

Travel competence: a requirement for transport sustainability

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Abstract

Widespread literacy was necessary to produce the consumer society we have today. Widespread travel competency will be necessary to produce the sustainable society we want tomorrow.

Road vehicles produced 87% of Australian transport emissions in 2007: that is, 68.5 Mt of carbon dioxide equivalent. Most of that came from private motor vehicles. In an environmentally sustainable society, that figure will have to come down.

The private motor vehicle is here to stay. It is the most appropriate mode for some trips, but not necessarily all those for which it is currently used. Research shows that motorists who have their erroneous expectations of public transport corrected are more likely to use it thereafter, than those who do not. This suggests that to maximize the use of the more environmentally friendly modes, motorists need up to date knowledge and experience of them. Programmes such as TravelSmart encourage people to expand their experience of the non-car modes but they are designed to correct the overuse of cars rather than prevent it.

I propose the phrase “travel competence” to describe the ability to make informed choices amongst all the available modes and thus discourage excessive use of the car in the first place.

Keywords: travel competence, public transport, cycling, walking, TravelSmart, travel blending, sustainable transport

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1 Introduction

The object of this paper is to suggest a way of moving towards sustainable transport by consolidating, formalizing and expanding existing educational practices under the title of *travel competence*, so as to expand travellers' perceptions of what are feasible modes for their journeys. This will enhance their ability to make use of the most appropriate mode for their journey, in any given set of circumstances.

At one time, only select groups in society, such as the clergy, needed to know how to read and write. However, to gain maximum advantage from a world that was increasing in complexity and sophistication and which required communication at a distance for members of society, widespread literacy became necessary in Europe in the nineteenth century (Venezky 1991).

There has also been an increase in the possibilities for personal transport since the beginning of the nineteenth century, with the development of both the internal combustion engine and the cycle, giving individuals a choice mode between train, cycle, car, plane, motorcycle, bus (and variations on each) as well as the traditional ferry and foot, and in some places, animal transport.

In the twenty-first century, it has become necessary to pay more attention to sustainability and creating a sustainable society. This includes using water and energy sustainably and travelling in a sustainable manner. In the same way that reading and writing became necessary skills in order to develop a literate society, travel competency (i.e. the ability to make informed choices amongst the available modes) is a prerequisite skill for the sustainable society as it enables people to make optimum travel choices.

Travel competence, nevertheless, is only one part of the equation for transport sustainability. It complements elements such as policy, strategies, infrastructure and enforcement.

This paper is set out as follows: sections 2 and 3 discuss the concepts of sustainable transport and travel competence. Section 4 offers some conclusions.

2 Sustainable transport

2.1 Definitions

There is no generally agreed definition of sustainable transport. Some authors have developed their own (Black 2010; Brindle 1998; Davis 1996). Litman (2008) gives several examples. Nevertheless there is wide agreement that a sustainable transport system will involve more use of walking, cycling and public transport than at present and less use of the private motor vehicle (PMV), even though with less polluting fuels, the latter will be more environmentally acceptable.

Walking, cycling and public transport generally use fewer resources per person than driving. However, this requires the modes which are shared to be well used. The breakeven point will differ in each case, but a bus with only one or two passengers is not likely to be an effective use of resources – a taxi would require less fuel and is likely to be able to pick up and drop off the passengers closer to their origins and destinations, thus being more convenient than buses or trains. A (shared) vehicle powered by dirty energy such as that derived from brown coal is also not appropriate if the alternative single occupancy vehicle uses cleaner energy (in terms of emissions), although it may be a better use of road space (Fawcett 1999).

This of course, does not solve the problem of the use of scarce resources such as construction materials, road space and personal allocation of time nor does it render transportation more sustainable from a financial or social point of view.

However the shared modes are not, in general, the dominant modes. For example, although over 70% of the trips to the Sydney CBD in the peak hour use the more sustainable modes, overall walking cycling and public transport make up less than a third of trips undertaken each day in Sydney (TDC 2010: Fig. 3.5). We can enhance current transport environmental sustainability by encouraging people to use modes other than the PMV for more of their travel. However the current urban form, because of the location, distances and lack of alternative provision, requires use of PMVs in some situations.

2.2 Barriers to greater use of more sustainable modes

There are many factors which go into a decision to use one mode in preference to another. Ortúzar & Willumsen (1990) give a list which includes some of the more easily measured factors such as trip purpose, travel time and availability of mode. Stradling (2002) lists some of the more subjective reasons for choosing between car and public transport, such as the feelings of control and independence that driving a car engenders. This paper considers only one of the many factors which can influence mode choice: a mismatch between reality and the travellers' perceptions of each mode.

2.2.1 Mismatches between attitude and reality

Before travellers can use any form of transport, they need to be aware of it. Garvill, Marell & Nordlund (2003) found that increasing awareness of other modes produced a temporary decrease in car use in individuals with a strong car habit, although not in people with a weak car habit (which may be because the latter group would have considered other modes anyway).

Nevertheless, awareness is not enough. When travellers make a choice, they must have a reason for that choice and be satisfied that the mode is appropriate to their needs – for example, that it will allow them to complete their journey in a reasonable amount of time (and the literature suggests that time is one of the most important considerations when choosing a mode, although factors such as access to modes, trip purpose, security, comfort and convenience may also play decisive roles (e.g. (Ortúzar & Willumsen 1990)). For this they require information. Research by the International Association of Public Transport suggests that between 5 and 25% of journeys are not made on public transport solely due to lack of adequate information (Union Internationale des Transports Publiques (UITP) 2003).

Ashton-Graham (2008) in Perth (W.A.) found that a lack of awareness and information prevented 17% of survey respondents from taking up alternatives to car trips they were currently making.

Indeed, van Exel and Rietveld (2009), working in the Netherlands, found that expected travel time was an important determinant of the mode chosen by travellers, but that motorists often had the wrong idea of how long a trip would take by public transport. They estimate that if the car travellers' knowledge of public transport travel time was more accurate, two out of three of them would use it more often.

However, published information, such as journey time, requires effort on the part of the traveller to search out. Information born out of personal experience, on the other hand, is immediately available.

Fujii, Gärling & Kitamura (2001) considered the effect on motorists of the closure of a freeway in Japan for eight days while maintenance was carried out. They found that motorists who overestimated travel time on public transport, increased their frequency of travel by public transport when their incorrect expectations were revised.

2.2.2 Reasons for mismatches

It is appropriate to ask here why a lack of practical experience gives rise to distorted views of reality. Three of the possible explanations are as follows:

Behavioural economics – simplified decision making

The subject of behavioural economics (Reeson & Dunstall 2009) is concerned with the way people make decisions, including decisions related to travel. Economic modelling assumes that people are rational and have complete information, which they use as appropriate. Behavioural economics maintains instead that people rely on simple decision making rules and habits. Simplification can result in a less than accurate picture of a situation. Some of the factors which contribute to simplified decision-making include:

- **innate conservatism:** i.e.
 - the tendency to remain with what people already know (e.g. a familiar mode);
 - the tendency to settle for what is good enough, rather than searching for the best (e.g. an option that works well enough, even though there might be a better one);
 - the tendency to remain with the default option;
- **uncertainty aversion:** people are uncomfortable with uncertainty. Therefore, any mode of which they have limited experience will inevitably involve uncertainty as to how it operates. In addition, the environment in which public transport operates, with many aspects (e.g. weather, volume of traffic, behaviour of passengers) out of the control of the operator, mean that things may go wrong, leading to uncertainty in timing and punctuality (Cityrail 2010);
- **risk aversion and loss aversion:** people give greater weight to the potential losses (e.g. loss of control over travel) than the potential gains (e.g. reduction in worry about parking and vehicle theft);

Changes in common knowledge

One way of collecting information is by taking advice from trusted associates; another is to base opinions on "common knowledge". However, "common knowledge" may be incorrect (Rissel et al. 2002 (see below)). What was "common knowledge" and what people needed to know/be told has changed over the years with the change in the prevalence of use of a particular mode. Old "common knowledge" has been lost and replaced by new "common knowledge".

An example is guidebooks for cycling. In 1874, a book called *Bicycling: its rise and development, a text book for riders* (*Bicycling: Its Rise and Development, A Text Book for Riders 1874*) was published in England. It contained many suggestions for routes. Its readers were told about the quality of the surface and construction of the road, which could vary enormously, but nothing about how to interact with other road users (even horses). Most modern guide books for road cycling, on the other hand, assume that the road surfaces will generally be satisfactory, but that readers need guidance on interacting with motor vehicles.

That is, the help that writers or publishers feel that readers will need has changed from advice about the carriageway itself to advice about other users of the carriageway (e.g. Roads and Traffic Authority (RTA) 2009b). To put it another way, what the writers think their readers do not need to be told has changed. (An exception is the book *Cyclecraft* (Franklin 2007), which discusses both).

With the rise of the PMV and the decline in cycling in Australia, the ability to drive is now the "common knowledge" (almost 84% of the population of NSW aged 16 and over at June 2008 (Roads and Traffic Authority (RTA) 2009a) had a driver's licence whereas only about 10% of Sydney residents use a bus on an average weekday (TDC 2002) and fewer than 1% of trips are by cycle (TDC 2010). Therefore people may simply never have had the opportunity to use some of the other modes and hence to correct misperceptions.

Habit

Habit is another factor which prevents people expanding their range of everyday modes. Studies have found that people with a strong driving habit acquired less information and had less elaborate strategies when choosing the mode for a given trip (Verplanken, Aarts & van Knippenberg 1997). Such people are likely to have restricted experience of modes other than their habitual one. Misconceptions have no opportunity to be corrected in such a situation.

2.2.3 Correcting the mismatch between attitude and reality

The lack of knowledge and incorrect ideas about the time taken for a trip by public transport suggest that those travellers are not familiar with and experienced in the use of public transport. Conversely, it suggests that there would be more use of public transport if travellers had accurate perceptions of it. On the same principles, one might expect more people to cycle if their concerns about safety were corrected (e.g. over 75% of respondents in a Sydney survey (Rissel et al 2002) thought that they were likely to be hit by a motorist if they cycled down a main road – a totally unrealistic perception).

Following on from this, it may be postulated that if people were competent in the use of all the available modes, they would be able to make an informed choice amongst them. Hence they might make use of a greater range of modes than if they only knew about one.

3 Travel competency

3.1 Definition

Travel competency is defined as the combination of knowledge, skills and possessions required in order to use the available modes of transport. It is a measure of the expertise a traveller needs in order to use a transport system. It might be expected that the less competence required above a level which could be termed "common knowledge" (in the case of the current transport system, the ability to drive (enjoyed by almost 84% of the adult residents of NSW (RTA 2009a)), the more use a mode would receive.

Travel competency can be divided into two parts:

- trip planning competencies (information only – doesn't require physical possession of a vehicle); and
- trip execution competencies (physical requirements – ability to drive, cycle, walk; actual possession of a vehicle, skills in using public transport etc).

The term is shorthand for

“I know (in enough depth) how the transport system works and what I can realistically expect from each of the available modes. I am proficient in everyday use.”

The definition refers to individual travel competency, but the concept is also applicable on a population level; that is, what is “common knowledge”, how skilled is the population, to what level of wealth do the public infrastructure and private possessions (vehicles) rise.

As the available forms of personal transport vary from place to place, and the conditions under which they are used also vary (in some places, for example, a ferry may be operated on demand rather than to timetable) no-one is likely to need a complete set of competencies.

Furthermore, as conditions change (e.g. new forms of tickets or ways to issue tickets), the competencies required will alter.

3.1.1 Examples

Table 1 gives examples of competencies required to use cars (as the driver) and public (stage) buses.

Table 1: Example competencies for car (driver) and bus

Mode	Planning competencies	Execution competencies
car/light commercial vehicles (driver)	route	access to a car/light commercial vehicle; <ul style="list-style-type: none"> - own - household vehicle - company car - hired - share scheme
	likely delays	ability to drive
		licence to operate vehicle
	likely tolls en route	access to toll payment method and credit
	parking options at the destination	ability to use additional equipment for the vehicle (e.g. navigation systems)
public bus	knowledge of destinations	knowledge of fares, concessions and payment methods
	knowledge of available services	ability to indicate a wish to board/alight from bus
	knowledge of scheduling	ability to obtain and read timetables/ use automated journey planners
	knowledge of bus stop locations	knowledge of appropriate travelling locations within the vehicles

Car/light commercial (driver)

Motorists need to be able to plan their route. This may be personal knowledge, done with the aid of maps (or the help of a passenger) or by following an electronic navigation system. In planning the route it will be necessary to know what delays (e.g. expected locations of congested traffic) and tolls the driver can expect to encounter en route. Although there is generally no restriction on the time the motorist may travel, there may be delays at certain times (for example, for bridges to open for shipping or because of bans on access for motor vehicles (e.g. in pedestrianized areas)). At the destination, drivers need to know where they can leave their vehicle while they conduct their business.

To carry out the trip, the motorist clearly needs a vehicle, the ability to drive, and if using public roads, should have a driver's licence. If the trip is likely to use a road with electronic tolling, the vehicle should be equipped with the necessary equipment and the driver should be in credit.

Public bus

Bus passengers do not have to navigate, so it is not essential that they know the route, but they do need to know which destination they want and the bus stops at that location. If they do not recognize the local landmarks, the driver or fellow passengers may be prepared to point them out so that the passenger alights at the appropriate point.

Where there are request stops, passengers need to be able to indicate to the driver where they wish to board and alight.

There are a variety of methods of ticketing for buses, which include paying the driver on the vehicle, pre-paid tickets only and conductors. The tickets may be by distance, number of zones, flat fares, time of day or by elapsed time. There may be concessions for selected groups (e.g. local students, local age pensioners). This is an area which can be very confusing for people not accustomed to the system (Christie 2010) and therefore discourage occasional users of the mode (e.g. visitors).

Some buses run so frequently that a time table is not considered necessary (e.g. the central Sydney and Wollongong free services (NSW Transport & Infrastructure 2009)) but in general it is necessary to know when buses are scheduled to run. There are now several different forms of timetable, ranging from traditional paper versions through to electronic versions on the Internet. Electronic journey planners and telephone helplines can provide information, as can the staff of information offices (ibid.).

A prior knowledge of the best travelling location within the vehicle is only necessary for some: for example, passengers with (unfolded) pushchairs or wheelchairs will find that often only one area on the bus is suitable for them.

3.1.2 Other competencies

The competencies suggested here are the basic requirements for travelling by that mode. They could be expanded if necessary. For example, if individual carbon trading was introduced (Niemeier et al. 2008) it would be necessary to include the calculation of the carbon footprint of a journey in the list of planning competencies. It would also be possible to extend competency to include advanced skills, such as fuel efficient driving (U.S. Department of Energy & U.S. Environmental Protection Agency 2010).

3.2 Benefits of travel competence

3.2.1 Personal benefits

Control is one of the benefits that driving (but not using the car as a passenger or carpooling), cycling and walking confer but public transport lacks (Hiscock et al. 2002; Stradling 2002). Nevertheless, public transport has benefits (e.g. providing time to undertake other tasks (Lyons & Urry 2005), freeing the traveller from worries about parking, vehicle security or delays due to congestion on the roads). Cycling and walking provide exercise as an inherent part of the journey. Any attempt to promote the non-PMV modes needs to emphasize these advantages.

Stradling (op. cit.) notes that motorists are discouraged by the amount of cognitive effort (information gathering and planning) that is required to use public transport and especially the affective effort involved (i.e. emotional energy expended – e.g. worry and uncertainty about whether a public transport vehicle will appear in time).

Travel competence reduces the need to expend this effort and by enhancing knowledge, enhances control. It empowers people to make trips they are not currently making.

Equally, public transport is not necessarily the most appropriate mode for all trips – for example, industrial estates may be relatively well served during the week but poorly served at the weekend. In this case, the PMV or cycle may be better choices.

Hence the benefit for the individual of travel competency is that it reduces the effort required of them in everyday life by ensuring that they are well prepared for all the situations they might meet.

Travel competency benefits individuals in unusual situations, such as when a life event (e.g. moving house) or a network event (e.g. road closure) occurs. It then enables individuals to minimize disruption to their travel. The flexibility engendered by travel competence means that they do not need to learn something new when a problem arises; they can slip into alternative behaviour which achieves the same result as use of their previous mode did. Individuals have greater control over their life than they would have had if they relied on one mode.

3.2.2 Societal benefits

As a method of maximizing the use of environmentally friendly modes of transport and minimizing the use of PMVs, travel competence has the potential to benefit the whole of society by changing the distribution of modes and hence the pattern of the disadvantages of each mode (e.g. amount and location of air pollution discharged).

Travel competency also has the potential to move (habitual) behaviour into the realm of planned behaviour because people are making a conscious choice. Studies show that attitudes do not necessarily translate into action (e.g. Garvill, Marell & Nordlund 2003) but there is a greater chance of changing conscious than unconscious behaviour (Verplanken et al. 2008).

The ability to use a mode brings with it an understanding of the problems associated with that mode. This has the potential to bring about greater tolerance between road users: for example, so motorists understand why cyclists might wish to move to the head of a queue of motor vehicles at traffic lights, to enhance their visibility (Sharples 2010).

3.3 Problems and risks

Every concept has both good points and bad; advantages and disadvantages. Travel competence is no exception. Potential problems include:

- empowering people to make trips they are not making already. As such, there is a risk of inducing trips. This may cause problems if the mode is already overused or the travel situation is already strained (e.g. the buses are full or there is no room on trains for more carriage of bikes);
- enhanced knowledge allows for enhanced flexibility, but this may lead to different imbalances among the modes. In order to prevent this happening during the Sydney Olympics, people were asked not to move out of their cars onto public transport, which could not have coped with a general movement of motorists to public transport (Tudge 2003);
- with enhanced travel flexibility there are extra costs. More use of other modes implies more money being spent on those modes for provision and maintenance, but it is still necessary to maintain the roads.

3.4 Becoming competent

3.4.1 Help with learning to use the available modes

An individual usually becomes travel competent by virtue of their experience with the available modes. This is often achieved by practical experience but driving a motor vehicle is one competency which requires formal tuition and testing.

Some elements of a travel competence training regime exist already: driver education at high schools (The George Institute 2010), the driver's licence test (Roads and Traffic Authority (RTA) NSW 2007), and cycle proficiency training (Bicycle Federation of Australia (BFA) 2006; Franklin 2007). However, these are aids to operating the vehicle, and do not go into details such as optimizing routes. The use of timetables may be taught at school.

Although there is a great deal of information on using public transport in the form of brochures, posters, web pages and telephone helplines (NSW Transport & Infrastructure 2009), organized instruction on using it is rarer. One place where a person can get help with using the public transport systems is in introductory language courses or phrase books (e.g. Berlitz 2007; Chau 2003; Gonzalez, Kettle & Placencia 2003; Mérieux & Loiseau 2008; Perlmann-Balme & Schwalb 2005; Sidwell & Capore 1990). These courses include phrases a person needs to know to travel locally and long distance. They may be very detailed descriptions of using the public transport system (of the capital city) of the target country (Chau 2003) or a more general discussion of transport (Mérieux & Loiseau 2008; Perlmann-Balme & Schwalb 2005).

However, expertise in using modes (as opposed to operating vehicles) is still usually left to chance. That depends on the traveller having an active desire to use the mode and then improving their skills. They do not necessarily want to, which does not necessarily lead to optimum use of the mode (Sharples 1999; Stradling 2002) much less optimum use of the transport system. Unnecessary mileage leads to more greenhouse gases (GHG), vehicle operating costs (VOC), time, stress and their associated costs than necessary – that is environmental costs, financial costs and health costs which are of no benefit to (a sustainable) society.

3.4.2 Help with moving to more sustainable modes

There already exist programmes whose aims are specifically to encourage people to move from the PMV to other modes. These are called travel plans. In Australia these sometimes go under the name of TravelSmart (TravelSmart Australia 2009) or travel blending (Ampt & Rooney 1998).

Travel competence promotes these ideas on a larger scale and preempts the need for them by ensuring that people have the expertise to make appropriate choices from the outset. Travel plans can be compared to repairing travel skills after the event; travel competence aims to arm travellers with knowledge before they make a choice.

A logical time to promote these ideas is at secondary school, when teenagers are learning to drive. It is important to remember, however, that driving is optional. Not everyone wants a driving licence; not everyone is eligible to obtain or keep one. However travel is necessary for everyone who wants to step outside their home.

3.5 The implications of travel competency for designers

3.5.1 Complexity

It is possible to design a transport system to lower the threshold of knowledge and skills required for travel competence. Alternatively, it is possible to make the system complicated so that a high level of competence is required. For example, Sydney's bus ticketing system, which requires passengers to prepay tickets for some services but not others (NSW Transport & Infrastructure 2009), appears to be designed not so much for "incompetent" travellers but rather to solve particular problems for the designers of the system, such as "excessive" dwell times. Similarly, redefining "on time" to mean 5 minutes either side of the advertised time (Cityrail 2010), benefits the operators of a system who have targets to meet, rather than helping individuals plan and execute their journeys.

3.5.2 Continuity

"Common knowledge" changes over time and contributes to attitudes. To enhance "common knowledge" the system to which it refers should remain unaltered. In the context of personal transport, this means any expansion of the system should use existing technology rather than different technology: for example, in Sydney, expand the rail system using more heavy rail rather than introducing metros.

That is, a system which was aiming to maximize use would minimize the requirements for travel competence by making transport easy to use with existing travel knowledge and skills.

4 Conclusion

Considerations about sustainability falls into three areas: environmental sustainability, social sustainability and economic sustainability. Using the very general definition:

sustainable transport is transport which meets the needs of the present without compromising the ability of future generations to meet their own needs

current transport systems do not meet all the performance indicator tests. Since we cannot know the travel technology future generations will have available, nor the shape of their urban areas, nor their communication needs, we cannot predict the resources that they will

need. We must fall back on the assumption that their needs will be similar to ours and that therefore we must ensure that there are adequate resources available for their use.

Although the PMV with more environmentally friendly fuel source will be part of the transportation mix, the sustainable society is likely to see public transport, walking and cycling used to a greater extent than today. Currently there are some travellers who can use every mode that is available but also some who are deterred from using modes other than their regular one by misapprehensions about these modes. These mistaken understandings may be due to inherent human behavioural factors or incorrect assumptions.

I propose the introduction of the concept of travel competency: that is, the systematic education of individuals in the skills required to make informed decisions covering the use of all available modes, so as to enhance people's flexibility and give them more control over their travel. A logical time to do this would be at secondary school, when teenagers are learning to drive. However it would be necessary to make provision for those people who do not have a drivers' licence, but who still need to travel.

A wide range of estimates have been given for the potential increase in the use of the more sustainable modes if misapprehensions were dispelled. It is likely to vary from place to place, depending on, for example, the base upon which it is built.

The implication of travel competency for transport planners include responsibility for making the transport system easier for travellers to use, rather than solving problems for designers.

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