# Getting in Touch With Tactile Map Automated Production

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## Important Links

Anonymized data sheet:

<https://docs.google.com/spreadsheets/d/1MxVwIdLBsMZQPl4EXY3sVHvCNdOhKzNmx9ZwVgRM3ac/edit?usp=sharing>

## My Questions

1. What is the best way to analyze so much data?
2. For qualitative questions, such as "Where did I first hear about TMAPs", should I break it down into quantitative categories based off the responses, or is there a better way to do this?
3. What should I do with the blind O&M?
4. What suggestions do you have on this process for future studies?

## Abstract

Maps are critical tools used to communicate spatial information, including landmark, route, and survey knowledge (Brock, Truillet, Oriola, Picard, & Jouffrais, 2015). Surveys conducted on blind individuals, such as Butler, Holloway, Marriott, & Goncu (2017), point to lack of availability being the primary cause of lower tactile map usage. When the blind participants in this study were asked why they wanted a map, the blind users expressed having maps, rather than text descriptions, was transformational and they experienced greater confidence, empowerment, and comfort while traveling after viewing a map. Tactile Map Automated Production (TMAPs) is a system for quickly generating tactile maps of neighborhoods from a specific address (Miele, Landau, & Gilden, 2006), which are downloaded from the online interface and embossed or mailed directly to the individual ordering them. The TMAP project was conceived at The Smith-Kettlewell Eye Research Institute and was transferred to the Lighthouse for the Blind in San Francisco in 2017 for continued support and development as TMAPs 2.0 (Lighthouse, 2020). This paper aims to investigate the effect TMAPs have had on the blind and visually impaired community since its first cluster of beta testers in October 2017, and what TMAPs can do to increase its reach. Ten participants were interviewed for this study: five blind individuals, four orientation and Mobility (O&M) specialists, and one blind O&M. All the users had obtained 2 or more TMAPs in the last year. Our study shows that availability to view TMAPs at home dramatically increases map usage, and suggests that making low-cost maps available with rapid turnaround is the most effective way to increase map usage among blind individuals in the future.

### References

Brock, A. M., Truillet, P., Oriola, B., Picard, D., & Jouffrais, C. (2015). Interactivity improves usability of geographic maps for visually impaired people. *Human–Computer Interaction*, *30*(2), 156–194.<https://doi.org/10.1080/07370024.2014.924412>

Butler, M., Holloway, L., Marriott, K., & Goncu, C. (2017). Understanding the graphical challenges faced by vision-impaired students in australian universities. *Higher Education Research & Development*, *36*(1), 59–72.

Lighthouse. (2020). *TMAP: Tactile maps automated production*. application. Retrieved from<https://lighthouse-sf.org/tmap/>

Miele, J. A., Landau, S., & Gilden, D. (2006). Talking tmap: Automated generation of audio-tactile maps using smith-kettlewell’s tmap software. *British Journal of Visual Impairment*, *24*(2), 93–100.

## Research Question

What has the effect of TMAPs been on the VI community over the last three years and what can TMAPs do to increase its reach?

## Hypotheses

* The main consumer of TMAPs has been O&Ms and businesses
* TMAPs has more than doubled map usage among its users
* TMAPs needs interactivity
* TMAPs needs to be less expensive, more along the lines of $10 a map with shipping

# Study Design

This study will be a semi structured interview obtaining usage information and areas for improvement from both O&Ms and blind users. The study can be split into two phases:

1. Interview current users of TMAPs
2. Analyze the usage data from the online TMAPs platform since 2017

## Phase 1, Interview Current Users of TMAPs

10 O&Ms and blind individuals will be recruited from the Lighthouse of the Blind in San Francisco, and identified through TMAP sales information. The interview will be done remotely over Meets, Skype, or Zoom, and participants will be compensated $30 an hour through an online gift card system for their participation in the study. The study should take around 1 hour.

## Phase 2

We will interview the MAD Lab (owners of TMAPs) and obtain information about TMAPs stats: see:

[Stats from TMAPs](#_Stats_from_TMAPs)

# Questions

## Demographic Information blind users

1. Age
2. Gender
3. What is your level of vision loss?
4. When did you become blind?

## Demographic Information O&Ms

1. Age
2. Gender
3. Years teaching O&M

## O&M and Blind TMAP Users

1. How do you currently use TMAPs?
2. How do you obtain TMAPS? (Show the [online order form](https://adaptations.org/collections/madlab-products/products/tmap).)
3. What do you think of the [online order form](https://adaptations.org/collections/madlab-products/products/tmap)?
4. Where do you use TMAPs? (ask when and why as well)
5. (O&Ms only): Do your students independently use TMAPs? Why or why not?
6. How many TMAPs do you order a month?
7. How long have you used TMAPs?
8. When did you obtain your last TMAP?
9. When did you use your last TMAP? Why did you use the TMAP?
10. How did you hear about TMAPs?
11. When and where did you obtain your first TMAP?
12. What is your map reading level or the level of most of your students? Beginner/Intermediate/advanced
13. Are you or your students braille readers?
14. With TMAPs, do you use Tactile/braille, Large print or both elements
15. What kinds of maps did you use before TMAPs?
16. What other tactile graphics do you use?
17. How many maps did you get/produce each month before TMAPs?
18. What do you like about TMAPs?
19. What could be improved about TMAPs?
20. What is not working about TMAPs?
21. What do you think of a lower cost ($15) tactile only graphic rather than the $25 visual and tactile graphic?
22. What are your thoughts on the tactile features of TMAPS? E.G. Walking paths, streets, center, buildings...
23. What could TMAPs do so you would positively tell your friends and colleagues about it?
24. What could TMAPs do to make you stop and say "wow"?

# Initial Significant observations of the data

* 8 people use TMAPs for intersections
* 8 people would like interactivity
* 7 people want to view transit stops, all blind people want to view transit stops
* 4 blind participants Would like way to view map online nonvisually
* The 3 blind participants with an embosser produce on average 42 TMAPs a piece, and the blind participants without an embosser produced 2
* 4 O&Ms say their student's reading level is beginner
* 4 O&Ms use other tactile graphics than TMAPs
* 4 O&Ms use both the visual and tactile view
* 5 blind participants only use the tactile view
* The 1 blind O&M uses both, but mostly tactile view
* 4 O&Ms Would like to add and remove tactile features, like particular buildings
* 4 O&Ms Would like ability to change the look/feel of each feature

## Hypotheses

* The main consumer of TMAPs has been O&Ms and businesses

Not able to figure this out yet

* TMAPs has more than doubled map usage among its users

Yes, from less than 1 map a year to 26 TMAPs on average, between 1-84 maps a year for blind users.

Yes, it about doubled map usage for O&Ms, from 10 maps before TMAPs to 10 TMAPs, but total maps with TMAPs was not asked.

For blind O&M, it went from less than 1 map a year to 2 maps a year.

* TMAPs needs interactivity

Yes

4/5 blind, ¾ O&Ms, and 1 blind O&M.

* TMAPs needs to be less expensive, more along the lines of $10 a map with shipping

Yes

3/5 blind, ¾ O&Ms, and 1 blind O&M

$10 on average

## Stats from TMAPs

1.      What are the number of TMAPs ordered over the phone as of the latest date? Total TMAPs sold by Adaptations: 161 (as of April 16, 2020). Non-Adaptations TMAP orders is 731. Especially early on weren't consistent about tracking maps given away for free, but our records indicate 1994. Be interesting to note how that compares to total downloads, and how much non-MAD Lab download activity there is.

2.      What date could one first order a TMAP over the phone? First TMAP sold by adaptations occurred on December 7th, 2017.

3.      Number of TMAPs generated with the online tool as of the latest date?

72 maps emailed, 2527 downloaded

(My numbers show 2678 downloaded)

4.      What date was the online tool first made available to online beta testers? I would hazard a guess that P5 was the first "beta tester". The first cluster of TMAPs specific to New York City, a fair indicator of P5's involvement, began Oct 17, 2017. That timeline jibes with my memory of extending access to them. This question is difficult to answer because a) We ourselves we're essentially the beta testers. We never embarked on formal beta testing, instead simply giving outside individuals access from time to time, and b) We didn't have the ability to create formal user accounts until April 2019, so it's difficult to discern from the earlier anonymous records who, whether MAD Lab or outside "beta tester", was generating a map. The earliest non-MAD Lab user account was first used on May 6, 2019.

7.      What went into the $25 price of a TMAP? Direct and indirect costs. Direct costs being $2.04 per EmFuse page, an Adaptations map packet being, generally 5-7 pages. Indirect costs would be labor + overhead. MAD Lab's involvement adding $11.25 to each map printed, then Adaptations adds their markup. Now that I look at this I realize maps are being sold at a loss, especially when one considers that no development costs, or ongoing web fees (heroku, github) are being recouped.

8.      What date did Lighthouse accept to take on TMAPs? February 3, 2017. That was the date LightHouse signed the contract with Raiz Labs to develop TMAP 2.0. LightHouse entered this relationship in partnership with Josh Miele/SKERI, which was underwriting this endeavor with NSF funding, with the understanding (Spoken, no MOU exists that I am aware of. Maybe SKERI has record of such a thing) that upon completion of the build LightHouse would assume full ownership and responsibility for TMAP henceforth.

9. Number of Unique user accounts

April 16, 2020 there were 58 unique user accounts