Bespoke Map Customization Behavior and Its Implications for the Design of Multimedia Cartographic Tools

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Online and mobile maps

Paper maps


Alex und Nati
Banana Boat Bar
Mainland China
Om Made Cafe
Rooftop
Sri Shanthi
18th Main Park
Grape Garden
Anand Sweets
Vishnupriya Arcade
H A Arcade
Casa De Bengaluru
hungry hogs Mimosa
Professional Couriers
Lazeez
Mainland China
60 Feet Rd
5th Cross Rd
2nd Cross Rd
1st Cross Rd
3rd Cross Rd
17th C Main Rd
17th D Main Road
17th E Main Rd
18th Main Rd
18th A Main Rd
17th H Main Rd

Objectives of our study

- Understand why and how users annotate digital and paper maps
- Provide design implications for the design of existing and future tools

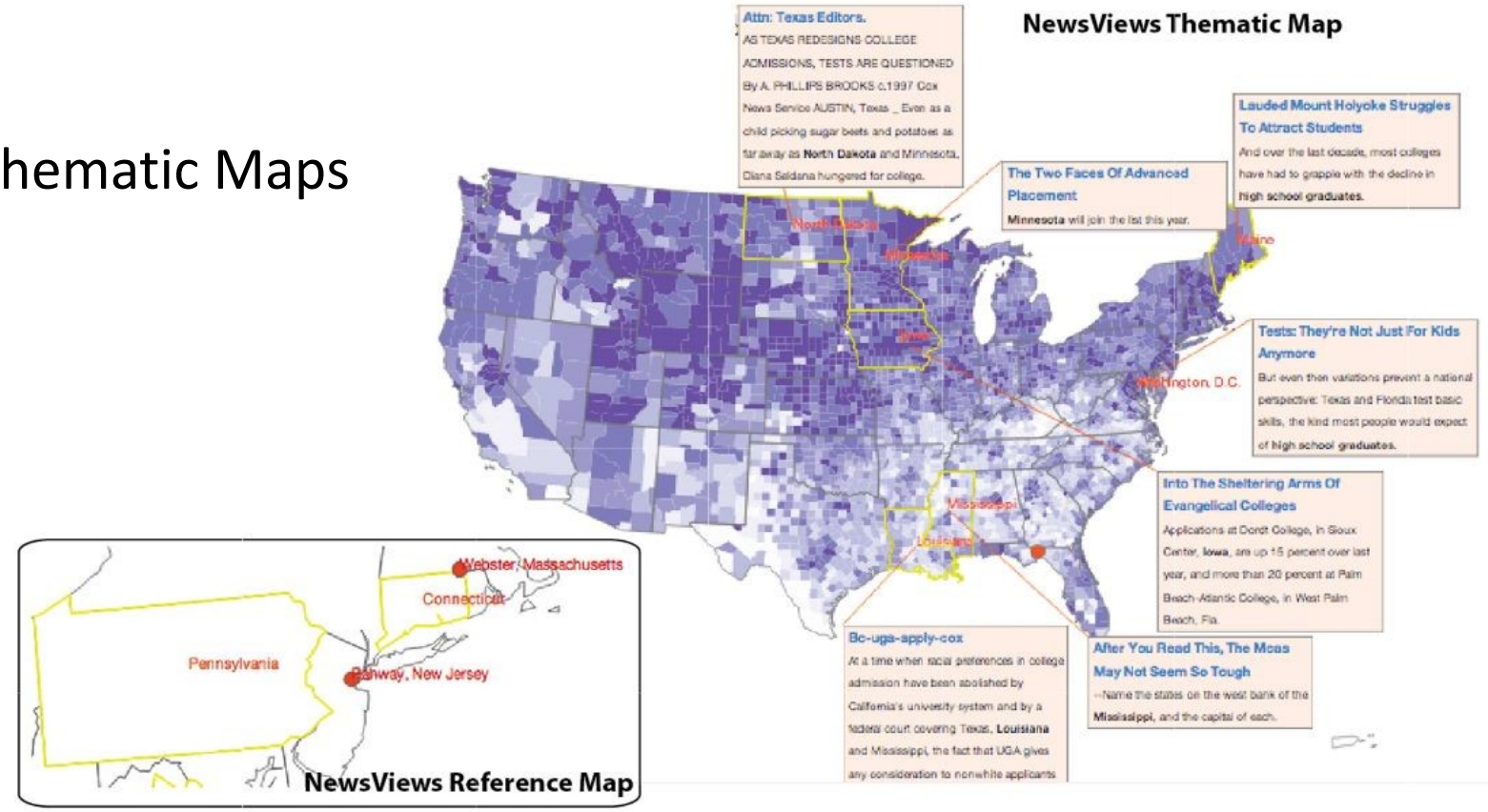
Framing and Related Work

Framing and Key Terms

- **Bespoke map customization:**
  The act of producing a new, simple spatial dataset with a small number of features and visualizing that dataset without the use of programming.
- **Reference maps:**
  Maps used for navigation and orientation.
- **Thematic maps:**
  Maps which communicate the geographic distribution of an attribute.
- **Distinction from map mashups:**
  Mashups often require programming skills and are thematic maps and not reference maps.

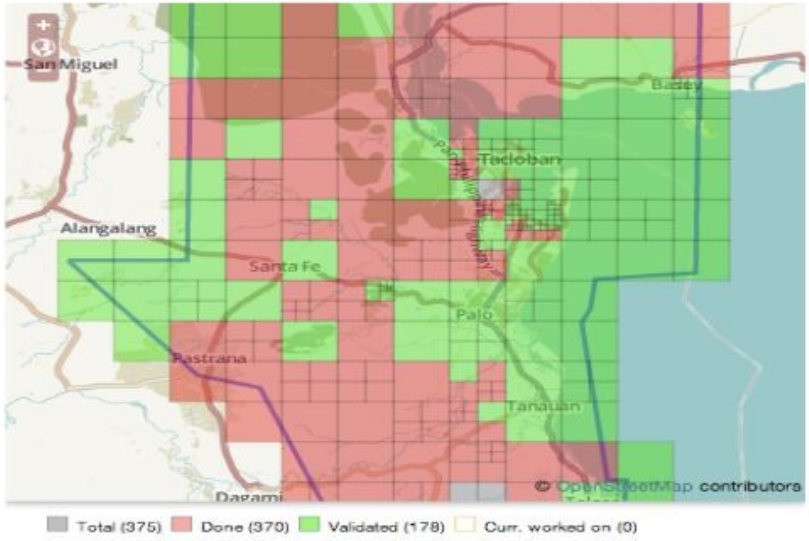
Annotation in Information Visualization

Thematic Maps

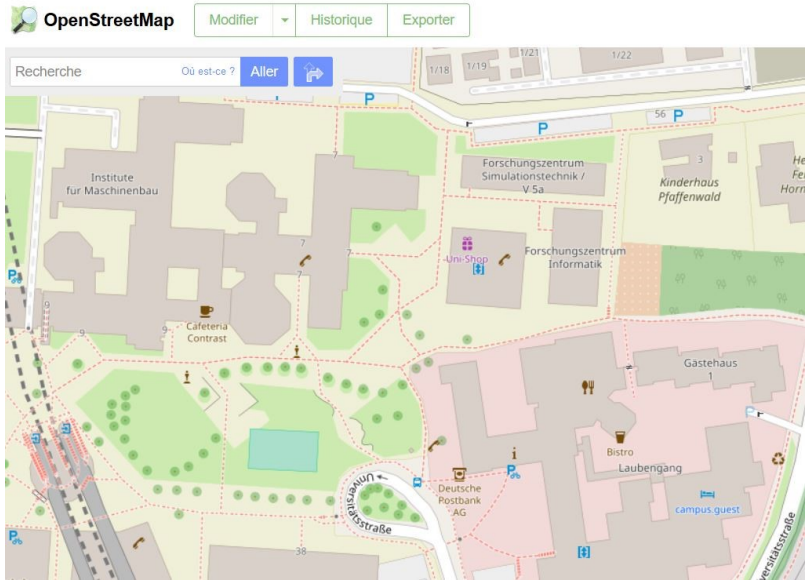


Gao et al. NewsViews: An Automated Pipeline for Creating Custom Geovisualizations for News. CHI 2014

Spatial decision support systems

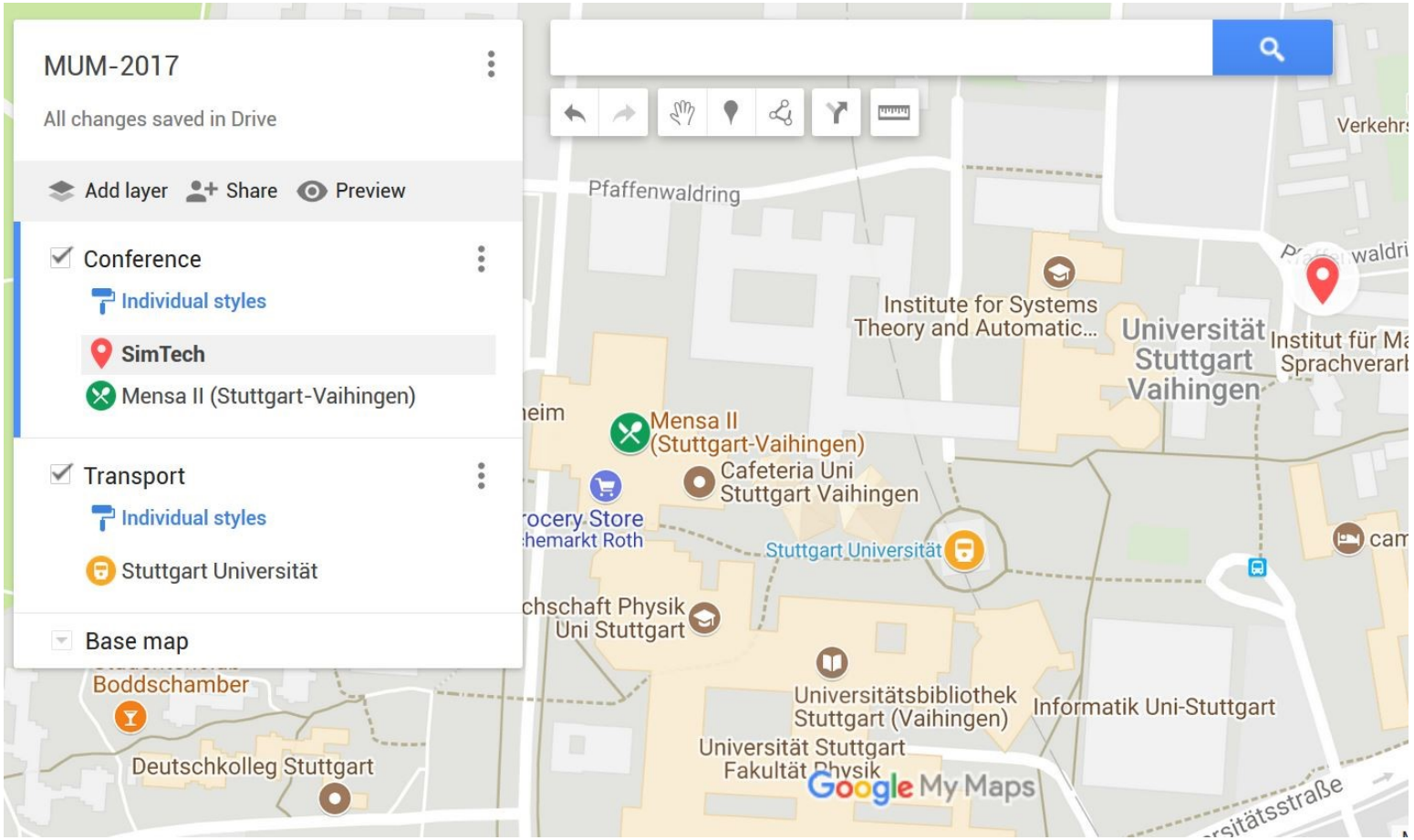


Palen et al. Success & Scale in a Data-Producing Organization: The Socio-Technical Evolution of OpenStreetMap in Response to Humanitarian Events. CHI '15.



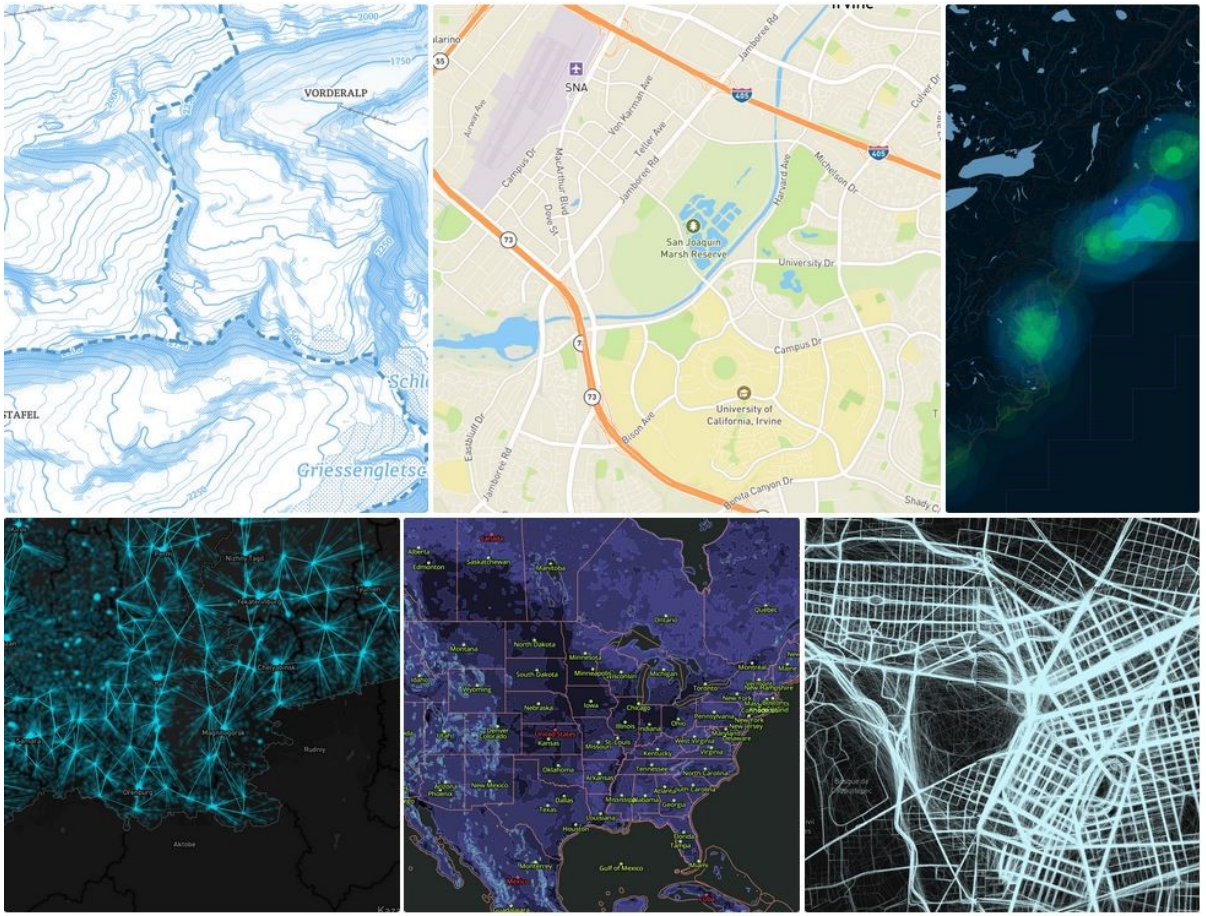
http://www.openstreetmap.org

Existing Map Customization Technologies and Tools



https://www.google.com/mymaps

Existing Map Customization Technologies and Tools



https://www.mapbox.com/mapbox-studio/

Paper and digital media for cartography

Hurst & Clough. 2013. Will we be Lost Without Paper Maps in the Digital Age? Journal of Information Science 39, 1: 48–60.

User Study

Methodology & Results

Methodology

(1) Online survey

108 responses:

39 69

Age range: 21-61

Quantitative data: descriptive statistics.
Qualitative data: bottom-up coding scheme[1].

(2) Qualitative analysis of a map corpus

Among survey participants

38 maps from 17 users

7 10

Age range: 26-58

12 countries on 4 continents:

 8  7  6

(3) Interview with a power user

One-to-one session 1.5h

29 years

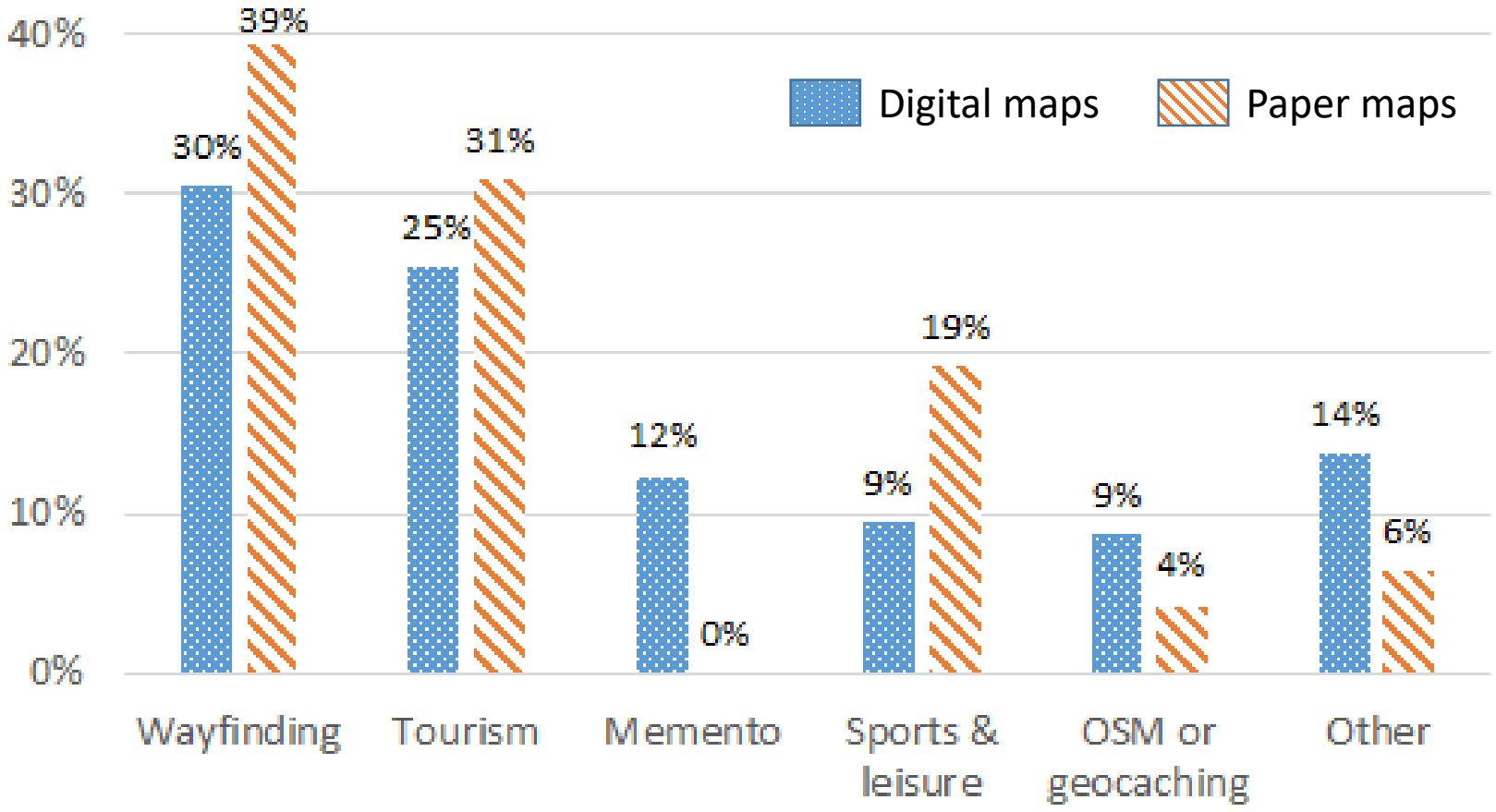
Google My Maps Use
> 6 years
> 20 maps

[1]Schöning et al. Informing Online and Mobile Map Design With the Collective Wisdom of Cartographers. DIS 2014

#Theme 1: Many People Customize Maps, but Most Remain Novices

- 71% of the survey participants customized at least one map
- Mean number of digital maps 6.4 (SD: 5.9) and paper maps 4.3 (SD 3.7)
- Recommendations:
  - Designing for bespoke map customization is important
  - Design should be done for Novice Users

#Theme 2: Map Customization Has Several Primary Use Cases



#Theme 2: Travel Maps

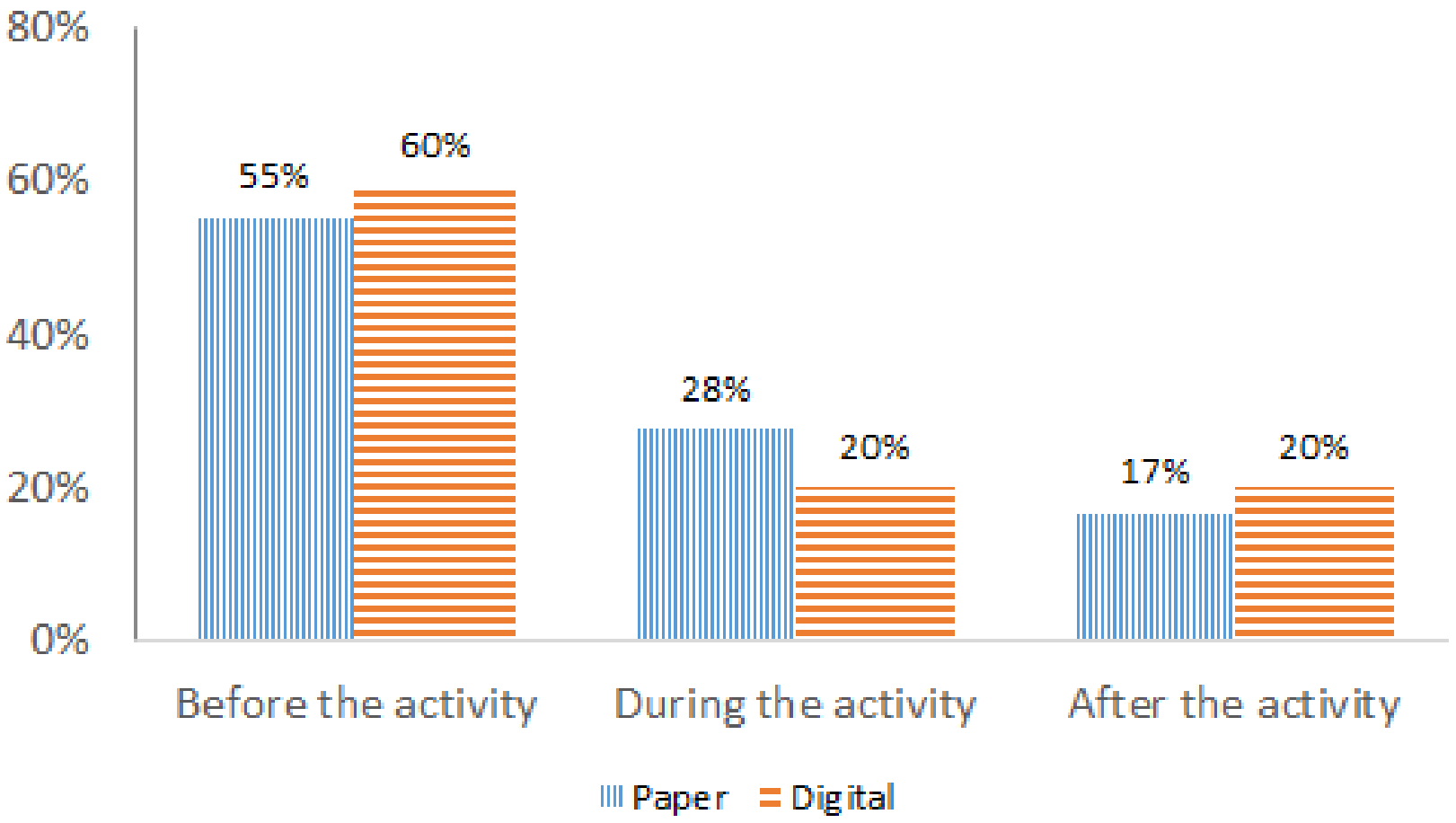
#Theme 2: Meeting & Event Maps

#Theme 2: Recommendations

- Bespoke customized maps for the same use case tend to be quite similar in character

  → Provide templates for specific Use Cases
- Make use of Artificial Intelligence to automatically customize maps
  - Data Mining (e.g. emails)
  - Learn and adapt to users' preferences

#Theme 3: Maps are Customized Throughout an Activity's Lifecycle



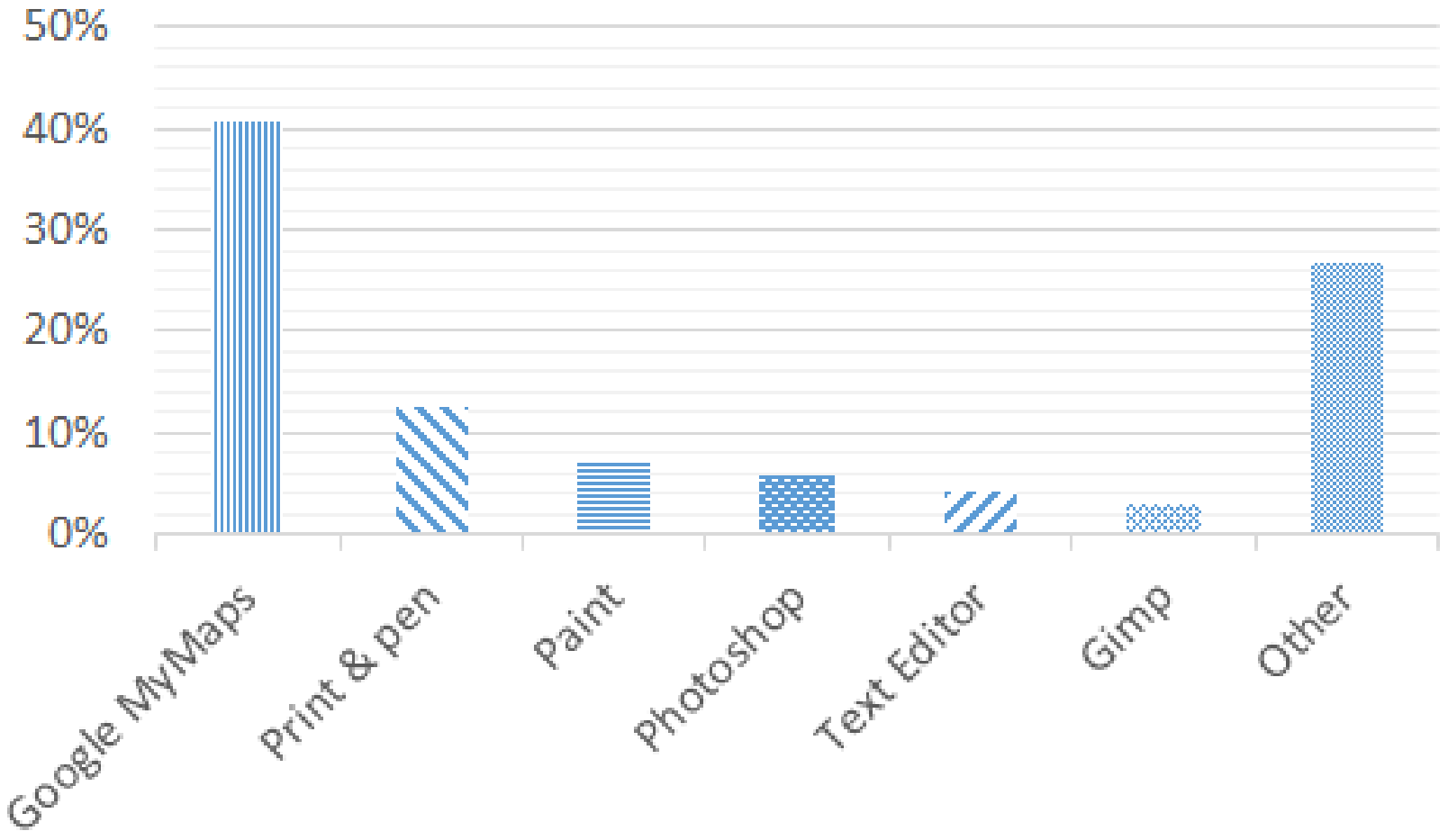
#Theme 3 : Recommendations

- Map customization tools need to support different media and devices

- Support offline map annotation for customization of maps during travel

- Mobile devices:
  integrate user’s positions and tracks

#Theme 4: Hybrid Use of Different Media (Paper and Digital)



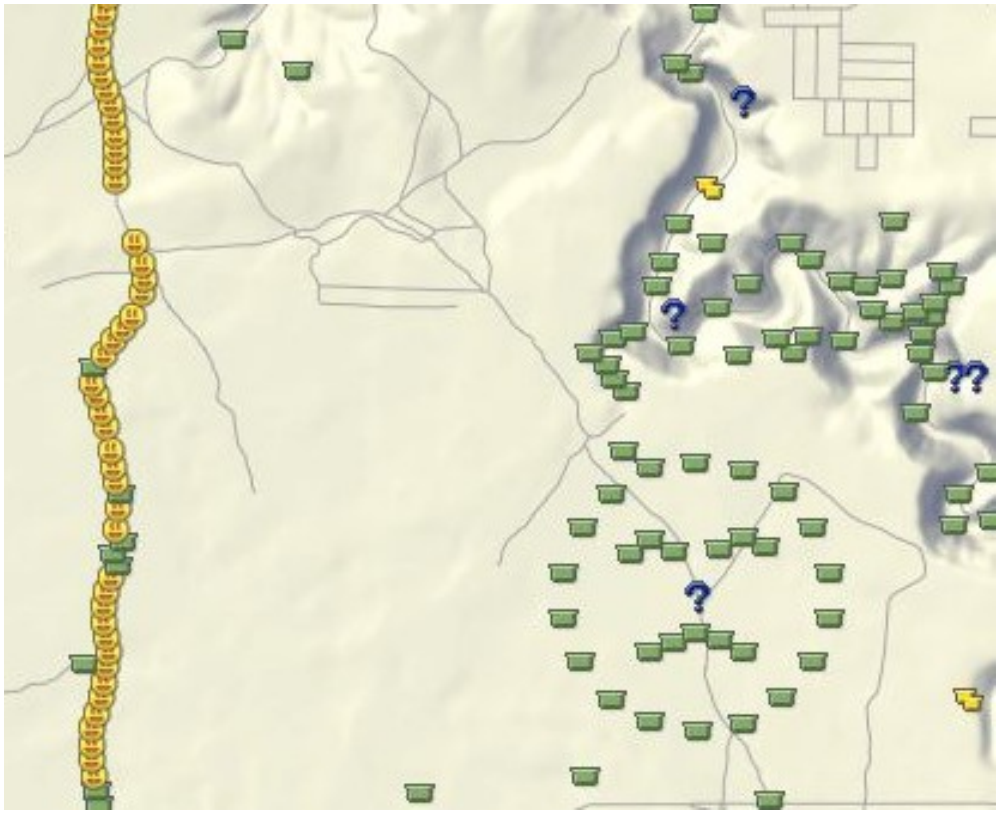
#Theme 4: Recommendations

- Focus not only on the digital production and use of maps, but also support the integration of paper into the customization workflow.
  - User Personalization and Artificial Intelligence cou optimize conversion from digital media to paper
  - Augmented reality and digital pen technology may provide new possibilitie

Norrie & Signer. Overlaying Paper Maps with Digital Information Services for Tourists. ENTER 2005

#Theme 5: Support Diverse Cartographic Styles

- Similarities in the cartographic styles of maps, diversity in lower-level stylistic decisions



#Theme 5: Recommendations

- Learn from personalization of menus and options successfully employed in other domains[1]
- Support ludic activities, e.g. by providing the full emoji character sets
- Support scribbles and sketches, by adding pen input capability when a hardware device supports it

[1]McGrenere et al. An Evaluation of a Multiple Interface Design Solution for Bloated Software. CHI 2002

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Conclusions

- Provide templates and tools for different use cases
- Increase the flexibility and personalization of tools
- Support map customization throughout the lifecycle
- Support hybrid use of different media
- Make tools more intelligent

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