Overcoming the barriers to walking for people who are socially excluded

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Abstract

Various barriers to mobility prevent some people from walking as much as they wish, which means that they cannot reach as many opportunities as they would like. This raises issues of social exclusion which are an area of increasing concern. It is increasingly being recognised that transport policy should take into account the needs of those who are socially excluded.

The objectives of the work described in this paper are:

- To identify barriers to walking for people with characteristics that make them socially excluded;
- To identify policy actions which can help to overcome the barriers;
- To show how the number of opportunities that can be reached are increased if the barriers are removed;
- To show which policies are most effective in overcoming the barriers.

These issues are being explored in a research project being carried out as part of a large programme looking at ‘Accessibility and User Needs in Transport in a Sustainable Urban Environment’ (AUNT SUE). A GIS-based tool is being developed to examine how transport policies can increase social inclusion by allowing more people to reach various opportunities including shops, medical and welfare centres, employment and leisure facilities. The tool is being used to establish how many people meet accessibility benchmarks defined elsewhere in the project with and without the policy intervention. Micro-level data based upon street audits has been collected for the city of St Albans in Hertfordshire, including details such as steps, slopes, access to individual buildings and obstructions on the pavement. In the paper, ways in which the tool will be used to test policies to increase social inclusion are discussed. The results are presented in terms of the numbers of people prevented from reaching some opportunities by barriers to walking and increases in numbers of opportunities that can be reached if the barriers to walking are removed.

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Introduction

Social exclusion is an area of growing concern. It is increasingly being recognised that transport policy should take into account explicitly the needs of those who are socially excluded. There is a wide range of characteristics that are associated with being socially excluded: having a disability which includes being in a wheelchair, having learning difficulties, and being visually impaired; being elderly; being aged about 13 to 20; being a member of an ethnic minority; having a low income; being unemployed; not having access to a car; living in a rural area; and being a single parent (Mackett et al, 2004). Usually those who are socially excluded are in two or more of these categories, for example unemployed teenagers and low-income people living in rural areas. There are many policies which can be adopted to help address the issues that cause social exclusion. However, the difficulties faced by some of the people who are socially excluded are very micro, for example, obstacles on the pavement which can hinder access in a wheelchair. Hence, micro level details may cause difficulties in the implementation of policies which have been designed at the macro or strategic level (Mackett et al 2007).

These issues are being explored in a research project being carried out in the Centre for Transport Studies at University College London as part of the work programme of the AUNT-SUE consortium (Accessibility and User Needs in Transport in a Sustainable Urban Environment) (see http://www.aunt-sue.info/). In this part of the programme, entitled BAPTIST (Benchmarks and Policies Towards Inclusive Sustainable Transport), a software tool, AMELIA (A Methodology for Enhancing Life by Increasing Accessibility) is being developed to test the extent to which transport policies can increase social inclusion. AMELIA is a user-friendly policy-oriented interface to a GIS (Geographical Information System). It is being used to establish how many people meet accessibility benchmarks defined elsewhere in the project with and without policy interventions. As part of the design process for AMELIA, the database is being explored to see the extent to which barriers to travel can be identified, and how these might be addressed. In this paper, the implications of micro-level barriers to walking are considered.

Social inclusion policy

The design of AMELIA requires an area to be defined for testing the tool and local authority involvement in the design process. The county of Hertfordshire, which is the county immediately north of London, has been chosen for this purpose. This research is being conducted in co-operation with Hertfordshire County Council (HCC). HCC has produced an LTP (Local Transport Plan) which has nine objectives to help achieve its vision of the future of transport in Hertfordshire over the next 20 years. The vision statement in the LTP starts with the phrase “To provide a safe, efficient and affordable transport system that allows access for all to everyday facilities” (Hertfordshire County Council, 2006, page 42). This puts inclusion right at the heart of the vision. The objective specifically concerned with accessibility states: “To develop a transport system that provides access to employment, shopping, education, leisure and health facilities for all, including those without a car and those with impaired mobility” (Hertfordshire County Council, 2006, page 43).

These concepts have to be translated into action. This involves defining policy actions to overcome barriers to movement. Table 1 shows some examples of the barriers to walking that have been identified in the AUNT-SUE work and possible policy actions. It can be seen that the six general barriers to walking have, in most cases, been divided into more specific barriers. This is necessary in order to identify suitable policy actions. The specific aspects relate to a conflict between the characteristics of the people involved, such as inability to step up to a particular height or being in a wheelchair, and the micro-environment, such as the height of the step or the existence of an obstruction. The purpose of AMELIA is to present the user with a set of possible policy actions given the characteristics of the population and the local environment, and then to quantify and map the effects of the policy actions to help the user make a judgement as to the most effective.

Data collection

A database is being set up for Hertfordshire. Macro-level data based upon the local authority’s information systems and other sources such as the 2001 Census of Population, are being assembled for the whole county. Micro-level data based upon street audits, including details such as steps, slopes, access to individual buildings and obstructions on the pavement are being be incorporated into the database. These more detailed data are only for the city of St Albans since it is not feasible to collect such data for the whole of Hertfordshire.

The detailed data for St Albans was collected on the street using the following equipment: an inclinometer for measuring the gradient of slopes, a tape measure for measuring short distances, such as between obstacles on the pavement and the kerb, and a measuring wheel for measuring longer distances, such as the width of roads. Data were collected on the following: buildings, characteristics of the footway, road crossings, bus stops, car parking and features, with one person collecting the building data, one collecting the other data and the third person using the measuring instruments. Each item was given a unique numerical code within its category. The codes were marked by hand using coloured pens onto A3-sized maps printed out from the Ordnance Survey Land-Line Plus database which is being used in the GIS.

Table 1 Examples of barriers to walking and possible policy actions to overcome them

Barriers to walking		Possible policy actions
General	**Specific**	
Change of level	The existence of steps	• Provide ramps • Provide escalators • Provide lifts
	Steps that are too high	• Ensure steps are of appropriate height
Concern about finding the way	Difficulty finding the way for people with visual impairment	• Provide tactile paving • Provide colour contrast paving • Highlight bollards, steps, subways, signposts for the visually impaired
Difficulty crossing the road	Lack of a safe place to cross the road	• Provide more pedestrian crossings • Introduce traffic calming
	Lack of dropped kerbs	• Provide dropped kerbs
	Dropped kerbs that are too steep	• Reduce gradient on dropped kerbs
	Difficulty seeing pedestrian signals at crossings	• Provide audible signals at pedestrian crossings
	Insufficient time to cross at pedestrian crossings	• Extend of pedestrian green phase on road crossings
	Pedestrian crossings unsuitable for wheelchair users	• Make pedestrian crossings suitable for wheelchair users
Difficulty moving along the pavement	Narrow pavements	• Provide wider pavements
	Obstructions on the pavement	• Remove obstructions that make pavements narrow
	Poor quality pavements	• Provide better quality pavements
Difficulty walking a long distance	Lack of places to sit when walking	• Provide seats
	Lack of public conveniences	• Provide public conveniences
	Facilities located too far from home	• Locate new healthcare facilities and major new food stores in places highly accessible by walking, cycling and bus
Fear	Concern about crime hotspots	• Reduce street crime • Provide CCTV (closed-circuit television) in appropriate locations
	Concern about walking after dark	• Improve street lighting

The information on buildings was for buildings that members of the public access, but not private buildings or those that only employees access. For each building the following was recorded: the unique reference number, the street address, the function of the building (shop, bank, café, and so on), the name of it, and the access (level, slope, ramp, or steps, including the number of steps, or the height if it was a single step). According to the inclusive mobility guidelines (Department for Transport, 2005), a ramp is a pathway with a gradient of more than 5 degrees.

Data collected on footways included obstacles to movement, width where it was narrow enough to pose a possible problem, the material, and its condition, and the gradient where it was steep enough to pose a possible problem. Data collected on road crossings included the location, the width of the road at the crossing, the width of the island, if there was one, the type of crossing (zebra, pelican, toucan, school, unmarked or other), and the material. Bus stops were recorded in terms of location, the type and number of seats, whether or not there was a shelter, the routes served and the information provided. Data on car parks included the location, the type (off street or on-street, and in the former case whether it was ground level, underground or multi-storey, and the latter case, marked or unmarked bays), capacity, restrictions, cost of parking, length of permitted stay and operating hours. The final data set collected was on features, which included telephone boxes, letter boxes, cash dispensers and seats, which were recorded in terms of type and location. Location was recorded on the map using a unique reference number.

GIS database

A GIS database was compiled for St Albans using the digital data from the Ordnance Survey Land-Line Plus data as the base. The building polygons were extracted from it and populated with the data collected in the field as attributes. The buildings were further grouped into different category levels based on the Ordnance Survey Points of Interest (POI) classification scheme (Ordnance Survey, 2006). The location data for car parking and features were mapped as point features and linked with their attributes. Using the footways and crossing data collected, a detailed pedestrian network layer of the link-node structure was created by manually digitizing the pavements and crossings using the Land-line data as a backdrop. Once digitized, the network data were subject to further editing to include nodes at all decision points such as crossings and intersections. The links representing footways and crossings were used to store the respective attribute information collected, which could be modelled for network analysis purposes as the cost of traversing a particular link or as a barrier. Output areas of St Albans were also extracted and linked with Census of Population 2001 data for accessibility analysis of specific groups of people. Figure 1 shows the GIS layers modelled for the centre of St Albans as an example of the GIS.

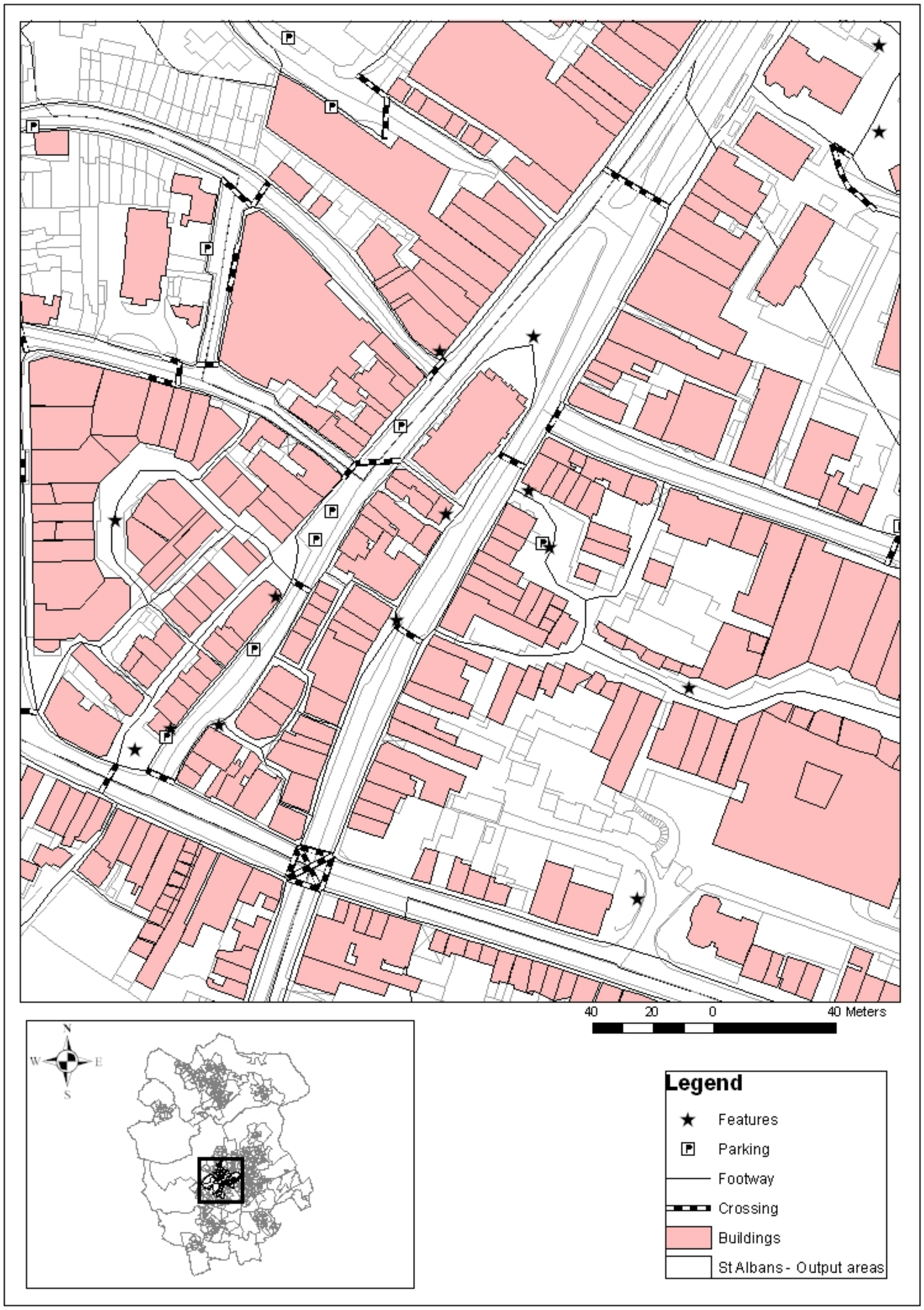

Figure 1 GIS layers, for the centre of St Albans
Note: The small map shows the output areas from the Census of Population 2001 used as the residential areas used for the figures in Table 2.

Analysis

Data have been collected for the city centre of St Albans in Hertfordshire. Despite the very good levels of access in St Albans there are still difficulties moving about. It is not possible to reach some key points in the city centre from all parts of the city centre without finding crossings lacking dropped kerbs, or with steep gradients on them, or pavements with obstructions which make it too narrow for some people to use them. Many of the buildings offer level access, but over half of them involve using either a ramp or one or more steps, which may be difficult for many people. The worst example found was the police station with fifteen steps and a notice saying 'Unfortunately we are unable to provide level access at this Station. Your nearest station with level access is Hatfield Police Station, St Albans Road, Hatfield, Herts, AL10 0EN'. This is a distance of over 9 km, which would be rather difficult for anyone in a wheelchair without a car.

There are various ways in which accessibility can be measured. In this paper it is considered in terms of the number of people prevented from reaching opportunities because of barriers to movement and the change in the number of opportunities can be reached if the barriers are removed.

For the first example, three types of obstruction are being considered:

- Crossings without dropped kerbs;
- Footways with an effective width of less than 1000 millimetres;
- A dropped kerb with a gradient of more than 5 degrees.

To show the possible impact of these obstructions to the 1436 people aged 60 or over living the city centre, the effects of the obstructions to three key places in St Albans are shown in Table 2. The key places are the Old Town Hall, which is in the centre of the city and is adjacent to the street market and the major shops, the City railway station, from where trains go to London, and the City Hospital.

People in wheelchairs may not be able to cross the road without a dropped kerb. Furthermore, people who need dropped kerbs to make a journey, need them at every crossing that they use to reach their destination. Also, they need them not to be too steep. The figure of five degrees being used here, is based on guidance in the inclusive mobility guidelines (Department for Transport, 2005). The width of the footway is also an issue. For illustrative purposes, a minimum width of 1000 mm is being considered here. Nineteen percent of the people aged 60+ cannot reach any of the key places if they need to use dropped kerbs at road crossings. This is the obstruction that affects the smallest number of people. The effective width of the footway is the obstacle that affects the second largest number of people, with 30% of the elderly people unable to reach the three key points if they are unable to pass through a gap of less than 1000 mm. The obstacle that causes the largest obstruction is dropped kerbs with a gradient of over 5 degrees. 56% of the population would not be able to reach the Old Town Hall if they cannot manage dropped kerbs which are steeper than 5 degrees, 94% would not be able to reach the hospital and none of them would be able reach the station. If people cannot manage to overcome any of the obstructions, most of them would not be able to reach the Old Town Hall (87%) and the hospital (94%), and none of them could reach the station.

Table 2 Number of residents of St Albans city centre aged 60+ who have barriers to walking between where they live and key locations

Obstruction	St Albans Old Town Hall		St Albans City railway station		St Albans City Hospital	
	No	%	No	%	No	%
Crossings without dropped kerbs	273	19	272	19	273	19
Footways with effective width <1000 mm	424	30	424	30	424	30
Dropped kerb gradient > 5 degrees	797	56	1436	100	1353	94
All of the above	1252	87	1436	100	1353	94

This analysis shows that, despite the high levels of accessibility in the city centre, there are some obstructions. In particular, there are many dropped kerbs at crossings, but there are problems with the gradient of some of them. Width restrictions on the footway stop some people from reaching key points in St Albans.

Whilst some people may be able to reach the city centre by foot (or live there), many others will need to arrive, by mechanized modes, either bus or car. Table 3 shows the percentages of the various types of building within various distances of car parks taking into account the three barriers to movement discussed above. This means that, for example, 26 per cent of eating and drinking facilities are within 50 metres of a car park, and 58 per cent are within 100 metres of one. To some extent, this is a measure of dispersal, with attractions and education and health having the most facilities within 50 metres of a car park. Clothing and accessories shops have the greatest number within 100 metres, but commercial services have the greatest number of building within 150 metres and 200 metres. The type of building which tend to be least well served by car parks within 50 metres is public infrastructure. Not surprisingly, the facilities which are least well served by car parks, as shown by the percentage beyond 200 metres from any car park, are the motoring shops which are the smallest category. The attractions are at the same level of 50 per cent for three of the distance bands, implying that half of them are well served with car parks close by, and half are not.

Table 3 Percentage of various types of buildings in St Albans' city centre accessible within distance bands from car parks taking into account barriers to movement

Building Class	**Distance (m)**				**Total no. of buildings**
	50	100	150	200	
Eating and drinking	26	58	65	72	113
Commercial services					
Legal and financial	32	57	78	84	37
Other commercial services	31	58	79	85	97
Attractions	33	50	50	50	6
Sport and entertainment	25	44	50	56	16
Education and health	33	50	60	69	48
Public Infrastructure	10	17	33	40	30
Retail					
Clothing and accessories	32	64	77	83	84
Food, drink and multi-item	23	47	63	77	30
Household, office, leisure and garden	28	55	72	76	123
Motoring	25	25	25	25	4
Total	28	54	69	75	588

If the barriers to walking are removed (Table 4), the number of buildings within 50 metres increases to 39 per cent. When the barriers are removed, the access to public infrastructure has the largest increase, increasing to 23 per cent within 50 metres of a car park and 60 per cent within 200 metres, while for motoring shops (of which there are only four) there is no change. The most accessible types of building are those housing attractions and clothing and accessories shops with about half of the buildings within 50 metres of a car park when the barriers are removed.

Another way to illustrate how accessibility is affected by policy actions is to see the increase in the number of car parking spaces that the opportunities can be reached from if policy actions are introduced as shown in Table 5. Two types of barrier are shown: difficulties crossing the street and difficulty moving along the pavement. It can be seen that currently there are no parking spaces within 100 metres of the Old Town Hall. If more pedestrian crossings are provided then 5 spaces are available within 100 metres. This action and reducing the gradient on dropped kerbs increases the number at the 200 metres but improving the pavements has no effect at this distance. Providing wider pavements has a very small effect on increasing the number of parking spaces within 400 metres, but improving the crossings has a much larger effect, particularly providing more pedestrian crossings and reducing the gradient on pedestrian crossings. It can be seen that there can be synergies between policies since increase the number of spaces within 200 metres is greater as a result of the policy three actions to improve road crossings together than the sum of their individual effects. This analysis suggests that improving road crossings is likely to be much more effective than widening pavements as a way of increasing accessibility in this situation. AMELIA will allow this type of analysis to be carried out rapidly. If the cost of the actions can be introduced into the model it will be possible to see which policy action is most cost effective in increasing accessibility.

Table 4 Percentage of various types of buildings in St Albans' city centre accessible within distance bands from car parks when the barriers to walking are removed

Building Class	**Distance (m)**				**Total no. of buildings**
	50	100	150	200	
Eating and drinking	37	73	81	84	113
Commercial services					
Legal and financial	41	68	92	95	37
Other commercial services	40	76	94	94	97
Attractions	50	50	50	50	6
Sport and entertainment	38	69	81	81	16
Education and health	38	56	71	75	48
Public Infrastructure	23	47	57	60	30
Retail					
Clothing and accessories	49	81	89	89	84
Food, drink and multi-item	37	70	97	100	30
Household, office, leisure and garden	40	69	86	86	123
Motoring	25	25	25	25	4
Total	39	70	84	86	588

Table 5 Number of car parking spaces that can be reached by walking various distances from St Albans Old Town Hall as a result of various policy actions

		Number of car parking spaces accessible within the distance bands			
		50m	100m	200m	400m
	Do nothing	0	0	18	54
	Policy action	Increase in the number of car parking spaces accessible within the distance bands			
A	Provide dropped kerbs	0	0	0	+45
B	Reduce gradient on dropped kerbs	0	0	+3	+142
C	Provide more pedestrian crossings	0	+5	+4	+145
A+B+C	Improve road crossings	0	+5	+14	+171
D	Provide better quality pavements	0	0	0	0
E	Provide wider pavements	0	0	0	+2
D+E	Improve pavements	0	0	0	+2

Conclusions

This paper has presented an analysis of some examples of the effects of the barriers to walking. This is part of the development of the software tool AMELIA which is designed to show the impacts of transport policy on social inclusion. This analysis has shown that data can be collected to demonstrate that aspects of the physical environment can affect social inclusion, and that these can be represented in a GIS database of the type to be used with AMELIA. This means that it can be used to show how changes to the physical environment can affect aspects of social inclusion.

A number of barriers to walking were identified. The impacts of these were examined in terms of how they can prevent people reaching destinations and how their removal can open up opportunities. These effects have been shown in various ways to illustrate the multi-dimensionality of the problems. It should be noted that only a small fraction of the issues concerning social exclusion have been discussed here.

An important issue is one of 'choice'. It is easy to assume because people with limited mobility can reach some examples of a particular type of opportunity the situation is satisfactory. For example, it was shown that it is possible to reach some of the buildings in the eleven categories defined within 50 metres of car parks. However, many of the buildings are unique, and for some purposes, such as clothes shopping, it is usual to look at several shops in order to make a choice. People eating out will wish to have a reasonable range, in terms of price and style. In order to be socially inclusive, those with limited mobility should have as wide a range of choice as other members of society.

However, it must be remembered that transport policy is about much more than changing the physical environment, and that most types of social inclusion are less well-defined than the physical aspects being implied here. This is not to say that physical aspects are unimportant, but to acknowledge that there is much more research to be done in this very important area.

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