to add braille labels and keys

## Costs:

- $0.10 per page for braille paper
- spur wheels:
  - $249 Tactile Graphics Kit, APH (optional) OR
  - $18 Crafty Graphics II: 3 Spur Wheels and 1 Compass with Spur Wheel, APH
  - $15 Grifhold Aluminum Pounce Wheels, Dick Blick
- point symbol hole punches: square, 1/8" circle, 1/4" circle, and 1/4" triangle
- areas: textured papers, manilla file folders, lightbulb corrugated paper
- lines: string, thread, candlewick
- glues: Xyron Adhesive, Tombo MonoAQUA, Aleene's Super Tacky Glue

## Advantages:

- many textures, line types, and point symbols available
- easy to teach/learn
Collage

Disadvantages:
- must glue collaged elements well or they may come off
- very time consuming
- beware of wanting the diagram to "look good," "feel good" is far more important

Tiger embosser

- design tactile graphic with a computer program
  - MS Word
  - Corel Draw
  - Adobe Illustrator
  - Tiger Designer
  - QuickTac
- proofread and save file
- send file to Tiger embosser

Tiger embosser

Costs:
- $6,000-$10,000 for embosser
- $0.10 per page for braille paper
Tiger embosser

Advantages:
- Uses regular braille paper
- Inexpensive if you already have a Tiger embosser
- Diagrams are reusable (you can build up a library of geometric shapes, lines, rays, angles, clock faces, cells, etc.)
- Relatively fast to design diagrams, it is faster to design diagrams on computer than to hand collage them
- Embossing the diagrams tends to be fast
- Braille is legible when superimposed on a level 1 or 2 solid fill
- Can be used with Quick Tac software, which will do 20dpi (dots/inch)

Tiger embosser

Disadvantages:
- What you see isn't necessarily what you get. Diagonal lines feel thicker than horizontal & vertical lines of the same width.
- Proofreading and editing of diagrams in Tiger Designer is critical. After fixing issues such as line thickness, then what you see in Tiger Designer will be what is embossed.
- As a graphics program, the Tiger Designer leaves a lot to be desired.
- The low end tiger embossers are relatively slow at embossing. The more fill you use, the slower the page embosses.
- The tiger offers 7 levels of dot heights, but you can only tell levels apart if they differ by 2 or 3 levels.
- Braille dots embossed by a Tiger are sharper than regular embossers, so some readers don't like Tiger output.

Normal embosser (Quick Tac)

- Design graphic in QuickTac software
- Emboss directly OR
- Embed diagram in Duxbury braille file
**Normal embosser (Quick Tac)**

**Costs:**
- $3,000 for embosser
- $595 for Duxbury (optional)
- $0.10 per page for braille paper

**Advantages:**
- inexpensive if you already have an embosser
- QuickTac software is free, user friendly, and talks to many embossers
- reuse diagrams
- embossing the diagrams tends to be fast (compared to collage/spurred diagrams)
- uses regular braille paper

**Disadvantages:**
- lower resolution diagrams than a Tiger embosser
- tactile graphic dots can be confused for braille
- If you don't use Duxbury, you need to find a way to add your running head and braille text to the diagram (such as 2-pass embossing)
Puff-paper diagrams

- design tactile graphic with a computer program
  - MS Word
  - Corel Draw
  - Adobe Illustrator
- proofread and save file
- send file to Tiger embosser

Puff-paper diagrams

Costs:
- $1,500 for toaster machine
- $1.25 per page for puff-paper

Puff-paper diagrams

Advantages:
- solid and dotted and dashed lines available
- different textures can be used for different filled areas
- great for reuse
- faster to design diagrams on computer than to hand collage them
- WYSIWYG--what you see is what you get
- easy to send PDF files to a proofreader
Puff-paper diagrams

Disadvantages:
- need to physically proofread each page to make sure it puffed up enough in the toaster
- cost—at $1.25 per page for materials, this can really add up

Software

- Microsoft Word
- Corel Draw
- Adobe Illustrator
- QuickTac
- Tiger Designer

Microsoft Word

Advantages
- easy to learn
- can be used with Tiger embossers and with puff-paper
- ViewPlus has excellent tutorials on their website, and the concepts can be applied to both Tiger and puff-paper diagrams
- cost
  - many tactile artists already have it on their computer
  - student/home office version is about $150
Microsoft Word

Disadvantages
- MS Word really isn’t a graphics program
- graphics are vector based and can be resized
- braille may shift when you draw or delete a graphic element
- can’t define your own fill textures

Corel Draw

Advantages
- easy to learn
- powerful vector graphics
- layers to organize your graphic
- charting tools make graphs and grids
- multiple pages in one file
- moderate cost, about $200

Corel Draw

Disadvantages
- harder to teach than collage
- some compatibility issues with Tigers
### Adobe Illustrator

**Advantages**
- powerful vector graphics program
- Jim Barker (CTEBVI Tactile Specialist) has published an excellent DVD showing how to use Illustrator to create tactile graphics
- define your own line and fill types, and reuse them
- layers to organize your graphic
- charting tools make graphs and grids easy
- the newest version (CS4) allows multiple pages in one file

**Disadvantages**
- complex program to learn
- expensive, $600 ($200 for educational license)
- older versions (CS3 and below) did not allow multiple pages (unless you played tricks with canvas size)

### QuickTac

**Advantages**
- cost--free from Duxbury Systems
- good selection of shapes, line types, and fill types
- allows you to 6-key braille labels
- current beta version can handle 20 dpi for Tiger
QuickTac

Disadvantages
- all dots emboss at full height, can't take advantage of multi-level Tiger dots
- raster graphics program

Tiger Designer

Advantages
- for editing "PRN" files
- free with Tiger purchase
- useful for fine-tuning tiger diagrams before embossing

Tiger Designer

Disadvantages
- line tool creates lines which are always 1 pt wide and solid
- fills are only solids
- braille labels limited to about 16 cells wide
  - the software allows you to enter print text, then translates it with the Duxbury braille engine
- raster graphics program
- can't scale or rotate
- This program isn't powerful enough for designing diagrams, it is a touch up tool.
Proofreading

Computer generated graphics, except for the simplest, must be embossed or toasted and felt before being sent off to the braille reader.

- Emboss and Feel
- Tiger Viewer
- Tiger Designer
- Swell Touch Diagrams

Emboss and Feel

- ADVANTAGE
  - the best method whether by ourselves or a visually impaired coworker or proofreader
- DISADVANTAGES
  - computer files must be embossed or toasted
  - collage masters should be thermoformed

Tiger Viewer

- ADVANTAGE
  - saves paper over embossing and feeling
- DISADVANTAGES
  - extra steps--print to a file, then open the file in Tiger Viewer
  - can't edit file
  - you can recognize a bad diagram in the Tiger Viewer/Designer, but you can't tell a good diagram without embossing and feeling it
Tiger Designer

**ADVANTAGES**
- saves paper over embossing and feeling

**DISADVANTAGES**
- extra steps--print to a file, then open the file in Tiger Viewer
- also allows you to edit the PRN file
- you can recognize a bad diagram in the Tiger Viewer/Designer, but you can't tell a good diagram without embossing and feeling it

Swell Touch Diagrams

**ADVANTAGE**
- Diagrams can be initially proofread on computer--pdf files can be sent as e-mail attachments.

**DISADVANTAGE**
- You can recognize a bad diagram on a computer monitor, but you can't tell a good diagram without printing and puffing it.

Final Though

We need to get over which way is right--collage or tiger or swell paper or some combination. We need to produce the best tactile possible in a reasonable timeframe.