An accessibility-first GIS framework for customizable, real-time outdoor/indoor wayfinding

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Research Question

What does an integrative approach to examining the factors affecting transportation equity imply for the structuring of GIS data standards for customizable, real-time outdoor/indoor wayfinding, as applied to the case study of college campuses?

Background

Purpose

Personal mobility in the built environment has been extensively explored by multiple fields of study, but practitioners are still uncertain what information to collect to close informational gaps and knowledge barriers to facilitate route-finding and navigation, particularly for people with disabilities. This project thus aimed to provide a framework for accessibility-first map data collection aimed at defining good attributes to collect via crowdsourcing real-time information, applied specifically to college campuses as a case study.

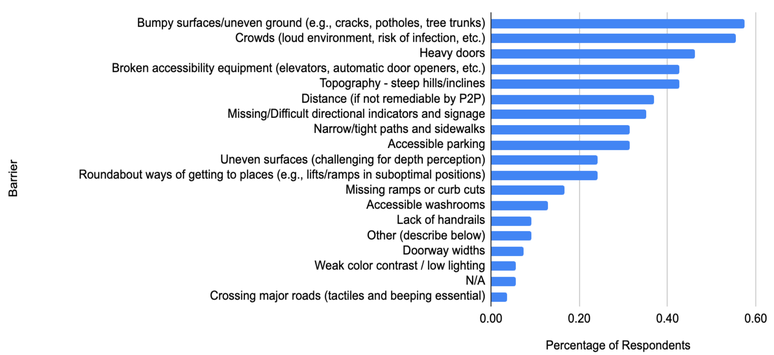
Preliminary Focus Groups, Survey

A preliminary understanding of wayfinding practices and barriers faced by people with disabilities on a representative US college campus was garnered via focus groups, continuous feedback, and a survey of students affiliated with disability services (*N* = 54).

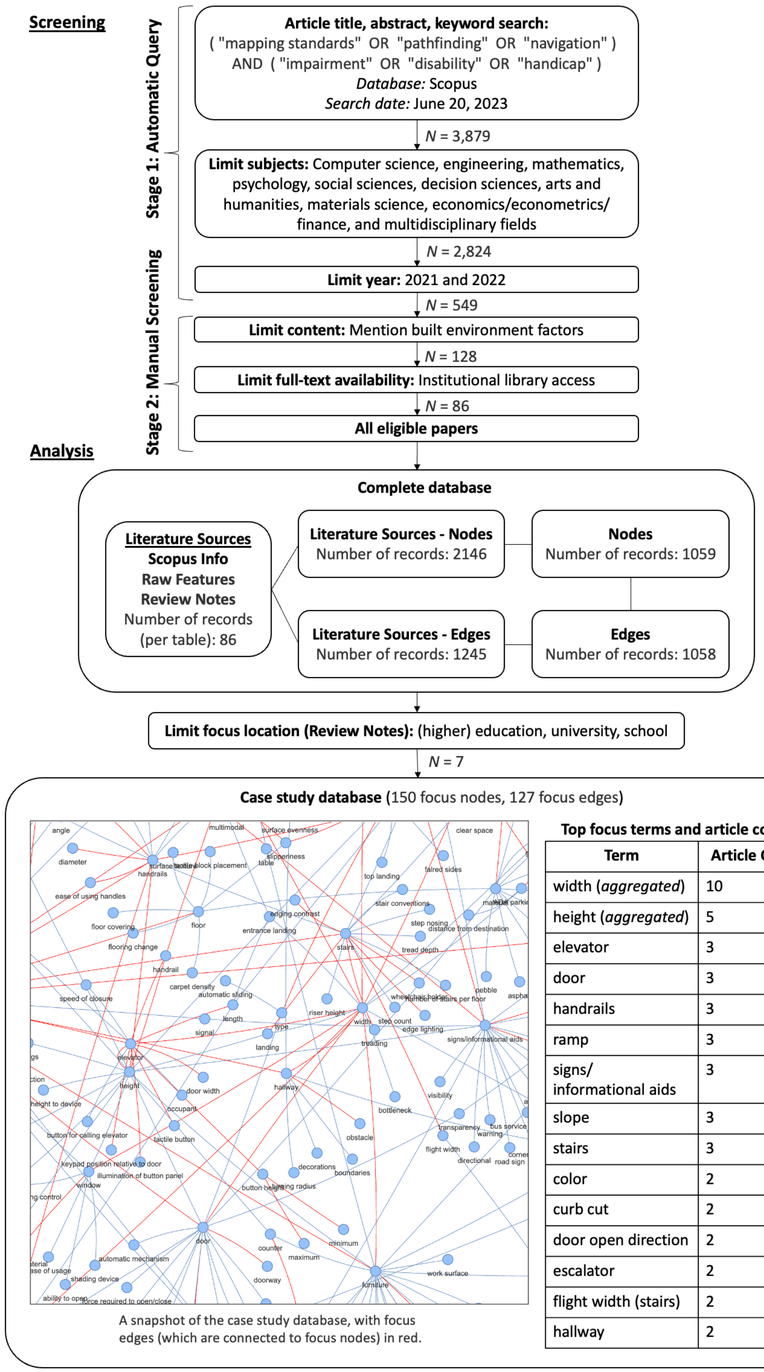
Focus Group Themes

- Importance of public availability of data, extensibility
- Campus paths to classroom buildings as primary concern, followed by classroom building indoor pathways, other buildings (campus health, surrounding restaurants and off-campus housing)
- Desired interoperability with college campus data

Barriers on the UNC-Chapel Hill Campus



Methods & Results



A snapshot of the case study database, with focus edges (which are connected to focus nodes) in red.

Top focus terms and article counts

Term	Article Count
width (*aggregated*)	10
height (*aggregated*)	5
elevator	3
door	3
handrails	3
ramp	3
signs/ informational aids	3
slope	3
stairs	3
color	2
curb cut	2
door open direction	2
escalator	2
flight width (stairs)	2
hallway	2

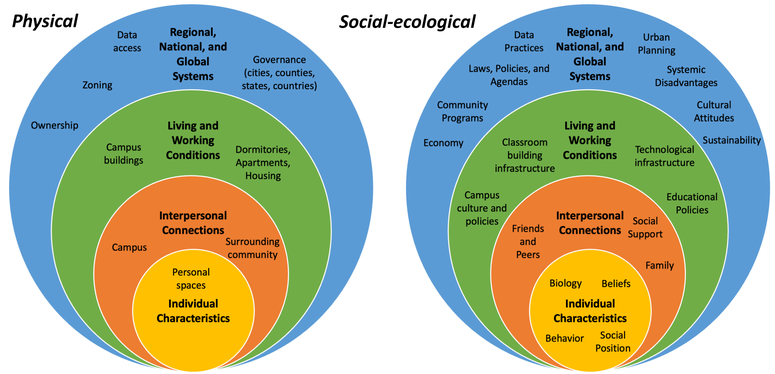
Conclusions

Accessibility is…

- *Everywhere.*
  - Humans constantly interface with the environment.
  - Modes of interaction: physical, mental
- *Multidimensional.*
  - Multisensory (sight, hearing, touch, smell, taste).
  - An object can take on multiple roles (facilitator, neutral, barrier).
- At the nexus of *multiple webs of influence*.
  - As humans move through the environment, we change it, and it changes us (intentionally and/or unintentionally).
  - The *information* garnered from the environment, *who* collects such information, and *how* it is employed affects applications.

On college campuses, GIS data standards should focus on aspects of buildings (indoors and frontages) and the surrounding pedestrian area, while considering the larger context of the campus/community.

Spheres of influence on GIS data standards



Future Work

- Further analysis of associations using graph techniques
- Taxonomizing via multiple perspectives (setting, contribution to wayfinding, mode of data collection)
- Applications to other settings
- Natural language processing for taxonomy generation from literature

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