

AUNT-SUE Design Guide

i-Journey: inclusive journey planner

Pete Davis, Loughborough University, November 2009

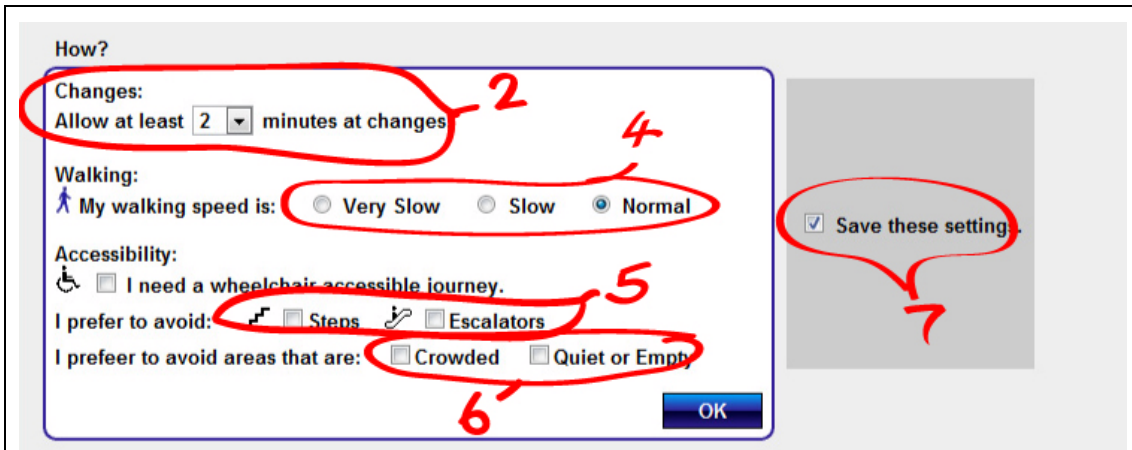
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Development Stage:	Web Based Prototype
Availability:	www.aunt-sue.info
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Short Description:	<p>This guide describes concepts and rules for the design of more inclusive internet journey planners. It is the outcome of detailed user-centred evaluation of existing journey planners and extensive research into the needs and behaviour of people for who are at greatest risk of being excluded from travel. This research generated over 50 specific design rules which are presented here. These design rules are illustrated using images of the i-Journey (inclusive journey planner) Prototype.</p>
Prerequisite Skills	<p>This design guide is intended for use by those involved in the evaluation, specification, design or development journey planners and assumes a familiarity with internet technology and existing internet journey planners. As the design rules mainly relate to the front-end user interaction, knowledge of web application programming is not required.</p>
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1 Optimised Personalisation

Many existing journey planners have "Advanced Options" which, for example, enable the user to specify preferred modes of transport and set a maximum walking time. However, most participants in our trials, including those who would benefit most from using these options, ignored them with the result that three disabled people being given journeys that they were physically incapable of doing. Many of the options that are provided were found to be unnecessary, whilst new options such as change time allowance and choosing to avoid crowded or quiet locations were popular.

Optimised Personalisation should include a small range of useful settings so that users can set preferences quickly before launching their journey search. These settings would then be saved to ensure that people are given journeys that are suit to their needs every time without needing to re-enter information.

1.1 Optimised Personalisation Content



1.1.1	There should not be an option that asks the user to choose between a range of non-exclusive search priorities (e.g. between "fastest", "fewest changes", "least walking" and "lowest cost"). It is impossible for users to predict which of these options will give them the most desirable route.
1.1.2	There should not be an option to set a maximum walking time. It is difficult for a user to state exactly how much walking they can manage. Walking may be split up in different parts of the journey and any system that fudges a given maximum to provide journeys with slightly more walking will undermine the user's choice.
1.1.3	The user should be able to set the amount of additional time allowed before transport stages. This is often inbuilt into a journey search, but the user needs to see it to have confidence in it. Some users will want to allow more time, and this will help them to plan a journey that they will not find stressful.

1.1.4	There should be an option which enables the walking speed to be set to slow. This may be done by providing "normal", "slow" and "very slow" options in order to de-stigmatise the "slow" option for those users who do not consider themselves to be disabled, but wish to allow more walking time.
1.1.5	The user should be able to exclude mobility barriers from the journey search. This means steps and escalators, but not lifts.
1.1.6	The user should be able to choose to avoid locations that are crowded or quiet. These options are not mutually exclusive. People with limited mobility may wish to avoid crowds, but be somewhere where there are people around if they need help.
1.1.7	A low effort way to save the users' journey preferences may be introduced. This should be unintrusive, clear and easily deactivated.

1.2 Optimised Personalisation Presentation

Where?
From: SE3 7DR
To: The British Museum

When?
Depart after 11:45
4 June 2009

How?

Changes:
Allow at least minutes at changes.

Walking:
My walking speed is: Very Slow Slow Normal

Accessibility:
 I need a wheelchair accessible journey.

I prefer to avoid: Steps Escalators

I prefer to avoid areas that are: Crowded Quiet or Empty

Save these settings.

1.2.1	Personalisation or "advanced" options should be visually part of the journey planner. This means graphical consistency and including them before the "Find Journeys" button so that users will not miss them.
1.2.2	A minimal range of options should be presented. Rather than providing all options that it is possible to provide, only a selection of most effective options should be given.
1.2.3	It must be obvious what the effect of selecting options will be on the journey search. Any ambiguity in the description of an option will effectively render it unusable.
1.2.4	It should be clear that using advanced options is optional. Although personalisation must be visually part of the journey planner, it should be obvious that they can be left.

2 Genuine Journey Choice

Current journey planners present a limited range of journey options to the user. These may be repetitions of the same route or a small number of similar routes at different times. Given that the user has specified a time of travel this is not the best way to provide choice.

A *Genuine Journey Choice* system would group repetitions of the same route as into a single journey option. The system would then present a short list of genuine alternatives and enable the user filter out unfavoured transport modes so that they can easily find their best possible way to make the journey.

2.1 Genuine Journey Choice Content

2.1.1	<p>The journey planner should provide a range of journey options. These options must fit the all the criteria entered, but other be as broad as possible by include the options with fewest changes, fastest, least cost and least walking.</p>
2.1.2	<p>The user should be able to filter out transport modes. This function should be provided so that users can see if there are alternative options that avoid certain modes of transport.</p>
2.1.3	<p>Journey options should present a range of information about each option. Only information that enables simple comparison between journey options should be provided so that the user can quickly make a decision about which journey suits them best.</p>
2.1.4	<p>Every vehicle (not just the types of vehicle in the journey) should be graphically represented in the journey options. This is a good way for users to understand at a glance what the journey will involve.</p>
2.1.5	<p>Departure and arrival times should not be shown for the journey options The duration should be shown as this is the time factor that enables the easiest comparison between journey options. Arrival and</p>

	departure times will be properly given as part of the journey plan.
2.1.6	The journey cost for each journey option should be given. For many this is the most important factor in choosing which journey option to take.
2.1.7	The total duration of walking in the journey should be given for each journey option. This is an important factor for many people in their choice of journey. The duration of each individual walk will be given in the journey plan.
2.1.8	Information about mobility barriers should be included with the journey options. People who did not exclude these from their search may still wish to avoid them if possible.

2.2 Genuine Journey Choice Presentation

Where?
From: SE3 TDR
To: The British Museum Edit

When?
Depart after 11:45
4 June 2009 Edit

How?

Changes:
Allow at least minutes at changes.

Walking:
My walking speed is: Very Slow Slow Normal

Accessibility:
 I need a wheelchair accessible journey.

I prefer to avoid: Steps Escalators

I prefer to avoid areas that are: Crowded Quiet or Empty

OK

Save these settings.

Find Journey Options >

2.2.1	Each journey option should be represented by the vehicles in that journey. This will define the journey for the user and they will understand how many changes are involved. Stating the number of changes numerically is always open to misinterpretation.
2.2.2	The graphical representation of the journey should not include walking, except where the whole journey is a walk. This is consistent with how people think of journeys (i.e. walking is assumed). Walks will be fully represented in the actual journey plan.
2.2.3	There should be strong visual distinction between each option. It is important that the user can view each option as a discrete package of information, but also make quick comparisons between options.
2.2.4	Each journey option should have its own "View" button. This should directly follow the option information and only one full journey plan should be shown at a time.
2.2.5	Additional functions for filtering or sorting journey options should visually separate from the options. Such additional functions are non-essential, but may have the added benefit of providing a key for icons in the options.

3 Rich Journey Plans

Good existing journey planners, such as the TfL Journey Planner provides additional details beyond travel times, locations and vehicles. For many people this information, including service updates and the presence of steps, lifts and escalators, can be very useful and further information such as vehicle access, warnings about crowding and even weather predictions would be welcome.

The challenge is to design such *Rich Journey Plans* without overloading the screen or the user so that people access the information they need to travel with confidence.

3.1 Rich Journey Plans Content

The screenshot displays a journey plan with the following details:

- Start:** SE3 7DR
- Depart:** 11:47, 3 min walking
- Arrive:** 11:50, Tudor Grange Bus Stop BP, Quiet
- Depart:** 11:52, 12 min, Route 386 towards Royal Parade, wheelchair accessible icon
- Arrive:** 12:04, Greenwich Rail Station, Quiet, Station Info button
- Depart:** 12:10, 18 min, Southeastern towards Charing Cross
- Arrive:** 12:28, Charing Cross, Crowded icon, Station Info button
- Depart:** 12:28, 25 min walking, Interactive Walking Map button
- Arrive:** 12:53, The British Museum, Printable Plan with Walking Maps button

Red annotations highlight specific features:

- 1. Navigation buttons (< Earlier, Later >)
- 2. Total journey time (1 hr 6 min)
- 3. Wheelchair accessibility icon
- 4. Crowding icon
- 5. Station Info button
- 6. Route 386 towards Royal Parade
- 7. Interactive Walking Map button
- 8. Printable Plan with Walking Maps button

3.1.1	The user should be able to switch to earlier and later iterations of the selected journey option. This means that the user can get a plan for alternative times without going back through the process.
3.1.2	All standard journey plan information should be provided. This includes departure and arrival times, location and vehicle information and travel durations.
3.1.3	The journey plan should indicate if vehicles are wheelchair accessible.
3.1.4	The mobility barriers that are present at each stage should be indicated. In addition to representing the presence of steps and escalators, there should be a more detailed description of accessibility

	for stations.
3.1.5	The journey plan should include provide additional information about facilities at stations or stops. This includes toilets, seats, shelter and more detailed accessibility information.
3.1.6	The journey plan should include additional descriptive information about journey environments. These must be objective observations (e.g. crowded or quiet) and avoid emotive language.
3.1.7	The journey plan may include a weather forecast for arrival at the destination (i.e. sun/cloud/rain and temperature).
3.1.8	Both interactive maps and PDF maps should be available. Whilst most users will prefer interactive maps for individual walking routes, having the option to see and print a complete set of maps of the journey will be useful for many.

3.2 Rich Journey Plans Presentation

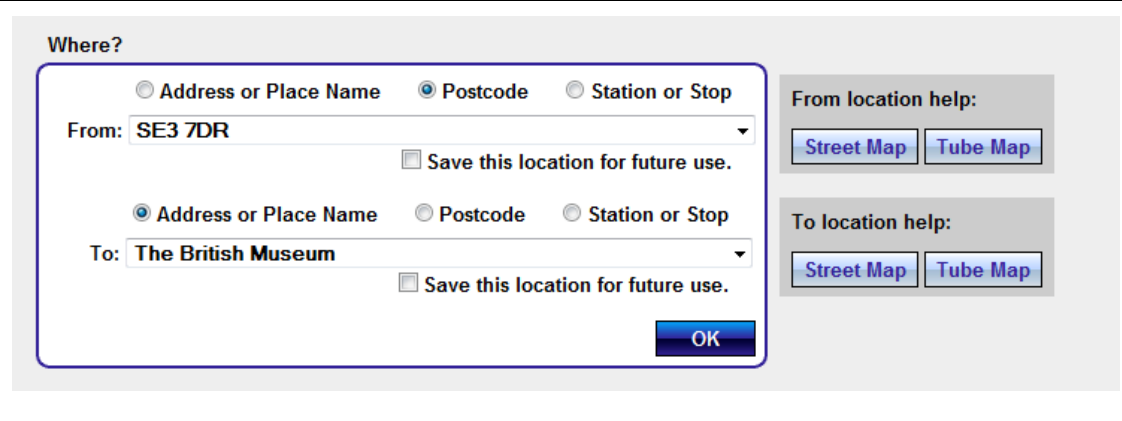
The screenshot shows a journey plan with the following details:

- Total Journey:** 1 hr 6 min, £3.60*, 28 min of walking.
- Stops and Modes:**
 - SE3 7DR (Start)
 - Depart 11:47 (3 min walking) → Tudor Grange Bus Stop BP (Quiet)
 - Depart 11:52 (12 min bus) → Greenwich Rail Station (Quiet)
 - Depart 12:10 (18 min train) → Charing Cross (Crowded)
 - Depart 12:28 (25 min walking) → The British Museum (End)
- Annotations:**
 - 1:** A red circle highlights the main journey flow from SE3 7DR to The British Museum.
 - 2:** A red arrow points to the 'Interactive Walking Map' button at the Tudor Grange Bus Stop BP.
 - 3:** A red bracket highlights the 'Interactive Walking Map' button at the Tudor Grange Bus Stop BP and the 'Printable Plan with Walking Maps' button at the bottom.
 - 4:** A red arrow points to the 'Station Info' button at Greenwich Rail Station.
 - 5:** A red bracket highlights the 'Interactive Walking Map' button at the Tudor Grange Bus Stop BP and the 'Station Info' button at Greenwich Rail Station.

3.2.1	<p>The journey plan should enable quick intake of the essential journey information first. This is done through graphical emphasis of the journey flow from location to location.</p>
3.2.2	<p>Map buttons should be visually integrated with the journey plan. It is vital that users are aware that these maps are available.</p>
3.2.3	<p>The availability and purpose of the different types of map should be clear. Interactive maps that are focused on a single walking route should be distinct from a collection of static (.pdf) maps that form a document of the whole journey.</p>
3.2.4	<p>Information about travel stages should be visually distinct from information about locations in the journey plan. In order to be readable, there must be a good visual connection between the information and the part of the journey that it refers to.</p>
3.2.5	<p>Supplementary information (e.g. weather, accessibility, descriptions) should be visually distinct from essential to the journey information (i.e. times, locations, transport modes). This is simply achieved through a column layout.</p>

4 Intelligent Location Entry

User trials demonstrated significant opportunities for error in location entry. These rules are intended to reduce the chances of users experiencing difficulty at the first stage of using a journey planner.

	
4.1	Types of location (e.g. station, postcode...) should be accurately and unambiguously named. This means that the names should encompass all of the location types that they represent.
4.2	There should be as few location types as possible (preferably none) and the search should have the flexibility to find what user is looking for without selecting a location type or spelling correctly.
4.3	There should not be a 'via' location option. It is simpler for users to plan two journeys and a <i>Genuine Journey Choice</i> system means that a range of suitable routes will be provided.
4.4	The choice of location types should be prominent to help the user provide a searchable input. Ideally this means locating the location types before the input box so that the user is prompted to make a suitable entry.

5 Better Walking Routes

Whilst this research did not look at maps in great detail, the user trials provided some interesting information that should lead to better provision and representation of walking routes in journey planners.

5.1	Interactive maps should be focused on walking routes. The initial view should encompass the start and finish of the walk rather than focusing on the start or end point. The user can then zoom if they need to view the route in greater detail.
5.2	Walking routes should be illustrated as realistically as possible (i.e. along pavements and crossing roads).
5.3	Frequent arrows on the walking route should indicate the direction of travel. When zoomed in it is easy for a user to lose track of the direction of travel.
5.4	Irrelevant surrounding areas on the map should be made less visually distracting. Facilities and transport nodes that are not directly on the route do not need to be shown.
5.5	A textual description of the walking route and any problems that may be encountered should be provided with the walking map. This is particularly useful for people who want to make a note of the route or those who find map-reading difficult.
5.6	Types of pedestrian crossing should be illustrated. This is particularly helpful to people who find climbing kerbs a problem.
5.7	The start and end of the walk route should be clearly labelled. These labels should be the same as the location names given by the journey plan.
5.8	The locations of public toilets, ATMs and highly recognisable landmarks may be indicated.
5.9	The map should not be zoomed by scrolling the mouse. Many users find this difficult to control and lose the route.
5.10	The walking map may provide alternative routes, not only the shortest one, and inform the user about the benefits of alternative routes.
5.11	A whole journey PDF should include a whole journey map and walking route maps.

6 Further Design Guidance

These additional recommendations have been drawn from the process of designing the i-Journey Prototype

6.1	Bold text increases legibility. This will help all users, but especially those who have impaired vision who will need to zoom less in order to make out the letters.
6.2	A two-page journey planner reduces navigation problems. Many of the problems that users experience navigating back and forth through web applications can be avoided by reducing the design to one page for user inputs and one for journey information outputs.
6.3	Dynamic content display elements reduce page overload and scrolling. Collapsible panels, accordions and tabs can be used to facilitate a two-page design that does not overload the viewer. However, it is important these are labelled in a way that fully informs the viewer of their content.
6.4	Consistent and instructive styling of elements improves interaction. This can be achieved with a simple style palette. The i-Journey prototype uses coloured borders with rounded corners for all expandable content, graphically rendered buttons for functional links and grey areas for non-essential functions and information.

Further Reading

Davis P.M., Case K., Marshall R., Gyi D.E., Sims R.E., Summerskill S.J., 2009.
Development of Tools to Reduce the Stress of Using Public Transport.
Paper at Ergonomics Society Conference. London, UK, Apr.

Davis P.M., Case K., Marshall R., Gyi, D.E., Sims R.E., Summerskill S.J., 2009.
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The Psychological Stress Perspective: A unifying view of accessibility in public transport and beyond.
Nordic Ergonomic Society Conference. Reykjavik, Iceland, Aug.