Connecting Engineers and the Community: Collaborating with Social Workers to Identify Community-Based Transportation Needs

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Introduction

- Environmental Justice (EJ) Communities
  - Low Income People
  - Elderly
  - Minorities
  - Children
  - Persons with limited English proficiency
  - People with disabilities
  - Female head of household

- Main Goal: serve EJ communities in a more effective way.

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Introduction

- Gap: Difference between needed and existing transportation services and systems.
- Presently transportation organizations try not to harm EJ communities.
- To understand the EJ communities needs, we need to hear their voices and those of different communities and professionals.

Project steps

- Literature Review
  - Identify transportation “Failures”
  - Resolve transportation gaps
  - Identify the consequences of these gaps
- Sample transportation and EJ-serving organizations
- Develop candidate transportation gap performance measures
- Design survey to solicit feedback of transportation professionals

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Engineering perspective

- The service gap in EJ communities' resulted from:
  - Transportation disadvantage
  - Social exclusion
  - Well-being

- Social exclusion defined by
  - Modeling the transportation
  - Mobility inequity
  - Associated social consequences

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Engineering perspective

- Transit and human service agencies were surveyed and the result was a need in:
  - Facilities
  - Capacity
  - New services
  - Staff

- Methodology and index introduced to measure transportation inequity

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Engineering perspective

- Public transit allows disadvantaged population to be more involved in social activities
  - Suburban areas experience a higher transit gap
- Level of income and residential area location cause a service gap for working women
- EJ service inequity includes poor bus transfer, lack of reliable and fixed network infrastructure, higher travel time and larger headway

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Engineering perspective

Sample Transportation Gaps and Strategies

Resource	Transportation Failure/Gaps	Strategies or Solutions
Mattson et al. (2015)	- Difficulties in finding qualified bus operators - Inadequate vehicle storage facilities - Inadequate maintenance facilities	-longer hours of service, weekend service, and an expansion of currently available services - Replace vehicles and upgrade facilities - Upgraded passenger facilities - Transfer hubs and passenger stations

Social worker perspective

Identify the consequences of transportation gaps on the well-being of EJ population in terms of:

- Health (both physical and psycho-social)
- Access to opportunities
- Community connectedness and social exclusion

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Social worker perspective

Federal investments build healthy communities by:

- Provide more transportation choices
- Promote affordable housing options
- Enhance economic competitiveness
- Support existing communities
- Value neighborhoods and communities

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Social worker perspective

Opportunities: employment, shopping, community and recreational services, and health

- Access to opportunities are directly linked to transportation planning and lack of transportation
- Rural communities struggle to fund and maintain public transportation services
- Those with major health concerns were found to have greater transportation deficiencies

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Social worker perspective

- Public transportation operates in urban areas where those who travel outside the CBD receive poor or no services
- low-income women and children experience disproportionate consequences
- Elderly service gaps include missed opportunities for health care, time spent with family, and opportunities for social inclusion

Social worker perspective

Community Connectedness/Social Inclusion may:

- Include:
  - School functions for children, youth and families
  - Social and disability services
  - Religious and community services
  - Participation in local senior centers

- Be achieved by access to opportunities, which is driven by access to transportation services

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Interdisciplinary collaboration

- Must always consider Environmental Justice (EJ) communities
- Identify service gaps for EJ population and possible solutions
- In this research transportation engineers and social workers work together

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Interdisciplinary collaboration

- Identify tools and techniques for assessing service gaps and solutions (State of Art)
- Identify the consequences of service gaps on EJ populations
- Identify interested organizations, agencies, and individuals
- Develop performance measures for service gaps

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Organizations, Agencies, and Individuals

- A sample of transportation organizations such as MPOs, transit agencies, cities were identified
- More than 100 professionals were selected from these organizations
- Recipients distributed across the US

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Develop service gap performance measures

- Identify service gaps and potential solution strategies
- Categories for defining service gap performance measures were determined
- Gap performance measures
  - Accessibility
  - Affordability
  - Operation
  - Service Quality

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Develop service gap performance measures

- Identified performance measures for each category
- The potential PMs are included in the survey for feedback from the professionals
- The survey includes questions related to demographic and PMs

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Develop service gap performance measures

Table 2: Accessibility candidate Performance Measures

	Ideas & Policies	Performance Measures
Accessibility	OVT	Waiting time, Transfer Time
	Stop Location	Distance to the nearest station to your house
	Walking Distance	Number of employment and other activities within 0.25 miles
	Biking Facility	Existance of bike lanes, Bike rack, bikeshare program
	Walking Facility	Existance of suitable and convinient sidewalk , pedestrian traffic sign and signals, Quality level of sidewalk
	Rideshare Program/ Co-op Vehicles	Number of vehicles/EJ household, Presence of rideshare program
	Access to the Family Doctor	Distance to the family doctor, Available options to access to family doctor, Ave time to access to the family doctor
	Route Connectivity	Level of route connectivity

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Develop service gap performance measures

Table 3: Affordability candidate Performance Measures

	Ideas & Policies	Performance Measures
Affordability	Subsidy per ride (for low income zones)	Existance of Subsidy per ride (for low income zones), How many trips can you afford per week? Total subsidy per communities?
	Special Pass Program	Existance of Special Pass Program
	Dynamic Fare based on Socio-Demographic Data	Existance of Dynamic Fare based on Socio-Demographic Data
	Dynamic Fare or Subcidy for Different Trip Purposes	Existance of Dynamic Fare or Subcidy (Via, Uber,..)
	Special Program for Emergancy Situations	Cost for an ambulance service
	Ride Promotions for EJ Populations	Existance of Ride Promotions for EJ Populations

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Develop service gap performance measures

Table 4: Operation Candidate Performance Measures

	Ideas & Policies	Performance Measures
Service Quality	In-Vehicle Convinience	Capacity of transif vehicle, # of seats for disabled people, Existance of route guidance and stop locations
	Station Convinience and Comfort	Average number of seats in each station, Existance of roof on stations, Availabilty of spaces for disabled people
	Route Facility (Light, Sign, etc.)	Number Satisfaction of route facility
	Service Coverage	Percentage of community or neighborhood routes covered by public transit?
	Enough Staff during 24/7	Number of Staff & Customer service 24/7
	Easyness/Suitability of Payment	Availability of any kind of facility or method to ease the payment for EJ populations
	Board & Alight Comfortability	Boarding and Alight Comfortability
	Assign trip travel councelor	Number of Trip travel councelor in EJ community

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Develop service gap performance measures

Table 5: Service Quality Candidate Performance Measures

	Ideas & Policies	Performance Measures
Operation	Service Frequency	Service Frequency
	In-vehicle travel time	In-vehicle travel time
	Vehicle Mile Traveled	VMT to important destinations
	Service Availability	Hours of Service (24/7)
	Fixed Route	Existance of Fixed Route

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Importance of measuring service gaps

The main outcome of surveys:

- Transportation organizations confidence in the candidate tools
- The importance of identifying and considering service gaps when developing comprehensive local and regional transportation plans
- Feedback on the identified performance measures

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Social workers help Engineers by

- Providing a different view point in resolving problems
- Conducting qualitative studies tools and techniques such as:
  - Running focus groups
  - Surveys
  - Interviews
  - Communicating with different communities

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Social workers help Engineers by

- Presenting the required skill in terms of social connectedness to become engaged in the communities
- Presenting the approach for connecting with partner companies and agencies which enhance the research outcomes
- Connecting with other experts to assist in developing and assessing new performance measures

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Future Roadmap

- Evaluate the performance measures based on reliability, validity, availability, complexity of interpretation, costs related to collection and use, and timeliness
- Evaluate the modeling based on reliability, validity, repeatability, cost, and complexity
- Select the performance measures and models that score high on criteria for the final round of feedback in a survey

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THANK
YOU !