Implementation of a Tablet Map as Input Device for Respondents in a Collaborative Approach to CAPI Interviewing

Chris Schlapper
University of Wisconsin Survey Center
University of Wisconsin-Madison

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Chicago Communities Study

• CAPI pilot study
• Dynamic Tablet Screen Maps (DTSM)
  • Runs on a tablet device
  • Electronic mapping tool to replace paper maps
  • Respondents submit answers to geospatial survey questions
  • Load answers into CAPI survey instrument
Collaborative Approach

- Connects CAPI instrument and tablet device
  - Interviewer uses the laptop
  - Respondent uses the tablet
Collaborative Approach - Data

- Bi-directional data flow
  - Available and editable on both devices
  - Unifies input from each device into a single data store
- CAPI instrument data structure
Laptop Services

- CAPI instrument
- Wi-Fi hotspot
  - Virtual Router Manager
  - Encrypted, password protected
  - No internet connection
- IIS Web Server
  - Hosts custom web application (DTSM)
- MySQL database
- Map server and tiles
  - Tilestache
Tablet Features

- Wi-Fi connection to laptop
- DTSM website hosted on laptop
- Safari web browser
- Displays maps as web pages
- Accepts respondent input
- Stand-by mode
- Showcards
  - Static and dynamic
- Self-Administered survey
  - CASI
Technical Details

- DTSM software
- Process flow
- Interface between the tablet and the laptop
DTSM – Technical Details

- Web Application
- C#, HTML, Javascript
- Implements local map tiles
  - Tilestache
  - GeoJSON
- MySQL database
  - Contains configuration data
  - Flexible and responsive to changes
MySQL Database

- Survey questions and responses
- CASI questions and responses
- Study configuration
  - Future implementations in other geographic regions
Database

- Survey Questions
  - Define attributes
  - Handle all potential programmatic behaviors of the DTSM
  - Program the attributes, not questions
- Modular design
  - Changes in order, adding, removing
  - Modify attributes during debugging
Survey Questions - DTSM Configuration

- id
- index
- cases_variable
- map_label
- map_center_lat
- map_center_lon
- initial_zoom
- calculate_zoom_without_answers
- calculate_zoom_with_answers
- response_mode
- maximum_responses
- enable_pan
- enable_zoom
- is_allow_multi_select
- reference_cases_variables
- selection_pool_cases_variables
- selection_pool_exclude_cases_variables
- selection_criteria
- selection_group
- command
- showcard_filename
- cases_fill_variables
- map_invalid_cases_variables
- dtsm_fill_variables
Survey Questions – DTSM Behavior

- maximum_responses
- enable_pan
- enable_zoom
- is_allow_multi_select
- reference_cases_variables
- selection_pool_cases_variables
- selection_pool_exclude_cases_variables
- selection_criteria
- selection_group
- command
- showcard_filename
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Survey Questions – DTSM Commands

1. Friends told me about it
2. Co-workers told me about it
3. Heard about it on the television or radio
4. Read about it in the newspaper
5. Read about it on the internet
6. Family told me about it
7. Other, please specify
Showcards

- Text files
  - HTML fragment
  - Inserted into static HTML frame in the DTSM
  - Ability to update with instrument changes
- Static
- Dynamic
  - HTML file with data fills from survey instrument
<table class='showcardtable'>
  <tr>
    <td class='showcardheader' colspan='2'>Reasons for choosing your current community</td>
  </tr>
  <tr>
    <td>{fill}</td>
    <td>{fill}</td>
  </tr>
</table>
Database – Selection Calculations

- Question
  - Columns
    - id
    - index
    - cases_variable
    - map_label
    - map_center_lat
    - map_center_lon
    - initial_zoom
    - calculate_zoom_without_answers
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    - selection_group
    - command
    - showcard_filename
    - cases_fill_variables
    - map_invalid_cases_variables
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- Weighting
  - Columns
    - id
    - total_population
    - non_hispanic_whites
    - non_hispanic_blacks
    - non-hispanic_asians
    - hispanics
    - fips
    - kd_prefix
    - community_name
    - kd_community_type
    - percent_non_hispanic_whites
    - percent_non_hispanic_blacks
    - percent_non_hispanic_asians
    - percent_hispanic
    - entropy_score
    - order_by_entropy
    - percentile_by_entropy
    - weight
    - weight_final
Technical Details

- DTSM software
- Process flow
- Interface between the tablet and the laptop
Process Flow – Data Collision
Process Flow - Goals

• Strict controls
  • Maintain synchronization between Interviewer and Respondent
  • Only one device/person has control
• Consistent behavior throughout entire interview
  • Easy for Respondent to interact with
  • Intuitively clear to interviewer which device has precedence
• Interviewer maintains control over the data interview process
Process Flow
Strict Process Flow – DTSM

• Require tapping [Submit] button
  • Even if response is a single region
  • Allows Respondent to consider their answer before finalizing
  • Standard web-form processing (submit the form)
  • Prevents further changes while the Interviewer is processing or confirming answer
• Lock down the tablet until new command issued from the laptop
Technical Details

- DTSM software
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Map Input Question

Ok, great. Now we would like to see on the map where you lived **before** you lived here? Please tap to highlight the community of your last previous residence, where you lived **just before** your current residence, then tap "Submit". You can scroll.

<1> CONTINUE
<2> RESPONDENT REPORTS LAST RESIDENCE OUTSIDE CHICAGO SELECTABLE A
<d> DON'T KNOW
<r> REFUSED

90001|Prv2
Ok, great. Now we would like to see on the map where you lived before you lived here? Please tap to highlight the community of your last previous residence, where you lived just before your current residence, then tap "Submit". You can scroll.

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Information received. Thank you.
Places Lived as Adult
Oak Park
Logan Square

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Summary

- Linked CAPI survey to a tablet device
  - Collaborative, bi-directional data flow
- Both Interviewer and Respondent input data
- Flexible system, defined through database
  - Adapt to changes in instrument
  - Allow for future study waves in new geographic regions
- Strict process flow control
  - Interviewer framework
  - Consistent experience for Respondents
  - Prevent data collision
Summary – Future Uses

- Maps and beyond...
  - Charts
  - Graphical response
- Electronic Showcards
  - Easier for interviewer
  - Automatically appear at the correct time
  - Dynamic data
  - Randomize option order
  - Enable respondent input
- CASI/ACASI
- Doorstep screening on tablet
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For copies of this presentation or more information, contact:

Chris Schlapper
ccschlapper@ssc.wisc.edu

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