Designing Great Maps for Web and Mobile

Allen Carroll and Larry Orman
About Allen and Larry

Allen Carroll, Program Mgr, Storytelling

- Family cartographer and navigator since age 5
- 27 years at National Geographic, 12 of them as Chief Cartographer
- Believer in the power of maps to inform and inspire

Larry Orman, Exec. Dir. Emeritus, GreenInfo Network:

- Magic marker map maker for years pre-GIS
- 19 years NGO advocacy and 19 geotech world
- Maps are a powerful lens for seeing the world
Why we’re here
About this workshop series

1: Print / image
   • Thursday, 10:30 a.m. Room 15A

2: Web / mobile
Please take our survey

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Answer survey questions and submit

Your feedback allows us to help maintain high standards and to help presenters
What we’ll cover in this session

1. What’s different about maps in the digital age?
2. Elements of web and mobile maps
3. The process: it’s linear – sort of
4. CLUES to making great maps
5. Some tips on designing digital maps
6. What to remember
But first, a quiz for you
We’ll ask . . .

- Is it appealing to you?
- Would you stick around …or move on?
or 2?
or 2?
We went to Antarctica to understand how changes to its vast ice sheet might affect the world. Flowing lines on these maps show how the ice is moving.
Lessons?

• **First** impressions matter! *Especially on the Web*

• **Attractive**, limited color palettes

• **Simple**, uncluttered designs

• **Fewer “noisy” lines**, more areas of color
How your brain perceives

<1 second
PRE-ATTENTION

1-3 seconds
RECOGNITION

3-20 seconds +
COGNITION
How your brain perceives

- <1 second
  - Will it bite me?
- 1-3 seconds
  - Hmm…
- 3-20 seconds +
  - Oh, I see!
What’s different about designing maps in the digital age?
A lot.
Web and Mobile = A New Medium

...but our heads are still in the print age.
What are the differences?

Print

Digital

What are the differences?
They fall into five categories:
Static

Dynamic

Print

Digital
3

Reflects light

Print

Emits light

Digital
4

One-time publishing
Print

Continual publishing
Digital
Long-lasting
Print

Ephemeral
Digital
Long-lasting Print

Ephemeral Digital
Let’s revisit these in more detail
The challenge: 
information overload

Maps must compete in a blizzard of information...hold their own in an ADD world
The challenge: users are more easily distracted

Studies show that people read and comprehend less on screen than paper.
The challenge: users are more easily distracted

...which means your designs have to be irresistible!
Good news: maps have come alive

Cartography now includes a whole range of user experiences

Maps can zoom, pan, scroll, change, move

Now: Map = Active verb!
Good news: maps have come alive

They’re windows into worlds of information
Maps have to be simpler

Rather than presenting everything on a single sheet
Maps have to be **simpler**

Re-think your map as a *story*
Maps have to be **simpler**

Parse things out as part of a narrative
Maps can move

Leverage the dynamism of digital media

Animations, time sliders, swipe or scroll to advance
Maps can be dynamically updated

Traffic

But...interactive maps can be tedious

Especially clicking on a map to see popups
Clicking vs. mouseovers

Mouseovers are better than clicks; popup on side panel
Static maps are OK!

Studies: most people don’t explore interactive maps

You can provide the illusion of interactivity with scroll actions
Designs need to be **responsive**

Not just size, but context and user interaction

Your maps have to work with a variety of sizes.
Designs need to be responsive

PC: Mouseover, click, scroll

Mobile: Tap, swipe

...and a modified user experience

Tablet: Tap, swipe
Dealing With Screen Sizes

Think mobile first

But don’t despair:

Users can zoom in

Mobile can accommodate more than you think
Reflects light
Print

Emits light
Digital
Color treatments are different

Subtractive

Additive
On screen you have more to work with

You can't use these colors in print...
On screen you have **more to work with**

(but why would you want to?) 😐
Take advantage of screens’ light-emitting character
Light-on-dark maps can look really cool

John Nelson, Esri cartographer
But beware!

Map color palette against white…
But beware!

Most contrast
But beware!

You need to adjust your color palette

This is better
But beware!

Here’s an example of what can happen
But wait!

**understated is good!**

A series of maps on an emerging hunger crisis

Each theme has a simple color palette: **Conflict**
But wait! understated is good!

A series of maps on an emerging hunger crisis

Each theme has a simple color palette:

Population

The map has no border!
But wait! understated is good!

A series of maps on an emerging hunger crisis

Each theme has a simple color palette:

Drought

This theme is an animation
But wait! understated is good!

A series of maps on an emerging hunger crisis

Each theme has a simple color palette:

Food

Non-subject areas are screened back
One-time publishing
Print

Continual publishing
Digital
Updating, tweaking, correcting is easy.

It’s so liberating…just hit refresh!
Feeding the monster

People will shun you if your site looks old

People expect your maps to be up-to-date
5

Long-lasting
Print

Ephemeral
Digital
How long will our web maps last?

My great-granddaughter might find this world atlas...
How long will our web maps last?

My great-granddaughter might find this world atlas...

...but will she find this web map?
Elements of web and mobile maps
Elements of Web and Mobile Maps

App or framework (user experience)
Elements of Web and Mobile Maps

App or framework (user experience)

The map
Elements of Web and Mobile Maps

App or framework (user experience)

The map (or maps)
Elements of Web and Mobile Maps

App or framework (user experience)

The map

Popups and map actions
Elements of Web and Mobile Maps

App or framework (user experience)

The map

Popups and map actions

Legends, scale bars, north arrows

👎
Elements of Web and Mobile Maps

Cartography: **All** elements of design and communication

App or framework (user experience)

The map

Popups and map actions

Legends and other ancillary items

Text, narrative
Elements of Web and Mobile Maps

Cartography first

User Experience later
Cartography = User Experience

They’re inseparable
What does this mean?

It can mean a lot of things, including...

Visually uniting the map with other elements
What does this mean?

It can mean a lot of things, including...

Incorporating map actions into text
What does this mean?

It can mean a lot of things, including...

Making maps respond to scroll
The process
It’s linear...sort of
The process
it’s linear…sort of

Before you start:

**What** is the purpose of your map?

**Who** is your audience?

**What** is your production environment?

Web map, app, etc.
The process it’s linear...sort of

Create initial wireframes → Refine concepts → Test → Create maps → Design and build app/UE → Refine design, UE → Test → Publish

Iteration, experimentation, trial and error is part of the process
Some **CLUES** to making great digital maps
Some CLUES to making great maps in the digital age

1. C onnect with your audience
2. L imit user options
3. U ser experience supports the story
4. E asy-to-read maps
5. S trive for simplicity
Connect with your audience
CLUES
Connect with your audience

Who is your audience?
Think of your mom
Step back and explain things
Avoid being technical
Be informal but respectful
Think about your *primary* audience

Lots of people may see your map, but whom do you *really* want to convince?
CLUES
Limit user options
The best maps and apps do one thing really well...they don’t any more.

If general purpose map viewers ever made sense
Focused, single-purpose apps better serve specific audiences.
The map viewer is dead!...?
User experience supports the story
CLUES

User experience supports the story

Maps serve lots of purposes...

Locate

Navigate

Compare

Narrate

Show change

Each purpose suggests different functions and user experiences
User experience supports the story

CLUES

Locate

Navigate

Compare

Narrate

Show change

Static

Turn-by-turn directions

Swipe

Previous/next

Play/pause
CLUES
Easy-to-read maps
C L U E S

Easy-to-read maps

A map for storytelling is very different from a map for analysis
Base map as context—not competition

A map for storytelling is very different from a map for analysis
CLUES
Easy-to-read maps

Simple, accessible thematic maps

Strip off non-essential information

Use limited color palettes
CLUES
Easy-to-read maps

Avoid visually complex symbols and icons

Simple shapes are usually better than pictographs

Which looks better?
Several simple maps are much better than one complex one.

This can be done additively as well.

User experience can parse a complex story into simpler components.
Simplicity in User Experience

Avoid GIS-y functions
Avoid multiple options and drop-downs
CLUES
Strive for Simplicity

Simplicity in Visual Design

Avoid unnecessary lines, rules, drop shadows, etc.
CLUES
Strive for Simplicity

Simplicity in Visual Design

Strive for clarity and elegance… Limited color palettes are usually more effective
Simplicity in Editorial Approach

Americans want to restrict carbon emissions from coal power plants. The White House and Congress may do the opposite.

Percentage of adults per congressional district who support strict CO2 limits on existing coal-fired power plants

NATIONAL AVERAGE: 69%
Here: No legend; map does the work
CLUES
Strive for Simplicity

Eliminate
Edit! Shorten! Reduce! Distill! Simplify!

Digital media = ADHD media

“Not that the story need be long, but it will take a long while to make it short.”
— Henry David Thoreau, Letters to Various Persons
CLUES

1. **Connect** with your audience
2. **Limit** user options
3. **User** experience supports your story
4. **Easy-to-read** maps
5. **Strive** for simplicity
Some tips on designing digital maps
Dealing With Screen Sizes

Responsive design

Photo & Text

Carousel

Map
Dealing With Screen Sizes

Responsive design: Separating Functions

- Photo & Text
- Map
- List
Dealing With Screen Sizes

Responsive design: Separating Functions…Some

Photo, Text, & Map

List
Dealing With Screen Sizes

Responsive design

Mobile First!

• Increasing mobile usage
• Good discipline
Creating a Consistent Style

Branding:
Website and maps seamlessly styled

City of St. Albert, Alberta
Creating a Consistent Style:

Cartography: Story and maps seamlessly styled

Al Qahira: A Trip to the Past
Creating a Consistent Style

Mood:
An immersive atmosphere

New York Times:
A Journey in Which…

DEMO
Creating a Consistent User Experience

The Power of Scroll

• Opens up real estate
• Incorporates other actions

Story Map: Farmers’ Markets

DEMO
Creating a Consistent User Experience

The power of Scroll

• Maps move as users scrolls

• TREND: Less interactivity, especially point and click

DEMO
Feeding the Monster

You can (and should) tweak, improve, enhance

You’ve created a monster—you’ll need to feed it

Four years, three versions
We’re planning another redesign!
Look Around!*

*Steal!

Be inspired by what others are doing

Be inspired by the world!
The process: Start fresh

Don’t stick with what you have (GIS analysis, older website)

Think anew about
- Who is your audience
- What is your goal
- How you’ll interpret and represent for your audience
The process: Brainstorm and sketch

Great digital tools: Markers and whiteboard

Outline key elements

Develop rough wireframes

Tools? Balsamiq, Photoshop, PowerPoint, Whiteboard, Pencil!
The process: Iterate and test

Be willing to abandon “great” ideas
Digital media are flexible, malleable; try things, explore options

Collaborate: different minds, different ideas

User testing is key (with whom?--fresh eyes, non-tech people)

• Early in process with static screens, rough implementations
• Later: Refining user experience, terminology, etc.
What to Remember
→ Keep it simple; reduce the noise and let the signal come through

→ Single-purpose to fit priority audience

→ Map and context work as a seamless whole

→ A simple, unified user experience

→ It’s a new medium - screens are small, but maps can do so much!
Open Discussion

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