

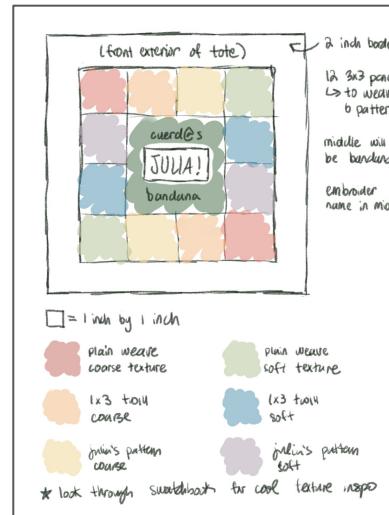
# PROJECT OVERVIEW

PROBLEM: Lack of access to discreet, effective mental health de-escalation techniques

USERS: Teens and adults who experience restlessness and/or mental health difficulties

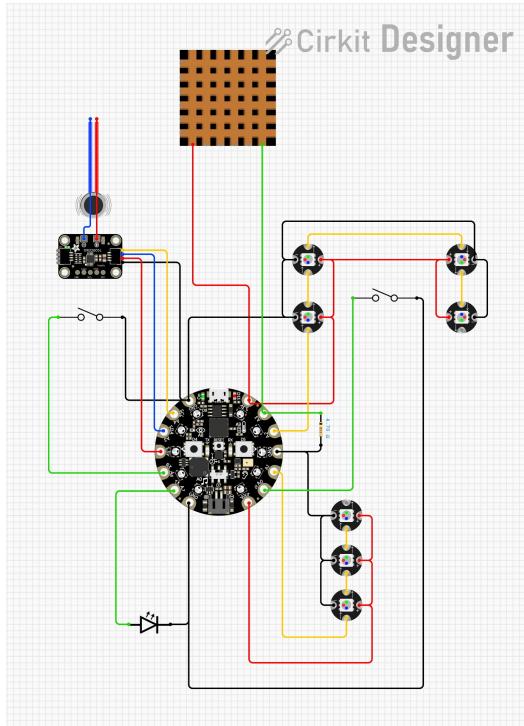
SOLUTION: A tote bag that provides visual and tactile stimulation for grounding, de-escalation, and anxiety relief

INSPIRATION: Cuerd@s (@wearecuerdos)



Initial prototype sketches and product vision (Procreate)

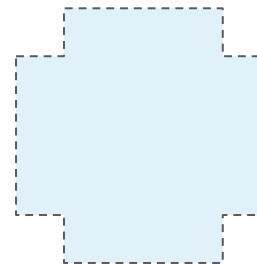
# TECHNICAL INFORMATION



Final circuit diagram

Product	Unit Cost	Quantity	Link	Purpose
Circuit playground	19.95	1	<a href="https://www.adafruit.com/product/3334">https://www.adafruit.com/product/3334</a>	microcontroller for tote bag
Slide switch	2.05	2	<a href="https://www.sparkfun.com/products/13740">https://www.sparkfun.com/products/13740</a>	turn heating pad, LED breathing pattern, vibration motor on / off
LEDs	0.68	1	<a href="https://www.sparkfun.com/products/13740">https://www.sparkfun.com/products/13740</a>	output lights breathing pattern (4), show vibration motor is on (1), show heating pad is on (1)
Flora neopixels	1.28	7	<a href="https://www.adafruit.com/product/3334">https://www.adafruit.com/product/3334</a>	output for dragon scales
Mini vibration motor	1.95	1	<a href="https://www.adafruit.com/product/3334">https://www.adafruit.com/product/3334</a>	output for vibration patch
Haptic motor controller	7.95	1	<a href="https://www.adafruit.com/product/3334">https://www.adafruit.com/product/3334</a>	output with for vibration patch with motor ^
Thermochromic fabric	16.95	16 sq in	<a href="https://www.adafruit.com/product/3334">https://www.adafruit.com/product/3334</a>	output for pressure based heater
Woven conductive fabric	4.95	16 sq in	<a href="https://www.adafruit.com/product/3334">https://www.adafruit.com/product/3334</a>	pressure spiral
Snaps		6		attachments for patches
Resistors		1		4.7 ohm
Conductive thread				connecting circuits
Misc. yarns / threads				weaving patchworks for front exterior
Embroidery thread				nice to have - add fun designs to tote bag if time permits
Tote bag	Thrifted	1		
		Total	65.49	

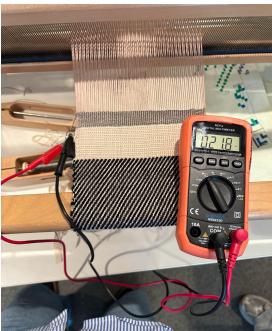
Final bill of materials

4x4 in. area per  
electronic patch (4)1/2 in. margin for  
patches (6)3x3 in. tactile woven  
/ knit patches (6)11x14.5 in.  
available bag space

# CREATION PROCESS



Loom setup



Pressure sensor



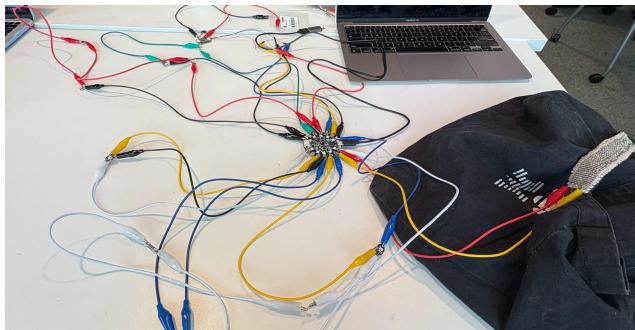
Tactile pile weave



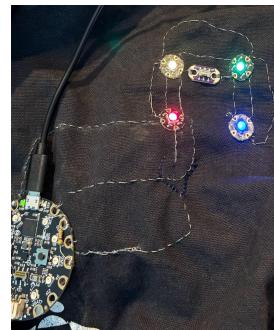
Finished weaves



Completed patches



Final circuit revision using all components & clips



First working lights



Me, weaving



Me, final tests

# TEXTILE CLOSE-UP



PILE WEAVE

- Plain weave
- 140 warps (7 in.)
- Pile every 3rd warp
- Woven size: 3 x 7 in.
- Final size: 3 x 3 in.



TWILL WEAVE

- 2 by 2 twill weave
- 4 shafts used
- 140 warps (7 in.)
- Woven size: 3 x 7 in.
- Final size: 3 x 3 in.



BUTTON KNIT

- 20 needles used
- 6 in middle for button
- 7 needles on each side
- Knit size: 3 x 3.5 in.
- Final size: 3 x 3 in.



WOVEN SENSOR

- Double weave
- Conductive yarn wefts
- Nylon mesh spacer
- Resistance: 40-70 Ω
- Size: 1 x 7 in.

# FINAL PROJECT



Me, modeling the pressure sensor and patches of my final product



Me with my poster board on the BWSI final event day @ MIT