A new walkability index and its application to local government planning in Northern Ireland

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Outline

- The KESUE Project
- Developing the Real Walkable Network
- Case studies and applications
Knowledge Exchange, Spatial Analysis and Healthy Urban Environments (KESUE)

- Emerged from PARC project
- ESRC Knowledge Exchange Call
- Local partners:
  - Belfast City Council
  - Belfast Healthy Cities
  - Dept. of Regional Development
  - Derry City Council
  - Public Health Agency
- Other UK Cities
Project aims:

- To maximise the policy impact of this walkability research and extend its use to increase evidence base for built environment interventions for increasing physical activity.
- To promote a virtuous circle of research, implementation and feedback.
Knowledge Exchange, Spatial Analysis and Healthy Urban Environments (KESUE)

- **Mapping** (May-Nov 2012)
- **Analysis/Integration** (Nov 12-Mar 13)
- **Dissemination** (Mar –Apr 13)
Developing a ‘Real’ Walkable Network

- Existing walkability models tend to use road centre lines - may fail to accurately measure connectivity.

- RWN allows the modelling of pedestrian routes across the city.

- Measures Walking Distances and Accessibility to any point or facility.

- Can be used for many types of Spatial Analysis.
Extent of the RWN

- Initially developed for PARC area
- Belfast City Council Area (population c. 580,000, Area 115 km²)
- Derry City Council Area (population c. 90,000, Area 387 km²)
- Combined, this covers 37% of Northern Ireland’s population.

- RWN broken down into:
  - Footpaths; Road Crossings; Shared; Back Access; Bridges: Track; Subways.
How did we develop the RWN?

- In NI network had to be developed from scratch.
- Research assistants digitising each footpath, subway, alley etc
- May - November 2012
- Quality Assurance
# Real Walkable Network v Road Network

<table>
<thead>
<tr>
<th></th>
<th>SOA’s</th>
<th>RWN Network Length</th>
<th>RWN Network Elements</th>
<th>OSNI Road Network Length</th>
<th>OSNI Road Network Elements</th>
<th>% Difference Length</th>
<th>% Difference Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belfast</td>
<td>150</td>
<td>2304 km</td>
<td>114491</td>
<td>1317 km</td>
<td>17415</td>
<td>+ 75%</td>
<td>+ 557%</td>
</tr>
<tr>
<td>Derry</td>
<td>69</td>
<td>1614 km</td>
<td>54012</td>
<td>1097 km</td>
<td>7381</td>
<td>+ 47%</td>
<td>+ 631%</td>
</tr>
</tbody>
</table>

![Road Network](image1.png)  ![RWN Network](image2.png)
GOOGLE MAP
Walking and Driving Routes

Google by Car: 1770m
Google by Foot: 1448m
RWN: 1181m
Using RWN to meet the needs of our partners

- Liaised with each partner to ascertain their needs for a particular piece of work;
- This usually involved creating examples to stimulate further conversation and ideas as to how work can be applied to their field;
- A feedback and revision process ensued until the partner was satisfied with the output and the work tailored to their needs;
- Some of these works are still ongoing with further work in the pipeline.
Objective Measures of Walkability

- **Aim:** To create an objective measure of Walkability for East Belfast using a 4 element composite index.

- **Output:** Interpolated Walkability maps and Tables which can be correlated with survey data from the PARC Household Survey.

- This work is to be repeated city wide for Belfast and Derry/Londonderry.
Accessibility Atlas

- **Aim:** To exemplify to project partners the type of analysis that was possible using the RWN and to stimulate discussion with them.

- **Output:** Booklet showing accessibility to 30+ services in both Belfast and Derry.

**Client:** Project Partners
# Accessibility Atlas Statistics

<table>
<thead>
<tr>
<th>Facility</th>
<th>Service Area (m)</th>
<th>% of council area in accessible Area</th>
<th>% all dwellings in accessible area</th>
<th>% Dwellings in Accessible Area within in 10% Most Deprived SOAs</th>
<th>% Dwellings in Accessible Area within 10% Least Deprived SOAs</th>
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</thead>
<tbody>
<tr>
<td>Primary Schools</td>
<td>800</td>
<td>32.8</td>
<td>75.1</td>
<td>93.32</td>
<td>25.83</td>
</tr>
<tr>
<td>Secondary Schools</td>
<td>1500</td>
<td>24.52</td>
<td>74.58</td>
<td>90.79</td>
<td>55.65</td>
</tr>
<tr>
<td>GP Surgeries</td>
<td>800</td>
<td>23.89</td>
<td>58.05</td>
<td>80.30</td>
<td>25.91</td>
</tr>
<tr>
<td>Pharmacies</td>
<td>800</td>
<td>34.99</td>
<td>81.16</td>
<td>96.33</td>
<td>81.16</td>
</tr>
</tbody>
</table>
Infrastructure & Service Provision: DRD Infrastructure Project

- **Aim:** To demonstrate the potential impact on Pedestrian Access and Public Safety of a number of proposed infrastructure projects;
- **Outputs:** Maps and Tables showing the travel distance before and after the Greenway is built.
- Also demonstrate impact on pedestrian safety re. changes to journey routes along main roads

**Client:** Derry City Council
Infrastructure & Service Provision – Derry/Londonderry Peace Bridge

- **Aim:** To show the potential impact on pedestrian accessibility of the Peace Bridge.

- **Outputs:** Maps & Tables demonstrating the impact on accessibility to the city centre.

**Client:** Ilex (Derry-Londonderry Regeneration Agency)
Infrastructure & Service Provision – Derry/Londonderry Railway Stn

- **Aim:** To inform the decision making process for a new train station in Derry/Londonderry as well as testing new infrastructure configurations to offer the greatest accessibility to this service.

- **Output:** Maps demonstrating accessibility to the proposed new train station and how access can be improved by adding in various infrastructure improvements e.g. footbridges

**Client:** Translink
Public Health and Well Being – Child Friendly Cities

- **Aim:** To provide data that assists in developing strategies which create cities which are friendly to children, such as those that influence childhood obesity.

- **Outputs:** Data created on a number of sub-themes centred around accessibility to schools and their proximity to public transport, areas of physical activity and hot food bars.

**Client:** Belfast Healthy Cities/ Institute of Environmental Health
Public Health and Well Being – Age Sensitive Cities

- **Aim:** To provide data that assists in identifying areas which have a prevalence of vulnerable pensioners.

- **Output:** Age Vulnerability Index comprised of single Pensioner households, no access to a car, long term poor health and % age over 60 or 75.

- Experimented with using slope as a barrier as a means of introducing ‘cost’ to RWN analysis.

**Client:** Belfast Strategic Partnership
Route Planning & Site Analysis – Park Gate Analysis

- **Aim:** To demonstrate the potential impact that maintaining 24/7 park opening has on access to local service provision, public transport and tourism centres

- **Output:** Report to the BCC Parks and Leisure Committee

**Client:** Belfast City Council
Aim: To demonstrate the need or over subscription of 3G Pitches in Belfast and to identify where possible existing non-council controlled can be used to satisfy demand

Output: Maps identifying gaps in service provision and where duplication of services exist

Client: Belfast City Council
Conclusion

- RWN is not a tool on its own but is given value in the context of other data and policy issues;
- Highlighted potential of spatial analysis for range of policy areas and professional groups; Public Health, Council Services, Infrastructure Development.
- Demonstrated use of RWN for:
  - Site selection tool;
  - Impact assessment;
  - Policy options and evidence base.
- Future areas for development include Impedance Values, and impact of pedestrian barriers.
More information about the project can be accessed at:
http://www.qub.ac.uk/research-centres/KnowledgeExchangeSpatialAnalysisandHealthyUrbanEnvironments/

or by contacting Prof Geraint Ellis at:
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