# Slide 1: Creating Audio-Tactile Graphics on the Fly

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## Slide 2 Disclaimers

* Scalable – not yet
* Credits:
  + Lucia Hasty (Rocky Mtn Braille)
    - http://www.tactilegraphics.org/
  + Steve Landau (TouchGraphics)
    - http://touchgraphics.com/
  + Josh Miele (Smith Kettlewell)
    - http://www.ski.org/lab/miele-lab

## Slide 3 Pascal’s Triangle

* Math 002
* Residential course
* Blind student with Braille 1 and 2 but no Nemeth skills
* Humanities major

## Slide 4: Pascal’s Triangle

Transcriber’s Note: see tactile diagram with Alexa

## Slide 5: Tactile with Braille

* Unsatisfactory (for me)
  + Too big
  + Too inaccurate
  + Not independent enough

## Slide 6: TouchGraphics’ STEM Binder

* <https://www.youtube.com/watch?v=eOtHT_flaoY>

## Slide 7: My first attempt

* TIE and Flexi-Paper by Repro-Tronics
* Soundstickers
* Braille labeler
* X-acto knife
* Bandaids

## Slide 8: My First Attempt Result

Transcriber’s Note: see tactile diagram with Alexa

## Slide 9: New Plan

* Need to use almost all of the sound sticker’s area
* Scale the triangle up to 11 x 11
* Put stickers directly on, not under, diagram
* Ordered a new Swell machine

## Slide 10: Second Attempt

Transcriber’s Note: see tactile diagram with Alexa

## Slide 11: Testing and Analysis

* Observations and Take-Aways:
  + No difference between cut-out windows and overlay
  + Users drag the pen rather than tap
  + Users didn’t immediately grasp concept without verbal introduction

## Slide 12: Third Attempt

Transcriber’s Note: see tactile diagram with Alexa

## Slide 13: Pen Friend Benefits

* Pen Friend (from RNIB)
  + Differently sized stickers!!!
  + Accessible pen!!
  + No need for Livescribe operator buttons on paper!!
  + Camera is more responsive

## Slide 14: Lessons Learned

* Important to have audio description as well as audio labels
  + Upper left corner sticker for overview and orientation
  + Image overview description
    - Follow guidelines! DIAGRAM/NCAM: <http://diagramcenter.org/table-of-contents-2.html>
* End-user training is helpful:
  + Tap not scan
  + Use one hand to scan and anchor, one hand to tap

## Slide 15: One More (Untested) Hack

* Livescribe Paper + 3D Doodler Pen + Livescribe Pen
  + Print Pascal Triangle on LiveScribe Paper with ink printer
  + Trace over honeycombs with 3Doodler, creating tactile feedback and keeping the placement of the numbers where they need to be.
  + Grab the smartpen, hit record, touch number area while reading aloud, then stop recording
  + Tip from Josh Miele/Steve Landau
    - Hit record button on livescribe notebook paper
    - Hit pause immediately in a 1-2 sequence
    - Scribble in an area – like you are coloring it in. Doesn’t have to be perfect but get overlapping lines.
    - Hit record button
    - Put pen near mouth and speak label or whatever content
    - Hit the stop button on the livescribe notebook paper.

## Slide 16: How-To Resources

* Handouts available online with conference site
* Email me: [ats169@psu.edu](mailto:ats169@psu.edu)
* Soon available at Lucia Hasty’s site: http://www.tactilegraphics.org/