UX / UI Best Practices for Designing Map Apps

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About Me

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UI/UX Design

Design
A plan or drawing produced to show the look and function of a system [...] before it is built or made.

UI = User Interface
The space where interactions between humans and machines occur.

UX = User Experience
A person’s behaviors, attitudes, and emotions when using a system.
Design Influencers

- User Needs
- Context
- Culture
- Cost
- Lifespan
- Business Needs
- Technology
- Sponsor
- Compliance
- Market Opportunities

Design
Challenges

App Design
- Navigation
- Forms
- Content
- Interactions
- Web browsers
- Devices
- Responsive

Mapping App Design
- Cartography
  - Basemaps
  - Symbology
  - Elements (legend, scalebar)
- Content
- Map navigation
- User interactions

“Mapplication Design”
Are these good designs?
What is good Design?

- What is it supposed to do?
- Who is it designed for?
- Are the users able to accomplish their tasks?
- Are the users happy?
- Do we meet business needs?
- What are the success criteria?

=> It has a Purpose
MAP UI PATTERNS
UI Patterns

Solutions to common design problems.

Defined as
- Problem
- Context
- Solution

Language for map app developers
Empty State

What problem does this solve?

Guide the user through the ‘first impression’.
Find a store near you!

Enter Address or Zip Code  Find  Target

Retailer has over 1000 locations nationwide.
Empty State

What problem does this solve?
Guide the user through the ‘first impression’.

What’s the solution?

• Anticipate first step and provide call to actions.
• Use appropriate cartographic elements like Focal Point.
Task Oriented

What problem does this solve?

User get frustrated if they are not able to find or complete their task on hand.
Task Oriented

What problem does this solve?
• User get frustrated if they are not able to find or complete their task on hand.

What’s the solution?
• Design the experience of the application based on tasks.
• Funnel users into a clear workflow.
Desert Fog Problem

What problem does this solve?

In multi-scale systems it is increasingly easy to get lost.

Lack of clues to orient oneself.
Desert Fog Problem

What problem does this solve?
In multi-scale systems it is increasingly easy to get lost.
Lack of clues to orient oneself.

What’s the solution?

• Provide clear & legible labels.
• Add landmarks or natural features (rivers, mountains).
• Add Home Button or Overview Map.
Data-Ink Ratio

What problem does this solve?

Large share of ‘ink’ (pixels) is used for something not relevant to the task.
Data Ink Ratio = \frac{\text{Data Ink}}{\text{Total Ink}}
Find your Representative

Here you can enter your zipcode or search on the map to find out who represents you in congress and more.

**BY LOCATION**
Find your representative by location. Enter your zipcode or select a state to begin the search.

Zip or State/Territory or Locate Me

**OR**

**BY NAME**
If you know the name of the representative you are looking for enter the name of the senator or representative below.

Senator or Representative Committee
Data-Ink Ratio

What problem does this solve?

Large share of ‘ink’ (pixels) is used for something not relevant to the task.

What’s the solution?

• Increase the data-ink ratio.
• Use alternative Basemaps & UI Patterns like Placemarks.
**Layouts**

- Full Map
- Partial Map
- Reference Map
- No Map
- Focus on the Subject
- Mobile
Full Map

Map is the **focus** & the **core value**
Partial Map

Map and content equally important & workflow driven
Reference Map
For navigation & reference purposes

Find your Representative
Here you can enter your zipcode or search on the map to find out who represents you in congress and more.

BY LOCATION
Find your representative by location. Enter your zipcode or select a state to begin the search.

Zip or State/Territory or Locate Me

OR

BY NAME
If you know the name of the representative you are looking for enter the name of the senator or representative below.

Senator or Representative Committee
No Map

Task doesn’t require a map but utilizes power of GIS
Focus on the Subject

Toggle between Full Map and Reference Map
Mobile

No partial map on mobile!

Toggle between reference map & full map
## Layouts Summary

<table>
<thead>
<tr>
<th></th>
<th>Full Map</th>
<th>Partial Map</th>
<th>Reference Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Detail</td>
<td>high</td>
<td>high</td>
<td>low to medium</td>
</tr>
<tr>
<td>Level of Control</td>
<td>high</td>
<td>medium to high</td>
<td>none to low</td>
</tr>
<tr>
<td>Tools</td>
<td>advanced</td>
<td>in workflows</td>
<td>none/few</td>
</tr>
<tr>
<td>Interaction</td>
<td>advanced</td>
<td>advanced ok</td>
<td>limited</td>
</tr>
<tr>
<td>Cartography</td>
<td>very important</td>
<td>important</td>
<td>limit distractions</td>
</tr>
</tbody>
</table>
Content

- Info Window

Anti-Pattern:

- Empty Info Window
What problem does this solve?

Too much information on the map requires user interaction to disclose it.
Info Window
What problem does this solve?
Too much information on the map requires user interaction to disclose it.

What’s the solution?
• Show useful information.
• Include contextual actions. (e.g. buttons, links)
• Avoid displaying default column names and meaningless data like ID’s or Lat/Long.
Empty Info Window
# UI Patterns & Best Practices for Map Applications

## General UX
- Empty State
- Desk Oriented
- Desert Fog Problem
- Data Link Rota

## Layouts
- Full Map
- Partial Map
- Responsive Map
- No Map

## Views
- Backup Toggle
- 3D - NEW

## Special Workflows
- Share Location
- Route Directions
- Route Positioning
- Meet in the Middle
- Snoop Maps

## Navigation
- Home Button
- bookmarks
- Spell in Pan - NEW

## Orientation
- Unified Search
- Location Finder
- Information
- Overview Map
- Local Point

## Content
- Info Window
- Marks
- Rich Marks
- Legend - NEW

## Visualization
- Legend
- Overview
- Basemap

## Exploring Spatial Content
- Sense
- Nearby
- Buffer

## Dealing with complex Data
- Event-driven Content - UPDATED
- Data Spotlight

## Output
- Data Export

## Anti-Patterns
- Empty Info Window

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http://www.designingmapinterfaces.com
Flowmap

What problem does this solve?

Data visualization with straight or geodesic lines have visual limitations.
Flowmap

What problem does this solve?
Data visualization with straight or geodesic lines have visual limitations.

What’s the solution?
- Map connections using directional Bezier curves.
- Add animation.
- Label start & end points.
What problem does this solve?

Users need a geographical reference in order to understand and relate to the information displayed on top of it.
What problem does this solve?

Users need a geographical reference in order to understand and relate to the information displayed on top of it.

What’s the solution?

- Use well established cartographic rules.
- Think in your target audience.
- Consider the style of operational data on top.
Legend

What problem does this solve?

The meaning of symbols is not clear until explained and correlated to a key.
WTH?
Legend

What problem does this solve?
The meaning of symbols is not clear until explained and correlated to a key.

What’s the solution?

• Display legend in a prominent location (on map).
• Show currently active data content; not every symbol.
Know Your Farmer, Know Your Food Compass Map

This map shows efforts supported by USDA and other federal partners as well as related information on local and regional food systems for the years 2009-2012.

To learn about specific projects or what's going on in a particular area, use the slide bar to zoom to that location, and select the pin symbols on the map. Note: Most projects are only accurate to the zip code level. If there are multiple projects in a particular area, they will appear on the same pin. You can scroll through them using arrows at the top of the pop-up box.
What Next?

Your user requirements include four hundred features.

Do you realize that no human would be able to use a product with that level of complexity?

Good point. I'd better add "easy to use" to the list.
What Next?

• Esri Services
  - Expert Review
  - UI/UX Workshops

• Stay connected
  - @michaelgaigg
  - http://www.michaelgaigg.com/blog/
  - https://maps-ui-ux-community.slack.com
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Select the session you attended

Scroll down to find the survey

Complete Answers and Select “Submit”