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PRESENTATION
FROM THE

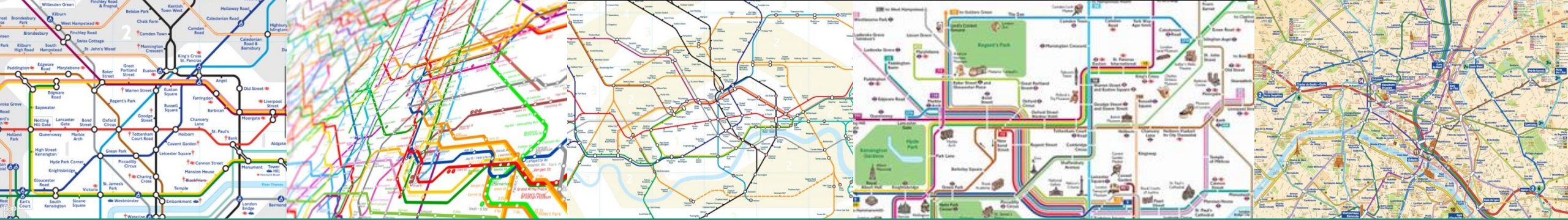
ICA JOINT WORKSHOP



Olomouc
Czech Republic
April 27–30, 2018

Atlases & Cognition & Usability





CLASSIFYING THE DIVERSITY OF BUS MAPPING SYSTEM

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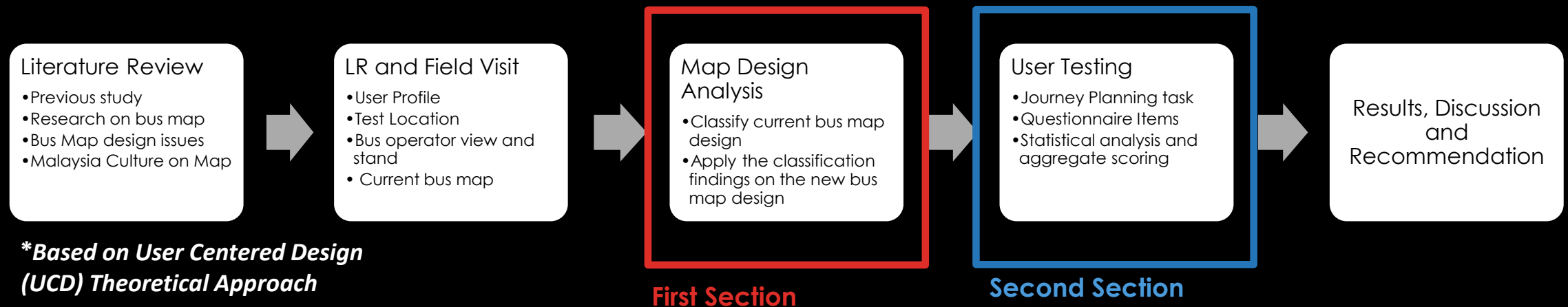
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Presentation Contents

First Section,
Classifying the Diversity of Bus Mapping System

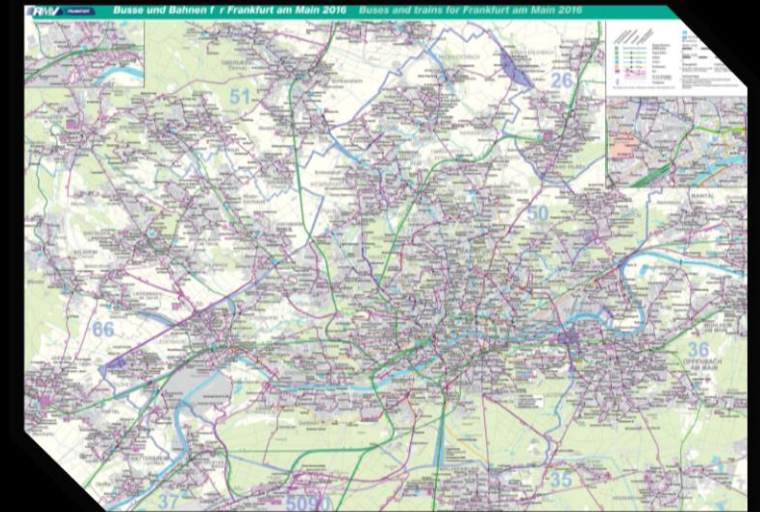
Second Section,
Improving the Bus User Experience and the Bus Information Provision Through Map



Introduction

Classifying the Diversity of Bus Mapping System

- Bus maps play an important role in portraying bus routes and other information for public transport users.
- Users need to know what, where, and when availability of the bus services.
- The task of properly formulating and presenting adequate of information in just a single map may not be an easy task.
- Better understanding of the variation, means better perspective for mapmakers during the map design process.



First Level of Distinction

THE GEOGRAPHICAL APPROACH MAP DESIGN

Use information and design of a topographic / street map as the basis.

no significant distortion - bus routes follow the original shape of natural and man-made features

most popular choice in designing bus map (before the year 2000)



SCHEMATIC MAPS DESIGN

Depicts the bus route in various straight line forms. Either in horizontal, vertical or at 45 degrees declination (Morrison 1996).

Well known and clearly effective for metro systems.

Surge of usage starting from year 2010



Analysis Flowchart

Classifying the Diversity of Bus Mapping System

Geographical Approach

Schematic Approach

First Section

Full Network

Main Road

Bus Route

Full Schematic

Semi Schematic

Differentiate between modes

Differentiate between bus services

Level of background information

Landmark Appearance

Visual Hierarchical Level

Second Section

North Sign

Grid

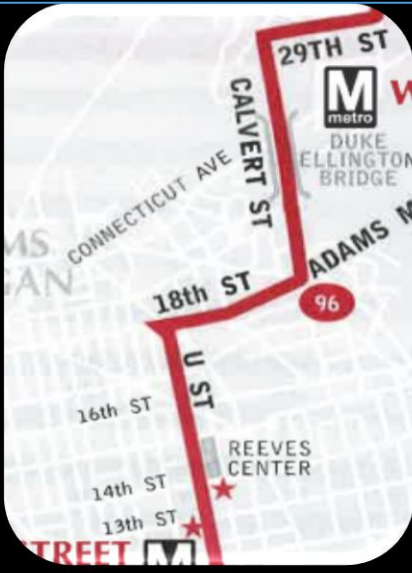
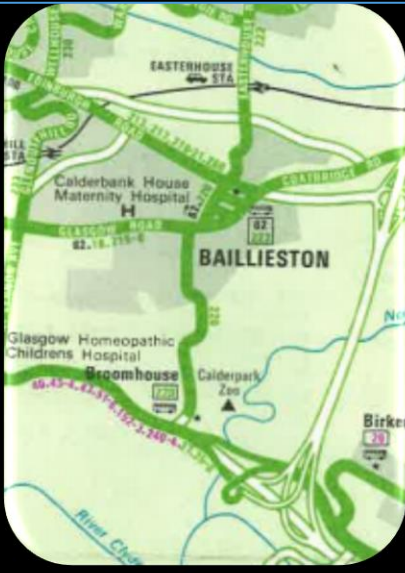
Inset Map

Scale

Legend

Type of Geographical Approach Bus Map

FULL ROAD NETWORK	MAIN ROAD ONLY	BUS ROUTE ONLY
<p>most popular style</p>	<p>only main roads are shown</p>	<p>look similar to the 'Main Road Only'</p>
<p>takes the main features of a topographic map</p>	<p>Other major features may included but not all.</p>	<p>The texts, numbers and label are only placed on the bus service's road.</p>
<p>puts all the information as background</p>	<p>The bus services numbers are placed alongside the roads to help users identified the bus services lines</p>	<p>Bus routes are the only features Background information vary</p>



Services differentiation from other modes (Geo Bus Map)

COLOUR

Used in the bus map that shares with the other transportation modes

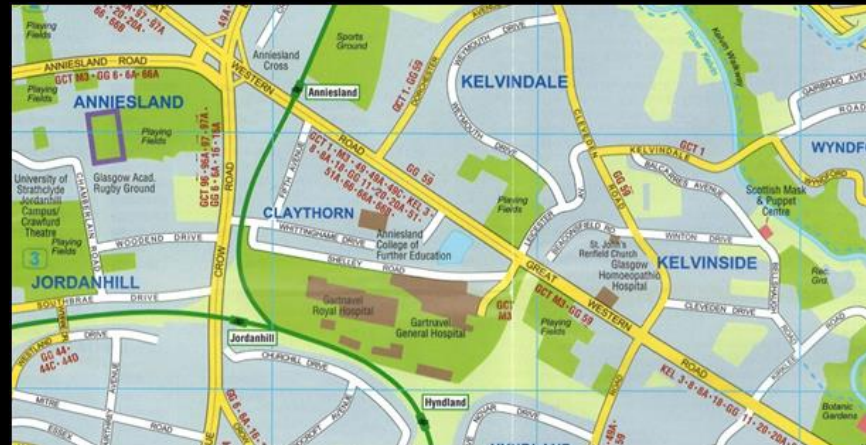
Easiest choice for cartographer to create a distinctive representation for each transportation mode (various range of colour)



COMBINATIONS OF COLOUR AND LINE STYLE

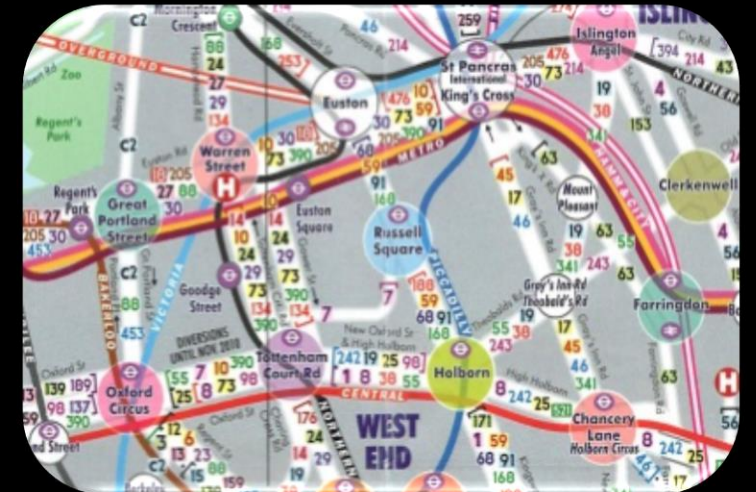
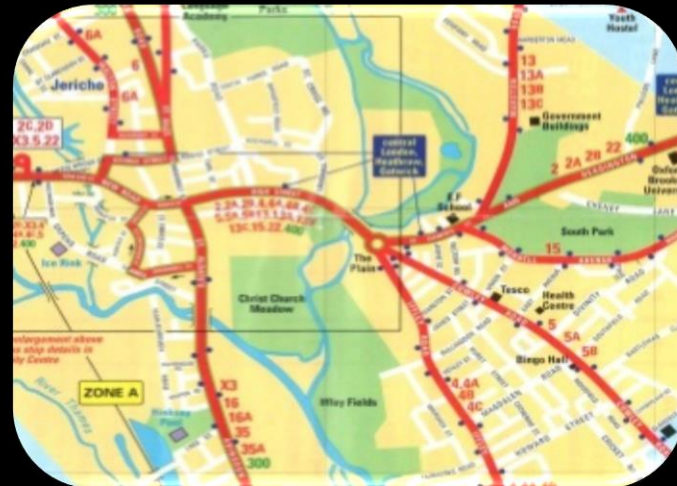
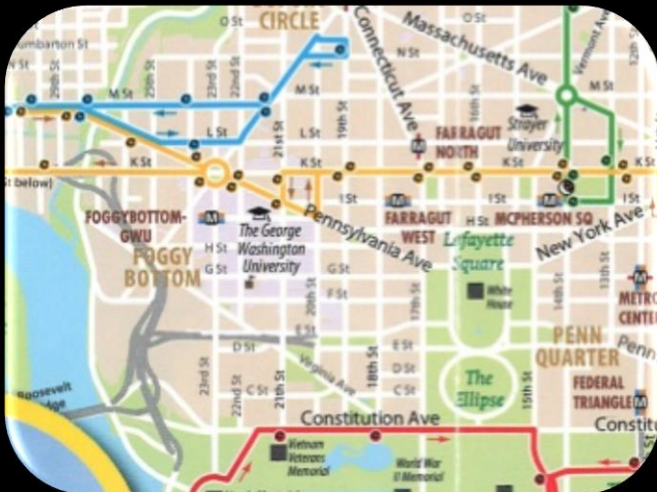
Gives more options to the map maker to differentiate the modes.

The distinctive line styles of each mode make the difference clear to the user.



Services differentiation from other services (Geo Bus Map)

COLOUR	NUMBER OR TEXT	ROUTE NUMBER AND COLOUR
most commonly used to distinguish	As the number of services increases, variations in colour or style become insufficient.	The distinctive aspect is in the colour of the service's number.
the only feature that changes, Other feature remained	widely used prior to year 200	Every road being used as the bus service route has bus service numbers
Individualized each services with each colour	Service numbers placed above the lines, which have the same colour as the bus routes.	The numbers are coloured based on the respective bus service.



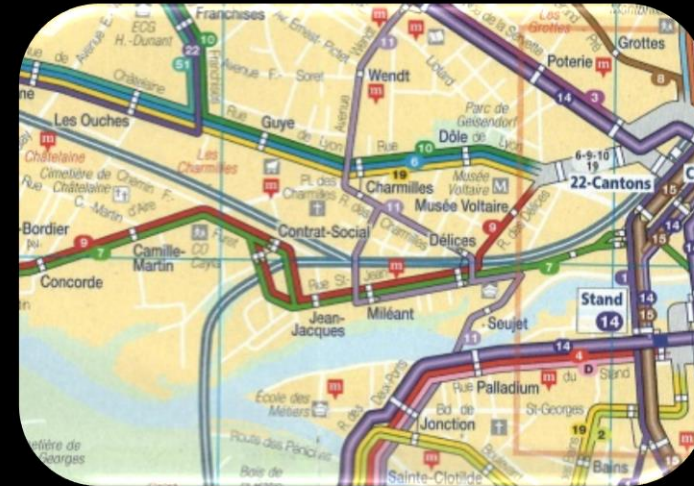
Level of Background Information (Geo Bus Map)

GRIDS

Always seen in national topographic maps.

Not widely used a bus maps.

Only useful if it is used to index information on the map

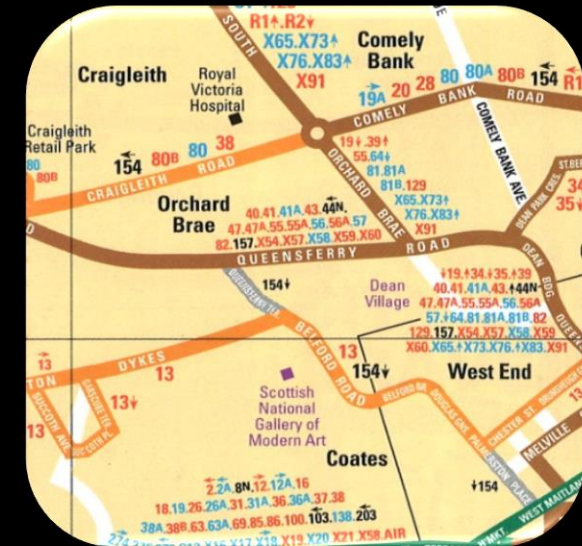


VISUAL HIERARCHY

A large bus map consist of various coloured routes, multiple line styles and many numbers to differentiate routes.

These features appear against a background which will affect their visibility and legibility.

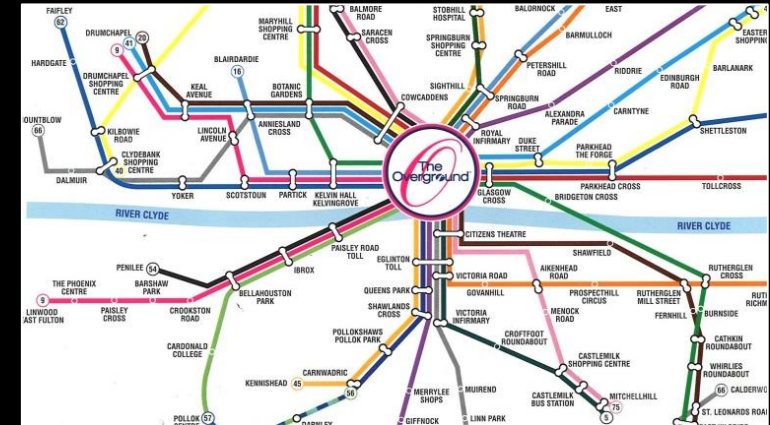
The bus services line should be at the top of this hierarchy to highlight the main purpose of the map.



Type of Schematized Approach Bus Map

FULL SCHEMATIC DESIGN

- retain topology (connections) but vary scale to such an extent that geography becomes highly distorted
- cartographer they tend to use the fully schematized approach rather than semi-schematized approach



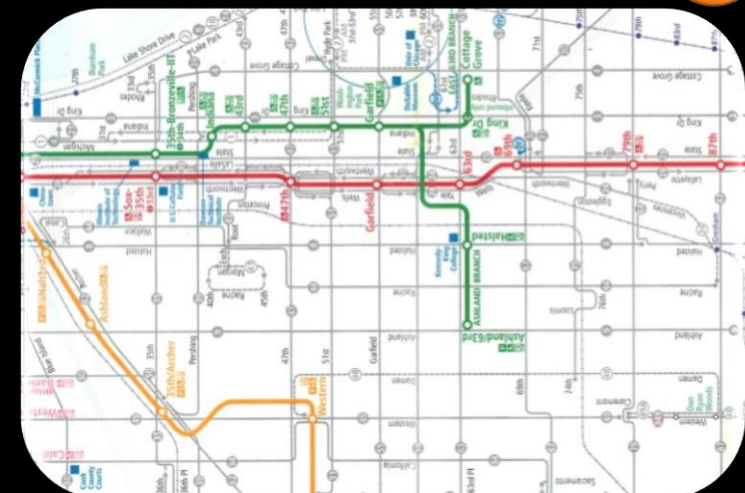
SEMI-SCHEMATIC DESIGN

- merges elements of the schematic map to locally simplify the representation
- retains an overall geographically-correct approach.
- a compromise between a fully schematic map and truly realistic geographical representation.



Services differentiation from other modes (Schematized Bus Map)

COLOUR	LINE SHAPE	COMBINATION OF TWO APPROACH
Used in the map that shares with the other transportation modes	The least used feature to differentiate transportation modes	Most widely used
Give various range of colour to use by cartographer.	Both the train and bus systems are represent by the same colour the only distinctive appearance is the line style (thicker and narrower).	gives a lot of options for cartographers to provide a distinctive appearance to several transportation modes



Services differentiation from other services (Schematic Bus Map)

COLOUR

wide range of colours are used to represent bus services

different colour is used for each service.

LINE SHAPE

second most used method to differentiate bus services in schematized bus maps.

bus services are represente by the same colour. (need to read the number above the lines to know which services)



Level of Background Information (Schematic Bus Map)

VISUAL HIEARCHY

Semi-Schematic Bus Map

may adopt the design and style use in geographically correct maps

presence of hierarchical levels can be seen in all semi-schematic maps examined.

Schematic Map

mainly focus on the route only

no background information other than major water bodies.

Users need to refer to other maps to locating the exact position.



GRIDS

Not extensively used in schematized bus maps.

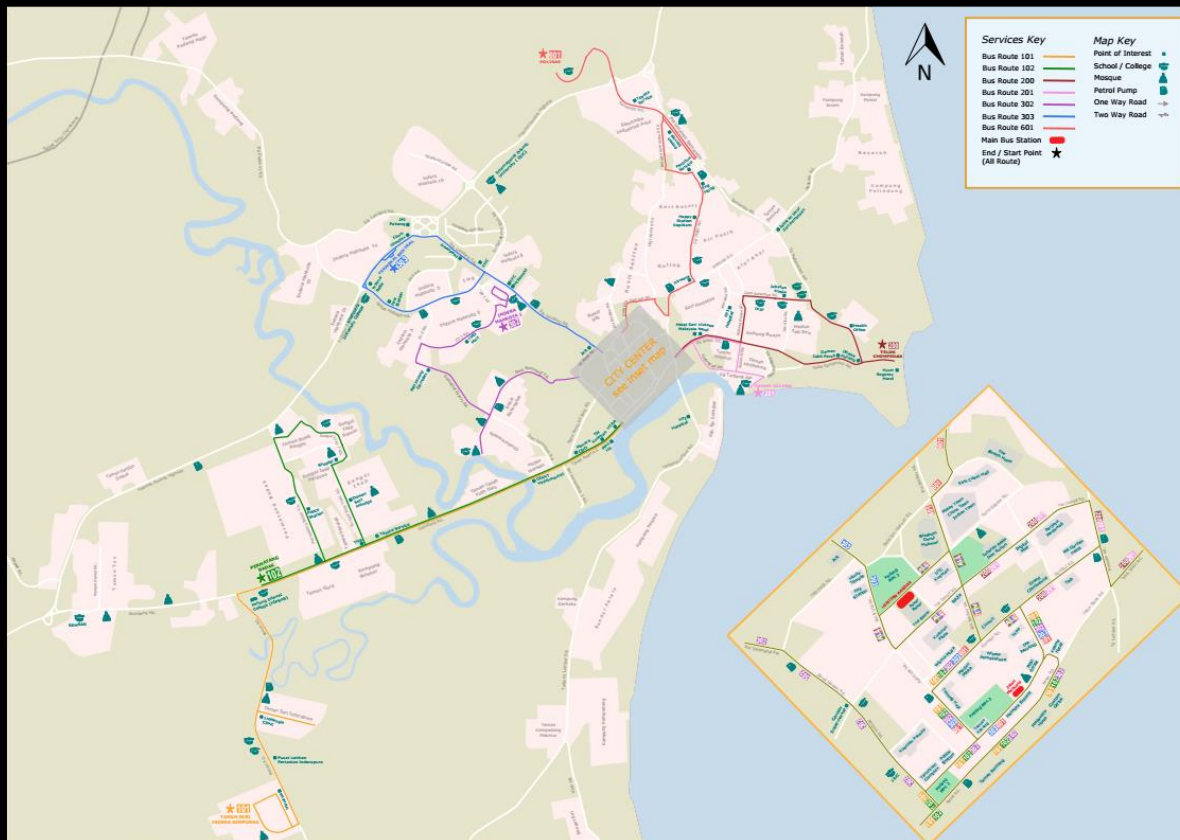
already have a high degree of distortion during the schematization

adding a grid may not give any help in determining locations.

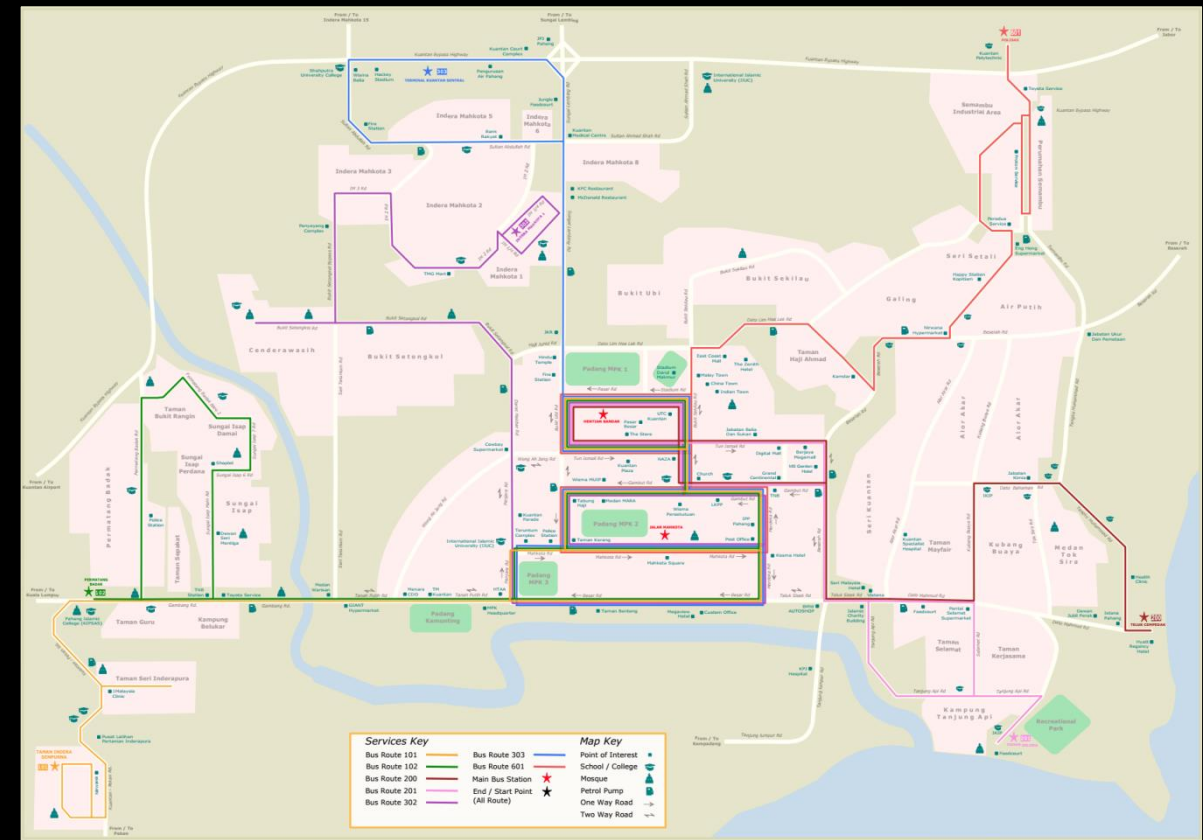


Map Use For User Testing

- Produce a new design of whole-network bus maps that can enhance the user experience in planning the bus journey.
- Investigation of landmark incorporation in bus maps.



Geographically-Correct Bus Map Design



Semi-Schematic Bus Map Design

User Studies Preliminary Results

Respondent Sample Profile

Gender

Gender	Number
Male	54
Female	46

Respondent Age

Age (Years Old)	Number
18-24	58
25-34	17
34-49	20
50-64	5

Travel Options

Items	Yes	No
Availability of Driving and Riding License	81	19
Access to a car / motorcycle	95	5

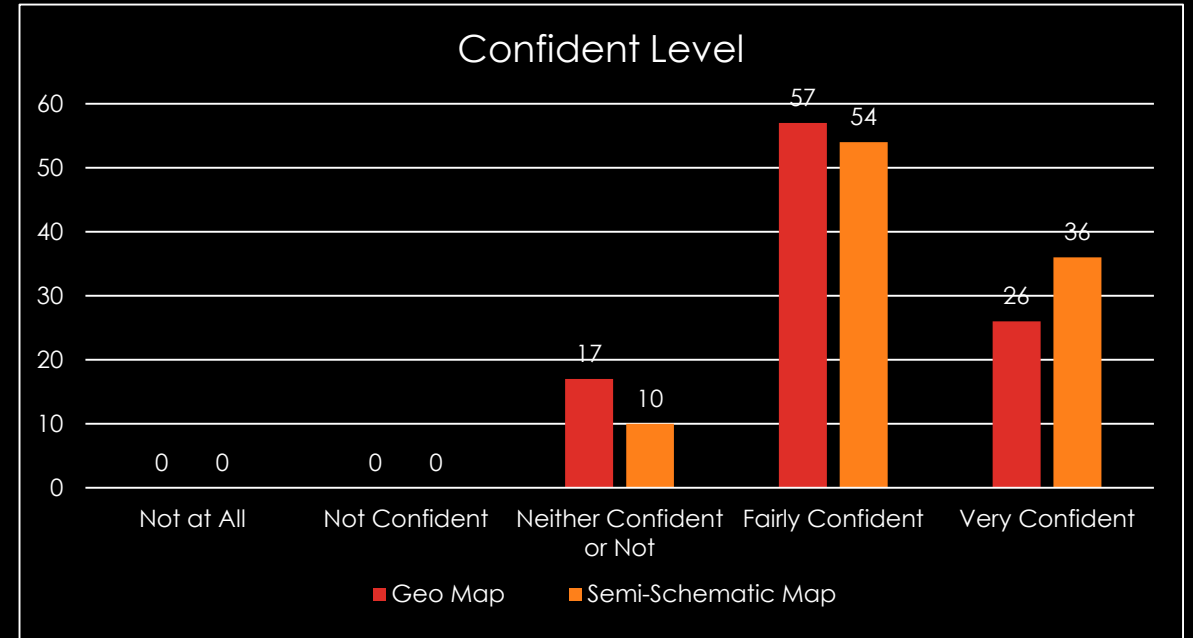
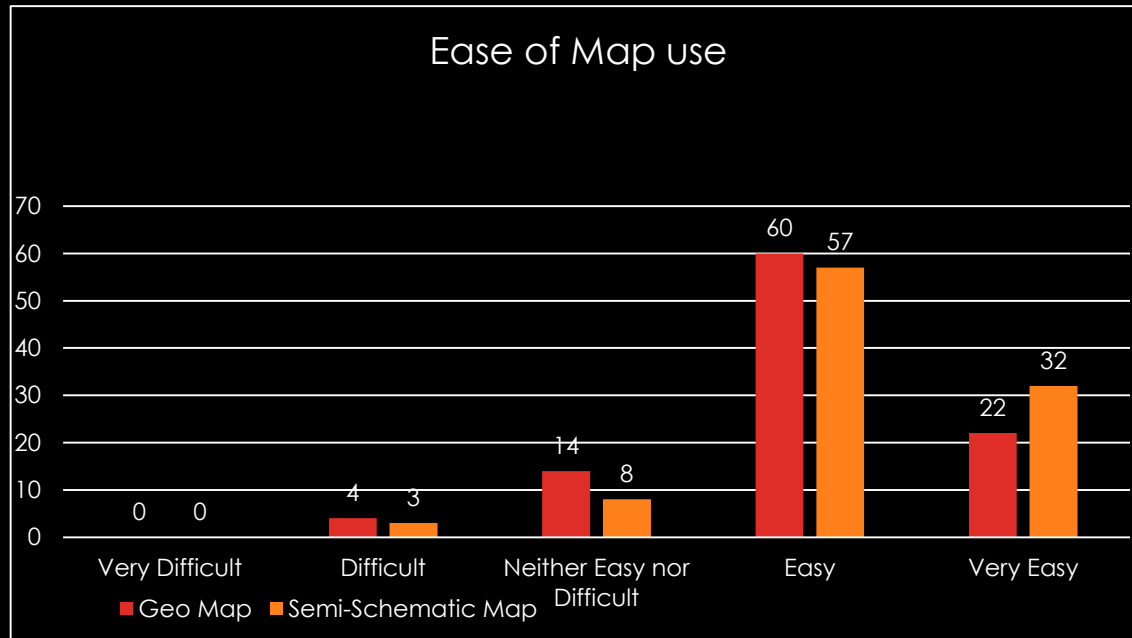
Current Bus Use Profile

Bus Usage Experience	Number
Yes	86
No	14

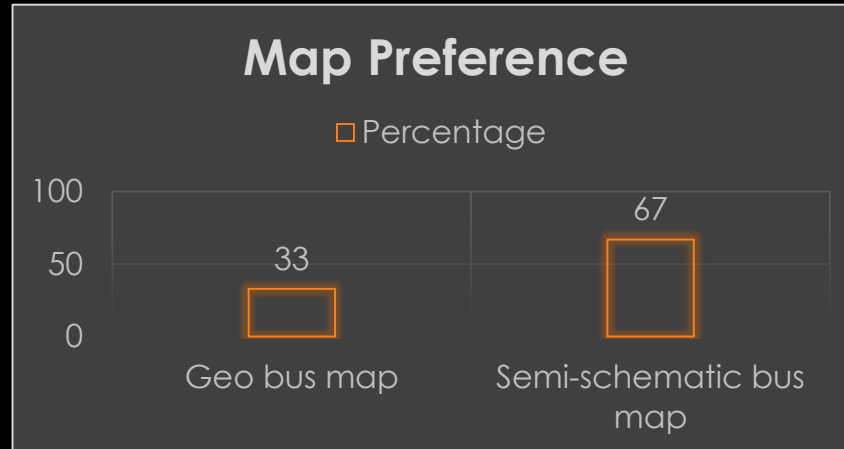
Bus Usage Frequency	Number
Never	14
Once per month	47
Thrice or twice per month	22
Once or twice per week	8
More than thrice per week	9

Other Transport Usage	Number
Yes	63
No	37

User Studies Preliminary Results



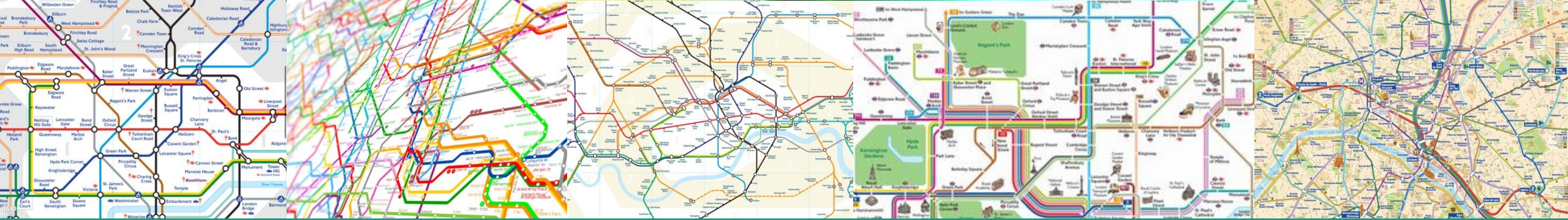
User Studies Future Analysis



1. Analysis of map preference by sample profile (gender, age group, current bus use profile)
2. Analysis of map effectiveness (answer correctness, ease of use rating and confidence level rating) by sample profile.
3. Analysis of map effectiveness by map preference selection
4. Analysis on landmark incorporation in bus map

Conclusion

- Analysing and classifying in detail the current cartographic approach of a bus map design is indeed a challenging process
- The resulted classification developed have help to identify the particular consideration that should be taken into account when designing a bus map in a specific context.
- Facilitate more in depth investigations into the details of cartographic design with respect to different in map cultures and local aspect value in any specific region.



THANK YOU

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