Department of Information Studies
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Welcome to this SIE, we will start shortly

Putting information behaviour on the cognitive map: exploring information seeking behaviours of academic researchers

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Before the start

- Timeline:

11:30-12:00 Introduction & background
12:00-12:20 Cognitive mapping practice
12:20-12:35 Online discussion
12:35-12:50 Q&A; summary

- Use the Chat or ‘raise your hand’ to discuss or ask any questions

Origin of cognitive mapping

- Cognitive mapping, a term which was first introduced in 1948 by psychologist Edward Tolman who did research on finding how cognitive map helps human and animals find their way in a complicated environment differently (Tolman, 1948).

- Derived from psychology field, it is also applied in geography and ethnography research to learn about the relationship between human and the surrounding environment.

The term “Cognitive mapping”

- A method that is used to get visual representations on the way users utilize or think about a certain resource or place (Bullingham, 2015).
- In the field of social science, it is used in a more general way to map how people understand the world (Pinch, Sunley, & Macmillen, 2009).
- **“Cognition”:** the way people perceive and interpret events; and it’s also a process of refining information (Rosenthal & Zimmerman, 1978).
- **“Map”:** process of forming the cognition of the outsider environment and the representation of such cognition (Downs & Stea, 2011).

Cognitive mapping in LIS field

Donna Lanclos:

- “the anthropologist in the stacks”
- Anthropologist view on library user experience

Successful application in the library:
ERIAL Project
(Ethnographic Research in Illinois Academic Libraries)

- Ethnographic techniques in academic library

Why “Cognitive mapping”

- Generate data in a very short time;
- Good way to elicit the topic;
- participant make direct contribution in a speedy way (participative relationship), they generate the research output directly and there is no wrong result;
- easily adaptable to difference context and research topic;
- the usage can be in diverse forms and it can be adapted with different research methods;
- it is an effective approach of stimulating dialogue and exploring relationships (Emmel, 2008).

How to?

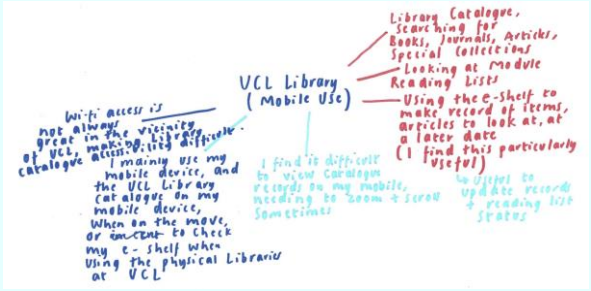
- Think carefully about the direction you give to participants
- Draw your conception on a piece of paper
- Use three different color pens in 6 minutes
- **Change the color** of the pen in every 2 minutes

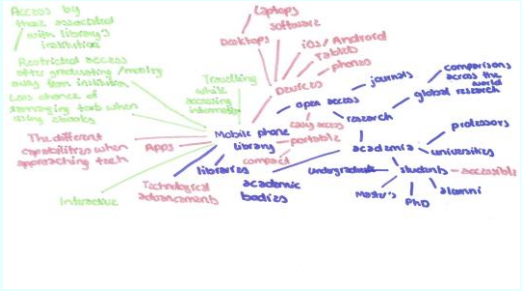
(Asher & Miller, 2013)

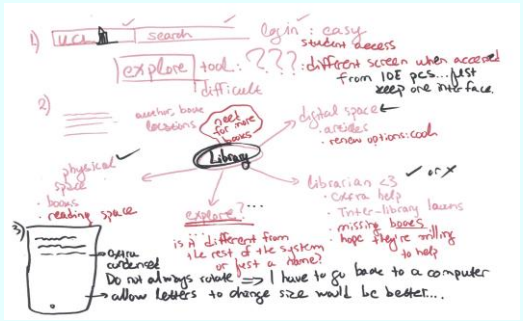
https://www.freepik.com/free-photo/huge-set-colorful-pencils-white-table-background-top-view_1174344.htm

Notice

- There’s no right or wrong way to draw up thoughts
- Can include words, texts, keywords, phrases, abbreviations, characters, rough scribbles, or diagrams







Interview as a supplement

- a supplement to cognitive mapping that gives participants space to explain or elaborate on their behaviour or the maps they produce

- questions asked can be moved around and added along with the responses from participants (Priestner & Borg, 2016).

https://builttoadapt.io/how-to-use-topic-maps-to-run-generative-user-interviews-fbbd9b74b554

Map analysis technique-Qualitative thematic analysis

Thematic analysis is “a method for identifying, analysing and reporting patterns (themes) with data” (Braun & Clarke, 2006, p. 79)

- Identify elements from cognitive maps (keywords, objects, items and concepts)
- Generate a set of elements
- Group elements into categories (by theme or research question)

Map analysis technique-Coding visual elements

Coding is “a process of identifying aspects of the data that relate to your research question” (Braun & Clarke, 2013, p. 206)

- Identify elements from cognitive maps (keywords, objects, items and concepts)
- Organize elements that can form a complete meaning into groups
- Discover relations between groups
- Focus on spatial relations and how they formulate the map

Map analysis technique-Quantitative counting

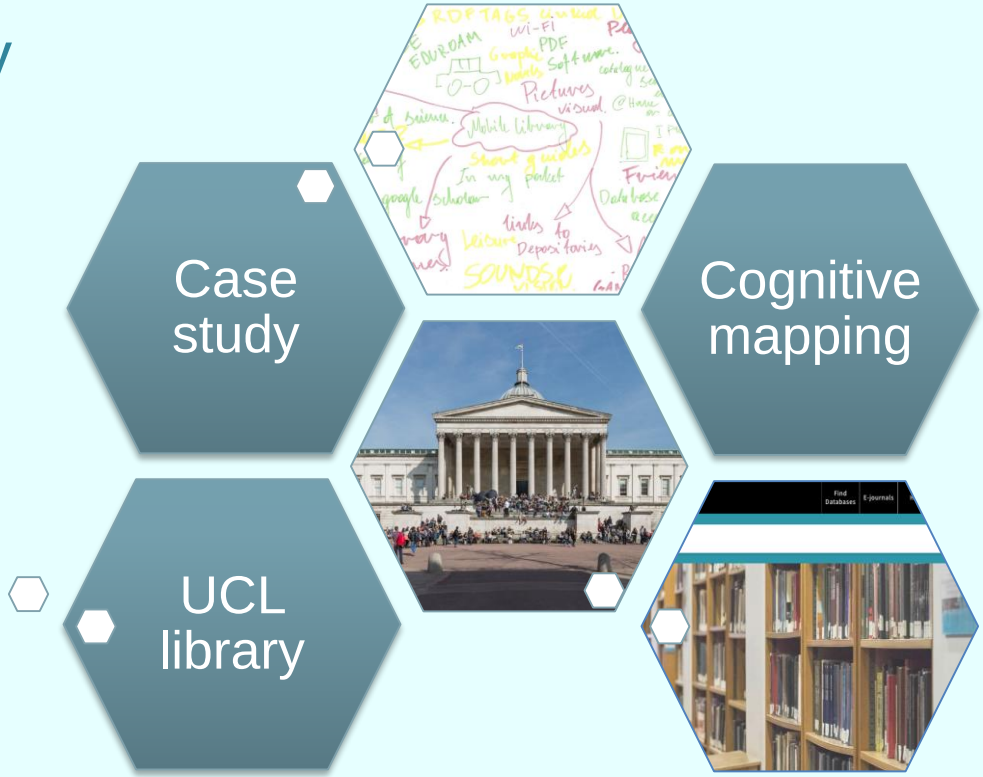
- Identify elements from cognitive maps (keywords, objects, items and concepts)
- Calculate the frequency of each element and create indexes to sort them based on their frequency and their occurrence sequence (mean position) in the drawing
- Calculate the F/P index

(Asher & Miller, 2013).

$$F/P = \frac{Frequency}{Mean\ position}$$

$$Mean\ position = \frac{Color\ A + (2 * Color\ B) + (3 * Color\ C)}{Frequency}$$

A Case Study

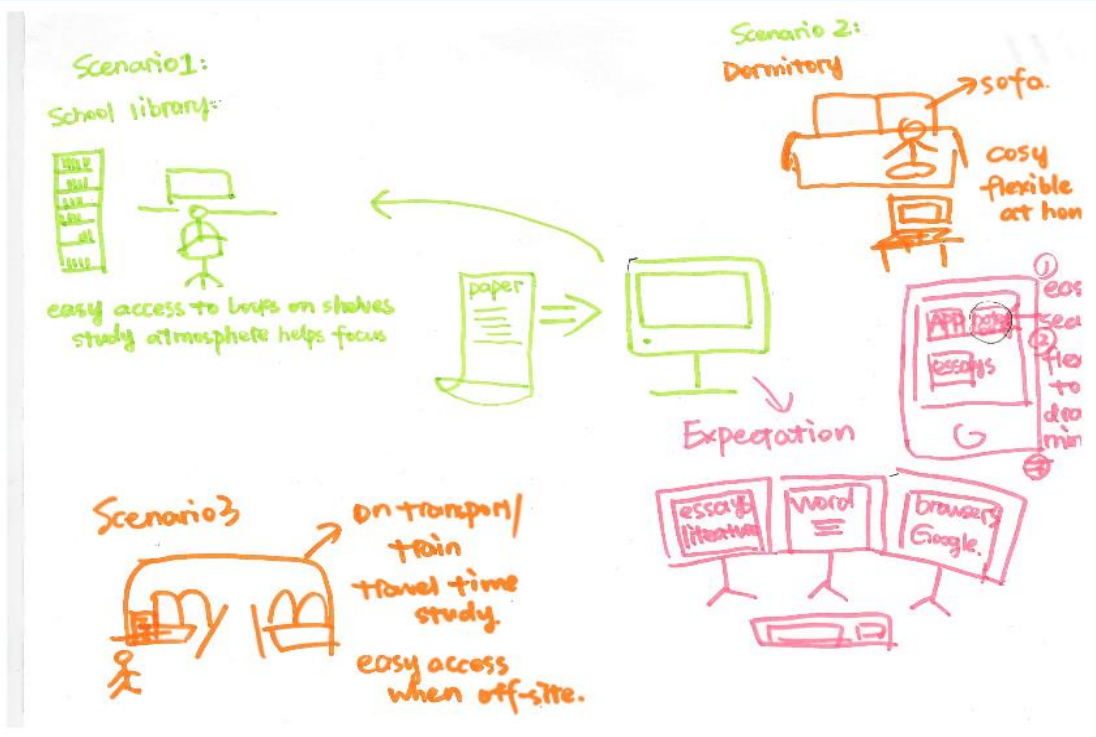

Case study
Cognitive mapping
UCL library
Pictures
Mobile Library
Find Databases
E-journals

Theme of drawing

“perceptions, usage and expectations of digital library”

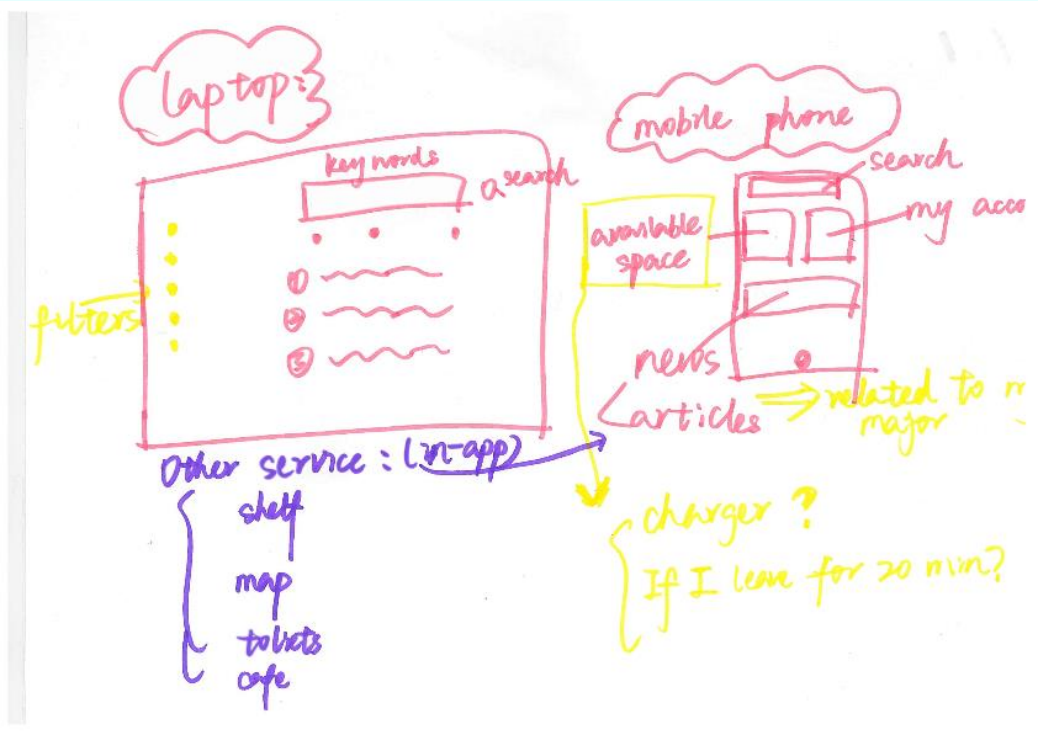
To explore:

- Information seeking behavior
- User experience
- Context: digital library



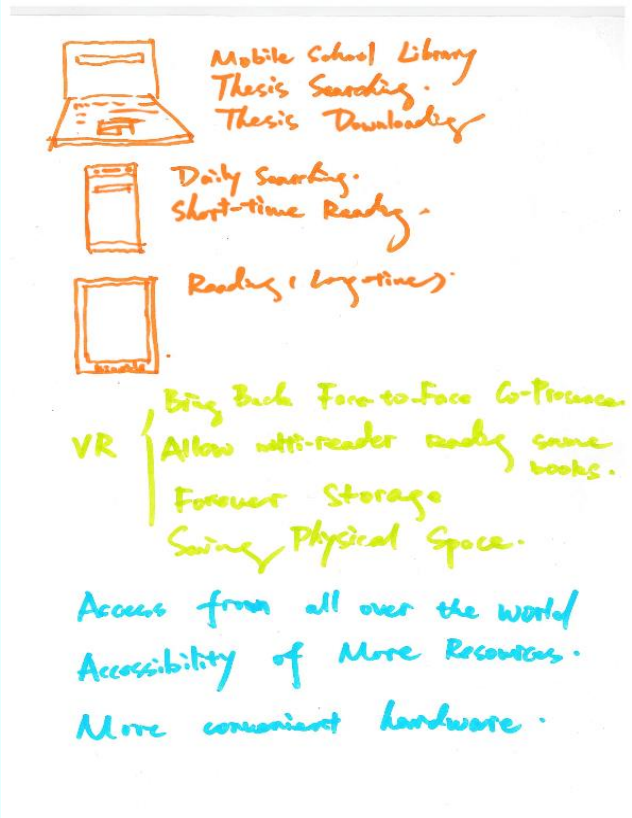
- Context-organised
- Core: academic tasks
- Average portion of three colors

First: green; second: orange; third: red



- Device-organised
- On laptop: academic searching, retrieving
- On mobile phone: checking, library service information

First: red; second: purple; third: yellow

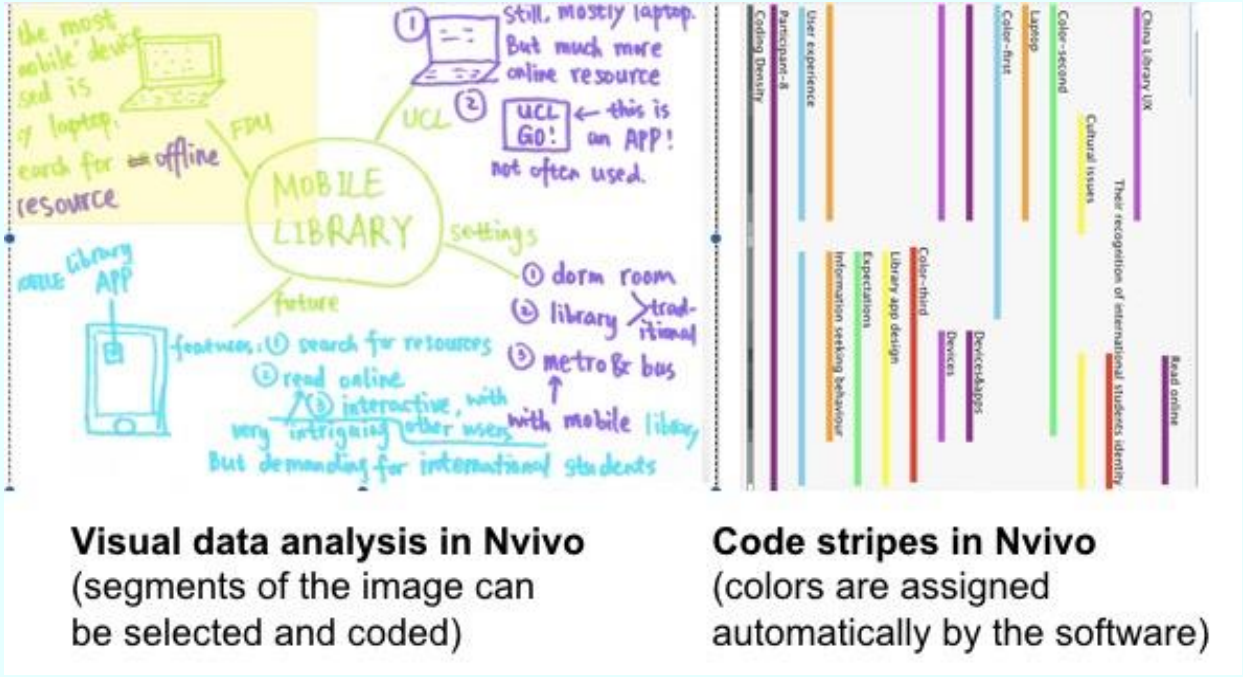


- Laptop: searching & downloading
- Mobile phone: daily searching, short-time reading
- Reading device (Kindle): long-time reading

- Expectation: VR experience to engage with library resources

First: orange; second: green; third: blue

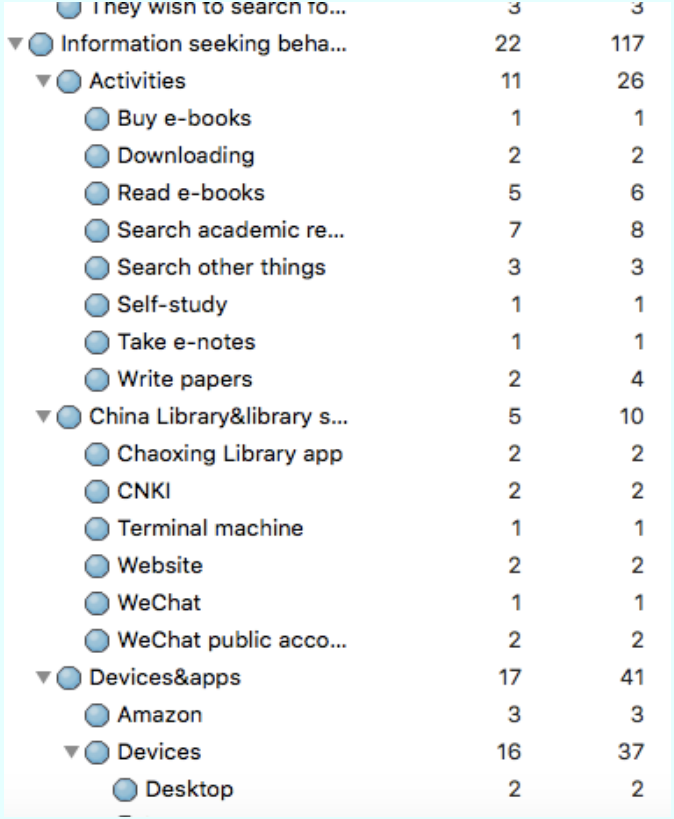
Data Analysis



Visual data analysis in Nvivo
(segments of the image can be selected and coded)

Code stripes in Nvivo
(colors are assigned automatically by the software)

Code tree



They wish to search fo...	3	3
Information seeking beha...	22	117
Activities	11	26
Buy e-books	1	1
Downloading	2	2
Read e-books	5	6
Search academic re...	7	8
Search other things	3	3
Self-study	1	1
Take e-notes	1	1
Write papers	2	4
China Library&library s...	5	10
Chaoxing Library app	2	2
CNKI	2	2
Terminal machine	1	1
Website	2	2
WeChat	1	1
WeChat public acco...	2	2
Devices&apps	17	41
Amazon	3	3
Devices	16	37
Desktop	2	2

F/P index table

Name of code	Type of code	Files (n/15)	Frequency	Mean position	F/P
Information seeking behaviour					
Activities	Sub category				
Search academic resources		4	4	1.75	2.29
Read e-books		3	4	2.25	1.78
Search other things		2	2	1.5	1.33
Devices & apps	Sub category				
Laptop		7	8	1.38	5.8
Mobile phone		6	6	1.17	5.13
Desktop		2	2	1	2
iPad		1	2	1	2
Kindle		3	4	2.5	1.6
Devices		2	2	1.5	1.33

Questions & Practice time (20 minutes)

- *Any questions so far?*

Prepare

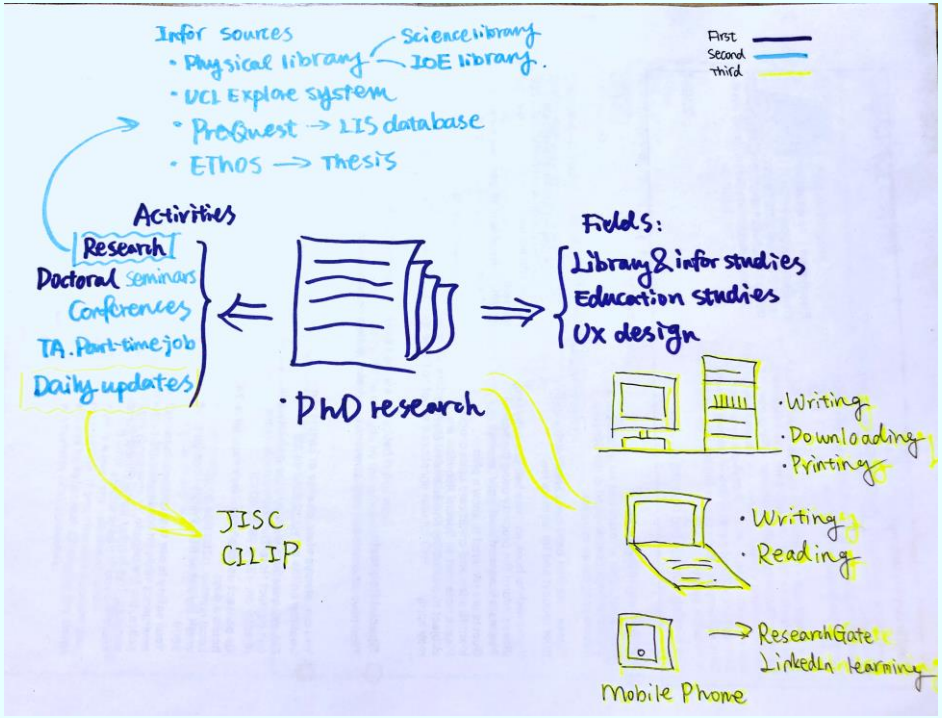
- a piece of plain paper
- three colored pens

Practice time! (20 minutes)

Please draw a cognitive map in 6 minutes by 3 colored pens
I will give you signs to **change pen color in every 2 minutes (if you have them)**

Topic of drawing:
Your information seeking behaviour as an academic researcher

Welcome to share your cognitive map on social media, by using #iconf!



Welcome to share your cognitive map on social media, by using #iconf!

Discussion time (15 minutes)

Now discuss with each other:

- What did you draw in the cognitive maps?
- How you expressed yourselves by drawing?
- What did you draw first and what did you add at the last minute?
- Is the 6 minutes enough to express what you want to express?
- How the cognitive mapping can be used to learn about information behaviour?
- How cognitive mapping can be used in your field and research?

Welcome to share your cognitive map on social media, by using #iconf!

Q&A

https://www.shutterstock.com/zh/image-photo/thinking-cat-questions-mark-above-against-208701973

To close

Strength

- A speedy way to generate data
- Adaptable to different research contexts
- Can be analysed from diverse perspectives

Weakness

- Difficult and time-consuming data analysis process
- Complementary techniques should be used along

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References

Asher, A., & Miller, S. (2013). So You Want to Do Anthropology in Your Library? or A Practical Guide to Ethnographic Research in Academic Libraries. Retrieved from http://www.erialproject.org/wp-content/uploads/2011/03/Toolkit-3.22.11.pdf

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101.

Braun, V., & Clarke, V. (2013). Successful qualitative research: A practical guide for beginners. sage.

Bullingham, L. (2015). The Library of the Mind. Retrieved 5 December 2017, from https://www.canva.com/design/DABVoBr4wYY/view

Downs, R. M., & Stea, D. (2011). Cognitive Maps and Spatial Behaviour: Process and Products, The Map Reader: Theories of Mapping Practice and Cartographic Representation.

Emmel, N. (2008). Participatory Mapping: An innovative sociological method.

Priestner, A., & Borg, M. (Eds.). (2016). User experience in libraries: applying ethnography and human-centred design. Routledge.

Pinch, S., Sunley, P., & Macmillen, J. (2010). Cognitive mapping of creative practice: A case study of three English design agencies. Geoforum, 41(3), 377-387.

Rosenthal, T. L., & Zimmerman, B. J. (2014). Social learning and cognition. Academic Press.

Tolman, E. C. (1948). Cognitive maps in rats and men. Psychological review, 55(4), 189.