

Don't make me think!

Usability of VGI editors: are they easy to learn?

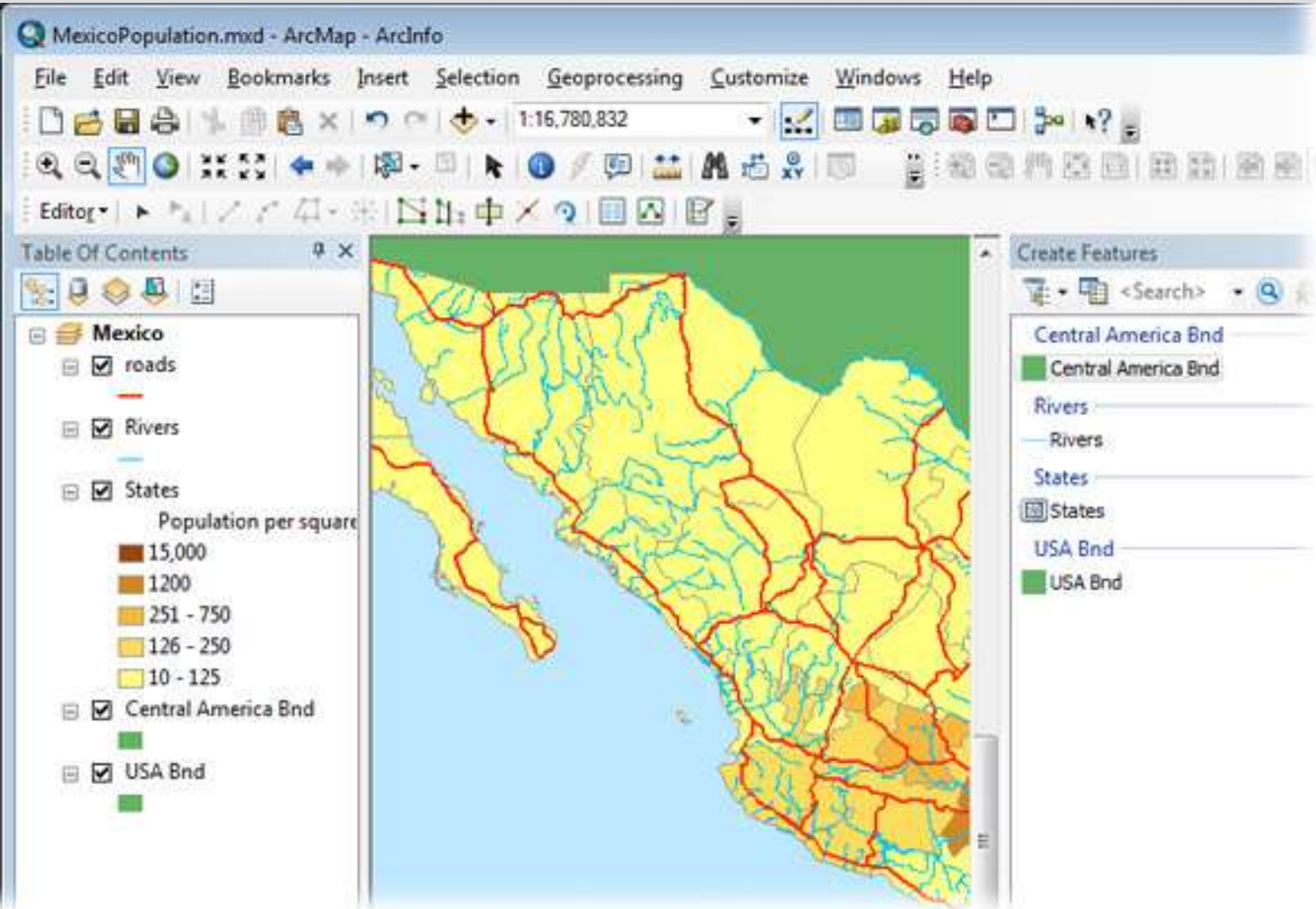
Dr Kate Jones & Dr Patrick Weber

@petzlux , #jiscg3

**Portsmouth University &
University College London**

Usable geoweb applications are hard

- GI concepts are multiple, novel and complex, resulting in a high cognitive load
 - Applications need to minimise and support users cognitive load
 - Traditional GIS applications are hard to use
- Geoweb applications becoming ubiquitous,
 - Entering wide consumer space of non GI experts
 - Offer more and more advanced concepts, functionalities (navigation, spatial queries, thematic formatting, spatial edits)



CAPopData

Save

Add Data

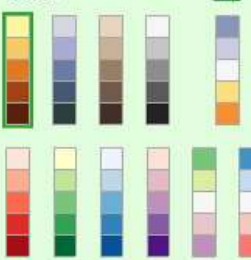
Layers

Basemap

Details

STYLES

Colors Flip



Opacity 75%

LAYERS

CAPopData
by estpop2009

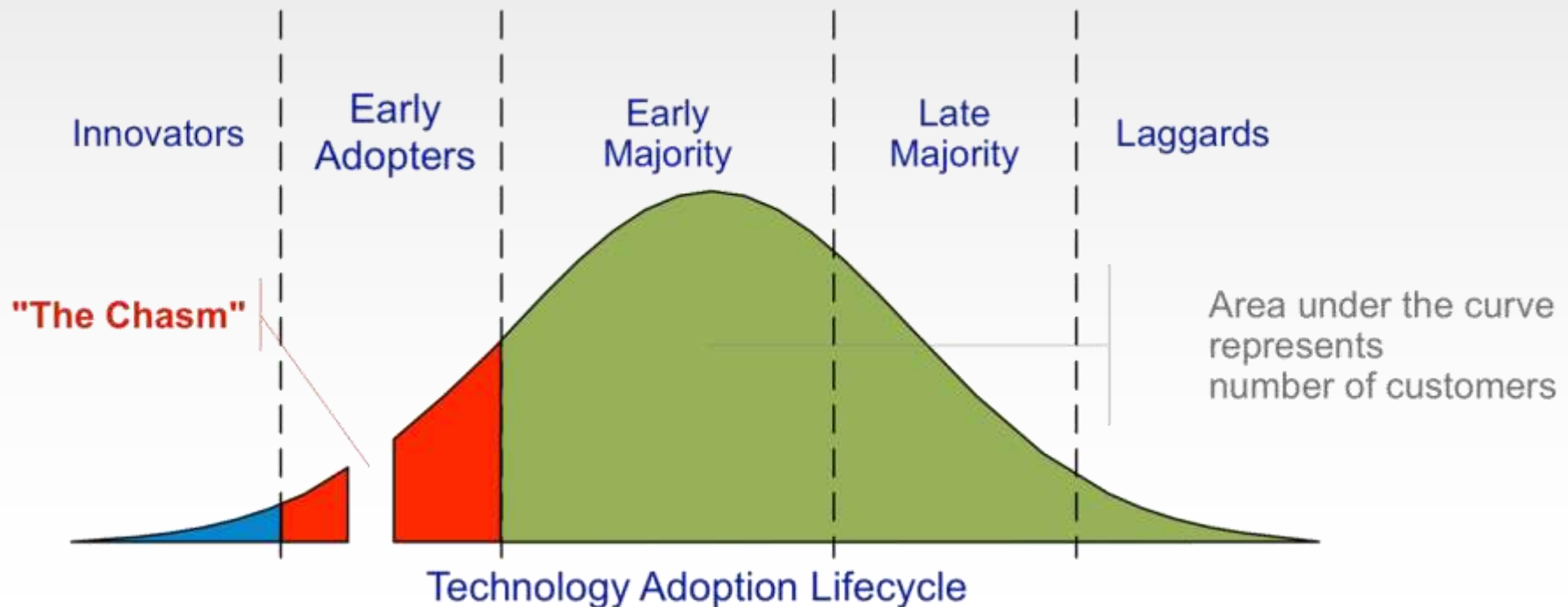
Place Names

Roads

Crossing the Chasm:

how to move from enthusiast contributors to mass participation?

Of all users registering an OSM account, only 35% go on to make at least one edit to the database! (source: <http://neis-one.org>)



Child of Ten Test (Al Gore 1998)

Ideal universal usability



“Usability” is a quality attribute that assesses how easy user interfaces are to use.

“Usability engineering” refers to methods for improving ease-of-use during the design process.

Usability is defined by 5 quality components:

- * **Learnability:** How easy is it for users to accomplish basic tasks the first time they encounter the design?
- * **Efficiency:** Once users have learned the design, how quickly can they perform tasks?
- * **Memorability:** When users return to the design after a period of not using it, how easily can they reestablish proficiency?
- * **Errors:** How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- * **Satisfaction:** How pleasant is it to use the design?

Usability of OSM & Potlatch 2 for contributing geodata

- Ten users were asked to complete a set of predefined tasks whilst **THINKING ALOUD**.
 - Participants without any previous online editing experience were chosen.
 - **Data collected:** Screen/Audio recording + eye tracking, pre/post questionnaires + observer
 - 10 participants, ~12 hours of video to analyse

- Description of the common tasks required of users
 - Building up and repetition of complexity:
 - Adding + Editing Points, Lines, Areas + attributes

Adding a pub and
naming it

Update point data
ensuring attribute
information is correct

Merge two roads,
update the road
classification, number
of lanes & speed limit

Adding a road
& naming it

Edit the shape of an
existing building

Connect roads
together at junctions
(intersection)

Drawing the hospital
building

Adding a cycle hire
point with 17 bikes

Rename a road &
update the direction of
traffic flow

Drawing a university
building, assign
department & building
name

Key

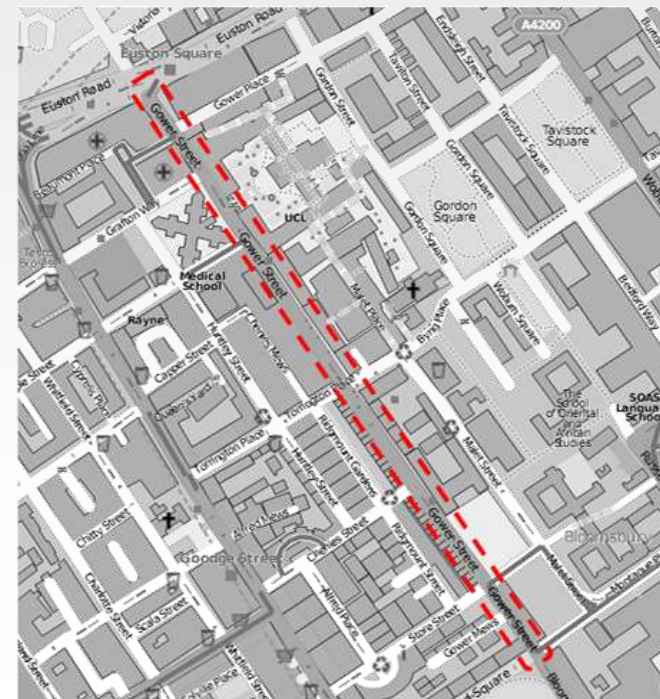
Point Objects

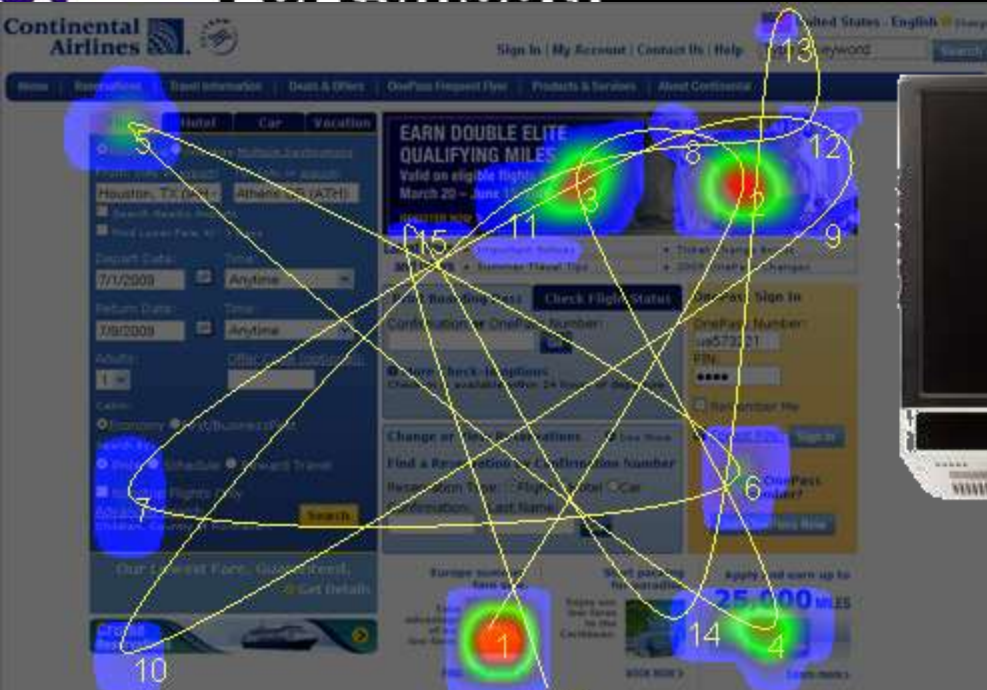
Line Objects

Area/polygon
Objects

10. Merging roads and setting speed limits

Gower Street has been mapped as two different road sections, one is designated as a primary road, the other segment is tagged as a service road – merge the two segments into one continuous road, and update the road classification so it is a Primary Road. Also update the number of lanes to three and set the speed limit to 30mph.





A Framework for analysis of results

NIELSEN HEURISTICS

Nielsens heuristics:

- 10 classes of usability issues that are commonly encountered with specific improvement recommendations
- we only touch here on a few of these, will be developed more comprehensively in the future

Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.

Follow real-world conventions, making information appear in a natural and logical order.

Google maps

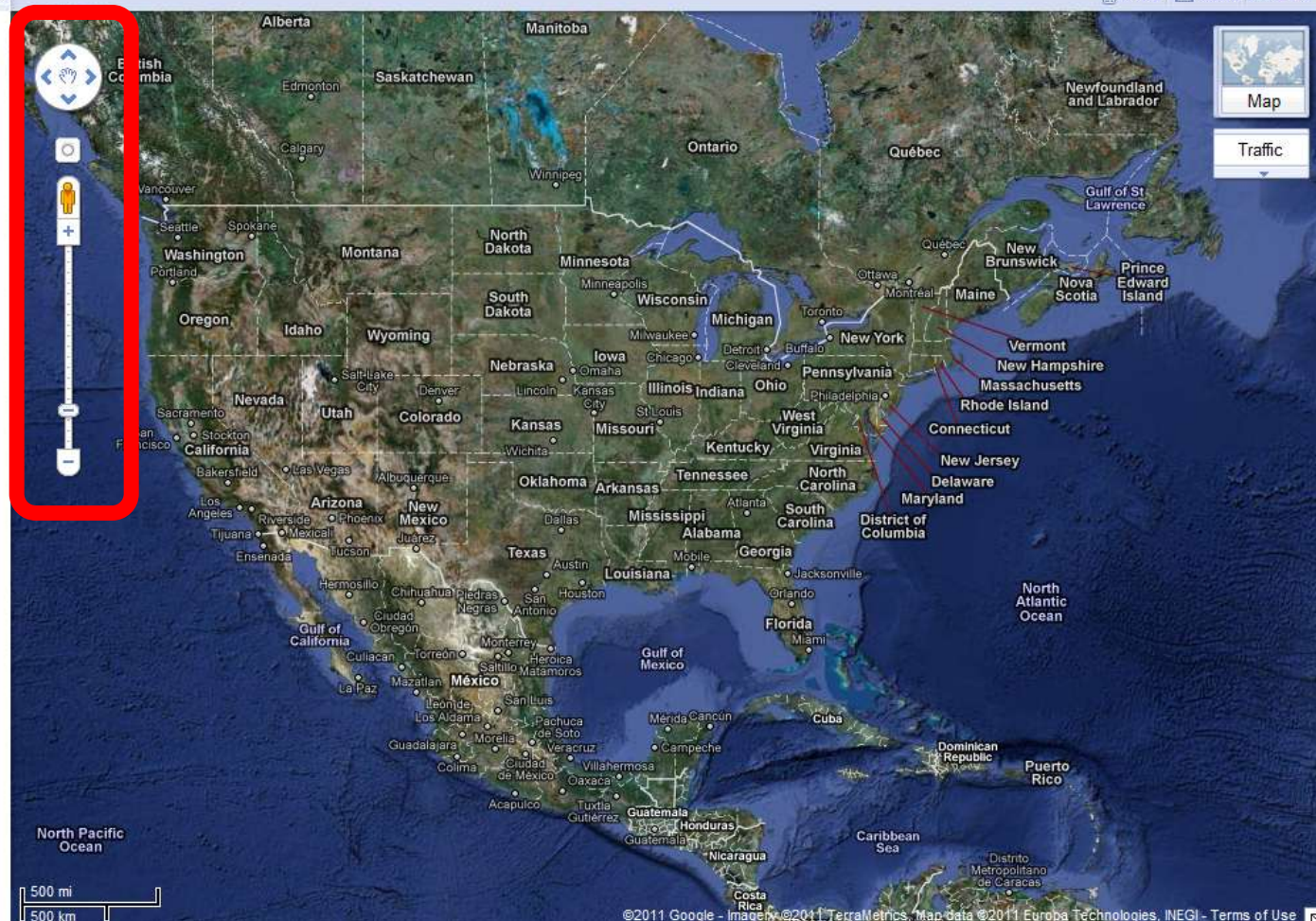
Search Maps What's Around Here?

[Get Directions](#) [My Maps](#)

[Set default location](#)

[Put your business on Google Maps](#)

[Print](#) [Send](#) [Link](#)



OpenStreetMap



The Free Wiki World Map

Search

Where am I?

Go

examples: 'Alkmaar', 'Regent Street', 'Cambridge', 'CB2 5AQ', or 'post offices near Lünen' [more examples...](#)

OpenStreetMap is a free editable map of the whole world. It is made by people like you.

OpenStreetMap allows you to view, edit and use geographical data in a collaborative way from anywhere on Earth.

OpenStreetMap's hosting is kindly supported by the [UCL VR Centre](#) and [bytemark](#). Other supporters of the project are listed in the [wiki](#).

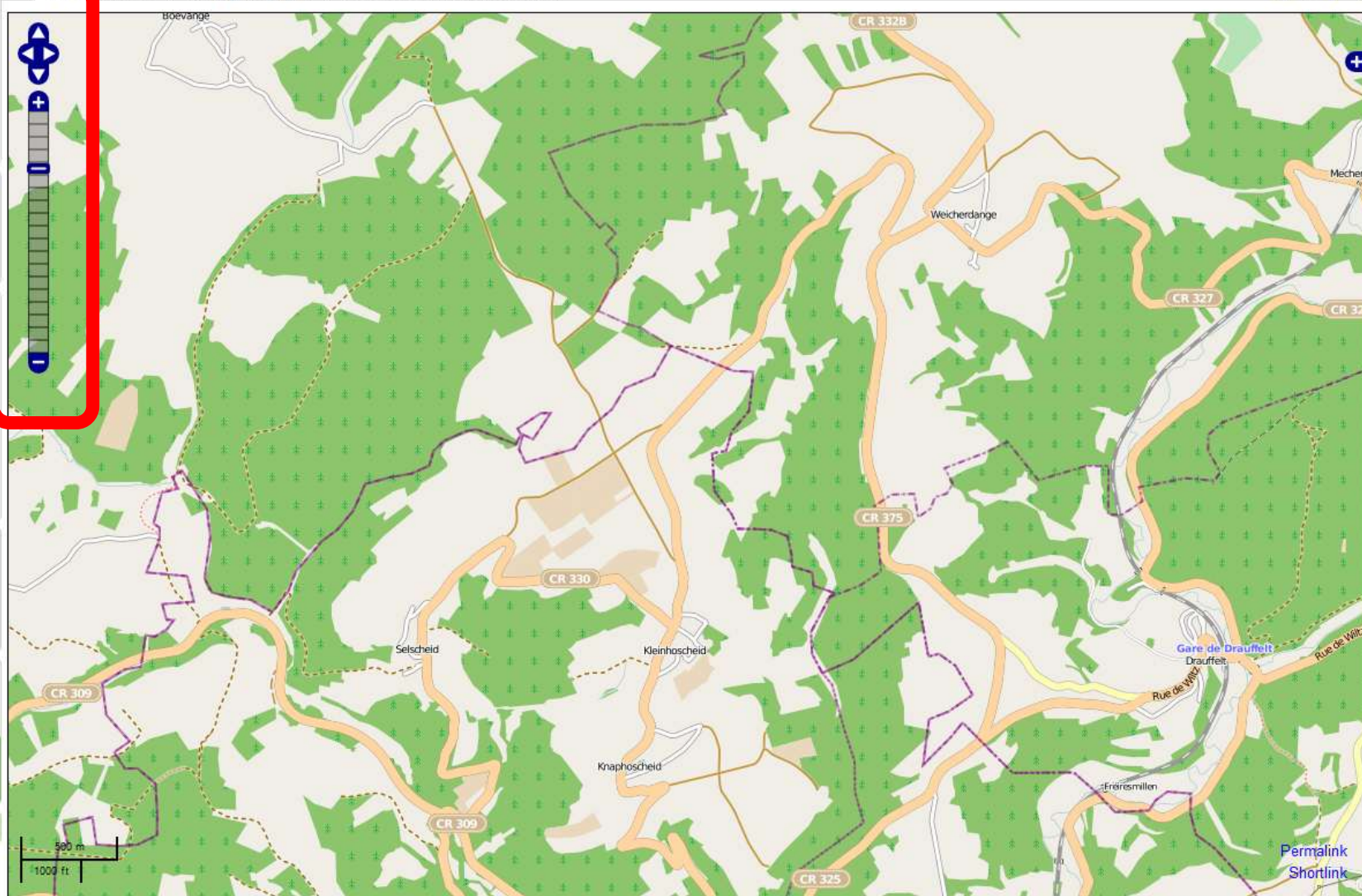
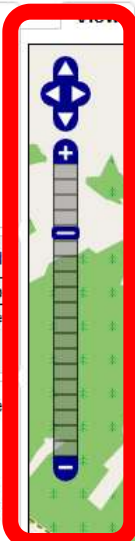
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Map Key

Come to State of the Map, September 9-11th, Denver
The 5th annual international OpenStreetMap Conference

SOTM

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[Edit](#) [History](#) [Export](#) [GPS Traces](#) [User Diaries](#)



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Search [Where am I?](#)

examples: 'Alkmaar', 'Regent Street,
Cambridge', 'CB2 5AQ', or post
offices near Lünen' more
examples...

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View Edit History Export GPS Traces User Diaries

Welcome, lynda | inbox (0) | logout

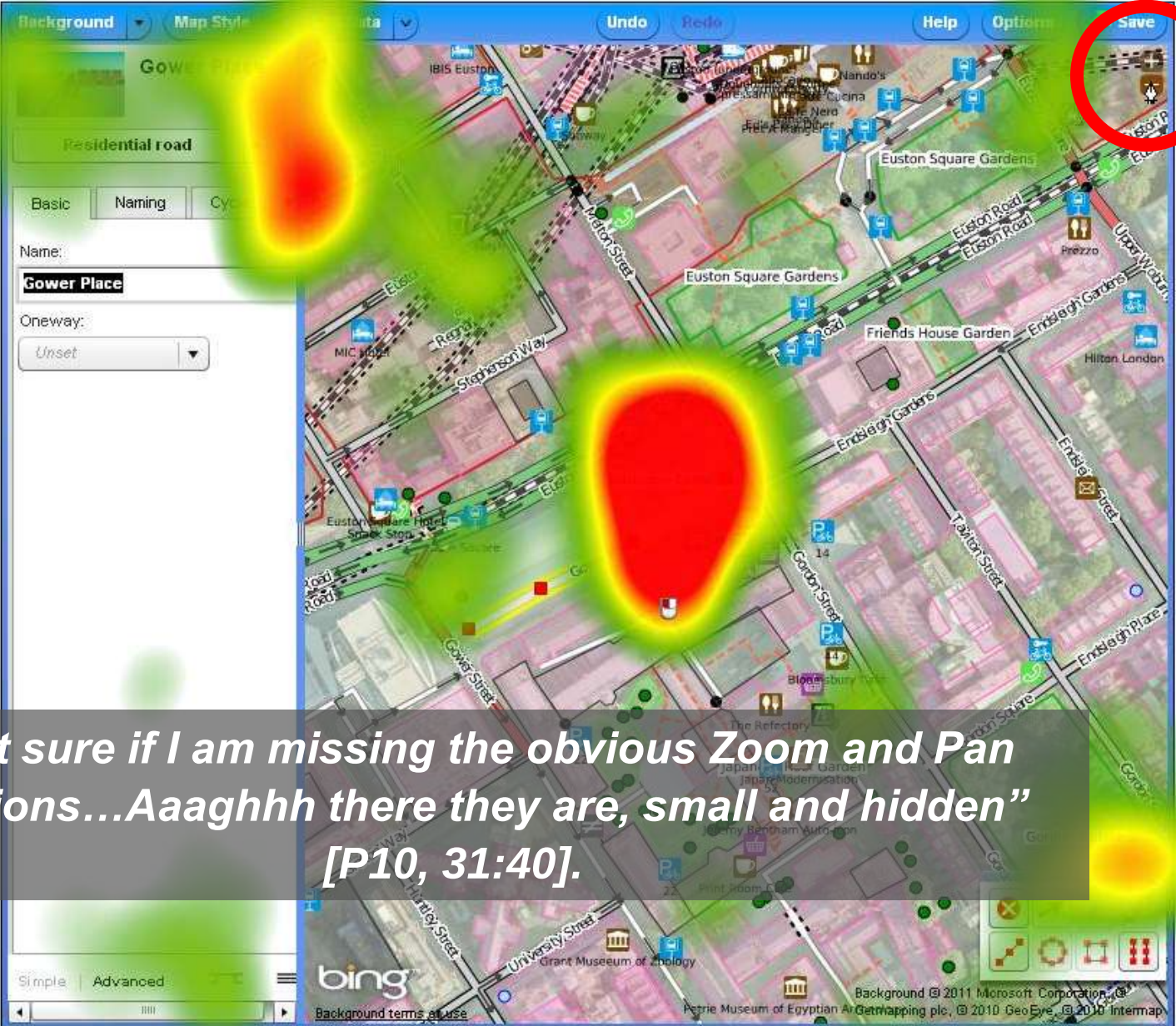
Background Map Style Data Undo Redo Help Options **Save**

Residential road

Basic Naming Cycle

Name: **Gower Place**

Oneway: Unset



Background © 2011 Microsoft Corporation
Getmapping plc, © 2010 GeoEye, © 2010 Intermap

*“..not sure if I am missing the obvious Zoom and Pan functions...Aaaghhh there they are, small and hidden”
[P10, 31:40].*

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SOTM

Search

examples: 'Alkmaar', 'Pent Street
 Cambridge', 'Claremont
 offices near Lunenburg
 examples...

[Make a Donation](#)



“...Am I supposed to click somewhere to save this. Ummm it should have a save right....! Aghh top right ...weeeee!”
 [P03: began searching at 10:51 found it at 11:03 seconds]
 and
“...[I was] not expecting it to be in top right-hand corner... I suppose” [P06 27:14]

User control and freedom

- Users often choose system functions by mistake
- Need a clearly marked “emergency exit” to leave the unwanted state
- Support undo and redo.

Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

File Edit View Favorites Tools Help

★ Favorites

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Search Where am I?

examples: 'Alkmaar', 'Regent Street,
Cambridge', 'CB2 5AQ', or 'post
offices near Lünen' more
examples...

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View Edit History Export GPS Traces User Diaries

Welcome, Patrick Rickles | inbox (0) | logout

Background Map Style GPS Data

The Jeremy Bentham

Pub

Basic Naming Address

Name:

The Jeremy Bentham

International Name:

Unset

Alternative Name:

Unset

Historical Name:

Unset

Simple Advanced



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Internet

100%

Interaction between cartography, selection process and density of mapped features:

“there is a lot of clutter there....” [P03 11:44].

“Even though I know this area, this visualisation is making it difficult for me to find things“ [P06 30:28]

“oh my gosh it’s hard to know where to click so you don’t impact what is there already!” [P08 37:50].

“oops I just moved the anatomy building, did not mean to do that!” [P06: 31:42]. This participant then stated

“...Soon there will be so many objects in the map I will not find an area that I can use to pan” [P06: conversation post experiment].

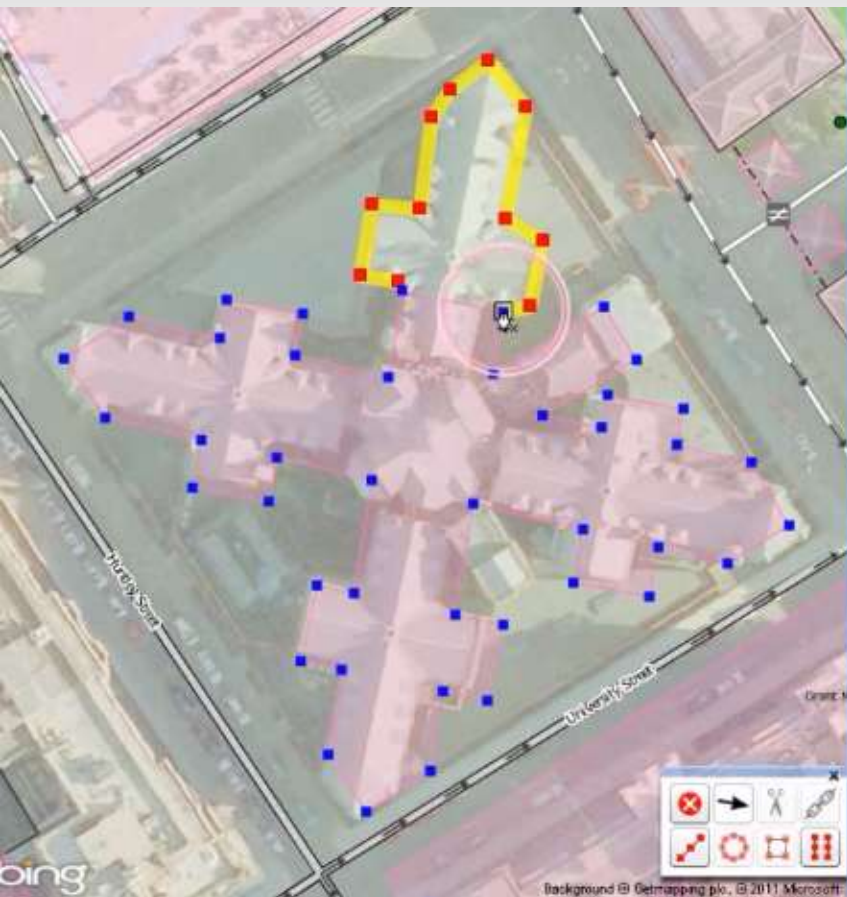
Recognition rather than recall

1. Make objects, actions, and options visible.
2. The user should not have to remember information from one part of the dialogue to another.
3. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

Flexibility and efficiency of use

Accelerators—unseen by the novice user—may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users.

Keyboard shortcuts vs. User Interface Elements



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View Edit History Export GPS Traces User Diaries

Welcome, Chorley | [inbox \(0\)](#) | [logout](#)

Background

Style

GPS Data

Help

Options

Add new points by dragging them onto the map

Shopping:



Food and Drink:



Amenity:



Tourism:



Accommodation:

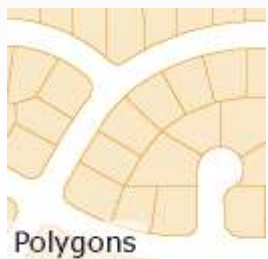
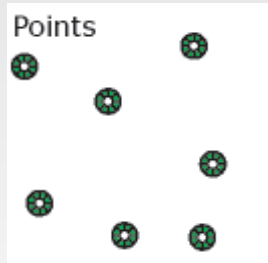


Comparison between

GOOGLE MAP MAKER & POTLATCH

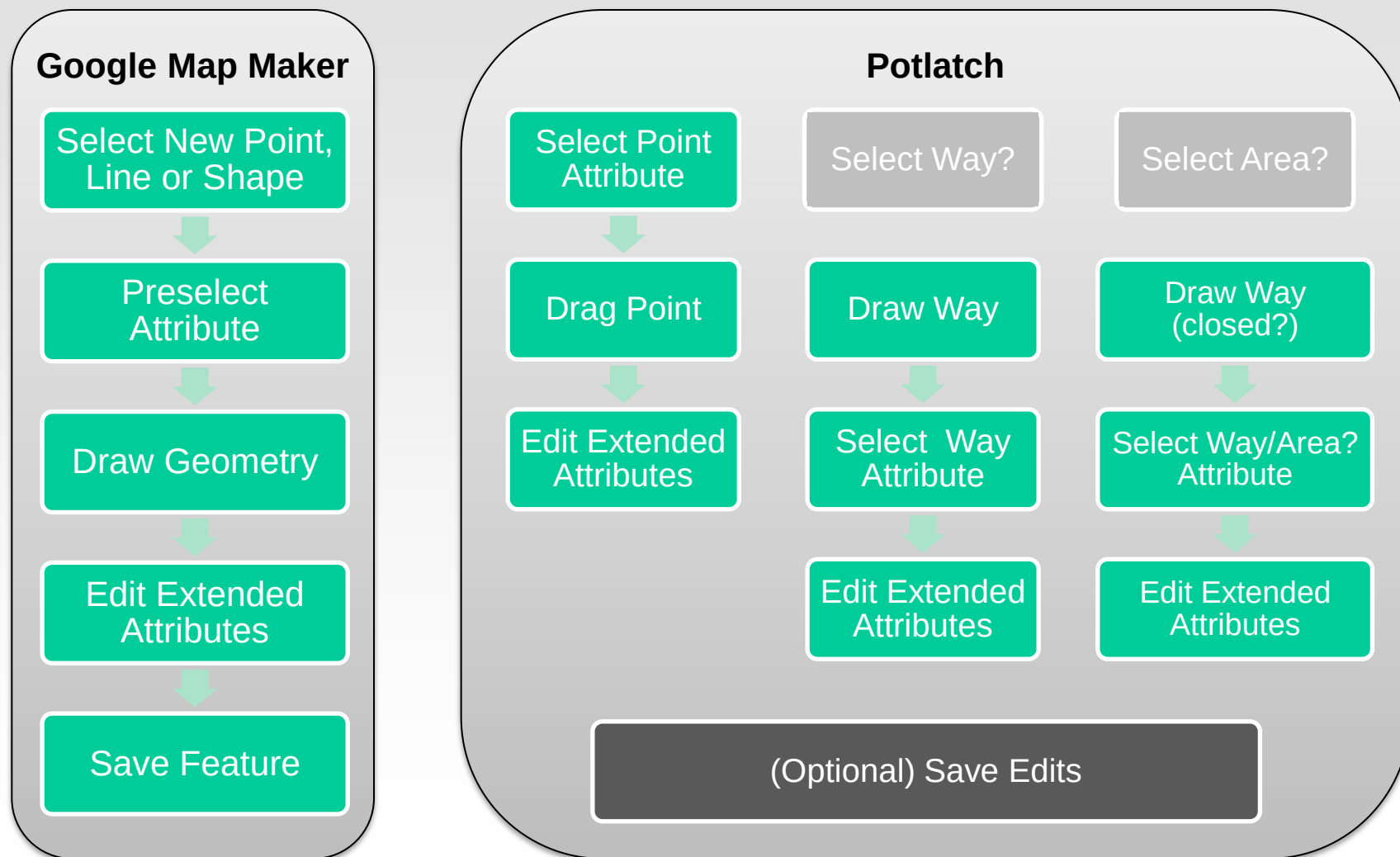


Consistency of concepts and terminologies



ESRI	OSM	Google Map Maker
Point	Node	Point
Line	Way	Line
Polygon	Closed Way (area=yes)	Shape

Conceptual Editing Processes

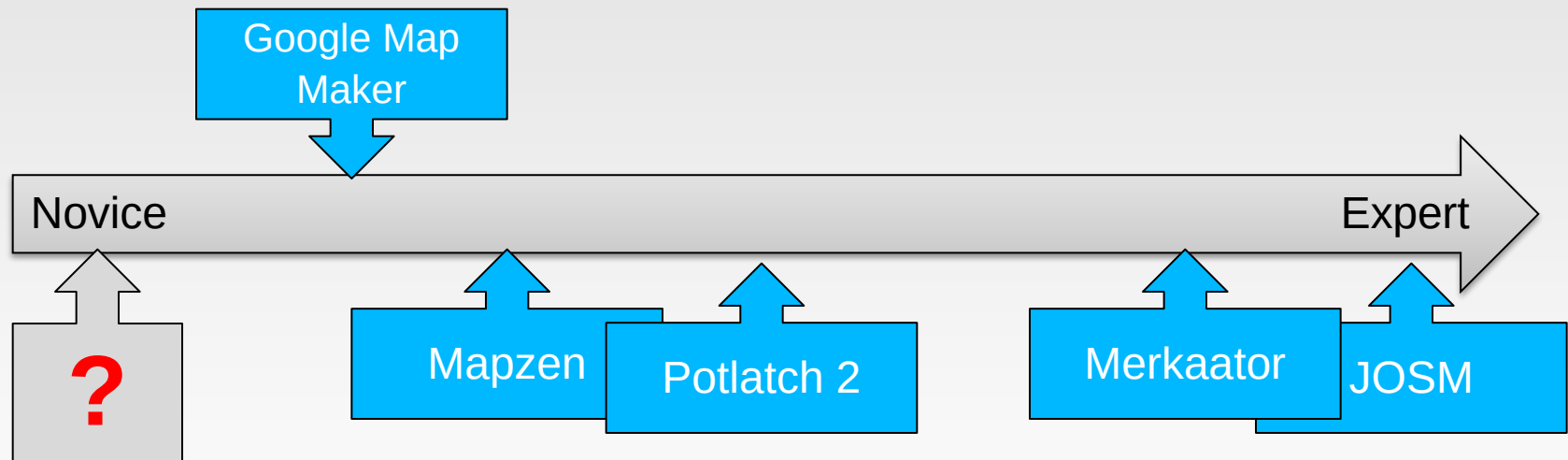


CONCLUSIONS

Post Experiment Survey Results

- No clear consensus on questions related to ease of learning and user satisfaction
 - They neither agreed or disagreed with statements related to learnability & satisfaction
 - In HCI literature tendency is for users to blame themselves
- Users disagreed with statements related to ease of use
 - But they really liked drag and drop

Conclusions: Continuum of editors



Conclusions

- Developing usable applications that incorporate advanced GI concepts is possible
- But necessitates constant feedback loop of usability evaluation
- Usability testing can be done easily, but needs time and analysis
- **Future work:**
 - More robust indepth data analysis from experiment
 - Detailed comparison of other geoweb interfaces vs trad GIS interfaces
 - Comparison of different devices: desktop/mobile/tablet

Thanks go to: Dr Muki Haklay, Prof Angela Sasse, Charlene Jennet

Contact: Dr Catherine Jones & Dr. Patrick Weber

www.spatialknowledge.eu Research blog

www.jiscg3.blogspot.com JiscG3 project



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@petzlux

Usability evaluation is not hard!

Material needed: Quiet Room with a PC (or other device if that is where your app is running on)

Get hold of some **representative users**, preferably novices.

Ask the users to perform representative tasks with the design.

Observe what the users do, where they succeed, and where they have difficulties with the user interface. **Shut up and let the users do the talking.**

<http://www.miratech.com/blog/user-testing-iPad-vs-computer.html>

Average time spent browsing

It takes **a minute longer** to perform **the same task** on a standard website when **using an iPad!**

2'43



iPad app

2'49



Website on a computer



3'53



Website on an iPad

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