

Spreading the Word:

**A Social-Psychological Exploration of Word-of-Mouth
Traveller Information in the Digital Age**

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Abstract

The use of ‘formal’ travel information pertaining to costs, routes, journey times, or real-time transport disruptions, and its role in travel behaviour (for example, choice of mode, route or departure time) has been widely studied, but little is known about the part played by ‘informal’ information, shared through word-of-mouth amongst friends, family, colleagues and other social networks, in relation to everyday travel. Furthermore, considerable investment has been made over recent decades in the development of sophisticated ‘advanced traveller information systems’, delivering formal, top-down information through media such as online journey planners, but less attention has been paid to parallel developments in the diffusion of bottom-up, user-generated information through ‘electronic word-of-mouth’ on the internet (acknowledged in the field of marketing as a growing source of influence on consumer behaviour). This thesis examines the role of word-of-mouth information diffusion within everyday travel behaviour and its emerging applications in the field of online traveller information, within a framework of social-psychological theories of behaviour and decision theory. The exploration of social-psychological factors underlying the social transfer of traveller information led to an expansion of existing theory, whilst the research also generated practical recommendations for the wider incorporation of ‘social design features’ into certain forms of traveller information system.

The research was undertaken in two empirical phases, both employing a qualitative methodology. In Phase 1 (exploratory), interviews and focus groups were used to: generate an account of the use of word-of-mouth travel information; explore participants’ perceptions of the influence of this form of information on their own and others’ travel behaviour; and identify social-psychological mechanisms underlying the influence process. ‘Local knowledge’ obtained through word-of-mouth was found to be highly valued, and was deemed trustworthy primarily because it was based on the informant’s direct experience (an instrumental-reasoned explanation). However, perceived trustworthiness could be improved by social-psychological factors such as social proximity, group-identification and accepted norms of behaviour. Word-of-mouth was found to play a complementary role to formal information in the decision process, and was reported to have had a direct influence on trip details (e.g. route or departure time), but was less likely to affect modal choice. More general interactions about travel (for example, appraising the experience of using a particular transport mode in general conversation), whilst not necessarily perceived as travel information *per se*, appeared to be influencing beliefs and attitudes, and shaping the psychological context in which travel choices might later be made.

Phase 2 (applications) was a qualitative case-study of an innovative, web-based traveller information system, entitled *Cycology*, through which 23 participants shared cycle routes and other information with one another over a period of six weeks. This allowed both a validation

of the earlier findings within an applied context, and an exploration of some findings in greater depth - in particular, the ways in which social norms and social identities around travel are established or reinforced in peer-groups through word-of-mouth interactions, and help to explain interpersonal influences on travel behaviour. Interactions on the website were found to: influence participants' behaviour in the form of using cycle routes suggested by others; strengthen pro-cycling attitudes; and enhance the experience of the cycle commute. A key finding was the role which *Cycology* played in building a sense of 'community' (group identification), linked to high levels of trust and pro-social behaviour amongst group members, which both reinforced positive views of cycling as a commuter mode, and increased people's propensity to act on information from others within the group. Together with the Phase 1 findings, this led to the proposed incorporation of additional 'social factors' into established models of information use. Practical recommendations from the research concerned ways in which developments in social media might be combined more widely with online, map-based traveller information, particularly route-planning tools, with the potential to enhance the perceived reliability (and influence) of such systems, and, consequently, their effectiveness as a transport policy tool.

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Chapter 1 : Introduction and Background

This chapter introduces the subject area of the research, presents the objectives and research questions, and a schematic overview of the structure of the PhD. The concepts of ‘informal’ and ‘formal’ travel information and word-of-mouth diffusion – as they are to be used in this thesis - are then defined, and background provided on contemporary technical and policy developments in the field of traveller information.

1.1 Introduction

Today's traveller has a wealth of information at his or her disposal to help plan and execute day-to-day journeys, from old-fashioned paper maps and timetables, to state-of-the-art satellite navigation systems and web-based services delivering detailed journey planning and real-time travel updates to computer or mobile phone. Conventional rational choice explanations of human behaviour would contend that the modern traveller, armed with comprehensive information about all her travel options, as well as powers of perception and reasoning, weighs up the costs and benefits (utilities) to herself of each option and arrives at a ‘rational’ decision to act in a way which she expects will bring her the maximum personal benefit. Thus, access to detailed, factual travel information should, through a cognitive process of ‘preference maximisation’, lead individuals to make optimal travel decisions (e.g. the cheapest/quickest/least congested route or mode), which may, when aggregated, lead to improvements in the efficiency of the transport system as a whole. Furthermore, integrated, multi-modal travel information facilitates the planning and execution of journeys by public transport, and it is suggested that this could encourage some people to make a journey by public transport, when they would otherwise have used the car, by raising their awareness of alternatives and reducing the time and effort of information search. This has clear policy advantages in terms of reducing traffic congestion and its negative social and environmental consequences.

Although deeply embedded in the culture and institutions of Western society, the behavioural assumptions inherent in the rational choice model have been the target of much criticism in recent decades, particularly from within the fields of psychology and sociology. Criticisms have been levelled against three key assumptions:

- 1) that choice is rational, in the sense of a continual deliberation to maximise utility;
- 2) that the individual is the appropriate unit of analysis in social action;
- 3) that choices are made in the pursuit of individual self-interest.

A strict interpretation of the first assumption may lead one to overlook the significance of factors such as emotion, habit and an individual's cognitive limitations; the second neglects the effect of social factors on human agency, such as social norms, social expectations and group identities; and the third may fail to acknowledge the influence of personal (moral) norms and pro-social values (Jackson, 2005).

In the context of everyday travel choices, therefore, it may be naïve to expect the provision of more and better information to lead directly and inevitably to changes in travel behaviour which benefit the individual, as well as society as a whole (such as reductions in traffic congestion). Indeed, the evidence of actual behavioural change as a direct result of the use of travel information is more limited than one might expect, particularly in terms of modal shift. Take, for example, the case of Transport Direct (the UK multi-modal travel information service). Despite an early ambition to "*enable and encourage people to use public transport more than they currently do*" (DfT, 2002) through the provision of multi-modal information demonstrating alternatives to the car, an online survey showed that 7.7% of users, after consulting the information service, intended to switch their mode from car to public transport for a trip they had made before, and 2.3% intended to switch the other way. This suggests an *intended* net modal shift to public transport of just 5.4% (AEAT, 2007). Other studies have suggested that presenting people with factual information is insufficient on its own to motivate behavioural change (e.g. Ampt, 2003). In the context of engaging the public in environmental policies, Owens (2000) argues that:

"A substantial body of social-scientific research suggests that, while greater knowledge may be worthwhile in its own right, barriers to action do not lie primarily in a lack of information or understanding (...). We should not be greatly surprised to find (...) that cultural rules and social networks had a greater influence on translating underlying concern into environmental action than the availability of detailed scientific information"...
(p.1143)

This may lead us to wonder whether the same argument might apply in the field of travel information and behaviour. Does *informal* information, shared through word-of-mouth amongst friends, family, colleagues and other social networks, have a role to play in travel decision making, and if so, might this be explained with the help of behavioural theories and constructs from the social sciences (particularly social psychology)? Although social influence might be most potent within immediate peer groups, experimental social psychology has demonstrated that individuals are also influenced by people they do not know personally, but with whom they feel some sense of connection, however fleeting. This might be, for example, an affinity with fellow cyclists, users of the same bus service, or even a brief sense of identification with fellow

passengers on a station platform when delays are announced. A number of social-psychological theories might be drawn upon to identify and explain some of the social factors underlying word-of-mouth information-use and its potential effects on behaviour, using concepts such as social learning (Bandura, 1977), social norms (Triandis, 1977; Cialdini et al., 1990) social identity (Tajifel, 1982) and referent informational influence (Turner et al., 1987).

A further dimension to this area is the growth of “digital word-of-mouth” (Dellacoras, 2003). The ability to connect with ‘people like me’, unimpeded by geographical distance, has radically increased as a result of the explosion in electronic communications, particularly internet-based social networking. This has rapidly expanded the realm of word-of-mouth information diffusion from traditional face-to-face communication, greatly increasing the channels for exchanging ‘bottom-up’ information. In fact, many user-generated travel and transport-related web-sites and email groups already exist for the purpose of sharing opinions and recommendations amongst groups of like-minded travellers. These are developing in parallel with increasingly sophisticated advanced traveller information systems. However, so far there has been little interaction between these two forms of information delivery. Web-based journey planners do not currently link to the type of customer reviews accessible to people buying, for example, books or holidays over the internet, which could address the informal travel information needs which might sometimes be helpful in planning a journey, although some public transport companies have recently started to embrace social networking, and there have been a number of developments in web-based interactive mapping. If the underlying aim of advanced traveller information is to help people make better-informed decisions which benefit not only themselves, but also the efficiency of transport networks as a whole (which may imply greater use of public transport to mitigate traffic congestion), then the inclusion of user-generated, informal travel advice might prove to be one way of widening its impact.

The aims of the research were thus defined as follows:

- To explore the role of informal information and word-of-mouth diffusion in everyday travel behaviour;
- To identify and explore social-psychological factors which may account for word-of-mouth influences on travel behaviour;
- To study the above phenomena in the context of an innovative, interactive information system, and to consider implications of word-of-mouth information-sharing for a wider range of advanced traveller information systems.

In summary, this research has offered an opportunity to combine theoretical concepts from a number of disciplines with empirical research to improve understanding of an unexplored phenomenon in transport studies, and to apply this knowledge to a specific area of transport policy and practice. The research takes place against a backdrop of rapid technological change in the field of advanced traveller information and user-generated content. The findings might prove to be of interest to developers and sponsors of such systems, and to policy-makers concerned with maximising the effectiveness of advanced traveller information in the context of broader measures to tackle traffic congestion.

1.2 Research Questions

The research questions were developed from the original research aims and refined iteratively as the literature review progressed.

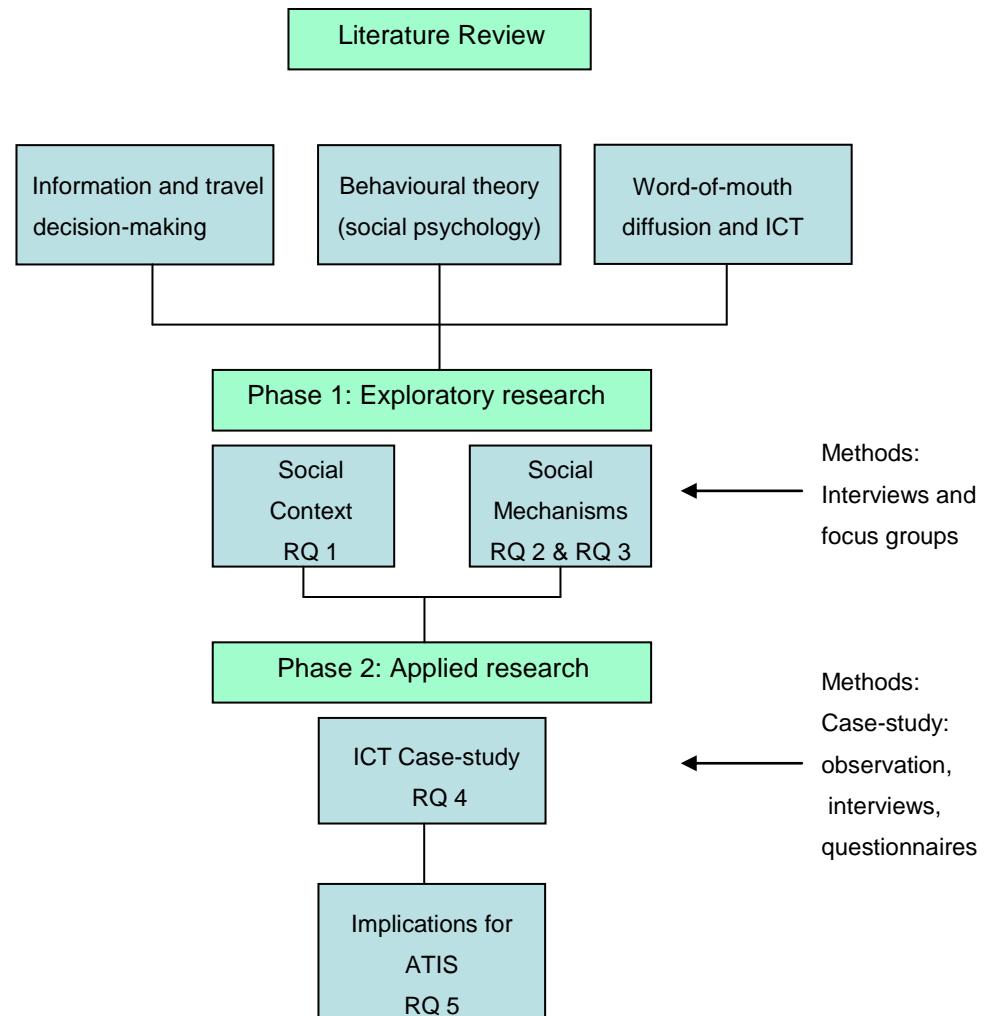
- a) Context: the social transfer of travel information.
 - 1. From whom, and in what circumstances, do people acquire travel information, and with whom do they share it? What types of information are conveyed through word-of-mouth?
- b) Mechanisms: the influence of word-of-mouth information in travel behaviour.
 - 2. What is the perceived role of word-of-mouth information in the travel decision process? How do informal and formal types of information interact?
 - 3. How do particular social-psychological factors (e.g. social norms, social identity, pro-social values, trust) appear to influence the use and effects of word-of-mouth information?
- c) Applications.
 - 4. How do word-of-mouth processes and informal information-sharing operate within an emerging web-based system incorporating user-generated travel information?
 - 5. How might information-sharing amongst travellers be applicable to advanced traveller information systems (ATIS) more generally?

The empirical research in this thesis was undertaken in two phases. Phase 1 (exploratory) addresses the social context of travel information (research question 1) and underlying social-psychological mechanisms which might help to explain the role of word-of-mouth in travel decision-making (research questions 2 and 3). In Phase 2 (applied), the initial findings were

translated into and explored more deeply within a specific context – a case-study of a web-based system enabling users to share travel information with one another (research question 4). Finally, the thesis broadened out once more by developing preliminary recommendations, based on the findings from both research phases, for the incorporation of ‘social design features’ into advanced traveller information systems more generally (research question 5).

A ‘road map’ of the PhD structure is provided in Figure 1-1, showing the two phases of the research and their relationship with the research questions (RQs) and research methods.

Figure 1-1: Overview of PhD Structure



1.3 Background

This part of the chapter begins by defining both formal and informal travel information, and word-of-mouth information diffusion, as they will be used in this thesis. It then outlines two aspects of the research context: the state-of-the-art in advanced traveller information systems and user-generated content at the time of writing; and the UK policy context in relation to traveller information provision.

1.3.1 Formal and informal travel information

This study differentiates between formal and informal travel information, with regard to both information content and the modes through which information is transmitted. In terms of content, 'formal travel information' may be described as 'factual' information provided to a mass audience (although it may be tailored to the needs of the individual) by, for example, transport providers and governmental agencies. It comprises information such as: departure and arrival times; costs; possible routes; and real-time updates on the running of the transport network. Formal modes of information delivery may be described as 'top-down' communication mechanisms and may include: paper timetables and route maps; telephone inquiry services; teletext and digital TV; GPS navigation systems; and web-sites delivering journey planning and real-time travel information.

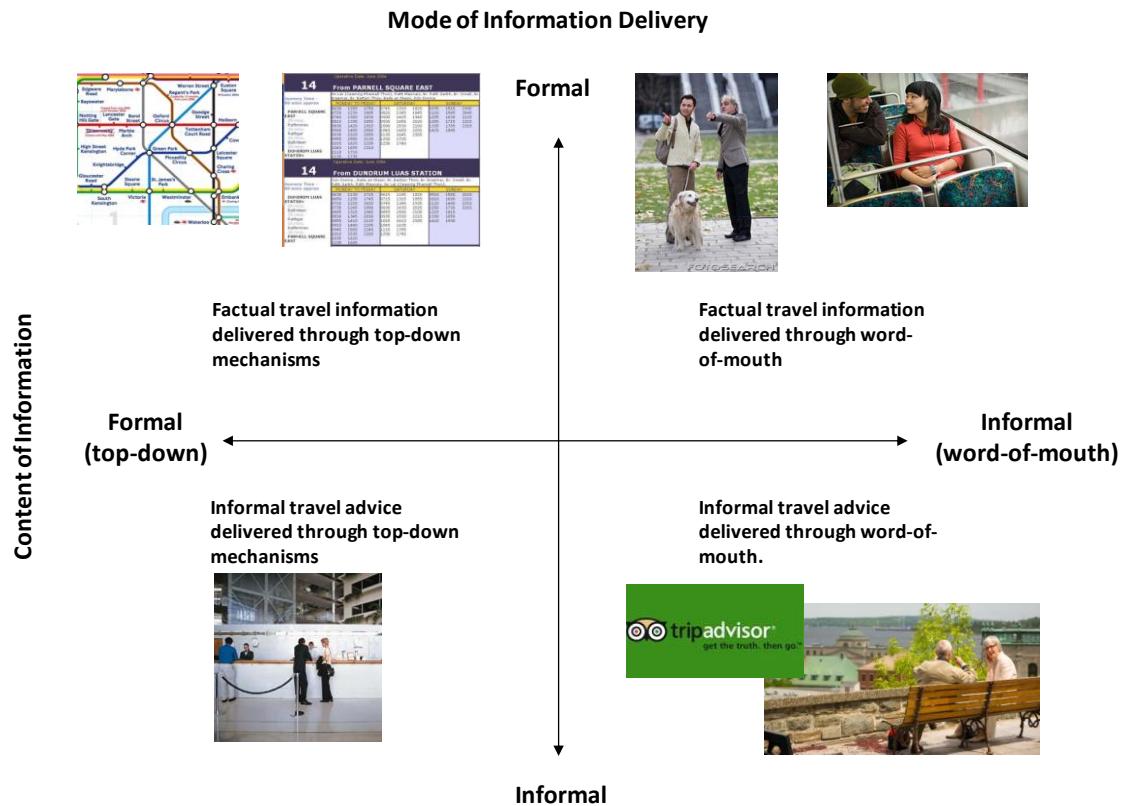
By contrast 'informal travel information' comprises what might be described as 'softer' aspects of the travel experience. It may cover many topics, from the perceived reliability of transport services, ease of interchange, perceptions of personal safety, ease of taking luggage, likelihood of getting a seat, to scenic aspects of the route. It is therefore rather subjective information likely to arise from the personal experience and attitudes of the information-giver, and orientated to the particular interests and needs of the information-recipient. It is likely to be regarded by the participants as 'knowledge' rather than information (cf. Kenyon and Lyons, 2003), and may be combined with an attempt to influence other peoples' attitudes, values and behaviour. Informal modes of information delivery are encapsulated by the term 'word-of-mouth'.

1.3.2 Word-of-mouth information diffusion

Informal delivery of information may be described as the passing of information, especially recommendations, through word-of-mouth in an informal person-to-person manner. A concept commonly used in marketing research and practice, word-of-mouth is traditionally defined as one-to-one and face-to-face exchange of information about a product or service, although this definition has been widened to embrace one-to-one interactions conducted at a distance via

communications technologies (Godes et al., 2005; Dellarocas, 2003). Moreover, information exchanged in online communities shares many common features with traditional word-of-mouth, although it is not strictly one-to-one, but one-to-many in nature. Hence, it can be argued that informal, or word-of-mouth, diffusion processes are in operation when travel advice is shared via social networking websites, just as they are when people interact with one another face-to-face.

Thus, we find that *formal* travel information may be transferred either through ‘top-down’ mechanisms (via published timetables etc.) or through word-of-mouth. *Informal* travel information, however, is usually transferred through word-of-mouth, although advanced traveller information systems would seem to offer the possibility of combining both types of information. The different combinations are shown in Figure 1-2. Previous research on the use and effects of travel information has concentrated on factual information, delivered through formal ('top-down') means such as published maps and timetables (upper left quadrant in Figure 1-2). Although research on travel information awareness and use has touched on word-of-mouth sources such as “asked a friend” (e.g. UK National Travel Survey, 2005 and 2006), the social transfer of formal travel information has not been explored in detail. Research in the field of tourism and leisure travel, and consumer studies, has shown the significance of word-of-mouth, in the travel decision-making process (e.g. Gretzel et al., 2007, Murphy et al., 2007, Bieger and Laesser et al., 2004), but similar research has not so far been undertaken with reference to everyday journeys. Moreover, the tourism literature has been more concerned with decisions about destinations than with the process of travelling to and from these destinations. This thesis is structured in such a way that the two right hand quadrants in Figure 1-2 will constitute the main scope of research in Phase 1. In Phase 2, the areas in the right-hand quadrants are explored in the context of an online information system where both formal and informal types of information are shared through word-of-mouth. Finally, the study moves into the domain of the lower left-hand quadrant by considering the incorporation of informal (user-generated) information into ‘formal’ advanced traveller information systems.

Figure 1-2: Formal and informal travel information

1.3.3 Advanced Traveller Information Systems (ATIS)

Modern advanced traveller information systems are extremely varied in form and content, offering journey-planning, real-time travel information and navigational advice through a range of technological media. Common examples include: detailed web-based information services; in-car navigation systems; and electronic message boards positioned beside motorways, bus stops and train platforms. Most systems of this type aim to provide the traveller with factual information such as journey times, costs, real-time arrivals and departures, and warnings of disruption on transport networks. Those systems to be given the greatest attention in this study are web-based journey-planning and real-time information systems, accessible via computers, mobile phones and other portable devices, as this is a technological medium which offers considerable scope for social interaction amongst users, as well as potential for the inclusion of user-generated content.

The opportunities for users to share travel information and advice via these systems are currently rather limited. For example, some web-based journey planners, such as those offered by Transport for London, Transport Direct and the AA, offer the user the opportunity to “email this route to a friend”, but the assumption appears to be that users are generally seeking travel information for their own individual use, without the desire to interact with other users. According to the categorisations in Figure 1-2, these systems could therefore be said to provide formal information via formal delivery mechanisms.

One example of a journey planning service which includes an element of informal advice is www.seat61.com, describing itself as an “independent, personal website” which provides links to public transport information around the world. This website features some of the ‘softer’ information about journeys (including photographs) which are missing from other journey-planners, such as ease of dealing with particular interchanges, and matters of comfort on particular transport services. This informal advice is based on the personal experience of both the website owner - “the man in seat 61” and contributions from website users. However, contributions are managed by the website owner, rather than being user-generated. The focus of the website is international leisure travel. Existing user-generated websites, also known as Web 2.0 or peer-to-peer (P2P) sites, relating to travel, such as www.tripadvisor.com, tend to focus on destinations rather than journeys, and again mainly address leisure travel. At the same time, some travel websites have converged with social networking, such as www.dopplr.com which helps long-distance business travellers to share their travel schedules. Another (leisure) travel website has incorporated information provided by local residents: www.spottedbylocals.com, but like www.seat61.com, this information is managed by the website owner.

Discussion around day-to-day travel is found more commonly via an abundance of specialist online forums (e.g. discussion forums hosted by local cycling campaigns such as www.bristolcyclingcampaign.org.uk or national motorists’ forums such as the RAC’s www.rac.co.uk/web/forum). Social networking sites such as Facebook enable members to join groups linking them to others with a shared interest (e.g. the Facebook “Friends of Bristol Streets” group). A further example is the cyclists’ social network: <http://morvelo.cc/>. Another recent development at the time of writing is location-based social networking applications for mobile phones, such as *Foursquare*, which allows people to leave location-related tips (for example, a recommended café) for friends in their network who may be in the same area. At the time of writing a further innovative project is underway in Brighton; in the TWAGO project (“Twitter As you Go”), local residents are using the micro-blogging system *Twitter* to share their local travel experiences. Recently, some public transport companies (particularly buses) have

begun to set up Facebook pages both to inform customers and elicit feedback; this development will be returned to in Chapter 11.

One area where some convergence between formal and informal information content has been identified is that of interactive mapping. This is where web-based maps, usually based on Google maps, but also bottom-up initiatives such as www.OpenStreetMap.org, are overlaid with route and other travel information, such as location of bus stops and timetable information (formal information). However, informal information can also be added by users, who may, for example, draw on their preferred cycle routes and post up comments and photographs. One example of a system of this type is www.bristolstreets.co.uk (Figure 1-3). Although not strictly a traveller information system (it also offers many other types of local information), this website offers an interesting example of how formal and informal types of travel information might be combined. A cycling layer of the site invites users to draw routes onto the map to share with others, as well as add comments about cycling facilities. This website was eventually selected as the platform for the Phase 2 case-study, and will be returned to in greater detail in Section 7.5.

www.OpenStreetMap.org is another P2P mapping project which allows users to create and share geographic data such as street maps, as well as to undertake route planning and add comments via a web log. Examples of informal travel information-sharing within online communities are the cycling journey planner developed by the Cambridge Cycling Campaign at www.camcycle.org.uk, which allows users to upload photographs to the map; this is now offered throughout the UK in the form of www.cyclestreets.net. Further examples are the interactive map developed by the Camden Cycling Campaign: www.camdencyclists.org.uk and Transport for London's cycle web pages at <http://www.tfl.gov.uk/> which both now incorporate user-generated cycle routes. A more detailed discussion of current developments in online route-planning for cyclists is provided in Section 7.2 as context for the Phase 2 research.

This section has provided an overview of some of the ‘social’ elements of existing web-based sources of traveller information, which provided a context for the case-study undertaken for Phase 2 of the thesis, and which will be returned to in Chapter 11, when potential applications of the research will be considered. The remainder of this chapter will now turn to the UK policy context of advanced traveller information.

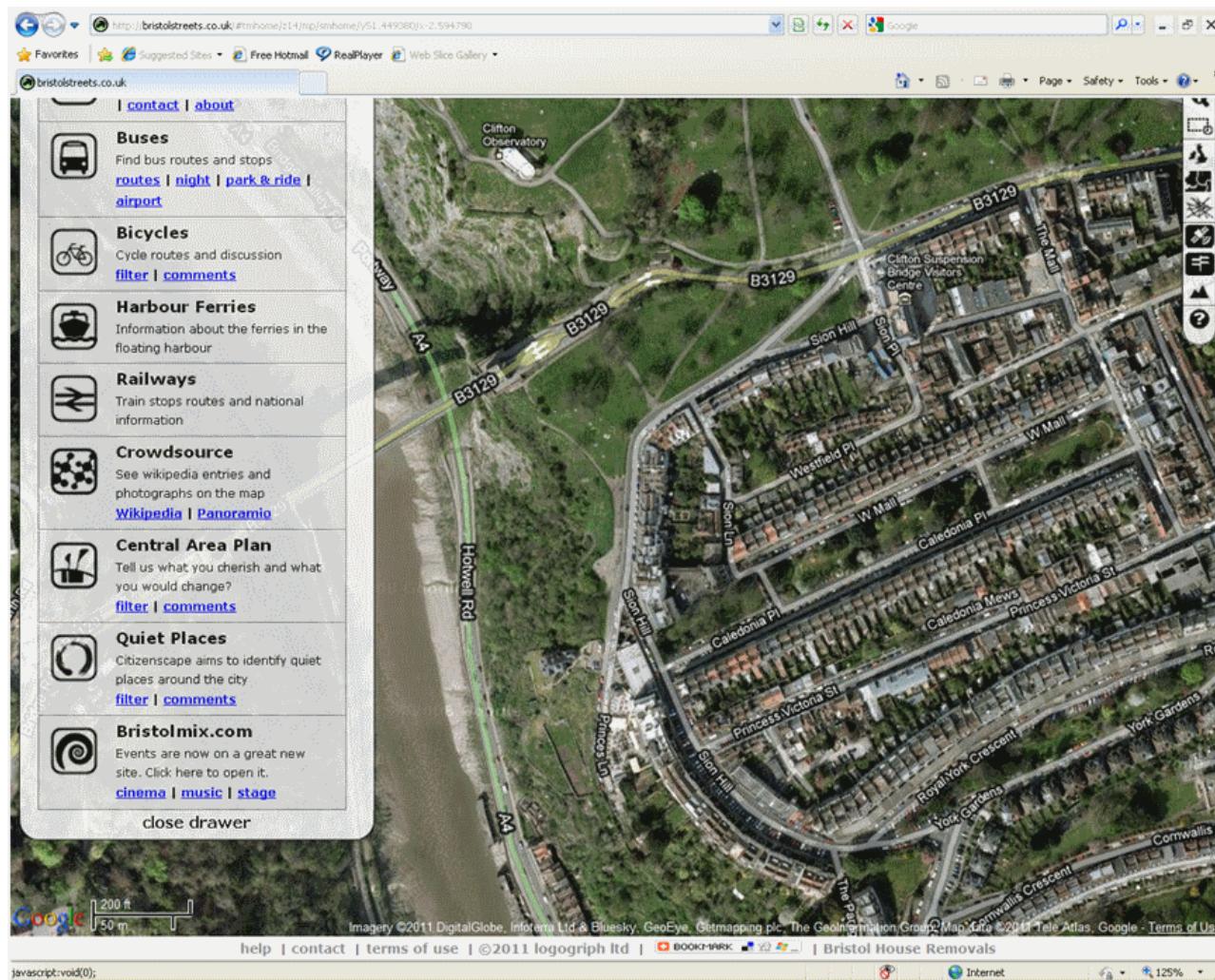


Figure 1-3 Bristolstreets website (screenshot)

1.3.4 UK Transport Policy Context

Providing better traveller information is one of the themes set out in the Department for Transport's policy framework for Intelligent Transport Systems (DfT, 2005), in which the following policy goal is articulated:

"facilitate the provision of and provide accurate, timely and relevant information to travellers so that they can make informed choices about travel mode and time and as part of the contribution to tackling congestion and enabling more efficient and less stressful journeys" (DfT, 2004, p.28)

More specifically, UK government interest in advanced traveller information is perhaps best exemplified by its investment in Transport Direct, the integrated, multi-modal travel information service announced in the 10 Year Plan for Transport (DfT, 2000), and launched in July 2004. By mid-2007, £55 million¹ had been spent on the development of the service. It emerged from a policy discourse around the desirability of creating "seamless journeys" by public transport, whereby public transport might be presented as an attractive alternative to the convenience of a car. The 1998 Transport White Paper (DfT, 1998) identified better public transport information as one of the tools which might help to achieve the government's objective of greater public transport use. Consistent with this policy approach, the Outline Transport Direct Business Plan (DfT, 2002) stated that "*Transport Direct will help boost the public transport industry and enable and encourage people to use public transport more than they currently do*" (p.4). The role of public transport information as a "soft" transport policy measure designed to encourage behavioural change was one of the measures explored in a study carried out for the Department for Transport (Cairns et al., 2004) and referenced in the 2004 Transport White Paper (DfT, 2004, p.40). "Soft" transport policy measures, also termed "smarter choices", seek to encourage people to use their cars less by enhancing the attractiveness of transport alternatives, including through better information provision. At the time of its inception, therefore, Transport Direct was presented as one of a package of policy tools designed to ease congestion on transport networks by stimulating behavioural change. Later, however, the overt message about the purpose of Transport Direct moved away from "getting people out of cars", towards offering people greater transport choice². Stakeholders have expressed the view that lack of information is not the main barrier to modal shift, so this service should not be expected to lead

¹ DfT reply to parliamentary question from Rose Kramer MP, 8 October 2007.

² Conversation with Transport Direct representative, August 2007.

directly to this form of behavioural change (AEA Technology, 2007). However, at the same time, Transport Direct continues to expand its provision of information about alternatives to the private car, exemplified by the recent addition of a cycling journey planner, which at the time of writing covers 32 towns, cities or areas; approximately £2.4 million had been spent on or allocated to this feature by the end of the 2010/11 financial year³.

The 2011 Local Transport White Paper, *Creating Growth, Cutting Carbon* (DfT, 2011) continues the discourse of enabling choice through information provision:

“The concept of enabling choice following provision of better information and education is what the Government’s approach to sustainable travel is all about”. (p.13)

However, the 2011 White Paper also incorporates the concept of “nudge” into information provision as a tool for behavioural change. “Nudge” (Thaler and Sunstein, 2009) involves encouraging individuals to make ‘good’ decisions by presenting choices in a way which nudges them in a particular direction. Nudging people towards more sustainable travel behaviour may involve (among many other measures) the provision of information about sustainable travel choices which is not only comprehensive, but also framed in a manner designed to encourage particular choices – for example, through careful use of language. This might be interpreted as a return to the earlier conceptualisation of travel information as a tool for promoting not just choice, but the ‘right’ choice (c.f. the 1998 Transport White Paper), albeit in a more subtle manner.

The Transport Direct cycle journey planner is also promoted in the 2011 White Paper as one means of encouraging “active travel”: *“In particular we aim to remove one of the key barriers for novice cyclists – knowing where it is easy and safe to ride”* (p.48). The use of the cycle journey planner is particularly encouraged within local contexts such as: schools; social groups; railway stations; hospitals and universities. Moreover, local authorities are encouraged to promote it as a workplace travel planning tool. This provides a highly relevant backdrop for the case-study research carried out for Phase 2 of this thesis (featuring an online information system for cyclists); policy relevance of the research will be returned to in the concluding chapter of the thesis.

³ DfT Response to Freedom of Information Act request for expenditure on the “find a cycle route feature” of Transport Direct. FOI Reference number F0006273.

1.4 Chapter Summary

This chapter has introduced the thesis by setting out the intellectual context of the research: how the conventional paradigm of information-use by the individual, rational decision-maker in pursuit of utility maximisation might be called into question with the benefit of insights from the social sciences, particularly social-psychological theories of behaviour. What happens when information incorporates not just ‘facts’, but subjective experiences and personal advice as it is communicated between people? Research suggests that information provision on its own has a limited effect on behaviour, but might information obtained through word-of-mouth include an element of social influence which might increase its impact? If so, might informal, word-of-mouth information have a role to play in travel information provision – particularly in the domain of internet-based traveller information systems, where opportunities for the incorporation of user-generated content continue to grow? This chapter has presented the objectives and research questions, defined some of the key concepts within the thesis, and set them within the context of current technological and policy developments in the field of traveller information.

Chapter 2 : Literature Review

This chapter summarises relevant aspects of five areas of literature which helped to locate the research to be carried out for this thesis, identify specific research gaps, and inform the development of a conceptual framework by identifying relevant theories and constructs. Firstly, Section 2.1 presents a summary of the literature on the role of information in the travel decision process, which typically focuses on ‘formal’ information and regards information-use as an individual matter. The review then turns to those studies which have identified a wish among travellers for informal types of information, and those which have made reference to word-of-mouth information diffusion (substantive work in this area having been carried out in relation to tourism and leisure travel, but not utility travel). Having identified a gap in knowledge about social aspects of information-use within the transport literature and within information-processing models, the review then turns in Section 2.2 to areas of social-psychological theory which have been applied to travel choice behaviour - particularly those which emphasise the importance of social interactions, in order to identify theories which might help to explain social aspects of information-use. Section 2.3 explores one area of social-psychological theory in greater detail: social influence within the group (important for the interpretation of the case-study findings). Section 2.4 considers literature from the disciplines of sociology and geography, exploring new relationships between communications technologies, social networks and travel, and implications this might have for the word-of-mouth diffusion of travel information through social networks. Finally, Section 2.5 summarises some recent research into online communities, which was informative in the development and interpretation of the Phase 2 case-study.

2.1 The role of information in the travel decision process

The research literature relating to the use and effects of travel information provided an essential starting point for this study (cf. Lyons et al., 2007, in which over 100 articles published since 2001 were reviewed). Of particular interest were those studies relating to the role of information in travel decision-making, the different types of travel information which people need or would like, and the extent to which people seek information through word-of-mouth. Most of the literature, however, focuses on individual decision-making, without considering in detail the role of social interaction in the way people acquire and use travel information. Among the research gaps identified by the Lyons et al. review (2007) were: better understanding of the social context of information-use, and an exploration of ways in which social factors might be better incorporated into information services. The current research was construed partly as a means of helping to fill these research gaps.

2.1.1 Decision-making models in the transport literature

A consideration of some of the decision-making models which have been applied within the literature to explore the role of information in travel decision-making provided a first step in the development of a theoretical framework for this project. Four commonly-used approaches in this field are: utility maximisation; bounded rationality; “satisficing behaviour” (decision-making which leads to satisfactory rather than optimal results); and habit. These approaches were reviewed by Chorus et al. (2006a). These are essentially models of *individual* behaviour which do not emphasise social influences on decision-making. However, they provide a number of conceptual approaches within which social factors might be considered.

The utility maximiser in micro-economic theory rationally weighs up the costs and benefits of all options in a continual process of deliberation, and makes the choice which best serves his or her individual interest. Access to complete information is assumed. This view of human decision-making is increasingly questioned, not least because it does not incorporate social factors into the concept of utility, and has been found to be a poor predictor of actual travel behaviour (Gärling, 1998). The concept of bounded rationality (Simon, 1959) acknowledges that whilst people may aim to maximise their utility, they also have cognitive limitations which may restrict their ability to understand or remember information. They may therefore employ “satisficing behaviour”: seeking sufficient information to reach a travel decision which is good enough to satisfy a certain level of expectation. They may also take short-cuts, or heuristic decisions, and this limits their motivation to seek or act upon travel information (Tversky and Kahneman, 1974). The role of habit in travel choice has been widely studied (e.g. Verplanken et al., 1997, Bamberg et al. 2003); habitual behaviour, defined as behaviour without deliberation, usually precludes the seeking of travel information except for confirmatory purposes, although habitual travellers may be forced to seek information when their usual travel arrangements are disrupted. Although social factors are not explicitly addressed within these approaches, they may prove to be significant; for example, social norms and social learning might encourage heuristic decisions, or reinforce habitual behaviours.

It is important to sound a note of caution in treating utility maximisation in decision-making as distinct from ‘less rational’ models. For example, in some circumstances it might be ‘rational’ to make a heuristic decision, because the costs of seeking further information outweigh the benefits. Moreover, a decision which seems irrational in isolation might actually contribute to utility maximisation at a longer-term strategic level. It is clear that long-term decisions concerning lifestyle and mobility, such as residential or work location, or car-ownership, place constraints on (or indeed create opportunities for) short-term daily activity planning decisions, which in turn

affect the very short-term rescheduling decisions which may arise when unforeseen events occur (Ben-Akiva et al., 1994, cited in van der Horst, 2006).

Market research by Social Research Associates (SRA) (2004 and 2005) applied some of the theoretical literature on decision-making to the case of Transport Direct. This work identified a broad range of decision-making models, and their relationship to information-use, as well as assessing implications for the design of Transport Direct itself. For example, the assumption that decision-makers are purely rational would imply the provision of a mass of information, from which users would select the optimum, utility-maximising choice. The models identified in this report include: ‘problem-solving’, which corresponds with the satisficing model described above; the “incremental model”, in which habit plays a strong role; and “discrete choice”, which the authors link to bounded rationality. Of particular interest for this research is the “steering” model, which suggests that some people rely heavily on recommendations from others. Interestingly, the same people often employed different strategies depending on the circumstances. This finding is supported by consumer research demonstrating that the same individual may use a variety of different decision strategies (Bettman et al., 1998); it suggested that care should be taken in this thesis not to categorise research participants as particular types of decision-maker relying on one or other type of information in all situations.

2.1.2 Information-processing theory

There is a long history of research into the role of heuristic rules in information-seeking behaviour within disciplines such as consumer psychology and behavioural economics (e.g. Stigler, 1961), which has been particularly influential in the development of consumer choice models. One of the “grand models” of consumer decision-making is information-processing theory (Bettman, 1979, cited in Gabbott and Hogg, 1994; Jackson and Polak, 1997; Sirakaya and Woodside, 2004; van der Horst, 2006). This was developed some thirty years ago as an alternative approach to rational choice theory, incorporating concepts such as bounded rationality (Simon, 1959). More recently, this perspective has been extended to provide an *adaptive decision-making* framework: individuals adapt their decision-making strategies in response to situational constraints and the complexity of the decision task (Payne et al, 1993). Consumer behaviour theorists have argued that consumers frequently *construct* rather than simply *reveal* their preferences when faced with choices of any novelty or complexity (Bettman et al. 1998).

According to information-processing theory, the consumer decision-making process comprises five main stages: (1) problem recognition; (2) information search; (3) alternative evaluation and selection; (4) implementation; and (5) post-purchase evaluation (van der Horst, 2006; Sirakaya

and Woodside, 2005). Bettman (1979) suggests that during this process the consumer is influenced by the following psychological, or individual, factors: motivation, goals and internal information (experience). Other theorists have extended the range of individual factors to include, for example, beliefs and attitudes, which may exert an unconscious influence on the decision-making process (Sirakaya and Woodside, 2005).

The stage most pertinent to the present study is information search, which psychologists divide into two categories: "internal" and "external" search. Faced with a decision "problem" (i.e. a goal which they wish to pursue) individuals initially carry out an internal search, drawing on past personal experience and memory; only if this process yields insufficient information will they go on to execute a search of external information sources. In the context of this study, word-of-mouth is one of the ways in which people may seek external information. Internal information takes precedence over external information because personal experience is rated more highly by the individual (Avineri and Prashker, 2006), partly because stored information is believed to be more reliable, and partly because this process does not incur additional financial or emotional costs. Jackson and Polak (1997) point out that the preference for stored information goes some way to explain habitual travel behaviours. In the context of consumer behaviour, the degree of external information search is affected by the perceived risks associated with both the product/or service to be purchased (e.g. its cost), and the costs of the information search itself in terms of time, money and psychological cost. Heuristics and satisficing behaviour may be employed to reduce the costs of external information search. The third stage of the decision-making process - alternative evaluation – is typically assumed to involve the selection of one choice from alternatives. However, information may also be sought even when alternatives are not available or not considered; in this case, information may serve a confirmatory purpose, reduce anxiety or enhance the travel experience (van der Horst, 2006). This point was informative for the development of the current research by helping to conceptualise informal information not just as a factor in the making of active travel choices, but also as something which might play a wider social and psychological role. The apparent complexity of this role indicated that a qualitative research methodology might provide an appropriate means of exploring this area.

One key assumption of information processing theory and other "grand models" of consumer behaviour is that behaviour is individual (Gilbert, 1991), an assertion criticized by Sirakaya and Woodside (2005) in their review of decision-making models in the tourism literature. These authors comment that all the models they reviewed "*accept that other individuals affect the decision-maker, but do not address active interaction with other individuals or sources along the decision-making process*" (p.829); most research focuses on individual psychological, not social variables. They therefore argue that a different theoretical approach is needed to accommodate

the fact that recreational travel is often a social activity involving family and friends, who may be significant mediators of trip decisions, particularly destination. Although the everyday trip context on which the current study focuses differs from tourist travel in the sense that it may be less frequently undertaken in a family or friendship group, Sirakaya and Woodside's (2005) conclusions concur with observations from the transport literature that the social context of travel information-use has been neglected (e.g. Lyons et al., 2007). For example, in their 1997 review paper, Jackson and Polak identify a number of elements which contribute to behavioural responses to travel information, distinguishing between factors located within the individual, and factors located in the environment. Among the latter they cite "*expected norms of behaviour: societal constraints and expected patterns of behaviour associated with a particular environment*" (p21). However, this dimension is not considered in detail, nor does it feature explicitly in their corresponding model of the decision-making process.

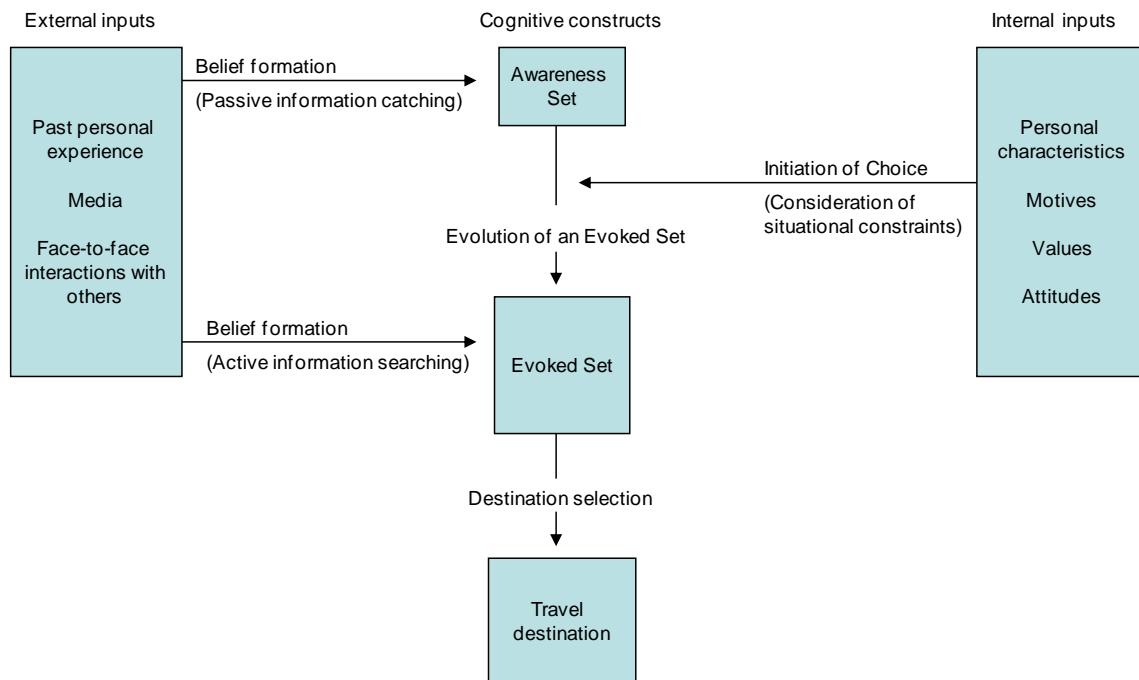
2.1.3 Choice set models

One of the models in the tourism literature which does emphasise the role of other people in the travel decision process, albeit in the sense that others may *influence* an individual's decision, rather than placing social interactions at the centre of the decision process, is Um and Crompton's model of the "pleasure destination choice process" (1990). Adopting a *choice set* approach, these authors conceptualise (tourist) travel decision-making as a funnelling process, in which alternative travel options are eliminated until a final decision is reached. The three choice sets identified in this model are the *awareness set* (all the alternatives of which the traveller is aware), the *evoked set* (a smaller set of probable choices) and the final decision selection. This model was developed to explain the process of leisure destination choice; it could be argued that in these circumstances a wider range of choices is available than would typically be the case for the more day-to-day trip decisions on which the present study focuses. However, the model includes some interesting relationships between concepts which are also applicable to the role of word-of-mouth in the everyday travel context. It integrates the role of social interactions into the decision process at both a "passive information catching" level and an active decision-making level, as well as incorporating social-psychological constructs, informed, for example, by Ajzen's (1991) work on attitudes and behaviour (see Section 2.2).

Figure 2-1 shows an adapted version of Um and Crompton's model (1990). In the model, external inputs contribute, through a process of belief formation, to the creation of an awareness set, prior to the initiation of any decision process. Although in this case the awareness set comprises all possible "pleasure travel destinations", it might also apply to all possible travel alternatives for different types of trip, be they matters of mode, route, travel time or destination.

The external inputs comprise personal past experience of the trip (more typically categorised as an internal factor in other models), words and images disseminated through the media, and awareness of trip attributes absorbed through face-to-face interactions with other people, including other people communicating their direct or indirect travel experiences. These external stimuli contribute first to the awareness set through a process of “passive information catching”, and later to the evaluation of the evoked set – the narrowed down set of alternatives, through a process of active information search, once the decision process has been initiated as a consequence of the need or desire to make a trip. Beliefs about trip attributes are formed by exposure to external stimuli, but are also shaped by individual factors such as socio-demographics, lifestyle, personality, motives, values and attitudes. Internal and external inputs are integrated through a cognitive process into the awareness set and the evoked set of alternatives. Situational factors such as time and money are considered in the process of narrowing alternatives to form the evoked set, from which the final choice will be made. This model is of particular interest because it includes the role of interactions with others not just as a form of active information search, but also as a factor in the formation of beliefs though passive information absorption - this occurs before the initiation of the choice process.

Figure 2-1: Model of the travel choice destination process, adapted from Um and Crompton, 1990.



2.1.4 The desire for informal types of travel information

Research into the types of travel information which people need (or would like to have) has demonstrated the importance of accurate ‘formal’ information such as journey time, costs, and route planning (Social Research Associates, 2004); these have tended to constitute the core characteristics of traveller information services. Referring back to Figure 1-2, p.8, they are located within the upper quadrants (formal information content). However, studies on user needs have found that respondents consider information on reliability to be even more important (Transportation Research Group, 2000; MORI, 2001, Accent, 2002). While it is possible to measure and present data on, for example, the average adherence to schedule of a particular service, notions of ‘reliability’ are subjective, and here the boundary between formal and informal information becomes less clear. Would a potential bus user be more influenced by data presented by the bus company, or by a friend’s perception that the service is ‘unreliable’? The TRG study (2000) found information on ‘convenience’ to be the third most important facet of a travel information service (more important than information on cost), which is an area of even greater subjectivity. Chorus et al. (2006a, 2006b) cite a number of other empirical studies which suggest that travellers may want advanced traveller information systems to provide information about ‘soft’ characteristics of travel alternatives, such as convenience and ‘image’. These factors are located in the lower quadrants of Figure 1-2 (informal content).

SRA (2004) explored convenience factors relating to interchanges and end-legs, suggesting that difficulties with physical accessibility and direction-finding at interchanges may be a barrier to travelling by public transport for some people (especially those with a walking disability, or travelling with children or heavy luggage). This type of information is difficult to provide in a top-down way, because “*what one user wants or needs in the way of “convenience”, another does not....*” (SRA, 2004, p23), but it may be a “killer issue” for some people in deciding how to travel. This might particularly be the case for those who fall outside the socio-demographic group most commonly using advanced traveller information - the male, able-bodied, well-educated business traveller (Chorus, 2006b). For example, research for Transport Direct concerning dyslexic travellers found that information on end-legs and interchanges was important, if not essential, for them to embark on public transport journeys (Lamont and Lyons, 2007). Other concerns which are crucial for some people are fears about personal security, likelihood of getting a seat, and availability of refreshments and toilets (SRA, 2004). While some of this information is ‘factual’, concerns such as personal security have a strong emotional and psychological dimension, which are unlikely to be satisfactorily addressed through formal information provision.

2.1.5 The use of word-of-mouth travel information sources

What research evidence exists to suggest that people acquire travel information through word-of-mouth, as well as, or instead of formal sources (the right hand quadrants in Figure 1-2)? Results from the 2005 and 2006 UK National Travel Survey show that 24% of those who had sought travel information for a public transport journey during the previous six months had “asked a friend”, whilst 28% of those who had sought information to plan a car journey had done the same. This compares with the 24% who had consulted Transport Direct or another website to plan a public transport journey, and 31% who had used one of these sources to plan a car journey. It is not possible to tell from the data how different information sources had been used in combination. Qualitative research by Farag and Lyons (2008a) showed that the use of word-of-mouth travel information sources, such as family, friends and colleagues, varied depending on how trustworthy the information obtained was perceived to be. Not surprisingly, participants were more likely to consult informal sources if they knew people who lived in, or frequently visited, their trip destination. With regard to specific groups of people, research has shown that those with learning difficulties tend to rely on word-of-mouth advice when planning journeys (TTR, 2004). Research in Australia found that users of ATIS also sought advice from family, friends and colleagues (Karl and Bechervaise, 2003). However, the role of word-of-mouth in influencing journey planning decisions has not been widely explored in the transport literature.

The role of word-of-mouth information has, however, been studied more extensively in the tourism and consumer studies literature (e.g. Gretzel et al., 2007, Murphy et al., 2007, Bieger and Laesser et al., 2004). Sirakaya and Woodside (2005) suggest that because the perceived financial and emotional risks associated with holiday decisions are often high, “*word-of-mouth or personal information sources are more influential than impersonal media sources in decisions*” (p.826). Referring to early research on the same subject, Gitelson and Kerstetter (1994) found that friends and relatives were usually cited as the most frequent and most credible source of pre-trip information. Um and Crompton (1990) cite a number of earlier studies from the tourism literature highlighting the importance of travel information received from family, friends and other social contacts. For example, Gitelson and Crompton (1983) found that 74% of respondents had received travel information from friends and family, whilst Walter and Tong (1977) reported that family and friends were the most influential source of information for destination choice.

The above studies concerned face-to-face word-of-mouth. However the phenomenon of “electronic word-of-mouth” via communications technologies is receiving growing research attention across a number of disciplines. For example, in management science, Dellarocas (2003) has explored the building of trust and fostering of cooperation through online feedback mechanisms, using a game theory approach. In health research, Ziebland et al. (2004)

undertook a qualitative study of the use of the internet by cancer patients; one of the main uses of the internet for these patients was found to be the seeking of experiential information from other patients. Closer to the field of this PhD, Chabot (2007) found 'Web 2.0' tools to be exerting a growing influence on tourists' decision-making. In a survey of users of Trip Adviser holiday reviews (www.tripadviser.co.uk), Gretzel et al. (2007) found that users were affected by social cues about the writers of reviews when evaluating content. Motivations for posting reviews included concern for other consumers, and "need for positive self-enhancement" (relevant, within this thesis, to the question of why people may provide travel information to others). Literature on online word-of-mouth in areas other than transport will be considered further in Section 5.5.

This section has highlighted existing theoretical approaches to (travel) information-use, which largely treat this as an individual rather than a social process. It has also summarized some of the references in empirical studies to informal types of information and word-of-mouth sources (including electronic communication), the majority in the tourism rather than the transport literature. It is postulated that in the absence of serious consideration of social factors within conventional decision theory, it would be fruitful to turn to social-psychological theories of behaviour in order to seek a greater understanding of the factors which might influence informal information-use and its diffusion through word-of-mouth.

2.2 Social-psychological theories relevant to word-of-mouth information processes

Together with theories of decision-making, social-psychological theories of behaviour contributed to the development of a conceptual framework for this project. These theories helped to identify some of the key concepts and mechanisms underlying the social transfer of travel information, such as social norms, pro-social values, self-concept, social identity and trust. A review was undertaken to find out which, if any, theories have been applied to social dimensions of information behaviour (and which, if any, had been applied to travel information in particular), and to identify any gaps in knowledge. This part of the review was used, in particular, to help formulate and answer Research Question 3 (how social-psychological factors might influence the use and effects of word-of-mouth information). Later, during the design of the applied research (Phase 2), some of the theories reviewed in this and the following section (2.3) were used to refine sub-question 4.4 on the role of social-psychological factors in the context of information-sharing via a web-based traveller information system.

As an over-arching theory, Bandura's social learning theory (1977) provides a helpful starting point for the understanding of word-of-mouth information processes, by explaining human behaviour in terms of a continuous reciprocal interaction between personal/behavioural and environmental determinants. It contends that people learn not only from their own direct

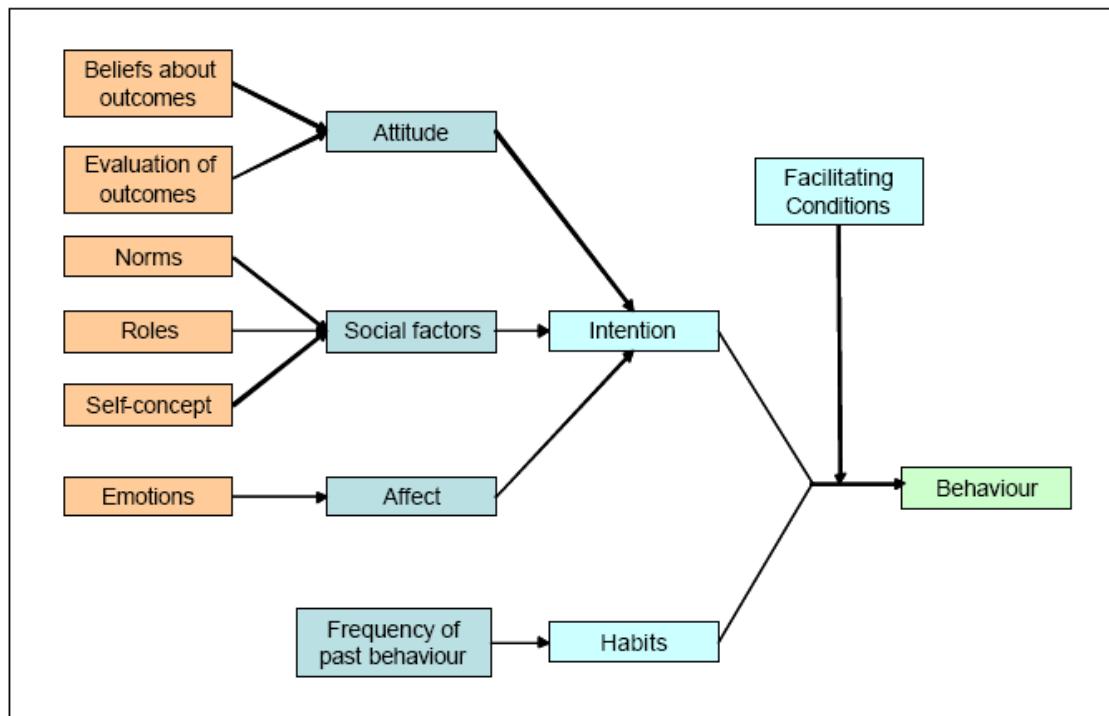
experiences, but also from the experiences of people around them. Vicarious experience of others' behaviour has as much influence on peoples' behavioural choices as do their own direct experiences. Sharing experiences through word-of-mouth is one of the direct ways in which social learning occurs, although the learning process may also occur non-verbally through the observation of others. In relation to travel behaviour, Sunitiyoso (2008) investigated the impact of social learning in small groups and its implications for travel behaviour modelling. Laboratory experiments within the context of a transport social dilemma (see below) revealed that people may be influenced by the behaviour of others when they have access to social information about other people's decisions.

A number of specific constructs relevant to the transfer of social information appear within *expectancy-value attitude theories*, such as the Theory of Interpersonal Behaviour (TIB) (Triandis, 1977), and the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The TPB proposes that behavioural intentions are partly influenced by *subjective norms*: the perception that "significant others" would or would not approve of the behaviour in question. This construct was measured using a travel behaviour survey conducted among UWE students by Sunitiyoso (2008). The survey showed that 49% of respondents considered it important that family members approve of their mode of travel to the university. This type of normative information about 'approved' travel behaviours is likely to be transmitted through word-of-mouth amongst close friends and family. The TIB adds complexity to the TPB by separating the 'social factors' which influence intentions and behaviours into *norms*, *roles* and *self-concept* (see Figure 2-2). *Social norms* are rules about what does and does not constitute acceptable behaviour; *roles* are "sets of behaviours that are considered appropriate for persons holding particular positions in a group" (Triandis, 1977, quoted in Jackson, 2005), whilst *self-concept* refers to a person's perception of him or herself (Anable, 2006). Self-concept is linked to Social Identity Theory, which suggests that people's sense of identity derives from their membership of certain social groups which have an emotional and value significance for them (Tajfel, 1982). Aspects of the work of Tajfel and colleagues in relation to social influence within the group will be reviewed in Section 2.3. Social norms, roles and self-concept are all factors which might affect the impact of word-of-mouth information on individual recipients; for example, information might be perceived as more reliable if it emanates from a person with whom the recipient identifies, or if it reflects a norm of behaviour within a reference group.

Despite their inclusion of social factors, expectancy-value theories such as the TIB and TPB are better known for their treatment of the *attitude* construct. An attitude is defined as a psychological tendency which is expressed by evaluating a particular entity with some degree of favour or disfavour (Eagly and Kulesa, 1997). These theories posit that an attitude is an

evaluative response to an attitude object arising from *beliefs* about the characteristics of that object, weighted by the *value* an individual attributes to it. Beliefs can be said to represent the information people have about the world around them, which they internalise as *knowledge*, be this objective (factual) knowledge, or a subjective assessment of their own knowledge. Hence, knowledge might be considered a precondition to attitude. Theories such as the TPB and TIB treat the formation of attitude as a *cognitive* evaluative response to an attitude object, but attitudes can also arise from an *affective* evaluation of an attitude object based on the positive or negative emotions which it induces (Lyons et al., 2008, Bohner, 2001). Whilst the TIB identifies *affect* as an antecedent to behavioural intention, it treats this as a separate factor rather than one which contributes first to attitude formation (see Figure 2-2). An understanding of constructs such as belief, attitude, intention and affect was important for this research because they may all be subject to influence through word-of-mouth. For example, attitudes towards a mode of transport might be influenced by word-of-mouth information, whilst social factors such as norms, roles and self-concept may help to identify reasons why such influence occurs.

Figure 2-2: Triandis' Theory of Interpersonal Behaviour (source: Jackson, 2005)



More detailed insights into the concept of social norms can be found in the work of Cialdini et al. (1990), who differentiate between *descriptive social norms* - “what most people do”; and *injunctive social norms* –“what ought to be done”, according to the moral rules of the social

group. Norms also constitute an important part of Schwartz's Norm Activation Theory (Schwartz, 1977), although in this case they are *personal* norms, as opposed to *social* norms. Personal norms are defined as self-expectations for specific action in particular situations, arising from a feeling of responsibility for others, and are used by Schwartz to explain pro-social behaviour (Schwartz, 1977). There is extensive use within the transport literature of Norm Activation Theory (NAT) and other models incorporating concepts of social responsibility and moral norms, particularly where travel behaviour is placed within a framework of pro-environmental behaviour (e.g. Taniguchi et al., 2003). Anable et al. (2006) remark that evidence of the role of social norms in travel behaviour is mixed, citing a number of contradictory findings from empirical studies comparing the effects of social norms alongside factors such as personal norms, moral norms and habit (e.g. Bamberg and Schmidt, 2003). Anable et al. (2006) conclude that "*there is evidence of various social influences on travel and it would appear that social norms merit distinct and thorough examination alongside personal norms*" (p.108).

Many components of earlier social-psychological theories have recently been incorporated into the Comprehensive Model of Consumer Action (Bagozzi et al., 2002). Subjective norms and social identity are included within the many other influences on consumer behaviour within this composite model. In the earlier Theory of Trying, Bagozzi had argued that many consumer behaviours can be studied from the perspective of "trying to act", hence these behaviours are goal-directed (Perugini and Connor, 2000). Bagozzi's model may be relevant to this study because the acquisition of travel information can be understood as a goal-directed behaviour: information may help to achieve the practical goal of making a journey (Farag and Lyons, 2008a).

A further group of social-psychological theories, such as Kelley and Thibaut's Interdependence Theory (1978) explain some social behaviour in terms of cooperation and competition amongst interacting individuals. They are of interest to this thesis because they concern social interaction, through which word-of-mouth information is transmitted. These theories have been applied in the field of travel behaviour with regard to modal choice (e.g. van Vugt et al., 1995), but without specific reference to information behaviour. Interdependence Theory proposes that interdependent persons may find it mutually beneficial to perform a *pro-social transformation*, in which each person starts to take decisions on the basis of what benefits the other person, rather than him or herself. One of the factors determining whether or not such a transformation takes place is *social value orientation* (McClintock, 1972). McClintock identifies four main categories of disposition: altruists and cooperators (both *pro-social*); and individualists and competitors (both *pro-self*). This approach is relevant to the proposed research because social values might affect people's willingness (or lack of it) to share travel information with others. Moreover, pro-social or

pro-self values might be reinforced, and corresponding behaviours encouraged through interaction with others. In social psychology, *values* are held to be beliefs relating to desirable end states which transcend specific situations, guide selection or evaluation of behaviour, people and events, and are ordered by relative importance (Schwartz, 1994, cited in Hewstone and Stroebe, 2001). Pro-social values help to explain pro-social behaviour, which may be a factor in people's motivation for providing information to others.

There are a number of theories which may be used in combination to understand why people help one another: biological; individualistic; social-systems; and interpersonal theories (Bierhoff, 2001). The *biological*, or evolutionary psychology approach, suggests that pro-social behaviour is genetically determined, and can be explained by the evolutionary advantages of both kin selection, and reciprocal altruism among non-relatives. The *individualistic* approach also focuses on individual tendencies, but argues that pro-social behaviour is not necessarily determined by our genes, but may be acquired through *social learning* (Bandura, 1977). According to the individualistic approach, people may be more helpful at some times than at others, depending on their mood, or they may be more consistently helpful because of pro-social personality traits, which include empathy and social responsibility. Therefore, some people might consistently wish to offer helpful information, whilst for others, this might be determined by situation or mood. The *social systems* approach is also concerned with social learning, but emphasises the influence of factors inherent within a social system, such as cultural norms and rituals shared within a community (e.g. norms of information-sharing). Finally, the *interpersonal* approach stresses the importance of interdependence structures, in which outcomes for the individual are influenced by the actions of others. It is associated with interdependence theory (Thibaut and Kelley, 1978), which was outlined in the previous paragraph.

Interdependence theory has provided a conceptual framework for psychology research on pro-social behaviour using experimental and stated preference methods. In these studies, participants were generally presented with a social dilemma – a situation where the immediate interests of the individual conflict with the long-term collective interest - to see whether they would exhibit cooperative or competitive behaviour. Some of these studies were framed within a transport context, often relating to modal choice, as the choice between car and public transport/cycling/walking may be regarded as an archetypal social dilemma (van Vugt et al., 1995, van Vugt, 1997, van Lange et al. 1998). The review of literature in this field did not reveal any application of the theories to the social transfer of travel information, but produced a number of relevant insights into the relationship between pro-social values and cooperative behaviour (e.g. Liebrand, 1984); social interaction and cooperative behaviour (e.g. Sunitiyoso, 2008, Avineri, 2006); and social values and trust (van Lange et al. 1998). The research identified in this

area was exclusively quantitative, much of it using laboratory experiments, which do not have high ecological validity. In-depth, qualitative study of these concepts in a real-world context might therefore improve understanding in this field.

The theories of social interaction outlined in the preceding two paragraphs were the only theories in this review which incorporated the concept of *interpersonal trust*. If word-of-mouth information is to have an influence on belief, attitudes and behaviour, trust in both the information-giver and the information itself are likely to be important factors. In interdependence theory, trust is articulated as trust in others to cooperate in a situation of interdependence, such as a social dilemma. However, this is not directly applicable to the case of seeking or giving information, as the participants in an interaction are not necessarily in a situation where the outcome for each depends on the behaviour of the other (unless the giving of information is interpreted as being motivated by long term reciprocal altruism). Although a ‘theory of trust’ was not identified in the carrying out of this review, the concept of interpersonal trust has been researched in a range of disciplines, notably economics, psychology and sociology. In a cross-disciplinary review, Rousseau et al. (1998) argue for a broad definition of trust as : “*a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another*” (p.395). Trust arises in conditions where both uncertainty and (inter-) dependence are present, although, as suggested above, dependence is unlikely to be mutual in the case where one person provides information and the other receives it. Trust may take different forms, but two conceptualisations which are pertinent to the present study are *calculus-based trust* and *relational trust*. The former is based on rational choice and is typical of short-term (often economic) interactions where the truster must calculate whether the trustee intends to behave in a way which is beneficial to the truster. Trust is derived in part from credible information regarding the intentions or competence of the other person. In contrast, *relational trust* derives from repeated interactions over time between the two parties, where trust is based on information available to the truster from within the relationship itself, within which emotion may play a part (Rousseau et al.,1998). Within social psychology, distinctions have been drawn between *reliability* and *emotional trust*. For example, Johnson-George and Swap (1982) found that their experimental subjects could readily attribute reliability to another subject whom they had met during the experiment, but emotional trustworthiness was more difficult to determine in laboratory conditions. In social psychology, research on relational trust has often focussed on trust in a specific relational - often romantic - partner, but was broadened by Couch and Jones (1997) to include trust in one’s social network of family and friends, termed by these authors as *network trust*. This form of relational trust was of particular interest to the current research in terms of the trust placed in information provided by a person within one’s social network.

Whereas the use of word-of-mouth information is likely to be affected by the degree of interpersonal trust inherent in a person-to-person interaction, trust in formal travel information could be described as a form of *institutional trust* (Rousseau et al., 1998). Anable et al. (2006) consider the role of trust in relation to the official institutions seeking to motivate support for climate change mitigation. Although their review failed to reveal any specific evidence in relation to trust in information and government action on climate change and transport, they cite a number of studies in other fields which demonstrate relative differences in trust inspired by different information sources. National government, the EU and relevant businesses tended to inspire less trust than non-governmental organisations or scientists independent of government or industry. It was of interest to explore whether this distrust in 'official' information sources might be mirrored in the field of travel information, and how far word-of-mouth information might be considered trustworthy in comparison with these sources.

This part of the review has revealed a number of social-psychological constructs and theories, such as social learning, social norms, social identity, pro-social values and trust, which might be explored in the context of informal information and word-of-mouth processes. These constructs and theories may help to explain some of the reasons why people seek information from, and offer it to, other people, and the extent to which it might influence them. Very little literature was identified where such theories had been applied to (social) travel information-use, suggesting a novel theoretical approach for this thesis. Figure 2-3 provides a summary of the main constructs and theories which arose from the literature review and which were to be investigated within the PhD research as factors which might contribute to processes of social influence when information is obtained or offered through word-of-mouth. First, however, more detailed consideration is given to theories of social influence.

2.3 Social influence and the social psychology of the group

Of particular interest for the second empirical phase of the research were theories of social influence, dating back to the experimental social psychology of the 1950s, and theoretical work on the social psychology of the group, developed by Tajfel, Turner and colleagues in the 1970s and 1980s. Both the group context of the Phase 2 research (use of an experimental case-study information system by a small group), and the interest in word-of-mouth as a channel for social influence, made two related areas of theory particularly apposite: the dual process theory of social influence (Deutsch and Gerard, 1955), and self-categorisation theory (Turner et al., 1987). Deutsch and Gerard (1955) reinterpreted some of the 'classic' experimental studies of social influence of the 1930s to 1950s by differentiating between *informational* and *normative* social influence. Self-categorisation theory, a development of Tajfel and Turner's (1986) social identity

theory, adds the concept of *referent informational influence* to those of normative and informational influence. It may be useful to clarify at this point that, in drawing on this area of social-psychological theory, the term *information* is used in its broadest sense – that is, raw data which require interpretation in order to derive meaning (Floridi, 2010). Thus, the term is used in this thesis to encompass the diverse forms of information, both ‘factual’ (for example, “the cycle path starts here”) and ‘social’ (for example, “*people like us* cycle to work”) which are communicated through social interaction, and not just the factual “semantic information” such as one finds in a railway timetable (Floridi, 2010). The latter definition is the one which is usually associated with “travel information”, so it is perhaps unsurprising that the theories discussed in this section have rarely been used in the study of travel information. Exceptions can be found in the fields of tourism, business and information systems research; for example, the concept of informational and normative influence informed recent studies of online (leisure) travel information-use by Arsal et al. (2010); Casaló et al. (2011), and Mendes-Fihlo and Tan (2009). Dholakia et al. (2004) built a social identity variable into their social influence model of consumer participation in virtual communities. Cheung et al. (2009) categorised the consistency and rating of online recommendations as normative determinants of information credibility, and found these factors to be influential alongside informational determinants such as argument strength and confirmation of prior belief.

According to Deutsch and Gerard’s dual process theory (1955), informational influence is based on the acceptance of information obtained from others as *evidence about reality*, whereas normative influence is based on the need to *conform with the positive expectations of others*, particularly in a group environment. Both processes may operate in parallel, although the relative importance of each will vary according to the situation. The former process reflects a dependence on others for the reduction of uncertainty, whilst the latter reflects the need for social rewards such as acceptance and approval. In the field of word-of-mouth travel information, an individual might accept information from cyclists about the lighting levels on a particular cycle route as evidence of reality (informational influence), because these cyclists have experience of using the route after dark, so their opinion is to be trusted. However, they may also be subject to a more subtle normative influence – that it is quite ‘normal’ behaviour within this group of cyclists to use this route after dark.

Informational influence is associated with a private acceptance of, and trust in, others’ opinions (conversion), whereas normative influence is believed to encourage public conformity (compliance) without an internalised change to an individual’s private attitudes. A strong normative influence, as conceived by Deutsch and Gerard (1955) might therefore, in certain situations, help to explain why expressed intentions to change behaviour, such as switching from

driving to cycling to work, may not materialise into actual behaviour change (the “attitude-behaviour gap”; e.g. Ajzen and Fischbein, 1977), or may affect only a temporary change. Hence social psychologists have tended to regard only informational influence (within this specific conceptualisation) as ‘true influence’ (Turner et al, 1987). This is consistent with concepts of impression management and self-presentation, which suggest that people comply with group norms in order to create a positive self-image in social interactions (e.g. Leary, 1995).

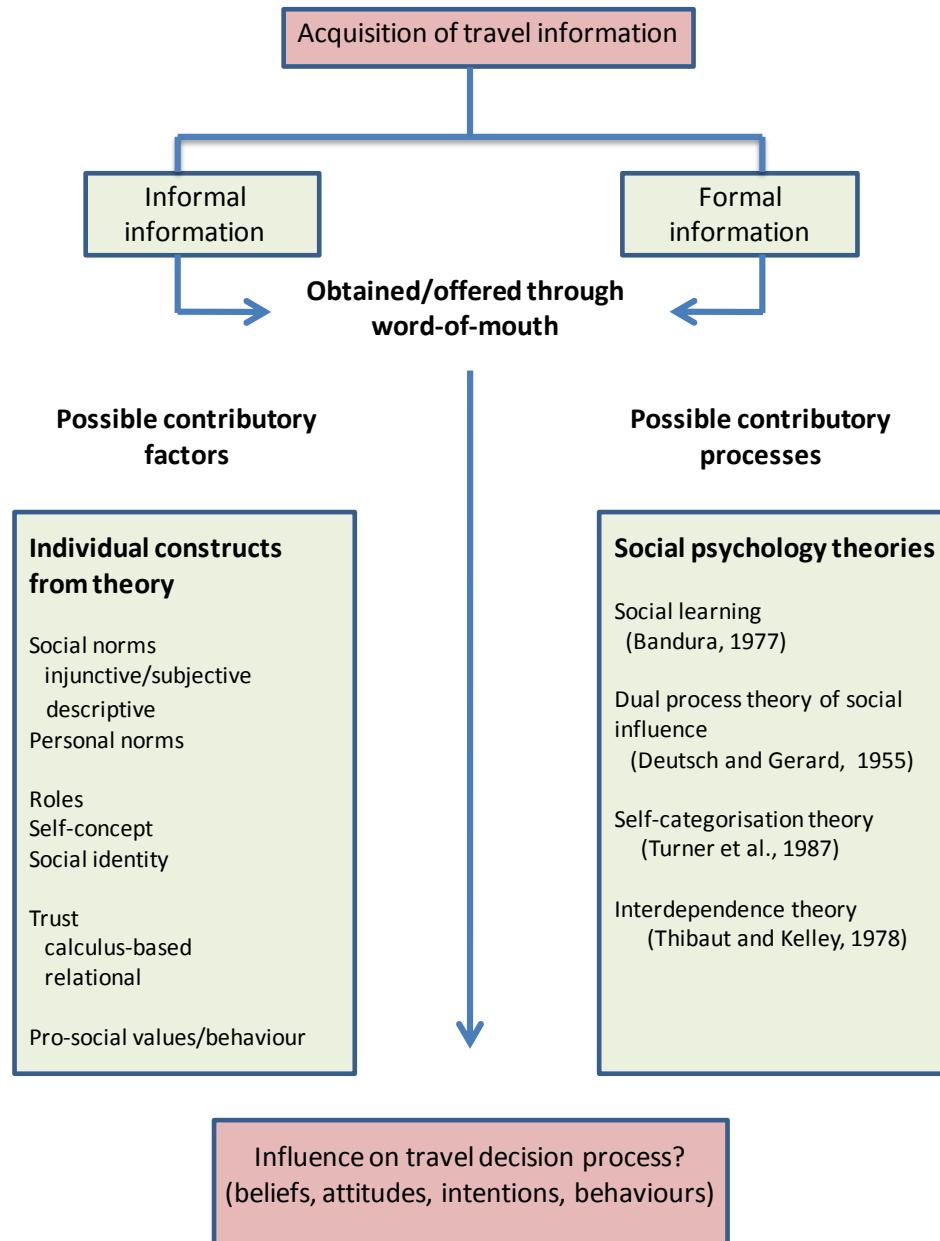
The experimental work of Deutsch and Gerard and other early social influence researchers elucidated specific social processes in a group context, but Tajfel, Turner and colleagues were interested in what happens to people’s *identity* in group settings; they argued that in such settings people’s psychological processes are qualitatively transformed (Wetherell, 1996), as personal identity gives way to social identity through a process of “depersonalisation”. Whilst still maintaining their identity as unique individuals in interpersonal comparisons, people can also perceive themselves as members of a social group with the characteristics of that group, and may modify their attitudes and behaviour to comply with norms within the ingroup (reference group). Perceptions of group membership are fluid, allowing an individual to categorise him or herself as a member of, and identify with, different groups, at different levels of abstraction, as they become more or less salient. Self-categorisation theory is thus a general theory of group behaviour which emphasises the effect of self-definitions (self-stereotypes) in the context of social groups. Thus, an individual may categorise him or herself, for example, as a man or woman, a student, a parent, a car-driver or a cyclist at different times in different circumstances, and may alter his or her behaviour depending on the saliency of a particular social identity.

Turner identified a form of social influence called *referent informational influence*, whereby people adjust their identity, attitudes and behaviour to correspond with the collectively defined attributes of their social groups (Wetherell, 1996). He argued that normative and informational influence were not as easily distinguishable as Deutsch and Gerard’s theory (1955) suggested, and that referent informational influence integrated both concepts: the basic influence process is one where the normative position of people categorised as similar to self tends to be subjectively accepted as valid (Turner, 1991). Thus, it is not the informational content *per se* of others’ opinions and actions which matters, but the extent to which it is validated by ingroup consensus (Turner et al. 1987). So, returning to the earlier example of shared information about lighting on a cycle path, Turner’s theory would suggest that consensus amongst a “reference group” of cyclists (e.g. work colleagues) about the safety of using the path after dark would exert more influence on an information-seeker within the same group than factual content about the lighting itself. Both dimensions of the information would be deemed more trustworthy than information provided by an outgroup (for example an unidentified cyclist or information from an ‘official’

source such as the local council). However, this interpretation might be questioned as one which underestimates individual differences in personality and behaviour, particularly in terms of susceptibility to group influence, and is especially incongruent with the concept of the 'individual rational decision-maker', within which the design and study of traveller information systems has traditionally been framed. The role of word-of-mouth as a channel of referent social influence alongside more conventional notions of individual, rational information-use, helped to provide a novel theoretical approach within this thesis.

Figure 2-3 summarises the key social constructs and theories from this part of the literature which were thought at this stage to offer some explanation as to how word-of-mouth travel information might influence beliefs, attitudes, intentions and behaviour (if evidence of such an influence were to be found). In the subsequent research design, the individual constructs - to the left of the figure – were to inform the design of interview questions about social-psychological processes, as well as guide the interpretation of the findings. The over-arching theories, to the right of the figure, were thought to offer insights into the overall influence process which might assist in the interpretation of findings.

Figure 2-3: Contribution of social psychology theories and constructs to understanding of the topic



2.4 ICT, social networks and travel

Another relevant body of knowledge which might inform our understanding of ways in which travel information is shared, and how word-of-mouth information might influence travel decisions, is sociological theory and empirical research addressing social networks and information diffusion. Two areas of particular interest are social network theory and the diffusion of innovations (Rogers, 2003).

Social network theory views social relationships in terms of *nodes* and *ties*; nodes are the individual actors within the networks, and ties are the relationships between the actors. Mark Granovetter (1973) developed the influential “Strength of Weak Ties” theory, which suggests that the weak ties connecting acquaintances provide a bridge between “clumps” of closer personal networks (strong ties). Information and innovation spread more effectively through weak ties than strong ones, as networks of close friends and family are likely to have the same information already. Social network analysis has recently gained some importance in transport research, not least in the field of activity-based transport modelling, where much work is being undertaken to combine spatial and social network models (cf. *Frontiers in Transportation* conference, Amsterdam, October 2007). It is suggested that by studying social networks we can gain insights into the generation of social activities, which might, in turn, contribute to improving the behavioural aspects of agent-based activity demand models (e.g. Carrasco and Miller, 2006). However, the emphasis of such research on the quantitative and geo-spatial aspects of social interactions means that little attention has been paid to understanding the *quality* of different relationships within a person’s social network, and the way that the different social dynamics within interactions with different people may lead to differing patterns of information diffusion, social influence and travel choice behaviour. It is suggested by Kozinets (2010) that there are possible synergies between the structural analysis of social networks and more meaning-centred qualitative approaches, in particular through online ethnography. Here he refers to the method of “netnography”, which will be discussed in Section 5.5. Netnography can, for example, help to provide explanations for the structural characteristics such as power and influence in relationships and social ties, which are uncovered by social network analysis.

Little is known about the reasons why information from particular people is given more weight and inspires greater trust (and therefore why some sources have a greater impact on other people’s attitudes and travel behaviour). Kozinets (2010) identifies this as an area of knowledge to which social network analysis might contribute (in combination with qualitative methods), suggesting a practical application which is highly pertinent to the current study: “*Trusting relationships, linked to strong ties, are also relevant to understanding and planning the online provision of many types of public information*” (p.53).

Kozuki and Mahmassani (2009) have developed an interesting model of the dynamics of information acquisition, social interaction and opinion formation in the context of activity and travel choice behaviour, in which they simulate the effects of word-of-mouth mechanisms on the formation and propagation of opinions about a new transport service. However, this model makes a range of assumptions about human behaviour which may benefit from greater exploration. This suggests that qualitative research may complement the more typical quantitative approaches by delving beneath some of the assumptions made about human behaviour within modelling approaches.

The positive impact of socialising with one's neighbours and local friends is demonstrated by empirical results from a 20 year longitudinal study in the United States, which found that people were more likely to describe themselves as happy if they were connected to other happy people – this emotional state seemed to spread through connections within social networks up to “three degrees of separation” (Fowler and Christakis, 2009). However, this effect required the presence of physical proximity: friends living within a half mile radius had the greatest positive effect, but this effect declined with distance. The second most positive effect arose from the presence of happy next-door neighbours, whilst other neighbours living in the same block had no effect.

A social network approach is of relevance to the study of word-of-mouth information diffusion in terms of the networks through which people share travel information. In addition to the ‘higher level’ sociological application of social network theory, described in the preceding paragraphs, it has been applied to travel information acquired through social interaction in the context of tourism and leisure travel. For example, Axup and Viller (2006) used a social network analysis to study social interactions among backpackers in Australia, in order to explore the potential for mobile social software (MoSoSo) specifically designed to facilitate the exchange of (tourist) travel information. Their studies involved pairing up backpackers with similar past or present travel experiences or future travel plans, to see which type of interactions were valued most highly. Among their results was the finding that participants rated the information they received from the other person more highly if they shared similar personality traits and values. The Axup and Viller research is especially relevant to this project because it explores processes of social interaction among travellers, in order to inform the development of communications technologies to facilitate information exchange. The major difference is that their research concerns leisure travel and is largely concerned with information-sharing about destinations rather than journeys *per se*.

Finally, *Diffusion of Innovations* theory (Rogers, 2003) defines *diffusion* as a process in which an innovation is communicated through certain channels over time among members of a social system. This theory could be applied to the use of traveller information because information is part of the “innovation decision process”, where the innovation in question is changed travel

behaviour. For example, cycling to work might be considered innovative in an environment where everyone else commutes by car, even if there is nothing innovative about riding a bike *per se*. “*The innovation-decision process is essentially an information-seeking and information-processing activity in which an individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation*” (Rogers, 2003, p.14). In this sense, seeking traveller information is one step in the process of deciding whether or not to adopt a new travel behaviour (Halpern et al., 2004). This approach is therefore relevant to the study, within this project, of word-of-mouth information diffusion. No previous research was identified which used qualitative methods to explore the diffusion of travel behaviours through the medium of word-of-mouth information.

2.5 The study of “online communities”

This final part of the literature review outlines some of the recent research into online culture (“netnography”), as well as some of the studies in a range of fields – such as information science, business studies and education – which have sought to improve understanding of social factors in the functioning of online communities, sometimes through the application of social-psychological theory. Examples from this area of literature informed both the design of the Phase 2 empirical work, and the interpretation of the results. Those studies which make recommendations for the design of ‘social’ features in order to improve the way in which online communities function are of particular relevance to the final research question in this thesis, which concerns the possible incorporation of ‘social design features’ into advanced traveller information systems.

A set of methodological guidelines is provided by Kozinets (2010) for the study of the social interaction which occurs through the internet and related information and communications technologies. Kozinets argues for the introduction of the neologism *netnography*, which is different from conventional ethnography, since online social experiences differ from face-to-face social experiences. Hence, the experience of studying virtual communities is different from that of studying physical communities. The term "virtual community" was originally coined by the internet pioneer Howard Rheingold (1993). Rheingold defined virtual communities as: "*social aggregations that emerge from the net when enough people carry on.... public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace*". (Rheingold, 1993, p.5). It was of interest for Phase 2 to find out whether an online space for informal information-sharing about local travel might evolve into a ‘community’ of this sort. Kozinets (2010) argues that an online (or virtual) community comprises "*group of people who share social interaction, social ties, and a common interactional format, location, or "space"*"

(p10). He also suggests that the term 'community' requires sustained social interaction, and a sense of familiarity, or shared identity, between members of the group.

"Netnography" is just one of the methods used in the literature for the study of existing online communities (i.e. 'realworld' communities which were not set up purely for research purposes). For example, Zhang and Watts (2008) investigated a Chinese online (leisure) travel community from a perspective of communities of practice, and considered applications to business development: how organisations can better utilise online social structures for their knowledge management practice. Cheung et al. (2009) conducted a survey of users of a popular consumer forum in China. As outlined in Section 2.3, these authors applied the dual process theory of social influence (Deutsch and Gerard, 1955) to measure normative and informational-based determinants of the perceived credibility of word-of-mouth consumer recommendations. Hall and Graham (2004) studied the ways in which members of an online community - a code-breaking Yahoo group entitled CipherChallenge - collaborated in the pursuit of a single financial prize. It showed that the initial motivation for people to join the group was to gain information for their personal benefit, but over time, the online interactions invoked a desire for members to reciprocate the help they had received. This was of relevance to the study of reciprocal helping (pro-social behaviour) within the Phase 2 case-study for this thesis.

Other studies have involved the setting up of an online environment for research purposes (e.g. Tu and McIsaac, 2002; Wilson et al., 2006; Hall and Widén-Wulff, 2008) or the setting up of experimental groups within an existing online community (e.g. Ling et al., 2005). New online social spaces were found to have been set up most frequently in the context of online learning. Tu and McIsaac (2002) used mixed methods to study "social presence" in the context of learning - this is defined as a measure of the feeling of community that a learner experiences in an online environment. One of the findings of the qualitative part of their study was that more variables contribute to "social presence" than is suggested by the relevant theory. This observation supports the view held in this thesis that qualitative research can be useful for building up a more detailed picture of some of the constructs within social-psychological theory. Hall and Widén-Wulff (2008) conducted a case-study of online information-sharing amongst postgraduate students, finding high levels of identity and trust within this small group. Wilson et al. (2006) used experiments to test the role of trust in team-working within a work environment. However, no literature was identified where a similar research environment had been created within the transport field.

Ling et al (2005) used an existing online community (a US movie review forum) as their focus of study, but set up experimental groups of members to study the factors which motivate users to make contributions to such communities. This research was informed by social-psychological

theories, but in a long discussion of methods, the authors conclude that social science theories are not always helpful in guiding the design of online community features, because such theories do not allow for real-world complexity. For example, a design feature may influence multiple psychological states and group processes, which each have multiple determinants, and this cannot be adequately explained by any single social-psychological theory. Ling et al. (2005) argue that, in their quest for abstract and generalisable theories of behaviour, social-psychological theories are sparse, with typically only a small number of variables, which are usually tested using the experimental method. This cannot adequately explain the full complexity of human behaviour in context. This adds strength to the argument held in this thesis for more in-depth, qualitative research which explores the complexity of social psychological variables within a real-world context.

The only examples found in the conducting of this review where technology was used to set up an experimental, online space for a qualitative study of social interactions within *the context of travel* were within technology studies (e.g. human-computer interaction), where prototype technologies are often 'trialled' to see what happens when people use them outside the confines of the laboratory. These studies are sometimes referred to as "field trials" (e.g. Esbjörnsson et al., 2004; Axup et al., 2005). Esbjörnsson et al. (2004) conducted qualitative research with (motor)bikers in Stockholm, who were given a new device to communicate with one another for a limited period. The design of the device was informed by an ethnographic study in the Stockholm biker community. As well as technical matters, findings covered issues of identity, community and enjoyment of the biking experience, which were reportedly enhanced through use of the technology. This raised the question of whether similar social processes might be observed within a web-based environment for the sharing of local, informal, travel information (Phase 2 of the research for this thesis).

2.6 Chapter Summary and Research Gaps

These findings and identified research gaps imply that the role of informal, socially acquired information in travel behaviour is an unexplored field within transport studies. Much research within transport studies has examined the influence of *formal* types of travel information on decision-making, but little is known about the role of *informal* information, nor the processes of word-of-mouth information diffusion, in the context of everyday travel. Moreover, theory and empirical research on information-use concentrates on its role within individual decision-making, neglecting both social factors and the role which information might play prior to the initiation of active decision-making. Whilst social-psychological theories have been widely applied to the study of travel behaviour, no studies were identified in this review where theories were

specifically applied to the social transfer of travel information. Moreover, the use of social-psychological theory within travel behaviour has predominantly relied on quantitative methods, typically seeking to measure pre-defined variables in order to test the applicability of theories. Research in this field has less frequently sought a more in-depth understanding of social-psychological constructs within the complexity of 'real lives'. Some studies of online communities within this literature review have also identified weaknesses in the quantitative approach to studying social-psychological mechanisms within an online environment.

The literature review has demonstrated that there are numerous behavioural theories within social psychology and other disciplines which, together, offer a conceptual framework within which informal travel information and word-of-mouth processes might be better understood. The application of such theories and constructs – using qualitative methods - within this thesis represents a novel approach, both theoretically and methodologically. A wide range of social-psychological theories was presented in Section 2.2, many of which contain constructs relevant to the field of study, but no single theory stood out clearly as one which should be applied above all others. Moreover, similar constructs appear in different theories, albeit with slightly different definitions (e.g. social and subjective norms; self-concept and self-categorisation). Therefore it was decided to take an open approach in this thesis by seeking to identify a range of constructs within the data, rather than 'testing' a specific theory or group of theories.

Subjective information received by word-of-mouth (including electronic sources) has been shown to be highly influential in people's choices about leisure travel, but has received little attention so far in transport studies with regard to more everyday travel behaviour. This may reflect the traditional dominance of instrumental-reasoned explanations for everyday transport choices, and the assumption that formal sources and types of information are most appropriate for facilitating these utilitarian choices. In contrast, holiday travel behaviour may be less affected by the practical constraints of everyday life and more strongly influenced by the subjective information and advice provided by other people - for example, intrinsic enjoyment of the travel experience may be a greater consideration than simply getting to a destination quickly. It may also be harder to access formal information about travelling in a distant and unfamiliar place, so word-of-mouth becomes a relatively more important information source. It might therefore be conjectured that, compared with leisure travel, everyday utilitarian travel behaviour might be more strongly affected by practical constraints, habit, and past (personal) experience, and perhaps less so by the types of social and subjective information which tend to be transmitted through word-of-mouth. However, little is known about the latter area; a gap which this thesis seeks to fill.

As informal information and word-of-mouth diffusion represent unexplored areas within transport studies, a flexible research design and a qualitative research methodology were chosen for the

research in this thesis. The overall research approach and the specific methodology selected for the exploratory phase of empirical research are explained in the following two chapters.

Chapter 3 : The research approach in this thesis

This chapter sets out the overall research design, the philosophical traditions which informed the ontological and epistemological approaches, and the reasons for a two-phase approach to the empirical research.

3.1 Research design

The exploratory nature of this research area led to the selection of a *flexible research design*. A flexible design evolves as the research proceeds, and data are typically qualitative. A 'good' flexible design requires rigorous data collection procedures, analysis and report-writing, framed within assumptions of an evolving design, the presentation of multiple realities, and a focus on participants' views (Robson, 2002). A flexible design was considered to be suitable for this research because it addresses a relatively unexplored area where 'bottom-up' theory building, based on rich qualitative data, was first required before more detailed research parameters could be defined. The flexible research design is consistent with the researcher's philosophical stance of *subtle realism* (Hammersley, 1992), which accepts the existence of an external reality independent of individual subjective understanding, but suggests that this reality is only "knowable" through subjective interpretation of both researcher and research subject (Snape and Spencer, 2003). Much travel behaviour research is deductive in nature: the researcher starts with a behavioural theory and uses this to develop and test hypotheses (Clifton and Handy, 2001). This is particularly the case where theories from social psychology have been used to explain particular travel behaviours (e.g. Bamberg and Schmidt, 2003; van Vugt et al. 1995, van Vugt, 1997, van Lange et al. 1998). However, a more inductive strategy was adopted for the present research. Although the research design was informed by a number of constructs and theories from social psychology, an open, exploratory approach was adopted with the aim of developing theory through analysis. Within travel behaviour research, Clifton and Handy (2003) suggest that "*While deductive research can involve quantitative techniques, qualitative techniques, or both, inductive research generally relies on qualitative approaches*" (p293).

A qualitative approach was chosen for the first phase of this research in order to seek, through the explanations of research participants, a better understanding of the social context of travel information and some of the social and psychological processes which might be involved. The aim was to identify promising themes, travel contexts and behavioural constructs for further study, rather than to test a particular theory or correlate information inputs with specific behavioural outcomes. As Banister et al. (1994) note:

"Qualitative research is part of a debate, not fixed truth....an exploration, elaboration and systematisation of the significance of an identified phenomenon" (p.3).

There is some novelty in this approach, as many (quantitative) studies of behavioural issues in transport make use of a set of behavioural assumptions made by the modeller (based on theory), but less research has been undertaken within the discipline to provide a deeper understanding of these assumptions. Clifton and Handy (2003) identify an important role for qualitative research in improving understanding of the complexities within travel behaviour:

"Yet the more we understand about travel behaviour, the more we recognise how much there is that we do not understand. As one question is answered, new questions emerge, and our appreciation of the complexity of travel behaviour grows. Qualitative methods, used in conjunction with quantitative approaches or on their own (...), offer a powerful tool for helping us understand these complexities" (p.283).

Before embarking on the detailed research methodology, consideration is given in the next section to the epistemological and ontological foundations of this thesis, drawing principally on the philosophical traditions of qualitative psychology.

3.2 Qualitative research and transport: some philosophical issues

3.2.1 Philosophical foundations

Given that the literature review has demonstrated a lack of any *strong* tradition of qualitative research within transport studies, it was clear that the philosophical traditions of other disciplines should be explored in order to inform and establish the philosophical grounding, and resulting approach to data analysis, of the current research. For example, Clifton and Handy (2003) write that "*although qualitative methods have been employed in transport research, the field has been predominantly entrenched in the quantitative paradigm for some time. This is not surprising given the historical dominance of science and engineering in shaping the field of transport studies*" (p.298). Eight years later, Freudental-Pedersen et al. (2010) state even more strongly that "*there is no qualitative research tradition in transport research*" (p.25), arguing that transport research has focused on physical mobility, and therefore on technology and modelling. Locating themselves within the *mobilities paradigm* (e.g. Urry, 2000, 2002, 2004) these authors, along with others in the mobilities field, elect to apply methods and knowledge from classical sociology to transport research. However, as much of the theoretical grounding of this thesis has been provided by social psychology, ontological and epistemological considerations have been principally informed by the philosophical traditions - and corresponding data analysis methods -

of qualitative psychology (whilst also acknowledging that many of the intellectual trends which have shaped psychology have been influential across the social sciences). Even in psychology, however, it should be noted that qualitative research still runs counter to the mainstream, rooted as this discipline is within the experimental method. Writing as recently as 2008, Giorgi and Giorgi remark that "*psychology is extremely conservative in its interpretation of science, and one departs from conventional criteria at great risk*" (p.27).

The following section outlines some of the key developments in qualitative psychology over the last century in order to provide a context for the identification of an appropriate ontological and epistemological approach for this thesis, and for the data analysis in particular.

The development of qualitative psychology: from phenomenology to the discursive turn

Ashworth (2008) identifies three overarching schools of thought about the conceptualisation of the subject matter of qualitative research in psychology. Firstly, for some, qualitative research should aim at discovering the objective *variables* involved in the human situation; this has parallels with the 'strong' version of a *realist* ontology, which claims that there is an external reality which exists independently of people's beliefs or understanding about it (Snape and Spencer, 2003). Secondly, a person's understanding of the world may be conceptualised as a set of quasi-linguistic *propositions* (or social interpretations); hence the object of study should be the social nature of the constructions of the world which guide people's thoughts and actions. Thirdly, qualitative psychology may conceptualise the person's grasp of their world in terms of perceptions or *meanings*, which may be either socially shared or idiosyncratic. This understanding of the focus of qualitative psychology is a cornerstone of phenomenology, in which researchers try to describe and understand an individual's *experience* within their own *lifeworld*. The latter two approaches may be equated with different strands of the *idealistic* position, which holds that reality is only knowable through the human mind and through socially constructed meanings (Snape and Spencer, 2003). Of the three viewpoints, it is the third, with its emphasis on *meaning*, which has influenced the ontology within this thesis most strongly, although a phenomenological position *per se* has not been adopted, as will be explained in Section 3.2.2.

Phenomenology

Founded by Edmund Husserl (1859-1938), the principal philosophical basis of the phenomenological movement was a rejection of the assumption that the focus of study should be that which lies behind, or is more fundamental than experience. On the contrary, Husserl maintained, investigation should always begin with what is *experienced*. Phenomenology does

not deny the existence of an 'underlying reality', but employs the methodological tactic of "bracketing" the question of reality separate from experience. The primary object of study is considered to be the thing as it appears, that is the 'phenomenon'. Therefore it does not contradict a realist ontology, but shifts the emphasis of study to the ways in which reality is experienced. Husserl understood experience as a system of interrelated meanings (a Gestalt), the totality of which are described as "the lifeworld" (Husserl, 1936/1970, cited in Ashworth, 2008). *"In a nutshell, phenomenology insists that the daffodils are indeed different for a wandering poet than they are for a hard-pressed horticulturalist."* (Ashworth, 2008, p.12). Equally, in the world of transport, a stretch of coastal railway is a different phenomenon for the daydreaming leisure traveller than it is for the railway engineer.

Idiographic Psychology

A further influence on the development of qualitative psychology was the work of Gordon Willard Allport (1897-1967). Allport was concerned that psychology should not neglect the unique in individual experience and behaviour; the *idiographic*, focusing on the interplay of factors which may be quite specific to the individual, is as important as the nomothetic – general dimensions on which individuals vary (Allport, 1962, cited in Ashworth, 2008). Allport did not restrict his interest to the qualitative approach alone, however, recommending that as many different methods as possible should be used to study an individual person.

The World as Construction

Phenomenology and idiography both lead us to view the person as a *perceiver*. Perception provides direct access to what is being experienced; hence perception is not a construction or representation. Although people are not necessarily passive perceivers - they pay attention selectively, make choices, and their perceptions are always coloured with meanings which relate to their life worlds – the phenomenological and idiographic approaches do not lead us to regard the person as *constructing* their lifeworld. Social constructionism was an alternative school of thought which gained prominence in the middle of the 20th century, becoming associated with approaches such as symbolic interactionism, hermeneutics and postmodernism.

Symbolic Interactionism

The work of George Herbert Mead is regarded as a cornerstone of the constructionist orientation in qualitative psychology (Mead, 1934, cited in Ashworth, 2008). During the 1950s and 1960s this was absorbed into the school of social research known as *symbolic interactionism*, a highly 'social' approach which postulated that mind and self are both products of social interaction. An

infant's capacity for thought and sense of self only develops through a relationship of communication with caregivers; therefore, thought arises in a social process. Only later can a person's thoughts and self-concept become individualized, and this is, in any case, largely dependent on the use of the social tool of language. Importantly, language and other systems of symbols are of central concern to Mead, and linguistic symbols are a system of socially shared, not idiosyncratic, meanings. Social interaction precedes thinking and selfhood, which are both built with social materials. Once a child has acquired the ability to reflect on his or her own action, he or she is able to build a self-concept or identity. Having developed the capacity for mind and self as a result of interaction, the individual is then able to develop selfhood and personal tendencies of thought in a relatively autonomous way within the social context in which he or she is located.

Symbolic interactionism contends that the capacity for self-reflection develops through the child's observation of other people's reactions to his or her behaviour. These ideas were influential in the development of Albert Bandura's Social Learning Theory, which maintains that a child learns by modelling the behaviour of others, and this occurs through the medium of symbols, particularly through verbal representation systems; therefore, behaviour is learned symbolically through the central processing of response information before it is performed (Bandura, 1977).

The symbolic interactionists contributed an extremely social outlook to qualitative psychology, arguing that the person is first of all a member of society, and only later becomes an individual. This leads to the argument that it is appropriate for qualitative psychology to explore the symbolic systems of society, not just linguistic systems, but also those which are embedded in the practices of the culture. This approach would lead one to conceptualise the car, for example, as not just a means of transport, but a cultural artefact ripe with symbolic meaning (e.g. freedom, independence and social status). Therefore, Mead's approach was an important building block for *discourse analysis* and *discursive psychology*. Qualitative methodology (often ethnographic, including participant observation) is often seen as the most appropriate approach for research arising from symbolic interactionism and related areas. Symbolic interaction also influenced the development of *grounded theory* and its specific framework for analysis (Strauss and Corbin, 1990).

Interpretation Theory: Hermeneutics

Having addressed the question of how the subjects of research are constructing their lifeworld, constructionist thinking then asks: "what processes of construction have the researchers themselves engaged in, in order to come up with the findings they have presented?". This is the area of hermeneutics (which may be described as a theory of interpretation). In the

constructionist school, all science is a matter of construction; and, therefore, the conclusions of research activity must be regarded as *interpretations*. We live in an interpreted world, and we ourselves are interpreters (Ashworth, 2008). By stressing the active role of the researcher in a dynamic process of knowledge generation, the hermeneutics approach offered a new view of the meaning of data in qualitative research, and one which was influential in, for example, the development of interpretive phenomenological analysis (IPA). As practitioners of IPA, Smith and Osborn (2008) refer to a two-stage interpretation process, or a double hermeneutic: "*The participants are trying to make sense of their world; the researcher is trying to make sense of the participants trying to make sense of their world*" (p.53). This understanding of empirical qualitative data was one which was influential within this thesis.

The Discursive Turn and Postmodernism

In the first half of the 20th century, a turn in Western philosophy led many thinkers to begin to see *language use* as "ontologically primary". The premise was that language does not simply reflect the world of experience, but rather our world is constituted by our shared language. Thus, language becomes, in a sense, the prime reality, and should therefore be the focus of study. This philosophical stance has influenced qualitative methods such as narrative analysis, conversation analysis and discourse analysis. This radical form of social constructionism suggests that the "perceptual tendency" - the idea that we can directly describe experience - should be abandoned, as experiences cannot but be shaped by constructions of events. Thus, qualitative psychology cannot reveal a lifeworld, but only a network of elements, which can only derive meaning from their position within the total system. Hence, all is construction, or "all is text" (Derrida, 1974, cited in Ashworth, 2008). This is a central tenet of postmodernism.

Postmodernism rejects the modernist assumption that our perceptions and constructions relate to the real world, and that ongoing progress is possible in research. The fundamental tenet of modernity is that there is a non-negotiable, solid truth or reality about which ever more accurate knowledge can be acquired. Thus, the researcher is engaged in a process of elaborating the structure of scientific constructs in a way which comes closer and closer to the 'truth' of actual reality. The knowledge advances incrementally, by following the recognized criteria of scientific research and scholarly activity. This is the paradigm within which natural science and technology is located, as well as the social and political world. Transport research, whether addressing the technological, the behavioural or the political, is solidly located within the modernist paradigm. For postmodernists, these criteria of validity no longer exist, as the connection between reality and human constructions has been abandoned. The idea of progress no longer applies, as there is no objective standard against which to evaluate an innovative theory, practice, product

or policy. Most psychology is modernist in its approach, but postmodernism questions this view, suggesting that psychology can no longer regard itself as lying "outside human society, looking in". It is just one of many discourses within a culture in which it resides. A consequence for the researcher is that he/she must see him or herself as part of this web of cultural construction. The researcher cannot be detached from the culture and society in which he or she is situated, so research becomes a joint product of both researcher and researched. In a weaker form, this view is connected to the broader concept of 'reflexivity' within research. Although a constructionist position is not adopted in this thesis, reflexivity as a principle is strongly espoused.

This section has outlined some of the key philosophical trends shaping qualitative psychology over the last century. The next section will attempt to show how some of these philosophical traditions have influenced the approach within this thesis. The links between these traditions and the chosen method of data analysis will be discussed in the next chapter.

3.2.2 Ontology and epistemology in this thesis

It may have become apparent from brief observations in the sections above about the relationship of the present thesis to these specific philosophical approaches, that an affiliation has not been made to the 'strong' versions of either the perceptual (e.g. phenomenological) or constructionist (e.g. postmodernist) tendency within qualitative psychology, as neither of these traditions are considered by the researcher to be exclusively appropriate for the current study. As this thesis spans a number of academic disciplines, it is believed instead that there are advantages to drawing on a variety of traditions, which in any case have many overlaps, by adopting a pragmatic and mixed approach.

Ashworth (2008) supports a pluralist approach, holding that the different philosophical tendencies "... have a number of emphases, but it is arguable that the richness of the human condition is such that no one tendency would encompass the whole (.....). Pluralism in qualitative psychology is to be valued." (p.25). Many researchers argue for a pragmatic approach to social research in order to ensure that it is relevant to contemporary society without becoming too deeply enmeshed in very pure philosophical traditions. For example, Bent Flyvbjerg (2001) argues for a *phronetic social science* based on practical judgement and common sense, suggesting that this may contribute most effectively to social and political development. Snape and Spencer (2003) argue for what they label a "toolkit" approach to social research, which focuses more on finding the appropriate method for addressing specific research questions, rather than being too concerned with (or constrained by) the underlying philosophical debates.

Snape and Spencer and (2003) point to an important contextual factor which may help to explain why much research in the social sciences adopts a practical approach to epistemology. This is that most social research is commissioned and funded by public bodies who wish to use the findings to inform policy and practice. The dominant research paradigms within this context have tended to be quantitative, and this is undeniably the case within transport research. This means that qualitative research in the social sciences has been strongly influenced by some of the expectations and practices which have grown out of quantitative research: "evidence" must be rigorously collected and analysed, be valid, able to support wider inference, must be as neutral as possible, and the ways in which interpretations have been reached must be clearly defensible. Snape and Spencer (2003) suggest that they, and many other qualitative researchers, do not fit neatly into any one 'school' of qualitative research, and instead borrow from different traditions within the social research field generally. They do, however, warn against the temptation to adopt certain practices which are generally acknowledged, but then failing to discuss explicitly the beliefs underlying them. This can make it difficult for others to judge the quality of their research. Moreover, there may be tensions if researchers attempt to fit the 'square peg' of quantitative terms such as evidence, inference and generalisability into the 'round hole' of a more interpretative epistemology (and this may be one reason why many research reports appear to 'gloss over' the underlying beliefs of the researcher).

Ontology

The ontology underlying this thesis might be described as a version of realism with a strong idealist flavour. This corresponds to *subtle realism* (Hammersley, 1992), which accepts the existence of an external reality independent of individual subjective understanding, but suggests that this reality is only 'knowable' through the subjective interpretation of both researcher and research subject. Thus, the data were understood to represent a combination of behaviours, attitudes and understandings as expressed by the participants in a research setting, i.e. the participants' subjective interpretation of an external reality. The status of the data was therefore one of representing social phenomena which exist apart from the setting in which the data were collected (i.e. the interview, focus group or website). Therefore, 'reality' has not been bracketed off, nor has the object of study been limited to the lifeworld of participants, as a phenomenological approach would imply (although understanding the meaning which participants ascribe to their experiences is indeed a vital aspect of this thesis).

The strong version of constructionism, where there is deemed to be no single underlying reality, has also been rejected. This partly reflects the tradition of transport research: this is an applied field, benefitting from public funding, and orientated towards informing policy and practice. In this

context, a denial of an objective, external reality would seem incongruous – an intellectual nicety indulged in by academics and divorced from the everyday transport concerns of real people. Yet despite this, a doctoral thesis should represent a rigorous intellectual exercise; although it may have (and, arguably, *should* have in transport) ‘real world application’, it is not an applied consultancy project. It is for this reason that an attempt has been made to clarify the ontological and epistemological assumptions which shaped the design, execution and conclusions of the research.

Epistemology

The epistemological approach within this thesis falls within the broad category of interpretivism. In opposition to positivism, interpretivism asserts that facts are not separate from values, and research findings are always influenced by the perspectives of the researcher. However, by being ‘reflexive’, the researcher can attempt to identify and acknowledge his or her own assumptions and values. Because the social world is not governed by law-like regularities, but is mediated through meaning and human agency, the social researcher seeks to understand the social world using both his/her own interpretations, and those of the participants (Snape and Spencer, 2003). In this sense, the epistemological stance encompasses some aspects of phenomenology (exploring participants’ meanings), idiography (exploring the unique in human experience and behaviour), and hermeneutics (interpretation).

Consistent with the chosen epistemological approach, the initial reading of the data was principally an interpretive one, in which the researcher explores the participants’ interpretation or understanding of social phenomena and their own behaviours, attitudes and motivations, as well as constructing her own interpretations of their accounts (Mason, 2002). Hence, the approach in this thesis concurs with Kozinets’ (2010) critique of the term “data collection”, which “seem(s) to imply that these things “data” are scattered about, like leaves on the ground or documents on a table, and that your job is simply to gather them up and “collect” them.” (p.95). The reading of the data was reflexive “a reflexive reading will locate you as part of the data that you have generated” (Mason, 2002, p.149). In line with the double hermeneutic previously described (Smith and Osborn, 2008), the analytic account could be described as the researcher’s interpretation of participants’ interpretations. The researcher was not simply “gathering” interpretations and understandings which already existed in the participants’ minds, ready to be retrieved in response to neutral questioning, but also encouraging them to think about their own and other people’s travel behaviour in ways which they had not necessarily done before.

Having given detailed consideration to philosophical issues underpinning the research, we turn in the final part of this chapter to the reasoning for separating the PhD into two research phases.

3.3 Rationale for two research phases

In the absence of previous research in this area, there was a need for initial, exploratory research about the use and effects of informal types of information and word-of-mouth delivery processes, in order to understand the general context in which it is used (what, when and by whom?), and to start to identify perceived effects and underlying social mechanisms which might explain these effects (research questions 1, 2 and 3). Only then would it be possible to move the focus of study to a specific applied area.

Following the exploratory research using interviews and focus groups, the next task would be to study how far the findings might be validated in the context of a real-world traveller information system, as well as exploring some of the initial findings - especially social-psychological mechanisms - in greater depth (research question 4). Recognising that interview and focus group methods can have limitations, Phase 2 would include observation of the actual use of an information system, as well as reported behaviour, thereby offering opportunities for methodological triangulation. Conclusions might then be drawn from both phases of the research which could be of relevance to advanced traveller information systems more widely (research question 5) – although further research would be required (outside the remit of this thesis) to test the wider validity of the findings in different contexts. Although the main research questions had been defined at the start of the research, the movement from the first to the second phase constituted an iterative process whereby key areas of interest emerging from the exploratory research were formulated into detailed research questions for further exploration within the case-study. This process will be described in greater detail in Section 6.1.2.

3.4 Chapter Summary

This chapter has outlined the overall research approach in the thesis: a flexible design employing predominantly qualitative methods, based on an ontology of subtle realism and an interpretative epistemology. The lack of a strong qualitative tradition in transport studies, coupled with the influence of social psychology theory within this thesis, led to the identification of qualitative psychology as the field which would provide the main philosophical grounding for the research. Having outlined the historical development of some key philosophical tendencies in qualitative psychology, we have explained that, rather than drawing on one specific tradition, a pluralist approach (drawing on aspects of phenomenology, idiography and hermeneutics) was selected for the current study. Finally, it was explained that the unexplored nature of the research topic necessitated a two-stage approach, whereby exploratory research would first seek to uncover promising themes which might then be studied in greater detail within an applied context.

Empirical Research, Phase 1: Exploratory Interviews and Focus Groups

Chapter 4 : Methodology, Phase 1

The first empirical research phase set out to explore the first three research questions through a qualitative study of the social context in which people acquire and offer informal travel information through word-of-mouth. It explored the role of informal information in the formulation of beliefs, attitudes and intentions and their influence on travel choices, drawing on a number of constructs and models from the field of social psychology and decision theory. Unlike many studies within travel behaviour research, which apply theories to explain observed behaviour and identify the antecedent factors, the aim of this phase of the research was to explore, using an interpretative epistemology, people's own detailed explanations of some of the social and psychological processes which contributed to their travel behaviours.

A qualitative methodology was therefore designed to address Research Questions 1 to 3:

a) Context: the social transfer of travel information:

1. From whom, and in what circumstances, do people acquire travel information, and with whom do they share it? What types of information are conveyed through word-of-mouth?

b) Mechanisms: the influence of word-of-mouth information in travel behaviour:

1. What is the perceived role of word-of-mouth information in the travel decision process? How do informal and formal types of information interact?
2. How do particular social-psychological factors (e.g. social norms, social identity, pro-social values, trust) appear to influence the use and effects of word-of-mouth information?

4.1 Selection of methods

The chosen methods of generating data for this phase of the research were in-depth interviews and focus groups. These were selected as a means of drawing out themes in a relatively grounded manner from participants' explanations of their own behaviour and motivations, and their beliefs about the motivations of others. Both interviews and focus groups were undertaken, as each method can generate a different form of data. Within a one-to-one interview, material is generated through the interaction between researcher and interviewee; a semi-structured interview allows key topics to be covered with the flexibility to ask follow-up questions which probe an individual's underlying reasons, feelings, opinions and beliefs. In a group environment,

data are generated through interaction *between* participants, which is particularly pertinent to a study of word-of-mouth information-sharing. Whilst a focus group offers less opportunity to probe individual views, greater spontaneity may arise from the stronger social context (Ritchie and Lewis, 2003, Kruegar, 1994).

The role of the researcher was given some thought during the design as well as the conducting of the interviews, seeking consistency with the researcher's ontological and epistemological stance, as described in the previous chapter. A decision was taken not to strive for complete objectivity or neutrality in interactions with the interviewees before, during or after the interviews, but rather to acknowledge that the nature of the interactions would have some effect on the data, and to attempt to use this in a positive way which might contribute to the richness of the data. This decision was influenced by Oakley's (1981) critique of the traditional view of interviewing as a mechanical instrument of data-collection, or a specialised form of conversation in which one person asks the questions and another gives the answers. Oakley elaborates on the importance of the one-to-one relationship between interviewer and interviewee, the personal meanings inherent in each social interaction, and the advantages in terms of rapport of responding to interviewees' questions within the interview. In line with the hermeneutic approach outlined in the previous chapter, data were being generated and not simply collected. The more positivist role of the interviewer as an impassive and neutral questioner, refraining from betraying any response to an interviewee's answers (e.g. by nodding the head or smiling), not giving away any personal information, and not answering interviewees' questions, was therefore rejected. The aim was to use some of these conversational practices in a controlled way in circumstances where they were felt to put the interviewee at ease and encourage fuller responses. This was felt to be all the more appropriate because the researcher was a member of the same community (i.e. the university) as the participants, which meant that each was party to a degree of pre-existing knowledge about the other, even if they were not personally acquainted. It also meant that some participants believed the interviewer and other focus group participants to possess information which might be helpful to them, and therefore occasionally asked questions during the interviews and focus groups.

As well as the philosophical reasoning, this approach was also felt to offer practical advantages. Participants were given some information about the research topic and two general areas of questioning prior to the interview or focus group. This was largely because the pilot interviews had shown that some people found it difficult to think of examples of relevant experiences when 'put on the spot' during the interview, which made in-depth follow-up questioning more difficult. This could be interpreted as a finding in itself, suggesting that people may not pay much attention to everyday interactions about travel. The interviewees were therefore invited to think

about certain trip examples beforehand, and these examples could then be probed during the interview to reveal more depth of thought. A possible drawback of this approach is that some answers were less spontaneous than they would otherwise have been.

As alluded to above, the interviews and focus groups were not only a forum in which participants offered their own reflections on the process of informal information-sharing, but also a means whereby they could share travel information with one another (and to a lesser degree with the researcher). The focus groups in particular were an opportunity for participants not only to discuss their experiences of information-sharing, but also to engage in the very process they were discussing. This meant that data took the form not only of behaviours, attitudes and understandings as *expressed by the participants*, but also, to a limited extent, their direct observable behaviour in engaging in the processes being studied. As the principal methodological aim of this phase of this part of the study was to understand participants' interpretations, rather than to observe their behaviour directly, the interview and focus group transcripts were analysed from the former rather than the latter perspective. Observation of actual information-sharing behaviour was undertaken in the second phase of the research (the case-study).

Population, sampling and recruitment

In-depth interviews and focus groups were conducted among new members of staff and students at the University of the West of England, Bristol (UWE). Participants took part in either an interview or a focus group, according to preference. Limiting the population to new employees and students within a single organisation offered the opportunity to explore and compare the different forms of information used by people travelling to a common destination for the first time, as well as to consider social norms and social identities within a particular organisation, or sub-groups within it. A university was also thought to provide fertile ground for this topic, as research has shown a positive correlation between educational level and travel information-use (Farag and Lyons, 2008b). With regard to word-of-mouth information, the 2007 UWE travel survey had revealed that 17% of those surveyed had obtained information about travelling to the university by "asking someone they knew". The university provides a useful population from which to draw a sample because its membership is constantly in flux. Starting at a university, either as a student or employee, represents a life change when people might be susceptible to changing their previous travel behaviour, and are likely to seek out travel information actively. Recruiting within the university also allowed a certain degree of comparability across cases.

Consistent with the qualitative approach taken, a *judgemental* or *purposive* sampling strategy was employed (Blaikie, 2000). This is a form of non-probability sampling which does not seek full representation of the target population; the aim was not to make generalisations about the whole population, but rather to identify interesting themes to be carried forward for further study. Employees were recruited at induction sessions and via an email list of new staff. Students were recruited at induction sessions and at the Freshers' Fair. Participants were offered £10 as a reward for taking part. The sample comprised employees who had taken up a post at the university within the past six months, and students who had started a course there within the previous month. The sample was selected in order to provide a diversity of socio-demographic characteristics and travel behaviours, to allow a range of different perspectives to emerge. By including a range of ages, gender, employees and students, and preferred modes of transport in this sample (a simple form of quota sample), it was hoped that a significant sample bias would be avoided. However, a certain degree of bias was accepted in drawing the sample from a specific (i.e. university) population, which has certain social characteristics, for example in terms of educational attainment, which make it unrepresentative of the wider population.

In total, thirteen interviews of approximately one hour, and two focus groups of 90 minutes were undertaken. Ages ranged from 19 to 60 (mean 34) and gender was balanced for the interviews but skewed towards women in the focus groups. One focus group comprised only employees, and the other only students, as social heterogeneity may sometimes inhibit some participants (Ritchie and Lewis, 2003). Age, gender and primary transport mode for commuting are shown below in Table 4-1.

Table 4-1: Composition of Phase 1 sample by age, gender and primary transport mode for commuting to the university

	Age range					Primary transport mode for commuting				
	19-29	30-39	40-49	50-60	Total	car	cycle	walk	bus	train
Women	8	3	3	1	15	5	2	3	2	3
Men	4	2	1	2	9	5	2	1	1	0
Total	12	5	4	3	24	10	4	4	3	3

Recruiting a balanced mix of participants was not straightforward. Among the employee group, far fewer men volunteered than women, and the majority volunteered to take part in one-to-one interviews rather than a focus group (hence the employee focus group comprised only women). Data collection took place in two phases: the first in May 2008 (employees) and the second in

October 2008 (new students). To redress the gender imbalance, male students were recruited more actively than female students in the second round. To encourage involvement in a focus group, the financial ‘reward’ for focus group participation was increased from £10 to £20. Some of the employed participants did not accept the reward, and others only did so when told that the money was provided from a research budget rather than directly from the researcher. Whether they were influenced by the increased financial reward, or were simply less comfortable with a one-to-one interview, the majority of students volunteered to take part in a focus group. A sizable number of the student volunteers dropped out between verbally agreeing to take part and setting up firm arrangements. One of the confirmed (male) participants failed to show up for the focus group, and another had to withdraw at the last minute due to a timetable change, but agreed to take part in an interview instead. However, despite these set-backs, it was felt that an adequate diversity of socio-demographic characteristics and travel behaviours had been achieved.

4.2 Content of the interviews and focus groups

Four pilot interviews had been undertaken beforehand and had revealed that some people found it difficult to remember the travel information sources they had used, particularly word-of-mouth. Therefore, all participants were emailed two days before the interview or focus group, inviting them to reflect on any sources of information they had used for their first trip to UWE and for another unfamiliar trip they had planned during the previous six months. They were also emailed a short summary of the project and a consent form two days beforehand, in order to save time when they arrived.

Topic guides were developed for both the interviews and focus groups, based on the research questions and relevant literature, both theoretical and empirical (see Appendix C). Particular attention was paid to ways of exploring social-psychological constructs, with reference to the phrasing of questions in previous studies (predominantly surveys). Clifton and Handy (2003) highlight the importance of carefully crafting the questions in qualitative travel behaviour research, noting that “*a relationship of trust needs to be established within a relatively short time frame*”. However, they also note that it is to the benefit of researchers in this field that “*many of the lifestyle and preference issues that are of interest to transportation researchers are not exceedingly sensitive in nature*” (p296). It goes without saying, however, that sensitivity should be used when asking personal questions, even when they apply to topics which may not seem sensitive in nature.

The topic guides for the interviews and focus groups are attached as Appendix A and Appendix B. Questioning and discussion covered the following general areas:

- Use of, and preference for, different types and sources of travel information in different situations, including first trips to UWE, and interactions between the two.
- Probing about word-of-mouth sources: what they learned; whom they received it from; whom they offered it to; their motivations for doing so; and its perceived impact (if any) on travel behaviour.
- Probing of social and psychological factors which might underlie these processes (e.g. social and subjective norms, pro-social values, self-concept, social identity and trust).

At the start of the focus groups, following general introductions and an outline of participants' travel behaviour to and from the university, photographs of different travel information sources (including people) were displayed in order to stimulate discussion. During the interviews, social and psychological factors were explored within the context of one or more specific examples of informal information-use provided by the participant earlier in the interview. In the focus groups, participants were invited to discuss and order a series of 'sort cards', each containing a statement which might help to explain why they would (or would not) take word-of-mouth information into consideration, or why they might offer informal information to other person (e.g. "I trusted the other person", "I had things in common with the other person", "I wanted to help the other person"). Blank cards were also provided so that participants could add their own statements. Thus, participants in the first focus group added "knowledge and expertise of the other person" as a reason for considering word-of-mouth information, and this was added to the set in the second group. The sort cards proved to be particularly helpful in stimulating open discussion in the (female) employee focus group, but less so in the student focus group which was less homogenous and where some (older, male) participants were more obviously dominant in the discussion. Each focus group was attended by one of the researcher's colleagues acting as an observer. The observers made notes of some of the non-verbal communication amongst participants which the researcher (moderator) was unable to record, and afterwards provided feedback to the researcher.

After each set of two or three interviews, notes were made by the researcher, reflecting on aspects such as the rapport with each interviewee, quality of the interactions (e.g. whether they were more familiar and less 'neutral' when there was perceived to be empathy between the two people) and the extent of any interviewer bias (e.g. questions being phrased in a leading way). Whilst some of the questioning could be regarded as leading, particularly when unplanned questions were asked spontaneously in response to participants' accounts, interviewees generally appeared to give considered responses rather than what they guessed to be the socially acceptable answer, although admittedly this cannot be known for certain (Bonsall,

2009). The interviews were conducted in an open and non-hierarchical manner (interviewer and participants all working/studying at the university and having a similar level of educational background), which reduced the likelihood of interviewees' responses being greatly biased by their perceptions of the interviewer. However, these issues were given due consideration and a reflexive approach adopted when the transcripts were analysed.

The proceedings were transcribed verbatim by the researcher in two phases, using voice recognition software, following each round of interviews and focus groups, and imported into QSR NVivo – a computer aided qualitative data analysis package.

4.3 Data analysis

As indicated in Chapter 3, some thought was given to the ontological and epistemological approach to be adopted, before the analysis was embarked upon. There are two broad camps within qualitative analysis: firstly, those methods which are closely allied to a particular theoretical or epistemological position, and secondly, those which are essentially independent of epistemology and can therefore be applied across a range of theoretical approaches (Braun and Clarke, 2006). Some methods belonging to the first category, such as phenomenological analysis, interpretive phenomenological analysis (IPA), discourse analysis, conversation analysis, narrative analysis and grounded theory (although this is not, strictly speaking a 'method', but rather a 'research framework') have already been alluded to in Chapter 3. Just as the philosophies underpinning these methods have contributed to the establishment of a philosophical stance for this thesis, so too have the related methods influenced the thinking about how the analysis of empirical data should be undertaken. Some specific analysis methods were ruled out because of their incompatibility with the philosophical approach adopted in the thesis. For example, in discourse analysis and conversation analysis, the focus of study is language use and the discourses communicated through social interaction, but no claims are made about any kind of 'objective reality'. These methods are strongly associated with social constructionism, and hence were deemed inappropriate within the more realist conceptual approach of this PhD. Three methods which *have* influenced the present analysis are phenomenological analysis, IPA and grounded theory; the influences of these methods on the present analysis are outlined in Appendix D. However, the main analysis method finally selected belonged to the second of the categories mentioned at the beginning of this paragraph - those methods which can be applied across a range of theoretical approaches.

4.3.1 Cross-sectional thematic analysis

Rather than adopting a method tied to a particular philosophical tradition, the principal method applied in this thesis is one which is frequently employed - but often unnamed - in qualitative social research: thematic analysis (Braun and Clarke, 2006). This selected method also draws strongly on the related cross-sectional “code-and retrieve” method within the “Framework” approach developed by the National Centre for Social Research (Ritchie et al., 2003), and the method of cross-sectional analysis set out by Jennifer Mason (2002). Cross-sectional/thematic analysis was used exclusively for the analysis of Phase 1 data, but for Phase 2 was complemented by *non-cross-sectional* analysis of the data elicited through a combination of observation, questionnaire and interview methods from a small number of specific individuals. This method, whereby individual cases are analysed in a holistic way, rather than through comparison with other cases, is also referred to as *contextual, case-study* or *holistic* analysis (Mason, 2002), or *vertical* analysis (Freudendal-Pedersen et al, 2010), and will be explained in Chapter 7.

Braun and Clarke (2006) concede that the process of thematic analysis is not necessarily unique, and can be found in many types of qualitative research. Indeed the steps outlined here bear a strong resemblance to those followed within phenomenological analysis and IPA, as described in Appendix D. A thematic analysis involves the following phases (Braun and Clarke, 2006):

- Familiarising oneself with the data: transcribing data (if necessary); reading through the data and noting down initial ideas through a process of synthesis or data reduction.
- Generating initial codes (also known as an index): coding interesting features of the data in a systematic fashion across the entire dataset; collating data relevant to each code. Codes may be "data-driven", in which case themes will emerge bottom-up from the data, or "theory-driven", when the researcher might be reading the data with specific questions in mind.
- Searching for themes: collating codes into potential themes; and gathering all data relevant to each potential theme.
- Reviewing themes: checking if the themes work in relation to the coded extracts (level 1), and the entire dataset (level 2); and generating a thematic map of the analysis. This involves refining the candidate themes.
- Defining and naming themes: ongoing analysis to refine the specifics of each theme and the overall story the analysis tells, generating clear definitions and names for each theme.

- Producing the report: writing the report is the final opportunity for analysis.

The first three steps above might be referred to as the data management phase (Spencer et al., 2003). The function of the codes is to organise the *retrieval* of sections of text for the purpose of cross-sectional analysis (Mason, 2002). For example, in analysing the data from Phase 1, the codes were arranged in a hierarchy under headings and sub-headings which reflected the basic structure of the topics discussed in the interviews and focus groups (e.g. use of travel information, receiving travel information, giving information). Within this structure which was largely theory-driven, ‘bottom-up’ codes were also allowed to emerge from the data. Once the process of coding text in the transcripts began, more codes were added, some collapsed into others, and others refined, resulting in around 100 codes. Some groups of codes were moved up or down the hierarchy as they began to emerge as more or less prominent. The hierarchy of tree nodes for Phases 1 and 2 are attached as Appendix E and Appendix L respectively. Each transcript was then coded sentence by sentence using the NVivo package. Each code was described and memos attached as ideas about the themes emerged.

The fourth and fifth steps (reviewing and defining themes) equate to a second stage in the analysis, which Ritchie et al. (2003) term “descriptive accounts”. This involved reading through the text assigned to each code, making comparisons between cases and looking for common themes, associations and contrasts. Themes and linkages were recorded as diagrams and elaborated through the process of writing. This evolved into a process of seeking explanatory accounts of the themes which were emerging from the data. Ritchie et al. (2003) distinguish between two types of explanation at an analytic level: those which are based on the explicit reasons that are given by participants themselves (for example, participants make travel decisions by weighing up options and making up their own minds); and those arising from implicit reasons which are inferred by the analyst (e.g. why participants may wish to present themselves as individual, rational decision-makers). Braun and Clarke (2006) define the two approaches, respectively, as *semantic* and *latent* analyses. Different types of evidence were used to generate and support explicit versus implicit accounts. In the former case, the evidence appeared overtly in the reasoning within the participants’ accounts. In the latter case, the researcher drew upon a number of the strategies proposed by Ritchie et al. (2003): searching for a possible underlying logic in what people said; using common sense to search for explanations; comparing findings with those in other studies; or relating findings to a theoretical framework. In reporting on the findings, attempts were made to link them to relevant theories and empirical studies in the literature review.

4.4 Generalisability, reliability and validity

The issue of generalisability of qualitative research - whether findings can support wider inference beyond the sample or population of study - is an important one, but one where there is very little consensus. Hammersley (1992) distinguishes between *empirical* and *theoretical* generalisation. The former concerns the application of findings to other people or contexts, and is also referred to as *external validity* (Robson, 2002). Theoretical generalisability involves the building of theories from the specific study which may be more widely, even universally applicable. Lewis and Ritchie (2003) categorise the development of policy recommendation from the findings of a specific sample as an example of theoretical generalisation. They further separate empirical generalisability into *representational generalisability* – whether findings from the research sample can be generalised to the parent population; and *inferential generalisability* – whether findings can inferred to other populations.

In the present research, the relative consistency of the findings at a higher level of abstraction (such as participants' construction of themselves as rational decision-makers) may imply a degree of representational generalisability from the sample to the parent population – i.e. the University - although this cannot be 'proven' in the same way as would have been achieved through probability sampling. More important was the process of theoretical generalisation from the present research through the elaboration of behavioural theory about (travel) information-use. However, this understanding of theoretical generalisation differs from the positivist conception of the formulation of universal laws, unrestricted in time and space. Rather it is aligned to Lewis and Ritchie's view that:

"qualitative research studies can contribute to social theories where they have something to tell us about the underlying social processes and structures that form part of the context of, and the explanation for individual behaviours or beliefs. (...) The degree to which the data from a study support existing theories can be assessed, by comparing how well different cases "fit" within an established theory and how far it is able to explain behaviour in individual cases. Those theories can then be developed and refined so that they accommodate any newly found variations in behaviour or circumstances identified through the research." (2003, p.267)

A degree of inferential generalisation was sought in Phase 2 by extrapolating some of the case-study findings to other possible information system settings. Such extrapolations are described by Patton (2002, cited in Ritchie and Lewis, 2003) as:

“...modest speculations on the likely applicability of the findings to other situations under similar, but not identical conditions. Extrapolations are logical, thoughtful and problem-oriented rather than statistical or probabilistic.” (2002, p584)

Reliability, or the replicability of the research findings if they were repeated in another study, is a concept with which qualitative researchers are often uncomfortable, to the extent that a number of alternative terms have been introduced. For example, Glaser and Strauss (1967) write of *trustworthiness*, and Hammersley (1992) of *consistency*. Like reliability, *validity* is a concept originating in positivism which is substituted by some qualitative researchers with terms such as *credibility* and *plausibility* (Glaser and Strauss, 1967). Internal validity relates to the robustness of the research design, or precision of a research reading, whereas external validity concerns the extent to which results can be generalised to a wider population (Robson, 2002; Lewis and Ritchie, 2003). The present research has attempted to address the threats to validity which can emerge as a result of factors such as reactivity, participant biases and researcher biases (Robson, 2002). This has involved strategies such as leaving an ‘audit trail’ to ensure openness and transparency, reflexivity (constant reflection on the research process and open reporting), and triangulation both through comparison with theory and other empirical studies, and through the application of different research methods within the project.

4.5 Chapter Summary

This chapter has described the methodology for the first empirical research phase. Interviews and focus groups were selected as the research method. Twenty four people (15 women, 9 men) were recruited purposively from a population of new employees and students at the University of the West of England. Thirteen people took part in a one-to-one interview, and two 90-minute focus groups were held: one comprising 6 employees and the other comprising 5 students. The interviews explored participants’ use of informal travel information and word-of-mouth when they first started their work or study at the university. Examples of giving and receiving information through word-of-mouth in other contexts were also explored, seeking to provide an understanding of the influence of such information on beliefs, attitudes and travel behaviour, and to identify social and psychological mechanisms through which this influence might have occurred. Interviews and focus groups were transcribed verbatim and analysed using a cross-sectional thematic analysis. The findings are discussed in the next chapter.

Chapter 5 : Findings, Phase 1

The main findings from the first research phase are summarised below under headings corresponding to the first three research questions. This is followed by a brief discussion of some of the other areas of findings which were deemed to contribute additional understanding to the context of informal information-use. The exploratory phase provided context and brought to light themes which would be explored in greater detail in Phase 2.

5.1 The social context of word-of-mouth information-sharing: who, what and when?

Research Question 1

From whom, and in what circumstances, do people acquire travel information, and with whom do they share it? What type of information is conveyed through word-of-mouth?

The findings reported in the first two sections below - people and content - were answered largely through participants' explicit (literal) accounts (explained in Section 4.3.1), whereas the third part - circumstances - required a more interpretive analysis of implicit as well as explicit accounts.

5.1.1 People

The most frequent examples of the social contacts from whom travel information was acquired, or to whom it was offered, prior to or after a trip taking place were: family members, friends, work colleagues, course-mates, house-mates, neighbours, and fellow members of social clubs or groups. Information was shared with people who might be categorised as both 'strong' and 'weak' ties (Granovetter, 1973) – the most important factor being that the information-provider had access to local knowledge (although the influence of such information may have been affected by the relationship between the provider and recipient of information, as will be discussed in Section 5.3). The social closeness of the people cited as having provided information (and to whom it had been offered) also varied according to trip context; for example advice on travel to and at holiday destinations tended to have been provided by friends and family, whereas smaller, everyday (and 'lower risk') trip details might be provided by any type of acquaintance. Unsurprisingly, if information was required during a trip, participants travelling alone might ask a fellow passenger, selecting whom to approach on the basis of how friendly or knowledgeable they thought they looked. Several (younger) participants reported that they would also contact friends or family for advice via mobile phone during a trip, particularly for help with way-finding. Informal types of information had been obtained both pre-trip and on-trip from

professionals, such as transport employees or travel agents. Occasionally, online reviews and blogs were consulted for informal travel information, usually when participants were travelling abroad, but occasionally via message boards within online communities relating to a particular interest or hobby closer to home.

The people most frequently cited as giving or receiving travel information before/after or during a trip are depicted in Figure 5-1 and Figure 5-2 respectively. During pre-trip planning, or in discussion after a trip, information had been both given to, and received from the strong ties to the left of Figure 5-1 (although not necessarily between the same two individuals or within the same interaction), but had flowed only one way from the weak ties to the right. Clearly, advice might be given as well as received via internet forums, but the participants in this sample had not posted travel information themselves. The categories of people in the centre of Figure 5-1 could include both strong and weak ties, and information had flowed both ways with these groups. It should also be noted that the categories of people are not mutually exclusively; for example, many of the people described by participants as ‘friends’ were also, for example, neighbours, colleagues and course-mates. Figure 5-2 shows that information had been shared with other travellers whilst en route, but had flowed one way from passers-by, transport employees and friends/family (via mobile phone) when it was required during a trip.

Figure 5-1: People - giving and receiving information before/after a trip

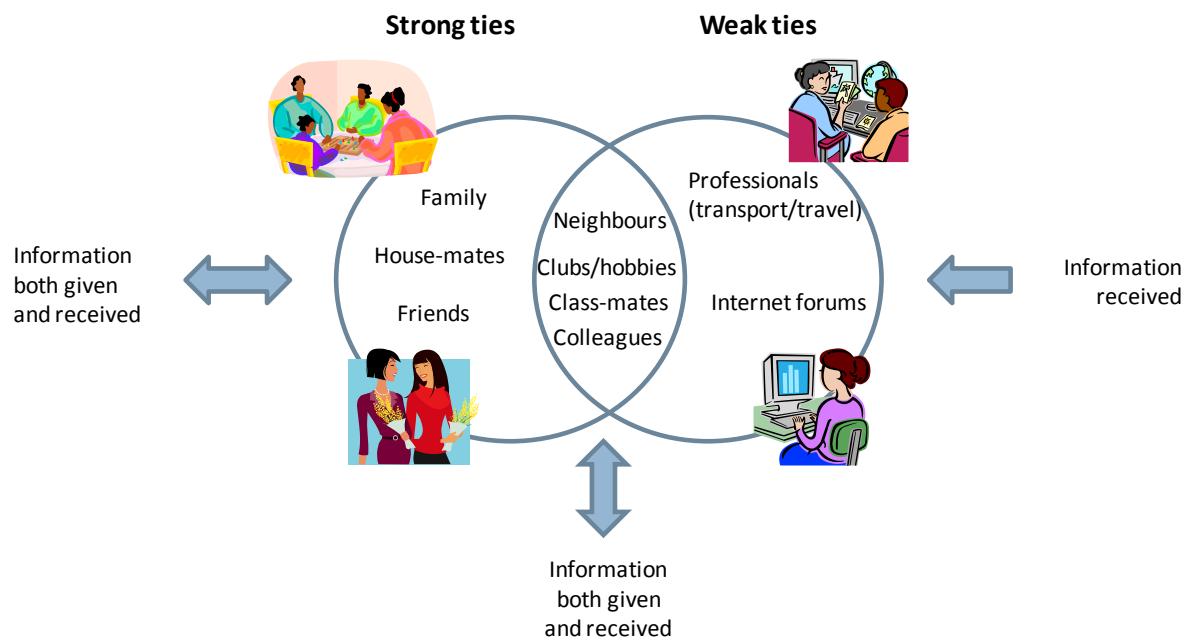
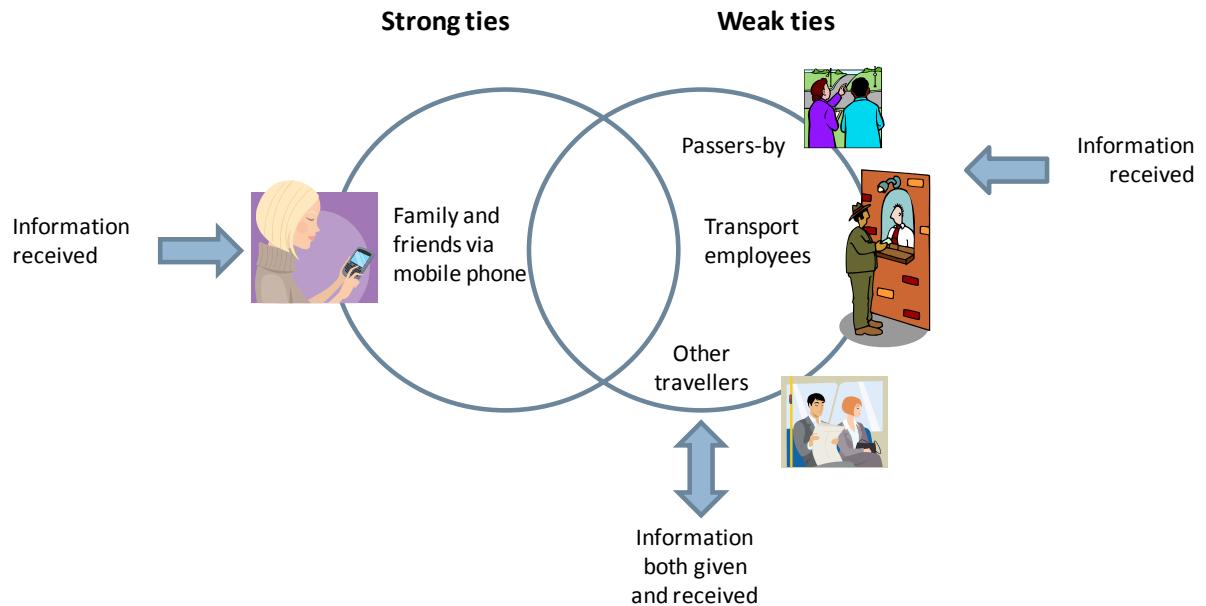


Figure 5-2: People - giving and receiving travel information during a trip



5.1.2 Content

The content of the information which participants reported to have received via word-of-mouth fell into three broad categories: a general idea which you could then go and check out ("*did you know you can get there by....?*"); a specific detail about, for example, routes, timings, costs, safety, location of bus/train stops, levels of congestion; or a general evaluation of a particular type of journey, or mode or transport service. Information obtained or offered by word-of-mouth ranged from the factual (formal) to the very subjective (informal). To illustrate the latter, students new to the city had been given the following types of advice:

"Not to go on the bus, because that's the bus that people are not so nice on, or that goes through a not very nice area, or don't get on that bus because it's really filthy. You get that a lot". (female)

"it's also to do with the area itself, like you get told not to take certain bus routes at certain times of the night, or if you haven't got any way home to get a taxi because it's not safe to take that route because it's got a reputation..." (male)

Although only four of the participants used a bicycle as their primary mode of transport to the university, roughly half the sample talked about cycling for other trips (including leisure). Word-of-mouth information-sharing, particularly about cycle routes, appeared to be common among this group; this was explained by the comment that many attributes of a trip by bicycle cannot easily be gleaned from formal information sources such as maps.

"Little things can make a big difference to how easy a journey is.... Just the traffic, the wind, how narrow the roads are. The hills." (male)

"But I think, especially with cycling, it's helpful to know areas to avoid, with lots of traffic and so forth, to make it a more pleasant journey... It's just nice sharing information. So it's like an informal little network of tips going on perhaps." (female)

Informal information about safety when cycling on isolated routes was also valued. As well as obtaining explicit route information, the two female participants who regularly cycled to work expressed the view that interactions with other cyclists served a motivational purpose when they were first considering this mode: *"it was just nice knowing that it was doable...."*

Informal route information was also frequently used to plan car journeys, often in combination with route-planners, maps and/or Satnav. Several incidents were described where Satnav directions had conflicted with word-of-mouth information from people who knew the route, which could lead to issues of which source was considered the most trustworthy:

"It was strange because I was being driven by my partner, and he'd never been to Milton Keynes. And I was taking him the way that my parents take me, so it was an experienced journey. And the Satnav wanted him to go another way, and it created a certain level of "who am I going to trust more" – the lady next to me, or this thing on the computer which pretends it knows where we're going". (female)

This participant went on to explain that her preferred route took into account subjective and personal factors such as "pleasantness", "nice places to stop" and the location of useful facilities en route, such as cash machines.

Internet route planners were frequently used, but helpful complementary information could be obtained through word-of-mouth, such as knowing the "pinch points", the quieter times to travel, and pleasant places to stop for a break. For train travel, participants had typically received or passed on to others information about getting the cheapest tickets, the most convenient stations for particular destinations and end-legs.

5.1.3 Circumstances

The reported circumstances in which information was transmitted through word-of-mouth could be grouped into four categories:

- i. The sharing of experiences and opinions about travel through *general interactions*, either before, during or after a trip.
- ii. The *passive absorption* of specific information which crops up in conversation, is not salient at the time, but may later be recalled if it becomes relevant (and hence becomes part of active decision-making about that trip).
- iii. The *active use* of specific information which crops up in conversation, and is salient because the information recipient is planning a similar trip; the information thus becomes part of active decision-making.
- iv. The *active seeking or offering* of information when an unfamiliar trip is being planned or information is required during a trip.

i. General social interactions about travel

Firstly, general social interactions about travel were reported to be very common in many social situations. This was not perceived as actual information-sharing, but rather a matter of everyday conversation, and might be interpreted as a process of internalising social norms within peer groups such as the workplace, or among course-mates. Many reported that certain perceptions about travelling around Bristol tended to arise repeatedly in conversation, notably that the buses are unreliable and overcrowded, and the traffic congestion abysmal. This sort of conversation was thought to be a social ice-breaker and a way of contributing to group togetherness (see 5.3.2 for links with social identity theory), rather than something which might actively influence travel behaviour. However, it also seemed to be helping to form or reinforce participants' beliefs about and attitudes towards particular transport issues. For example, even those who never used buses in Bristol 'knew' from what people had told them that bus services were poor and expensive, and those who never travelled to the university by car knew about the congestion and parking problems. This kind of discourse was especially evident in the focus group discussions, during which evaluative statements of this nature tended to attract general support. For those who did use these modes, these general (negative) interactions seemed to reinforce what they already knew. Far from encouraging them to think about changing their behaviour, such conversations appeared to be solidifying it by confirming, for example, that traffic problems are just something which everyone tolerates. On the other hand, some participants thought that

awareness of norms of behaviour within their office or classroom environment might cause them at least to *think* about their own modal choices, if they realised they were operating outside the norm.

"Maybe I was assuming that there's only one way of doing something, then I found out that for other people, the normal way is doing it x, y or z (....) and obviously they've got so much information about that because everybody else does it so they all know. (....) I might be prepared to think "well maybe". Reconsider doing it. If something is normal."

(male)

Therefore, it is postulated that general word-of-mouth interactions may be playing a role in helping to form, reinforce or challenge individuals' beliefs and the attitudes arising from them (particularly their evaluations of particular transport modes). Although the content of such interactions might not be perceived as 'travel information' with a direct bearing on cognitive processes of decision-making, they might be influencing travel behaviour *indirectly* by affecting the way in which travel choices are framed, and what types of information are sought, once an active decision process is initiated in relation to a specific trip.

ii. Passive absorption of non-salient information which "crops up in conversation"

The second category of interactions are those where information about a specific trip was deemed to have cropped up in conversation, was not salient at the time, but was *passively* absorbed and later recalled when it became relevant (i.e. when a similar trip was being made). It thus became part of active decision-making about a specific trip at a later date. This was described by several participants as "*picking up on other people's experiences*"

"I think a lot of the time you talk to people and you hear things from people and you sort of sense, subconsciously, some of these things register. And then when you're trying to plan a trip you then think, oh yeah". (male)

Like the general interactions about travel described above, this process may be conceptualised as "passive information catching" (see Um and Crompton's model, Figure 2-1).

iii. Active consideration of salient information which "crops up in conversation"

In the third, and related, set of circumstances, specific information was once again said to crop up "in the course of a free-flowing conversation" but in this case was salient at the time because the information recipient was planning a similar trip. For example, someone might mention a trip they were planning, or a new job they were starting, and a friend or neighbour would volunteer information about getting there. Information is relevant at the time and is immediately absorbed

into an active process of decision-making about a specific trip. This was the most frequently cited mode of information-sharing:

“Quite often when I mentioned I was going there a lot of people said, oh, I've been there, it's really nice. Have you thought about going this way or that way, and they'd volunteer the information. And so that kind of came through voluntarily from other people once they knew that I was going there. So that wasn't even something I particularly sought out. It just came as part of people's reaction to hearing I was going.” (female)

iv. Active seeking or offering of information as part of a cognitive decision process

Finally, information might be actively sought or offered by word-of-mouth, either when participants were intending to make a specific trip, or when a trip was underway. This type of ‘active information search’, directed towards making a specific travel decision, is the usual focus of studies of the role of information in behaviour, within frameworks such as information processing theory and cognitive theories of decision-making (see Section 2.1). Within social psychology it is consistent with the model of goal-directed behaviour developed by Bagozzi and colleagues (see Section 3.2). Consistent with the literature on formal travel information-use (e.g. Farag and Lyons, 2008a and b), informal information tended to be sought to help plan unfamiliar trips, particularly those which were time-sensitive or involved several interchanges. Word-of-mouth sources were considered to be especially helpful at the local level. For example, in the context of planning their travel to the University before they first started working or studying there, two participants said:

“Before I started this job I asked anybody who had any sort of relation either to UWE or anything in the surrounding area about how they got to work, what route they took etc . Particularly for driving.” (female)

“When I knew I was coming, I asked lots of people. I suspect, I asked nearly everybody..... you know if I met somebody who I knew was a cyclist, I think I would have asked them....” (male)

Pre-trip information was generally sought less frequently when people were travelling with others, as this was felt to furnish travellers with greater confidence to deal with matters as they arose; an exception to this was the case of travelling with children, which was felt to require more pre-planning and could be greatly facilitated by informal information from other parents.

Information was also reported by most participants to have been actively sought (or offered) en route. For example, information about buses was frequently requested from other passengers

while waiting at bus stops, especially asking other passengers when buses were expected. This was particularly the case where real-time information was not available and when buses were not thought to adhere to ‘official’ timetables . One participant remarked:

“For the buses, I pretty much ignore timetables, because they never run on schedule....I normally ask others at the bus stop.” (male)

As noted above, mobile phones were frequently quoted as a vehicle for actively obtaining word-of-mouth information from friends and family while en route, particularly amongst the younger participants. This reduced some of the need both for pre-trip planning, and seeking information from strangers if something unexpected occurred en route.

5.2 The perceived role of word-of-mouth information in decision-making processes

Research Question 2.

What is the perceived role of word-of-mouth information in the travel decision process? How do informal and formal types of information interact?

The analysis of participant accounts in response to this question was strongly interpretative, both on the part of participants themselves (their own interpretation of the influence of word-of-mouth on their attitudes and behaviour), and the researcher’s additional interpretations, regarding, for example, participants’ self-perceptions - c.f. the double hermeneutic referred to on p45.

The majority of participants considered informal travel information to be complementary to formal types of information when used in an active cognitive process of deciding about how, when and where to travel (levels iv. and iii. above). It was described as “*nice to have*”, often providing extra detail which might make a journey easier or more pleasant. Whilst for some it was a useful extra, others used it as a matter of course, actively ‘factoring in’ word-of-mouth advice when making a new trip. Many said that they used word-of-mouth for reassurance or helping to confirm a decision about a planned trip.

“So, and then I was speaking to my friend about travelling here, it's just to reassure you, I think, and help you make up your mind, before making your travel plans. You know, so they are not essential but they are useful”. (female)

Similarly, many participants gave examples of approaching fellow passengers on public transport for reassurance (having already checked timetables and variable message signs), or being asked questions by other passengers. Conversely however, some people spoke of relying predominantly on word-of-mouth and using formal information only for confirmatory purposes.

The majority of participants said that if they were forced to rely on either formal or informal information they would prefer the formal because it was likely to be more objective and easier to understand. However, others thought they were more likely to follow a personal recommendation rather than “*following the official route*”. This was sometimes explained as a matter of convenience, or of having greater trust in a person with experience compared with an official information source (both factors will be discussed in Section 5.3.1). For example:

“I generally mistrust formal information when it comes to public transport. Generally you get a better idea from word-of-mouth”. (male)

Similarly, several participants said they would sometimes prefer to phone a friend for help with way-finding when they were in an unfamiliar place, rather than relying on formal sources such as maps. Generally however, it was felt that factual information and informal advice were two different things which “*work very well together*”. Examples of these complementarities included consulting maps and/or journey planners prior to an unfamiliar trip, but also seeking advice from people with local knowledge about traffic conditions or qualitative aspects of cycle routes.

As mentioned above, many participants believed that information received through word-of-mouth often took the form of a general idea; they would then need to go and check out the details themselves.

“And if you think, okay, I’m interested in what they’re saying, you’ll then go and check it out. Because it’s their opinion, and they’ve not necessarily got the detail... the informal (information) would give me an idea of where to look for the formal. So I wouldn’t ignore it, but I wouldn’t go on it alone, because I don’t think there’s enough detail in it”. (female)

However, some participants attributed greater importance to certain pieces of informal pre-trip information, considering travel advice from family, friends and colleagues to have had a significant impact on the execution of particular aspects of a trip, such as route, departure time, station, where to park or stop for a break. Informal information was less likely to have influenced choice of mode, which was often perceived to be fixed for instrumental reasons (e.g, cost, time, the only option available, or the need to ‘trip chain’). However, word-of-mouth sometimes affected modal choice when people were travelling abroad, and in some cases these decisions were influenced by informal information from internet reviews and blogs (perhaps because people feel less ‘locked in’ to particular modal choices when they are outside their everyday environment). These tended to be consulted only because the participant did not know anyone personally who had experience of that trip.

Many participants spoke of gathering information, including through word-of-mouth, considering different options and making their own decisions. Several spoke of “*following my own advice*”, “*making my own mind up*”, and “*knowing what’s best for me*”, in a discourse reminiscent of individual utility maximisation and rational choice theory. However, new information was thought to be mixed in with existing knowledge and coloured by personal travel preferences and established habits, which has a greater congruence with the Theory of Interpersonal Behaviour (Triandis, 1977 – see Section 2.2). Consistent with information-processing theory, this then forms part of a feedback loop in which a new travel option is tried on the basis of new information (which might be formal or informal), assessed on the basis of experience, and fed back into the process of deciding about future trips.

Interestingly, participants provided more examples of instances where they believed they had influenced the modal choices of others, than examples of being influenced themselves. This was particularly the case where people who felt strongly about the benefits of walking or cycling (especially for fitness) thought they had been instrumental in another person’s decision to try out the same mode. Others thought they had generally “put people off” particular transport modes by recounting their bad experiences, for example of buses, taxis and cycle routes. These instances provide examples of (perceived) normative social influence, explored in the work of Cialdini and others (1990). They may also indicate that people assume their influence on others to be greater than the subjects of such influence might themselves believe.

As discussed in Section 5.1.3 above, processes of general social interaction and the picking up of non-salient information through conversation (levels i. and ii above) were not considered to have had a *direct* effect on final decision outcomes once a trip was being planned, although participants described a possible influence on their general way of thinking through subconscious or passive processes of absorbing information. For example, one participant reported trying out a different transport mode from his usual one following a passing comment from a course-mate, explaining that the comment had “made him think”, although it did not have a direct bearing on the final decision, which he described as reaching through an individual and rational process. Returning to Um and Crompton’s model (Figure 2-1), “passive information catching” through general social interactions may be contributing to the formation of beliefs about different transport possibilities (the “awareness set”) which are later drawn upon when an active choice process is initiated.

Participants also described general social interactions with people they did not know whilst trips were underway, usually in the context of problems occurring on public transport. Although this form of information-sharing sometimes played a role in individuals’ immediate decisions about what to do next, it also helped to generate a feeling of ‘group togetherness’ (as outlined in

Section 5.1.3). Complaints about transport were seen as a way of bringing people together and encouraging them to cooperate in conditions of adversity – described by one participant as the “Blitz spirit”.

Having discussed participants’ accounts of the influence of informal information on decision processes, the next section moves on to the third research question, which explored social-psychological factors which might help to explain the use and effects of information shared through word-of-mouth.

5.3 The role of social-psychological factors in word-of-mouth information-use

Research Question 3

How do particular social-psychological factors (e.g. social norms, social identity, pro-social values, trust) appear to influence the use and effects of word-of-mouth information?

Participants were asked whether they believed social considerations such as their relationship to the other person, commonality of interests, social and personal values relating to travel, or concern with social norms, affected their propensity to consider, follow up, or act upon word-of-mouth travel information, or indeed their inclination to seek or offer informal information at all. These areas of enquiry reflected some of the key ‘social’ constructs arising from the literature review of social-psychological theories of behaviour. Of particular interest were those factors which were thought to render the information provided by one person more reliable and trustworthy than that of another. The aim was to explore whether social-psychological constructs such as social and subjective norms, pro-social values, self-concept and social identity emerged as significant within people’s own explanations of their thought processes and behaviour (and those they attributed to others). Although, as with all the Phase 1 data, thematic analysis was the main method of analysing the transcripts, the thinking in this part of the analysis was informed by both phenomenological (focusing on meaning) and interpretive approaches – in particular interpretative phenomenological analysis, outlined in Appendix D.

5.3.1 Trust

The majority of participants considered that holding common interests, similarity of circumstances, membership of a particular group, or closeness of relationship to the person providing information, would have some degree of influence on how seriously they were likely to view this information. Central to this was the concept of trust, but there were differing views as to whether this trust arose simply as a result of the person’s experience of a particular journey (‘local knowledge’), or whether it reflected a more deep-seated trust in them as a person, which

emanated more broadly from their relationship with that person. In many instances, the two were thought to be intertwined:

“...if I trust the people, I would trust the information.....you become a judge of people, and some people you trust with information, and other people you wouldn’t trust with information” (female).

Similarly, trust was thought to be linked with sharing common interests or attributes:

“I mean, you normally trust people that you feel you have something in common with, don’t you?” (female).

In general however, the past experience of the information-giver was thought to make the quality of their information more trustworthy or reliable, and this was more important than the closeness of the relationship one had with that person (an ‘instrumental-reasoned’ rather than a ‘social’ explanation); unsurprisingly, if the information-giver did not have personal experience of the trip in question, their information was unlikely to be given serious consideration, however close the relationship or trustworthy they were felt to be as a person. Relating this to the literature review, it appears that “calculus trust” or “reliability” may be more significant than “emotional” or “relational trust” in the domain of travel information (Rousseau et al., 1998; Johnson-George and Swap, 1982). This appeared to be particularly the case when the content of the advice was more factual, such as route directions.

“You need to trust the person, and it doesn’t matter so much if they are close...I’d just need to know that they knew, or thought they knew, what they were talking about.”
(female)

Several participants mentioned close family members or friends whose travel advice they would *not* trust, because they knew them to have different modal preferences, different attitudes to time-keeping, or simply a poor sense of direction. Several participants remarked that knowing the person well allows you to evaluate any information or advice according to what you know of their personality, attitudes and preferences, so that you can apply it to your own circumstances without necessarily taking it at face value. *“I think if you get to know somebody well, then you can temper what they give you”* (male). In considering information provided by a colleague, one participant commented:

“I would take account of the whole picture of what I knew of her and her opinions, I suppose, in evaluating any advice or information she gave me. And I think it’s very difficult not to really.” (male).

In this case, the participant believed that the information-giver had different personal norms from him with regard to environment (c.f. Schwartz, 1977), and he took this into consideration when evaluating what she told him. If the friend or relative's preferences and attitudes did happen to coincide with those of the information recipient, this would make them seem *more* trustworthy than a person they knew less well. In this case, "relational trust" arising from the relationship with the information-giver serves to reinforce the "calculus trust" arising from that person's knowledge and experience:

"If somebody had the same knowledge and experience and I trusted (that) just as much as my family member, I would probably still listen to my family member (...) just because that's another good point to add to the final thing altogether". (male)

Trust in another person's knowledge appears to be highly nuanced, even within the specific field of travel. For example, you may trust a person's subjective judgement about ease or comfort, but not their sense of direction. You may trust in their experience, but not in their ability to remember and communicate it accurately. Speaking of her neighbour, one participant commented:

"She has no sense of direction, so I wouldn't ask her whether to turn left or right anywhere, but in terms of ease of using various transport, like she uses the train and the car, and how easy she finds those....I would trust her implicitly." (female).

Information received through word-of-mouth was also thought to be trustworthy if it were specific rather than vague, if it were provided by someone local, if it did not appear to be overly directive, and if the information was provided in a way which implied that the information-giver had similar travel preferences (even if the information recipient did not know them well). The last point was particularly important for people reading online reviews, who spoke of looking for 'social cues' to judge whether a source was trustworthy.

5.3.2 Similarity and in-group identity

The effect of sharing common interests with the information-giver, perhaps through membership of a social group, or similarity of circumstances, such as working in the same office, has a certain resonance with the concept of social identity (Tajfel, 1982, Tajfel and Turner, 1986), which suggests that people derive a sense of identity from membership of certain social groups which have emotional significance for them. A number of examples were provided of information-sharing within a particular group as a way of supporting other members. One of the participants who cycled regularly commented:

"I think, because there's fewer of us in the work environment...maybe there's a kind of looking out for each other a little bit more than car drivers....". (female).

One participant remarked that he would be more likely to listen to local travel advice from other UWE students than from anyone else, because “*us students, we've got to stick together*”. These in-group memberships appeared to have some emotional significance for these participants. However, a sense of strong in-group support versus out-group ambivalence, characteristic of social identity theory, was not revealed within the interviews or focus groups. This may partly have been a reflection of the research method and the discourse of individualism running through the discussions, and because no particular group memberships were salient; these issues were thought to warrant further investigation in Phase 2. When it came to listening to specific pieces of advice, one-to-one similarities with the other person (e.g. socio-demographic similarities, similar attitudes to transport, similar personal norms, or shared interests) appeared to be more important than belonging to a group.

5.3.3 Social judgement

Social considerations were thought to be less of an issue when people sought or offered on-trip information from fellow passengers and needed to make a quick judgement about whom to approach. The main reasons for approaching a particular person in this case were because they looked knowledgeable or experienced, as well as friendly and approachable.

"You ask the person who looks really confident. And eventually perhaps, you start looking like that person, rather than the person who keeps looking around and looking at the sign all the time" (female).

People’s perceptions of what made them or another person look knowledgeable did, however, vary. For some, it would be because a person “looked local”, whereas several of the younger participants said they would prefer to ask somebody older than themselves. According to social-psychological theory, the process of making quick judgements in this way could be described as one where participants were drawing on stereotypes: shared beliefs about personality traits and behaviours of group members (Fiedler and Bless, 2001). This area was thought to warrant further investigation in Phase 2. Furthermore, some of the younger participants said they were reluctant to approach strangers for information when travelling in an unfamiliar place, for fear of appearing vulnerable.

5.3.4 Pro-social behaviour

Providing pre-trip directions or advice about modal options, for example to visitors to one's home or workplace, tended to be described in instrumental-reasoned terms: "*making things run more smoothly*" or "*making life easier*". Some people said they would put themselves in the other person's shoes, advising them with regard to what they knew to be their visitor's modal preferences, rather than trying to steer them in the direction of their own. This also applied to giving directions: i.e. describing a route which was easiest for that person, rather than necessarily the one they would choose. This could be interpreted as *pro-social behaviour*, defined by Bierhoff (2002) as "*helpful actions intended to benefit another person, which are not undertaken through professional obligation*". However, some people said they would tell someone about their favourite option first, but largely because they knew most about it and believed it to be 'better', rather than through attempts to be prescriptive.

Most participants described their motivations for offering information to fellow passengers in instrumental-reasons terms: e.g. "just being helpful". When probed, participants spoke of feelings of empathy: "*I know how unpleasant it is to be lost*"; and reciprocity: "*people have helped me when I've had a problem*" and "*Because you know what it feels like, don't you, the other way around*". Both empathy and reciprocity are facets of pro-social behaviour (Bierhoff, 2002). However, most people were reluctant to volunteer advice to others, particularly strangers en route, unless they were specifically asked, or unless it was obvious that the person was floundering. Some commented that it is not normal in our society to help people you do not know. Some people said they would only offer information if they were confident in their own knowledge. Their degree of helpfulness might also depend on their mood that day or how many other people were around (you are less likely to help someone if you are in a crowd). The latter phenomenon is referred to as the 'bystander effect' in social psychology; experiments have shown that social inhibition makes people less likely to intervene and help someone in an emergency situation if other people are present (e.g. Darley and Latané, 1968; Latané and Nida, 1981).

5.3.5 Personal norms and values

Relatively few participants said their (modal) travel choices were directly influenced by personal norms and values (such as pro-social or pro-environmental values), although several indicated in the course of the interviews that they were indeed concerned about the environmental impact of transport. Those who did admit to considering environmental issues in their transport choices tended to say that they were reluctant to impose their views on others:

"I don't actually discuss it because I know a lot of people don't want to talk about the environment. They'd rather sit in cars on their own. It's not up to me to pass any judgement on that" (female).

Similarly, many stressed that they did not like to feel they were being pushed in a particular direction by someone "with an agenda", and that they would tend to find this patronising. Paradoxically however, people who had used blogs as a source of travel information when abroad considered this type of information to be less biased than formal sources because:

"You're not really being sold it. I'm not sure if that's the case with everyone, but I am always suspicious on what I'm being told. And if it isn't being sold to me, even if it is being sold to me, but it is being sold to me in such a way that it doesn't feel like it is being sold, then I'm more inclined to use it." (male)

5.3.6 Subjective norms

The perception that 'significant others' would or would not care about or approve of a particular travel behaviour (the *subjective norm* - Ajzen, 1991) was difficult to explore in the context of word-of-mouth travel information. The aim of the questioning in this area was to explore whether participants were likely to give information greater weight or consideration if it had come from someone who they knew would care about their travel choices (or whether there was any element of implicit approval-seeking in following the advice of significant others). Several younger participants described examples of acting on information provided by their parents, and one person said it "felt odd" when she did not take a route suggested by her father. But generally they did not see parental concern or approval as influential in whether or not they followed this advice. Sometimes participants did speak of implicit or subconscious seeking of approval when acting on the advice of a person they knew well. However, this was more likely to be expressed in instrumental/reasoned terms: "my friend would think I was stupid if I ignored his advice and then got lost", than reflecting any deeper sense of seeking the affirmation of the other person. This is consistent with previous research which has shown the connection between subjective norm and behavioural intention to be relatively weak (Bagozzi and Lee, 2002, Terry et al., 1999). However, it is worth noting that some participants implied in open discussion, as opposed to in response to direct questioning, that the opinions of a spouse or parent for example were indeed important to them. This raises issues about possible self-presentation factors; most participants stressed that they were independent-minded individuals, which may have belied any underlying concerns they had about how others judged them. It is perhaps unsurprising, therefore, that admissions of approval-seeking rarely appeared within considered responses to direct

questions. The limitations of direct questioning as a research method are discussed further in Chapter 6.

5.3.7 Social norms

Some participants expressed the view that enjoying broader social approval was more significant than the approval of ‘a significant other’. This may relate to social norms within a particular group, such as work colleagues or course-mates. Alternatively, it may be defined as a process of *internalisation*, whereby a decision is adopted based on the congruence of one’s values with the values of others (Bagozzi and Lee, 2002). However, this tended to be something to be enjoyed if personal travel behaviour happened to correspond to group norms, rather than being a factor which might influence an individual’s behaviour. Everyone was aware of the ‘normal’ way to travel amongst their colleagues and course-mates, but many said that they were not influenced by these norms personally (in fact, several people spoke of consciously challenging the norm).

More generally, some participants thought that they were more influenced by information which communicated injunctive social norms (as opposed to descriptive social norms – see Cialdini et al., 1990). For example, information which suggested alternatives to flying and also implied that flying should be avoided for environmental reasons, would be given greater weight than completely objective information, if this view corresponded with an individual’s own personal norms.

Some also remarked that they believed people to be influenced by group norms and other social factors but were unwilling to admit it.

“I think we try not to be influenced by other people and seek approval openly. But I think underneath we are influenced. It's like, as we were saying, in our office there are quite a lot of people who walk or cycle. Now, I've never had that - in a previous job everybody drove, so I never entertained the possibility of walking, or getting a bus, or anything like that. You just don't think. You get in your car and you drive, because everybody else does. But I think, because other people do cycle and do walk, then you think, well if they can do it, then I could, couldn't I? And it's this thing of you would get approval and accepted. It's not that it's necessary, it's just again that you have something in common..... So I think it does affect you in the decisions you make” (female).

Figure 5-3 and Figure 5-4 summarise, respectively, the main motivations cited for giving information to others both pre-trip and en route, and the main social-psychological factors affecting the use of word-of-mouth information in the two contexts.

Figure 5-3: Social-psychological factors: motivations for giving information to others

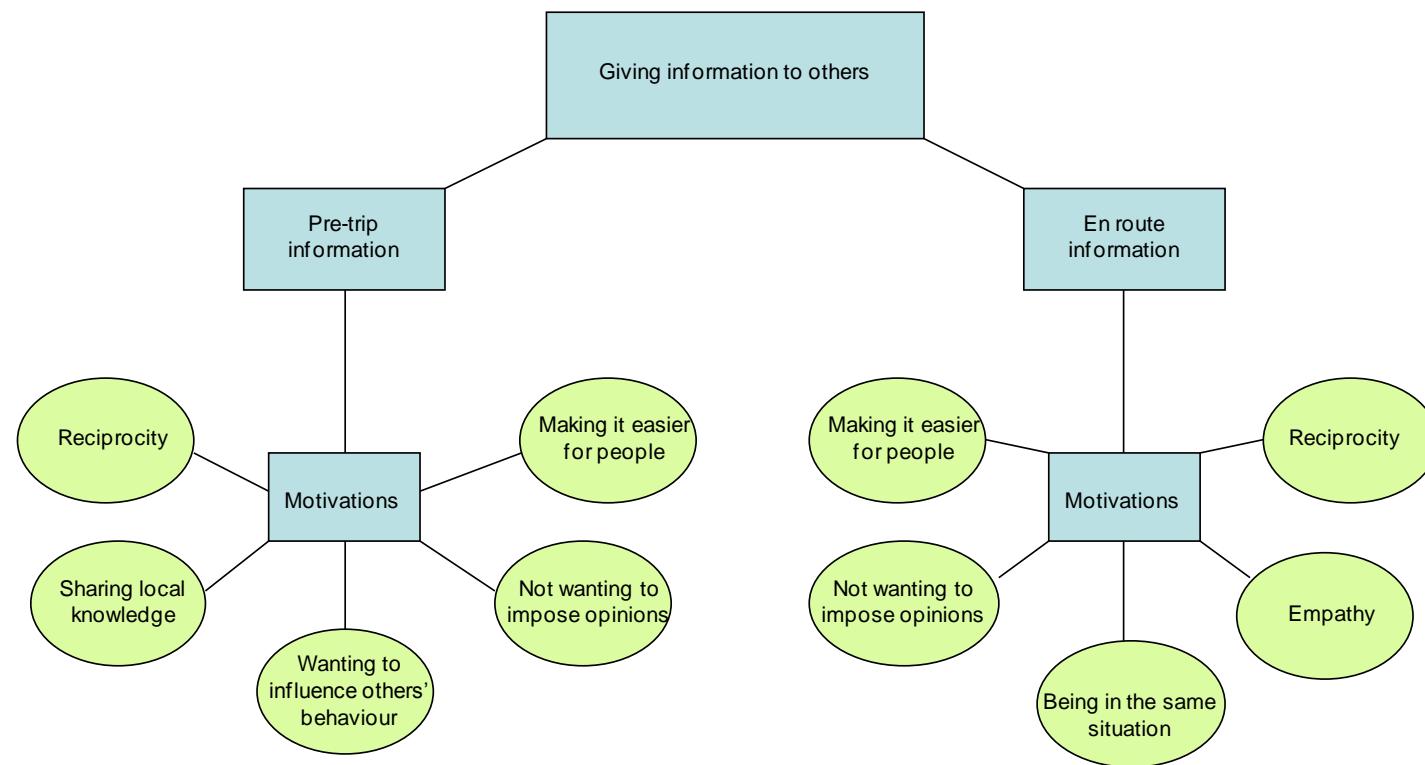
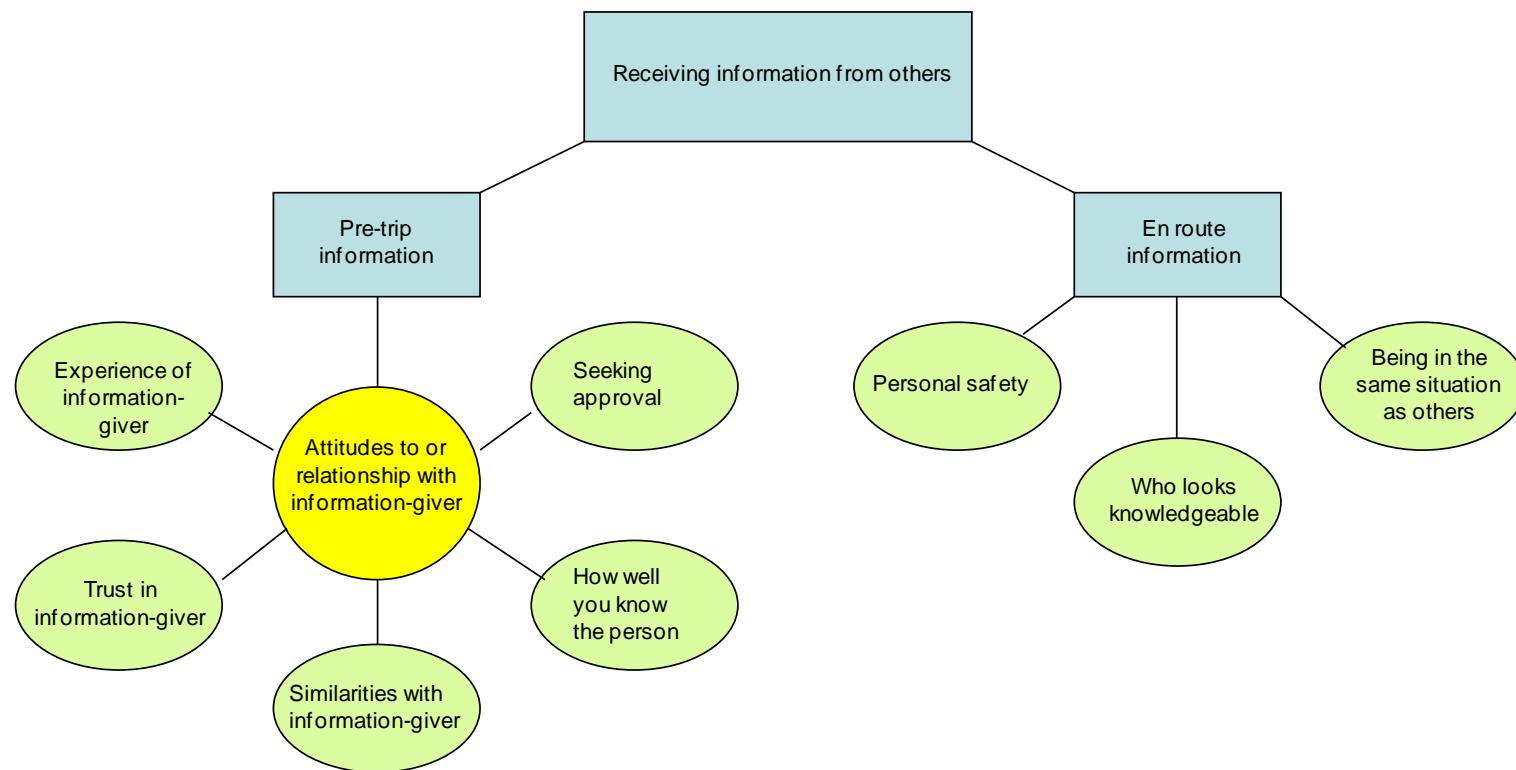


Figure 5-4: Social-psychological factors affecting use of information received from others



5.4 Other areas of findings

The previous sections have discussed those findings which relate specifically to the three main research questions posed in this phase of the study. However, a number of other areas were covered in the interviews and focus groups which are felt to have an important bearing on the direct research questions.

5.4.1 Cognitive factors

Some participants said their main motivation for asking for information by word-of-mouth rather than seeking formal sources was to save time and effort:

"I find it's usually easier to ask people who know. I'm much better at asking people something instead of looking it up on the computer or finding it in a book or whatever. I just find it's quicker for me." (female)

In these cases, asking other people for information rather than looking up formal sources appeared to provide a cognitive short-cut (Tversky and Kahneman, 1974). Conversely, cognitive factors were sometimes thought to be a *barrier* to informal information-use, particularly in relation to word-of-mouth route directions. Consistent with literature on bounded rationality (Simon, 1959), several participants said they found it difficult to follow verbal directions because different people perceive and describe things in different ways. Cognitive limitations might also make it difficult for people to provide accurate word-of-mouth information, sometimes making it seem less trustworthy as a result:

"I know there's lots of things that aren't on the maps. And I definitely trust that what the person has in their head kind of better. But I'm not sure I quite trust their ability to communicate (...) what they are remembering to me". (male)

"It's difficult when you stop to ask people because they know things in a different way from what perhaps you do. You might be asking for a place and they might notice something different. You are literally talking about the same thing but you are describing it in a different (way)." (male)

One participant said she felt inhibited in asking strangers for directions in case she had difficulty in following them. Some participants were also critical of their own abilities to provide accurate word-of-mouth directions, to the extent that they sometimes preferred not to give information at all rather than risk giving the wrong information, even if this made them seem unhelpful.

However, difficulties in processing traveller information from *formal* sources were also frequently referred to, usually in a way which involved criticising particular information sources for being difficult to understand; common targets of criticism were web-based journey planners for rail and bus, and simplified route maps for bus and underground which misrepresented distances and directions, and were therefore deemed to be of little use to people who did not know the area or the names of stops.

5.4.2 Personality-related factors

The amount of information sought or offered by word-of-mouth also appears to be affected by personality factors, although there were more similarities than differences between participants in this respect, which might in part be a reflection of cultural expectations - with regard to time-keeping for example. Virtually every participant said they "hated being late", and many reported feeling stressed by time-sensitive journeys (and annoyed with themselves for feeling stressed), especially in the context of job interviews and starting a new job. This made them more likely to seek travel information both before and during a trip; the role of word-of-mouth advice in providing reassurance and reducing uncertainty seemed to be especially important in this respect. However, several participants commented on the significance of the trip context, pointing out that they were much more relaxed about trips which were not time-sensitive, and therefore less likely to seek advice. A further strategy for reducing uncertainty was to do a trial run of the trip before a job interview or the first day of the new job - virtually every one of the employed participants (and some of the students) had done this before starting their job (or course) at the university. This suggests that however much external information has been obtained, whether it be formal or informal, it does not substitute for personal experience as a means of reducing uncertainty.

Other personality-related factors explored in the research which might affect the seeking or offering of information by word-of-mouth were self-presentation and self-efficacy. Differing levels of concern with self-presentation - the process of controlling how we are perceived by other people (Leary, 1995) - appeared to have some impact on people's willingness to ask others for advice or to offer it themselves. Whilst most professed themselves always happy to approach other people for information and advice, be they friends, acquaintances or strangers, for others it was something they forced themselves to do because they would feel more foolish if they failed to ask and then made a mistake.

"I think it is natural to be concerned to ask and show you don't know, but I think I've worked on that and I'm OK about it and I think I'd ask (...) if I could." (male)

Several participants expressed concern about not wishing to appear a ‘know-all’ by offering unsolicited advice to others, and many said they would be hesitant about approaching strangers to give them information unless it was very clear that they were in difficulty, although it was outside the scope of the current research to probe into whether, once again, this was a matter of individual personality or cultural norms.

Participants were also asked to consider their word-of-mouth information-seeking behaviour in relation to self-efficacy: belief in one’s own ability to reach a specific goal (Stroebe and Jonas, 2001). Unsurprisingly, everyone considered themselves capable of planning or executing a journey without input from other people, although in many of the specific trip examples provided, participants believed that it would have been more difficult, time-consuming, or even impossible to do this without the benefit of information provided by others. Self-efficacy is similar to perceived behavioural control (Ajzen, 1991) and in relation to travel information-use might be regarded as context-dependent rather than a stable feature of personality.

5.4.3 Past (personal) experience

The importance of past experience in influencing attitudes and behaviour is well documented, featuring in both the information-processing theories and the more complex of the (social-psychological) behavioural theories reviewed for this thesis. In the former it is the locus of the ‘internal information search’ which precludes or obviates the need for an external information search, then feeds back into future information searches once a behaviour has been enacted. In some of the latter, frequency and/or recency of past behaviour is a moderator of behavioural intention (e.g. as a precursor to habit in Triandis’ theory of Interpersonal Behaviour) or of trying to act (e.g. Bagozzi’s Theory of Trying). In the context of this study, past experience was found to affect informal information-use in a number of ways. Firstly, some participants appeared less likely to seek informal information or word-of-mouth reassurance from others as a general rule, even during or prior to an unfamiliar trip, because they regarded themselves as experienced travellers, which gave them a high degree of self-confidence – or self-efficacy - with regard to travel (this group also said that they were frequently asked for information and advice by others). Secondly, consistent with information-processing theory, past personal experience of a similar trip reduced the perceived need for external information of any type. Personal experience clearly took precedence over what participants had learned from others about their experiences. One participant who had cycled to work in her previous job remarked:

“I’ve lived in Bristol for quite a while, so when I got the job I knew where UWE was and I knew what Bristol public transport was like. So I was pretty sure that I was going to drive

in (...). and then (...) one of my colleagues said actually there's a really good bus service down to where I live. And I've never even looked." (female)

However, in most cases where unfamiliar or time-sensitive trips were being actively planned, or were underway, different types of information tended to be used alongside personal experience of similar trips in the evaluation of different options. Finally, as mentioned above in the context of reducing uncertainty, most participants reported using personal experience to aid trip planning in the sense of doing a trial run of new, time-sensitive trips. Some also spoke of simply trying out a new travel behaviour rather than employing an extensive information search.

As well as past *travel* experience, there was also some discussion of past experience of *information-use*. For example, many participants said they were "loyal" (perhaps out of habit) to a tried and tested information source, such as a particular route-planning website, and some said they would only switch to another source if it were recommended by someone they knew. Similarly, some participants said that because they had generally had a good experience of receiving word-of-mouth travel advice (in the sense that it had been reliable and useful), they would now always include word-of-mouth sources when seeking travel information.

5.4.4 Instrumental factors

In the travel behaviour literature, instrumental factors usually refer to the practical costs and benefits of a particular trip, such as monetary cost, journey time, ease, flexibility, reliability, protection from the weather, or health and fitness. These are distinguished from psychological factors such as habit, and symbolic-affective factors such as self-expression, status and autonomy, and are often associated in the literature with the 'reasoned' motives for modal choice (e.g. Anable and Gatersleben, 2005; Kenyon and Lyons, 2003; Steg et al., 2001). Previous research, particularly in transport psychology, has highlighted the tendency for people to explain their travel behaviour first and foremost in instrumental-reasoned terms (see Steg et al., 2001).

It is perhaps no surprise, therefore, that the participants in the current research made frequent reference to instrumental factors associated with their general travel behaviour (particularly their modal choices) when considering the specific role played by informal information and word-of-mouth:

"I just take the car because it's easier. It doesn't relate to any information about what people do." (male)

Referring to general interactions with her course-mates about travel to the university, one participant remarked:

"I think those are part of the conversations, but because I'm limited in the modes I've got anyway, they're not going to sway the decision. (...) So I think certainly anecdotal experiences are part of that information. But how much I listen depends on how much choice I've got either side of their advice anyway. (female)

Clearly, instrumental factors are understood to exert a major influence on whether travel information is sought or listened to in the first place (for example, only seeking bus times if you know there is a direct service), as well as on the final travel choice. As one participant said when explaining why she had disregarded a suggestion to commute by bus:

"I might want to go somewhere else on the way home (...). So if I was forced to catch the bus, it wouldn't fit in with my lifestyle as well. So even though I knew it would probably be fine and I'd had this positive recommendation, I just don't actually think it would fit." (female)

5.4.5 Interest in web-based informal travel information

In order to provide a bridge between this stage of the research and the applications phase which was to follow, the interviews and focus groups briefly touched on the participants' experience of and enthusiasm for "electronic word-of-mouth", such as web-based travel reviews. As reported previously, some were enthusiastic users of websites such as www.tripadviser.com for holiday travel, and were experienced in looking for social cues when deciding whether or not to follow up the tips and advice provided by contributors – i.e. whether the contributor might have similar likes and dislikes to them. Others had consulted independent travellers' blogs, found on Google, for specific items of travel information when travelling abroad, and reported finding them useful and more trustworthy than official transport-operator web-sites because they felt that they were not being 'sold' a particular travel option. However, this mechanism generally appeared to be second best to actually knowing someone who had been to the same place.

As mentioned previously, some participants used internet forums connected with a hobby (e.g. long distance running) to obtain UK travel information relating to specific events. One person had found a blog which provided information about getting cheaper rail fares, and a few people had appreciated the informal information added by cyclists to www.bristolstreets.co.uk (but thought there was room for improvement). Generally, however, participants had not considered using the internet as a source of informal information for local/national travel, mainly because

they were not aware of any such sources, although many said they thought this was a good idea, and would consider using it if they knew where to look (whilst a small minority were adamant that they would never do so). Most said they thought that a web-based repository of local knowledge/experience of travelling to UWE would be useful, although there would probably be issues relating to ease of use, and whom to trust. Comments on such a system included the following:

- it would need a critical mass of users to be effective (otherwise it might be neither comprehensive nor up-to-date enough to be genuinely helpful);
- relevant information would have to be easy and quick to access; for example it could be ordered by the different areas people would be travelling from;
- it would need to be recommended by someone you knew in order for you to trust it;
- it would need to be contained within a particular community (e.g. UWE students), because you would be likely to trust fellow students more than ‘strangers’;
- knowing that contributors had experience of a similar journey to you would give it reliability.
- it might give people more options and ideas about travel options;
- cycle routes and advice about cycle facilities would be especially useful, as would hints about reliability of buses.

These suggestions were used to help select a case-study for Phase 2 of the research.

5.5 Chapter Summary

The exploratory research revealed the value attributed to informal advice obtained from social contacts with first-hand experience of a particular trip, and its role in improving awareness of different travel alternatives and/or improving the trip experience. The circumstances in which informal information was acquired or transmitted were found to take three main forms: general social interactions about travel; passive absorption of information about specific trips; and the active seeking or offering of information during the planning or execution of a trip. General social interactions about travel (for example, appraising the experience of using a particular transport mode), whilst not necessarily perceived as travel information, appeared to be influencing beliefs and attitudes, and shaping the psychological context in which travel choices might later be made. More specific conversations about particular trips often involved a process of passive

information absorption, through which items of information were stored and later retrieved if a similar trip was being planned. Finally, at the stage of planning or undertaking a trip, information obtained through word-of-mouth was thought to have played a complementary role to formal information in the process of active decision-making, and was believed to have directly influenced trip details (such as route or departure time), but was less likely to have affected participants' modal choice.

'Local knowledge' was deemed trustworthy primarily because it was based on the other person's direct experience, but trustworthiness could also be improved by social and psychological factors such as the degree of familiarity or similarity with the information-giver, or, to a lesser degree, identifying with other members of a particular group. In terms of providing informal information to others, factors such as empathy and reciprocity, both facets of pro-social behaviour, frequently appeared in participants' accounts. These themes were explored in relation to all the common forms of everyday transport, but informal cycling information, particularly about cycle routes, began to emerge as an area of particular interest as the research evolved. Preliminary enquiry into the potential for informal information-sharing using the internet (harnessing "digital word-of-mouth") to enhance the planning of utility trips revealed an interest in a local, community-based information system in which other users' information could be relied upon both because of their first-hand knowledge and through a sense of belonging to the same community.

Chapter 6 : Discussion and transition to the next phase

By using interviews and focus groups as a research method, the exploratory study encouraged participants to reflect in detail on their use of informal and word-of-mouth information, and its perceived role in travel decision processes, setting this in the context of their own real-life experiences. As well as elucidating the perceived influence of word-of-mouth on actual travel behaviour, it also shed light on its influence on some of the processes which might precede a behaviour, such as the internalization of norms, and the formation of beliefs, attitudes and intentions. Unlike structured methods of obtaining data on travel preferences, choices and antecedent constructs, this methodology cannot demonstrate statistically significant relationships between behavioural constructs or prove or disprove theories. What it can do is explore people's understanding of some of the behavioural assumptions expressed in theories, and help us to interpret meanings which may emerge through open discussion (based on an interpretive and phenomenological epistemology). From this perspective, Bandura's social learning theory (1977) provided a useful framework within which to conceptualise the research participants' explanations of the role of word-of-mouth information in everyday travel. They described a process of "picking up on people's experiences" and benefiting from other people's "local knowledge" through word-of-mouth, and in turn, sharing their own travel experiences to facilitate other people's journeys; in social learning terms, it allowed them to learn vicariously from other people's experiences. Word-of-mouth communication thus provides a medium through which social learning can occur.

The role of word-of-mouth in transmitting social or group norms also stood out in this study. The findings implied that norms might be transmitted more effectively through a process of passive internalization rather than of active compliance with 'significant others' (subjective norm) or identifying with the 'in-group' (social identity) (Bagozzi and Lee, 2002). In the domain of travel behaviour, people may regard norms as exerting a stronger "informational influence" than a "normative influence". The former is described as "*influence based on accepting the information obtained from others as evidence about reality*", and the latter as "*influence based on conforming to the positive expectations of others*" (Deutsch and Gerard, 1955). Although the original focus of this research was the influence of informal information on *decision-making*, the initial analysis of the findings suggested that word-of-mouth may play just as important a role (if not more so) *prior* to the initiation of an active decision-making process, when beliefs and attitudes are being formed through "passive information catching" (Um and Crompton, 1990). When active information-search begins, key choices such as mode have often already been made, or are highly susceptible to other factors, particularly instrumental ones. Whereas general

interactions and topics which happen to crop up in conversation may be difficult to ignore, even if they are given little thought at the time, information about specific trip details may never even be sought, and therefore can be ignored, if the traveller already has a negative attitude: why find out what time the bus leaves if you already 'know' from your colleagues that the bus service is terrible? It might be better to check out another mode which has received a more positive review.

With regard to the cognitive process of decision-making about travel, a discourse reminiscent of the individual utility maximiser emerged from participants' explanations of their own decision processes. This was interesting in the light of the criticisms of this model from the fields of psychology and sociology which emerged in the literature review. Consistent with literature on motives for modal choice (e.g. Steg et al. 2001, Kenyon and Lyons, 2003) participants tended to describe their decision processes in instrumental-reasoned terms; different sources and types of information were evaluated and a 'rational' decision reached based on what suited them best as individuals. It is perhaps unsurprising that people wish to see and project themselves as rational decision-makers bearing in mind how deeply the concepts of individual self-determination and rational thought are embedded within Western culture, and nowhere is this more likely to be evident than within a university, from which the research sample was drawn. A different type of discourse might have emerged had these questions been posed to people belonging to a less individualist and more collectivist culture. Triandis (2001) offers a social-psychological perspective on individualism and collectivism:

"In individualist societies people are autonomous and independent from their in-groups; they give priority to their personal goals over the goals of their in-groups, they behave primarily on the basis of their attitudes rather than the norms of their in-groups, and exchange theory adequately predicts their social behavior." (p.909)

This he contrasts with collectivist cultures where:

"people are interdependent within their in-groups (family, tribe, nation, etc.), give priority to the goals of their in-groups, shape their behavior primarily on the basis of in-group norms, and behave in a communal way." (p.909)

Notwithstanding the preponderance of rational and individualist accounts of behaviour, the findings have highlighted a variety of other factors identified in behavioural theory, such as cognitive shortcuts, past behaviour, and the attitudes and experiences of, as well as concern for, other people. Because of the focus on social-psychological mechanisms within this study, the role of other peoples' attitudes and experiences, and the propensity to help others, are of

particular interest. A key topic to emerge was the level of trust which could be placed in other people and the information they provided: what kind of factors rendered one person more reliable as a source of information compared with another? The concept of "calculus trust" appears to be particularly important in the travel decision process. Thus, the most important factor rendering information trustworthy was deemed to be the direct personal experience of the information-giver. However, "relational" or "emotional" trust also appears to be significant, particularly in the realm of pre-trip planning, when knowing the information-giver better makes it easier to evaluate the information they are giving you. This is where social factors such as familiarity, approval and similarities between information-giver and recipient might have a role in increasing the perceived reliability of the information. With regard to offering informal travel information to others, pro-social behaviour, typified by feelings of empathy and reciprocity, appeared to underlie some of the motivations for doing so, particularly when it came to helping strangers during a journey.

Returning briefly to the research method, it was sometimes difficult to identify the mechanisms of social influence which occur through word-of-mouth; some participants said this process occurred at a largely sub-conscious level. Again, this is consistent with research showing that people tend to rationalise their behaviour, and this may be compounded in an interview situation, where people may be concerned with self-presentation (Leary, 1995). It should also be acknowledged that many of the interview questions were framed in a way which probed the role of informal information in active/cognitive decision-making, reflecting the original conceptualization of the research, and this might have introduced an element of interviewer bias which inadvertently guided responses towards 'rational' accounts. Of course, careful analysis of what people say can lead to interpretations of their attitudes and motivations which do not necessarily correspond with their own reasoned explanations. What is said spontaneously or 'off the cuff' may differ from what is expressed within a considered response to a direct question. This led to the conclusion that different research methods, perhaps involving direct observation of word-of-mouth behaviour, might therefore prove helpful in developing the research in the second empirical research phase.

Whether the participants in this study were genuinely rational and individualist in their thinking with regard to travel (albeit influenced by others to varying degrees), or simply wished to project themselves in that way, it is useful to consider the implications for transport policy and practice, and travel information in particular. Behavioural change measures such as travel plans may benefit from a greater understanding of word-of-mouth information transfer, and how this might relate to the spread of new travel behaviours within communities through a process of social influence, although the present research has highlighted that many people may be resistant to

suggestions that their travel choices are influenced by others. However, no particular group membership was salient during the Phase 1 interviews (word-of-mouth information-sharing was discussed in a variety of contexts), whereas group identification might be expected to be stronger in contexts where social similarities are emphasised – such as within an ‘online community’, or among work colleagues commuting via the same mode of transport. An issue which was thought to warrant further investigation in Phase 2 was, therefore, whether social influence might be more strongly observed in a small group context where membership of this group might be salient.

6.1.1 Implications for travel information provision

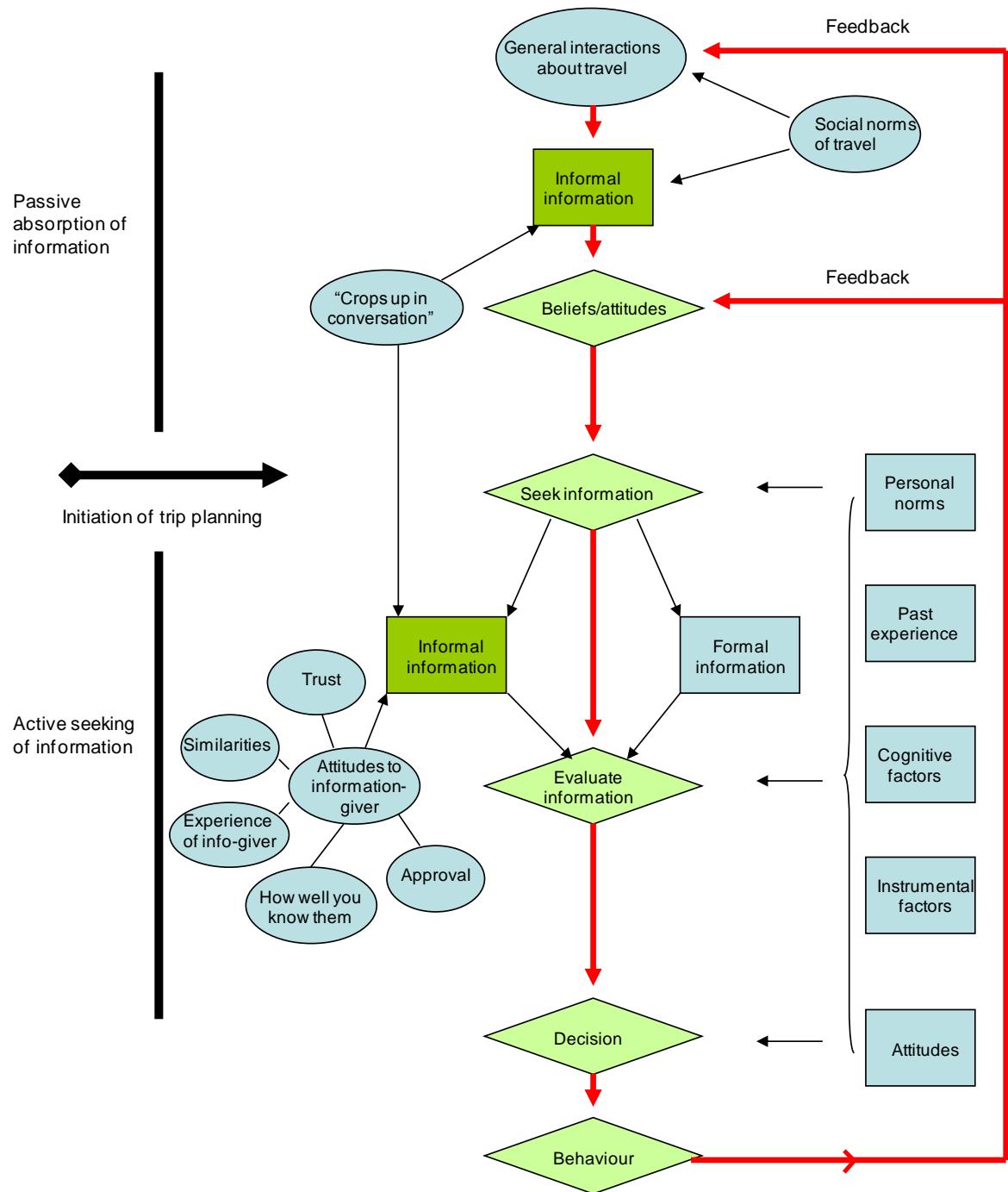
With regard to the provision of travel information, it appears that informal information and word-of-mouth processes may influence travel behaviour in complex ways, from the passive absorption of other people’s experiences and behavioural norms (influencing beliefs and attitudes) to the active consideration and use of specific items of information (influencing aspects of travel behaviour). In the process of active information search (or active offering of information) it is equally clear that informal information and word-of-mouth delivery mechanisms complement but cannot replace formal types or sources of information. Nor is it possible to isolate information from other factors as a motivator of particular travel behaviours. The findings showed that informal information was considered alongside formal information and weighed up with factors such as past experience and instrumental opportunities and constraints when part of a rational decision process. Social-psychological factors were found to affect important aspects of word-of-mouth information behaviour: whom to ask for information and why; why to give information to others; what makes it trust-worthy; and whether to act upon it, although the final travel decision was nearly always deemed to be an individual one. No population segment stood out as having a particular propensity to use word-of-mouth – it depended on personality and experience rather than factors such as age, gender, family situation, employee or student status. In terms of transport modes, there were strong indications from the half of the sample who regularly cycled as one of their transport modes, that word-of-mouth was a particularly useful source of cycling information

Figure 6-1 brings together some of the main features of the (pre-trip) travel decision process, highlighting the role of informal information (encompassing both informal content and delivery through word-of-mouth) within the overall process, and the main social-psychological factors which were found to affect its use. It might be over-ambitious to expect advanced traveller information systems to address all parts of this process. As information systems tend to be consulted when a trip is being actively planned, the second (applied) phase of the research was

intended to focus on features of the lower part of the model, particularly the social-psychological factors (lower left) affecting informal information-use within a web-based case-study system. However, it was considered important that the second research phase should also remain open to the possibility that passive information absorption and background normative influence (depicted in the top section of Figure 6-1) might also occur through the use of an information system which allows sustained social interaction amongst users.

The following section draws out the main findings relevant to advanced traveller information provision and suggests the areas for further examination in Phase 2 through the formulation of preliminary questions. These guided the development of the detailed Phase 2 research questions, which are set out at the beginning of Chapter 7.

Figure 6-1: The role of word-of-mouth information in the pre-trip travel decision process



6.1.2 Moving to the next stage: identification of areas for study in Phase 2

This section outlines some of the main findings from the exploratory research phase, and the further questions which emerged from them with regard to applications in the field of advanced traveller information systems. This guided the development of detailed research questions for Phase 2, which will be set out in the next chapter, and the selection of an information system case-study in which they might be answered.

Box 6.1

- Informal types of information from other people are thought to provide a useful supplement to formal travel information by improving awareness of and knowledge about different travel alternatives and/or improving the experience of a journey. ‘Local knowledge’ based on personal experience is especially valued.
- Informal travel information is conveyed extensively through face-to-face word-of-mouth among people who know one-another, although electronic word-of-mouth (interactive websites, web-based discussion forums etc) is sometimes used as an alternative, especially for travel abroad. Participants expressed interest in the idea of a local, web-based source of informal travel information, where staff and students at UWE could share tips and experiences.

Question: How would people respond to and use a local, web-based source of informal travel information?

Box 6.2

- For informal information to be considered useful, it must be deemed trustworthy, and to be trustworthy it must first and foremost be based on the direct experience of the person providing it. However, perceived trustworthiness is sometimes also affected by social-psychological factors such as:
 - familiarity with the person providing the information: knowledge of their personality and preferences allows you to interpret better what they say and adapt it to your own circumstances.

Box 6.2, continued

- similarities with the other person: information may be given greater credence if provided by 'someone like me', whether that be in terms of socio-demographics, attitudes to transport, personal norms, levels of fitness, or shared interests.
- norms of travel behaviour: information may be given greater consideration if it reflects norms of behaviour within a peer-group.
- Different types of trust may be required for different types of information. For example:
 - for geographical information such as route directions, trust in the person's cognitive abilities and sense of direction.
 - for more subjective information such as an assessment of the ease or pleasantness of a route or mode, trust that a person would 'see things in the same way' (here the above-mentioned social-psychological factors play a stronger role).
- When informal information is read on the internet, familiarity with the person posting the information is likely to be lacking - unless this occurs within a virtual community of regular contributors, or a physical community such as a neighbourhood or organisation. Instead, people may look for similarities with the information provider ('social cues') and use this to assess the reliability of the information. They may also absorb the norms of behaviour in a particular travel context.

Question: How might these social-psychological mechanisms (particularly trust) function in the context of a web-based system for informal information-sharing?

Box 6.3

- Pro-social behaviour may motivate people to provide information to others, putting themselves in the position of the recipient. Giving information to people you already know may be a matter of wanting to share your experiences, or wanting people to make similar choices to your own because you consider them to be somehow better (although in general people do not want to appear directive).

Question: Are people more likely to be helpful to people within their own community? Would they share more information about local travel, if they could, for example through an online system? Why might they *not* behave pro-socially?

Box 6.4

- Although in-group positivity versus out-group negativity (social identity) did not emerge strongly from the findings, there were indications that some people who cycle might experience a sense of in-group identity.

Question: Would group identification emerge more strongly if people were sharing information within a group of 'similar others' (a reference group), and would a group of cyclists provide a suitable context in which to study this?

Although cycling was the primary commuting mode for only four members of the original research sample, it transpired in the interviews that half the participants cited cycling among their means of local transport. Word-of-mouth information-sharing, particularly about cycle routes, was reported to be particularly important for cycle journeys, compared with other transport modes; this was explained by the view that many features of a cycle trip cannot easily be obtained from 'traditional' information sources such as static maps or even online cycle journey planners . Some evidence was also found in the literature for an expressed need amongst cyclists for better route information; for example, in the US, Priedhorsky et al.(2007) identified an 'unmet need' amongst cyclists for a comprehensive and up-to-date web-based

information resource, and “personalized ratings of byway bikeability” (i.e. personalised information on the comfort of cycling along a particular road or path).

The present research also found that whilst many of the features reportedly discussed through word-of-mouth might be described as instrumental, concerning matters such as topography, traffic volumes and infrastructure, it appeared that information shared through word-of-mouth about cycle trips also touched on more aesthetic and sensory aspects of the actual experience of cycling. Informal information about personal security when cycling on isolated routes was also valued, whilst interactions with other cyclists had also served a motivational purpose for some people when first considering taking up cycling. Consistent with Skinner and Rosen’s study of social identity amongst cyclists (2007), some participants experienced a degree of in-group identity with other commuter cyclists within their organisation, expressed through a concern with “looking out for one another”. Thus, it appeared that route-sharing amongst current and potential cyclists was not limited purely to the transfer of instrumental information (cycling as a means of transport to get efficiently from A to B), but could also involve the communication of social and psychological meanings between participants in the interaction. This raised the question of whether they might, in turn, be influencing one another’s attitudes and behaviour through the medium of such interactions (for example, gaining confidence about cycling due to a sense of mutual support). Therefore, information-sharing among existing commuter cyclists, and those considering it, appeared to offer a fruitful context for the study of word-of-mouth processes in greater depth.

The subsequent Phase 2 case-study was also devised in the context of rapid developments in “digital word-of-mouth” (Dellarocas, 2003) and in particular the diffusion of user-generated content via the internet. This has vastly expanded the realm of word-of-mouth information diffusion from one-to-one communication (often face-to-face) to electronic “one-to-many” (Godes et al., 2005). When asked for their opinions on this topic during the exploratory research, nearly all participants had expressed an interest in the idea of a web-based source of local, informal travel information, where users could share hints and travel advice with one another. Thus, the idea of developing an online environment in which cyclists in a particular location might share their knowledge of routes and other cycling-related issues, communicating with one another by means of an interactive map, began to take shape.

Building on the Phase 2 findings, it was anticipated that an exploration of a case-study information system might generate an in-depth understanding of the use and effects of informal travel information within an applied context, with specific reference to the role and relative importance of the different social and psychological factors under study: for example, the types of information most frequently consulted, whether it was thought to influence beliefs, intentions

or behaviours, and how far factors such as trust affect the way it is used. Building on Figure 6-1, a key aim was to develop a more specific model showing the role of word-of-mouth and explanatory social-psychological mechanisms in the context of travel information-use. In addition to theory development, the final stages of the PhD study were also intended to generate practical outputs in the form of reflections about the incorporation of specific 'social design features' - if appropriate - into other types of advanced traveller information systems, such as web-based journey planners currently offering only formal information.

6.2 Chapter Summary

This chapter has set out to form a bridge between the first and second empirical phases by discussing some of the main findings so far and their relevance to the field of advanced traveller information. A model was developed to show where, and how, word-of-mouth information may play a part within the complex process of pre-trip decision-making, and how this role may be shaped by social as well as individual factors. Consideration was also given to methodological issues, particularly the advantages and limitations of the interview method, and it was suggested that observation of actual behaviour might complement data obtained through participants' self reports. Further areas of enquiry emerging from the Phase 1 research were also identified, and reasons presented for choosing word-of-mouth cycling information as a focus of study for Phase 2. The next chapter will present the detailed research questions and methodology for the second phase of empirical research.

Empirical Research, Phase 2.

Cycology: a traveller information

case-study

Chapter 7 : Methodology, Phase 2

This chapter begins by defining the detailed research questions for Phase 2, then provides contextual information relevant to the selected case-study by outlining some contemporary developments in the field of informal information-sharing and online route-planning for cyclists. Consideration is then given to methodological issues concerning the case-study as a research approach, and the specific methods of data generation are set out. The selected case-study information system is then introduced, and the operation of the study described. Finally, two data analysis techniques are described which were used in addition to the methods employed for the analysis of Phase 1 data.

7.1 Phase 2 Research Questions

In this section the remaining two main research questions are reiterated, and a number of detailed sub-questions defined. The findings from Phase 1 about key facets of informal information-use in a general context, the perceived role of such information in the complex picture of travel decision-making, and underlying social-psychological factors, were now transferred to a case-study scenario in order to draw the exploratory findings into the realm of a specific transport application. A qualitative approach continued to be employed, allowing an openness to the possibility that the general will not necessarily translate directly to the specific, and that new themes may emerge which were not apparent in the exploratory phase. Although the research had now moved from a general to a specific context, there remained a need to take a grounded approach which observes what happens rather than measures pre-determined concepts. Nonetheless, a number of detailed research questions were defined, and are provided below.

Research Question 4.

4. How do word-of-mouth processes and informal information-sharing operate within an emerging web-based system incorporating user-generated travel information?

4.1 For what types of informal travel (cycling) information is the case-study system used?

Categories of information emerging in Phase 1 were: options and ideas; specific factual detail; and subjective advice. Consideration would also be given to ways in which informal information was combined with formal information in the case-study system.

4.2 What word-of-mouth processes (e.g. patterns of interaction) can be observed within this small group context?

4.3 What influence (if any) has word-of-mouth information exerted on participants' attitudes, intentions and travel behaviour within the case-study?

Phase 1 findings had shown that information obtained through word-of-mouth was reported to have influenced participants' trip details but not more 'strategic' decisions such as modal choice. Normative information obtained through general conversations was thought to have had no *direct* effect on trip choices, but may have influenced general attitudes. How far would this be apparent within the case-study system?

4.4 How do social-psychological mechanisms appear to function in this online context?

A number of more specific areas of interest arising from the Phase 1 exploratory research were identified for further exploration:

4.4.1 Obtaining word-of-mouth information from others:

In Phase 1, trust was found to be a key factor affecting informal information-use. Whose information did people trust in this online environment, and why?

- Relational trust:
 - Familiarity (if you know someone off-line as well, or if you come to know them through regular online interactions)
 - Similarity (e.g. sharing socio-demographic characteristics, similar attitudes to transport, personal norms, levels of fitness, or shared interests)
 - OR social proximity through being within the same community (e.g. within an organisation or locality)
- Calculus trust:
 - How would this interact with an 'instrumental-reasoned' trust in the other person's experience?
 - What might make information seem *less* trustworthy?

4.4.2 Giving information to others:

Why did people contribute information to the case-study system? The following issues from Phase 1 would be explored:

- Pro-social behaviour/ reciprocal altruism/social exchange
- Are people motivated by their membership of an in-group (e.g. within an organisation or locality)?
- What might prevent people from posting information?

Research Question 5.

5. How might information-sharing amongst travellers be applicable to advanced traveller information systems (ATIS) more generally?
- 5.1 Could advanced traveller information systems which currently offer only 'formal' types of information benefit from the integration of 'social design features' (types of user-generated content incorporated into Web 2.0 systems), and if so what specific form could these take?
- 5.2 To which modes of transport (beyond cycling) might information-sharing be most applicable?
- 5.3 What features of a 'user community' might be conducive to word-of-mouth information-sharing (e.g. group size, composition, types of user).

Following a brief section placing the second phase of the research within the context of current developments in the field of Web 2.0 cycling information, the remainder of this chapter sets out the methodology employed to answer these questions.

7.2 Context: Digital word-of-mouth, online route-planning and cycling

The area of interactive cycling information was introduced briefly in Section 1.3.3, but this section provides a little more detail in order to explain the context in which the case-study was selected and developed.

Web-based discussion of cycling issues in the UK can already be found in abundance on specialist online forums hosted (to name but a few) by local cycling campaigns and the national cycling advocacy organisations, personal blogs, and social networking sites such as <http://morvelo.cc/>. Online cycle route planners are also increasing in number and accuracy.

Pioneering work in this area was carried out by the Cambridge Cycling Campaign at

www.camcycle.org.uk, which released a route planning system in 2006, illustrated with a wealth of photographs uploaded and tagged by users (over 25,000 in number at the time of writing). This map uses geographical data from www.OpenStreetMap.org, the free digital map launched in 2004 and created by users worldwide. In response to the considerable interest generated by the Cambridge journey planner and photomap, its originators have now developed a national system: www.cyclestreets.net, with increasingly comprehensive coverage across the UK. A further example of a sophisticated, interactive map created by the 'user community' is provided by Camden Cycling Campaign at www.camdencyclists.org.uk; here contributors have plotted both utility and leisure routes around Camden on a Google map, whilst route planning is available through a link to www.cyclestreets.net. Parallel, 'top-down' developments in online cycle journey planning have occurred regionally, such as the Transport for London cycle route planner, and at the national level through a partnership between Transport Direct, Cycling England and Ordnance Survey. At the time of writing, Transport Direct's new cycle journey planner at www.transportdirect.info covers 32 English cities/areas.

In the field of utility cycling there has been little convergence so far between the sharing of 'social information' (personal accounts of the actual experience of cycling a route), such as one might find within an online discussion forum, and geographical information in the form of routes drawn on maps or described by an automated journey-planner. Many cycling websites feature both interactive maps and discussion forums, but on separate pages of the site. Moreover, systems such as the www.cyclestreets.net photomap, on which users may add comments to the photographs they upload, do introduce a more personal element to the routes which they illustrate. However, the maps themselves do not offer obvious opportunities for social interactions between users about the routes they display. Therefore, in order to be able to study social and psychological aspects of online route-sharing amongst cyclists, it appeared that an innovative approach would be needed, and a bespoke case-study system developed which would enable (and encourage) social interactions amongst the participants. This system was developed by Toby Lewis as part of www.bristolstreets.co.uk, and given the name *Cycology*. Subsequently, a route-planning website incorporating cyclists' comments has come online in Minneapolis-St Paul, USA (www.cyclopath.org), and this will provide a source of comparison for the recommendations arising from *Cycology* in Chapter 11.

The case-study system will be described in Sections 7.6 and 7.7 of this chapter, but first, consideration is given to methodological issues surrounding the use of case studies. The specific research methods which were employed within the case-study framework are then discussed.

7.3 Methodological framework: an ‘experimental case-study’

This thesis takes the position that the case-study is a research *strategy* (e.g. Robson, 1993), within which different research methods may be employed, rather than being a research method in itself (a position argued by Yin, 2009). Robson (1993) defines case-study as:

“*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence*” (p51).

Blaikie (2000) describes a case-study as “*an umbrella term for a family of research methods having in common the decision to focus on inquiry around an instance*” (p215). Yin (2009) adds that case studies are appropriate when understanding of the phenomenon encompasses an understanding of important contextual conditions, because they are highly pertinent to the phenomenon of study. This strategy was relevant to the second phase of empirical research because a detailed understanding of the use and effects of a ‘real-world’ interactive information system was sought, but to do so required an understanding of the contextual conditions of its use. Understanding the context (such as the environment in which it was used and the travel opportunities and constraints facing its users) was especially important for the interpretation of the findings regarding the behavioural effects of information-sharing, and underlying social-psychological factors. The use of several different data collection methods was thought important as a means of gaining this understanding – another facet of the case-study approach (Robson, 1993).

Where the second empirical phase differed from conventional conceptions of the case-study was that the chosen information system was not ‘naturally occurring’ – it was not an existing website which people were already using in a natural setting. Had such an online system existed where social interactions were of sufficient quality to answer the research questions, and if online contributors could be interviewed or surveyed, this would have qualified clearly as a case-study. However, as noted in the previous section, no such system had been identified, which meant that a system needed to be specially designed and research participants recruited, creating, in essence, an ‘artificial’ research-manipulated environment. In this sense the study also differed from previous research on the use of online discussion forums, blogs, social network sites and so on, many of which involve case studies of particular online environments, but all of them involving *existing* online environments (e.g. Zhang and Watts, 2008; Hall and Graham, 2004; Jansen et al., 2009; Honeycutt and Herring, 2009). The requirement of setting up and ‘testing’ a new information-sharing platform meant that the study took on some elements of a *quasi-experiment*, but without the availability of a suitable comparison group, only a *single-group pre*-

test post-test design would have been possible. Although this design is commonly used to evaluate the impacts of policies and programmes (GSR, 2007), it is considered to be methodologically weak (Robson, 1993). Consideration was given to using an interrupted time-series design, imposing interventions throughout the course of the project, and observing any changes following these interventions, but this was also rejected because the main objective was to observe interactions occurring as naturally as possible.

Real-world interventions are sometimes described as ‘trials’ or ‘field-trials’. In the transport literature, the impact of such trials is often studied using an experimental design – typically a *pre-test post-test* design - and quantitative methods (e.g. Beale and Bonsall, 2006; Taylor and Ampt, 2003; Taniguchi et al., 2003; Taniguchi and Fujii, 2007). Trials may be described differently when a product, rather than a policy is being tested or evaluated. In technology studies (e.g. human-computer interaction), prototype technologies are often ‘trialled’ to find out what happens when people use them outside the confines of the laboratory. These studies are sometimes referred to as ‘field trials’, and do not necessarily employ the language of the experiment (e.g. Esbjörnsson et al., 2004; Axup et al., 2005, discussed in Section 2.5). This less experimental approach to trials is more analogous with the research design in the second part of this thesis than the policy-related trials typical within transport research, although the focus of such studies tends to be on evaluating the technologies *per se*, rather than using the technology as a context to study users’ wider attitudes and behaviour.

The Phase 2 design did not, therefore, meet the criteria of a case-study, an experiment or a field trial in their *strictest* senses, whilst containing elements of all three. It is argued, however, that the research design was, in all senses but one, that of a case-study, and hence this term has been adopted in this thesis. Whilst the information system itself was to be specially created for the project, it would not be used in a laboratory, but in a real-world environment, and was to be studied in relation to its impact on real-world behaviour. The research was also based on an interpretive epistemology and employed qualitative methods, both of which are typical of the case-study; this contrasts with the more positivist language of the social science experiment.

Moreover, it has been argued that a strong overlap exists between case-study and other research designs, and there are particularly clear overlaps with some forms of experimentation. Like a case-study, an experiment takes place in a specific context at a particular time, and may be complemented by additional forms of data collection (Robson, 1993, Flyvbjerg, 2006). A leading proponent of the case-study approach, Yin (2009) argues that case studies were long thought, mistakenly, to be just one type of quasi-experimental design – the “one-shot post-test only” design. Robson (1993), argues that it is possible to undertake “in-breeding between

strategies" (p.169), suggesting that case-study and experimental methods might usefully be combined in real world research:

"The inherent flexibility of the case-study, and its use of multiple methods of investigation, make it feasible to introduce 'experiment-like' features to develop an understanding of the effects of the intervention." (p. 169).

Having concluded that the Phase 2 design would constitute a 'case-study with experiment-like features', consideration was given to the development of a robust case-study design. The first task in case-study design is to identify the unit(s) of analysis: what precisely is the 'case' to be studied? (Yin, 2009). The unit of analysis chosen can then have implications for how the researcher wishes to generalise from the findings. It is possible to have one or more units of analysis embedded within another, although the main unit of analysis is likely to be at the level being addressed by the main study questions. As the research questions to be addressed by this part of the PhD concerned advanced traveller information systems, and this was the area to which analytic/theoretical generalisation was sought, the main unit of analysis was identified as the bespoke layer of www.bristolstreets.co.uk created for the project - the Cycology website. Following Yin's (2009) definition, the 'case' - the Cycology website - represented a more abstract concept: that of online information-sharing. Within the main unit of analysis were other, embedded units of analysis, such as information-content and specific social-psychological factors. The case can be placed within several wider contexts such as: commuter cycling; the organisations where participants work or study; the city of Bristol; and travel information more broadly.

Finally, it was necessary to clarify the type of case under study, which then has implications for the way in which analytic generalisations might be made. Yin (2009) identifies five possible rationales for a single-case design such as Cycology: the critical case; the extreme or unique case; the typical case; the revelatory case and the longitudinal case. Of these, the current research constituted an "extreme or unique case" - when a case is so rare that multiple cases cannot be studied at the same time. Analytic generalisation is possible if the case acts as an exemplar with which to compare other cases as they arise.

7.4 Methods of data generation

As previously noted, case studies can provide a research framework in which any research method might be used (Robson, 1993). The selected methodology for Cycology was primarily qualitative: predominantly observation of interactions on the website, supported by participant interviews and questionnaires to address research questions which could not be adequately

answered through direct observation. This approach was informed by previous empirical studies of online behaviour; for example, both observation and interviews were used by Hall and Widén-Wulff (2008) in a case-study of blogging practices among a group of students, whilst Hall and Graham (2004) used observation, survey by questionnaire and in-depth interviews to study the code-breaking Yahoo ‘e-group’. The researcher also had administration rights to the Cycology system, which provided access to information on date and time of log-in to the site by each participant, and each of the markers opened. This allowed a descriptive (numerical) analysis to be undertaken of participants’ engagement with the website.

The combining of observation with interviews is also a familiar technique in the transport field, although little has been undertaken so far in an online environment. One contemporary example is the Brighton-based TWAGO project ('Twitter As you Go') where travellers *tweet* or *blog* about their everyday travel experiences. A classic early ('offline') example of combining observation with interviews was the *HATS technique*, developed in the 1980s by Jones et al. (1983). The Household Activity-Travel Simulator (HATS) involved the recording of spatial and temporal data on activity participation by household members, which then helped to structure a discussion of the reasons for this behaviour during interviews. By recording their movements on a map and noting the timings, respondents were, essentially, keeping an activity travel diary. The use of travel diaries followed up with interviews is not uncommon within transport geography; for example, Line et al. (2010) used diaries to capture participants' narratives of their use of ICTs within everyday mobility, which served as a basis for in-depth interviews. These authors note that their methods were borrowed from those commonly used within mobility studies (Line et al., 2010). Whilst travel diaries reveal self-reported data, new technologies now allow spatial information about trips to be recorded automatically using GPS technologies, thus creating new opportunities for capturing observed behaviour which can then be probed during interview. Although the Cycology project was intended to capture data about participants' travel behaviour in a way not dissimilar from a travel diary, the main focus of the study was not on peoples' travel behaviour *per se*, but on their observed use of the website. Hence, the study was perhaps methodologically closer to contemporary research on online communities, discussed in Section 2.5 of the literature review.

Having discussed the methodological framework and use of specific methods, we now turn to an explanation of the design and implementation of the Cycology case-study.

7.5 Selection of the case-study information system

The selected platform for hosting the case-study system was www.bristolstreets.co.uk. This website exhibits many features of an advanced traveller information system, providing detailed,

interactive information on public transport and cycling (and car driving to a lesser degree); see Figure 7-1. Since its inception in 2007, it has hosted a variety of other types of community information, such as houses for sale, environmental information and 'quiet places' in the city. Its distinctive feature is that all the information is based on a (Google) map, overlaid with different categories of information (such as a bike layer, a bus layer, and a 'quiet places' layer). Whilst much of the information is retrieved automatically from a range of other information sources and overlaid on the map, some of the layers – notably the bike layer and the quiet places layer – include markers added by visitors to the site. Thus, the travel component combines formal travel information (e.g. bus routes and times) with an interactive cycling layer on which people may draw cycling routes and add markers, such as comments and photographs, and may also endorse each other's comments. The cycling layer has been used to host a survey of cycling facilities around Bristol – hence many comments have been posted by users with the intention of drawing problems to the attention of the city council. The website thus provides a combination of local formal and informal information with possibilities for social interaction, and was therefore considered to offer an ideal web-based environment within which to build the case-study information system for this research. Screenshots from the website are presented elsewhere in this thesis in Figure 1-3, Figure 8-13 and Figure 8-15.

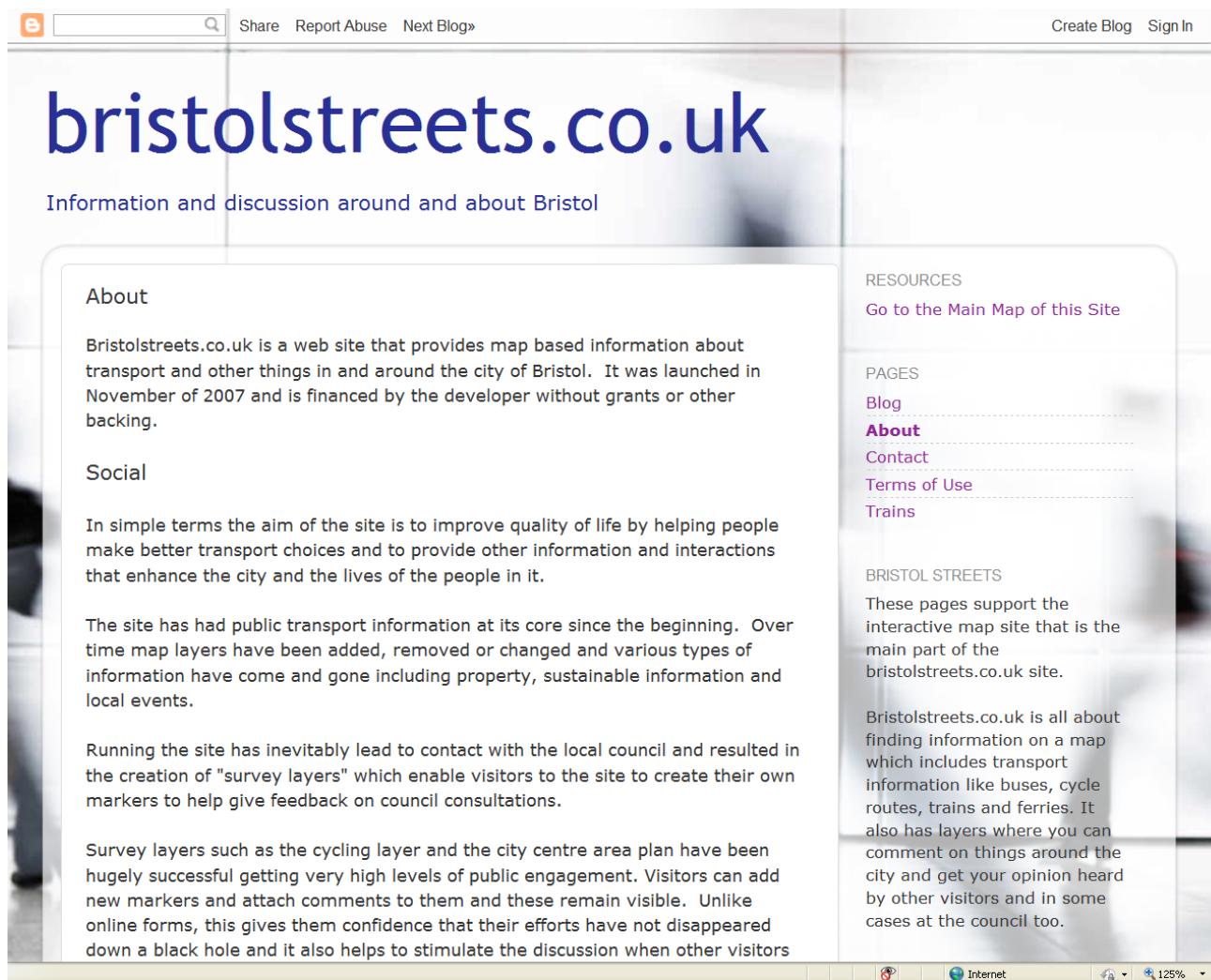


Figure 7-1: Screenshot showing “About” section of www.bristolstreets.co.uk

During June and July 2009, when the observational stage of the Phase 2 empirical research took place, total ‘visits’ to the site numbered 3938⁴, a mean of 65 visits per day. Hits ('clicks') on the site over the same two months totalled 41,887, of which 8978 were on the bike layer (mean 687 total hits per day; of which 147 were on the bike layer)⁵.

The designer of www.bristolstreets.co.uk, was sufficiently interested in the concept of testing out new ‘social design features’ to agree to build a bespoke layer of the website for the purposes of the research; thus, the *Cycology* layer was born.

7.6 Population, sample and recruitment

The population from which the research sample was drawn was people who cycle, or were considering cycling to work or study at five neighbouring organisations in Bristol. This specific group of modal users was selected for in-depth study on the basis of findings from Phase 1 as well as the small body of literature concerning social identity and cycling (e.g. Skinner and Rosen, 2007, Gatersleben and Haddad 2010) and cyclists’ preference for personalised route information (Priedhorsky et al., 2007). Further empirical evidence of the willingness of employees at UWE to share route information with others in the organisation was provided by a small ‘bike buddying’ scheme which was piloted in the spring and summer of 2008. Approximately 30 existing cyclists came forward to offer route advice to other people.

The study population was limited to five neighbouring organisations because the Phase 1 findings, as well as evidence from the social psychology literature (e.g. Kramer and Brewer, 1984; Van Lange and De Dreu, 2001), suggest that people are more likely to cooperate with one another within a defined community. At a more practical level, the sharing of cycle route information would be more relevant to participants if they cycled to the same locality. Even where participants in Phase 1 did not necessarily express feelings of in-group identity, they expressed a preference for ‘local knowledge’ from others within their community (in this case the university), because these people were likely to have relevant experience and were therefore regarded as trustworthy - this could in fact be instrumental reasoning as a proxy for issues of social identity. The five organisations were located on the northern fringe of Bristol: UWE

⁴ A “visit” is when a particular web browser connects to the site. Figures exclude the visits and hits by Cycology participants, which are presented separately in Chapter 8.

⁵ Figures provided by Toby Lewis.

Frenchay Campus; the Higher Education Funding Council for England; the Ministry of Defence at Abbey Wood; Hewlett Packard Labs; and a small engineering company. This allowed the study population to be diversified beyond the Phase 1 research population, but without compromising the project's local focus.

Volunteers were recruited from the five organisations using posters and flyers, bicycle user group email lists, 'snippets' on the organisations' intranet websites and the Bristol Streets website itself. In order to try to reduce the potential bias towards experienced cyclists, people who had recently bought a bicycle through the university's tax-free purchase scheme were also approached via the personnel department (in the hope that this might attract novice cyclists). A 'snowballing' technique was also used by asking the selected volunteers to forward the invitation to participate to anyone they knew who was contemplating cycling but had not yet done so (a strategy which was not successful). An initial online questionnaire was administered to determine volunteers' level of experience in cycling (generally, and specifically in this part of Bristol) and any previous use of www.bristolstreets.co.uk or other online cycling information/mapping etc, plus the area they would normally commute from. The aim was to recruit people with different levels of experience as some were expected to act more as 'information-givers' and some as 'information-seekers', as well as to obtain a broad geographical coverage of participants' cycle routes to their places of work or study. Twenty to 25 active participants were thought to be required for the duration of the project in order to generate sufficient numbers and combinations of interactions, whilst keeping the group small enough to allow a sense of social closeness within the group, as well as allowing the researcher to meet and interview as many participants as possible. Some guidance on group size was found in the literature, although there was little consistency and limited direct comparability with Cycology. For example, Hall and Widén-Wulff (2008) conducted a case-study of online information-sharing amongst a small group of only six postgraduate students. Tu and McIsaac (2002) studied interactions amongst 51 students in an online learning environment, and found that "*Many students reported that they felt lost in the multithread discussion environment. They became confused and frustrated, having difficulty determining "who" was talking to "whom" about "what".*" (p143). Studies of 'organic' online communities revolving around a hobby or interest (as opposed to online groups within a work/study context, or those set up for research purposes) tend to involve groups of far larger numbers, although indepth data may only be obtained from a limited number of group members. For example, Hall and Graham (2004) studied an online community with over 2,500 members, but surveyed 30 and interviewed eight. Taking into consideration these factors relating to both interactivity within the group and practical matters of data generation and management, a sample of 30 participants was selected purposively for

Cycology from a group of 60 volunteers, of whom 23 eventually played an active part in the project.

Although one of the organisations was the university from which the Phase 1 sample had been drawn, none of the original participants took part in Phase 2. The final sample contained people who had been cycling to work for differing lengths of time, ranging from six months to over ten years, and who were at that time cycling to work with different frequencies (ranging from every day to very infrequently). Just one of the 23 participants was contemplating cycling to work but had not yet done so. A diversity of ages and a balance in numbers between men and women was sought. Achieving a gender balance was important, as previous research on interactions in online communities has highlighted differences between levels of male and female participation in online groups, as well as in the nature of their interactions (Mann and Stewart, 2000). A summary of the sample is shown in Table 7-1 and Table 7-2.

Table 7-1: Cycology participants by age, gender and organisation

	Age range				Total	Organisation					Total
	20-29	30-39	40-49	50-60		UWE staff	UWE student	HEFC -E	HP	MoD	
F	4	5	3	1	13	7	0	5	0	0	13
M	2	3	2	3	10	4	3	0	2	1	0
Total	6	8	5	4	23	11	3	5	2	1	1
											23

UWE: University of the West of England; HEFCE: Higher Education Funding Council for England; HP: Hewlett Packard; MoD: Ministry of Defence.

Table 7-2: Cycology participants – commencement and frequency of cycling to work

	Commencement of cycling to work prior to the study				Total	Frequency of cycling to work					Total
	<1 year ago	1-2 years ago	2-5 years ago	> 5 years ago		Every day	Often	Sometimes	Rarely	Never	
F	4	3	5	0	12	6	5	1	0	1	13
M	1	3	2	4	10	2	6	1	1	0	10
Total	5	6	7	4	22*	8	11	2	1	1	23

* One female participant is excluded from this part of the table because she had not cycled to work.

Careful consideration was given to the type of incentives offered to participants in this project. It was concluded that social and practical incentives may work better than financial ones for a study of this type. For example, participants may gain personal, instrumental value from information exchanges (e.g. knowledge of recommended routes), but also social value through reputation-building ('being an expert'), or psychological value from supporting a project which may also benefit other cyclists in the long run or even encourage non-cyclists to give it a try. Careful thought was given to ways in which such benefits might be communicated in the recruitment process and during the project.

7.7 Operation of the Cycology study

Participants were invited to attend a briefing (with lunch) in order to introduce them to the case-study system, the research project, and to one another. The briefing was run twice in order to maximise attendance - therefore participants were not all able to meet one another. The researcher offered to meet those who could not attend one of the briefings on a one-to-one basis. Thirteen participants attended the briefings, and the researcher met a further three people one-to-one. The opportunity for participants to meet some of their fellows at the start of the experiment was thought to be one way of encouraging both the level of interaction amongst them during the experiment, as well as a general sense of involvement in (and commitment to) the project. As prior knowledge of one another may have influenced their interactions during the project, participants were asked whether they knew anyone else who had volunteered for project (no one was aware that they did). All were given a Participant Guide and Project Information Sheet (attached as Appendix H and Appendix I).

Participants were asked to use the Cycology website over a period of 6 weeks, starting in early June 2009. They were invited to mark their favourite cycling route/s on the interactive map, post comments or photographs, discuss local cycling matters, and respond to one another's questions. Each marker appeared on the map as a balloon identifying the person who had created it. Clicking on the marker revealed a comments box, to which subsequent comments could be added, in the manner of a discussion thread. As well as the geographical markers, it was also possible to create 'floating markers' for comments and responses not relating to a specific location. To personalise the messages, participants could submit a thumbnail image such as a personal photograph or icon. In the manner of a discussion forum, participants were sent an email digest every day, containing any markers which had been created, or comments added to existing markers during that day. Each person had a registered password to enter the Cycology layer of the site, which was only accessible to members of the group for the duration of the experiment. All the interactions were observed and recorded. The researcher also had site

administration rights which allowed her to analyse participants' browsing activity: which markers they were looking at and when. Participants were also asked to keep a record of their activities on the website (e.g. reasons for looking at a particular feature) and any off-line activities associated with it, such as following up information by checking other sources, using a suggested cycle route, or contacting another participant off-line.

The website contributions were analysed by the researcher, in order to explore within the written text any discourses of trust, social identity or pro-social behaviour, as well as seeking evidence of any behavioural change (e.g. trying out new routes). However, it was necessary to go beyond an interpretation of observed behaviour in order to achieve a better understanding of the social-psychological factors under study, particularly those concerning motivations for sharing information and reasons for trusting others (or not). These factors were initially explored through a short questionnaire, then probed through one-to-one interviews at the end of the experiment; the interviews also provided an opportunity to explore participants' reflections on their experience of using the site, any influence on attitudes, intentions and behaviour, and possible suggestions for improvements to the social features of the site.

Ethical considerations were also given due consideration in the design of the study. In addition to the following of standard university procedures for ethical social research, concerning confidentiality, anonymity and the right to withdraw (all participants signed a consent form confirming their understanding of these issues), thought was also given to additional ethical issues relating to the use of an online discussion forum. This included the adoption of a code of conduct for 'appropriate use' of the website, adapted from those used by the Students' Union and Yahoo for the online forums which they host (attached as Appendix J– Code of conduct for on-line discussions). Participants were informed of the option of using a pseudonym on the website, and were advised not to reveal personal information such as home addresses.

7.8 Content of questionnaires and interviews

Both the questionnaires and interviews were designed to complement the observational data by giving participants an opportunity to explain their own contributions, their reactions to those of others, and broader views about the website, both as they had experienced it and what they thought its wider potential might be. The questionnaire and interview questions were designed to answer the detailed Phase 2 research questions, in particular research questions 4.3, 4.4 and 5 concerning, respectively: behavioural and attitudinal effects; social-psychological processes; and wider potential applications in the field of advanced traveller information.

Firstly, the short questionnaire was designed, comprising 13 open questions (attached as Appendix F). The main purpose of the questionnaire was to capture participants' immediate views on their experience of the Cycology project as soon as the six weeks had passed, including: their evaluation of the information posted; their motivations for contributing (or not); any perceived changes to their own attitudes and (travel) behaviour; and thoughts about how such a website might work in different contexts. This was in anticipation of a time lag between the end of project and the earliest time when interviews could be held, the main summer holiday period having now started. The questionnaire also served a useful function in helping the researcher to prepare for each interview and refine the interview guide for each individual, based on the answers given in the questionnaire. Thus, issues raised in short statements in the questionnaire could be probed and full explanations sought during the interviews. The interview guide template is included as Appendix G. All interviews were transcribed for analysis within NVivo.

7.9 Data analysis

A thematic analysis of the website contributions, questionnaire responses and interview transcripts was undertaken according to the same procedures and with the same philosophical underpinning as described in Section 4.3. A list of NVivo codes is attached as Appendix L. Three further forms of analysis were also undertaken: a descriptive numerical analysis of levels of activity on the website using Microsoft Excel; the establishment of a 'typology' of Cycology participants, and non-cross sectional (holistic) analysis of individual participants. The latter two techniques are explained below.

7.9.1 Establishing typologies

Typologies are forms of classification which help to explain the segmentation of the social world or specific ways in which phenomena can be characterised or differentiated (Ritchie et al. 2003). This involves creating multi-dimensional or multifactorial classifications in which categories are discrete and independent of one another (an individual feature can only be assigned to one category). Typologies were thought to be useful for the Phase 2 analysis, as they might, for example, provide findings of interest to developers of traveller information systems incorporating user-generated content, by indicating the different types of people needed to make an online group (or 'community') of travellers function well.

Kozinets (2010) proposes a typology of interest to the current research, which categorises types of interaction within online communities. *"Participation can move from a factual and informational type of exchange to one that effortlessly mixes factual information and social, or*

relational, information." (p34-35). In *cruising communities*, participants' interest in the consumption activity is low, as are social relationships with other members. A *bonding community* is characterised by deep and long lasting relationships amongst members, but a weaker focus on the unifying consumption activity (for example, a social networking site). The primary purpose of a bonding community is to meet participants' relational needs. Another type of community is where the focus is very much on the consumption activity, and less on social bonding. This type of community is likely to involve the sharing of information, news, stories and techniques about a particular activity. Kozinets terms this type of community a *geeking community*. Many newsgroups and blogs would fit into this last category, where members share detailed information but do not engage deeply in social relationships. Kozinets (2010) maintains that the modes of interaction in these communities are predominantly informational. The fourth type of community combines both strong social bonds with detailed information about the unifying interest. These are termed *building communities*, and often emerge from website forums and virtual worlds. Here, the interaction is both informational and relational. It was of particular interest to see whether the Cycology group would constitute a *geeking community*, or perhaps develop into a *bonding* or a *building community* (if indeed it could accurately be defined as an 'online community' at all – a matter to be discussed in Section 11.4).

One way in which the establishment of a typology was thought to be useful in the analysis of Phase 2 data was to inform the selection of a small number of cases for holistic (non-cross-sectional) analysis.

7.9.2 Non-cross-sectional analysis

Non cross-sectional analysis may also be termed *contextual, case-study* or *holistic* analysis (Mason 2002). These forms of data organisation focus on discrete parts of the data set, with the aim of documenting something about these parts in particular (e.g. observational, questionnaire and interview data relating to a specific individual). Mason (2002) suggests that "*it is a practice guided by a search both for the particular in context rather than the common and consistent, and the holistic rather than the cross-sectional*" (p.165). Two reasons for taking a non-cross-sectional approach to the Phase 2 analysis were: a) a desire to gain a sense of the distinctiveness of different elements of the dataset (i.e. participants as individuals); and b) a wish to use this method in addition to cross-sectional indexing, in order to build explanations based on two alternative ways of 'slicing' the dataset.

The analytic logic for this approach is that explanations are derived from the analysis of, or comparisons within, cases or 'wholes'. Instead of comparing specific features of one person's account with similar features of another person's account, as if they were like-for-like and free of

context, the aim is to compare the overall explanation of a phenomenon within one person's account, with the explanation of the same phenomenon in another person's account. For example, with regard to Cycology, this could relate to an individual's propensity to contribute to the website within the context of their personality, usual behaviours, likes and dislikes, and time commitments. The mixing of both cross-sectional and non-cross-sectional data analysis is a method explored by Freudendal-Pedersen et al. (2010), who use the terms *horizontal* (thematic) and *vertical* (holistic) analysis in relation to a study of the ways in which individuals narrate their everyday life-related choices, and the unintended consequence of these choices on their mobility patterns. A vertical analysis was carried out of individual participants in the Cycology project, using all data sources pertaining to each individual to complement the main horizontal (thematic) analysis, in order to bring out individual voices from within the data. Four such vertical analyses are summarised in Section 11.4.2, each representing a 'type' within the typology which was developed.

7.10 Chapter Summary

This chapter has presented the methodology used for the second empirical research phase within the thesis. Starting with the context of online cycling information, it was explained that no 'naturally occurring' information system had been identified in which social interactions were of the quality required to answer the research questions, and therefore a bespoke system needed to be developed, incorporating design features which might stimulate social interaction. This took the form of a specially designed layer of www.bristolstreets.co.uk, entitled Cycology. The research design was one of a case-study 'with experimental features' (as Cycology had been developed for the project and hence did not constitute a 'naturally occurring phenomenon' in the strictest sense of the case-study approach). A mixed method approach to data generation was employed (observation, questionnaires and interviews). Thirty people, of whom 23 eventually took part, were selected purposively to use the Cycology system over six weeks. Data were analysed using thematic analysis, descriptive numerical analysis, typologies and non-cross-sectional analysis. The findings of the research will now be reported in the following four chapters.

Chapter 8 : Findings, Phase 2 - Descriptive analysis of the Cycology website

As discussed in earlier chapters, the Phase 1 findings had provided new knowledge about the context of informal travel information and word-of-mouth processes (who tells what to whom, and when), its influences on attitudes, intentions and behaviours, and underlying social-psychological mechanisms. In particular, Phase 1 had delivered new insights into the role of word-of-mouth as a channel for ‘background’ normative influence, affecting general beliefs and attitudes about travel within which the decision process for specific trips is later framed, as well as social factors found to be associated with informal information in the context of active trip planning (depicted, respectively, in the top and bottom left sections of Figure 6-1, p95). Neither of these areas had been discussed in the existing literature on traveller information (within transport studies), as this has conventionally addressed the use of information only within an active decision process and from an individual, not a social, perspective.

Phase 2 of the research had then set out to explore informal information and word-of-mouth processes within an applied context – that of advanced traveller information (research questions 4 and 5). The tasks in Phase 2 were to:

- validate the earlier, general findings in the applied context of a real-world traveller information system;
- explore the operation of the identified social mechanisms in a small-group context;
- study the identified social factors in greater depth.

The findings reported in this and the next two chapters address the fourth main research question of this thesis:

4. How do word-of-mouth processes and informal information-sharing operate within an emerging web-based system incorporating user-generated travel information?

This question was divided into four sub-questions corresponding with the main areas of Phase 1 findings:

- 4.1 For what types of informal travel (cycling) information is the case-study system used?
- 4.2 What word-of-mouth processes (e.g. patterns of interaction) can be observed within this small group context?

4.3 What influence (if any) has word-of-mouth information exerted on participants' self-reported attitudes, intentions and travel behaviour within the case-study?

4.4 How do social-psychological mechanisms appear to function in this online context?

Although the data generated through all three methods used in Phase 2 (observation, questionnaire and interview) were integrated to answer all four sub-questions, the answers to the first two - reported in this chapter - drew principally on observational data from the Cycology website, whilst the second two, reported in Chapter 9 and Chapter 10, drew mainly on the interviews and questionnaires. A benefit of the mixed-method approach was that participant accounts could help provide a better understanding of some of the observed activity on the website, as well as elucidate people's own experience of using it and the ways they believed it had influenced them. Conversely, observation of actual activity on the website provided a means of validating or questioning participants' own accounts. This also meant that the analysis could be undertaken using both the group as a whole, and each individual, as units of analysis. Thus, in Sections 8.1 and 8.2 below, analysis of website use and patterns of content over time are presented in aggregate (use by the whole group). In Sections 8.3 and 8.4, data on types and patterns of participant involvement are disaggregated into individual users⁶. The psychological and behavioural findings reported in Chapter 9 and Chapter 10 emerged principally from a thematic qualitative analysis, in which themes were identified horizontally across the whole group, but illustrated with individual examples.

This chapter describes the findings of a descriptive numerical analysis and a qualitative content analysis of messages posted on the website, the viewing of posts, levels of engagement by different participants, patterns of interaction, and culminates in an analysis of the two 'most read' discussion threads. Furthermore, by providing a comprehensive description of the activity on the website, it sets the context for the subsequent two chapters on attitudinal and behavioural influences, and underlying social-psychological processes associated with information-sharing (Chapter 9 and Chapter 10, addressing research questions 4.3 and 4.4 respectively). The descriptive analysis also supports Chapter 11 of this thesis, which considers implications for traveller information systems more broadly.

⁶ Each participant was given a pseudonym for the reporting of the findings, which will be used in this and the remaining Chapters.

Following a numerical overview of activity on the website, this chapter addresses sub-questions 4.1 and 4.2. in the following sub-sections:

4.1 For what types of informal travel (cycling) information is the case-study system used?	8.2 Content of website posts
	8.4 Detailed analysis of two interactions
4.2 What word-of-mouth processes (e.g. patterns of interaction) can be observed within this small group context?	8.3 Levels of participant involvement

8.1 Numerical overview

Over the six week period of the Cycology project, 132 postings were added to the site by the 23 participants, of which 77 elaborated on routes drawn on the map, and 55 comprised general comments, questions or responses. Eighty postings formed part of 29 short discussion threads, the number of comments in a thread ranging from 2 to 5. The 13 female participants contributed 65% of the postings (mean number of postings by women = 6.6), whilst the 10 male participants contributed 35% (mean number of postings by men = 4.6). The overall mean number of posts was 5.8. The lowest number of contributions was 1, and the highest 14. Four (female) participants accounted for 34% of the postings. Figure 8-1 provides a screenshot of the website at the end of the first week of the project. Figure 8-2 shows that 46% of contributions were made during this first week, as participants enthusiastically drew their routes on the map, after which the subject matter widened but contributions became less frequent. Figure 8-2 also shows that at least one message was posted on 26 days out of the 30 working days (i.e. Monday to Friday) of the project. Interestingly, participants were not prevented from posting at the weekend, but never did, demonstrating that the website tended to be associated with commuting and work – an observation supported by people's accounts in the interviews. Some of the most active contributors commented that checking the website was part of their daily routine, and something they might do when they first arrived at their desks, or when they needed a short break.

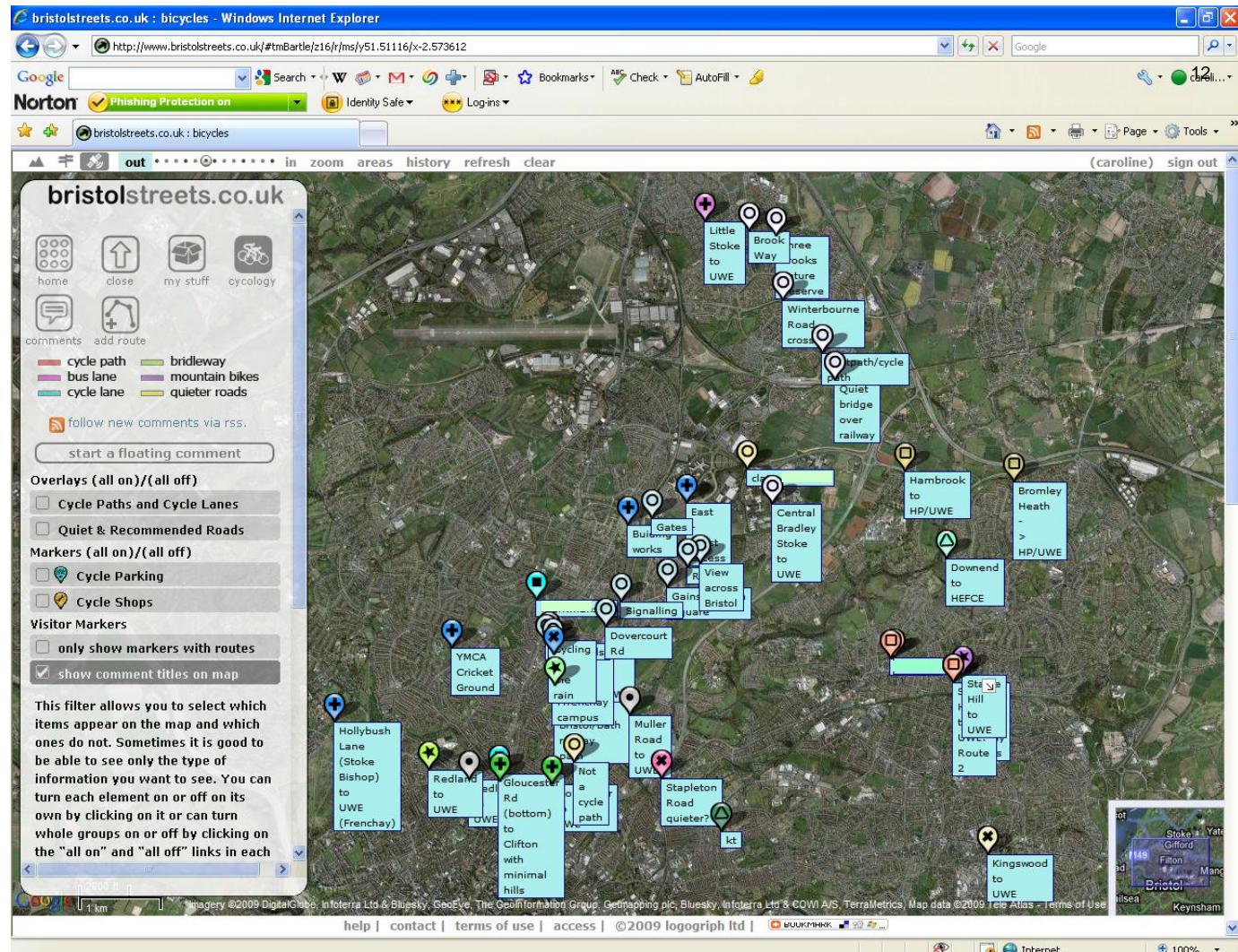


Figure 8-1: Screenshot of the Cycology website at the end of week 1.

Viewings of markers on the website numbered 1059 over the six weeks; the breakdown over time is depicted in Figure 8-3. 89% of these markers were posts, or groups of posts (discussion threads) created by participants, the rest being markers already present on the website, such as those showing the location of cycle shops or cycle stands. The number of markers opened per individual ranged from 1 to 127 (mean = 46). There was less of a gender imbalance than was the case for the number of messages written, with women representing three of the five top 'readers' (whereas the five top 'writers' were all women). The mean number of markers was similar for men and women (45 and 47 respectively). A comparison of male and female participation was of interest because previous research on interactions in online communities has highlighted differences between levels of male and female participation in online groups (men tending to participate more), as well as in the nature of their interactions: for example, Mann and Stewart (2000) suggest that men tend to engage in "report talk" (focussing on instrumental information) and women in "rapport talk" (placing greater emphasis on relationship-building). However, these findings were not supported by the present research, as female participants contributed more than male participants on average, but the content of their posts did not, overall, differ in a qualitative way from those of male contributors (male participants were not necessarily more 'factual', nor female participants more 'conversational'). As was the case in Phase 1, gender differences were neither clear nor consistent across this small sample.

Figure 8-3 shows that the number of markers being opened decreased over time, following the same pattern as the number of posts written. Each of the 132 markers was opened eight times on average. However, these figures must be qualified with the important observation that it was not possible to know how many participants read the posts in the daily email digest without following the links to the website. Several participants noted at interview that they were happy to read the email digest unless they wanted to look at a specific route on the map, and this was reported to have happened increasingly with time, reflecting the tendency perhaps for the topic of the posts to broaden out from routes, and therefore becoming less dependent on the map.

Figure 8-2: Number of messages posted over time

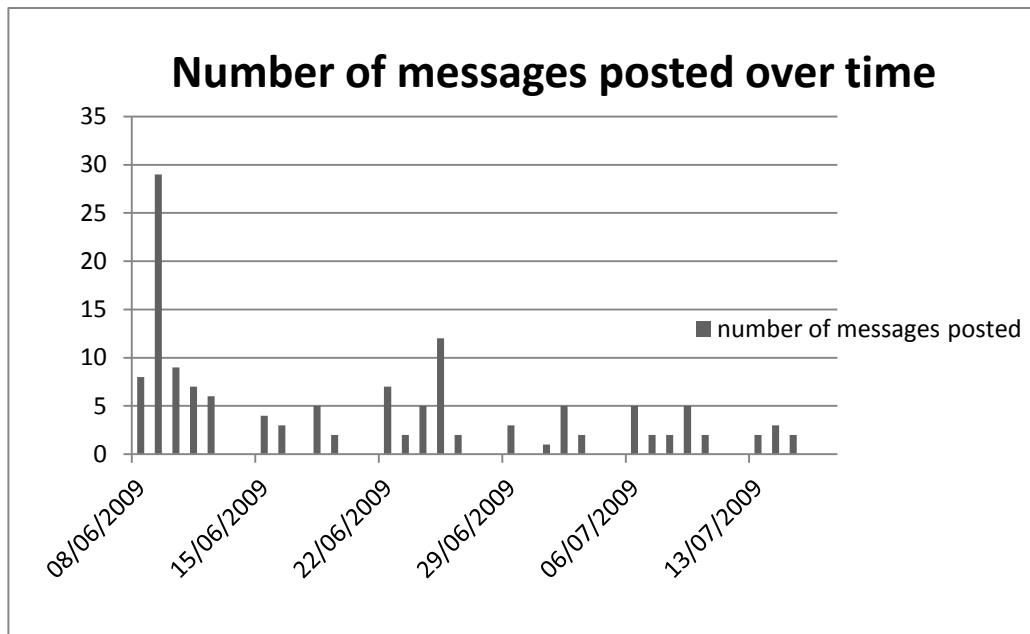
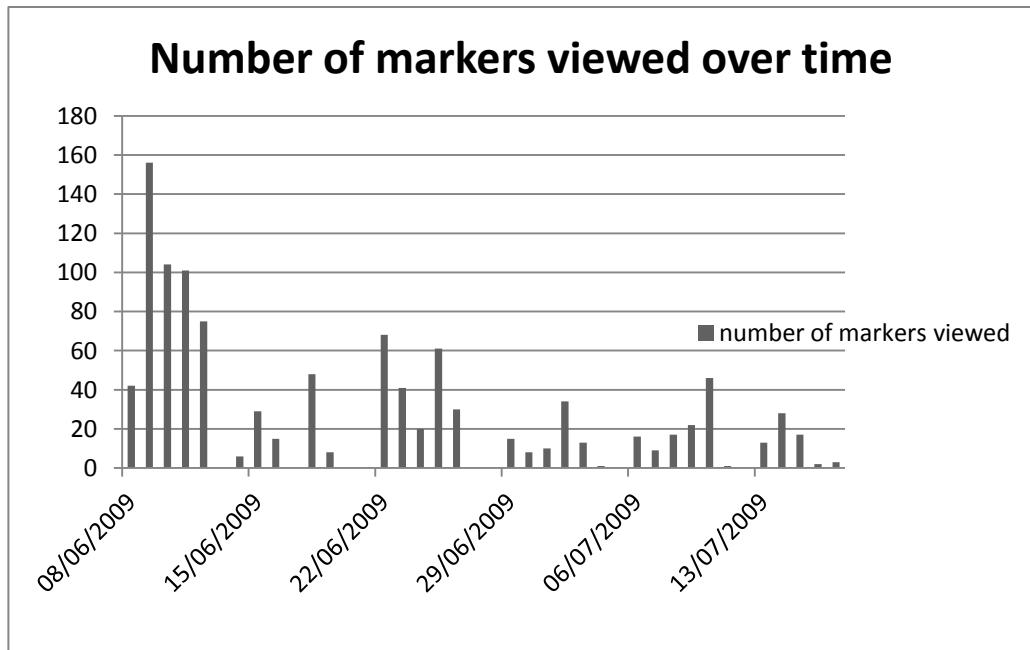


Figure 8-3: Number of markers viewed over time



How might the level of activity on the Cycology website be assessed overall? There were no specific expectations, as no similar ‘real world’ website had been identified with which to compare it: both the research design and the website itself were experimental. However, the Bristol Cycling Campaign discussion forum was being observed to provide a loose comparison, and the number of messages posted to these groups per day averaged 4.9 during the same period in June/July 2009. This is not greatly different from the average number of posts to the Cycology site per working day⁷ (4.4), despite the much larger membership of the cycling campaign discussion group - comprising just under 200 members. During the same time period, the cycle layer of the main bristolstreets website was attracting a lower level of activity: approximately 1.4 posts per working day (as most markers were added to the main site as part of a survey about cycling facilities for the City Council, over two thirds identified hazards and locations for suggested cycle lanes; only 8% constituted routes). However, in the later weeks of the Cycology project, the number of posts per day rarely exceeded three, and this number seemed unlikely to rise without the ‘injection’ of new members to add new routes and discussion topics. Some participants expressed, at interview, a disappointment in the number of posts and level of interaction, although this was affected by the extent to which an individual took part in discussion threads (a matter returned to in Section 8.3). However, others reported that the level of interaction was sufficient to maintain their interest, and most said they found the project useful and/or enjoyable. In terms of how well the website functioned as a ‘product’ which might be further developed (not a research question as such, but an area of interest in relation to potential applications in the field of advanced traveller information), one area which did not ‘take off’ was the posting of routes other than commuter routes, such as leisure routes, but this was attributed to the strong commuting focus of the project. A ‘product tester’ might have been disappointed that as many as one third of the participants posted only twice (and one only once), and one third of the total posts were written by only four participants, but this does concur with literature on participation in online communities, which suggests that the majority of posts tend to be provided by a small minority of the participants (e.g. Ling et al., 2005; Zhang and Watts, 2008).

⁷ Mean number of posts per day was calculated by dividing by five, as the website was not used at weekends.

8.2 Content of website posts

This section presents a numerical summary of website content and trends in content over the six weeks of the project, and a thematic, qualitative analysis of website posts. Together with the previous section, it answers sub-question 4.1:

4.1 For what types of informal travel (cycling) information is the case-study system used?

As would be expected, given the focus on commuter cycling and the recruitment within places of work or study, the major topic of discussion on the Cycology site was cycle routes between the participants' areas of residence and their places of work, drawn on to the map and annotated with comments, some short and functional, and others more descriptive (examples will be given below). Some other routes around the city were added, such as cycle routes to railway stations, between residential areas, and to the popular Bristol to Bath cycle path. Some comments about leisure cycling on the Bristol to Bath cycle path were also made, but beyond that, little discussion about leisure routes occurred. Apart from the description and discussion of routes, postings generally took the form of up-to-date warnings, such as an incidences of bike theft or broken glass on a roundabout, discussion of general cycling issues such as taking bikes on trains or the Bristol Cycling City initiative, notification of a cycling event (the Big Bike Breakfast), and musings and observations about the cycling experience in general or specific occurrences on the journey to or from work. A list of all posts and threads is attached as Appendix M.

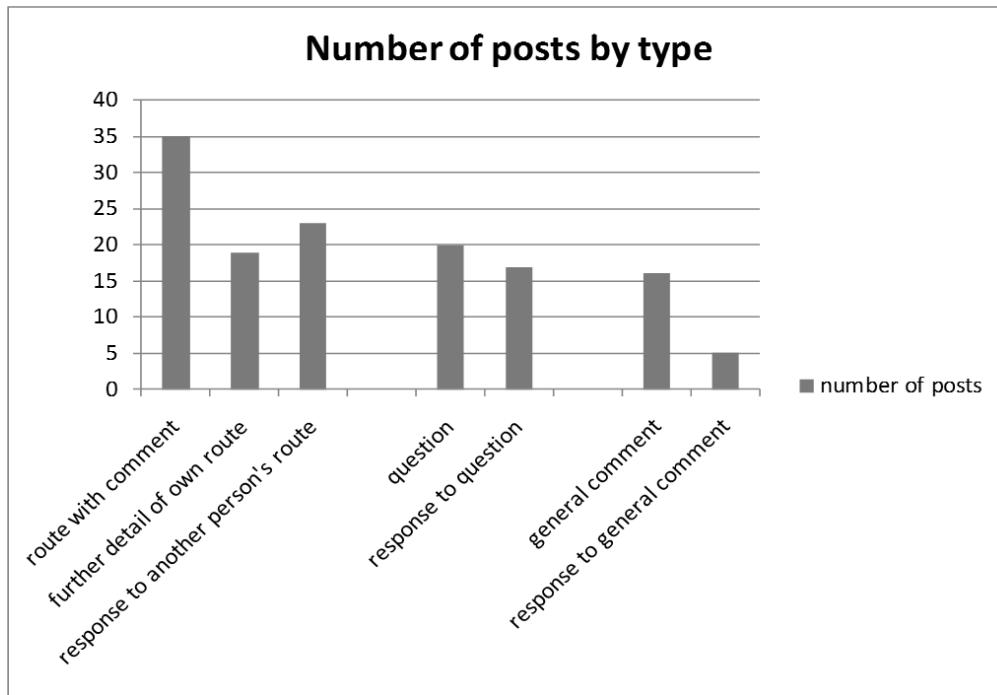
As well as providing their own information and observations, most participants also posted questions, which often led to short discussion threads. However, some questions also went unanswered, the questionnaires and interviews revealing this to be a source of disappointment to some. A significant reason for this was the limited number of participants; 23 people did not appear to be a high enough number to be able to answer queries about cycle routes from all parts of the city since participants did not, between them, have knowledge of cycle routes in all areas. This suggests that greater numbers would be required if an information-sharing forum such as this were to be sustainable in the longer term, although the advantages of greater breadth must be weighed against the possible loss of 'intimacy' as group size increases (see Section 10.3 for a full discussion of group size effects).

8.2.1 Numerical analysis

A numerical summary of the content and function of all posts was provided by placing each within one of seven categories, which are presented in Figure 8-4. The first three categories are grouped together as those pertaining to routes. The largest category (35 posts) comprises

comments tied to routes drawn on the map, and a further 19 provided detail of features along the route. These posts were all proactive (i.e. offering information without it being requested) and peaked in the first week of the project.

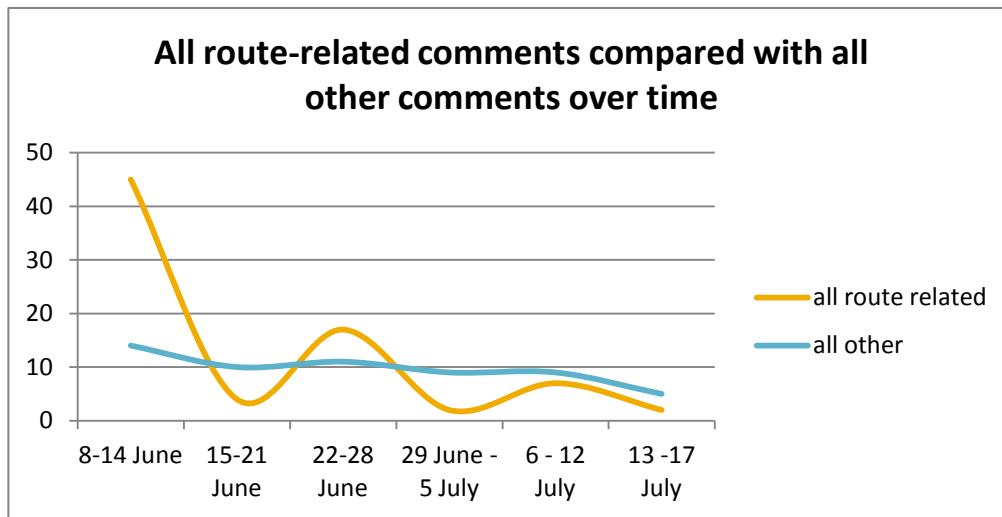
Figure 8-4: Number of posts by type



Twenty three messages were posted in response to proactive route comments, and this sometimes included feedback when someone had tried out a route and then offered views on it. These responses followed the same pattern over time as the proactive route information. The second group of categories comprise direct questions and responses to them. There were slightly more questions than answers, and a slight time lag between the two, with most questions in the first and third week and most responses in the fifth week. The third group of categories (general comments and responses) comprised proactive comments concerning non-route related matters, plus a small number of responses to them. These comments peaked in the fourth week of the project. Many participants indicated in the interviews that by this stage they had said most of what they had to say about their routes, and started to widen the subject matter. However, the number of general posts and responses per week was relatively low (between 2 and 7). Charts showing the distribution of messages over time in each of the three groups of message categories are provided in Appendix K. Figure 8-5 shows that when the numbers of all route-related comments are combined, and compared with the combined numbers of questions, answers, general comments and responses, over half of route-related

messages were posted within the first week, whilst questions and general comments were more constant over the 6 weeks, albeit with a reduction towards the end. In total, route-related posts constituted a slight majority of all posts (57%), and, as has been previously noted, some of the questions also related to routes. This gives rise to speculation about how the pattern of messages would have continued had the project gone on for longer. Unless more ‘news-worthy’ incidents were to occur along the routes of the existing participants, it seems likely that more people would have been required to join in order to bring fresh contributions.

Figure 8-5: All route-related comments compared with all other comments over time



8.2.2 Qualitative analysis

The previous section showed trends in content over time, by grouping posts into broad categories according to subject matter (route or non-route related) and function ('pro-active' statement or question; 'reactive' response). In this section more detailed attention is given to the content of the posts, drawing out themes which run across these broad categories, as well as the tone in which they were written. The main themes identified are wayfaring (geographical route descriptions), safety, cycling infrastructure, sharing space with other road/path users, and sensory, aesthetic and affective descriptions of the cycling experience. Many posts fell into more than one of these categories. The titles of posts and groups of posts (threads), categorised according to these themes, are attached as Appendix M.

Across all the themes, many postings combined both instrumental/geographical information, such as steepness (the words *hill*, *hilly* or *steep* appeared some 45 times), traffic volumes and infrastructure features such as quality of road surfaces, with subjective descriptions of the ‘lived’

experience of cycling the route. According to the classification of formal and informal information used in this thesis, instrumental/geographical (factual) information may be categorised as formal (obtained through word-of-mouth rather than official sources), whereas more personal, subjective evaluations are categorised as informal. Therefore, both informal and formal information were communicated through word-of-mouth on the website, and many individual posts contained a combination of both. This means that although the research question addressed by this analysis concerned *informal* information, the findings actually refer to both formal and informal information delivered through word-of-mouth.

A small minority of the wayfaring comments were short and functional, in the vein of:

Daily trip to work – mainly off road, bit hilly. (*Kate*)

This is my normal route to work. I go along Gloucester Road and Filton Avenue to avoid losing height. (*Henry*)⁸

However, the following represents a more typical route comment, combining factual information (visibility, speed humps) with evaluative and experiential commentary:

Good route. Haven't had many problems with aggressive drivers. The roads don't have cars parking alongside, so there's lots of visibility. The only problem is coming down Braydon Avenue. The road surface is terrible and when combined with the speed humps, you spend a lot of time in the middle of the road. But the road is so bad, I've not had trouble with cars wanting to go too fast. (*Jess*)

This combining of the ‘factual’ with the ‘evaluative’ is in line with the findings from Phase 1 about the way in which formal and informal information are thought to complement one another, although in the Phase 1 interviews, ‘formal’ information was generally associated with information from official sources (e.g. printed timetables) rather than factual information received through word-of-mouth. Furthermore, in Phase 1 the content of information which interviewees had reported obtaining or offering through word-of-mouth had been categorised in the following ways: options and ideas; specific factual detail; or subjective advice. In Phase 2, specific factual detail was usually combined with subjective advice, but general options and ideas (which in

⁸ Verdana font is used to distinguish verbatim comments on the website from participant quotes arising from interviews and questionnaires (italicised, Arial font).

Phase 1 had referred to matters such as suggesting alternative transport modes) were absent, presumably because the information offered and requested was specific to a narrow group of users travelling to and from similar places, and using the same transport mode.

Other route comments combined factual route information with more whimsical observations. In this example, a route plotted on the map was supplemented with a remark about a cat :

A nice route (there is a black cat on a wall who appreciates a tickle behind the ears) but bendy so you can't go fast, there are too many people walking dogs and toddlers on it. (*Elaine*)

Another participant remarked in her interview how much she had enjoyed this comment, and had looked for (and found) the black cat when she cycled along this route – hence, although she was already familiar with the route, she believed that the additional commentary had improved her experience of cycling along it (a matter to be discussed in Section 9.4 on changing the experience of the commute). Hence, such descriptive comments can make journeys more interesting, which may increase positive attitudes towards it – this will be discussed in Section 9.2.

The safety theme was manifested mainly through the comments about avoiding or dealing with motor traffic, which appeared in some twenty of the postings, and concerns about using unlit paths at night. A general consensus about preferring quiet routes was apparent, and there were some specific discussions about how to deal with traffic at difficult junctions. Safety concerns with unlit cycle paths provided another common area of concern. A sense of fear was sometimes communicated within comments about road traffic or unlit paths:

I guess that the cycle path is dark and scary in winter. (*Sally*)

Grievances about road infrastructure which did not favour cyclists were also shared amongst participants who had experienced similar problems. For example, a comment that a traffic island designed for cyclists and pedestrians was too narrow provoked an emphatic response of : “totally totally agree”. Other comments about infrastructure covered topics such as a poor cycle lane, inadequate cycle access to the university, and poor road surfaces.

Matters of shared space with road or path users other than motorists were also common topics. The general tone of comments about drivers’ behaviour towards cyclists was uncomplimentary or sarcastic, although not aggressive, for example:

Note: i've been screamed at by motorists a few times along Kellaway Ave.
No doubt for various injustices i have caused them. (*Andy*)

After cars, pedestrians were the most commonly cited annoyance, evidenced, for example by a thread entitled “Gripe with pedestrians”. Although conflicts of interest were apparent, issues with adults, children and dogs were often conciliatory in tone:

To be fair though, i think i tend to do the same when on foot. (*Doug*)

Smiling and giving way avoids confrontation. (*John*)

There were occasional warnings of more unusual obstacles. One contributor noted within her description of a route through a park: watch out for the hissing geese! (*Sarah*). Another had experienced an alarming but ultimately edifying encounter.

A deer jumped out at me about here on the cycle path behind HP from the woods. I managed to skid to a halt without hitting it and then it bombed off down the path. Be warned! However, it did make a nice addition to an otherwise soaked journey and I've definitely never been so close to one before. (*Rick*)

Moving towards the more sensory and aesthetic aspects of the cycling experience, many participants commented on the scenic aspects of particular routes, often communicating a real sense of pleasure in their journeys. Some postings also referred to the sensory pleasure of cycling at speed downhill:

Sometimes i go home slightly different so that I can go down that big hill in Lockleaze (yippie). (*Andy*)

The enjoyment of the journey is conveyed through this part of a discussion thread:

This is good if you have a mountain bike or it's not muddy! you do have to carry your bike up a flight of steps first though to get up on the hill then it's field tracks, nice and quiet and good views so for me worth the extra effort. (*Kate*)

....I've got onto the track from a lane / car park off Shaldon Road before and it is lovely - good for dog walking too + in spring, bluebells in the woods!
(*Sally*)

Finally, participants occasionally contributed more general thoughts about the cycling experience. In the following example, a sense of empathy with other cyclists and the positive feelings this engendered were clearly expressed:

So my cycle home yesterday started off as one of my most unpleasant to date. It was absolutely throwing it down. It was nice to see I was joined by so many other cyclists- also soaked through. The best part was that everyone was so happy and friendly! I spoke to more people on the way home than I have done as any other time on a bike. By the time I got home I was in a better mood than I'd been in all afternoon, and then the sun came out :) I guess the shared "ordeal" brought out the friendliness in everyone. Thought I'd share that good cycling-in-the-rain experience! (Alice)

It became clear in the interviews that this type of informal comment had played a role, for some people, in reinforcing positive attitudes towards cycling, and helping to create a sense of group identification – matters to be discussed in Sections 9.2 and 10.2 respectively.

The over-riding tone of the interactions was friendly: a feature mentioned by many of the participants in their feedback questionnaires and interviews. Some participants and discussion threads were particularly ‘chatty’, others more factual. Just one of the 23 participants made comments which appeared brusque and caused slight offence to one or two others. Three participants, one female, two male, who lived in the same area (but did not know each other) quickly established an informal, conversational style, swapping experiences of particular routes and addressing one another by name. Other interactions were more ‘functional’ in tone, such as a discussion among four male participants about what one was ‘supposed to do’ when negotiating a difficult junction. Some contributions were humorous, and some participants (mainly female) often adopted a self-deprecating style in terms of their cycling competence. This is consistent with Mann and Stewart’s (2000) suggestion that men engage more in “report talk” and women in “rapport talk”, although, as previously noted, this was not a difference which could be observed to any significant degree.

Overall, providing feedback on the project, one participant summed up the content of contributions as follows:

“There seemed to be a mix of submissions ranging from the highly informative and quite serious to some more general (or fun) comments more about the experience of cycling in Bristol in general. Both types were interesting and complemented each other well, meaning that the site was very technically useful, but also not too dry and boring”. (Adam)

Another participant remarked that the mix of content made it feel “*more like a conversation between people than a formal exchange of data*”, which highlights the social nature of the information and process whereby it was shared.

Not all participants were so positive about the information content, some saying they found some content to be trivial or mundane. Indeed, some active contributors remarked that they considered some of their own comments to be trivial but were keen to keep the interactions going (these participants were perhaps exhibiting pro-social behaviour and were conscious of wanting the research experiment to be a ‘success’, an issue to be discussed in Sections 10.5 - pro-social behaviour, and 10.7 - reflections on the methodology).

8.3 Levels of participant involvement

This section addresses sub-question 4.2:

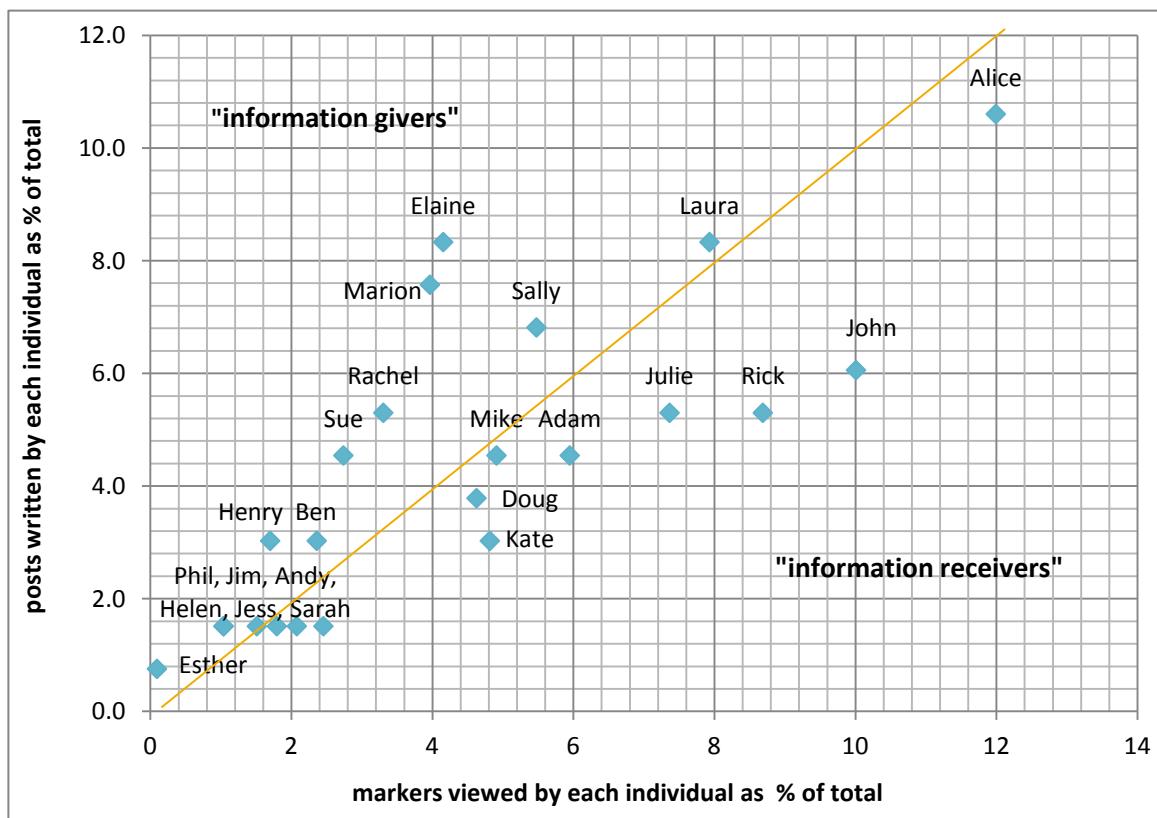
4.2 What word-of-mouth processes - e.g. patterns of interaction - can be observed within this small group context?

In the figures below, data are disaggregated into individual participants.

Figure 8-6 compares the number of posts written by each participant as a percentage of total posts, with the markers opened by each participant as a percentage of the total markers opened. This scatter graph shows that the two activities were roughly in proportion for most participants; for example, the person writing the most also read the most, and the person writing the least also read the least (although, as previously mentioned, some people who rarely went to the website stated in interview that they had nonetheless continued to read posts within the email digest). The closer an individual sits to the 45 degree line, the more their share of the posts written was in proportion to their share of the posts read. This is of little surprise, as someone logging onto the site to post a message might well also take the opportunity to read the other posts already there. Unless they wished to see a route on the map, those who simply wanted to read a message and not post themselves could do so by reading the email digest. However, there were some discrepancies, i.e. people whose share of the markers read was higher than their share of the messages written (e.g. John, Rick, Julie), and, especially notable, a group who wrote a greater proportion than they read (e.g. Elaine, Marion). The previous caveat still holds for the latter group - they may have read a great deal more but via the email digest rather than by going to the website and clicking on markers. However, the chart does give an indication of participants’ general level of engagement with the website, and the extent to which they engaged both as contributors and readers. Those furthest below the line might be categorised

as ‘information receivers’, whereas those furthest above it might be classed as ‘information givers’. For those closer to the line, their ‘information-giving’ and ‘information-receiving’ activities were more in proportion, with those to the top right of the chart being the more active in both domains, and those to the bottom left being more inactive in both areas. In terms of participant attributes, the five most frequent contributors to the site were all female, and four of the five had begun cycling to work within the previous two years (two had begun within the past six months).

Figure 8-6: Writing posts and opening markers, by individual



One dimension which this chart fails to reveal is those people who participated little in terms of observed website activity, but were nonetheless enthusiastic about the project in their interviews and questionnaires, stating that they had read the daily email digest with interest and had formed opinions on some of the posts (for example Jess, Phil and Esther). Conversely, some participants with high levels of website participation declared themselves to be less enthusiastic during interviews than the graphs might lead one to expect (e.g. John and Elaine).

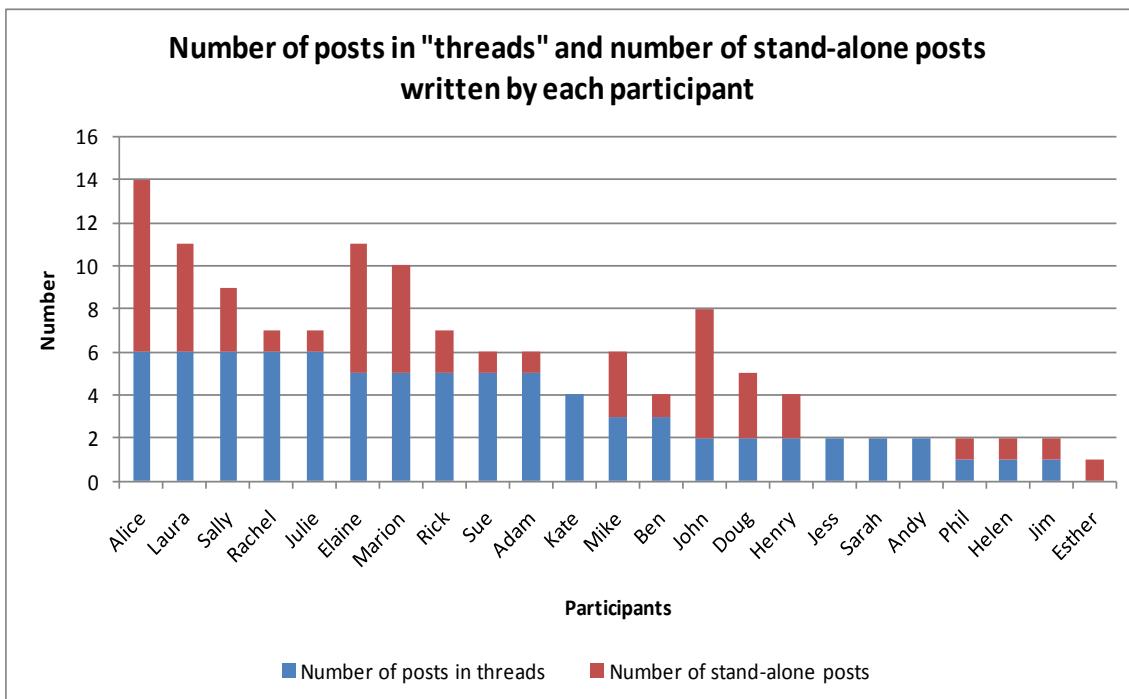
8.3.1 Level and patterns of interaction

A broad indication of the level of interaction on the Cycology is provided by the number of posts which appeared in the short discussion threads. Eighty posts (58%) formed part of 29 threads, and most participants reported that they were satisfied with the level of interaction, although some were disappointed with it. Many thought that although the level of interaction was satisfactory, it could also have been improved. As previously noted, not all questions were answered, and the length of threads (between 2 and 5 messages) was rather short compared with more ‘traditional’ email discussion forums such as those of the Bristol and Oxford Cycling Campaigns. This is likely to be a reflection of the different content of the Cycology threads (i.e. mainly route-related) compared with the two cycling forums, in which discussion topics are more diverse and often rather controversial. Moreover, the obvious point that the Cycology group was much smaller than the membership of the other forums also meant that the reservoir of knowledge (and possibly range of opinion) was narrower.

In this section, the data are once again disaggregated to analyse levels of interactivity by individual, showing how many threads each took part in, who was more reactive and who more proactive, and how many times each person’s posts were read by others (in total). Network diagrams are also provided to give an overview of the strongest connections (whose markers each participant opened most), and the connections within two geographical sub-groups.

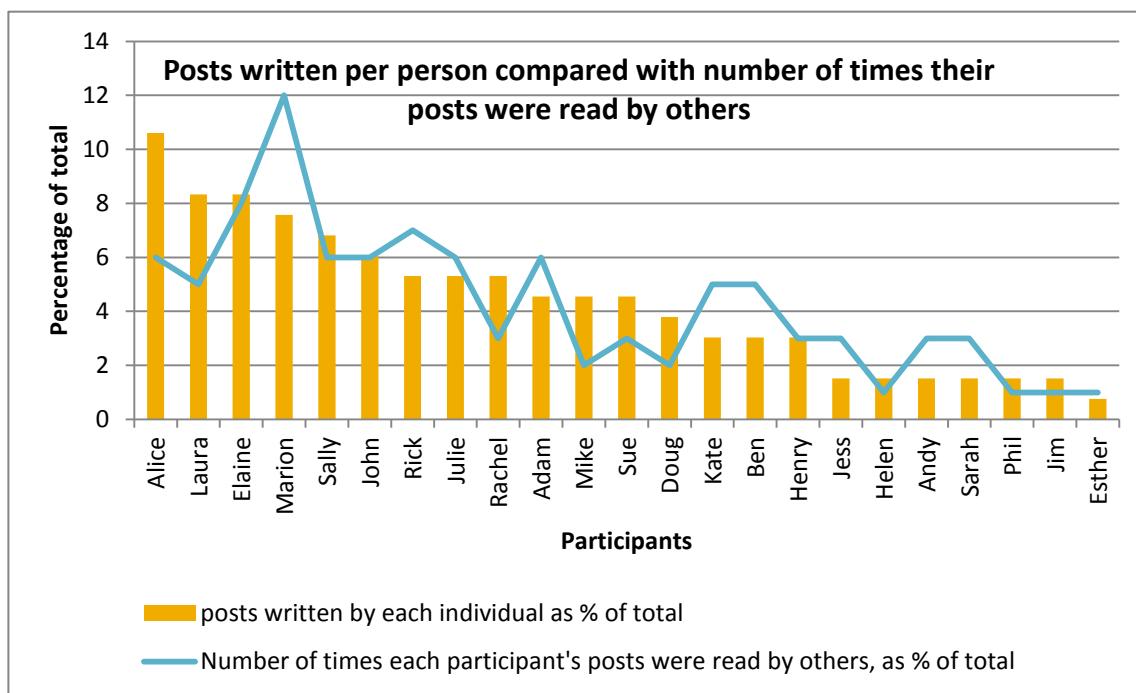
Figure 8-7 shows the number of times each participant started or joined a discussion thread compared with the number of times their posts did not elicit a response. This is of interest because it may have affected participants’ evaluation of the level of interaction on the website. For example, the participant who appeared at interview to be the least satisfied with the amount of interaction responded to only two messages and received no response to six of his own posts. Conversely, the people who were involved in the most interactions (Alice, Laura, Sally, Rachel and Julie) all expressed relatively high levels of satisfaction with the project.

Figure 8-7: Number of posts in ‘threads’ and number of stand-alone posts written by each participant



How far is it possible to gauge from the data who the most popular contributors were? Figure 8-8 indicates that the relationship between writing and being read was not as clear as one might expect. The person who wrote the most (Alice) was not the person whose posts appeared to be read the most (this was Marion). This might to some degree reflect the perceived quality (or relevance, or interest) of the content. In fact, several other people, during interview, mentioned Marion’s posts as examples of the type of comment which they liked. However, care must be taken in drawing too many conclusions from these figures, as other factors, unrelated to the content of the posts, might have influenced the frequency with which they were read. For example, posts written at the beginning of the project, when enthusiasm was at its highest, might have been more likely to be read on the website than those posted later, which might have been more frequently read in the email digest. In fact, the six most popular markers were created in the first two days of the project, and all constituted discussion threads. Moreover, comments tied to routes were more likely to be read on the website (and hence this was recorded by the system) than non-route related comments, because routes needed to be seen on the map, whereas, non-route comments could just as easily be read on the email digest (hence this was not recorded).

Figure 8-8: Posts written per person compared with number of times their posts were read by others

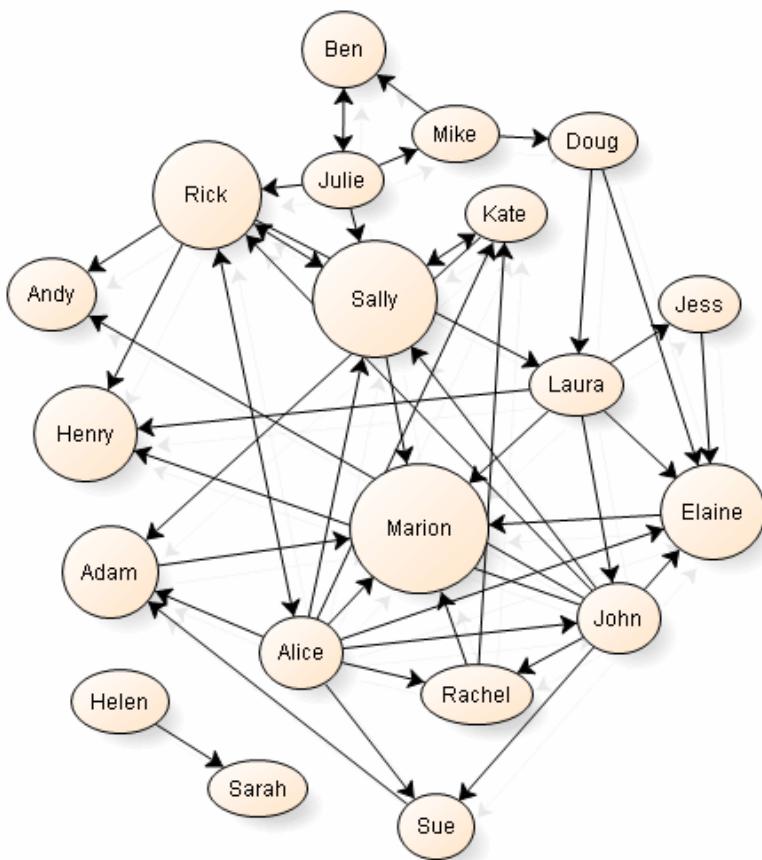


These data were also affected by the fact that responses to an existing comment retained the same title as the original comment, and were automatically recorded by the system as having been written by the person who wrote the original post, not those who wrote the subsequent responses. Therefore, a person who started several threads would be attributed many more ‘hits’ than a person who tended to respond to others’ comments. The popularity of Marion’s contributions therefore partly reflects the fact that she started four discussion threads, whilst Alice started only two, despite being the most frequent contributor and adding to four threads started by others. It might be suggested that the popularity of the participants with the most ‘hits’ was not entirely undeserved, however. The fact that their comments began discussion threads could mean that their posts were intrinsically more interesting than those which did not attract a response, or were simply relevant to more people because of the area where they lived.

Finally in this section, an analysis was carried out of who looked at whose posts (i.e. whom the markers they opened had been created by). A matrix was created of the markers opened by each individual and converted into a network diagram: Figure 8-9. To prevent the diagram from becoming too complex, a connection is only shown between two participants where one person opened markers created by the other five or more times (thus, an arrow pointing from ‘person A’ to ‘person B’ shows that person A opened markers by person B at least five times) . Two-way

arrows show where this was reciprocated by the other person. The size of the circles give an indication of the overall number of times each person's markers were opened by the whole group (hence Marion has the largest circle).

Figure 8-9: Who opened whose markers – whole project



Despite omitting a large number of smaller connections (fewer than 5 markers opened), and three people who neither opened five markers of any one person nor whose own markers were opened five times by any one person, the diagram provides an impression of the complexity of the interconnections, and the lack of obvious patterns of interconnectivity. Even the two 'outliers' on the bottom left (Sarah and Helen) were actually connected to several others, but opened other people's markers fewer than five times. Moreover, it is notable how few of these 'strong' links were reciprocal. However, a more detailed analysis, involving all the connections, revealed a tendency for markers to be opened slightly more by people who lived in the same area, with clusters of people - often those taking similar routes - tending to look at one another's posts and

to respond to them. Hence, there was a small cluster of people living south west of the five workplaces who tended to interact with one another more than with others and to look at each others' markers more frequently; another such group living north west, and another living east of the employment area. The interviews and questionnaires revealed that most people were most interested in the comments which they described as "useful", which was often synonymous with being geographically relevant (although they could also be 'useful' in terms of serving a more social purpose, as will be discussed in a later section). The website data confirmed that most people were most likely to look at markers on the map between their areas of residence and their places of work.

Two such clusters are depicted below, this time including all links within the sub-group (i.e. when an individual opened a marker or markers created by the other at least once). The first, Figure 8-10, shows the links amongst four people living to the north west of the places of employment, demonstrating that all links but one (Mike-Ben) were reciprocal. Three of the four people were involved in the second 'most read' interaction on the website (Staple Hill to Frenchay Campus), which is analysed in the next section. Once again, the relative size of the circles provides an indication of whose markers were opened the most within the sub-group (although this may give a slightly misleading impression as any response within a thread was attributed by the system to the person who started it).

Figure 8-10: Who opened whose markers – North West cluster

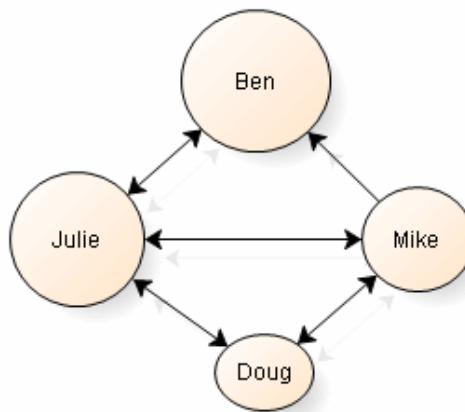
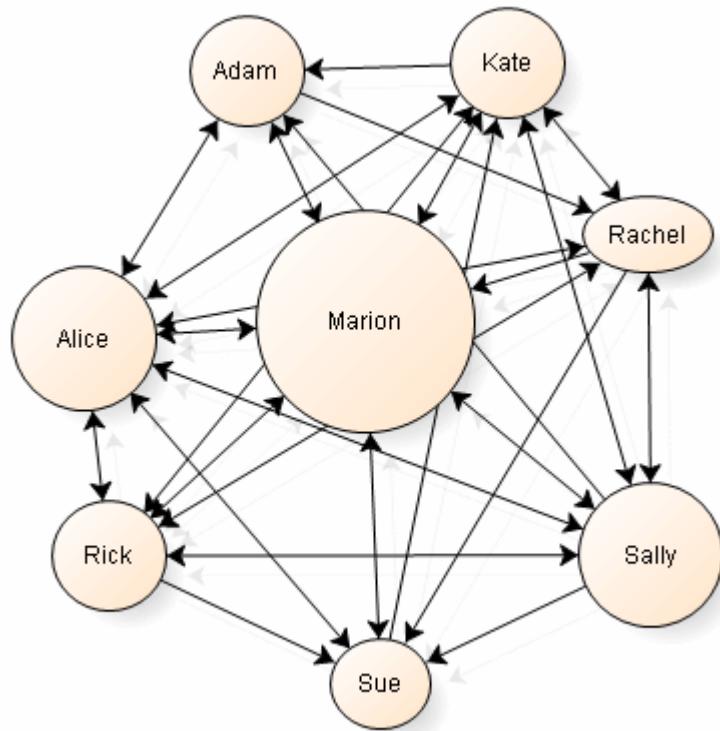


Figure 8-11 shows the more complex network of connections between a group cycling from the south west of the employment area.

Figure 8-11: Who opened whose posts: South West cluster



This shows a high degree of interconnections and reciprocity within the group, and once again shows the ‘popularity’ of Marion’s posts (or the threads which she began). Four people in this cluster took part in the most read thread on the website, which is analysed below.

8.4 Detailed analysis of two interactions

This section now returns to sub-question 4.1:

4.1: For what types of informal travel (cycling) information is the case-study system used?

Of the 29 threads, the eleven most popular (i.e. the markers which were most frequently opened) all started as routes with comments, which then attracted further suggestions, questions and feedback from other participants. The two most read markers were entitled *Horfield to UWE Frenchay Campus* (opened 37 times), and *Staple Hill to Frenchay Campus* (opened 33 times). Each of these will now be briefly discussed in order to give a flavour of the website interactions.

8.4.1 Staple Hill to Frenchay Campus message thread

In the first example, shown in Box 8.1, three people (Julie, Mike and Ben) discussed a route in a short thread, and these three opened the marker considerably more than anyone else.

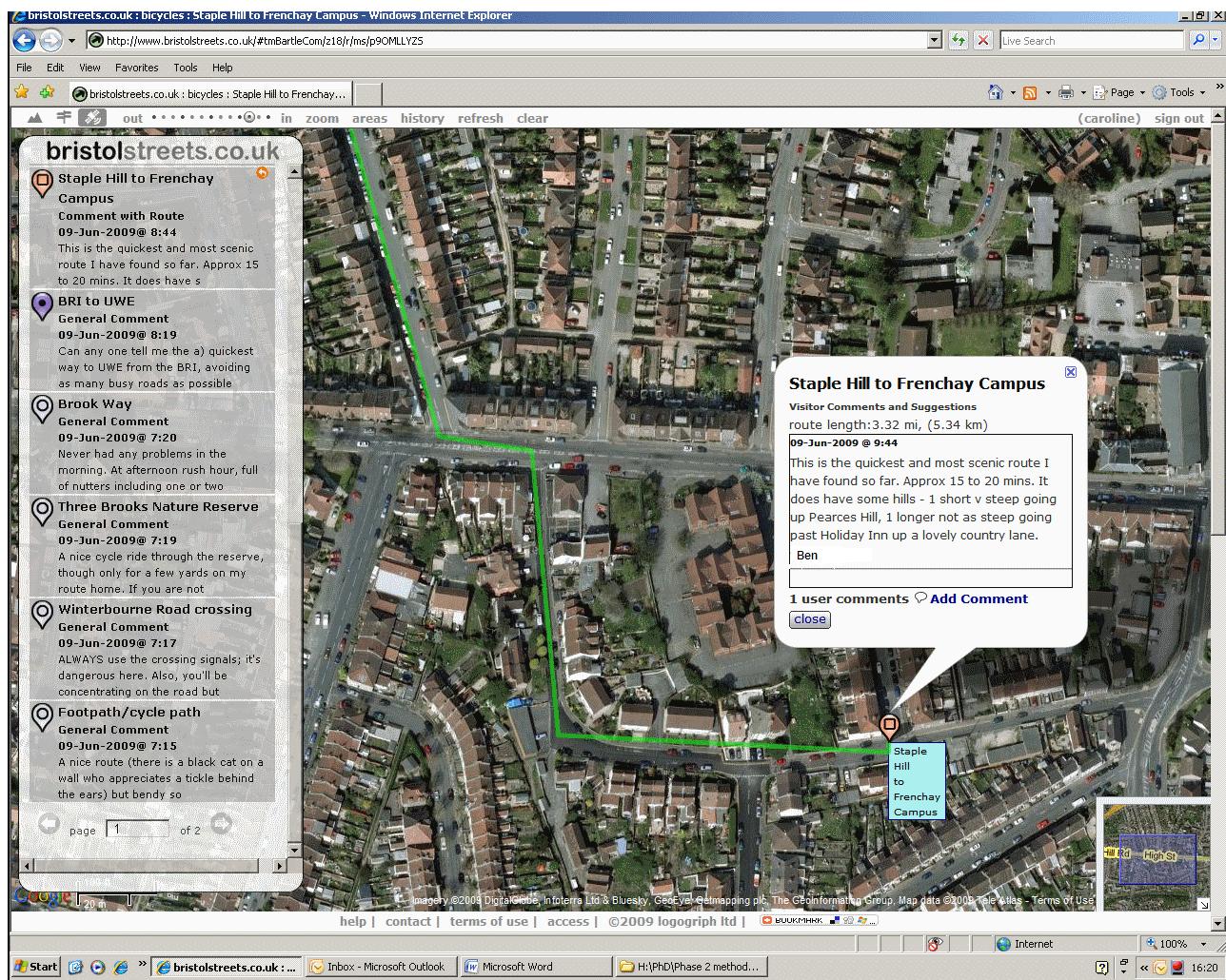
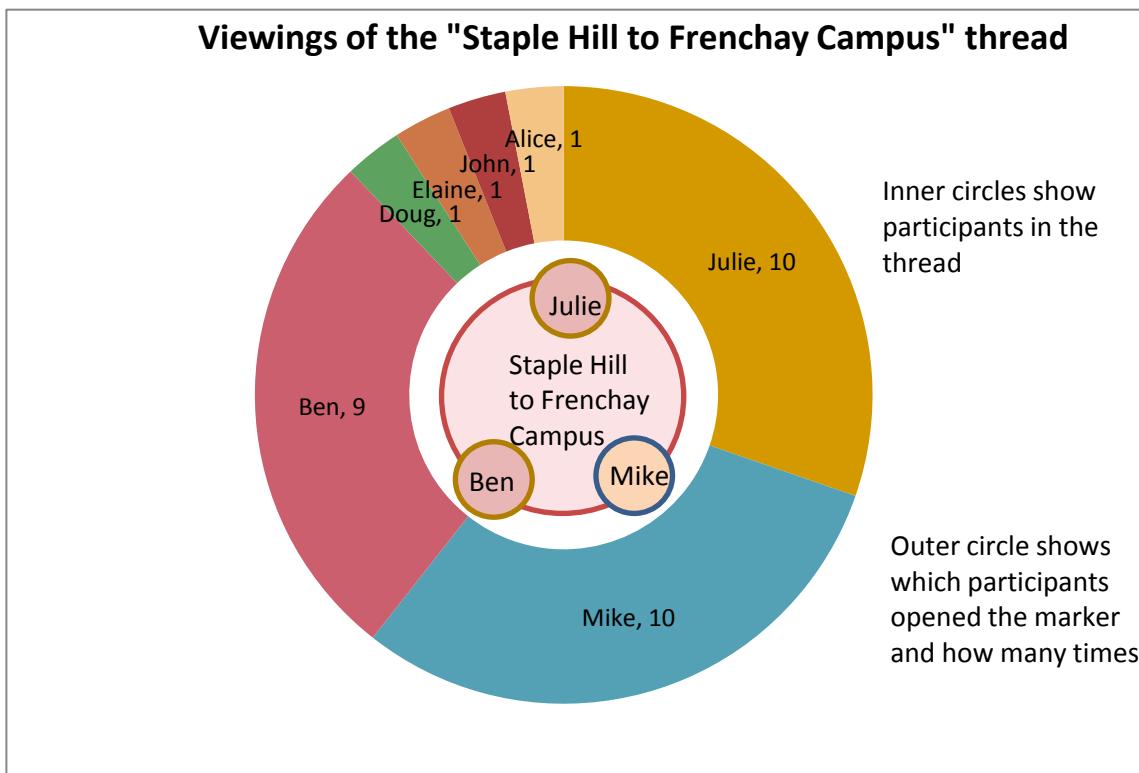


Figure 8-13 shows a screenshot of the opening message. The number of times the thread was opened by each participant is shown in Figure 8-12. At interview, Julie, Mike and Ben all remarked that had found the interactions between them both informative and enjoyable.

Figure 8-12: Viewings of the "Staple Hill to Frenchay Campus" thread

However, this clustering was not observed consistently; the clarity of the data in this respect might be obscured by the fact that some participants tended to look at most markers as they were added throughout the project regardless of geographical relevance, others looked at a variety of markers at the beginning but then returned less frequently to the site as the project continued, whilst the possibility of accidentally clicking on a marker cannot be ruled out (a caveat which in fact applies to all areas of analysis in this section).

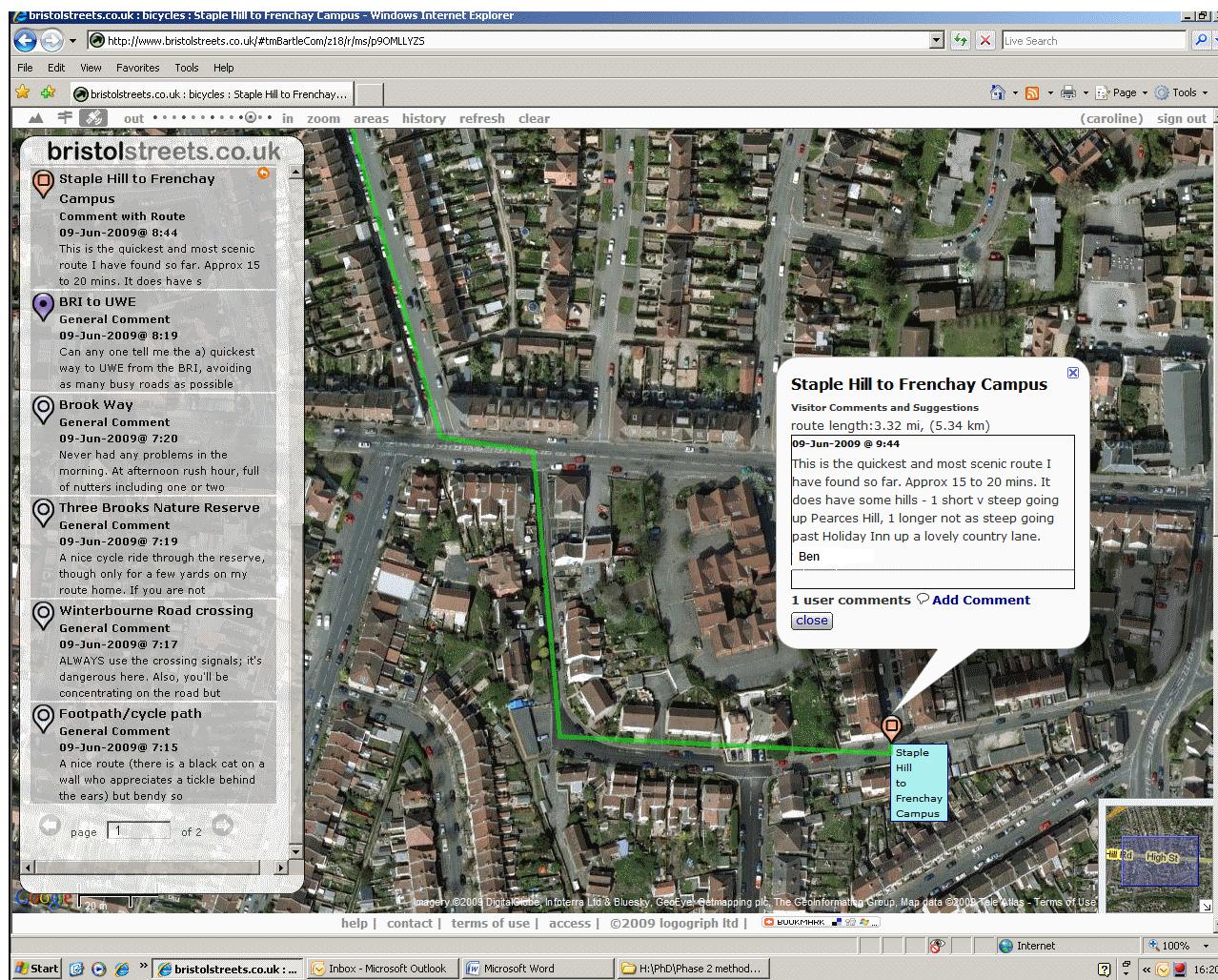


Figure 8-13: Screenshot: Staple Hill to Frenchay Campus

Box 8.1 Staple Hill to Frenchay Campus

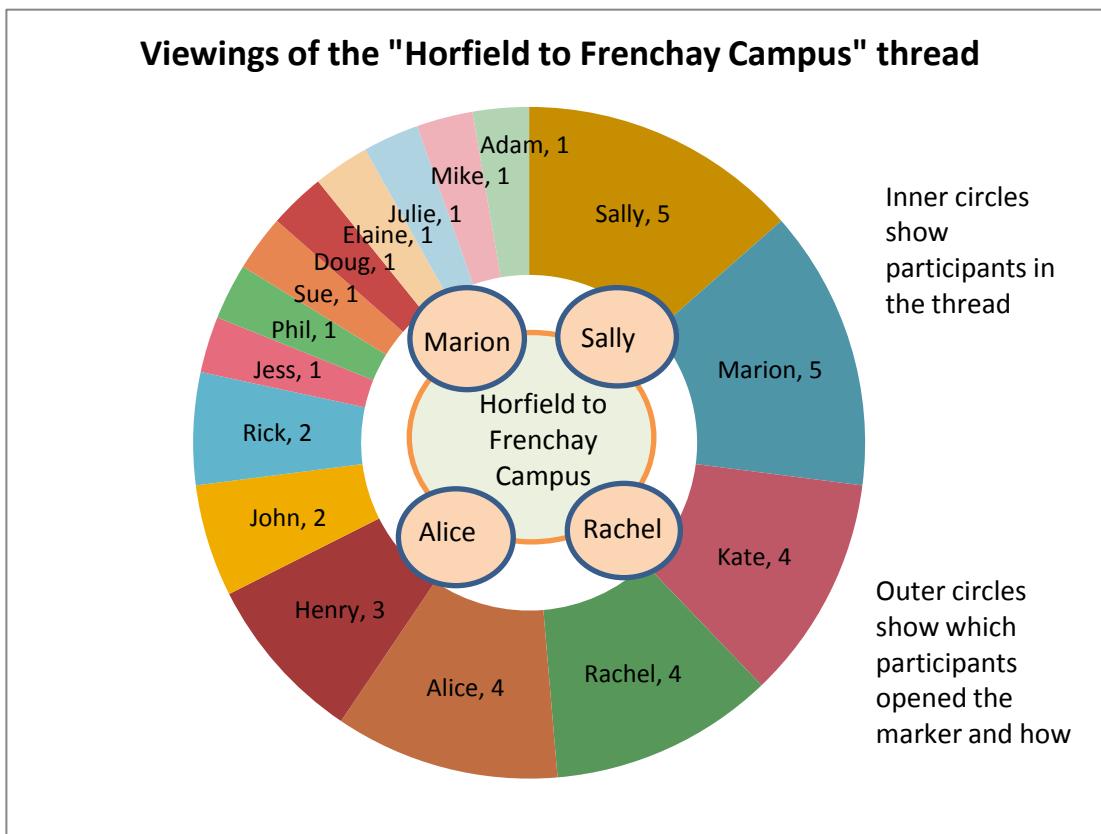
Ben	This is the quickest and most scenic route I have found so far. Approx 15 to 20 mins. It does have some hills - 1 short v steep going up Pearces Hill, 1 longer not as steep going past Holiday Inn up a lovely country lane.	9/06/2009
Mike	Staple Hill to UWE: I start at Mail House pub, go down Pendennis and Croomes Hill, but turn right at double mini. This takes me along Overndale (short hill) turn left on to Cleve Wood Rd. There is a hill up to Beckspool but reckon less than Pearces Hill. If you go round to the right on Beckspool and turn into Belfields Lane, 3 cut throughs (not for racing bikes) take you to the start of Filton Rd. Potential awkward point is crossing Bristol rd, but this route seems hilly than doing Pearces Hill (or the return journey which is worse!)	9/06/2009
Julie	Tried Ben's route via Pearce's Hill yesterday and today and was suitably impressed. Definitely more hilly than the ringroad route but that's what gears are for (!) and a good 5 mins quicker (which can make a big difference to me in the morning!) Will give Mike's route a try too - I had no idea there were so many alternatives!	10/06/2009
Mike	To: Julie Hey Julie, Did you try the Beckspool route? What did you think? I agree it could do with the plant life being cut back.	2/07/2009

In this interaction there is a mix of both factual route details (particularly from Mike) and subjective commentary, conducted in a ‘chatty’ style. Ben adds to the route plan he has marked on the map by alluding to its aesthetic aspects: “*the quickest and most scenic route I have found so far*” (...) *up a lovely country lane*”. Mike’s response offers informal advice on “*3 cut throughs (not for racing bikes)*”, again providing the sort of personal, subjective information previously found to be typical of word-of-mouth exchanges. Concerns with hills and steepness were commented upon more than anything else on the website, and are a strong feature of this interaction. Mike later remarked in interview that he got the impression that Ben was considerably fitter than he was, as he seemed happy to cycle up hills which he himself avoided. He also thought that it might have been potentially off-putting for a novice cyclist if he or she had followed Ben’s advice. Julie was not put off, however, and her contribution to the interaction shows that she tried the route straight away and was “*suitably impressed*” (which Ben found gratifying). Mike returned to the thread three weeks later to ask Julie whether she had tried his route, referring to a comment she had made in another thread about the dangers of scratchy, overhanging plants to the passing cyclist. Because of the time-lag, Julie may not have noticed this question. As in other exchanges between these three participants, it is notable that they referred to one another by name, creating a friendly tone.

8.4.2 *Horfield to Frenchay Campus* message thread

The content of this second example is shown in Box 8.2, with a screenshot of the opening message provided as Figure 8-15. The four participants in the thread (all located in a geographical cluster) also opened the marker more than anyone else, but in this case many other people also read it (Figure 8-14). This may partly reflect the fact that more participants lived in this part of the city so it was likely to have been of wider interest. However, not everyone opening this marker lived in this part of the city.

As previously noted, the popularity of the *Horfield to Frenchay Campus* thread may be partially attributed to the fact that the highest concentration of participants lived in this part of the city; the thread also involved descriptions of the two main cycle routes to the employment area from residential areas to the southwest.

Figure 8-14: Viewings of the "Horfield to Frenchay Campus" thread

The *Horfield to Frenchay Campus* message thread exemplifies the combination of instrumental/geographical (formal) and social/experiential (informal) information identified previously in this chapter. The first contributor marked her route on the map and used the comments box to add a few words about her evaluation of the route: “*hard work uphill and scary coming down because the road surface is so horribly bumpy*”. The impression given is of someone who may regard him- or herself as being a novice, not especially fit, slightly nervous, cyclist, and who is willing to admit this. This kind of tone may have been appealing to the Cycology participants overall, as many described themselves in the interviews as being not particularly confident or experienced at cycling. Interestingly, the people (both male and female) who highlighted Marion’s contributions as ones which they especially liked, assumed her to be male (her website name did not identify her gender). It would seem, therefore, that assumptions were *not* being made associating lack of confidence with the female cyclist! The interviews suggested that when assumptions were made about the gender of other participants (which did not occur often, as most people’s website names clearly denoted gender), this was done not so

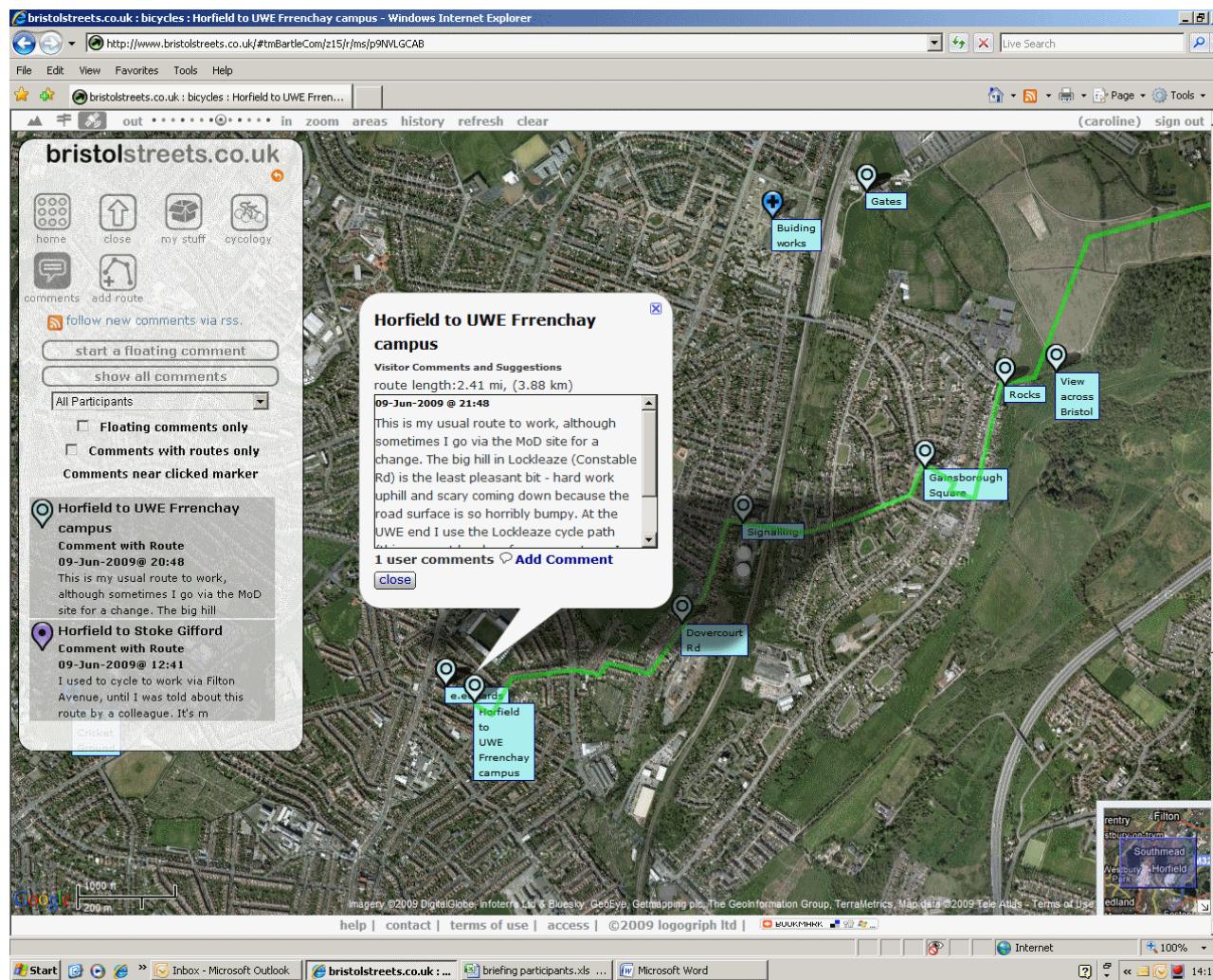


Figure 8-15: Screenshot: Horfield to Frenchay Campus route

Box 8.2 Horfield to Frenchay Campus message thread

Marion	This is my usual route to work, although sometimes I go via the MoD site for a change. The big hill in Lockleaze (Constable Rd) is the least pleasant bit - hard work uphill and scary coming down because the road surface is so horribly bumpy. At the UWE end I use the Lockleaze cycle path (this may not be clear from my route as I couldn't see where it is on the map!)	9/06/2009
Sally	Try going straight over rather than right up constable rd - gentler hill, less busy (see montpelier to uwe route)	11/06/2009
Sally	how do you go via the MOD site?	11/06/2009
Alice	To get to UWE via the MOD, go straight on at Locklease Rd (right would take you to constable rd). Keep going straight along wordsworth rd, until the next stop sign- turn right onto Bonnington Walk, over the railway bridge, then turn left into the football grounds. Follow this path, past the double metal gates (if they're shut you can go around them on either side), this will take you out onto the cycle and pedestrian path. Go straight on, the MOD on your left, and a housing development on your right. To get to UWE follow the cycle path past the yellow "gate", with the nursery on the right. Take the 2nd exit at the round about (to the right up the hill), follow the cycle path which should take you to the H.P. entrance next to the UWE sports ground.	12/06/2009
Rachel	I usually cycle the Lockleaze cyclepath way as it's quicker (I think anyway!) But if you're cycling late at night in the dark, the MOD way usually has more people about (playing rugby etc..) and some lights so for me feels a little safer	12/06/2009

much on the basis of the content of the individuals' website contributions, as in a general sense that more men than women cycle generally.

In response to the opening comment, Sally helpfully offers an alternative to the “*uphill, scary*” section and asks about the alternative route mentioned by Marion. At this point Alice writes a detailed, factual description of the other main route to the university campus from this direction. This was the only case throughout the project of someone describing a route in words rather than plotting it on the map. Alice may have done this because she had already plotted part of this route on the map a few days earlier. She included an informal comment about what to do if a gate along the route was locked, and this was, in fact, a topic of discussion in another thread also started by Marion (the “*Gates*” thread turned out to be the most read ‘non-route’ marker). Finally in this thread, Rachel added her comparison of the two routes, introducing a common topic on the site: lighting along the routes and her perception of relative safety. Overall, therefore, this interaction provides a clear example of the way in which word-of-mouth may comprise both factual (formal) and subjective (informal) information, with the latter adding an extra layer of personal detail with which the routes might be evaluated.

8.5 Chapter Summary

This chapter has reported the findings of the descriptive part of the analysis which sought specifically to answer research questions 4.1 and 4.2, as well as providing a context for answering subsequent questions relating to: influence on attitudes, intentions and behaviour; social-psychological processes; and exploring wider implications in the field of advanced traveller information. As Phase 2 remained partly inductive, ‘space’ was also left for unanticipated findings to emerge.

Question 4.1 had asked what types of travel (cycling) information were provided and requested in the case-study system, with reference to the categories identified in Phase 1 (general options and ideas, factual details, and subjective advice). On the Cycology website, specific factual detail was usually combined with subjective advice, but general options and ideas about transport were absent because information was specific to a ‘niche group’ of users (cyclists) who were seeking and offering specific rather than general travel information. Many posts combined formal information such as factual route descriptions and lines on the map with subjective evaluations of the experience of cycling along them (informal information), supporting the Phase 1 findings concerning people’s preference for integrated formal and informal information. The main themes appearing on the site were wayfaring (geographical route descriptions), safety, cycling infrastructure, sharing space with other road/path users, and subjective (affective) descriptions of the cycling experience.

Trends in content over time were shown by grouping posts into broad categories according to subject matter (route or non-route related) and function ('pro-active' statement or question; 'reactive' response). It was shown that route information constituted the majority of posts, and most of these were posted during the first week. Questions also peaked in the first week, but responses to questions only peaked in the fifth week. Non-route related comments and responses to them both peaked in the fourth week. Overall, the offering and requesting of non-route information, as well as general comments and responses to them, were relatively steady over the six weeks, although small in number and tailing off at the end. Although this kept the website interaction 'ticking over', the dwindling numbers suggests that 'injections' of new participants, information and opinions may have been required to maintain the level of postings at one or more contributions on most days if a project such as this were to continue for a longer period. This frequency of posting allowed a level of interaction which was regarded as 'sufficient' by most participants (to be returned to in Chapter 11).

Question 4.2 concerned word-of-mouth processes and patterns of interaction. It was shown that geographical clusters of people travelling from the same areas tended to interact with one another on the website (unsurprising as the majority of posts related to routes), but there was no such pattern among the interactions dealing with non-route related cycling matters. In terms of the markers opened, there was also a slight tendency for people to focus on reading posts created by people who lived in the same area, but many also read posts by other people from other areas as well. It was also demonstrated that most people wrote and read similar proportions of posts, with few obvious 'information-givers' or 'information-receivers'. The role of different individuals has helped to inform the development of a participant typology, to which we return in Chapter 11. The next chapter will focus on the influence of Cycology on participants' attitudes, intentions and behaviours, whilst Chapter 10 will move on to the role of social-psychological factors.

Chapter 9 : Findings, Phase 2 - Influence on attitudes, intentions and behaviour

This part of the analysis aims to answer the research question 4.3, based primarily on a thematic analysis of interviews and questionnaires, and supported by observation of the website.

4.3. What influence (if any) has word-of-mouth information exerted on participants' self-reported attitudes, intentions and travel behaviour within the case-study?

This section presents four areas where influence occurred: the trying out of new routes seen on the website; becoming more active on cycling issues (complaining/campaigning); reinforcing pro-cycling attitudes, intentions and behaviours; and changing the experience of the commute. A context is provided by the Phase 1 findings in this area, which showed that information obtained through word-of-mouth was reported to have influenced participants' trip details but not more 'strategic' decisions such as modal choice (although some believed they had influenced the modal choice of others). It was found that normative information obtained through general conversations was thought to have had no *direct* effect on trip choices, but may have influenced general attitudes. Overall, participants had described a process whereby informal and word-of-mouth information had been combined with formal types and sources, and used as part of a rational (individual) decision process consistent with information processing theory (Bettman, 1979).

9.1 Trying out new cycle routes

The most significant effect of the Cycology website in terms of altering behaviour - and the one which was the easiest to identify – related to route choice amongst existing commuter cyclists (who, as has already been explained, accounted for all but one of the participants). The interactions on the website showed that four new routes, recommended by others, had been used, and two people also reported their intentions to try out a route they had seen on the site. One such example on the website said:

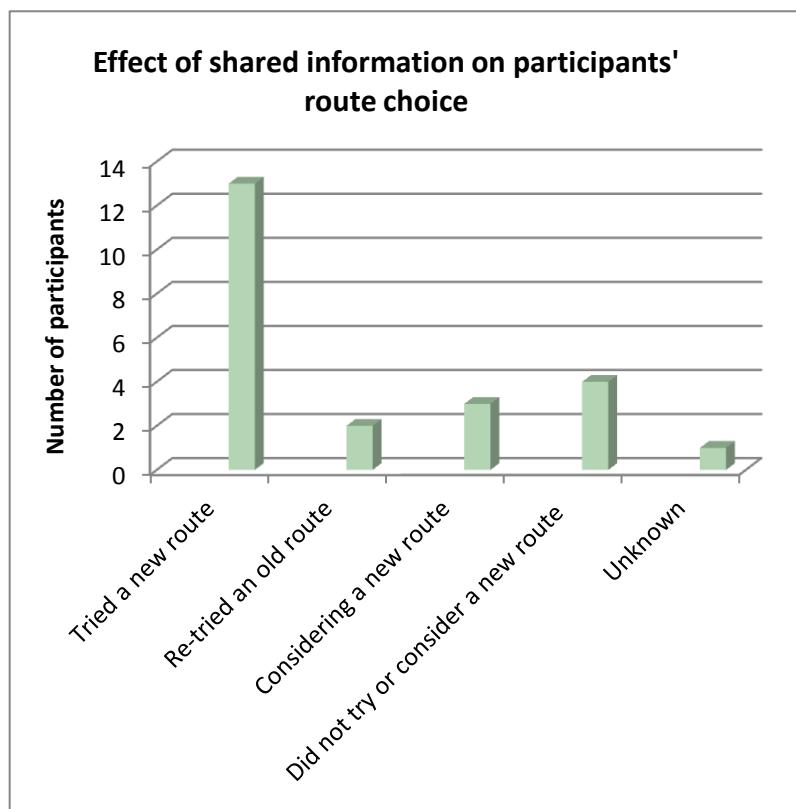
Tried out the suggested North View/upper Cranbrook Road route last night, and it was way better than my normal route apart from the horrendous right turn onto upper Cranbrook Road, but I'm sure I'll get used to that! (Rick)⁹

⁹ Verdana font continues to be used to denote verbatim comments from the website.

As in previous and subsequent chapters, is used to (italicised, Arial font). However, the interviews and post-project questionnaires revealed that there had actually been considerably more trying out of routes than the website postings suggest, possibly because some routes were used after the end of the project, or simply because people did not ‘get around’ to giving feedback on the site. Figure 9-1 below shows that, in total, more than half (13) of the participants reported having tried a new cycle route suggested by another participant, two had re-tried an ‘old’ route (i.e. a route they knew but had not used for a while) and a further three said they intended to try out a different route when circumstances permitted. For one person these circumstances included trying to remember to veer from his habitual route:

“I was going to try altering my route and go the way someone had indicated on the map, but I found I was on autopilot on my normal route and kept forgetting to try it, old age I suppose!” (Jim)

Figure 9-1: Effect of shared information on participants' route choice



Because the choice of cycle routes from one location to another within a few kilometers is limited, what was described as a “new route” was often in fact a variation to part of an existing

route. Two of the four people who did not consider changing their route reported the reason as being lack of any relevant suggestions or better options, for example:

"Well you know, if somebody had.... if there'd been an interesting route that would have worked for me, then maybe I would have tried a different route. But there wasn't really anything that served my purposes, I don't think". (Doug)

"(There's) only one other route pertaining to Bradley Stoke and I think it's suicidal".(Elaine)

The longer-term behavioural effects of gaining knowledge of, and trying out, new routes varied according to participants' evaluation of the routes once they had experienced them. Sometimes it merely led to a confirmation that someone's habitual route was 'the best' for them:

"I did re-try an old route that I used to use to get to work, prompted by reading some of the comments about that route on the site. However, I soon remembered why I stopped using it previously (too many obstacles), and went back to my usual route!" (Marion)

For another person, speed was the most important factor, and having tried an alternative route from the website, he was confident that his usual route choice was indeed the fastest:

"And I'd always wondered. "am I missing something, is there a route that's quicker that I've just not cottoned on to?" It was good to know that that was not necessarily the case, and that the routes I was taking were the fastest routes". (Ben)

Others reported that information from the website had helped them to widen their repertoire of routes, which meant that they had moved from always taking the same route to varying their route on some days, or they simply kept a 'bank' of alternative routes in mind:

"And I definitely tried them and thought "yeah, this is good". And I've gone from one route, which I was kind of doing day in day out, which is a bit boring, to varying it now, and some days I just sort of, on the fly, think "oh, I'll go that way instead". And I do different route".(Kate)

For some however, the website had provided a new route which turned into a participant's regular route choice, for example:

"Though it was useful for me. The two people that I did communicate with, who came from the South Gloucestershire side, I did try both their alternative routes. There's one of them I'm sticking to now, as it's much better than the one I was doing before".(Julie)

The data therefore provided evidence – as far as is possible for reported behaviour - that the sharing of route information on the Cycology website did have an impact on the route choice behaviour of the majority of participants. This corresponds with the Phase 1 findings about the influence of word-of-mouth on particular details of a trip (in this case, the route). However, the findings in Phase 2 suggested a higher degree of social influence (albeit in the narrow field of cycle route choice) than the more general accounts provided by participants' in Phase 1 had indicated. This might be explained by the high levels of trust within the small experimental group (considered in Section 10.1) and by the fact that trying a new cycle route is perceived as 'low risk'. It may also imply that social influence is more prevalent than many people may wish to admit when reflecting on their general travel behaviour, and may be particularly prevalent within a salient reference group: in this case a group of fellow cyclists and co-workers. This explanation will be discussed in detail with reference to social-psychological theory in Chapter 10.

9.2 Reinforcing pro-cycling attitudes, intentions and behaviours

Although there was no evidence from the interviews that participation in the project actually changed people's attitudes towards cycling or travel in general, it seemed that it did, for some, serve to reinforce what one person described as her "*cycling is good ethos*". A participant who had recently started cycling said that her involvement in Cycology had encouraged her to continue:

"Being part of this project did improve my enthusiasm for cycling, and as it went on just as I have started cycling to work, it encouraged me to keep at it". (Alice)

Attitude theory suggests that attitudes can strengthen when supported by direct and indirect experience - in this case, the experience of cycling. The associations which link the attitude object to relevant prior experience create an *intra-attitudinal* structure - the internal structure of the attitude (Eagly and Kulesa, 1997).

Alice and another participant both commented that this sense of encouragement partly emanated from realising that many people cycle further than they do:

*"I suppose I was already thinking that cycling was good, and **the** way to get around. And I suppose it might have reinforced it a bit. You know, that there are other people out there doing all sorts of different routes, and from further away, as well. So I was thinking, you know, my half-hour seems like plenty, then you see lots of people who are doing further routes, and you think "that's great, good for them!". You know, it kind of reinforces that my half hour isn't that bad, and even in winter, it'll be fine - that sort of thing". (Sally)*

This can be interpreted as a change, for this participant, in the *descriptive social norm* relating to the ‘normal’ distance which other people cycle (Cialdini et al., 1990).

It was perhaps of note that both these women had started cycling to work within the previous six months. A participant who had started cycling to work within the previous year also thought that the project had served a motivational purpose, particularly because she had discovered a better route. So even if it had not changed her overall attitude to cycling, it might have made her feel more positive about her regular commute.

“I’m not sure that it changed my views like that particularly. I suppose I was more encouraged to cycle, and I think I probably cycle more now that I’ve found myself a route. Maybe, yes. Maybe it’s improved my opportunities for cycling.” (Helen)

Another participant who had started to cycle only within the previous year, who did so only infrequently, and described herself as a nervous cyclist, remarked that reading about other people’s experience of a particular route, which involved a “frightening” road crossing, had given her the confidence to try it.

“I think it does make you think about things, if you’ve got a conversation going on, that maybe I would like to be a part of that. This last week I’ve been so frustrated. Sat in the car. And I’m actually thinking “for God’s sake, it’s only a bit of dark. Get a light. Sort yourself out”. (Esther)

This participant particularly enjoyed the social aspects of the site, remarking that it had helped to increase her resolve to cycle more often and not to be put off by the darker mornings, even if this intention had not yet materialised into action (exemplifying the widely identified ‘attitude-behaviour gap’ in social psychology; e.g. Ajzen and Fishbein, 1977; Anable et al., 2006). This might also be interpreted with reference to the Theory of Planned Behaviour (Ajzen, 1991): the participant’s perceived behavioural control may have changed because cycling on dark mornings is now thought possible if a plan is instigated to obtain some bicycle lights.

The one person in the project who was not yet cycling to work thought, hesitantly, that it had provided her with a little encouragement to start, hence reinforcing an intention:

“It was nice to see other people cycling from near me, and even further away from me. I suppose it might have sort of reinforced my desire to cycle. To work. At some point. A little bit”.(Helen)

She thought that she would have derived greater encouragement from the website if there had been more participants in the same position as herself:

"Yeah, just more thinking "there's other people in the same boat". Or "look we're both...". Maybe someone could have been like "well, I didn't ride to UWE yesterday, but I rode from my house to this point on the map, and that's good, and maybe I'll work myself up to going to UWE...". If there'd been more conversation like that, it could have been like "oh yeah, I'm going to try that this week!" or whatever".(Helen)

This suggests that positive attitudes towards, and intentions to, cycle are more likely to be reinforced when there is some sort of identification with participants in the interaction, a proposition which will be explored further in Section 10.2: 'community', in the context of self categorisation theory (Turner et al., 1987).

It would seem, therefore, that the participants who were most susceptible to encouragement, or most likely to have positive attitudes to cycling reinforced through the online interactions, were those who were relatively new to cycling to work. This may be because perceived barriers to cycling (such as distance, effort, wet weather) may still be salient in the mind of someone who has recently switched from another commuting mode, but these barriers may reduce in significance as he or she becomes more accustomed to it. Participants who had been cycling to work for many years remarked in the interviews that 'social support' for cycling was not something they particularly required, because cycling was simply part of their routine; beliefs and attitudes were strongly in favour of cycling based on considerable experience, and were thus more stable and less likely to be influenced by others. However, many people in this group thought that they would have found the website helpful (in terms of both practical information and social support) when they had just started cycling, and might even provide an encouragement to those who were not yet cycling *"because I think there's a lot of people out there that could cycle, that don't cycle, partly because they might not know what route to take. They might not know that there's a culture of people that do cycle as well".(Ben)*

This moves the focus from the actual effects of the project to participants' thoughts about how the project might – hypothetically - have affected their attitudes, intentions or behaviours under different circumstances, or how they thought it might affect those of other people.

"I think one of the common barriers to people getting on the bike is, they see the busy road, like they say "I don't want to cycle down the Gloucester Road." So something like this can show them an alternative. Because if you just look on the map, you can't see that there is a way through behind the MoD for instance (...) Whereas if you look here, you see it there is another route, and you think "other people do it". .(Phil)

“...if I was new to cycling, and I was looking at something like this, and I was looking for support, I might look at that and think “okay - other people go through these situations, and they feel good about it and stuff”. So I won’t be quite so put off by the fact that I got drenched last night ”. (John)

This sense of encouragement from the knowledge that ‘other people do it’ exemplifies the type of background, normative influence on attitudes and intentions - effected through social interaction - which emerged from the Phase 1 interviews.

9.3 Taking action on cycling issues

Some participants felt that their involvement in the project had spurred them into taking some sort of action as individuals, if not as a group. This was reported to have happened for two reasons: firstly, if you notice a problem along a cycle route and then tell other cyclists about it, it causes you to think about it more seriously; and secondly, if others also remark that they are experiencing the same problem, you feel that you have stronger grounds for making a complaint. For example, one participant explained that she had complained to the Council about a poor road surface after she had commented upon it on the site, whilst another, who saw few other cyclists at the early hour he travelled, was motivated to take up the issue of a locked gate after being obstructed by it himself and then seeing it discussed on the website:

“So, that was quite strange, to actually stop on the route and realise how many other people were using it at the time. But it was also a bit scary that they closed the gate.....I spoke to the guy from South Gloucestershire, who is planning the new cycle routes, and mentioned to him that they’d closed it and said “surely that’s the key route for lots of people.” (Phil)

At one stage in the project a question was posted on the website about the lack of lighting on a well-used cycle path:

My main issue is the lack of lighting on the cycle path - makes for a dangerous ride in the winter. Any ideas whose responsibility this would be?
(Sue)

However, this was not answered, leaving the contributor feeling (as she said in the interview) that *“perhaps I’m the only person who thinks the path is dark”* - although there were in fact other mentions of this concern on the website. One person asked what others’ approach to using the “dark and scary” cycle path was, and another said in interview that she had intended to reply but had not got round to it.

Interestingly, and in contrast to the general view, one participant remarked that the presence of contributors on the website who seemed concerned to ‘get things done’ actually made her less likely to take any action herself. This could be interpreted as a free-riding effect. Commenting on a situation where she had noticed that a particular set of traffic lights - one which is usually sequenced to give cyclists a chance to cross a busy junction on their own – were not functioning properly, she said:

“And I just mentally thought, partly, again, seeing other people on there who were much more active about talking about things and doing things than I am. I thought, “there’ll be another cyclist, who will be on to that really quickly. Who’ll ring somebody up and say the cyclists’ lights are out - sort it out”. I mean, that’s a bit lazy on my part, it just gave me the sense that - a lot of people who cycle are quite proactive. So if I hadn’t done that, I may have just thought “gosh, I hope someone does that”. But I had more of a feeling of “oh yeah, someone will do that”. (Kate)

As well as actual effects, the issue of the *potential* campaigning effects of the website also arose in some interviews. Many people mentioned spontaneously that a website like this could be a good way of communicating with local councils about cycling issues, either by allowing transport planners and cycling officers to access the site, or simply by encouraging people to act individually or band together to contact the council about shared concerns. It was felt that the latter would probably have happened naturally, if the project had continued for longer (in fact, the cycling layer of the main bristolstreets website had hosted a cycling survey in which users were invited to mark issues of concern on the map for the attention of the City Council).

It was also suggested that a website of this nature could give Councils an insight into what ‘normal people who cycle’ are thinking, as opposed to the sometimes more radical views expressed by the cycle campaign organisations. This is interesting in the light of Spinney’s findings about the ‘professionalization’ of cycling stakeholders and corresponding disenfranchisement of the ‘non expert cyclist’ (Spinney, 2009a). One person articulated the potential of the website in this area as follows:

“I think after the routes went up, people started making comments about the different traffic habits, the state of the road and things like that. That was really useful, and I think that might be something that perhaps Bristol City Council or South Gloucestershire Council might want to take a view on. Be a part of, perhaps, and be able to view some of those things, because it’s a bit of an insight into what works for cyclists. Traffic planners should have access to this (laughs), definitely” . (Julie)

9.4 Changing the way people experience their commute

Half of the participants reported more unexpected, psychological effects from the project, saying that it had subtly changed the way they experienced their everyday commute. Here, the focus is not on tangible effects, such as change of route, but on the ‘lived experience’ of cycling, or what Spinney (2009b) describes as the “ *fleeting and ephemeral meanings that arise through cycling as an embodied and sensory practice*” (p.829).

All of these people cycled to work either every day or frequently. Some said that they had thought more carefully about their everyday cycle ride as they looked out for features commented upon by others who rode the same route (such as the black cat) and also paid more attention in looking for interesting features and stories which they could describe to others. Two people in this group took photographs along their routes (but unfortunately were unable to upload them), and one person experimented with some new routes, which had not been provided by other participants, just so that she would be able to tell people about them.

A number of people remarked that their participation in the project made them feel less isolated during their cycle commutes; even if they actually saw very few other cyclists along their way, it gave them a sense that lots of other people were going the same way at different times of day.

“It was good to kind of.... I suppose as a cyclist, you feel fairly isolated anyway, you don't realise that other people are cycling in. So it's useful to have someone else who cycles to chat to, and it's nice to know that you're not the only one that's cycling in. So it was really useful. It was good.” (Ben)

“Yeah, it just opened my mind up to think "well there's other people doing the same routes, or similar routes." And they go through similar things I go through (...) It made me think "but we're all having quite common experiences here". And it just made me feel a bit more like I wasn't alone doing the things I'm doing on my commute. So it was quite nice” .(Kate)

One person described this as ‘personalising’ the cycle journey:

“The fact that it does feel very lonesome to set out on your first cycle ride to work. You don't know who else is doing it, you don't know if anyone else is going the same way as you. If you've got a few people on there and you've read that and gone "these people do this every day, they're setting out earlier than me." (...) I think in that way, what it really does is it personalises cycling, and it makes you feel very confident in the fact that other people are doing it” .(Adam)

In a similar vein, this participant remarked that the project had given him “*quite a nice feeling about cycling in that area, and it does make you feel quite like you own the road, as if it's your area, in some ways, because people are going through it and it's yours.*” He described the experience as one of ‘wayfaring’, and of a sense of his cycle trip becoming ‘humanised’ by the awareness that others were using it:

“It showed me the diversity of routes that are available and also I quite like the ‘wayfaring’ feel that the site engendered. It humanised the cycling route as you were able to see other people’s stories posted in places that I go through every day and you could think about that as you were cycling through and imagine all the other people with different experiences and stories of the same place that use it every day”.(Adam)

9.5 Chapter Summary

This chapter has sought to answer research question 4.3 concerning the influence of word-of-mouth information on participants’ attitudes, intentions and behaviours. The effects arose from both formal and informal types information, the key factor being that it was communicated through word-of-mouth amongst people within the group. The findings ranged from the direct, tangible effect on behaviour in the form of people using routes they had seen on the website, to more subtle psychological effects on the way in which people experienced their commute by bicycle. It was thought to have strengthened pro-cycling attitudes and intentions through direct and indirect experience (intra-attitudinal structure). The effect on attitudes corresponds with the Phase 1 findings that social interaction can exert a ‘background influence’ on attitudes to travel.

When it came to making active travel choices, in Phase 1 it was clear that participants believed word-of-mouth information to be just one influencing factor within a complex process of individual, rational decision-making (depicted in the lower part of Figure 6-1, p.95). By creating an environment where social influence could be directly observed, Cycology demonstrated that people may be more susceptible to influence from others than they might generally realise, or admit to. This effect may have been accentuated by the context of the small group (reference group) within which the Phase 2 participants were placed. However, it was also clear that in noting new routes and trying them out, people were engaged in a rational, individual decision process, and were not simply following others without deliberation. Therefore, the new knowledge generated by this research about word-of-mouth influence seeks to complement, but not replace existing models of the role of information within the decision process. A process model developed from the current findings is presented in 11.5. First however, the following chapter will discuss in detail some of the key social-psychological mechanisms which were found in this research to explain why participants were influenced in the ways they were.

Chapter 10 : Findings, Phase 2 - The role of social-psychological factors

The objective of this part of the analysis was to explore the ways in which social-psychological mechanisms functioned in this online environment, based on a thematic analysis of interviews and questionnaire, supported by interpretation of observed behaviour on the Cycology website. Would information from others be considered trustworthy, and if so, why? Would social factors such as social proximity (membership of an ‘in-group’) influence levels of trust, or would trust appear to be based primarily on instrumental factors such as the informant’s direct experience of the route? And what would motivate people to offer information to others? Drawing on social-psychological theory from the literature review as well as the Phase 1 findings, this part of the analysis sought to answer the research question 4.4:

4.4 How do social-psychological mechanisms appear to function in this online context?

A number of more specific areas of interest arising from the Phase 1 exploratory research were identified for exploration:

4.4.1 Obtaining word-of-mouth information from others:

In Phase 1, trust was found to be a key factor affecting informal information-use. Whose information did people trust in this online environment, and why?

- Relational trust:
 - Familiarity (e.g. knowing someone ‘off-line’ as well, or coming to know them through regular online interactions)
 - Similarity (e.g. sharing socio-demographic characteristics, similar attitudes to transport, personal norms, levels of fitness, or shared interests)
 - OR social proximity through being within the same community (e.g. within an organisation or locality)
- Calculus trust:

How would this interact with an ‘instrumental-reasoned’ trust in the other person’s experience?

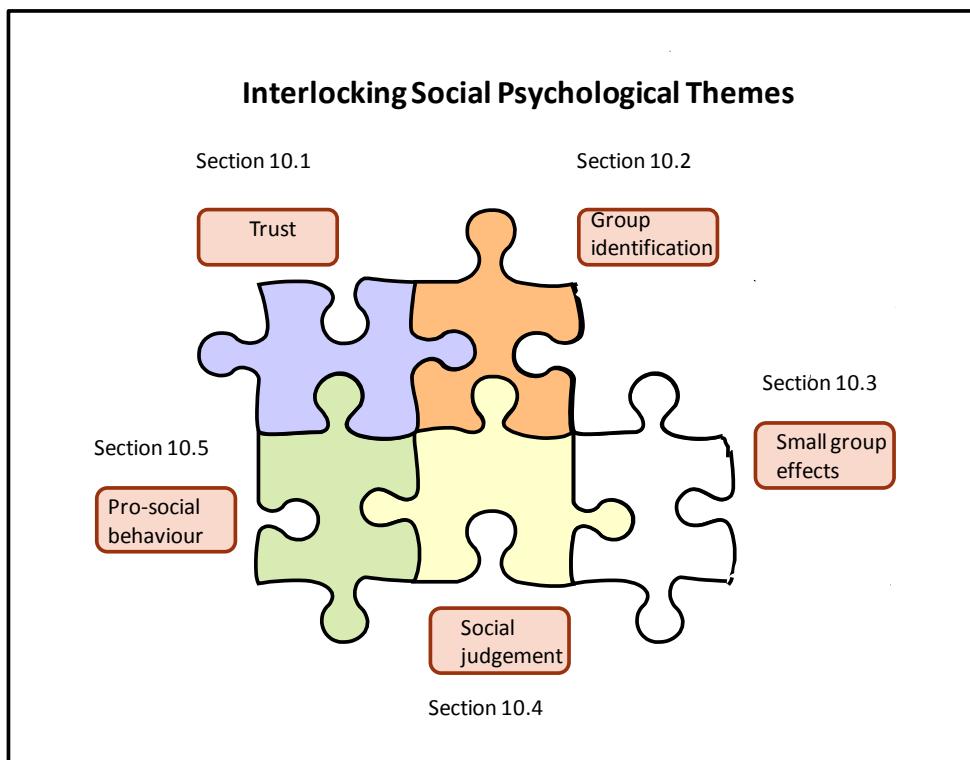
What might make information seem *less* trustworthy?

4.4.2 Giving information to others:

Why did people contribute information to the case-study system? The following issues from Phase 1 would be explored:

- Pro-social behaviour/ reciprocal altruism/social exchange
- Are people motivated by their membership of an in-group (e.g. within an organisation or locality)?
- What might prevent people from posting information?

In order to maintain the flexible design and open nature of the research, these questions were defined *not* with the intention of providing a fixed structure for the findings, but rather as a guide to help identify the potential areas of interest which might emerge. Therefore, answers to these questions are not reported sequentially, but rather, the findings will be presented as a number of interlocking themes which emerged from the coding and analysis, with reference to specific questions where appropriate. The themes are displayed in Figure 10-1. They are: trust; group identification; small group effects; social judgement and pro-social behaviour. These themes will be addressed in Sections 10.1 to 10.5 below.

Figure 10-1: Interlocking social-psychological themes

10.1 Trust in the information posted

This part of the analysis principally addresses research question 4.4.1, which relates to trust in the information received from others. In Phase 1, trust was found to be a key factor affecting the use of information provided by others. Trust was found to be rooted mainly in the real experience of the information-provider ('local knowledge'), but was also found to be affected by social-psychological factors such as social similarity with the information-provider. Most of the Phase 1 participant accounts concerned face-to-face interactions with individuals they knew. The question to be answered now was whose information would people trust in this online environment where the people did not know each other, and why?

Questionnaires and interviews revealed that all respondents believed the information posted on the site to be reliable and trustworthy. This was also suggested by the generally friendly and harmonious tone of the interactions observed on the website, and the positive responses when people had followed a suggestion or expressed an intention to do so. Most of the interview and questionnaire responses indicated a calculus-based reasoning for this trust relating to the intrinsic quality of the information: because participants had real experience of the routes;

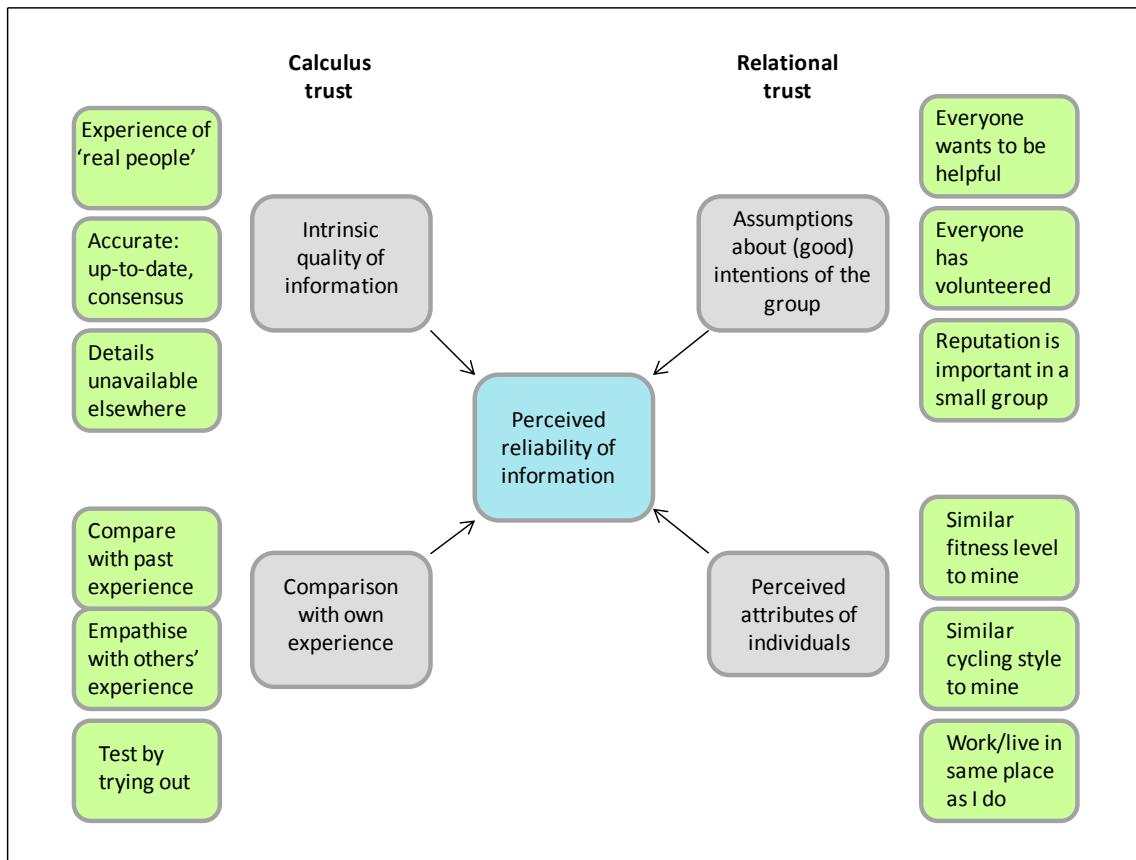
because the information was up-to-date and inaccuracies could quickly be corrected by others; and finally, because a level of detail could be provided which was absent from other (formal) information sources. It will be recalled from the literature review that calculus-based trust is based on rational choice and is typical of short-term interactions where the truster must calculate whether the trustee intends to behave in a way which is beneficial to the truster. Trust is derived in part from credible information regarding the intentions or competence of the other person (Rousseau et al., 1998). Many participants were also able to compare some of the posted information with their own experience, or were prepared to test the reliability of information by simply trying out a suggested route. This supports the Phase 1 findings that calculus-based trust is the primary trust mechanism when people assess the credibility of word-of-mouth travel information.

However, some participant responses implied a more ‘social’ dimension to this trust in the routes and comments in Cycology because: “*actual people ‘with faces’ had posted them*”. Sometimes this involved a judgement being made about attributes (especially fitness level) of an individual information-provider, but more usually trust was based on assumptions about the good intentions of the group as a whole. This corresponds with the concept of relational trust, which is more likely to derive from interactions over time between the different parties, where trust is based on information available to the truster from within the relationship itself, within which emotion may play a part (Rousseau et al., 1998). These different contributory factors are summarised in Figure 10-2, with calculus-related factors on the left of the diagram, and relational factors on the right. Each of these factors will be discussed below.

A theoretical dimension to the understanding of trust within the small group of Cycology participants is provided by theories of social influence. Deutsch and Gerard’s dual process theory (1955) suggests that members of a group are more likely to take the judgments of other group members as trustworthy evidence of reality (compared with non-group members), and, hence, are more susceptible to informational social influence. In the literature review (Section 2.3) it was explained that informational influence is based on the acceptance of information obtained from others as *evidence about reality*, whereas normative influence is based on the need to *conform with the positive expectations of others*, particularly in a group environment. Turner (1991) later identified a form of social influence called *referent informational influence*, whereby people adjust their identity, attitudes and behaviour to correspond with the collectively defined attributes of their social groups (Wetherell, 1996). Referent informational influence integrates the twin concepts of normative and informational influence, asserting that the basic influence process is one where the normative position of people categorised as similar to self tends to be subjectively accepted as valid (Turner, 1991). Thus, it is not the informational

content *per se* of others' opinions and actions which matters, but the extent to which it is validated by ingroup consensus (Turner et al. 1987). In the following sections consideration is given to how far these theoretical assumptions were borne out in the Cycology study.

Figure 10-2: Factors contributing to trust in the information posted on Cycology



10.1.1 Calculus-based trust

Intrinsic quality of information

Factors relating to the intrinsic quality of the information (shown to the top left of Figure 10-2) were among the most frequently cited reasons for believing it to be reliable. Among these, the most common and fundamental reason for trusting the information was the view that it was based on the real-life experience of 'real cyclists', and that this was lacking from other sources of (formal) information. This corresponds with the significance attributed to 'local knowledge' in Phase 1 of this research.

“And I certainly felt that it was reliable in that people had tried using them. They'd kind of done the route, and it was their route that they took to work, and so I kind of trusted it from that point of view. And there was nothing else really like that, that I'm aware of, that you can use”.(Ben)

“I appreciated the ‘real’, personal comments that people made – about what they personally enjoyed or found difficult about a route (.....) I was inclined to trust the information given because I knew it was from real cyclists....”.(Marion)

Regarding accuracy, another participant remarked:

“it becomes a discussion, doesn't it, of things. So in a sense, if somebody put something that is outrageously incorrect, it's not a bad thing, because it does encourage other people to refute it. And give you good information”. (Jim)

In this sense, an online group format such as the Cycology website was thought to offer advantages over one-to-one interactions because inaccurate information could be swiftly corrected by others, and in cases where opinions differed, the reader might be guided by the consensus or majority view. Hence, information appeared to be perceived as more reliable if it represented a group norm. The link made between group consensus and information reliability suggested a process of accepting agreed norms of opinion within the group. This illustrates Deutsch and Gerard's concept of “normative informational influence” (1955), and here a parallel can be also drawn with recent literature on the credibility of electronic word-of-mouth in the context of online consumer recommendations. Drawing on Deutsch and Gerard's dual process theory (1955), Cheung et al. (2009) categorised the consistency and rating of online recommendations as normative determinants of information credibility, and found these factors to be influential alongside informational determinants such as argument strength and confirmation of prior belief. Similarly, one of the reasons why information on the Cycology site was deemed credible was that it was thought to represent a group consensus (if anything inaccurate were posted, it was expected to be corrected by others).

Within this category (intrinsic quality of the information), the third factor contributing to perceived reliability was the level of detail contained within the postings. Most participants believed that the website provided a degree of detail, based on users' experience, which could not be provided by formal sources such as a printed cycling map, with the added advantage of being kept up-to-date. Examples of such details which were thought to enhance the credibility of the information included: condition of the road; cycle-theft hotspots; broken glass on the road; and pleasant views. One person noted in her questionnaire:

“the advantage is that this is up to date and people can tell each other about anything that is blocked, by road works etc. The gate on the rugby ground that is sometimes shut is another example. In many ways it is more reliable than the maps because it tells you what is actually there!” (Elaine)

However, the relative advantages afforded by a standard cycling map in offering far more comprehensive information was also noted by many.

Comparison with own experience

The second category of calculus-based trust factors depicted in Figure 10-2 is comparison with own experience, which might take the form of agreeing with another person’s route directions based on past experience (a rational comparison), empathising with another person’s experience (an emotional comparison), or simply testing out a route suggested by someone else (“physical reality testing” – a social-psychological construct outlined below). First among these factors, the findings showed that trust was reinforced if information on the site corresponded with the reader’s own experience of cycling the routes which were described. For example, commenting on posts from other participants which related to his own route, one person said:

“And then, so I.... because I found the ones on my route to be true, I would expect that if I saw a comment somewhere else, I would take it as read really. I would believe it.” (Phil)

In this case, it appeared that a heuristic rule was being applied – if what one person in the group says corresponds with my own view (i.e. it is ‘true’), I will expect the contributions of other people in the group to be true as well. This is an example of a *judgemental heuristic*, whereby quick and efficient judgements are made by rules-of-thumb which generally yield valid results (Fiedler and Bless, 2001). Affective processes might also be involved in this judgement: the recognising of shared experiences and corresponding feelings of empathy could also increase the trust which someone might have in another participant’s viewpoint:

“Of course, you can never really know what people are really like. With an Internet persona. But you know, if people are cycling to work the same as me, you know that they’re going through the same sort of things. You know if it’s cold and wet, or if cars are screaming by. So you kind of think, because there’s a shared experience, you know, you tend to believe them more”.(Phil)

Finally in the ‘comparison with own experience’ category, it was also common for people to test the reliability of the information by simply following a recommendation and assessing whether or

not they agreed with the advice which had been given. This would then affect the credibility of other comments from the same person, or, heuristically, other contributors as well. This can be interpreted as a process of “physical reality testing” (Festinger, 1950). According to Festinger, people use different methods to test the “subjective validity” of their opinions, attitudes and beliefs. These methods can be placed on a continuum between physical reality testing on the one hand, and social reality testing on the other. Where it is possible to test an opinion, attitude or belief physically (such as riding a cycle route which one thinks may be good), subjective validity is confirmed or denied through one’s own direct experience; this was the case when participants tested out cycle routes which they saw on the website. At the other extreme, where no physical reality check is possible, the validity of one’s opinions, attitudes and beliefs can only be tested by comparing them with those of others (“social reality testing”). The reported role of Cycology in reinforcing a general ‘cycling is good ethos’ (Section 9.2) might have resulted from a process of social reality testing among some members of the group. Knowing that ‘similar others’ shared their positive view of cycling appeared to render some participants’ positive attitudes subjectively more valid.

A benefit of an online system is that it allows people to share the results of this reality testing process with other readers, typically through a ‘user rating’ system. One participant suggested that such a rating system might be useful in this context of online travel information:

“I mean in my opinion, I suppose with any site like that, like with eBay or anything like that, people gain trust by you experiencing something, and people leaving feedback, so like rated users: how good is this route, how trustworthy are their comments - rated by the user community”. (Adam)

This open-minded approach to testing out people’s advice was facilitated by the view that taking a new cycle route on someone else’s recommendation was a low risk activity so it is easy to give other people’s suggestions the benefit of the doubt. One person articulated this view as:

“I just thought “that looks useful. Let’s give it a go”. Because, you know, you try it, and if you end up at a dead end, you cycle back. It’s not disastrous”. (Sally)

This corresponds with Deutsch and Gerard’s (1955) assertion that greater trustworthiness is possible where the reliability of other group members’ judgements can be checked.

10.1.2 Relational trust

The reasons which have been reported so far for participants’ belief that information on the website was to be trusted can be all categorised as expressions of calculus-based trust.

However, it was clear that the high degree of trust could also be attributed to more social factors, based on assumptions made about other individuals, and, in particular, the group as a whole. This may be categorised as a form of relational trust, where trust arises from within the relationship itself (Rousseau et al., 1998). The concept of relational trust has been slightly amended in its application to Cycology, since most literature in this field concerns interpersonal trust arising from repeated interactions between two individuals.

Assumptions about the (good) intentions of the group

In Cycology, trust arose more from the relationship between individuals and the group, rather than between particular individuals. Hence, there was an over-riding belief that everyone on the project was well-intentioned, and trying to be helpful, leading to a norm of providing reliable information:

"Knowing that these are real people and that it was a relatively small group, I felt in no way that I needed to doubt any information. Since this is a voluntary project, I was certain that the nature of posting information would be correct and useful to the project." (Laura)

Assumptions were therefore being made about the benevolence of people's motivations within the group (Deutsch and Gerard, 1955). Three constituent factors relating to assumptions about the group's good intentions are depicted to the top right of Figure 10-2. It was assumed that everyone wanted to be helpful, not only because they had volunteered for the project, but also because they might learn something useful for themselves; moreover, there was a general assumption that people who cycle tend to be supportive of one another (described in the next section on group identification). As one participant noted:

"There's nothing to be gained from putting any misleading information in there. Everyone is actually trying to help each other really and trying to improve their own experience of cycling, I suppose. Yeah definitely. It definitely felt very trustworthy, the messages coming up".(Rick)

Occasionally it appeared that self-presentation and impression management concerns (Leary, 1995) were also playing a role for some people in ensuring that they provided accurate information in order to earn a reputation for good posts. It was assumed by these participants that others in the project would be subject to the same pressure and hence were to be relied upon. This reflects a type of normative pressure to provide reliable information.

"I think there's a high bit of accountability with this sort of thing (...) I mean, when I was writing mine I was thinking, I'm posting a good route, I want to give a good description, I

*want people to be able to use my route because it's, you know, because it **is** a good route, and I enjoy cycling on it. So I just tended to trust them, I had no reason not to. Nobody made a false post or anything like that" (Adam)*

As expected, the small size and restricted nature of the group - and the consequent sense of association with other participants which this created - also increased the level of trust which some people placed in the website information (and in those providing it). An association between small group size and an 'automatic' trust in others - despite not knowing the individuals involved - was made by a number of people. For example:

"I didn't really know anyone in advance. Because it was such a small group of us, in a sense, (...) well, I automatically trusted them, really, and their advice." (Rachel)

This was contrasted by some with the lower level of trust they would place in a publicly accessible website. One person stated: "*I personally tend to have much less trust in comments when I don't know who has provided them*", and another commented on the "*trusted user-base*" of a small, secure website. Asked about the reliability of the information, one participant employed at the university mentioned a sense of 'reassurance' in knowing that most people in the project worked at the same place:

"To be honest, I think perhaps, the fact that it was kind of the UWE staff that were doing it as well. I don't know why, but I found that more reassuring, that they were people that worked at the same place as me. And, yeah, I think when you use that kind of facility to talk to people, you've got that more one-to-one aspect of it, so that makes it more reliable."
(Ben)

Another participant thought that, compared with a user-base within the university, where it was always possible to find out who people were, she would have less trust in the information on an open website, and would also be more wary of providing information if she did not have an idea of who the readership might be:

"Whereas when it's just Joe Bloggs, you have no idea who they are or where they've come from. I think you might be more wary about giving any information to them. Or really trust their information, before you've used it before".(Rachel)

However, this point should not be over-emphasised, as most participants thought that they would also expect information posted on an open website to be reliable, and would generally take it at face value, albeit exercising a little more caution than they would when assessing information from the "*trusted user-base*" of the Cycology site. Interestingly, when asked about the issue of

trust and perceived reliability of the information on the website, many people criticised themselves gently for being trusting, naïve or gullible.

Some people also implied that the unofficial nature of the site made Cycology more trustworthy than an ‘official’ website might be (e.g. information from a transport company or governmental body) : “*Not a corporate site if you see what I mean so I trusted it more*” (*Sarah*). This corresponded with findings in the exploratory research that word-of-mouth was in some circumstances considered to be more trust-worthy than ‘official’ information. Contrasting user information from other cyclists with official cycling information provided by the city council, one participant commented “*the council always seems, in my mind, to have ulterior motives, to get you to go a certain way, and maybe to ignore the fact that their other roads have potholes*” (*Alice*.)

The previous paragraphs have demonstrated the high degree of trust which participants placed in the group as whole, and this connects with the concept of group identification, which will be discussed in the next section. It was clear from the participant interviews that trust in the group as a whole was a stronger feature than trust in particular individuals within the group. This contrasts with the findings from the exploratory research which showed that trust in word-of-mouth information was more likely to be strengthened by one-to-one similarities with the other person than by a sense of shared group identity of any form (although there were indications from the Phase 1 analysis that cycling might provide an exception to this). This underlines the point that participant accounts in Phase 1 usually referred to word-of-mouth influences within dyadic relationships, whereas Cycology created a specific group context in which to observe such influences.

Within the Cycology project, clues provided and assumptions made about the identities of specific individuals were reported to have made little difference to participants’ evaluation of the information posted. A straightforward explanation for this is that the interactions on the website were not of sufficient quantity or length for participants to reveal a great deal about themselves, although it might also be the case that the sense of trust in the group as a whole negated the need to assess the credibility of specific individuals within it. However, despite this, it did appear that some judgements were being made by some participants about other people’s cycling styles and levels of fitness, which could colour the way in which certain information was evaluated. These factors are encapsulated within the final category depicted in Figure 10-2: ‘perceived attributes of individuals’.

Perceived attributes of individuals

These kind of judgements tended to be formed by comparing other peoples' comments about, for example, the difficulty of getting up a particular hill, with an individual's own experience of the same hill. If this suggested that the writer's level of fitness did not correspond with that of the reader, then this would be borne in mind when reading other comments by the same person. This matter will be discussed further in Section 10.4 on social judgement.

"if you know a road that somebody has commented on, it's just easier to gauge if you agree with their level. You know, what I think would be a nice thing, would be to have a little rating, like "I'm an experienced cyclist, or I'm a beginner". You know, another way of gauging what level somebody is at".(Rachel)

Another participant remarked that he had got the impression that a person he interacted with on the site was fitter than he was, and this slightly shaped his view of that person's comments:

"Obviously it helped that I knew what they were talking about and where they were talking about. And it would make me investigate what they've said, without actually completely believing what they said. Like they said, going up Pierces Hill, it's a bit of a hill, but not a problem, sort of thing. Well, you're obviously fitter than I am, mate, because (laughs) it is a problem!" (Mike)

For one participant, the ability to assess someone's level of fitness and compare it with his own was something he would have liked to be able to gauge from the website, but was unable to do:

"you can make a better judgement (when) you can relate to the comments that are being made, (...) well it's not a case of saying "I don't believe you." Because I'm sure people are saying what they believe is true. For them.(...) I took what people said on here in good faith. But without the extra knowing them (...), without that extra bit of information, I don't know how to relate that to my abilities".(John)

However, another participant thought that judgements such as this about cycling styles or fitness made no difference to the level of trust he would place in this type of cycling information. For him, the degree of trust would reflect the other person's depth of experience and no more:

Phil: "So I know that there's quite a big variation in the type of cyclist. But it doesn't really bother me. You've got the occasional cyclist and a racing cyclist using the same routes.

Interviewer: Yeah, so it wouldn't affect how reliable you regarded what they'd written?

Phil: No. I think the only difference would be if someone was commuting every single day and someone was commuting once a month. Then that person cycling every day has got a broader depth of experience".

10.1.3 Comparison with trust in other (formal) sources of information

Finally, participants were also asked to compare the trust they had in the route information on the Cycology site with the routes generated by an automated cycling route planner such as the one available on www.transportdirect.info. Consistent with the points previously discussed, many people thought that they would trust the information on a user-generated site more because it came from 'real people' based on their experience, provided information about small but significant details, and was known to be up to date, although many also pointed out the practical advantages of a route planner over the Cycology site, such as speed of acquiring information and greater breadth of information. One person said, comparing a route planner he had used with a "social site" (as he termed Cycology):

"I think I still trust social sites more. Just because I don't think, I don't know enough about the information they (i.e. route planners) use to plan it." (Rick)

Comparing the two sources of information, another participant expressed a strong preference for user-generated information, once again drawing on the dominant discourse within participant accounts about the 'real' nature of the information:

"It's real. I like the real. If you go to the AA, and get a route map, they'll send you in a direction, and even if you look at it and think "well that's wrong" or "that's rubbish". But if it comes from a person like this, you know somebody's actually tried it. And it just makes it more real life. To me". (Esther)

However, it was stated by many that a route planner has the advantage of being immediate, and providing directions from the precise start point and endpoint required. Hence, both types of route information fulfil different functions. Many people said they would look on a route planner first, and then seek personal comments from users about the routes provided; the majority view was that an ideal system would combine both forms of information (i.e. both formal and informal). This suggestion will be discussed in Section 11.2 on desirable 'social design' features for advanced traveller information.

10.1.4 Informational, normative and referent social influence

Returning briefly to the theoretical constructs outlined in the opening paragraphs of this section, we now consider how the trust factors described above might be conceptualised as channels of normative, informational or referent informational influence (Deutsch and Gerard, 1955; Turner et al., 1987). The calculus-based trust factors on the left of Figure 10-2 (intrinsic quality of the information and comparison with own experience) can be linked to accepting others' advice as evidence of reality, so influence ensuing from them might be categorised as straightforward informational influence. The relational trust factors to the right (assumptions about the benevolent motives of the group and perceived similarity with group members) incorporate a social identity dimension; trust is enhanced through positive expectations about the reliability of a reference group of fellow cyclists: hence referent social influence may ensue. Normative social influence, in the manner defined by Deutsch and Gerard (1955) (i.e. complying with others to seek approval and acceptance within the group), provides an unconvincing explanation, *on its own*, of the mechanisms of trust and influence within the Cycology case-study, but would seem, nonetheless, to be an intrinsic element of several trust factors. For example, the concept of 'reputation building' within the group (appearing in the upper right of Figure 10-2) implied a normative pressure to provide trustworthy information and to be regarded, as one participant articulated, "*as a trusted member of the community*". The different conceptualisations of the reference group within which these mechanisms of trust and social influence were played out will be discussed in the following section.

10.2 Group identification ('community')

This section will explore conceptualisations of the group (the 'in-group' or 'reference group') within the Cycology project, and addresses that part of research question 4.4 which pertains to shared membership of a community. The existence of one or more salient reference groups with Cycology might be said to underpin all the social-psychological processes explored in this chapter, and to have created a setting which was conducive to processes of referent informational influence, manifested in the attitudinal and behavioural effects described in Chapter 9.

Although expressions of group identification could be observed in some of the website postings, most of the data in this section were generated from the interviews, and, to a more limited extent, the questionnaire responses. Phrases such as *community-building*, *cycling community* and *virtual community* arose without prompting in many of the interviews and questionnaire responses, and these were interpreted within a framework of social identity and self-categorisation theory (e.g. Tajfel, 1982; Tajfel and Turner, 1986, Turner et al., 1987). The word

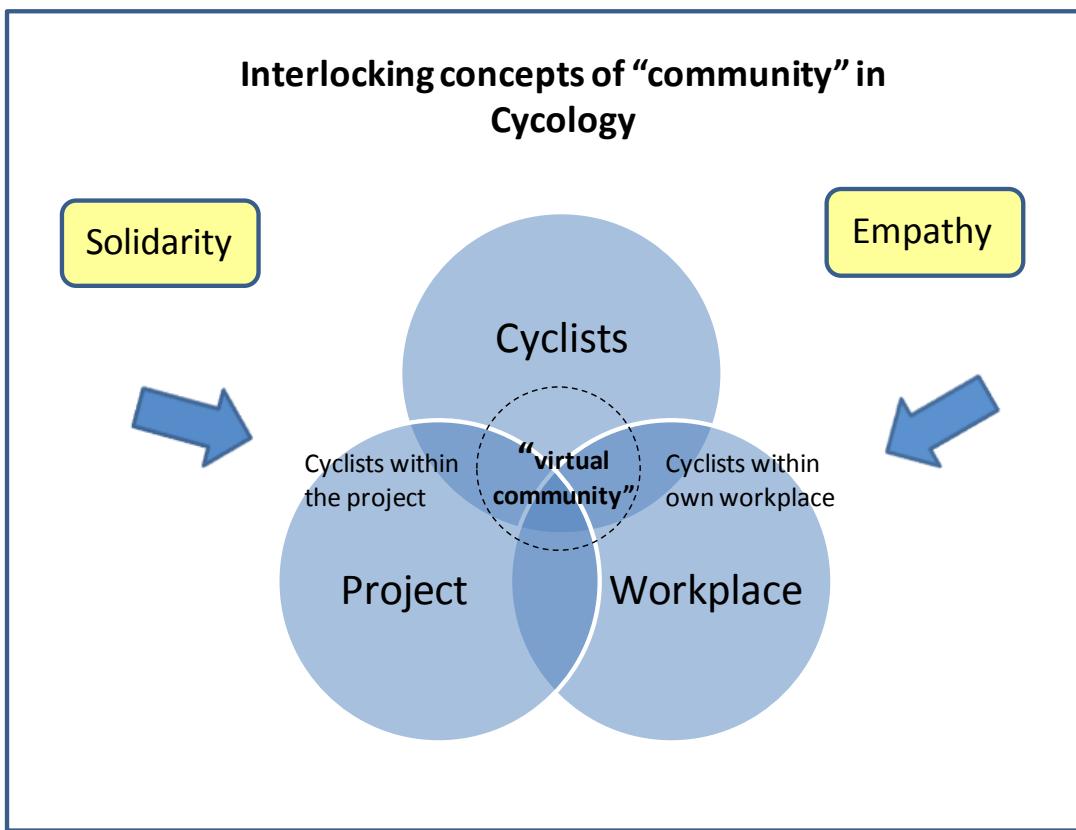
'community' appeared twelve times within the questionnaires and 144 times in the interviews. Three types of 'community' were identified within participant accounts: a community of cyclists generally; a work-based community; and a community of people within the project (identified as either cyclists, co-workers or research volunteers) . Self-categorisation theory posits that group identification contributes to cooperation (in this case, the sharing of information) and allows referent informational influence to occur within the group (Turner et al., 1987). As Figure 10-3 suggests, these different communities were often felt to overlap, although they were ascribed different levels of importance – or salience - by different people. For some participants, cycling was the common factor which generated a sense of association within the project, whereas for others, a greater sense of community arose from the knowledge that the participants worked for the same organisation, or a small group of neighbouring organisations (a matter to be discussed in Section 10.3 on effects of group size). Those participants who did not feel themselves to be a member of a project community still made general observations about 'the cycling community'. Moreover, self-categorisation theory holds that people's social identities are fluid, as they identify more strongly first with one, and then another social group as the saliency of different group memberships changes. Two factors which contributed to the sense of community in all three forms were a sense of solidarity and empathy with other in-group members.

In this section, group identification within each of these articulations of community will be discussed in turn, as well as two forms of emotional support associated with all of them: solidarity and empathy (illustrated by particular postings). Finally, consideration will also be given to those who did not experience a sense of group identification within the project, along with an interpretation of the reasons for this. This gives rise to reflection on group identification factors which might affect the 'success' of virtual communities of travellers, which will be discussed in Chapter 11 in the context of wider implications for advanced traveller information systems.

10.2.1 A community of cyclists

In terms of 'the cycling community', it was generally felt that people who cycle are somewhat more likely to band together and support each other than users of other transport modes. Elaborating on why she believed the project participants to be "like-minded", one person expressed her sense of belonging to a general "cycling fraternity":

"I suppose like-minded in the sense of people who cycle. It doesn't necessarily need to be academics who cycle, or people who work at UWE who cycle, but more the general cycling fraternity. Who have a.... I suppose some are more militant than others..... but who have a view about promoting cycling - that it's a good thing to do." (Sally)

Figure 10-3: Interlocking concepts of ‘community’ in Cycology

A sense of group identification was expressed by another:

“I definitely feel that, being a cyclist, I definitely feel more of a community link with them somehow, because I know they’re cyclists”. (Kate)

It was suggested by some that this may be because cyclists consider themselves a vulnerable minority which needs to work together to improve conditions for all cyclists:

“And so you’ve become, you create this sort of “us against them” mentality, just to keep yourself safe. So everybody then clamours together. Because of power in numbers and everything.” (Jess)

The high level, group categorisation of ‘all cyclists’ was more likely than the workplace or project categorisations to generate a sense of intergroup contrast with the users of other transport modes (especially motorists). A fundamental premise of social identity theory is that positive evaluation of the ‘ingroup’ (which is required in order to improve self-concept) requires contrasts to be made with a more negatively evaluated ‘outgroup’ (Tajfel and Turner, 1986). Social identity was found by Gatersleben and Haddad (2010) to affect cyclists’ perceptions of other

cyclists – believing other cyclists to be like themselves. A sense of ‘cycling in-group’ versus ‘car-driving outgroup’ could be detected in some of the website posts, and was especially clear within the interviews. The former is exemplified by the following posts on the website:

Never had any problems in the morning. At afternoon rush hour, full of nutters, including one of two people who just hate cyclists.

Note: I've been screamed at by motorists a few times along Kellaway Avenue. No doubt for various injustices I have caused them. (Andy)

One participant considered the “us and them” situation to be an inevitable result of cyclists feeling “beaten down” by motorists, but he also considered this to be regrettable:

“I think cyclists have a tendency to form quite a tight group, because there's a real "them and us" type of mentality to it, which I find very annoying, as I drive as well (...) Because there doesn't have to be this antagonism between cars and cyclists. But (...) if I meet someone for the first time and find out they cycle, I end up talking to them about cycling quite a bit. Whereas I'm not particularly interested in cycling, I don't know a great deal about it, but you always end up with your war stories about cycling and horrors about getting run off the road by maniac drivers.. And that sort of thing. So yeah, I think it's a minority group that feel sort of slightly beaten down a lot of the time, you know.”

(Rick)

This concurs with qualitative research carried out among road users in four locations in the UK by Musselwhite et al. (2010), which attributes the ‘us’ and ‘them’ focus of road users to the highly competitive nature of road space in the UK. This previous participant statement also exemplifies the fluidity of self-categorisations (Turner et al., 1987); people can move in and out of different groups as their salience changes. In the example above, the participant describes how his sense of antipathy towards motorists increases when he discusses cycling with another cyclist (that is, when membership of a cycling ingroup is salient), but he is not entirely comfortable with this, as he also drives a car on other occasions (implying that there may be times when membership of a car-driving ingroup might have more salience for him).

The feeling of being in a minority, as well as a belief that more people should cycle, could also make people more inclined to help one another, including sharing information. The greater motivation of cyclists to share information and support, compared with users of other modes, was particularly contrasted with car drivers, partly because sharing knowledge of a route such as a “cut-through” rarely creates congestion among cyclists as it could well among car drivers:

“....cyclists sharing information doesn't deny them use of it. It's like, would the car drivers put on excellent rat runs? Or no, because they want to keep their rat run to themselves. Whereas cyclists have no problem telling you their rat runs, because there's not enough cyclists to make it..... I've never been in a cycle traffic jam, if you know what I mean”. (Mike)

However, it was also suggested that people who walk or use the bus may also experience a sense of community, particularly the latter, who may have to share the “ordeals” of bus travel (to which we return in Chapter 11).

10.2.2 A workplace community

In addition to the sense of identification with other cyclists, a feeling of association with others at their workplace was apparent in the accounts of some participants. For example, one person said she would have used the website in exactly the same way if it had been open to the whole of her organisation because of a feeling that she had a “link with people”:

“I quite like the work thing, you know, it's that..... it gives you that connection to people if you work at a place, or you're all here at UWE, you've got that link with people”. (Rachel)

Others articulated a sense of group identification not with others in their workplace generally, but with those who commuted by bicycle in their company or organisation. The feeling of belonging to a work-based cycling community appeared to be especially strong amongst those participants who worked for the smaller organisations, all of which were considered to have a reasonably strong cycling culture. They also commented that a lot of word-of-mouth information was shared face-to-face, for example, at the bike racks or in the changing rooms. All of them also had an email bicycle user group, although they were not thought to be used for the type of social information-sharing which occurred on Cycology.

Some participants also mentioned what they thought to be the potential of capitalizing on a workplace identity in order to encourage people to contribute to a website such as Cycology. One person said that, if the website were available to all within a workplace:

“I think that there would be more of a sense of exclusivity and community between users, with them more likely to input into the site” . (Alice)

10.2.3 A project community

Alternatively, a sense of community also appeared to be linked to the project itself, or through a sense of connection to other people within it, either as a specific group of ‘fellow cyclists’, or as a group of people who had volunteered for the project. One participant remarked upon a feeling of community within the project engendered by the custom of people answering other people’s questions. This was also evidenced by the way in which comments (particularly “gripes”) were often quickly reinforced by other participants.

“.....because when I cycle in it’s often quite early, and I don’t see many other cyclists. So it’s quite nice. You get a sense of community when you see that other people are riding exactly the same route, and most of the comments, they’re annoyed about the same sort of things that annoy you, or think that the same things that you think would also be a good idea”. (Phil)

Interestingly, this participant implied that a sense of community within the project could only ensue if there were something linking participants in the world outside, such as living or working in the same area.

One participant described Cycology as a “*virtual community of people who cycle which provides a space for collaboration and help on all things cycling*”. The degree to which Cycology might accurately be described as an ‘online community’ will be returned to in Section 11.4.

Expanding on this in her interview, she said:

“I guess part of that is that we have this common element of all working around the same area. And that there were a limited number of participants. So I started recognizing people’s names. And that recognition made it feel like there’s some kind of community feeling to it. That it’s just these 23 people, or however many were participating. So I knew it was just “this is us, there’s nobody else. This is our community. We’re all cycling.”
(Laura)

However, not everyone shared this view. For example, one person felt disappointed that the “community aspect” did not develop, due to insufficient interaction. Another thought Cycology had the potential to develop into a community, but:

“You know, there wasn’t a strong sense of, I didn’t feel a sense of community like I do with my housemates or with my other friends. But there was certainly a feeling of mutual interest, shall we say. There were people there who were doing the same things as I was doing, and were willing to chat about it”. (Adam)

Many participants felt connected to others within the project not only as fellow cyclists, but also as a group of people who had volunteered for a research project. This also linked to their high levels of trust in the information posted. One person thought the project engendered an inherent sense of community which transcended other connections such as shared workplace or geography:

"I mean, I feel part of UWE, I don't feel part of the MoD or Hewlett-Packard or anything, so I wouldn't say I felt a sense of community with either of those, and I don't think the geography either, to be honest. But I think the project gave it a sense of community. I think it transcended where you work or anything...." (Julie)

This section has so far explored three broad concepts of community experienced in Cycology as a whole; we now turn to two social factors inherent in some of the postings which were thought to enhance these group identification effects, and which can be summarised as solidarity and empathy. Fourteen people (in 25 references) mentioned the effect of a certain type of post (such as 'cycling in the rain', highlighted in Section 8.2.2) as something which contributed to a sense of community amongst group members or cyclists in general, and this was often linked to other concepts such as 'mutual support', as well as shared experiences and emotions.

10.2.4 Mutual support (solidarity)

The idea of 'solidarity' was raised spontaneously by a number of participants with reference to specific posts. One participant remarked: *"I enjoyed posts that encouraged a feeling of solidarity amongst cyclists when people discussed annoying issues or comical aspects of a route"*. One such example from the website was entitled "Gripe with Pedestrians":

Does anyone else ever find when crossing here on a bike that pedestrians insist on walking in front of you and taking up the whole of the crossing section? Grrr... particularly in term time... (*Laura*)

Yes, whenever I've cycled along this section I find that you have to continually switch lanes to avoid pedestrians. Perhaps a few more logos indicating space for cyclists and space for pedestrians would work? (*Sue*)

For others, this was a general impression they gained from the project as a whole. One person said that the site *"made me feel "solidarity" with the others who cycle and a kind of supporting/ed feeling" (female)*: Another commented:

"I mean, I kind of got a sense that everybody doing it, you know, we're all cycling, everyone

kind of had an attitude of, you know, being willing to share information, help each other. It was a nice feeling of solidarity in a way (...). So it was quite a nice feeling of community, even though we were actually geographically not linked." (Kate)

Solidarity is also associated with pro-social behaviour (Bierhoff, 2001), thus connecting it with an area which will be discussed later in Section 10.5. There were also some overlaps between the idea of Cycology providing social support for those new to cycling, and the way in which some postings encouraged community-building (although practical information was perhaps considered to be even more important). Was there a relationship between the amount of cycling experience an individual had and the importance they attributed to 'community/social support'? One person who had cycled to work for many years did not think the "cycling in the rain" type of comment (quoted in the qualitative analysis of website posts in Section 8.2) prompted a sense of community for him personally, as he had been cycling too long, but thought it might do so for novice cyclists. Running two queries in NVivo showed that community building was indeed mentioned most by people who had been cycling to work between 6 months and 2 years, and the three categories of community identified previously were mentioned most by people who had been cycling to work for between 1 and 2 years. Participants who had been cycling to work for many years implied that social support for cycling was not something they particularly required, because cycling was simply part of their routine; hence attitudes (and intentions and behaviours) were likely to be more stable and less likely to be influenced by others. In social identity terms, it might simply be the case that people's 'cyclist social identity' becomes less salient as it becomes a more habitual transport choice.

10.2.5 Shared experiences and emotions (empathy)

For some, creating a community was said to involve sharing feelings, motivations and experiences. Others used terms such as "shared experiences", "empathy", "group feeling" and "camaraderie". These aspects appear to give the information greater resonance than if it were merely instrumental.

"I think that, you know, if you're creating a sense of community, it's not only the information that is getting across, but also the feelings and motivations. You know, "I had a good day, I had a bad day." And those sort of shared experiences. That make a sense of community. If it's just sort of "I go from point A to point B this way ", it's not nearly as..., it doesn't touch you as much." (Jess)

The community-building effects of some of the posts seemed to be especially strong when participants were involved in interactions. The most active user of the Cycology website remarked in her questionnaire:

"When people responded to my comments I did feel quite excited about being involved in the cycling community, and was therefore encouraged to write more (...). Participation in this project made me feel part of the cycling community which was quite nice. When I felt bad about it, e.g. in rubbish weather, I knew there were others who had gone through the same, which encouraged me to keep cycling- I am now an "all-weather cyclist"!" (Alice)

Like the concept of solidarity, empathy is another factor which is strongly associated with pro-social behaviour; the existence of both these factors may therefore have enhanced participants' willingness to contribute to the website.

10.2.6 Lack of group identification

Subtle distinctions among different participants' expressions of in-group/out-group contrast could be detected within the Cycology project group itself. Two people explained that they felt excluded from the group of participants, and possibly did not identify with a 'cycling community' either (although one of these participants said that she felt more friendly towards cyclists than other road-users because she believed that they "looked out for each other"). With reference to the theory of Turner et al.(e.g. 1987, 1994) these two participants did not categorise themselves as members of the Cycology group. One of them, who was not cycling to work (although she was contemplating doing so work), felt excluded because she believed that most other participants were confident cyclists or had been cycling for a while. This inhibited her participation on the site. She thought she would have felt more involved if there had been others in the same situation, and if there had been communication between them:

"It seemed like, if there were other people who were only thinking about cycling, they weren't really commenting or asking questions. So I felt a little bit like "oh, I'm going to be the only one..". (...) Yeah, I think I was a little bit like "everybody else is already cycling. I'm the only one who is not cycling. I don't really have that much to say." (...) I think it would have worked out better if there'd been more people who weren't cycling". (Helen)

The other participant who felt isolated from the group was the only person who was actively negative about the project. Asked whether he thought postings such as "cycling in the rain" evoked any feeling of 'togetherness', he was the only person to say no:

Andy: "No. Because these are so, for me, these little posts, they were, you know, pretty anonymous. Even though she is (she? –yeah) she was making an attempt to show some personal experience, I don't feel any connection to her".

Interviewer: "Right. Why was that then? Why didn't you feel any connection to her?"

Andy (laughing): "I don't have any idea who she is! Yeah. I mean, I guess I don't feel that connected to the cycling community. That I feel like I should join in some general banter about cycling experiences".

Another interesting finding was that membership of the 'project community', or at least one's status as a trusted member, could be perceived as quite fragile. One participant thought that a response to one of his routes, a response which he experienced as a criticism, might lead other participants to consider all his posts to be unreliable:

"And it's a perfectly good route in my eyes. So after that I probably would think, what's the point? Because you know, I'm now no longer a trusted user of this community." (Adam)

Two people described themselves as having a rather unsociable personality which meant that they did not 'need' to feel part of a group. While believing that Cycology could engender a sense of community, one of the two said that this was not important for her:

*"But then, I think it's probably helpful for people who like to feel part of a group. To me it's not important to know that other people are cycling. I'm cycling because I want to. I'm not bothered if other people..... I mean, obviously, for the sake of the environment, I wish other people were cycling, but I don't need to feel part of a group. But that's me" (laughs).
(Elaine)*

Using a framework of social identity and self-categorisation theory, this section has explored several different senses of 'community' which emerged from participants' accounts of the Cycology project, as well as the way in which certain posts on the website conveyed a feeling of solidarity and empathy. The next section will elaborate further on the group context by exploring ways in which the limited size and composition of the Cycology group affected participants' experience of using the website.

10.3 Effects of limited group size and composition

During interviews and in their questionnaires most participants reported on what they considered to be the advantages and disadvantages of the small size of the user group within the Cycology project, and the possibility of recognising or being recognised by others because of the

workplace context. Most of the advantages can be summarised as social (for example, greater trust in the information and community-building amongst group members, associated with familiarity with other users), whereas the disadvantages might be categorised as instrumental (membership not always large or diverse enough to provide a sufficient pool of knowledge or basis for interaction). Observation of the website activity also supported this broad conclusion.

10.3.1 Positive effects

Starting with the perceived advantages of a limited group size and composition, it was reported that the small size of the group (23 participants) created a sense of ‘intimacy’, as it meant that people could quickly start to recognize other participants’ names (although it was rare for anyone to gain a sense of the ‘person behind the name’ unless they had happened to come across one another in another context - see section on social judgement below). Because participants had been recruited from a small number of organisations, there was a reasonable chance that they would have met other participants ‘in the flesh’ and recognised them on the website (aided by the fact that many people used their real names when they wrote comments). However, it should be noted that none of the participants knew that they knew anyone else when the project started, and it was rare for anyone to report later that they had recognised more than one other person whom they had come across in ‘real life’. Unsurprisingly, the participants who most frequently reported a sense of knowing who others were, all worked in one of the smaller organisations. For most, this sense of social proximity provided an incentive for contributing to the site, although two people reported that they had felt inhibited in what and how much they wrote because they did not like the sense that they might be identified by colleagues (especially their ‘superiors’).

The small size of the group was thought by some to have increased their inclination, or sense of commitment, to contributing to the website.

“Because it was small, it encouraged me to use it more. Because it was contributing to something”. (Alice)

Asked if she would have contributed as much if the group had been bigger, one participant said:

“Probably yes, but I don't think I would have put as much time into it. Partly because there'd be more people involved in it, and partly because it becomes more anonymous the bigger the group gets (...).but it was a nice feeling, knowing it was a smallish group and we were all doing it for the same reason”. (Kate)

“The same reason” refers to the fact that Cycology was a research project for which people had actively volunteered to participate.

The motivating effects of limited group-size and social proximity with other participants concurs with the outcomes of the *EcoTeams* approach to encouraging environmentally sustainable behaviour at the local level (Staats et al., 2004). *EcoTeams* involves groups of householders coming together to discuss their resource use, and agreeing to make changes to their behaviour, which they monitor together. Parallels can be drawn between identified ‘success factors’ in the *EcoTeams* method (which produced significant resource savings, sustained over time), such as the focus on practical information and tacit knowledge, and a supportive social element which meant that people were more likely to carry out their good intentions if they made plans in front of others (Avineri and Goodwin, 2010).

As discussed in Section 10.1 on trust, the small size of the group was also thought by some to have improved the reliability of information on the website, and this may have partly been a consequence of the sense of familiarity with other contributors:

“I think the small group aspect is certainly interesting, because after a while you come to trust posts by people. Like I said with Marion, you think it's going to be amusing or something quite nice about the route, and Alice will post stuff which is either very useful, or she'll post something about your bike being stolen or something like that”. (Adam)

As previously discussed, the workplace context of the study meant that participants sometimes recognised colleagues, or thought that they might be recognised, and this was thought to have a moderating effect on what people wrote, ensuring that they provided accurate and reliable information:

“And I wouldn't really consider that someone would maliciously put bad information, particularly in such a small..... maybe if this was open to the whole (...).... I mean, it's a small group, probably some people can figure out who other people are. Like I thought I could figure out who a couple of other people were...” (Helen)

This finding is supported by several areas of social-psychological theory and empirical research concerning people’s greater propensity to behave in a cooperative or pro-social manner within groups where they can communicate and where ‘dissenting’ behaviour would be visible. This was observed in social dilemma experiments conducted within a framework of Kelley and Thibaut’s Interdependence Theory (1978), which were outlined in Section 2.2 of the literature review. Such experiments demonstrated that pro-social behaviour is more likely to occur within

small groups than in larger ones due to enhanced feelings of group identification, personal responsibility, and ability to ‘make a difference’ (Van Lange and De Dreu, 2001). Secondly, one of the founding hypotheses of self-categorisation theory (Turner et al., 1987) is that factors such as social interaction, similarity and reduced social distance all contribute to intragroup cooperation.

However, claims in this area should be balanced against the observation that most of the Cycology participants thought that reliability of (instrumental) information would not be a problem on an open website either (i.e. in a much larger and more anonymous group context), albeit they might treat information from anonymous sources on a public website with a little more caution.

It was thought by some that a further advantage to limiting the size and composition of the group was that it would be less intimidating for novice cyclists. Even if participants did not actually know anyone else in the group, they did not regard the other individuals as ‘complete strangers’ because many (at least in the case of the university participants) shared the same place of work or study:

“I think someone who was thinking about cycling would feel more comfortable with it being initially just UWE based (...). I think if someone was thinking this was for UWE people to look at, you feel like you’ve got some association with other people. I suppose it’s just how you feel, isn’t it.” (Ben)

10.3.2 Negative effects

Turning now to the disadvantages of the small group size, it was thought by most participants that the group could have been bigger than it was in Cycology, but still retain its ‘small group feel’, and that this would have been beneficial in terms of increasing the reservoir of knowledge within the group and also increasing the number of interactions, but without necessarily losing the sense of familiarity among group members. Most participants thought that if a similar website were to be created for general use (as opposed to a research project) either the university population alone, or the university plus some of the smaller near-by employers, would provide a sufficient reservoir of users, working on an assumption that the number of core users would be only a small percentage of the overall user-base. In terms of ideal group size, the majority view was that the group should be small enough for participants to have a sense of association with one another, but to be drawn from a population diverse enough to provide both a wide knowledge base and a degree of anonymity for those who wanted it (although some participants

disliked the anonymity and would have preferred to be interacting only with colleagues). More specific estimates of ideal group size will be provided in Section 11.4.

Asked to compare, hypothetically, a website with restricted access, such as one within the workplace, with an open access website, many participants saw advantages in the greater pool of knowledge available on an open site. Some provided examples of when it would have been useful for them to access user cycle routes outside their locality, including when visiting other cities. Some also saw advantages in sharing information as widely as possible so that the associated benefits could also be extended to as many people as possible. However, many participants were concerned that an open access website could lead to a deluge of information, making such a website confusing and difficult to use, and losing some of the social benefits emanating from a smaller and more restricted user group.

This section had highlighted some of the effects of limiting the number of participants to 23 and recruiting them from a small number of organisations (which was undertaken for carefully considered methodological reasons, to which we return in Section 10.7 – reflections on the methodology). In summary, these effects were seen as broadly advantageous in psychological terms (trust, group identification, accountability) and disadvantageous in a more practical sense (reservoir of knowledge not great enough for all questions to be answered). In Chapter 11 consideration will be given to ways in which the advantages of ‘intimacy’ (and usability) of a restricted access website and small user group might be combined with the benefits of a much broader knowledge base offered by an open group. For now, however, we remain with the operation of the Cycology project; in the next section we move from consideration of factors affecting the group as a whole to a more detailed analysis of some of the interpersonal relationships within the group.

10.4 Social judgement

A matter explored at interview, following up an area of interest arising from Phase 1, was whether any clues provided and assumptions made about the other participants’ identities made any difference to individuals’ evaluation of the information. This section therefore addresses that part of research question 4.4 pertaining to similarity and familiarity between information-giver and receiver.

There seemed to be little interest in protecting identities in this small group environment: the majority of participants used their real name (either first name only or full name) to sign off their postings. Four female participants used only an initial and surname, or only initials, therefore not indicating their gender, and a further female participant used a female-sounding pseudonym.

Eight uploaded a thumbnail picture of which four were portraits. Most people thought that the use by some people of thumbnail photographs or avatars made the website feel more friendly and personal, and allowed the reader to gain a very basic impression of that person. However, it seemed that this was not enough to motivate more than a minority to upload a portrait of themselves.

10.4.1 Judgements about the group

As discussed in Section 10.1, most participants expressed the view that the individual characteristics of the other contributors were not apparent and did not matter. The main explanations given for the failure to obtain an impression of specific individuals were that the project had not been of sufficient duration and the posts not numerous or long enough to allow this. Hence, the judgements being made tended to be about the group as a whole, rather than individuals (for example, that everyone was friendly).

Interestingly, many people assumed that everyone else in the project was a more experienced/competent/serious cyclist than they were. Many were self-deprecating about their own cycling competence. For some, the idea of the ‘serious cyclist’ conflated with the impression that other participants were ‘expert’ or ‘activist’ cyclists. As discussed in Section 10.2, this reduced the motivation of some people (those who considered themselves particularly inexperienced or ‘not serious’) to contribute to the website, and in some cases made them feel excluded from the group. However, this impression is incongruent with the observation that four of the five most frequent contributors to the website had been cycling to work for less than two years (and two of this group had started cycling to work within the past six months), and did not appear to regard themselves as confident or especially experienced cyclists.

In addition to these generalised impressions about the group as a whole, some participants did, in the course of the interview, reveal assumptions that they had made about particular individuals - for example, interviewees usually used the male pronoun when referring to specific individuals if their thumbnail photo or user name did not reveal gender. When questioned about this, these interviewees could not explain why they assumed other participants to be male, except possibly that they tended to see more men than women cycling (in fact, there were more women than men on the project). It seemed that people were using their knowledge of the real world as a yardstick to judge people on the website, rather than gaining an impression of website users from their contributions *per se*. Just as people tended to assume that other participants were male, because they tended to see more men cycling, one woman also said she might assume that a man writing on the site was fitter than she was because the men she sees cycling tend to go faster. Commenting that she knew more women than men who cycled

amongst her work colleagues, one participant thought that her impressions of male cyclists were rather generalised (as fit and fast), and this might have extended to her impression of people on the Cycology site:

"I suppose I'm also basing my judgement on the people I know from the faculty who cycle already. And I don't really know the guys. The guys I see on my route are whizzing by in their Lycra (laughs). You go "okay, you know what you're doing a bit more".

So I suppose it's my assumptions based on what I already see or know. In that way. Rather than actual people I meet on the site. Does that make sense?". (Rachel)

According to social-psychological theory, the process of overlooking individuality in this way could be described as one where participants were drawing on stereotypes: shared beliefs about personality traits and behaviours of group members (Fiedler and Bless, 2001). Within the field of social cognition it is posited that social judgements are only partly determined by the stimuli of a given situation, and also depend heavily on prior knowledge drawn from memory. People often lack the time, cognitive capacity or motivation to consider all relevant information (or indeed, insufficient information might be available from the given situation, as in Cycology). The lower the capacity, motivation or level of new incoming information, the stronger the impact of prior knowledge will be on the inferences and judgements made in a given situation. 'Top-down processing' occurs in this way when information-processing is driven by abstract, super-ordinate knowledge drawn from memory, as the quotation from the previous paragraph suggests. Conversely, 'bottom-up processing' occurs when information processing is driven by new incoming stimuli. Hence, the greater the depth of information-processing, the less influential prior knowledge will be (Fiedler and Bless, 2001). Thus, a social cognition explanation of the judgements made in Cycology about fellow group members would be that processing was largely a 'top-down' matter. One of the reasons for this may have been that the main focus of attention was the content of the route information itself, so greater processing capacity was devoted to the routes than the people suggesting them.

10.4.2 Judgements about individuals

Although most judgements were made about the group as a whole, it was reported in Section 10.1.2 that participants sometimes compared individual contributors' attributes with their own, especially fitness levels, or confidence with regard to cycling in traffic, and used this to gauge how well that person's experience might correspond with their own (especially ability to get up steep hills). In this case, a greater degree of bottom-up processing may have been occurring, as

these participants were assessing cues about other people's attributes from the website contributions themselves, before merging this with their own prior knowledge in relation to their own attributes and experience. Thus, judgements being made about an informant's particular attributes could affect the credibility with which the information would be received. This did not equate to 'not trusting' a person - quite the opposite, as one might trust a person to tell the truth about their own experiences, without necessarily expecting that they would experience the same things in the same way. Similar findings had emerged from the Phase 1 interviews in relation to travel experiences and preferences more generally.

There was also a suggestion that the same process of comparing oneself with the other person in the interaction with regard to, for example, cycling style or fitness, and making allowances for this, occurs when information and advice is being given, as well as when it is being received. One participant believed that the fact of not knowing who people were as individuals might have inhibited her from giving detailed advice, for example about negotiating car traffic on busy roads, in case the advice was not appropriate to the reader's level of confidence in cycling:

"But personally I don't like giving that kind of advice, because I don't feel..... because I don't know the person. You know, if you knew that person.... then I probably would, but I'd have to be very explicit about it, you know: "this is how I do it". But I'm quite happy to have cars that close to me, or you know, take that risk myself. Whereas they might not be. So I'd feel quite bad giving them some advice, which could end up not being such good advice in the end". (Rachel)

Finally, judgements were sometimes also made about other participants' attitudes towards cycling – as far as was possible from the short interactions on the website. This is connected to the assumptions, described above, which were made about other participants being 'serious cyclists'. The concept of 'serious cyclist' implies not only a certain way of cycling, but also a certain attitude to cycling. One person said that he was happy to join in short discussions with one particular contributor because he or she appeared to have a similar attitude to cycling to his own, despite not being able to deduce very much about their character from such short interactions (he assumed that this person was male when in fact she was female):

"You can't say someone's similar to you from that. But you know, they have the same attitude to cycling, you know, they focus on... they weren't afraid to post little things that might seem silly, but to say something that was typical of cycling, but didn't need to be that grand or anything like that ". (Adam)

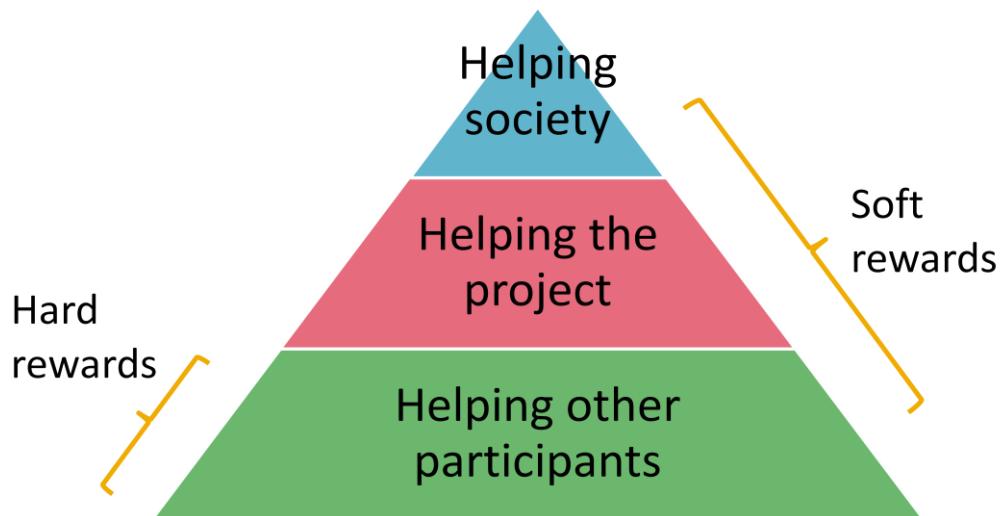
10.5 Pro-social behaviour and attitudes

In this section we explore some of the motivations expressed by the participants for contributing, or not contributing to the website, with a broad theoretical framework of pro-social behaviour. This addresses research question 4.4.2, which asks why people are willing (or not) to offer information to others.

10.5.1 Reasons for contributing

Participation in Cycology was voluntary, and everyone who posted on the website could be said to have acted ‘pro-socially’ in its broadest sense – that is, helping behaviour intended to improve the situation of the help recipient, which is not motivated by professional obligation, and which may be either egoistically or altruistically motivated, or a mixture of the two (Bierhoff, 2002). In so far as voluntary information-sharing was the *raison-d'être* of Cycology, pro-social behaviour was in some ways an essential component of the whole project. In addition to the posting of route information, evidence of pro-social behaviour could be found in the warnings about new problems along cycle routes, such as: broken glass on a roundabout; recurrent danger points on routes; the notification of a local cycling event, which concluded with the remark “*I wouldn't want anyone to miss out*”; and the way in which many (although not all) questions posted on the website were answered. Not all the posts might be described as helpful in a practical sense, especially those which involved ‘sharing a gripe’ about poor infrastructure or the behaviour of other road users, although even these were construed by some as psychologically helpful in terms of community-building and boosting cyclists’ morale in the face of adversity.

Three levels of helping could be detected in the observed behaviour of the Cycology participants: first and foremost providing helpful information to other participants; secondly, assisting the researcher and the project as a whole; and thirdly, at a more abstract level, supporting a transport choice for short trips (i.e. cycling) which may be construed as more beneficial to society as a whole than other transport modes. The three levels are depicted in Figure 10-4, which also indicates the associations of the different types of helping with ‘hard’ and ‘soft’ rewards; this will be discussed later in this section. Thus, at the first level, pro-social behaviour took the form of posting information which was helpful to other participants in a practical way, or making observations which might enhance others’ enjoyment of cycling and reinforce a sense of ‘community spirit’. For some participants, writing this kind of post was motivated not only by wanting to be helpful to other participants, but also the researcher, and/or to make the project ‘a success’ because they supported the idea of sharing cycling information in principle. Posting questions on the site could also be interpreted as a pro-social act at both the

Figure 10-4 Hierarchy of pro-social behaviour in Cycology

first and second levels, in that it helped to stimulate interaction on the site for the benefit of other users and the researcher, even if a straight-forwardly egoistic motive was also present: that of seeking information for the questioner's own benefit. At the highest and most abstract level, engaging in an activity which might play a part in encouraging cycling (which all participants believed Cycology did, or had the potential to do) could also be regarded as a pro-social act in relation to wider society because of the reputation of cycling as a pro-environmental transport choice (Tapp et al., 2010). Of these three levels of pro-social behaviour, the first is of most interest for the present research, and is therefore the focus of this section. The extent to which some participants were motivated by wishing the project to be a 'success' (second level) is also addressed here, although this is also a methodological issue with implications for research validity, to which we will return in Section 10.7 (reflections on the methodology). The third level - the extent to which cycling might be regarded as a 'pro-social transport choice', although a related topic of interest, did not lie within the scope of the research questions and is therefore excluded from the present analysis.

The main reason given by participants for contributing to the site was that it was a matter of "give and take". Most people said they wanted to be helpful and "share stories", but also hoped that they might learn something useful for themselves, especially alternative routes and details about them which were unavailable from other sources. One of the most frequent contributors summed up her reasons for posting simply as "*It seemed like a friendly, helpful thing to do*". She later mentioned the appeal of "getting something back", but for her, this was not the main issue:

"You know, it's nice to have a bit of something back. And as you noticed, I posed the question about the cycle path without much response. But no, I just sort figured, if there's something that might be useful to people, it's not very difficult to share it". (Sally)

The comment that it was not very difficult to share information suggests that, for this person at least, the 'pro-social actions' were not very costly to the help-giver.

Motives of reciprocity were also demonstrated by the following:

"And I felt that I had something to add in telling people about my route and just passing on information. So that was really why I did it, and I was quite interested in whether anyone else had a route". (Rick)

"Just to contribute something really, just to put something up there. It would have been interesting if there was somebody doing a similar commute to me, you know if someone had had an alternative route which would have served me, it would have been interesting to see". (Doug)

The interest in obtaining feedback as well as providing a route which might be of use to others was exemplified by this early posting accompanying a route drawn on the website:

If anyone knows a better route - please let me know!!! It's not too bad apart from the bits around kellaway avenue/coldharbour road where the roads are narrow and quite steep, and the same going up to the downs on Clifton Down road. (Rick)

This participant said in interview that he was especially interested in hearing other people's views about his route, suggesting that a self-serving motive was at least partly responsible for telling others about his route. Two people responded in this thread, one confirming that she believed this to be the best route, and another suggesting an alternative route, which the original contributor then tried and reported back on. Thus, this interchange might be interpreted as pro-social on the part of all three participants, with motives which might be both altruistic and egoistic.

A number of theoretical approaches might be drawn upon to help explain this reciprocal helping behaviour: social exchange theory (Homans, 1958), reciprocal altruism (Trivers, 1971; Fehr and Fischbacher, 2003) or as evidence of the combining of an altruistic and egoistic motive system (Bierhoff, 2002). The present findings support Bierhoff's (2002) assertion that "*in many real life*

examples, a mixture of altruistic and egoistic goals seem to motivate pro-social behaviour” (p.331). Of the different explanations of pro-social behaviour which were outlined in the literature review (biological, individualistic, interpersonal and social-systems theories), the present research particularly supports a social systems approach because there appeared to be a *norm* of helpful behaviour within the ‘project community’. The social-systems explanation of pro-social behaviour emphasises the influence of factors inherent within a social system, such as cultural norms and rituals shared within a community and argues that people are socialized into a particular pattern of behaviour which reflects the ‘rules’ and expectations within their community (Bierhoff, 2001).

For some, the reciprocal ‘taking’ in return for ‘giving’ took an affective form as well as, or instead of, a practical form. A third of the participants articulated a feeling that it was “nice to help people”. One person explained how pleased he felt to know that his route had been helpful to someone, noting that he was surprised to realise this as he had assumed that his motives for going on the website were confined to the more practical matter of improving his knowledge of routes:

“I thought that was nice. It was just the fact that I had done a route and I'd put it on there and someone else benefitted from that. I really liked that actually. It made me feel good to be honest, the fact that I'd put the route on there and someone else was benefiting from it. It's nice to know that. I initially went on there to see if I could find out whether there were other routes that I could come across, so I didn't expect that to begin with. But it was nice to know that perhaps you'd saved someone some time in the morning”.(Ben)

Ben also described this feeling as “*a bit of an ego boost*”.

The most active contributor to the website reported feeling pleased when others responded to her comments, and this encouraged her to write more. For her, the positive feelings she experienced as a result of contributing were linked to a desire to feel part of “the cycling community”:

“I felt quite good about posting comments, although I was quite aware that some of them may have seemed quite trivial, especially as at the time of this study I was quite new to cycling and had not experienced much. When people responded to my comments I did feel quite excited about being involved in the cycling community, and was therefore encouraged to write more”.(Alice)

Some participants said that if they liked a particular route themselves, they tried to make it sound interesting and pleasant in order to encourage others to try to it. Just one person made a direct

reference to positive self-presentation as one of the rewards for acting pro-socially by offering useful information:

"When it asked for a username or a pseudonym, I always put a user name. On a site where you're posting, I want people to know it's me. If I'm posting a route I want to take some of the glory for that". (Adam)

Rewards such as enhanced reputation and personal satisfaction are termed 'soft rewards' by Hall and Graham (2004) in their study of motivations for contributing to an online group called *CipherChallenge*, through which code-breaking enthusiasts cooperated to solve a puzzle. They identify these rewards as important alongside the "hard or explicit rewards" of access to information and knowledge. The sense of "collective morality" based on reciprocity which developed within the group studied by Hall and Graham was echoed within Cycology. These authors caution against labelling such reciprocal helping as 'altruistic' due to the existence of soft rewards, but this reciprocation is consistent with the broader term 'pro-social behaviour'.

Another 'soft reward' for contributing to the Cycology site was the sense that this might be a way of encouraging people to start or keep on cycling. Half the participants revealed in their interviews that they liked to encourage others to cycle whenever the opportunity arose (although they did not identify themselves with the image of the "evangelical cyclist"). This contrasted with the exploratory research, when most participants said they were very reluctant to try to influence other people's travel choices, suggesting that people reveal themselves to be more 'directive' when faced with a specific situation, than they would admit to be when discussing travel behaviour more generally. Alternatively, this may be a specific 'cycling effect'; people who cycle may be more concerned than users of other modes to convince others to join them.

In addition to helping others and seeking practical (hard) or psychological (soft) rewards from other participants, some people participated actively and regularly because this was a time-limited project which they wished to be successful - thereby exhibiting pro-social behaviour towards not only the other participants, but also the researcher. One participant, who had hoped for more interaction on the website, admitted that he was making a conscious effort to contribute because he wanted the project to work well, as well as wanting to obtain more benefit personally:

"Yeah, I mean, I was conscious, to a certain extent, after a while I got to the point of looking for things that I could respond to. Because, partly from the perspective of wanting it to work as an experiment, and partly because I wasn't getting much from it, I

thought maybe if I put more in, then I might get more back. So I did make a conscious effort to try and respond to posts".(John)

The evidence that some participants were behaving pro-socially towards the researcher as well as other participants within the confines of the project demonstrates one of the biases which result from studying an artificial setting rather than a natural one (for example, an existing online community). This matter will be discussed further in Section 10.7. However, when probed on this matter, most of the group expressed the view that they would have behaved in a similar way on the website if it had been a permanent feature within their organisation or locality, and not a research experiment. Although this cannot be demonstrated without further research in a 'natural setting', it might be hypothesised that those who would contribute to a 'real-world' website might have similar pro-social motives to those who would volunteer for a research project of this type, since the same positive approach to information-sharing about cycling and a desire to make the initiative work might be in place. Evidence of this can be found within the literature on behaviour within real world online communities; for example – as previously mentioned - Hall and Graham (2004) found evidence of "good citizenship" and reciprocity within the Yahoo group *CipherChallenge*.

This section has so far discussed expressions of pro-social behaviour in the form of contributions to the website, as well as participants' motives for making these contributions. Most of the discussion so far has, therefore, related to the more active contributors. However, nearly one third of the participants wrote only one or two messages, and it is also of interest to understand why they did not contribute more.

10.5.2 Reasons for *not* contributing

An emerging online community such as Cycology requires a regular flow of contributions in order to survive and cannot function if members are interested only in reading others' postings - referred to in online circles as "lurking" (see Kozinets' definition of an online community as a "*group of people who share social interaction*" (2010, p.10)). Indeed, many online services built on user-generated content, such as www.tripadviser.com or the movie reviews website studied by Ling et al. (2005) require a critical mass of user reviews in order to be able to operate, and these authors have applied much thought to how people might be encouraged to contribute more. Studies of online communities have shown that it is common for a small group of active members to contribute a disproportionately large share of the messages (e.g. Ling et al., 2005; Zhang and Watts, 2008). For example, in the online travel (backpacker) discussion forum studied by Zhang and Watts (2008), the most active 2% of members posted 25% of all the messages. Adar and Huberman (2000) found that on the peer-to-peer music sharing service,

Gnutella, 10% of users provided 87% of the music. This phenomenon was also found in Cycology – albeit to a lesser degree - where the most active 5 participants (22%) wrote 55% of the posts. If posting routes, comments and questions was essential to the project, and represents a pro-social behaviour, as we have argued, which was both egoistically as well as altruistically motivated, why did the quieter members behave in a manner which was ‘less pro-social’?

The most common reason cited by those writing low numbers of posts (two or less) were: lack of relevant knowledge (relating to lack of, or limited experience of cycling to work, or only ever cycling the same route); lack of time; and lack of interest. This is summarised in Table 10-1. As will be discussed in the section on typologies, there was not always a direct link between enthusiasm for the project or cycling knowledge (expressed in interviews and questionnaires) and level of engagement with the project (reading and writing posts). Among the seven participants who wrote two posts or fewer, two were unenthusiastic about the project mainly because they rarely or never cycled to work, which meant that they believed they had little knowledge to share:

“I was happy to post information. But, as my cycling is limited to getting to UWE, I didn’t know what else to post after I presented the route I take”.(Andy)

Another of the low contributors was, however, a frequent and long-standing commuter cyclist who felt that he had little to learn from or offer the project because he was cycling the same way every day from an area where none of the other participants lived:

“I did not really think I could post anything of any great interest to start a thread, but I did add to an existing thread a couple of times. If I’d had anything relevant to say I would have posted more often”.(Jim)

This serves as a timely reminder of the obvious point that pro-social behaviour in an online community is unlikely to be stimulated if there is perceived to be no direct relevance to the interests of the user, with regard to either seeking or offering information.

Three more of the seven low contributors were enthusiastic about the project but felt they had limited knowledge to offer. Asked how she felt about posting, one of this three said: “*bit scared as didn’t wanna seem an idiot*”, demonstrating self-presentation concerns. Several of the low contributors reported later that they had been reluctant to post because they believed that all the other participants were more knowledgeable about cycling than they were (although this was not in fact the case).

Finally, one of the seven was both enthusiastic and experienced but said he had had little time to contribute during the project period, due to work pressures. As evidence of his interest in the Cycology concept, this participant reported that he had later recommended the cycling pages of the main bristolstreets website widely in his company, after several hundred new employees began work at his offices over the summer following a company merger.

Table 10-1: Stated reasons for low level of posts (seven lowest contributors)

	little knowledge of routes	little enthusiasm for Cycology	not enough time to contribute
<i>Jess</i>	*		*
<i>Sarah</i>	*		
<i>Andy</i>	*	*	
<i>Phil</i>			*
<i>Helen</i>	*	*	
<i>Jim</i>		*	
<i>Esther</i>	*		*

These three types of constraint were not limited to those who posted the fewest times. In particular, many people (including some of those who contributed the most) said that they did not have the time to log in and post on the website as much as they intended. As most participants used the website whilst at work, time constraints were usually attributed to work pressure, although some participants also went away for short periods of the project. In addition, some found certain technical aspects of using the site, such as the log-in procedure to be time-consuming and a disincentive to writing posts .

Two of the more frequent contributors were actually rather unenthusiastic about the project, but had taken an active part due to a sense of obligation, suggesting that they were exhibiting aspects of a “pro-social personality”, which is associated with high levels of personal responsibility (Bierhoff, 2002). This meant that they acted pro-socially despite facing the same constraints which inhibited others from contributing.

This section has demonstrated how the majority of participants acted pro-socially in the Cycology project, and did so at one or more of three levels (helping other participants, helping the researcher, and helping to encourage a modal choice construed as pro-social). An analysis was also conducted of the reasons why one third of the participants contributed little (perceiving themselves to have little knowledge, little enthusiasm for the project, or insufficient time).

This part of the chapter has elaborated on five interlocking social-psychological factors which help to explain the psychological and behavioural effects of both informal and formal information, shared through word-of-mouth within the case-study information system. Before concluding this chapter, we now briefly consider some of the ‘non-social’ factors influencing the use and effects of the website information, which provide an important context for the social-psychological mechanisms previously discussed.

10.6 The role of other (‘non-social’) factors

10.6.1 Instrumental factors

In Section 5.4.4 (role of instrumental factors in Phase 1 data) it was noted that instrumental factors, such as availability of alternative transport services, have a major influence on the context of information-use, including whether or not travel information is sought or used in the first place. This was also illustrated in the case-study, where – unsurprisingly - the practical usefulness of information was seen as essential to the project (indeed, this was understood to be its main purpose). Within Cycology, ‘usefulness’ generally referred to geographical relevance: geographical information had to be relevant to the places people were going in order to be of practical use. Most often, people were interested in alternative routes between their homes and place of work. As one person summed up, the website was “*Very useful if you happen to cycle those areas, less so if you live/work elsewhere or don’t yet cycle that far*” (Helen).

Although some participants read comments regardless of their geographical relevance, sometimes because they were “fun” or interesting to read despite relating to an area through which they did not usually cycle, the majority referred in their questionnaires to a preference for reading posts that were geographically relevant to them, and therefore useful. Most of this group tried out a new route provided by another participant, although one person, for whom no relevant new routes were posted, said that the website had given her the confidence to work out new routes for herself due to the usability of the map itself and the general sense of encouragement she obtained from belonging to the group. Interestingly, in this case, social as well as instrumental factors had contributed to practical benefit. Conversely, five participants said in their questionnaires that the project was not useful to them because no alternative routes (i.e. previously unknown to them) for their commute were suggested. One of this group stressed that without information of practical use, the project had no influence on what he did:

“Umm, I mean, I’ve been cycling, doing that commute for quite a long time, and I guess I’m fairly settled in my habits as to what I do, and I didn’t see anything that would influence what I did. There were some interesting comments, but there was nothing I took away as

being directly usable, or especially useful for me".(Doug)

Here, a direct link was being made between the instrumental role of the information and influence on behaviour in terms of route choice, suggesting that the social mechanisms involved in information-exchange (discussed in this chapter) may have been more effective in influencing attitudes and general motivations for cycling rather than having a direct impact on route choice. This quotation also suggests a link between length of cycling experience, habitual behaviour, and lack of interest in, or susceptibility to the more social aspects of the website. Unsurprisingly, those who found the project to be of little practical use were, in the main, those who had been cycling for a long time, and tended always to use the same route to work because there was little alternative, or because none had been suggested. However, most of these participants said that they would have found it especially helpful when they had just started cycling, or were new to Bristol or their place of work, or when they wanted to cycle to another new place.

Similarly, another participant, when asked if she personally had gained anything useful from the interaction on the site, said:

"No, but then it depends on "do you need it or not?". And I didn't feel, apart from, as I say, when I asked the question "is this road still shut?", "yes, it is" - that was very helpful. If you have a specific need. Because again, I have my route, I'm happy on it. And some people are looking for example, for bike buddies, and it would be very useful for that sort of thing. If you tend to be not interested in that, and you don't feel you need it, you wouldn't use the site in that way".(Elaine)

Those who were primarily interested in the instrumental purpose of the site said they did not, personally, value it as a social forum. As one person commented, "*I'd use it as an information source, rather than a social interaction site*". This participant (Mike) did indeed only contribute to interactions about his route to work, although he employed a personal and friendly style on the website (rather than an impersonal, pragmatic one), suggesting that friendly social interaction was not an end in itself but a means of achieving the main purpose – the practical business of sharing instrumental information.

Although this section has emphasised the importance of the *direct* instrumental role of the Cycology information, and focussed on the views of the sub-group of participants who saw it chiefly in these terms, many participants expressed the view that social types of information (for example, shared experiences and emotions) could also be 'useful' in a different way. As the preceding sections have shown, social information was thought to play a significant role in building up a sense of community and mutual support, which could, in turn, encourage people to

cycle more, as well as simply making the site more enjoyable and fun to use. In this sense, social interactions could be seen as playing an *indirectly* instrumental role in encouraging general cycling behaviour via the reinforcement of pro-cycling attitudes and intentions. Again, it was thought that information-sharing, as in Cycology, could be particularly useful, *in both senses*, for those who were new to cycling or to a particular workplace.

Another participant highlighted a temporal dimension to the instrumental and social roles of the website. He remarked that he had first seen the website as a source of (route) information, but as time went on and everyone had posted their routes, the community dimension became stronger.

“At the start it was for the information aspect, the informative aspect, but towards the end it became for the community aspect”.(Adam)

This perception is supported by the changes in the content of website postings presented in Figure 8-5, which showed that route information peaked in the first week, whereas other types of comment remained more steady over time.

Having discussed instrumental factors in the sense of the practical usefulness of the Cycology information, we now give brief consideration to the inevitable impact of broader instrumental factors in the ‘outside world’ on people’s willingness to change their behaviour in response to new information. This was the sense in which instrumental factors were considered in Section 5.4.4. It would seem obvious that word-of-mouth information about cycling, even if more persuasive than information from official sources, will not *on its own* be sufficient to start people cycling or cause them to cycle more if they face practical constraints. Because all but one of the case-study participants were already cycling to work at least occasionally, few examples of such personal constraints were provided in the interviews. However the participant who was not yet cycling to work cited an instrumental reason - lack of sufficient fitness - as her main justification for not cycling (even though she had felt encouraged, to a degree, by her involvement in Cycology, and had learned of a suitable route). The participant who cycled to work the least frequently cited lack of bicycle lights and lack of cycling skill as her main reasons for not cycling more (at least in winter), although she also described a psychological barrier relating to the fact that she had once witnessed a serious accident involving a cyclist.

10.6.2 Individual factors: personality and past experience

Although detailed consideration has been given the role of *social* factors in information-use within this thesis, it is important, as suggested in the previous section, to remember that this is

only one part of a complex picture of information behaviour, in which *individual* factors such as personality and past experience remain a major element. In this section we outline a number of such individual factors affecting the giving, reading and using of information on the Cycology website.

Firstly, information behaviour within the case-study was always individual in that people were looking at and writing the messages privately (often at work), and processing the information cognitively; the physical use of the Cycology website was not a 'group activity' in this sense. Personality factors affected how people regarded the website - for example, whether they enjoyed the social interaction - and how open they were prepared to be about themselves (self-disclosure). As previously noted, two participants described themselves as "unsociable", explaining that they did not tend generally contribute to online forums unless there was a specific information need, or to answer a direct question .

"I'm not very sociable anyway, as you know, so I tend to sort of lurk on these sites. I get the information I need, and think "that's a good idea, I'll bear that in mind". Or, "that's a good lock" or whatever I'm worried about at the time. And act accordingly, you know".(Jim)

A further personality-related factor affecting individuals' activity on the website was degree of concern with self-presentation (Leary, 1995); expressed as a reluctance to demonstrate lack of knowledge (for example, Sarah was a "*bit scared (to post) as didn't wanna seem an idiot*"). By contrast, the most frequent contributor, Alice, reported feeling worried that her comments were sometimes trivial, but wrote them anyway.

The influence of past, personal experience on the validity attributed to information acquired from others has already been discussed with regard to trust (Section 10.1); for example, participants spoke of comparing the comments about routes which they knew with their own experience. If such comments coincided with their own opinions, other comments about unfamiliar routes would also be seen as reliable. In some cases, evidence of disagreement based on personal experience also appeared on the website.

For some individuals, their level of cycling experience affected the degree to which they contributed to the website. Notably, some who considered themselves less experienced reported that they had written few posts because they felt they had little knowledge to offer. However, this was not a consistent finding. The most frequent contributor (Alice) had started cycling to work only during the previous six months, and described herself as having little cycling experience. Conversely, some participants who had been cycling for many years (e.g. Jim) contributed little.

The latter finding suggests that more experienced cyclists were less engaged with the website because they had a lesser need for information, but this was not necessarily the case, as most expressed themselves as being receptive to new ideas such as alternative routes. For example, Rachel remarked that she had expected to participate in the project mainly as an information-provider, but had learned more from it than anticipated. A more detailed picture of individual factors which affected the use of the website by four participants (Elaine, Andy, Laura and Phil), each representing a ‘user type’, will be presented in 11.4.2.

10.7 Reflections on the Phase 2 methodology

The Phase 1 research had revealed some of the limitations (as well as the strengths) of the interview method in exploring word-of-mouth information-use, and for this reason it was decided that data from observation of *actual* behaviour should supplement *reported* beliefs, attitudes and behaviour in Phase 2. The Cycology study was illuminating in what it revealed about the difference in interpretation which may arise from different data sources. In some cases, participants’ own accounts - through questionnaires and interviews - of their engagement with the website provided a different view from that which had been obtained through observation of their actual activity on the website (i.e. logging in, opening markers and writing posts). The most notable example of discrepancy concerned participants who logged onto the website infrequently and wrote very few posts (e.g. Phil, Jess and Esther), creating an impression of disengagement, but who expressed high levels of enthusiasm for the project during interview. Some of the reasons for this discrepancy were discussed in 10.5.2. Conversely, other individuals (e.g. Elaine and John) were more negative than their actual activity on the website had suggested. Thus, the two data sources together allowed a more comprehensive analysis than either would have done on its own.

An ‘artificial’ research environment

A further methodological strength lay in the innovative nature of the case-study. Not only was the Cycology platform technologically innovative, but also exemplified the relatively new methodological area of creating ‘online spaces’ in order to study particular facets of social life (Section 2.5 of the literature review). This latter point, does, however, give rise to questions about the effects which the nature of the project – i.e. an online environment set up specifically for the research, as opposed to a ‘naturally occurring’ online community – may have had on the findings. To what extent, for example, was participants’ behaviour affected by the artificial nature of the research environment and the fact that they had volunteered to take part? Whilst it was clear from the interviews that this did inevitably influence behaviour (e.g. some people were behaving pro-socially because they wished to assist the research), most participants expressed

the view that they would have behaved in a broadly similar fashion if this had been a ‘real-world’ website, albeit their participation might have been reduced in the absence of a sense of commitment to a time-limited project. Clearly this remains untested, but participants’ statements in this respect are moderately convincing since many were enthusiastic about the principle of information-sharing about cycling, and saw practical benefits for both themselves and the cycling community, regardless of whether this was occurring in a ‘natural’ or ‘artificial’ setting.

A related matter for reflection is the degree to which the introductory briefings for participants, held just prior to the start of the project, might have stimulated the sense of community which arose so clearly in the findings. Might these face-to-face meetings among some of the participants have interfered with, either positively or negatively, the process of group identification? It is possible that this occurred for some; for example, two people who met at one of the briefings exchanged contact details and later became friends. However, this development did not appear to affect directly their use of the website, as they did not interact with one another there; in fact, one did not realise who the other was (she used a pseudonym). Interestingly, one person obtained the impression from the briefing he attended that the other participants were all deeply committed cyclists (unlike him), and reported in the interview that this had given him a negative attitude to the project from the outset. However, this was the only case where a direct effect from the briefings arose in the data. Ultimately, the effects should not be exaggerated because the briefings were attended by small numbers - one was attended by seven participants and the other by six. Moreover, there was no direct association between, on the one hand, attendance or non-attendance at a briefing, and on the other, level of contribution to the website or degree of stated enthusiasm for it. However, the potential for prior face-to-face meetings to bias the findings is a matter which deserves consideration if similar case-studies were to be undertaken.

Reflections on epistemology

It is also apposite to return briefly to the epistemological issues which were discussed in Section 3.2.2 and consider the effects of the research process on the nature of the data. A reflexive approach requires an appreciation that the data were generated (and not collected) in a dynamic process through participants’ interaction with the website, their interactions with one another, and those between participants and the researcher. Although the descriptive analysis reported in Chapter 8 emerged from a largely literal reading of numerical data, most Phase 2 data were qualitative and subject to an interpretative reading. A double hermeneutic (Smith and Osborn, 2008) was created though the interpretations of both participants and researcher. However, the findings were not construed as merely a product of the research process, nor a social construction in the postmodern sense, but were closely connected to people’s activity

outside the research (i. e. cycling to work in real life); ontologically, the existence of an external reality to which the findings directly relate, is espoused.

Limitations in the data

At a more practical level, an assessment was made of whether the case-study had generated sufficient quality and quantity of data to answer the research questions, and also whether enough interaction had occurred on the Cycology website, and was of sufficient use to participants, to be regarded by them as a successful pilot initiative. Overall, the number of posts and log-ins to the website provided enough data to conduct a detailed analysis and, with the important addition of the interviews and questionnaires, allowed answers to be found to the research questions. However, with the benefit of hindsight, a larger number of participants would have extended the breadth of information exchange and possibly led to greater number of interactions on the website (although restricting Cycology to a group of under 25 allowed the researcher to gain deeper knowledge of each individual than would have been possible with a larger group, and contributed to a degree of familiarity within the group).

Sixty people originally volunteered for the project, of whom 30 were selected in accordance with the criteria described in Section 7.6, with the expectation that 25 would actually participate. Attrition was slightly higher than anticipated as a number of volunteers withdrew for a mixture of personal and work-related reasons. A further reason, which was unexpected and only discovered at the end of the project, was a technical one: the computer system at one of the organisations from which participants were recruited did not support the website effectively. With hindsight, a greater number of the original volunteers should have been invited to participate, to allow for unexpected attrition. Moreover, the target number of final participants should, ideally have been higher than 25, but perhaps no greater than 35, in order to maintain sound project management and to allow the majority of participants to be interviewed. The ‘ideal’ group size for a ‘naturally occurring’ community of online users (without the additional management and data-collection/management requirements of the PhD) is a matter of debate which will be discussed in Section 11.4.

The quantity of data obtained from the website itself might also have been greater had the case-study run for longer than 6 weeks (perhaps 8-10 weeks). This would have needed to have been decided at the outset when participants were provided with documentation clarifying their expected involvement. Extending the project whilst it was underway would have required the agreement of all participants, and was, moreover, considered impractical for Cycology because the main summer holiday period was about to begin.

Finally, it was noted in Section 8.1 that it was not possible to gain a complete understanding of which of the website postings had been read by whom, and when, because the daily email digest made it possible to read the messages without logging on to the website. Only when participants were logged in was it possible for the system to record which of the website markers were opened by whom. The email digest was intended to serve as a daily reminder of the website's existence (at which it was reportedly very successful), but it was not anticipated that participants might stop after reading the digest and not follow the links to the website itself. For this analysis the researcher had to judge the veracity of participants' self-reports (in interview) regarding their reading of the email digest, and such reports could provide, at best, only a broad picture. This was not considered to be serious gap, as quantitative data were chiefly contextual and formed only a minor part of the overall data set, but the observation of reading behaviour would have been more complete if the gap had been filled. If a similar case-study were to be designed, one way of collecting data on the reading of the email digest might be to request an acknowledgement of receipt each time a participant opened a new email containing the digest. Naturally, this would still not guarantee that an email had actually been read, nor would it capture data on the reading of individual messages within the digest. Another option might be to dispense with the digest altogether, but this would entail the loss of a deliberate similarity with an internet discussion forum. Without an email reminder, participants might forget to check the website at all, with serious consequences for the case-study overall, although a compromise might be to include only part of each message in the email, necessitating a visit to the website to read a complete post.

In conclusion, this was a voluntary project which requested a longer time commitment and greater engagement from participants than that required by many research projects - and no 'hard' incentives such as cash were offered - yet 21 of the 23 agreed to be interviewed afterwards and all offered constructive feedback on Cycology's strengths, weaknesses and potential for future development, suggesting a degree of success both as a means of data collection and a real-world information system.

10.8 Chapter Summary

This chapter examined the role of social-psychological factors in five areas which were prominent within the analysis: trust, group identification, group size, social judgement and pro-social behaviour. Two groups of ‘non-social’ factors were also outlined to provide additional context: instrumental and individual factors.

Firstly, in the section on trust, it was explained that all participants believed the information posted on the site to be reliable and trustworthy. This took the forms of both calculus-based trust and relational trust, although the former was more important. Calculus-based trust arose from the intrinsic quality of the information and through a comparison with participants’ own experience. Relational trust took the form of assumptions about both the good intentions of the group as a whole, and perceived attributes of individuals. Secondly, several different senses of ‘community’ (group identification) emerged from participants’ accounts of the Cycology project: a community of cyclists generally; a community of cyclists within the project; a community of people within the same or neighbouring places of work; the project was also described by some as a ‘virtual community’. Group identification was enhanced by the way in which certain posts on the website conveyed a feeling of solidarity and empathy, and this was thought by some to increase the resonance (impact) of the information. Group identification and related trust mechanisms were found to have enhanced processes of referent social influence.

Thirdly, the effects of the limited size and composition of the Cycology group were examined. Limiting the group size and composition had ‘social advantages’ (for example, greater trust in the information and community-building amongst group members, associated with familiarity with other users), but ‘instrumental disadvantages’ (membership not always large or diverse enough to provide a sufficient pool of knowledge or basis for interaction). The fourth section explored social judgements made with the group. Judgements tended to be based on attributes of the group as a whole, but where judgements were made about individuals, they tended to be based on stereotypes and reflect comparisons with people in ‘the real world’ rather than actual judgements of people using the website (‘top-down processing’).

The fifth area explored was pro-social behaviour. Three levels of helping were identified: helping others in the project (by contributing to the website); helping the researcher; and behaving pro-socially towards society in general by using an environmentally friendly transport mode. Reciprocal altruism (‘give and take’) was identified as the main reason for pro-social behaviour, as participants were found to have obtained ‘soft rewards’ for helping others (e.g. enhanced reputation and personal satisfaction), as well as ‘hard rewards’ in the form of useful, practical

information. Three main reasons were provided by those who contributed little: sparse knowledge; lack of enthusiasm for the website generally; and lack of time to contribute.

Finally, a number of points were made about the role of instrumental and individual factors affecting word-of-mouth information-use. Within Cycology, ‘usefulness’ generally referred to geographical relevance: geographical information had to be relevant to the places people where were going in order to be of practical use (*direct* instrumental role of the information), but many participants expressed the view that social types of information (for example, shared experiences and emotions) could also be ‘useful’ in a different way. Social information played an *indirectly* instrumental role in encouraging general cycling behaviour via the reinforcement of pro-cycling attitudes and intentions. It was thought that information-sharing as in Cycology could be particularly useful, *in both senses*, for those who were new to cycling or to a particular workplace. With regard to individual factors, both personality-related factors (e.g. concern with self-presentation or degree of ‘sociability’) and past experience in cycling were found to affect information behaviour.

This chapter completes the discussion of findings in response to research question 4. The next chapter will now turn to research question 5.

Chapter 11 : Implications for the wider field of advanced traveller information

In this chapter the final research question of the thesis will be addressed:

5. How might information-sharing amongst travellers be applicable to advanced traveller information systems more generally?

The following sub-questions were defined:

- 5.1 Could advanced traveller information systems which currently offer mainly ‘formal’ types of information benefit from the integration of ‘social design features’ (types of user-generated content incorporated into Web 2.0 systems), and if so what specific form could these take?
- 5.2 To which modes of transport (beyond cycling) might information-sharing be most applicable?
- 5.3 What features of a ‘user community’ might be conducive to word-of-mouth information-sharing (e.g. group size, composition, types of user).

The aim of the chapter is thus to provide additional discussion and draw broader conclusions about the applicability of the findings from the exploratory research (Phase 1) and the case-study (Phase 2) to the area of advanced traveller information. Answers to research questions 5.1 and 5.2, discussed in Sections 11.2 and 11.3 respectively, draw principally on a thematic analysis of the interviews with Cycology participants, during which the strengths, weaknesses and potential future development of an information system of this type were discussed. In addition to the thematic analysis of interview and questionnaire data, research question 5.3 is also addressed (in Section 11.4) with the assistance of the numerical analysis of website usage reported in 8.3 and a non cross-sectional analysis of the different data sources (website observation, interviews and questionnaires) relating to four individual participants, each representing a “user type”. The technique of non cross-sectional qualitative analysis was described in Section 7.9.2. As well as drawing on participant responses and researcher interpretation, this chapter also incorporates a system developer’s perspective obtained through a post-project interview with Toby Lewis, the developer of www.bristolstreets.uk and the Cycology layer of the website. The findings in this area thus represent a series of reflections on *potential* implications of the empirical findings for advanced traveller information systems, highlighting where further research or validation could bring further insights. Firstly, however,

consideration is given to the principles of generalising from case-study research and the extent to which broader claims can or cannot be made on the basis of the research carried out within the Cycology study.

11.1 Generalising from the case-study

In the previous chapter, findings were reported from the study of informal information-sharing amongst users of an innovative information system – a single case, in a specific location, concerning a specific mode of transport. Before turning to the implications of the findings for advanced traveller information systems more generally, consideration must now be given to the principles of how far is it valid to generalise beyond the specific case, by returning briefly to the methods literature. The problem of external validity has been a common critique of case-study research, although some proponents challenge the very assumption that knowledge must be generalisable in order to have value. As Flyvbjerg (2006) argues: "*That knowledge cannot be formally generalised does not mean that it cannot enter into the collective process of knowledge accumulation in a given field or in a society.*" (p.227). Forms of generalisation appropriate to the research in this thesis were introduced in Chapter 4.4, but in this section we consider those which specifically concern case-study research.

Notwithstanding Flyvbjerg's position that "*often it is not desirable to summarise and generalise case studies*" (2006, p.241), a degree of generalisability has been sought in this thesis in the form of both an elaborated theory of information behaviour, and specific findings from the use of the Cycology website which might be translated to other advanced traveller information system contexts. Theoretical generalisation is typical of case-study research (Yin, 2009, Robson, 1993). In this case, it was sought by generalising this particular set of findings to broader theory by comparing the empirical results with, principally, the assumptions of, and findings related to social-psychological theories of behaviour, as well as findings from the literature on (travel) information-use, and behaviour within online communities. The translation of specific findings from the Cycology study to other traveller information system contexts constitutes a form of inferential generalisation (Ritchie and Lewis, 2003), and this was sought through comparisons with the literature, supplemented by comparison with contemporary, real-world developments in social media and transport.

In the domain of theory, case studies can be useful not only for testing existing theories in the literature, but also for building new ones by testing new propositions or hypotheses (Flyvbjerg, 2006). In this thesis, existing models of information-use were elaborated upon, at the end of Phase 1, through the addition of the social factors found to be active when travel information, both formal and informal, is communicated through word-of-mouth. In Phase 2, these additions

to existing theory were both further elaborated, and validated within a specific information system context. Thus, one of the outputs of the research was a new model elucidating the role of word-of-mouth information within travel behaviour (presented in 11.5). However, the theory must be tested in other similar contexts and the same results replicated, if the theory is to gain strong support. Yin (2009) refers to this as the “logic of replication”, arguing that *“the theory (...) that led to a case-study in the first place is the same theory that will help identify the other cases to which the results are generalisable.”* (p.43). Thus, the model of word-of-mouth influences on travel behaviour would now require testing in other contexts where travel information is communicated within social networks (either through electronic or face-to-face word-of-mouth) – but this must remain outside the scope of this thesis.

Whilst the behavioural model may be applicable in a broad range of contexts (although this will require testing), the key aim of Research Question 5 was to seek generalisation in the specific application area of advanced traveller information. It will be recalled that in Chapter 7 the Cycology website (or ‘information system’) was identified as the main unit of analysis of the case-study, in order that generalisations might be made to other information systems (Yin, 2009). Cycology was categorised as an *extreme* or *unique* case (in relation to traveller information), as no other system of precisely this nature had been identified. The logic of generalisation from a unique case is that it can be used as an exemplar with which to compare other cases as they arise (Yin, 2009, Flyvbjerg, 2006). In the intervening period since the Cycology case-study was designed, technological developments in the field of social media have continued apace, which means that at the time of writing, more applications have indeed arisen in the field of traveller information (incorporating user-generated content) which could be directly compared with Cycology. Whilst this means that the recommendations made in this chapter may now appear less innovative, the evidence that similar developments are now actually occurring adds legitimacy to the findings and might be interpreted as a form of validation for some of the practical suggestions which emerged from the research.

11.2 Desirable ‘social design features’

Today’s traveller information systems are extremely diverse, offering journey-planning, real-time travel information and navigational advice through a range of technological media. As the suggestions proposed in this section cannot address all types of system, the category to be considered here is web-based journey-planning and real-time information systems, accessible via computer, mobile phone and other portable devices, as this is a technological medium which offers considerable scope for social interaction amongst users, as well as being most directly comparable with the Cycology website. This section seeks to answer research question 5.1:

5.1 Could advanced traveller information systems which currently offer mainly ‘formal’ types of information benefit from the integration of ‘social design features’ (types of user-generated content incorporated into Web 2.0 systems), and if so what specific form could these take?

Transport has not been immune from the recent explosion in digital word-of-mouth, but – as discussed previously in this thesis - there has so far been little convergence between the sharing of informal information based on the personal experiences of transport users, and formal travel information delivered by transport operators and/or government agencies through advanced traveller information systems. However, the current research has shown that both forms of information are considered highly complementary, and can, together be influential in the travel decision process. This section considers some of the ‘social design features’ incorporated into the Cycology website which were viewed positively by participants, as well as their suggestions for improvement. In considering these matters, the research incorporated a degree of ‘prototype testing’ by users of an innovative information system. Of particular interest were the suggestions for incorporating elements of user-generated information into automated route planning systems. Inevitably, such proposals represent what was considered by (non-technical) users to be desirable, and not a discussion of what might be technically feasible, for which further research would be required. Most of the recommendations in this area, therefore, led on directly from participant responses during interviews, although in some cases researcher interpretation formed part of the process of developing recommendations from participant responses. In addition, a system developer’s perspective was obtained from Toby Lewis, who was first asked for his feedback on the functioning of the Cycology website prior to his being informed of participants’ opinions.

11.2.1 User recommendations

Many of the perceived benefits of the user-generated content on the Cycology website have already been discussed in the previous chapter, as they were particularly closely associated with the reliability which participants attributed to the information. Such benefits were often identified by comparing and contrasting them with ‘formal’ types and sources of information, such as paper maps and online maps and route planners (such as Google maps), and often referred to social aspects of the site. Benefits included the extra level of detail provided by ‘real users’, the ability of users to keep information up-to-date, and the email digest which helped to keep it fresh in peoples’ minds and enhance the interactive dimension.

Another aspect which was appreciated was that posts were kept short and to the point, without the ‘rambling’ and sometimes negative nature of some of the postings which appear on cycling forums or email groups (described by some participants as “ranting”). It is conjectured that this could have resulted, at least in part, from the small size of the comments boxes on the website. Although there was no limit to the amount of the text which could have been added, the small boxes could have provided a cue to keep posts short. The ability to upload a thumbnail portrait or icon which would automatically accompany an individual’s posts (as with social network sites) was also considered by participants to be a positive feature which was thought to ‘personalise’ the site, although only a third of participants actually used this facility.

Participants identified the main disadvantages of the Cycology site compared with formal travel information sources (such as automated route planners and static maps) as the time required to obtain answers to route questions, and the limited geographical coverage, which meant that some questions could not be answered at all. The ‘instant routes’ provided by route planning systems and their wide geographical remit meant that they were considered more attractive than a site such as Cycology when routes were being sought at short notice or outside the immediate locality. It was noted, however, that few participants knew of the existence of journey planners specific to cycling, and none of those who did could recall the actual name of services such as www.cyclestreets.net, or Transport Direct’s cycle route planner.

A number of technical improvements to the Cycology website were suggested in the interviews. Many thought a desirable feature was the ability to post photographs to illustrate the route comments. In fact, this facility was available in principle, but suffered from technical problems during the project period. Interestingly, only the two most enthusiastic and frequent participants attempted to upload photographs to the site (and were unable to do so), which could suggest that only a minority of very active users might take the time to upload photographs if a system such as Cycology were to be developed further, due to the extra time required above and beyond writing comments, as well as the additional inconvenience of stopping to take a photograph during a cycle ride. However, this may be an area where norms might develop once an idea has gained currency; for example, at the time of writing, over 25,000 photographs had been uploaded by users around the UK to www.cyclestreets.net.

The popularity of the thumbnail portrait feature (in participant accounts if not actually in practice on the site) has already been noted, but one participant went further by suggesting the addition of tick boxes through which users might provide a little extra information about themselves (similar to the brief personal profile information which one may provide on social networking sites). A specific example would be the option to self-categorise oneself according to degree of cycling experience. This might help information-seekers to assess how far they might expect to

experience aspects of a route in a similar way to particular information-providers. As suggested in Section 10.1.2 on relational trust, an experienced cyclist might be more likely to heed warnings of heavy traffic and steep inclines as expressed by another experienced cyclist, than if such concerns were voiced by a novice cyclist. The information would be more likely to be considered subjectively valid if it emanated from a person thought to be similar. Within Cycology, a sense that other participants had a similar level of ‘cycling competence’ might also have encouraged some of the less confident cyclists to contribute to the website more. In fact, there were several people who considered themselves to be beginners, or not confident cyclists, or believed that they lacked the knowledge to contribute actively. If they believed themselves to be outside the norm within the group, they were likely to feel somewhat excluded, showing how important it was for people to feel some sense of similarity and group identification with others in order to engage. As discussed in detail in Section 10.2, this finding was illuminated by self-categorisation theory (Turner et al., 1987). Interestingly, many people thought that everyone else was more experienced at, or more serious in their approach to, cycling than they were. It is conjectured that a ‘self-rating’ feature (through which most participants may well have self-categorised themselves as ‘non-serious’ cyclists in some way) might have helped to dispel this belief and encouraged the quieter participants to contribute more.

A further participant suggestion for helping users to assess the validity of the information was the incorporation of a user rating system, such as the invitation to agree or disagree with the statement “*I found this review helpful*” (or “*I like/dislike this route*”), commonly found on websites offering user-generated reviews. As discussed in Chapter 2.5 and Chapter 8 of this thesis, research (e.g. Cheung et al., 2009) has found user ratings of consumer recommendations to increase the perceived credibility of online recommendations through a process of normative influence. This should perhaps be balanced against the risk that some people might be inhibited by the prospect of their posts or routes being ‘rated’, especially in a small group. A rating system might be more helpful on an open website, where posts are likely to be more anonymous.

A suggestion raised by a number of participants was linking the map to a more ‘standard’ type of discussion forum rather than relying on ‘floating comments’ to discuss matters not linked to a particular location (i.e. comments boxes which hovered over the map). It was thought that a forum environment might be conducive to higher degrees of interaction on more general topics. This slightly contradicts the view that the succinctness of the comments, possibly related to the small comments boxes, was a positive feature of the website. Only through the testing of different formats could it be gauged whether the length of posts was a feature of the website format or simply the style of those particular users. The juxtaposition of maps and discussion forums/email groups is already a feature of some local cycling campaign websites such as

www.camencyclists.org.uk and www.camcycle.org. At the time of writing, Camden Cycling Campaign's online forum included an area specifically for route requests, but only three messages had been posted. The community-based cycle route website www.cyclopath.org in Minnesota, USA, had elicited 109 route-related comments in 28 threads in its linked discussion forum between its introduction in April 2010 and February 2011. An advantage of a forum structure over the Cycology website is that discussion topics can be found quickly, whilst on Cycology it was necessary to scroll through floating comments chronologically, which may have become awkward had the project continued for longer.

There were a number of suggestions as to how information on Cycology might be targeted to a user's geographical area of interest. One such suggestion was that a user might elect to receive within their email digest only those comments within particular postcode areas. This might be a useful feature should a system attract a higher level of usage than was the case during the project. It was also suggested that some messages, filtered by geographical area and/or topic, might be sent out instantly to mobile phones, in a similar way to the short messages ('tweets') shared within *Twitter* groups. In this way it would be possible to warn other cyclists immediately of current obstacles or hazards (such as the warning on Cycology of broken glass on a roundabout) along their regular cycle routes. These might be analogous to the 'official' travel alerts currently delivered by many traveller information systems (such as Transport Direct and Transport for London's online travel information) or indeed 'tweets' sent by transport operators about occurrences in the transport network. Another way of obtaining the most geographically relevant information would be the capability to search for user routes between one postcode area and another; once again, this might prove useful if the system were to attract so much route information that a filtering system would be required to prevent the map from appearing overcrowded. The filtering information by geographical area is possible on the Minnesota cycle route website www.cyclopath.org, where users may specify 'watched regions' and elect to receive email notification when changes are made to the map in those areas.

It was clear that the Cycology website fulfilled a role different from that of an online journey planner, with the latter providing instant and comprehensive information but lacking the personal dimension which made the user-generated routes appear to be more trustworthy. Rather than preferring one type of online information over the other, most participants felt that the two were complementary, and in an 'ideal world', both might be combined. It was suggested that, if technically feasible, a route might be generated instantly by a journey planning facility, but user comments referring to sections of the route could also be retrieved by the system and appear as comments boxes on the map. There was a general view that it would be useful to be able to comment on the routes generated by an automated planner, and to ask other cyclists what they

thought of them. One template for incorporating user comments onto computer generated routes has been developed for www.cyclopath.org, where sections of the route can be selected to reveal 'notes' added by users.

In general, user feedback is incorporated into route planners through dialogue between individual users and website/system managers; for example feedback is actively encouraged by www.cyclestreets.net. This allows route information to be updated and routes generated by the system to be optimised, but through a process which is not visible to other users, suggesting that the 'social advantages' arising from a sense of identification with other users (such as greater perceived reliability) are not incorporated. Interestingly, at the time of writing, funding is being sought by the developers of CycleStreets to add a feature allowing cyclists to plot their own cycle routes and contribute route comments (c.f. <http://www.cyclestreets.net/routes/>, accessed 12/12/10).

To a certain degree this type of convergence is already occurring on the Camden Cycling Campaign's online map, where routes contributed by users can actually be compared with routes generated by www.cyclestreets.net on the same map. At the time of writing, however, user comments on the Camden map do not, in general, provide the level of detail or the type of personal interaction which emerged through the Cycology contributions. This may, in part, be a function of the greater size of the Camden user base, the greater number of routes on the map, and the open (publically accessible) nature of the website. It might also result from the fact that the Camden website includes a discussion forum where interactions can take place (although, as previously noted, little discussion of routes had taken place at the time of writing).

Finally in this section, a suggestion was made about how social proximity and group identification within the small group might be maintained whilst extending the geographical scope and overall user-base of the website. One way of achieving this might be to set up sub-groups of users within an organisation or locality, under the umbrella of a larger, open system. Users could choose whether their routes/comments were to be accessible to everyone, or just members of their own group. Ideally, it would be possible to contact other subgroups for information if knowledge from outside the immediate area were sought. This is analogous with the different levels of access on social network sites such as Facebook, or the way in which Liftshare operates using both an open system and restricted access groups within organisations. In addition to the advantages of such an arrangement in terms of obtaining and offering practical information, design features which allowed the formation of groups within groups might also stimulate and build upon processes of group identification, which were found in Chapter 8 to encourage referent social influence among users.

11.2.2 A system developer's perspective

Following the analysis of participant interviews, the developer of www.bristolstreets.co.uk and the Cycology layer, Toby Lewis, was interviewed in order to obtain his independent assessment of the project, ascertain whether it had stimulated any ideas for further development in the field of social media and traveller information, and discuss the recommendations arising from the research.

Lewis reported that the project had led him to consider developing the Cycology concept as a service which he could offer commercially to travel planners in larger companies and organisations in the local area. This would take the form of a map-based website where informal travel information might be shared among employees about all local transport modes. As well as its use for cycling, he believed that informal information-sharing could be particularly helpful for bus travellers and for car-sharing – a view shared with many participants, which will be discussed in the next section. Lewis outlined the idea to travel planners attending the city's Green Commuter Club in late 2009, as well as the City Council's travel information team, from whom the concept received a favourable response in principle; but it was thought that budgets were unlikely to stretch to the purchasing of such a service in the present economic climate, when many travel planning posts were disappearing. Therefore, he was dissuaded from pursuing this as a viable business option for the time being, but believed it to be an idea worth following up should economic conditions improve. He reported being interested in the apparent social benefits which ensued from the closed environment of Cycology (as opposed to the publically accessible bristolstreets website) and this had contributed to his view that it might be a marketable idea of interest to travel planners. Lewis also predicted that the next big development in online mapping would be in improved website compatibility with mobile devices (notably smart phones), with the current market for 'apps' (e.g. CycleStreets apps for iPhones and Android) providing a transitional phase.

Lewis also reported a number of design-related ideas which had emerged from the project, many of which corresponded with suggestions which had been made separately by participants. Notable among these were the use of more non-location-specific, social networking type features. For example - using Facebook terminology - people might be given the option of posting more personal profile information, and of selecting geographically (and socially) close sub-groups with whom to interact more frequently than their whole 'friend' network. Facebook might even be used as a gateway interface through which 'friends of friends' might be brought into the network. Echoing the recommendation made by participants for a linked discussion forum, he acknowledged that bubbles on the map might not necessarily be the best place to

locate discussion, and that comments and responses might perhaps be better placed to the side in the manner of a 'normal' discussion forum. Each marker on the map could, for example be linked to the forum rather than opening as a bubble. He regards it as a limiting factor of www.bristolstreets.co.uk that people are not used to websites which are not driven by the text, and may need a visual interface more simple than a map to which their eye is initially drawn (rather like the chronological list of comments on the sidebar on Cycology).

This part of the chapter has provided a number of propositions for desirable technical features, from a user perspective, which might be incorporated into an 'ideal system' for sharing online traveller information. These might be best suited to those systems where the map is a central feature, such as www.walkit.com (for walking), the Google maps route planner (mainly driving or walking), or the cycle route planners previously mentioned such as www.cyclestreets.net. Transport Direct also offers a map view of its route plans, as well as the location of incidents on the transport network. Most user recommendations corresponded with conclusions drawn independently by the Cycology developer. Ideas for further 'social design features' from both these sources are summarised in Table 11-1.

Table 11-1: Recommended 'social design features'

User recommendations	Developer ideas
Combining user comments with routes generated by automated planners.	Route planning algorithms which incorporate user feedback.
Enabling user subgroups (interacting amongst themselves) to develop within a wider system.	Enabling users to 'friend' geographically (and socially close) sub-groups.
Allowing users to filter routes/comments by geographical area.	Allowing users to filter routes/comments by geographical area.
Receiving updates (including real-time) on comments relating to specified geographical areas.	Better mobile access via smart phones (allowing, for example, users to receive relevant updates whilst en route).
Linking a discussion forum to the map.	Putting comments to the side instead of on the map, with every marker perhaps linked to a forum rather than opening as a bubble.
Allowing users to specify personal profiles.	More social networking type features (e.g. profiles).
Facilitating the use of profile pictures and the uploading of photographs to the map.	Technical features for more efficient uploading of photos (e.g. automatic file compression).
	Linking to Facebook to draw in 'friends'.

11.3 Potential relevance to other transport modes

This section addresses the following research question:

5.2 To which modes of transport (beyond cycling) might information-sharing be most applicable?

It reports on questionnaire responses and interview discussion about the potential usefulness of web-based information-sharing for transport by modes other than cycling, the types of informal information which might (or might not) be beneficial, and the extent to which users of other modes might identify with one another and be willing to cooperate. Like the previous section, the findings here relate to hypothetical scenarios, as no one had engaged in this form of online information-sharing in relation to utility travel apart from the Cycology project.

A distinction was clearly drawn between the different potential uses of such a website for different transport modes. Identified uses fell into four categories: route-finding; other items of informal, practical information and advice; community-building amongst users; and drawing issues to the attention of transport operators or local authorities. As the main focus of information-sharing on the Cycology site had been routes, the most commonly suggested alternative use was for walking, as route-planning was thought to be an important factor in cycling and walking (and car driving – although motorists were already thought to be well served by ‘conventional’ route planners, satellite navigation systems and motorists’ discussion forums). The route-finding dimension was thought to be less relevant for public transport users, whose routes are already fixed by the service provider – unless travellers have a choice between different service alternatives. User comments could, for example, complement the walking routes generated by systems such as www.walkit.com in the ways suggested for combining cycle route planning with users’ routes, which were discussed in the previous section.

Although the route-sharing element is less relevant for bus travel, other types of informal information were thought by participants to have a helpful role to play in improving the experience of local bus travel – particularly those which might reduce uncertainty. Bus travel was a potential application area which was also identified by the Cycology developer during the follow-up interview. Several participants remarked that it would be useful to obtain from other travellers the kind of detail which bus companies might be reluctant to provide – for example if particular buses were consistently either early, late or over-crowded. Hence, bus route and timetable information from the bus companies could be complemented by user comments about the experience of using the service at different times, leading to an improvement in the breadth of public transport information available. For infrequent bus users (as the majority of Cycology

participants were), online information-sharing was thought to be potentially useful for obtaining up-to-date information such as changes to routes and road-layout (for example, whether the introduction of bus lanes was speeding up particular journeys).

It was also suggested that this might be a useful means of conveying informal information about the basic norms of bus travel for those who had not used this mode of travel for some time, and were apprehensive about doing so; for example whether it was necessary to 'flag down' a bus or whether it would stop anyway - although in theory this type of information might also be provided by the bus company, or by a combination of both providers and users. For example, the Transdev Yellow bus company website includes detailed advice on using buses, including: "*please clearly put out your hand so the driver knows you wish to board*" (www.bybus.co.uk, accessed 15.2.11).

Most of the examples of 'useful informal information' referred to local bus travel rather than other public transport modes, although some also mentioned its potential use for train travel; buses may have been given the greatest consideration because the context of the Cycology project had been information-sharing about local commuting, amongst a group of people for whom travelling to work by train was rarely a convenient option (many did not live close to a local train station).

The community-building dimension of information-sharing, which had been apparent within Cycology, was also discussed in relation to other transport modes. Generally participants believed that the sense of belonging to a community within which people support and encourage one another (in-group identification, c.f. Tajfel, 1982, Turner et al., 1987) was likely to be stronger among people who cycled than amongst users of other transport modes. This was attributed by participants to a tendency for cyclists to consider themselves a beleaguered minority in a transport culture dominated by the car, and perhaps because cyclists have a stronger motivation to 'convert' others (social identity amongst cyclists was discussed in Chapter 10.2; see also Gatersleben and Haddad, 2010; Skinner and Rosen, 2007). However a number of people did suggest that a similar sense of group identification might develop amongst regular bus users, particularly those using the same buses and routes and travelling to similar destinations.

"I've heard people say the brotherhood and sisterhood of cycling, which is a bit corny, but there is that sort of a feeling. If you get a puncture by the side of the road, someone's going to stop and give you a hand. (...) People who are trying cycling more need to know what the new routes are, so I think (...) this community seems to work well for cyclists, but I also think it might work well for public transport, say buses." (Julie)

It was thought that the social aspects of a site such as Cycology might be helpful for those enduring what was described as the “shared ordeal” of travelling by bus, although it was acknowledged that sharing negative stories could deter others from using the bus. There may well have been an element of bias in the assumption that shared experiences about bus travel would tend to be negative, as participants had nearly all elected to cycle to work at least some of the time, suggesting that bus travel was not their first preference. Increasingly, bus companies are experimenting with the use of social media, using for example Facebook and Twitter to keep customers informed of service changes and sometimes providing a forum for feedback, questions and discussion among users (see for example, the Facebook pages of the Devon bus company Transdev-Yellow Buses at www.facebook.com/, accessed 15/12/10). It is estimated that approximately 50 UK bus companies now have Facebook or Twitter pages (Austin, 2010). The sense that ‘social media’ can be used to build on the sense of community among public transport users is gaining strength among public transport companies, particularly as a means of improving communication between providers and users (to which we return later in this section). An example can be found in the words of Jim Allison, multimedia managing producer at Bay Area Rapid Transit, San Francisco:

“There’s a natural community that exists on public transit that does not exist when people travel by car. You get on a train and you’re within a community. Whether you sense it or not you’re out there in the public with these other people, and we want to be out there in the public as well.” (North Jersey Transportation Planning Authority and New Jersey Institute of Technology, 2010, pp3-7).

Most people thought that information-sharing of this nature would not work for car drivers commuting to work, because they do not consider themselves to be a community (“driving is simply what everybody does”), and car driving might be thought of as more individualistic than other modes. Drivers were not expected to want to share a quiet back route via a website, for fear of this route becoming congested. Once again, this may represent a degree of anti-car bias on the part of the Cycology participants, or perhaps a misperception, although interestingly the majority were also motorists as well; in relation to self-categorisation theory, the ‘cycling in-group’ was more salient during interactions between researcher and participants. A more favourable view of motorists’ propensity to cooperate with one another might be gained from observing the discussion forums of organisations such as the RAC (www.rac.co.uk/forum), where motorists have shared, for example, their ‘favourite drives’. An interesting recent example is provided by drivers’ use of an iPhone ‘app’ called *Tweet Park*, which offers access to a large, interactive database on parking in Israeli cities using GPS technology, and allows drivers to ‘tweet’ others in the vicinity when they vacate a parking space, “with the amorphous Tel Aviv

parking hunting crowd turning into a community whose members help each other”

(www.haaretz.com, published 22.10.10, accessed 12/12/10).

However, Cycology participants considered lift-sharing to be the only aspect of car driving which might benefit from informal information-sharing; here, the use of the map would be beneficial in showing people's routes and possible pick-up points. It was thought that there might be potential for developing a sense of community amongst users of a lift-sharing system, especially if this were related to the workplace. In fact the UK-wide car-share system *Liftshare* provides an online environment which can be restricted to a particular organisation. It was also noted by one participant that motorcyclists have their own community/ies akin to those of cyclists, and might therefore be receptive to processes of group identification through the sharing of information. This idea is supported in the literature by the research of Esbjörnsson et al. (2004), reported in section 2.5.

Although not usually considered as 'modes of transport', two further potential user groups for a system such as Cycology were thought to be wheelchair and pushchair users. The map could provide a format for sharing detailed information about the accessibility of paths and pavements, and could also serve a useful function in communicating problems to those responsible for path maintenance. This leads to the final category of suggestions for the wider applicability of a Cycology-type information system: its potential use in providing feedback to transport companies and local authorities about everyday users' travel experience, communicating both the good and the bad, and swiftly drawing attention to issues of concern at specific locations. It would remain to be seen, however, whether opening such informal online groups to participation by what might be construed as 'officialdom' might change the dynamics and content of the interactions. It is worth recalling at this point that the cycling layer of the www.bristolstreets.co.uk website, from which the Cycology website originally grew, is used partly as a means of communicating cyclists' comments to the City Council.

As previously noted, public transport companies are increasingly now using social media as a means of communicating with, and obtaining feedback from their users, either by entering into a direct dialogue using sites such as Facebook, or through blogs and discussion forums which co-exist with 'official information' sites. A pertinent example is provided by the Bay Area Rapid Transit (San Francisco), which at the time of writing offered an informal blog, called *Posterous*, linked to its official website:

"We're using Posterous to share tidbits of news and photos from riders. On the spectrum of Stuff You Get From BART, this is in between our official www.bart.gov website -- where you can go for trip plans, schedules, advisories etc. -- and our

twitter.com/SFBART feed, where you can get little 140-character updates but not the pretty pictures”.

(<http://sfbart.posterous.com/> accessed 15/12/10)

Interestingly, the blog had received much less user feedback than the independent discussion group “BART Rage”, which advertises itself thus:

“The purpose of this site is to create a community for BART riders who are willing to share good and bad experiences. Through this site we are hoping to share with other riders/employees and let our voices be heard to BART management that BART is important to commuters”.

(<http://bartrage.com/> accessed 15/12/10)

Regarding the potential use of a website such as Cycology for improving communication between everyday transport users and transport providers or authorities, the comments emerging in the interviews about the application of the technology in other areas of transport could thus be validated through comparison with actual contemporary developments in the field of social media and transport.

Table 11-2: Potential use of online information-sharing for other (non cycling) transport modes

	Cycling	Walking	Public transport	Car-sharing	Wheelchairs, pushchairs
Route-finding	✓	✓		✓	✓
Informal advice	✓	✓	✓		✓
Community-building	✓	✓	✓	✓	✓
Communicating with authorities/operators	✓	✓	✓		✓

Table 11-2 summarises the relevance of online information-sharing to different modes of transport, as identified by Cycology participants and discussed in this section. In summary, the route information which formed the core content of the website, and the innovative map basis, may be a feature which can be translated most directly to walking and for specific groups such as wheelchair users. However, the ability to post user comments on a map alongside public transport routes and timetables might also provide a means of enhancing information and help to create or sustain a sense of community among regular users, as well as reducing uncertainty

for new or infrequent public transport users. The social benefits inherent in community-building were thought to be relevant across all transport modes. Although not its primary focus (since there are other ways of achieving this), this is a technology which was also thought to have the potential to improve communication between ordinary travellers and providers of transport services and authorities responsible for infrastructure maintenance.

11.4 User groups: desirable size and composition

This section addresses the following research question:

5.3 What features of a ‘user community’ might be conducive to word-of-mouth information-sharing (e.g. group size, composition, types of user)?

The focus now moves from desirable social features of information systems themselves and the potential ‘market’ for user-generated information amongst users of modes other than cycling, to considering some of those features of the *user group* which might contribute to maximising the usage (and usefulness) of an interactive information system. Although a system designer may have no actual control over who uses his or her system, greater knowledge in this area may provide a starting point for ‘designing in’ features which might encourage particular types of contributor. This is an area which has attracted interest in fields such as information management, where researchers are exploring the factors which motivate contributions to online communities with a view to informing the design of technical features (e.g. Ling et al. 2005, Hall and Graham, 2004). Such knowledge may also be useful in suggesting the types of context in which such systems might work best (for example, an open versus a limited access website). It may also assist those marketing and implementing such information systems (such as workplace travel planners) by suggesting whom their most receptive ‘target audience’ might be.

Firstly, some general issues about desirable group size and composition are considered, using data arising from the participant interviews and the functioning of the Cycology website. Consideration is then given to ‘ideal types’ of user, based on a user typology constructed from a vertical analysis of the three data sources pertaining to individual Cycology participants (observed website activity, questionnaire and interview). To illustrate the typology, a brief analysis of the experience and involvement in Cycology of four participants (one from each of the four ‘types’) is presented. Implications for the development of advanced traveller information systems incorporating a ‘virtual community’ dimension are discussed.

The perceived social advantages of limiting group size and composition, such as community-building, trust and pro-social behaviour within Cycology, balanced against the drawback of limited breadth of knowledge, were discussed at length in Chapter 8. It can be concluded that a

compromise might have been achieved by increasing the overall number of participants drawn from the five organisations; it remains a matter of speculation as to what the ideal number might be, but it seemed feasible (and this was suggested by a number of participants) that 50 relatively active users (contributors) might be a suitable number. 'Active use' is difficult to define, but experience of the Cycology project suggests that the average number of posts per participant over the six weeks (5.7 – just under one per week), which generated an average of 4.5 posts per day in total, was sufficient to maintain participants' interest in the site; it was noted in Section 8.1 that this was comparable with the level of posting activity on the Bristol Cycling Campaign forum, which has been active since October 2006. However, the number of posts on Cycology appeared close to the minimum level of activity necessary for it to function effectively as a forum for information exchange and social interaction. This suggests that if user numbers were more than doubled from 23 to 50, as was suggested, each user would need to post, on average, once every two weeks as a minimum, although ideally more frequently. It is recognised that this average masks the possibility that a small proportion of users might be expected to contribute the majority of posts (as discussed in Section 10.5.2, this is borne out by the literature on online communities, and the Cycology project itself), and that individuals' posts would be unevenly spread over time. Moreover, group composition might be expected to be dynamic, as people move out of the active user group and others join. This might be especially likely in an environment such as a university, with a regular turnover of students.

Had a greater number of people participated in Cycology, the numbers cycling from particular areas should have increased (thereby widening the opportunities for interaction) and the geographical scope of the knowledge base might have been expanded by bringing in people who cycled from other areas, allowing more questions to be answered. Participants favoured the idea of limiting the user base to some form of defined group at a particular geographical location – the workplace having provided an obvious example because of the commuter context of the Cycology project. Those who worked at the university believed that such a website could be accessible to all within it without losing its sense of community. The total number of people cycling to the university at least occasionally has been estimated at approximately 2300¹⁰, and this might be expected to form the core population from which active users might be drawn, although this figure would increase if potential (as well as existing) cyclists were also attracted to the site. In addition to the desirable number of 50 people contributing to the site at any one time,

¹⁰ Based on an estimated 12% of staff and 6% of students cycling to the university (2010 UWE Travel Plan estimate). Total staff: 2,802; total students 32,359 (UWE Report and Financial Statement, July 2010).

it could be expected that many more might read it and learn about cycle routes without contributing ('lurking'), extending the overall effects (for example, the static cycle map on the UWE website received nearly 13,000 views in the two years until February 2011).

The 'ideal' group size relates, in part, to whether or not Cycology might be considered to be an 'online community' at all, and whether this is a concept which might be applied to digital word-of-mouth about transport more widely. As discussed in Section 2.5 of the literature review, Kozinets (2010) interprets Rheingold's (1993) assertion that "enough people" must be involved for an online group to feel like an online community, by suggesting a minimum of 20 people. The maximum number of people held to be possible while still allowing efficiency of communication is between 150 and 200 (according to these criteria, Cycology was thus at the lower end). Kozinets (2010) further argues that for an online group to become an online community it must demonstrate more than simply the transfer of information and draw people together in "fellowship and commonality" (p10). In this sense Cycology could be considered a 'community' because it moved beyond the mere transmission of information, but perhaps did not go on for long enough or involve enough people for there to be the sustained social interaction required for participants to gain a sense of familiarity with other members – another of Kozinets' (2010) criteria for defining online communities. Thus, Cycology might best be described as an 'emerging online community'. To see whether a 'mature' community might emerge over time, testing is required over a longer time period, and ideally in a natural environment - making such a system available, for example, to all employees via an organisation's intranet.

A further source of reflection is whether informal information-sharing in the context of advanced traveller information really necessitates the development of an 'online community' according to the criteria of Rheingold (1993) and Kozinets (2010), in order to play a useful role in travel behaviour. Hall and Graham (2004) found that norms of reciprocal helping quickly evolved in the *CipherChallenge* Yahoo group, leading to effective information exchange, but without the development of social relationships. Members were considered to be *exchanging information* rather than *generating knowledge*, and the strength of interest in the subject (code-breaking) was such that the group did not need strong social relationships in order to maintain its survival. Parallels might be drawn here with travel information-sharing; arguably the 'practical usefulness' aspect of the Cycology website could have functioned (people may still have tried out routes suggested by others) without the added dimensions of community-building and social support, and indeed some participants saw this instrumental function as its sole purpose. This suggests that online information-sharing need not be restricted to specific 'in-groups' in order to play a useful role. However, the research for this thesis has demonstrated that the social dimension can increase people's propensity to trust others' information, share their knowledge with others,

and reinforce positive attitudes, intentions and behaviours with regard to cycling through processes of referent informational influence. It may therefore increase people's propensity to make practical use of the information, even if this facilitating role may be difficult to identify and remain unacknowledged by users. Here, parallels may be drawn with the success of the *EcoTeams* initiative in increasing environmentally sustainable behaviour within local communities by bringing householders together to plan and discuss relevant activities (Staats et al., 2004).

The conclusion to be drawn is that this is a matter of degree: whilst informal travel information, broadcast through electronic word-of-mouth to internet users at large, may still be useful and exert an influence on detailed aspects of travel behaviour (such as route choice), it is likely to be less influential than if it emanated from a fellow member of a true online community. This is a matter which might be explored further through comparative research on the uses and effects of different sources of informal, online traveller information in different contexts.

In considering the different types of individual who might together form an effective group for information-sharing, the obvious point should be raised that different types of knowledge and levels of experience are required within the group. If everyone were already very well informed of local routes and highly knowledgeable about cycling issues, there would be little need to interact with other cyclists (except for social reasons, or to collaborate in cycling campaigns – although other means exist for doing this). Equally, if everyone were very inexperienced, there would be little knowledge to share. It will be recalled that for this reason, one of the criteria for the purposive selection of Cycology participants was their frequency of cycling to work, and how long they had been doing so, in order to achieve a balance between 'information-givers' and 'information-receivers'. Level of cycling experience did not in the end correspond directly with people's propensity to engage actively with the website, and this was sometimes a surprise for participants themselves: one person who cycled every day remarked in interview that she was surprised to have found that, having started the project expecting to offer information more than receive it, she had actually learned more than she felt she had contributed.

In fact, those who contributed to the website the most were *not* the most longstanding cyclists (as noted in Section 8.3, two of the five most active contributors had stated cycling to work only 6 months before the project started, and two had commenced cycling between one and two years prior to the project). These four active contributors reported at interview that they were motivated by the social aspects of the site as well as its functional use. An interest in social ties as well as obtaining or giving functional information was therefore a key factor in most people's motivation to contribute. It should also be noted that an interest in the social dimension was not sufficient *on its own* to motivate people to post messages, as those with the least cycling

experience were also amongst the lowest contributors. A conclusion to be drawn is that an interactive online community requires members who believe they have at least some knowledge to share, but are also interested in building social ties. Using Kozinet's (2010) typology of online communities (outlined in Section 7.9.1), a desire to engage only in practical information-sharing about the "consumption activity" - in this case cycling - results in a "geeking community", whereas interest in both the activity itself and in building social ties results in a "building community". Hall and Graham's (2004) interpretation of the *Cipherchallenge* Yahoo group corresponds with Kozinets "geeking community" type, and they note that although there was cooperation and a "social infrastructure" within the group, this did not lead to genuine collaboration and knowledge generation (something which might be expected in what Kozinets (2010) terms a "building community"). Whilst Cycology did not, over its six week duration, attract the level of social interaction required to become a "building community" (in fact, it was closer to a "geeking community", with detailed information being exchanged without the development of strong social bonds), over half of the participants believed that they would have been interested in both the social and functional aspects of the site had the project continued for longer and involved more people. Together with insights from the literature on online communities in other areas, this suggests that is desirable for an online community based around transport to incorporate both dimensions.

A further criterion for active participation was the sense of identification with other members of the group; it was previously noted in Section 10.2 that a minority of participants felt inhibited from contributing because they believed everyone else to be more serious or experienced at cycling than they were. This highlights the significant effect of social comparisons and 'in-group' sensibilities on the dynamics within a group, and would deserve some consideration if attempts were made to set up a 'real-world' community of this nature to encourage the less confident cyclist or those still only contemplating it (the same might apply in relation to communities of other transport users).

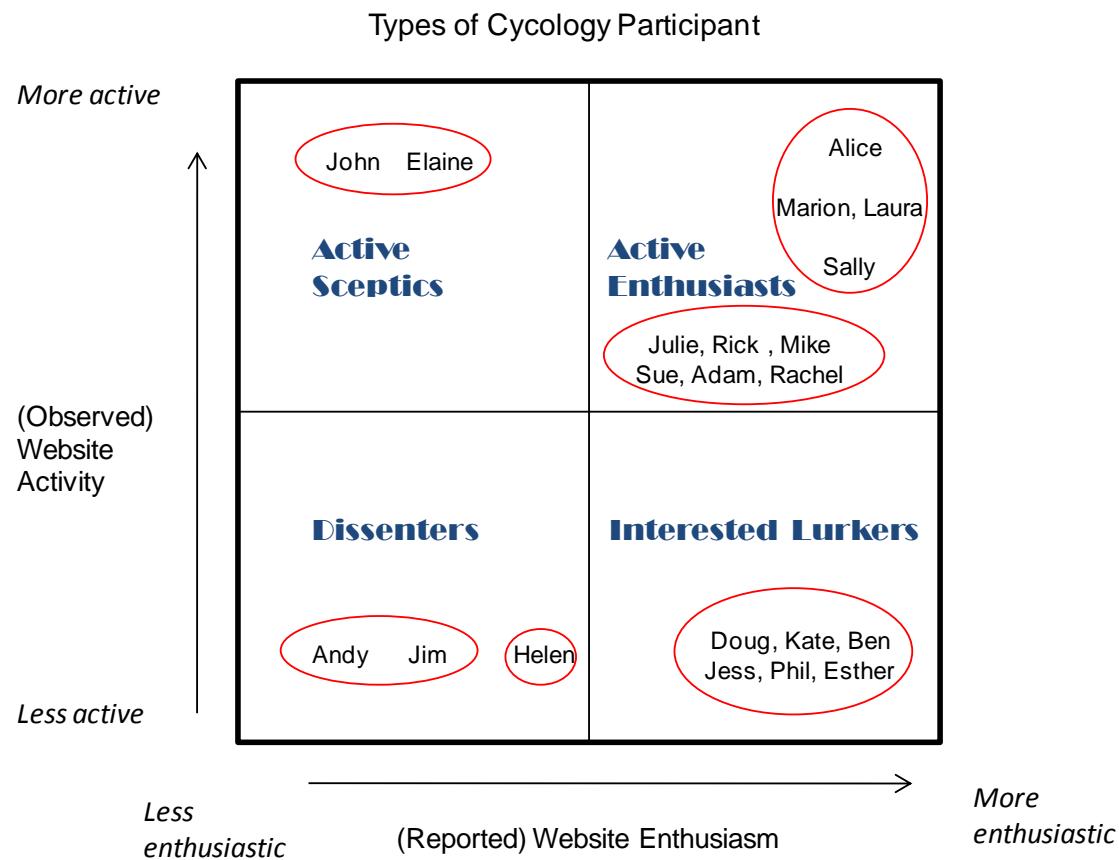
Following discussion of the desirable size and composition of the group as a whole, consideration is now given to the different types of individual user who might, in combination, be most likely to maintain an active and interactive information-sharing forum, or indeed an online community.

11.4.1 Developing a user typology

A typology of users may prove to be of interest to those designing and implementing online traveller information systems comprising user-generated content, by indicating the different types of people needed to make an interactive information-sharing system function well – that is,

attracting enough activity to sustain members' interest and to be considered useful. Using the technique described in Section 7.9.1, the following typology was created by categorising Cycology participants into two distinct dimensions: their level of observed activity on the website (both posting and reading others' posts); and their level of interest in and enthusiasm for the project (as it actually was, as well as what they believed it could become) as expressed in questionnaires and interviews. The principle of identifying two dimensions, producing four 'types', was modelled on Kozinets's (2010) typologies of online community participation and online community interaction, although the dimensions and types differ from those used by Kozinets. The typology of Cycology participants is shown in Figure 11-1.

Figure 11-1: Types of Cycology participant



By combining observed behaviour with reported 'enthusiasm', an attempt is made to capture not only what happened in the project, but also the potential for people's future engagement if they were to use an information system such as this outside the confines of the project and without the constraints, such as time and absence, which limited some participants' contribution to the Cycology project. Participants' location on the vertical axis reflects an objective measure: the

number of posts each person read and wrote. Thus, the three groups of people in the lower quadrants (less active) are all drawn from the bottom left of Figure 8-6, p135, which shows the proportion of posts written and read by each individual. The three groups in the upper quadrants (more active) are drawn from the centre and right of Figure 8-6, p135. Participants' location on the horizontal axis reflects the researcher's interpretation of each person's enthusiasm for the Cycology concept, as expressed through interviews and questionnaires, moving from unenthusiastic on the left, to very enthusiastic on the right. An example of each type (Elaine, Andy, Laura and Phil) has been selected for non-cross-sectional analysis in the next section.

The 'active sceptics' and 'active enthusiasts' comprised those who wrote the most posts, and in all but two cases, were also those who opened the most markers. The active enthusiasts expressed themselves to be interested in and positive about the website, whereas the two active sceptics were more negative and said they had contributed largely through a sense of obligation. The active enthusiasts are clustered into two groups: those who posted between 9 and 14 times, and those who posted 6 or 7 times. The three 'dissenters' were those who contributed little and also expressed a lack of interest for the project (one being actively critical, the other two unengaged). The 'interested lurkers' were a relatively large group who wrote few posts (between 1 and 5), but expressed enthusiasm for the project, either as it was, or *what it might become*. The members of this group tended to say that they would have contributed more if they had had more time to devote to the project. Two participants are absent from the typology as they were not available for interview; hence their level of enthusiasm was difficult to gauge.

It is possible to speculate on which of these types might be most likely to create and sustain an online community in the specific field of local travel; the 'active enthusiasts' are perhaps the most promising category, similar to Kozinet's (2010) "Maker" type, whom he categories as "*active builders of online communities and their related social spaces*" (p34). The 'active sceptics' could also be expected to make a contribution initially if they felt the community to be a 'good thing' which should be encouraged. Their longer term participation might only be anticipated, however, if they were to move towards the 'active enthusiast' category. 'Interested lurkers' present a potential reservoir of active enthusiasts, who might become more engaged under particular circumstances (or, alternatively, might drop out and become 'dissenters'). Kozinets (2010) describes the lurker as "*a new member who is using the community to learn about the core consumption activity or to reach out and build social relationships*" (p.34). The conditions under which they might participate more, as expressed by the participants themselves, include more people travelling from the same area, actual availability of alternative routes, and continual changes to the physical environment or occurrences considered 'worth sharing'. Individual factors will also play a role; the two participants who described themselves as 'unsociable' would

not perhaps be expected to contribute significantly if they took little pleasure from the social aspects of the site. One of these participants was an ‘active sceptic’, but contributed out of a sense of moral duty – exhibiting pro-social behaviour - rather than through enjoyment. This suggests that pro-social behaviour may not be sustained if there is no sense of reciprocal benefit from participating.

It is also useful to consider the attributes which people said they wanted from this or a similar site. Some people described it as “not a social site”, remarking that they would only use it in the longer term if they had a specific question, such as looking for a new route, and would not engage in “chit chat”. For them, the purpose of the site was to share practical information, not social information conveying mutual support, encouragement for cycling and so on. They regarded it as a resource which they might use if and when they felt the need, rather than regarding it as an online community as such. These were, in the main, participants who were long-standing cyclists, with relatively fixed cycling behaviours, and therefore considered themselves to receive little benefit from community-building and supportive aspects of the website – although they saw value in these features in principle as a means of encouraging novice cyclists. As discussed in the previous chapter, those who appeared to gain most from the social and supportive aspects of the website tended to be those who had more recently taken up cycling to work. These also tended to be the people who were looking for stronger social ties, or at least more frequent social interaction, on the website (although some long-standing cyclists also fell into this category). Arguably these are the types of people who might be expected to make a greater contribution to sustaining an online community, and are all to be found within the categories of ‘active enthusiast’ or ‘interested lurker’.

11.4.2 Four individual cases (of user)

In order to gain a deeper understanding of the beliefs, attitudes and behaviours of the Cycology participants, a holistic, or vertical analysis of all data sources pertaining to each individual was carried out. Mason (2002) describes this form of analysis as “*a practice guided by a search both for the particular in context rather than the common and consistent, and the holistic rather than the cross-sectional*” (p.165). Freudendal-Pedersen et al. (2010) describe it as a means of bringing out individual voices from within the data. This method was described in Section 7.9.2. The cases of four Cycology participants are summarised in Boxes 11.1 to 11.4, each illustrating one of the four ‘types’ within the typology. The aim is to highlight, within the context of the ‘whole person’, some of the attributes which may be conducive to active, online information-sharing.

The factors we have discussed in this part of the chapter, relating to the desirable size, nature and composition of a user group which might interact to cooperate and share information are summarised below:

- Number of active contributors: approximately 50;
- User base: a defined group (e.g. a large employer or co-located smaller organisations).

User attributes:

- People with different levels of knowledge and experience of the relevant transport mode – including those with none ('enough' of each so that no category feels excluded);
- People interested in social interaction as well as functional use.

User types: (in order of importance):

- active enthusiasts, interested lurkers, active sceptics. The active enthusiast types corresponds with Kozinet's (2010) *Maker* – the active builders of online communities, whilst interested lurkers correspond with his *Lurker*, who observes, learns and feeds into the community.

An interesting next step, which remains outside the scope of thesis, would be to develop a strategy for recruiting the different types of people, as well as reflecting on the sort of system design features which might encourage the different types to use it.

Box 11.1: "Active Sceptic"**Elaine (30-39, cycles to work every day, began 2.5 years previously)**

Elaine said in the interview that she was only interested in the practical usefulness of the site, not "chit chat". She did not see Cycology as a place for socialising - it was simply a place to share practical information. She describes herself as a private person who does not like to "share bits of herself". Hence she does not take part in internet discussion groups and does not wish to socialise on a website. She believes that some people like to feel part of a group or community, but she does not because she considers herself unsociable. Similarly, she cycles for her own reasons and does not need to feel part of a collective. However, she said she was quite happy to ask and answer specific questions, both face-to-face and electronically. She had used a considerable amount of word-of-mouth information when she first started cycling, and likes to encourage others to cycle by sharing her knowledge. Although she was very clear about making her own decisions about cycling, she was not entirely sure that the cycling culture and peer group pressure at her place of work had not influenced her in some way.

Ironically (as she thought she was not very involved and was only participating out of a sense of duty), she was one of the more interactive participants, posting 11 times, responding to other comments 4 times and also asking questions. Her contributions included a high degree of subjective opinion and advice, and were written in an informal style. Although she said that she did not like contributing to "chit chat" or writing "isn't it nice to see the birds", but did write a descriptive post of this nature (the cat which likes to be tickled) which others remembered and liked. She logged in on 7 days, opening a total of 44 markers. This was a case where there was a discrepancy between the observed level of posting activity and varied content (she was one of the most active contributors), and her own perception that she had not been especially engaged with the project.

Elaine slightly contradicted herself by saying that she was mainly contributing just for the sake of the research project, but then said that she would probably also have contributed if it were an open project within her place of employment (i.e. not a research project). She also thought that she would contribute to a public website such as www.bristolstreets.co.uk, all out of a sense of civic duty. She might therefore still be an active contributor to an interactive system outside the research project context even if she were not interested in the social dimension, perhaps due to her 'pro-social' values. However, without genuine interest, her involvement might not be sustained.

Box 11.2: “Dissenter”**Andy (30-39, cycles to work infrequently, began 2.5 years previously)**

Andy was markedly more negative than any of the other participants about the website - and, since the majority was generally positive, could be described as an “outlier”. There appeared to be for two main reasons for this : 1) he did not like the way the website worked technically, as he thought the bubbles on the map format and unstructured digest did not stimulate interaction; 2) he seemed to feel alienated from the other participants, which contrasted with most other people in the project. The latter point seemed to emerge from his experience of the project briefing, where he had formed the impression that many of the others were “hardcore cyclists carrying their helmets and wearing special shoes”. He stressed the point a number of times that he was not a very enthusiastic cyclist, and felt that the other participants were – hence he was bored by their comments rather than feeling any empathy with them. He had no wish to exchange banter or bond with them, and was only interested in obtaining functional information, not to engage in sustained interactions or community-building. He said that this would have been different if he had known the other participants, but as it was, he “did not care” what they thought.

One possible factor for this disengagement may be that Andy, during a chance encounter with the researcher after the project, admitted that he had seldom cycled during the project, having realised how easy it is to park a car at his place of work in the summer. He had previously been very enthusiastic about cycling, which suggested that a degree of cognitive dissonance may have occurred (changing attitudes to match behaviour).

Andy also thought he felt negative about the website because he is very used to a discussion forum format, which he believes to be much more conducive to interaction. He did like the Cycology map, but thought it would be better if the forum were the focus, with links to a map. Because it was unclear to him whether people were responding to threads, and because he was not engaged, he did not realise that there had been three responses to his question about a difficult junction. He actually found this quite interesting when he read it in the interview, but blamed the format for the fact that he had missed them. However, although Andy was generally negative about the project, he was positive about the overall concept, saying that he liked the map and that a university-wide initiative was a great idea which might encourage more people to cycle. He thought that informal information-sharing would also work well for bus users, although he personally would only use it for instrumental information.

Box 11.3: "Active Enthusiast"**Laura (20-29, frequently cycles to work, began 18 months previously)**

Like some of the other participants from a smaller organisation, Laura worked out the identity of others in the project. The much smaller size of her organisation made this more possible than it was for participants from the larger organisations. Laura emerged, from the interview and questionnaire, as possibly the most enthusiastic of the participants. She concentrated on the more community-building, sharing-experience type of posting, and was able to remember more specific examples than anyone else. She also liked the practical advice and warnings, but was most enthusiastic about comments which created a positive impression of a route and pointed out features which helped her to enjoy the experience, such as the black cat which liked to be tickled. She opened 84 markers over 7 days and posted 11 times - a combination of routes, warnings, questions and a "gripe"- making her one of the most active contributors. Her tone was very informal and conversational.

Interestingly, although she mentioned seeing someone cycling along whom she recognised from work, and also worked out that she was in the project, she did not mention the fact that she and another participant had met up socially after meeting one another for the first time during the project briefing (this person described Laura as a friend during her own interview). Perhaps this was because Laura had not really associated the project briefing with the project itself, or perhaps because her friend was not very visible on the website.

Laura liked the small size of the project, feeling that the group was small enough for her to start recognising names (although she had not really got any sense of them as individuals). She thought that there was enough interaction and a sufficient number of people involved. One reason might be that she does not talk to other cyclists at her workplace very often, so Cycology served as a genuine "social space" for her. She was the only person who used a pseudonym on the site, and she seemed to like this level of anonymity. Although she did not try a new route, she said that the project has changed her experience of cycling, making her more observant in looking out for pleasant features, or hazards, to pass on to others. She was enthusiastic enough in this respect to take photos of both hazards and attractive views, but was unable to upload them to the site. She had tried to make looking at the site/email as part of her daily routine, and found it a pleasant distraction when she needed a break from her work. She said that the project had also made it more likely that she would join a cycling discussion forum. She described Cycology as a "*virtual community of people who cycle*".

Box 11.4: "Interested Lurker"**Phil (30-39, cycles to work frequently, began 6 years previously)**

Phil was a participant who, from observation of website activity, appeared to have little interest, but showed through the interview and questionnaire that he was actually very enthusiastic, saying that he had regularly read the email digest to follow developments on the website. He made two contributions: once to reply to a thread about why the gates on the rugby ground route are sometimes locked (providing an explanation); and once to mark his route to work from home, commenting on lighting, traffic and steepness. He logged in just once, opening 11 markers. In both the interview and questionnaire he said he had participated less than he intended and this was due to time constraints.

After the project, Phil publicised www.bristolstreets.co.uk within his company later in the summer, when a new cohort of several hundred people started working in his building, in order to encourage them to cycle, and this was probably one of the largest practical outcomes of the project in terms of word-of-mouth information diffusion.

Despite being a long-standing commuter cyclist, Phil was a strong proponent of the "community dimension" of the website, and raised this early in the interview without any prompting. He liked the way that the project gave him a sense that others were cycling his route, as he travels to work early in the morning and sees few people en route. For him, the project provided a pleasant feeling of shared experience. He thought a practical outcome might be that people would be more likely to raise infrastructure problems with the route with the Council, because they would be more aware that others would be experiencing the same problems. He gave an example of feeling more confident to raise an issue with a Council official because he knew that many others were affected.

He is enthusiastic about cycling as means of transport and likes to encourage others to do so - he gave examples where he believed he had played a key role in two people's decisions to start cycling to work (his wife, who now cycles to her place of work, and a colleague in his own company). He tried out one of the Cycology routes to UWE with his wife; hence, electronic word-of-mouth had been followed by face-to-face word-of-mouth influence.

11.5 Chapter Summary

This chapter has sought to answer research question 5 by considering some of the ways in which social aspects of the Cycology website might be translated to other web-based traveller information systems, both for cycling and for other modes of transport. Additionally, it has considered features of the user group and types of individual within it which might make information-sharing as effective as possible. This includes creating an environment where there is enough interaction, for enough knowledge to be shared to be of direct practical benefit to members, as well as creating a sense of community where processes of social influence are enhanced.

Recommendations for the incorporation of ‘social design features’ into other forms of advanced traveller information system highlighted in particular the benefits of combining user comments with routes generated by automated planners. User-generated route information was considered to be especially relevant for cycling and walking, but general user comments on transport services were also considered to be potentially useful for public transport. Comments could be posted on the map alongside public transport routes, and it was thought that this might be useful not only for other travellers (especially those who were new to, or considering a mode of transport), but also in terms of providing feedback to transport operators. Similarly, user comments posted to the map by cyclists and pedestrians (as well as wheelchair and pushchair users) could communicate both good and bad features of the route to those responsible for maintaining them. The community-building aspects of this type of system were thought to be beneficial in terms of motivating and sustaining cycling, walking, lift-sharing and the use of public transport. Community-building was thought most likely to occur within distinct groups where members shared a sense of identity. In order to sustain enough interaction to create or maintain such a sense of community, approximately 50 contributing members were thought to be required. Four ‘types’ of website user were identified in the Cycology project, and it was concluded that ‘active enthusiasts’ were particularly important in sustaining interaction, although ‘active sceptics’ might also be expected to contribute for pro-social reasons, and ‘interested lurkers’ provided a reservoir of potentially more active users.

Chapter 12 : Conclusions

In this final chapter, the main conclusions of the thesis are drawn together in two areas: theory development; and practical applications to advanced traveller information systems. Wider discussion points emerging from the research, including relevance for policy and measures to encourage travel behaviour change, as well as recommended areas for further research, are then considered.

12.1 Theory development

This thesis has applied constructs and theories from social psychology to improve understanding of the use and effects of traveller information from a perspective which has hitherto been neglected: the role of informal information; its transmission through social interaction; and related influences on everyday travel behaviour. Whereas 'conventional' understandings of travel information focus on 'facts' about, for example, times, routes and costs, provided by official sources to help the individual make utility-maximising travel choices, this analysis has conceptualised travel information as something broader in which 'facts' are overlaid with subjective opinions, emotions and normative messages as they are communicated between people. The addition of a 'social layer' to the travel information means that social processes are also in operation alongside well-documented processes of individual, instrumental reasoning. In the case-study, the interactive nature of the website, together with the limited size and composition of the user group created an environment for processes of group identification, trust, pro-social behaviour and social influence. This suggests that some aspects of the conventional, individualist paradigm within which traveller information has been conceptualised, should be questioned. Moreover, this thesis has shown - through participant accounts in both phases of the research - that the role of information communicated through word-of-mouth does not begin when an active decision-making process has been initiated, but also plays a more subtle, background role in the formulation of beliefs and attitudes, which in turn shape the context in which active travel choices may later be made. Furthermore, where information is obtained from others within a reference group, it plays not only a straightforward informational role, but also a normative one by conveying norms of preferred behaviour within that group; information of this nature is perceived as more valid than information from other sources. The process of *providing* information to others is also affected by social factors such as reciprocal helping.

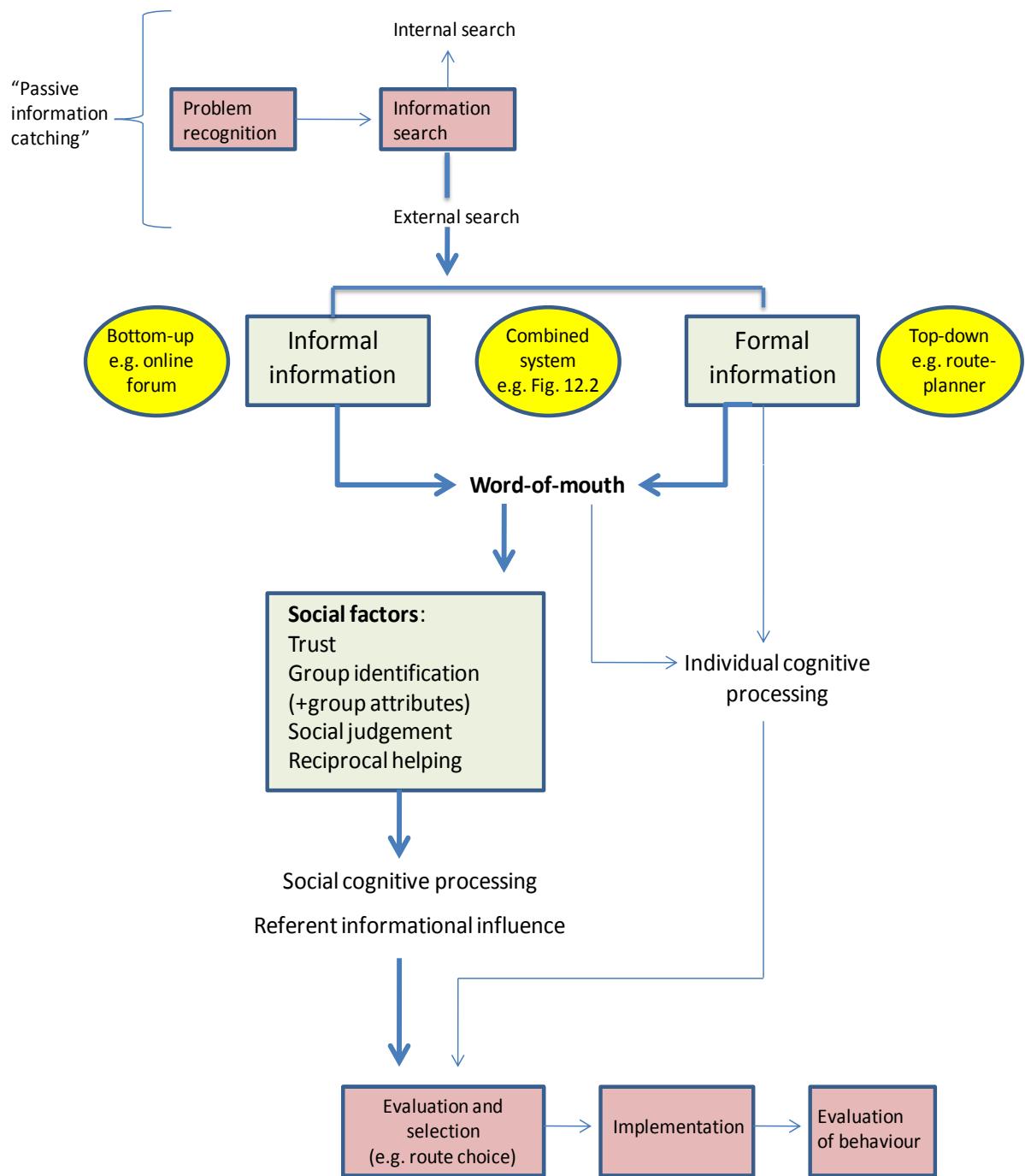
At the same time, it was clear from both stages of the research that informal items of information and word-of-mouth information diffusion were just two small elements within the complex

decision processes affecting everyday travel behaviour, and that these processes are essentially (but not exclusively) ‘individual’ and ‘rational’ – for example, there was no evidence of people ‘blindly’ following the advice of others without deliberation. Factors such as instrumental constraints, personality-related factors and conventional notions of individual, utility-maximising travel behaviour were also apparent in the findings. In fact, social identity theory has been criticised for assuming too sharp a distinction between personal and social identities (Wetherell, 1996). Therefore, the new knowledge generated through this research about social influence through word-of-mouth information-sharing seeks to complement, but not replace, existing models of the role of information within the travel decision process.

Figure 12-1 shows how the social factors discussed in this thesis, informed by types of theory not previously used in this field, and validated in an applied context, can be integrated into an information processing model (e.g. Bettman, 1979, cited in Gabbott and Hogg, 1994; Jackson and Polak, 1997; Sirakaya and Woodside, 2004; van der Horst, 2006), thus adding to existing theory. This model takes one part - the Section to the lower left - of the process model which was developed at the end of Phase 1 (Figure 6-1, p95), and elaborates it on the basis of the more detailed social-psychological findings in Phase 2. It also represents a form of validation of the more general Phase 1 findings within a specific ‘real world’ context – that of a traveller information system used by a group of cyclists.

The model depicted in Figure 12-1 is an elaboration of the second stage of an information processing model: *information search*. It will be recalled from Section 2.1.2 of the literature review that this stage follows *problem definition*, and precedes *evaluation and selection*; *implementation*; and *post-hoc evaluation*. As previously noted, the research for this thesis found that word-of-mouth information also plays a role in travel decision processes prior to *problem recognition*, when social interaction about travel can reinforce social norms of behaviour and contribute to the formulation of an individual’s beliefs and attitudes through a process of “passive information-catching” (Um and Crompton, 1990). This is important because it may influence the types and sources of information (both formal and informal) which are later sought when an active decision process is initiated, i.e. at the stage of problem recognition.

Figure 12-1 : Processing of informal and formal travel information



In existing models, *information search*, is, in turn, divided into *internal* and *external* information search (Jackson and Polak, 1997; Avineri and Prashker, 2006). In the former, an individual draws on memory of past experience, and only if this provides insufficient information will he or she execute an external information search. Here, Figure 12-1 extends existing models by dividing external information into: formal types of information obtained directly from formal sources (e.g. timetables and journey planners); and both formal and informal types of information obtained through word-of-mouth. An example of an online information source within each of these categories is shown in the three circles. The circle to the left denotes existing 'bottom-up' information sources such as the travel review website www.tripadviser.com or the cyclists' social network <http://morvelo.cc/>. The circle to the right denotes existing 'top-down', electronic information sources such as www.transportdirect.info. Of greatest relevance to this thesis is the form of combined system denoted in the circle in the centre of the figure. This is the type of nascent, online system which incorporates both top-down (formal) and bottom-up (informal) information, exemplified by the webpage mock-ups in Figure 12-2, which will be described in the next section.

Figure 12-1 shows some of the social-psychological factors which may be involved when both formal and informal types of information are communicated through word-of-mouth. Particularly in the case-study, it was found that the more important issue was not whether information was formal or informal in *content* (in fact, the two were often mixed), but the fact that it was *delivered* through word-of-mouth rather than from 'official' (formal) sources. Factors such as group identification and trust may increase the influence of information conveyed through word-of-mouth if it is provided by a person perceived as similar – i.e. if it comes from a member of a reference group. In this case, the social transfer of information may provide a channel of "referent informational influence" (Turner et al., 1987). Self categorisation theory suggests that such information is subject not to *individual* cognitive processing, as conventional conceptualisations of information-use suggest, but to *social* cognitive processing (Turner et al., 1987). The stages of this process are denoted by the thicker arrows in Figure 12-1, and represent the main area of findings in this thesis.

However, the research did *not* show that information obtained through word-of-mouth is necessarily *always* affected by social factors; in some circumstances, it may be subject to individual processing in much the same way as information from formal sources. These processes are represented by the thinner arrows to the right of the model. This might be the case if, for example, the information-seeker feels no social connection with the information-giver, or is not receptive to the social aspects of the information, as was the case with some of the routine cyclists in the case-study who stated that they were interested only in instrumental

aspects of the website. Examples provided by participants in the exploratory research included fleeting conversations with fellow travellers when instrumental information was sought or offered during a trip. Trip context was also important in this respect: social factors played a stronger role in word-of-mouth information-use for those travel decisions with a higher cost – in terms of money, time or effort – than it did for ‘low risk’ decisions, when the costs of acting on information which turned out to be unreliable were low.

The individual use of formal travel information from official sources, on the right of the figure, was not explored in any detail in this research (this area having been widely studied already), but it frequently appeared in participant accounts by way of contrast with word-of-mouth information. It was reported by many participants that information from a known and trusted (personal) source was given greater weight than information from an official source; for example transport companies and local authorities might be thought to “have an agenda”, and/or lack the detailed and up-to-date knowledge which a local transport-user could provide. However, overall, informal and formal sources and types of information were thought to serve different purposes and to be complementary (hence the expressed wish to be able to combine automated route planners or timetables with user-generated comments).

Within an information processing model, all these sources and types of external information then feed into the next steps in the process: an evaluation of alternatives; the selection and implementation of a decision (e.g. a travel behaviour); and post-hoc evaluation. Within the case-study, this was exemplified by the selection, trying out, and assessment of new cycle routes. However, this thesis has also explored the broader role of word-of-mouth information, showing that, whilst it does not always lead directly to the active selection of a behaviour, it may nonetheless exert a more subtle influence, for example by providing confirmation of existing travel choices, and these factors may *indirectly* influence behaviour. Hence, the sense of mutual support and empathy experienced by some cyclists in the Cycology project was reported to have reinforced pro-cycling attitudes and intentions, which in turn encouraged them to maintain their cycling activity.

12.2 Advanced traveller information systems

This section discusses two higher-level findings which arose from the research, which may have relevance for future developments in advanced traveller information – particularly web-based systems offering real-time travel information and journey planning. The two principles discussed below are: that the incorporation of bottom-up, informal information can enhance the perceived quality and reliability of information systems; and that such mechanisms can provide transport providers with useful feedback from users. An example is then provided of a way in which

practical recommendations reported in Chapter 11 might be implemented through the adaptation of a cycle route planner within a particular organisation.

The first broad principle - outlined in the previous section - is that user-generated information often inspires greater trust than 'official' information, largely because it is based on the experience of 'real people' rather than transport service providers or governmental bodies. This involves both calculus trust, emanating from the intrinsic quality of the information (e.g. detailed and up-to-date), and relational trust, associated with the relationship between information-giver and receiver (Rousseau et al., 1998); however, the former trust mechanism is primary. Thus, the users of the Cycology system considered the information to be more reliable (although less comprehensive) than the information they might acquire from a standard cycling map or route-planner. The case-study also provided evidence of people enacting a new travel behaviour (in the form of using new cycle route) on the basis of the information provided. Although not tested in this research, this raises the possibility that the incorporation of user-generated information may increase the perceived reliability of traveller information systems more generally, which may, in turn, enhance the effects of such systems on travel behaviour. This thesis has suggested that this is most likely to occur if information systems can be 'localised', allowing processes of group identification to occur amongst users – for example by linking journey planning services or real-time travel updates (incorporating user comments) to the websites of individual organisations ('white-labelling'), or allowing restricted-access discussion groups to form alongside top-down, open-access information services. Indeed, this is consistent with recommendations in the Local Transport White Paper (DfT, 2011) that the Transport Direct cycle journey planner be used within local contexts such as schools, social groups, railway stations, hospitals and universities; moreover, the White Paper recommends that local authorities promote it as a workplace travel planning tool.

The second principle is that information contributed by travellers is useful not only to other travellers, but also to transport providers (and transport planners), as it offers a means of updating them on day-to-day issues such as occurrences on the transport network, infrastructure problems (e.g. roads, cycle paths and footpaths), or errors in journey-planning information. The findings suggested that there is a demand from users for systems which allow prompt and efficient communication - aided by an online map to locate problems – not only between transport users themselves, but also between users and providers. In practice, this might mean encouraging representatives of local transport service providers to access the 'localised' traveller information systems which we have described above.

In addition to these general principles, more detailed, practical recommendations for ‘social design features’ also emerged from the case-study, which may be applicable to a wider range of web-based information systems – particularly those where a map forms a significant part of the interface (for example, map-based journey planners, or real-time, location-based information, such as maps showing the impending arrivals of buses at specific stops). Suggestions for the development of design features, particularly relevant to route planners for walking, cycling and car-sharing, were described in Chapter 11. User comments could also be helpful where public transport routes, or live incidents on the network, are presented on a map. Other recommendations included the incorporation of more social networking-type features, such as user profiles, into the interface.

Figure 12-2 provides a visualisation, using four simplified, webpage mock-ups, of how a cycling route planner might be adapted to incorporate features of this type within a particular organisation. Transport Direct’s cycle route planner is currently ‘white-labelled’ on the University of the West of England’s (UWE) website, but the mock-ups show how the system might be developed to allow users within the university to add their comments to sections of route generated by the route planner, read other users’ comments, and discuss related issues. The first page mock-up is thus an amended version of the existing UWE webpage which connects to the Transport Direct route planner, but with the addition of references and hyperlinks to user comments and discussion. Page 2 shows part of a route to the university generated by the route planner, with written instructions appearing to the left of the map. The new feature is that a user might then click on the link under a section description to open markers created by other UWE users near that section of the route, or add their own markers. Page 3 shows a comment created by a UWE cyclist near the first section of route described on the left side-bar (direction 2.6). The marker also includes a link to the contributor’s user profile – a social-networking feature. Having opened this marker, a reader may then click to read responses to this comment (message thread), which appear on the left side-bar (page 4). The reader can then add to the thread, or start or open other discussion threads. If the user comments were accessible only to users with a UWE log-in (whilst leaving the standard route planning service accessible to all, so as not to exclude, for example, visitors to the university), the social benefits arising from a ‘socially proximate’ group of users – described in detail in the previous two chapters, might be expected to ensue.

Figure 12-2: Mock up of a cycle route planner incorporating user comments

Page 1

Cycling and Walking at UWE

Find out more about...

- [Cycling facilities](#)
- [Cycling events](#)
- [Walking in and around campus](#)

Cycle routes and discussion

Enter your postcode to plan your route and see comments posted by UWE cyclists:

From: BS1 8QJ to Frenchay Campus

>> Service supplied by [Transport Direct](#).

[Open the map](#) to see user comments and add your own

[Discussion topics](#)

[Back to top](#)

[Accessibility](#) | [Terms & Conditions](#) | [Privacy Policy](#) | [Feedback](#) | [Help](#)
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Page 2

Cycle Route Details | Transport Direct

Directions:
BS1 8QJ to BS16 1QY

Outward journey for Sat 05 Mar 11 leaving after 17:35

Transport	Leave	Arrive	Duration
Cycle	17:35	17:50	15 mins / 3.0miles

Maps: Outward journey

You can view different stages of the journey by selecting them in the list and clicking "Show Route"

[Map of entire journey](#) [Show route](#)

Ordnance Survey Maps © Crown Copyright 100020237

Page 3

Cycle Route Details | Transport Direct

Directions:
BS1 8QJ to BS16 1QY

**2.6 Turn left onto cycle path
Route uses shared use footpath**

[Open user comments](#)
[Post a comment](#)

2.7 Take second available left on to Station Lane

[Open user comments](#)
[Post a comment](#)

2.8 Follow Sheldon Road straight on, continue for 0.2 miles

[Open user comments](#)
[Post a comment](#)

Outward journey for Fri 04 Mar 11 leaving after 16:50

Transport	Leave	Arrive	Duration
Cycle	16:50		5 mins / 0.05miles

Maps: Outward journey

Caroline, UWE 4/5/11, 13:11

[See Caroline's profile](#)

Station Lane
Poor visibility due to overhanging vegetation as you emerge from under the railway bridge – watch out for on-coming cyclists as you turn the corner. I had a near-miss this morning!

[open message thread](#)

City of Bristol College
ey Down

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Click to open linked thread

Click to add a response

Page 4

Cycle Route Details | Transport Direct

UWE cycling discussions

Message thread:
Station Lane

Original post:
Caroline
4/5/11, 13:51

Poor visibility due to overhanging vegetation as you emerge from under the railway bridge – watch out for on-coming cyclists as you turn the corner. I had a near-miss this morning!

Replies:
Mark, 4/5/11, 15:02

I agree - does anyone know who should be contacted to try and get the greenery cut back?

Replies:
Becky, 4/5/11, 18:23

Try the Council's Report a street fault pages at....>>[more](#)

[Add a reply](#)

Outward journey for Fri 04 Mar 11 leaving after 16:50

Transport	Leave	Arrive	Duration
Cycle	16:50	17:05	15 mins / 0.05miles

Maps: Outward journey

Station Lane
Caroline, 4/5/11

City of Bristol College
ey Down

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In conclusion, if the range, quality, and perceived reliability of traveller information can be improved through the incorporation of user-generated content - and this research suggests that it can - it may be a matter which warrants consideration for a wider range of advanced traveller information systems, as the technological opportunities for doing so continue to grow.

12.3 Discussion: relevance to behavioural change policies and measures

Following the presentation of theoretical and applied conclusions, in this final section we return to the wider policy context within which the research was originally framed – as set out in the introduction to the thesis. Can any conclusions be drawn from the research with regard to the development of user-generated traveller information as a tool to encourage sustainable travel behaviour and help tackle traffic congestion? In discussing this matter, we also consider areas of further research which are required in order to achieve better understanding in this area.

The research demonstrated that although word-of-mouth traveller information plays a wider social and psychological role than a direct influence on the selection of travel choices, it is indeed one factor which can *contribute* to the selection of a travel behaviour, particularly with regard to details such as route choice. Examples of trip details which were influenced by word-of-mouth were reported by participants in the first phase of the research, and this was directly observed in the case-study, where over half of the participants used a cycle route suggested by another participant. However, as we have acknowledged, word-of-mouth influences are clearly just one amongst a myriad of other factors which affect everyday travel behaviour. Furthermore, where influence does occur, it is not always easy to distinguish straightforward informational influence (when information meets a practical need and is used regardless of its source) from normative influence (where social factors also affect the use of the information). Further research, perhaps of a quantitative nature, would be required to test whether or not there is a direct and significant relationship between the specific social factors discussed in this thesis, and people's propensity to follow the travel advice of others. Moreover, it might be conjectured that cyclists – the main focus of this study - are particularly susceptible to notions of in-group identification, so that further work is required to understand the relevance of this and other social-psychological theories amongst users of other transport modes, in different social contexts beyond the limited socio-economic scope of this study, and with larger samples.

Caveats aside, it is possible to reflect on the relevance of some of the findings to policies and measures designed to encourage sustainable travel behaviour. The exploratory research phase indicated that significant behavioural shifts (such as change of transport mode) are unlikely to result *directly* or *exclusively* from word-of-mouth interactions, and the Cycology project was unable to challenge this finding, as nearly all participants already cycled to work. However, even

those individuals who were less enthusiastic about their own involvement in the project reported that they believed an initiative such as Cycology, if extended for general use within an organisation, could be *one factor* in encouraging people to take up cycling to work. Further research would be desirable, especially amongst people considering, but not yet cycling (or indeed amongst those considering the use of other sustainable transport modes), to explore this further. Whilst the case-study did not generate clear findings about the role of word-of-mouth in encouraging people to start to cycle, it did, however, show that it could help sustain those who had started relatively recently. The process of sharing information could perform a community-building role whereby positive views of cycling as a commuter mode were reinforced, alongside the more obvious functional role of diffusing practical travel information. Both roles were thought to offer particular encouragement to those who were new to cycling or new to a particular workplace, when identification with other cyclists appeared to be especially salient. This is interesting if one recognises the importance of encouraging people not only to start cycling, but also to maintain it once they have started. A recent study for the DfT: *Cycling, Safety and Sharing the Road* (Christmas et al., 2010) notes that the reasons why a person retains a habit are not always the same as their reasons for originally acquiring it:

"This serves as a reminder that, even when we have found the real reasons why people cycle, promoting cycling and sustaining cycling are not the same thing". (p.17)

Thus, the role of informal information-sharing in helping people to *maintain* a sustainable travel behaviour is worthy of consideration in the overall context of behavioural change.

The importance of group identification in the Phase 2 findings also gives rise to the question of whether it is possible to stimulate 'sustainable transport identities' as a means of encouraging sustainable travel behaviour within defined communities such as the workplace, and whether this principle could be developed within the context of travel plans. Such processes may, indeed, already be at work through established initiatives such as communal "bike breakfasts" for cyclists during the annual "Bike to Work Week" in the UK (www.bikeweek.org). One challenge would be to stimulate such identities in a way which draws people in, rather than creating exclusivity; for example, a reference group of people who walk, cycle or use the bus occasionally might be more conducive to travel behaviour-change overall, than would the existence of stereotypical 'hardcore cyclist' in-groups, which might risk alienating potential new cyclists .

Finally, this discussion might be placed within the context of contemporary policy interest in both "nudge theory" (Thaler and Sunstein, 2009, as discussed in the Local Transport White Paper, DfT, 2011), and in understanding how policy 'nudges' towards socially desirable behaviours can permeate through social networks - or alternatively, why some nudges have no effect at all

(Ormerod, 2010). An information-sharing forum such as Cycology may act as a nudge by both increasing choice through the provision of instrumental travel information, but also by communicating normative information about the transport choices which ‘similar others’ are making. It also provides a form of social network through which such nudges can quickly be diffused. Information flows between members of the Cycology group were briefly touched upon in Chapter 8, and there is considerable scope for research into the diffusion of travel information through social networks, and the effects of such information on travel behaviour amongst network members. Greater understanding of network effects may, in turn, contribute to more effective policy-making. As Ormerod (2010) argues:

“when it comes to contemporary challenge – climate change for example – it seems clear that we will often need to induce dramatic mass behaviour change. We are unlikely to do so using simple incentive based approaches and need to get better at harnessing the power of networks.” (p.37)

Drawing on a range of social-psychology theories, and using an exploratory, qualitative approach, this thesis has begun to shed light on the role of ‘spreading the word’ about everyday travel behaviour, especially through the medium of internet technologies, but in this multi-faceted and fast-changing area, there remain new avenues to explore.

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Appendix A – Phase 1 Interview Topic Guide

1. Introduction

- Introduce self, and tell of my position.
- Outline PhD research project:

My research is about the use of different types of travel information, including informal information obtained through word-of-mouth, and its influence on peoples' decisions about how, when and where to travel. One of the ways I'd like to explore this is by asking people how they found out about ways of getting to UWE when they first started here, as well as their use of different types of travel information in other circumstances.

- Purpose of interview research
 - Overview of what the interview will cover
- The interview will take a maximum of 1 hour.
- Confidentiality
 - Material used from the interview will be used in the PhD thesis – quotes from interviewees may be used, and these will be non-traceable and completely anonymous → it may say things like “Male”.
- Right to leave at any time during the interview
- No right or wrong answers – just want thoughts and opinions. If there are any questions you prefer not to answer, you are free to do so.
- Any questions?
- Are you still happy for the interview to be recorded? (this will have been raised previously when interview was arranged)
- Let's start.

2. Warm-up information: experiences, circumstances, behaviours

These questions are intended to be easy to answer, in order to break the ice, provide some contextual information about the interviewee, and introduce the concept of formal and

informal travel information. Replies will not be probed. Spend a maximum of 10 minutes on this section.

2.1 About yourself

- Please tell me a little about yourself in relation to UWE:
 - Are you student/staff, full-time/part-time?
 - How long have you been at UWE?
 - Which campuses do you go to, and how often?
 - Which area do you live in (how far do you need to travel)?

2.2 Your travel behaviour

- How do you usually travel to and from UWE?
 - If by car, do you car-share, and if so, how often?
- What other modes of transport, if any, do you sometimes use to get to or from UWE?
- In general (aside from your journey to/from UWE) what forms of transport do you tend to use?

2.3 Your use of travel information

(Travel information can include information on, for example, travel times, costs, routes, or more personal advice relating to comfort, convenience, safety etc. It might be obtained from formal sources such as paper timetables, internet journey planners, telephone enquiries, or informal sources such as friends and family).

- For what sort of trips do you tend to use travel information?
 - *Prompts: different trip purposes or modes of travel*
Business, leisure, shopping, holiday, going to an event, taking children somewhere...
 - *Different modes of travel*
- Generally speaking, what sources of travel information do you use if you need to plan an unfamiliar trip?

- *Prompts: formal and informal sources.*
- Generally speaking, what types of travel information do you use if you need to plan an unfamiliar trip?
 - *Prompts: formal and informal types.*

3. Core questions: attitudes and explanation

The first two sets of questions in this section are intended to identify a trip example which will yield some in-depth reflection on use and influence of informal travel information..

3.1 Remembering when you first travelled to UWE:

- How did you find out about ways of getting to and from UWE? (*prompts: “ways” can include transport mode, routes, times etc).*

If interviewee mentions only formal information, prompt with:

- When you first started here, did you ask for, or were you offered, any informal information or advice from other people about travelling to UWE?
 - If so, please tell me a little about this information. How far, if at all, do you think it influenced your decisions about how/when to travel?
 - If not, why not?

If the response to this question offers enough scope to probe about informal information, proceed straight to 3.3. If not, ask:

- Have you received any informal information about travel to/from UWE since you first started here?
 - If so, please tell me a little about this information. How far, if at all, do you think it influenced your decisions about how/when to travel?
 - If not, why not?

If the response offers enough scope to probe, proceed to 3.3. if not, ask:

3.2 Thinking about other sorts of trip:

- Can you think of an example of another trip you needed to plan? (*prompts*: e.g. *business, leisure, shopping, holiday, going to an event, taking children somewhere*). If so, please give details:
 - where you were going and why
 - whom you were travelling with
 - by what mode of transport
- What sort of travel information did you use to help plan this trip?
- Did you receive any informal information or advice from other people?
 - If so, please tell me a little about this information. How far, if at all, do you think it influenced your decisions about how/when to travel?
 - If not, why not?

If not, ask whether they can think of an example when they did.

3.3 The use and influence of informal information (compared with formal information) for this particular trip

I'd like to hear in more detail about the informal information you have used for your travel to UWE/other trip example, compared with formal information.

- Who was the other person/people who gave you this information/advice?
- Who else might you have asked and why?

Attitudes to/relationship with information-giver

- How much confidence did you have in the information/advice you received? Why was this the case? Did you trust it more or less than formal sources of information? (**Trust**)
- How much did you feel you identified with the person/people giving you the information/advice? (**Social Identity**). What kind of things do you have in common with them (e.g. gender, age, occupation etc?)
(**Homophily/heterophily**)

- Is the person/people who gave you the information particularly important to you (e.g. close friend/family member/partner)? If so, how important was it to you that they approved of your transport arrangements for this particular trip?
(Subjective norm)

- What advice did they give you?
- Did you act on it?
- Did you ask them for this information, or did they offer it voluntarily?
 - If you asked them, why did you want/need this informal information?

Prompts: saving time/effort; information not available from formal sources; opportunity for social interaction.

- What do you think you learned which you think you could not have learned from formal types and sources of information? *Prompts: routes, services, times, convenience, reliability, parking etc.*

Attitudes to information content (e.g. transport mode) :

To what extent did you act on this advice because it related to “normal” travel behaviour (something everyone else does), or a behaviour you consider to be the “right” thing to do (something everyone ought to do)? **(Social norm)**

- Why do you think they provided you with it?
- How did these discussions take place? *Prompts: face-to-face, by phone/email etc...*
- How carefully did you feel you needed to plan this journey? How important was other people’s advice to you in reducing uncertainties? (e.g. risk of being late, getting lost etc?)
- How far could you have planned this trip on your own without asking others for advice?
(self-efficacy)
- How do you feel, generally, about asking people for advice **(self-presentation)**
 - If you don’t ask people, why not?
- How typical is the example you have just described of your use of travel information more generally?

3.4 Turning these questions around to information you have given to others:

- What type of information/advice have you given to other people about travelling to/from UWE? (*if interviewee can't think of examples, ask about another specific trip*)

- To whom did you give this information/advice?

(prompt: friends, other students on your course, colleagues, strangers etc)

- Did they ask you, or did you offer your advice without being asked?

- Why did you respond to their request, or offer this advice?

Expect interview to say they wanted to be helpful, but try to probe reasons, e.g.

- **pro-social values**

- conforming with **social norms** (expected behaviour to assist someone when they ask)

- wanting to look helpful (**self-presentation**)

- wanting to help this person because he/she is like me (**social identity**)

- Wanting to influence the other person towards a particular travel behaviour (e.g. because you feel strongly about it).

- In what ways do you think this information might have influenced their travel choices?

4. Wind down: suggestions/looking to the future

- Can you think of any improvements which could be made to the travel information available to people coming to UWE?

- In what ways might *informal* information be made widely available to people coming to UWE (or for transport more generally)?

5. Close

- That is the end of the interview
- Do you have any questions or anything you would like to add to what you have said already?
- Thank you for taking part in the interview

Appendix B – Phase 1 Focus Group Topic Guide

Before beginning the discussion: offer refreshments

Place name cards on table.

1. Scene-setting and ground rules:

- Welcome
- Introduce self and research

My research is about the use of different types of travel information, including informal information obtained through word-of-mouth, and its influence on peoples' decisions about how, when and where to travel. One of the ways I'd like to explore this is by asking people how they found out about ways of getting to UWE when they first started here, as well as their use of different types of travel information in other circumstances.

- Housekeeping (toilets, exit?)
- Expected roles of participants. No right or wrong answers – just want thoughts and opinions. If there are any questions you prefer not to answer, you are free to do so.
- Any questions?
- Recording of discussion (please only one person speaking at once), note-taking
- Confidentiality: Material used from the interview will be used in the PhD thesis – quotes from interviewees may be used, and these will be non-traceable and completely anonymous
- Consent forms
- Let's start. Switch on tape recorder

2. Individual introductions

- Ask each member of the group to introduce themselves:

Names

Area of study

- Jot down table plan with names.

3. Opening topics (10 minutes):

- Your travel behaviour
 - By what means do you usually travel to and from UWE (car etc.....)?
 - Does anyone ever use any other modes for this trip?
 - Which areas do you live in (how far do you need to travel)?
 - In general (aside from your journey to/from UWE) what forms of transport do you tend to use?
- Your use of different types of travel information

I'd like to move on now to the topic of travel information, which is the subject of this study. Here are a few pictures, illustrating some sources of travel information.

- What do you think of these examples? Can you suggest any others?
- Which of these do you tend to use?
- For what sort of trips would you use them? E.g. more for some modes than others?

Try to cover both pre-trip and on-trip.

- What type of information do you tend to receive or pass on through word of mouth? (e.g. convenience, comfort, reliability)
- Does anyone use any informal, electronic means of information-sharing concerning travel (e.g. plotting routes on maps, social networking, email discussion forums, message boards)

4. Discussion

4.1 Remembering the first time you came to UWE (20 minutes)

NB need to work hard at steering the discussion away from general comments about transport services and road congestion.

- How did you find out about ways of getting to and from UWE during your first two weeks? (*prompts: “ways” can include transport mode, routes, times etc*).
- When you first started here, did you ask for, or were you offered, any informal information or advice from other people about travelling to UWE?
 - If so, please tell me a little about this information. How far, if at all, do you think it influenced your decisions about how/when to travel?
 - If not, why not?
 - Did it just come up in conversation?
- Do you think you have influenced anyone else by passing on informal information?
 - If so, how?
 - If not, why not?

4.2 Example of another unfamiliar trip (20 minutes)

Ask everyone to think of an unfamiliar trip they have made in the past year. This might be, for example, a trip for work, leisure, shopping, a holiday, going to a special event, or travelling with someone they wouldn't normally go to this place with.

- Please give details of the trip:
- What sort of travel information did you use to help plan this trip?
- Did you seek any informal information or advice from other people?
 - If yes, what, and from whom?
 - If not, why not?
 - did it just come up in conversation?

- How far do you think your decision about how, when or where to travel was influenced by informal information?
- How did it influence you (e.g. mode choice, route)?

4.3 Reasons why you might have been influenced by informal information (30 minutes)

Use sort cards demonstrating some social-psychological factors: get group to organise them in order of importance and discuss choices. Have blank cards so that other factors can be identified during the discussion.

Attitudes to/relationship between information-giver and recipient

- The person was a close friend/family member.
- I trusted the other person.
- I felt I had things in common with the other person.
- I wanted the other person to approve of my travel arrangements.

Attitudes to information content

- I had confidence in this information.
- the information I was given related to "normal" travel choices (most people would travel in this way)
- the information I was given related to travel choices, which I think people *should* make

Attitudes to seeking and acting on information (differentiate between pre-trip and on-trip)

- I am generally happy to approach other people for advice.
- I needed to plan this journey carefully
- other people's advice was important to me to reduce the uncertainty of this journey.
- I could not have planned this trip without asking someone's advice.

4.4 Reasons why you have given information to others (*differentiate between pre-trip and on-trip*)

- I wanted to make their life easier.
- I was confident about the accuracy of the advice I was giving
- I am a helpful person.
- I wanted to influence the other person to make travel choices, which I believe are right.
- it is "normal" to help people.
- I wanted to look helpful.
- I wanted to help the other person because they are like me
- It just came up in the conversation

5. Winding down (10 minutes)

Ending the discussion: signal that end of discussion is approaching.

- Do you think it might be helpful if *informal* information were more widely available to people coming to UWE (or for transport more generally)?
- If so, how could this be done?
- Would anyone like to say anything else?

Thank you for taking part.

Give out the money/vouchers (recipients must sign to say they have received it).

Appendix C – Exploring social-psychological factors: examples from research

1. Role beliefs (TIB)

Bamberg, B. and Schmidt, P. (2003). Incentives, Morality of Habit? Predicting Students' Car Use for University Routes With the Models of Ajzen, Schwartz and Triandis. In *Environment and Behaviour* 2003; 35; 264. Sage Publications.

- *For me as a student it is (appropriate/not appropriate) to use the car for university routes.*
- *Using a car for university routes is (fitting/not fitting) my position as a student.*

NB Role beliefs are linked to **self-identity** (identity as a student, academic, mother etc).

2. Subjective norm (TPB)

Bamberg and Schmidt (ibid).

- *How strong would 1) your friends; 2) your partner support you if you use the car for university routes next time?*

Perugini, M. and Connor, M. (2000). Predicting and understanding behavioural volitions: the interplay between goals and behaviours. In *European Journal of Social Psychology*, 30, 705-731. John Wiley and Sons Ltd.

- *People who are important to me think I should/should not perform activity Y in the next 4 weeks to try to achieve goal X.*
- *People who are important to me would approve/disapprove of my performing activity Y in the next four weeks to try to achieve goal X.*
- *People who are important to me want me to perform activity Y in the next four weeks to try to achieve goal X.*

3. Personal norm (Schwartz's norm activation model)

- Bamberg and Schmidt (ibid).
 - *If I use the car for my university routes next time I would have a moral stomach-ache (likely/unlikely)*

- *Not using environmentally friendly travel modes like bike or public transport for university routes next time would violate my principles (agree/disagree)*
- *How strongly do you feel a personal obligation to use environmentally friendly travel modes like a bike or public transport for university routes next time?*

4. Social Norms

Sherif, M. (1936) *The Psychology of Social Norms*. New York. Harper and Brothers (Harper Torchbook edition, 1966).

A very broad area! Social norms are described by Sherif (1936) as “customs, traditions, standards, rules, values, fashions and all other criteria of conduct which are standardised as a consequence of the contact of individuals.” (1936, p3). He conducted experiments to test the process of consensus formation within groups, showing how shared social norms emerged.

Injunctive and descriptive social norms (and personal norms) were tested in an experimental field setting (observing whether people dropped litter under controlled conditions by:

Cialdini, Robert, R Reno and C Kallgren 1990. A Focus Theory of Normative Conduct: recycling the concept of norms to littering in public places. *Journal of Personality and Social Psychology* 58, 749-758.

However, “There is no definitive scientific theory of social norms” (Turner, J.C., 1991, p2).

Turner, J.C. (1991) *Social Influence*. Open University Press, Buckingham

5. Prestige

Ellaway, A., Macintyre, S., Hiscock, R. and Kearns, A. (2003). In the driving seat: psychosocial benefits from private motor vehicle transport compared to public transport. *Transportation Research Part F*, 6, 217-231

- *Most people would like to travel by the type of car/public transport that I use*
- *When I travel by car/public transport it makes me feel I'm doing well in life*

6. Self-presentation

Cramer, K., and Gruman, J. (2002). The Lennox and Wolfe revised self-monitoring scale: Latent structure and gender invariance. *Personality and Individual Differences*, **32(4)**, 627-637

Lennox and Wolfe (1984) Revised Self-Monitoring Scale

- In social situations, I have the ability to alter my behavior if I feel that something else is called for.
- I am often able to read people's true emotions correctly through their eyes.
- I have the ability to control the way I come across to people, depending on the impression I wish to give them
- In conversations, I am sensitive to even the slightest change in the facial expression of the person I'm conversing with.
- My powers of intuition are quite good when it comes to understanding others' emotions and motives.
- I can usually tell when others consider a joke to be in bad taste, even though they may laugh convincingly.
- When I feel that the image I am portraying isn't working, I can readily change it to something that does.
- I can usually tell when I've said something inappropriate by reading it in the listener's eyes.
- I have trouble changing my behavior to meet the requirements of any situation I find myself in.
- I have found that I can adjust my behavior to meet the requirements of any situation I find myself in.
- If someone is lying to me, I usually know it at once from that person's manner of expression.
- Even when it might be to my advantage, I have difficulty putting up a good front
- Once I know what the situation calls for, it's easy for me to regulate my actions accordingly.

7. Self-identity (Stryker)

Sparks, P. & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Social Psychology Quarterly*, **55(4)**, 388-399.

- *I think of myself as a 'green consumer';*
- *I think of myself as someone who is very concerned with 'green issues'.*

Terry, D.J., Hogg, M.A. and White, K.M. (1999). The theory of planned behaviour: Self-identity, social identity and group norms. *British Journal of Social Psychology*, 38, 225-244

- *'to engage in household recycling is an important part of who I am' (1 5 no, definitely not to 7 5 yes, definitely) ;*
- *I am not the type of person oriented to engage in household recycling ' (1 5 completely false to 7 5 completely true) ;*
- *'I would feel at a loss if were forced to give up household recycling ' (1 5 strongly disagree to 7 5 strongly agree)*

Self identity is linked to **role beliefs**.

8. Social Identity (in-group, out-group – Tajfel)

NB. Both self-identity and social identity contribute to **self concept**. In social identity theory, identity emanates from the group memberships.

Terry, D.J., Hogg, M.A. and White, K.M. (1999). The theory of planned behaviour: Self-identity, social identity and group norms. *British Journal of Social Psychology*, 38, 225-244

Group norms:

- *How many of your friends and peers would engage in household recycling ? ' (1 5 none to 7 5 all)*
- *'Most of my friends and peers think that me engaging in household recycling during the next fortnight would be.. ' (1 5 undesirable to 7 5 desirable).*

Identification with the reference group:

- *'How much do you identify with your group of friends and peers? ' ; 1 5 not very much to 7 5 very much)*
- *'In general, how well do you feel you fit into your group of friends and peers ? ' ; 1 5 not very much to 7 5 very much.*

9. Social Values

Liebrand, W: The ring measure of social values.

- *How would you share a resource between yourself and an unknown other?*

10. Social influence

Yos Sunityoso: draft thesis

- Would the number of people currently participating in car sharing affect your decision on whether or not to join the programme?

For example: You may consider joining car sharing if a significant number of people have already been joining.

- If your answer is **Yes**, what is the percentage of students at Frenchay campus participating in car sharing programme that may encourage you to join?

11. Homophily/heterophily

These concepts, developed by sociologists in the 1950s, were used by Everett Rogers in *The Diffusion of Innovations* (1983); also known as the “Like me principle” - Laumann, E. O. (1966), *Prestige and Association in an Urban Community*, Indianapolis, IN: Bobbs-Merrill.

Hypotheses about the role of homophily and heterophily in WOM referral behaviour were tested in the following study:

Johnson Brown, J. and Reinigen, P.H. (1987). Social Ties and Word-of-Mouth Referral Behaviour. In *The Journal of Consumer Research*, Vol. 14, No.3 (Dec., 1987), pp350-362.

In this strong and weak ties analysis, standard socio-demographic questions were asked about respondents' occupation, age, gender, education etc. Ties were classed as homophilous (heterophilous) when they had identical (different) category memberships for at least three of these attributes.

Appendix D – The influence of theory-driven analysis methods

Phenomenological analysis

Phenomenological psychological research involves investigating and analysing lived examples of the phenomenon under study within the context of the participants' lives, in order to understand the psychological meanings that constitute the phenomenon. Phenomenological techniques can be used to reveal meanings of which the research participants themselves may not be aware. Giorgi and Giorgi (2008) state that: "*while persons' awarenesses are concomitant with these lived experiences, they are hardly ever totally coincident to what is being experienced by them. Usually, the capacity to live through events or respond to different situations greatly exceeds the capacity to know exactly what we do or why we do what we do.*" (pp28). Arguably, such attempts to read below the surface of participants' accounts are common to any interpretive reading of qualitative data, but are particularly useful when, as is the case in this PhD, underlying psychological meanings are sought.

The "database" in phenomenology is often based on retrospective descriptions, since the key data to be analysed concern the way in which people actually live through and interpret situations. The bulk of the data collected in this PhD were indeed retrospective descriptions (obtained through interview and to a limited degree through questionnaires).

Giorgi and Giorgi (2008) identify the following steps in phenomenological data analysis:

- reading of the participant's entire description by the researcher;
- constitution of the parts of the description: the text is divided into 'meaning units';
- transformation: meaning units are actively transformed by the researcher. For example, what is implicit may be transformed to the explicit, allowing the analysis to reveal meanings that are lived, but not necessarily clearly articulated by, or in the full awareness of the participant; secondly, a degree of generalisation occurs; thirdly, an attempt is made to describe what took place in a way which renders psychological meanings more visible.
- determining 'structures': attempting to determine which constituents are typically essential in order to account for the actual experiences reported, as well as the relationship between the different constituents.

Interpretative Phenomenological Analysis

IPA is phenomenological, but with the added dimension of emphasising the active role of the researcher in the research process. The researcher is attempting to get close to the participant's personal world, but this access is complicated by the researcher's own conceptions; these conceptions are in fact essential if the researcher is to make sense of that other personal world through a process of interpretation. As previously explained, interpretation and reflexivity were key aspects of the current analysis. As in phenomenology, participants' retrospective accounts (often emerging from semi-structured interviews) usually constitute the main form of data in IPA. Analysis is idiographic, starting with the detailed examination of the interview transcripts, one at a time, before slowly working up to more general categorisations. Smith and Osborn (2008) suggest the following steps in conducting an analysis:

- Looking for themes in the first case: the researcher annotates the transcripts with comments. Initial notes are transformed into concise phrases, and the themes move to a slightly higher level of abstraction.
- Connecting the themes: connections are then sought between the emergent themes, so the order of themes becomes more analytical or theoretical.
- Continuing the analysis with other cases, respecting both convergences and divergences in the data.
- Construction of superordinate themes across the different cases. By reaching higher levels of abstraction, convergences may appear across seemingly disparate cases, so the analysis respects both theoretical convergence and, within that, individual idiosyncrasy in how that convergence is demonstrated.

It might be argued that these steps could be translated to any form of thematic qualitative analysis, but the emphasis here is on understanding participants' meanings and acknowledging the role of researcher interpretation, both key considerations in the current analysis. However, as already discussed, the use of phenomenology or IPA in their pure forms was rejected because of inconsistency with the epistemological approach of the thesis (there is no intention to "bracket off" reality and study only the life world of participants).

Grounded theory

Finally, the present analysis was also informed by grounded theory, which emphasises the generation of theory which is *grounded* in data. It assumes that social phenomena are complex and therefore require "conceptually dense" theory, at various levels of generality, based on the analysis of qualitative data. A grounded theory is inductively derived from the study of the phenomena it represents: "*one does not begin with a theory, then prove it. Rather, one begins*

with an area of study and what is relevant to that area is allowed to emerge.” (Strauss and Corbin, 1990, pp23). Grounded theory has been associated with the philosophical tradition of symbolic interactionism (Snape and Spencer, 2003).

As the concepts and theory most relevant to this research were not clearly defined at the outset in the project, grounded theory provided a useful approach to start to understand the role played by informal information-sharing in travel behaviour. The use of grounded theory in transport research featured only rarely in the literature review, although it should be noted that it is not a research method in itself, but a framework in which to use and interpret findings using appropriate methodology. Therefore, one might argue that this approach was used implicitly in the design of some studies, particularly those using qualitative methods. As the present research evolved it was felt appropriate to incorporate a certain degree of structure into the interview and focus group schedules, which then informed the process of coding and analysis. Moreover, this research did not emerge from vague concepts without any grounding in existing theory and previous empirical work, as would have been required by a purist grounded theory approach. The research approach was not therefore one of grounded theory in the strict sense, but more akin to *constructivist grounded theory*, which acknowledges that researchers enter the research scene not as impartial observers, but with an existing interpretive frame of reference (Charmaz, 2005).

This section has attempted to show how three specific approaches influenced the evolution of thinking about the analysis within this thesis, but without being considered appropriate for wholesale adoption.

Appendix E – List of NVivo codes, Phase 1

1. General travel behaviour

- 1.1. Reasons for modal choice to UWE
- 1.2. Reasons for modal choice for general travel
- 1.3. Choosing to live close to work or work close to where you live
- 1.4. Intentions to use other transport modes

2. Use of travel information

- 2.1. Understanding of the term travel information
- 2.2. In general, trips for which travel information is used
 - 2.3. Travelling with other people
 - 2.4. Visiting friends and family
 - 2.5. Specific trips
 - 2.5.1. Non-UWE trips - information considered
 - 2.5.2. Information considered and/or used for first trips to UWE
 - 2.5.2.1. Formal travel information
 - 2.5.2.2. Informal travel information

3. Interaction between formal and informal information

- 3.1. Preference for formal or informal information
- 3.2. Combining formal and informal – complementarity

4. Attributes of informal information

- 4.1. Professional advice
- 4.2. Informal travel information
 - 4.2.1. Specific contribution of informal information
 - 4.2.2. Internet reviews or message boards
 - 4.2.3. Difference between advice and information
 - 4.2.4. Crops up in conversation
 - 4.2.5. People who give me travel information

- 4.2.6. People tell you the bad things
- 4.2.7. Subconsciously absorbing information from others

5. Receiving travel information or advice from others

- 5.1. How it influenced my travel decision
- 5.2. Why it did not influence my decision
- 5.3. En route information
 - 5.3.1. Choosing whom to approach
 - 5.3.2. Safety
 - 5.3.3. Being in the same situation
- 5.4. Pre-trip information
- 5.5. Attitudes to information content
- 5.6. Attitudes to or relationship with information giver
 - 5.6.1. Trust
 - 5.6.2. Having things in common (social identity)
 - 5.6.3. Approval (subjective norm)
 - 5.6.4. Friendliness
 - 5.6.5. How well you know the person (incl. shared values)
 - 5.6.6. Experience of information-giver
 - 5.6.6.1. Benefiting from other people's local knowledge
 - 5.6.6.2. Picking up on peoples' experiences
 - 5.6.7. Reinforcing my own choices
 - 5.6.8. Saving time or effort
 - 5.6.9. Seeing that it was feasible

6. Making my own mind up

7. Giving information or advice to other people

- 7.1. Why other people give advice or information
- 7.2. Pre-trip advice to others
 - 7.2.1. Influence of informal info on other people's decisions

7.2.2.Motivations

- 7.2.2.1. Reciprocity
 - 7.2.2.2. Wanting to be directive
 - 7.2.2.3. Not wanting to impose your own views
 - 7.2.2.4. Making it easier for people
 - 7.2.2.5. social expectations
 - 7.2.2.6. Sharing your local knowledge
- 7.2.3.Thinking about other person's preferences
- 7.2.4.How well you know the person
- 7.2.5.Being confident of your knowledge
- 7.2.6.Trust

7.3. En route advice to others

- #### 7.3.1.Motivations
- 7.3.1.1. empathy or reciprocity
 - 7.3.1.2. Making it easier for people
 - 7.3.1.3. social expectations
 - 7.3.1.4. being in the same situation
 - 7.3.1.5. Not wanting to impose own views
 - 7.3.1.6. how you are feeling
 - 7.3.1.7. Being confident of own knowledge
- 7.3.2.Not wanting to help people

8. Other factors influencing travel decisions

- 8.1. Own experience
- 8.2. Trial runs of time sensitive trips
- 8.3. Preferred travel habits
- 8.4. Giving it a try
- 8.5. Instrumental factors
- 8.6. Modal identities
- 8.7. Personal norms

8.8. Personality factors

- 8.8.1. Attitudes to uncertainty
- 8.8.2. Self-efficacy
- 8.8.3. Concerns about social norms of travel
- 8.8.4. Self-presentation
- 8.8.5. Concern about lateness
- 8.8.6. Finding travel stressful

8.9. Cognitive factors

9. General interactions about transport

- 9.1. General conversations en route
- 9.2. General conversations when not travelling

10. Social norms

- 10.1. Norms of travel to and from UWE
- 10.2. Group norms
- 10.3. Injunctive social norms

11. Ideas about providing informal travel information at UWE

Appendix F – Post-Cycology Questionnaire

NAME:

1. How would you describe your experience of using the Cycology website, and participating in the project overall?

2. What was your impression of the information/comments posted on the website by the other participants?

3. Were there any postings you particularly liked (or disliked) and why? Please give one or two examples if you can.

4. Were there any postings you found particularly useful (or not useful) and why? Please give one or two examples if you can.

5. How far did you feel the information was reliable, compared with, for example, routes marked on a normal cycling map? Please explain your answer.

6. How did you feel about contributing information/posting questions yourself? (e.g enthusiastic, reluctant, non-committal – please explain why)

7. Did you have any “off-line” conversations with any of the other participants, relating to the project? If so, please expand (e.g. with whom, what about?).

8. Did you consider doing, or actually do, anything different (e.g. try a new cycle route) as a result of reading comments on the website? Please explain your answer.

9. Did your participation in the project give you any other new ideas or thoughts relating to cycling and travelling more generally? (if so, please explain)

10. What do you think would be the pros and cons of making interactive cycling information such as this available for general use:
 - on a secure website within an organisation?
 - on a publicly accessible website?

11. Do you think this type of web-based information-sharing might work in relation to forms of transport other than cycling? Please explain your answer.

Thank you for taking the time to fill in this questionnaire!

Please return to caroline.bartle@uwe.ac.uk and retain a copy for yourself.

Appendix G – Cycology interview guide template

Cycology Interview Guide template

Template to be modified for each interviewee, informed by observational and questionnaire data.

Interviews should preferably be held in a location with a computer and access to the website (where this is not possible, printed screen shots will need to be taken to the interview).

Warm-up questions:

1. How would you describe your current level of cycling activity? (e.g. occasional, “fair weather”, committed)
2. Turning to the Cycology project, can you describe how you used the website/email digests? For example:
 - approximate frequency of reading and posting
 - prompted by email digest?
 - just read email digest without going to the site?
 - ignored digest?
 - read most postings, or only picked particular types or particular people (if so, follow this up in main questions)

Main questions: social-psychological mechanisms

The following questions aim to reveal, inter alia, different types of trust (e.g. relational trust, calculus trust) in the information and information-giver. There is some overlap in these questions, so it is unlikely that every participant will be asked every question.

3. In your questionnaire, you said you liked this comment. Can you expand a little on why this was? (if none was identified, ask them to browse website for a few moments to find an example – encourage them to “think aloud” while doing so).
 - content?
 - use of language?
 - something about the writer?
 - reliability of the content/writer?

If participant does not talk about “usefulness” in their answer, ask them to also identify a comment or set of comments they found “useful”. Ask them to expand on why it was useful, using similar prompts.

4. Were there any comments you did not like? If so, what didn’t you like about them?

Was there a participant (or a number of participants) whose contributions made a bigger impression on you than others? (could add: for example, I can see from the data that you looked at this person’s postings a lot)

- why was this?
- what impression did you gain of that person?
- had you met or did you know anything about them beforehand?
- how reliable would you consider their postings to be, and why?

If interviewee is not forthcoming in providing examples, show him/her a few contrasting examples of different types of posting (e.g. some very factual, some very chatty, some with thumbnail photos, some using pseudonyms) and ask them to talk about them, using the same prompts as above. .

Motivations for providing information to others (e.g. pro-social values, in-group identity/“community spirit”, wishing to influence others):

5. How did you feel about posting comments yourself? (can you expand on what you said on your questionnaire?/I note that you were an active contributor/I note that you only made a few comments but you looked at other people’s contributions.....)

For more frequent contributors:

- can you explain what motivated you to contribute?
- did the small group environment make any difference - would you have made the same type of contributions to a public website?
- what did you think of the responses (if there were any) to your contributions?

For less frequent contributors:

- can you identify anything which prevented you from posting many comments? (e.g. social inhibition, lack of time)

6. How would you feel (or did you feel) if/when someone said they were going to try your route or otherwise follow a suggestion you had made? (show examples in cases where this had actually happened)

7. How would you feel if someone who had not yet cycled to work saw advice/route suggestions you had put on the website and gave it a go? (this is a theoretical question, as there was no one in the project who was still only thinking about cycling to work).

Social identity

8. Did it matter that most participants worked at UWE like you?

OR: did it matter that most participants did not work in the same organisation as you? If yes, would you have felt differently about the project if it had been internal to your own organisation?

9. Did the Cycology project help engender any sense of belonging to a “cycling community”? – please expand.

Influence on self-reported attitudes, intentions and behaviour

10. Did your participation in the project lead you to do anything different (e.g. trying a new route /think about doing something different/ provoke any new thoughts about cycling or travel more generally? (refer to questionnaire responses). Did you learn anything new?

11. If you acted on someone’s advice within the project, or are thinking of doing so, can you say why you considered their advice to be reliable? (could ask them to identify the relevant posting and then explain what appealed to them about it – beyond the purely instrumental).

Wind down Questions

12. What is your overall assessment of the Cycology project?

- what worked well and did not work well?
- what would you improve?
- do you think it has the potential to encourage prospective and hesitant cyclists?

13. Do you think anything could have improved the social interaction?

14. What suggestions might you make to a website designer?

15. How do you think this sort of informal information system compares with online, door-to-door route planners? (could show an example)
16. In what kind of context could online information-sharing such as this best be applied? E.g. privately within an organisation/on a public website/in relation to transport other than cycling? (refer to questionnaire answers)
17. Do you think any of the information collected in the Cycology project should be kept? (e.g. routes imported onto public Bike layer of BristolStreets website). If so, need to discuss details, as each route/comment will only be made public with the consent of the person who originated it.
18. Do you have anything else you would like to add?

Thank you for your participation!

Appendix H – Cycology Guide for Participants

Caroline Bartle

Research student

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Cycology Project:

Cycling and on-line information-sharing

Participant Guide

What the project involves

Thank you for agreeing to take part in this research project about the sharing of local cycling information, using a secure section of www.bristolstreets.co.uk, a local map-based website providing transport and other local information. You are one of a small group (about 25 people) who have been recruited to the project to share cycling routes and other information with one another over a period of 6 weeks, starting on Monday 8 June. The group comprises people with different levels of cycling experience who are currently cycling to work or study (or contemplating doing so) at a number of neighbouring organisations in North Bristol.

Although the project runs for 6 weeks, it should only take a few minutes of your time every day or so, at a time convenient for you. You could mark your favourite cycling route/s on the interactive map, post comments or photographs, and ask questions about local cycling matters. You will receive a regular email digest of new postings on the website. At the end of the six weeks you will be invited to a face-to-face interview to discuss your experiences of taking part in the research.

Using the Cycology layer of the website

1. Setting up an account on www.bristolstreets.co.uk

Because this area of the website will be visible only to the project participants, you will need to sign in with a password in order to access it. You will need to register on the site to create your log in password associated with your email address. If you intend to use an email address other than the one you have already given as your contact email, **please let me know this other address in advance** (preferably by email) as access to the research layer will only be given to email addresses which are known to be participants.

To register, open the website home page, and click on **Sign in** in the top right hand corner. The email address you use will be the one to which your email digest will be sent. Make up a password and click the sign in.

You will then receive an email and will need to follow the hyperlink to confirm your registration. Once this is confirmed, you log in using the same sign-in box you used to register.

Once logged-in, click on the **home** icon on the side menu to make the **cycology** icon appear. Click on the **cycology** icon to enter the project area.

2. Choosing your account settings

Once signed in, click on the my stuff icon, followed by account icon, on the side menu.

Set your “how may we use your email to contact you?” to announcements (this is the email digest).

Set your site name (this will appear on all your postings). If you do not change this it defaults to the part of your email address before the “@”. You can use your real name or a nickname if you prefer.

Please click the “Add/Change Picture” button to upload a picture to appear as a thumbnail with your postings. The thumbnail will help other users recognise your posts. It does not

necessarily have to be a portrait, but that is what most people will use¹¹.

Click on home to return to the bristolstreets home page.

Click on cycology to return to the project area.

3. Switching between cycology and the rest of the bristolstreets website

You can switch to other parts of the website without logging out by clicking the **home** icon.

To return to the project area, simply click on the **cycology** icon. Please check that you are in the project area before posting your comments, routes etc.

A word of warning: if you click on the **bike** icon on the bristolstreets home page, you will enter a different layer of the site where you will see markers posted by cyclists as part of the City Council cycling survey. Any comments you add here will be publicly visible as this is not part of the cycology project. If in any doubt, check the side menu - if you see the cycology icon in the top right corner of the menu, you are in the right place!

4. Using different map views

You can look at the map in either terrain mode or satellite mode by clicking the mountain or satellite buttons on the tool bar along the top. You can choose to have road names and colours denoting main roads visible by clicking the road sign button between the terrain and satellite buttons.

¹¹ Please note that all information uploaded by participants to the cycology area of the website (names, photos, travel information etc) will only be visible to other participants, the researcher, and the website administrator. You will not be identified in the reporting of the research - even if you choose to use your real name and photo within the project, these will be anonymised in the writing-up of the research.

5. Choosing the types of information you want to see

You can turn different types of information on and off by checking the boxes on the side menu when you are on the home page of the cycology area:

- a. Existing overlays and markers

Overlays

Cycle paths and cycle lanes

Quiet and recommended roads

Markers

Cycle parking

Cycle shops

- b. Markers created in the project

Visitor markers

Only show markers with routes

Show comment titles on map

The visitor markers have different colours and shapes as each identities a different participant.

6. Looking at routes and creating new ones

To see a route created by another participant, you need to click on the relevant marker, and the green line marking the route will appear. Only one green line is visible at a time. To be able to get a quick idea of which routes you might want to look at, check the **only show markers with routes** box, and the **show comments titles on map** box.

You can also choose which route to look at by clicking on the **comments** icon and checking the **comments with routes only** box. Clicking on a route comment on the side bar will open up the marker on the map.

To add a new route, click on the **add route** icon on the side menu. Instructions for drawing lines on the map can be found on side bar. When you have finished drawing the line, click **save route**, and a comments box will appear in which you can write the route origin and destination and a route description (and upload a photograph if you like). When you save

this, the marker will appear on the map at the beginning of the route. If you want to add a comment or photo along a route, you will need to create the route in separate segments, or add an additional comments marker later.

7. **Reading and adding comments**

If you want to add a new comment to the map, simply move your mouse to the position you would like to put it, and click once quickly.

NB it is quite easy to create a new marker in this way by accident – if this happens, just click the **cancel** button when the comments box opens.

You can also create a non-geographical comment by clicking the **start a floating comment** button.

The quickest way to read and respond to an existing comment is by clicking on a visitor marker on the map, which opens the comment box, you can then click the “add comment” link in the lower part of the comment box.

Clicking the **comments** icon on the cycology home page allows you to read comments on the side bar and filter them. You can choose to:

Show comments with routes only

Show floating comments only

Show comments by individual participants

Clicking on a comment on the side bar will open up the marker on the map.

8. **The email digest**

You will receive a regular (a maximum of once a day) email digest containing all new postings on the cycology layer of the website. Clicking on a hyperlink will take you directly to the new comment on the webpage.

Further help

There is a help feature at the bottom of the screen on bristolstreets, but if you have any further questions about using the website, or any other aspects of the project, please do not hesitate to contact me.

Confidentiality, data protection and code of conduct

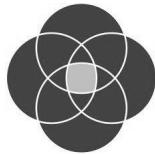
Your attention is drawn to confidentiality and data protection section of the project information sheet, and to the code of conduct for on-line discussion. In line with UWE research ethics requirements, you will also be asked to sign a consent form before starting the project.

And finally.....

I hope you will find participating in this project to be an enjoyable and useful experience. As well as helping me with my PhD research, I hope that it might make a contribution (however small!) to building a “cycling culture” in this part of Bristol, as well as helping to inform discussion on the value of web-based “peer-to peer” travel information.

Caroline Bartle, 27/05/09

Appendix I – Information sheet for Cycology participants



Centre for
Transport &
Society

Cycology Project:
Cycling and on-line information-sharing
Project Information Sheet:

This project constitutes a specific case-study within a 3-year PhD study exploring word-of-mouth influences on everyday travel behaviour¹².

What is the research about?

The aim of this research is to explore information-sharing, via the internet, amongst a small group of people (approximately 25) who are either already cycling, or considering cycling, to a number of neighbouring organisations in North Bristol.

What will it involve?

You will be invited to share cycling routes and other information with one another using a specially designed, secure section of the website www.bristolstreets.co.uk. The research runs over a period of 6 weeks, starting on 8 June 2009, but should only take a few minutes of your time every day or so (whenever convenient for you). You could mark your favourite cycling route/s on the interactive map, post comments or photographs, and ask questions about local cycling matters. At the end of the six weeks you will be invited to a face-to-face interview to discuss your experiences of taking part in the research and any influence you think it might have on your commuting behaviour. I may also contact you occasionally by email or telephone during the course of the experiment.

¹² Full title: *Exploring word-of-mouth influences on travel behaviour: the role of informal information and its implications for advanced traveller information systems.*

Confidentiality and data protection

Content added to the secure area of the website will be visible only to the research participants, the PhD researcher and the website administrator during the experiment. By default it will be removed from the website and anonymised on completion of the experiment. However, you may request any content you have created to be transferred to the main (public) area of www.bristolstreets.co.uk after the experiment (for example if you think the cycle routes you have marked would be of interest general users of the website). Your browsing activity on the website will be recorded during the course of the project in order to provide basic quantitative data, such as the most and least frequently looked at routes and comments on the website, but this will cease immediately upon completion of the project. Any such data will be anonymised and securely stored.

Your name will not appear in any reporting of the research results: all participants will be given a pseudonym and participant anonymity will be maintained in my PhD thesis and any related academic publications and presentations. All information will be kept securely and only shared within my PhD supervision team. Your participation is voluntary, and you are free to withdraw from the study if you wish at any time.

On-line discussion “code of conduct”

Participants are requested to read the project code of conduct for on-line discussion, based on standard terms of participation in on-line forums.

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Appendix J – Code of conduct for on-line discussions

Cycology Project:

Cycling and on-line information-sharing

Code of conduct for on-line discussions

In line with standard rules of participation in on-line discussion forums, it is assumed that you have read, understood and will abide by the following¹³:

About your posts

Keep your contributions civil and relevant. We're committed to providing an atmosphere in which friendly and mature dialogue takes place.

The following are not acceptable:

Messages which are unlawful, harassing, defamatory, abusive, threatening, harmful, racially offensive, homophobic, or are highly objectionable.

Impersonating someone else or attempting to mislead other members of the forum about your identity.

Please:

Stay on Topic - Try to keep posts on the subject of the thread.

Although you might choose to use your real name and a thumbnail portrait on the website, do not reveal any other personal information about yourself (for example: your telephone number, home address etc).

Respect the confidentiality of other participants in the project – they may not wish their postings to be repeated outside the project group.

¹³ Based on UWE students' union discussion forum rules

Keep graphics that you use in footers and avatars etc to reasonable dimensions.

You agree that the webmaster, administrator and moderators of this forum have the right to remove, edit, move or close any topic/content at any time should they see fit.

About the law

You may not post any defamatory or illegal material of any nature on the project website. This includes text, graphics, video, programs or audio. Posting a message with the intention of committing an illegal act is strictly prohibited.

You agree to only post materials to which you have the copyright or other permission to distribute electronically. You may not violate, plagiarise, or infringe on the rights of third parties including copyright, trademark, trade secret, privacy, personal, publicity, or proprietary rights.

Privacy

Please take a moment to check the terms of use, including the privacy policy, of www.bristolstreets.co.uk.

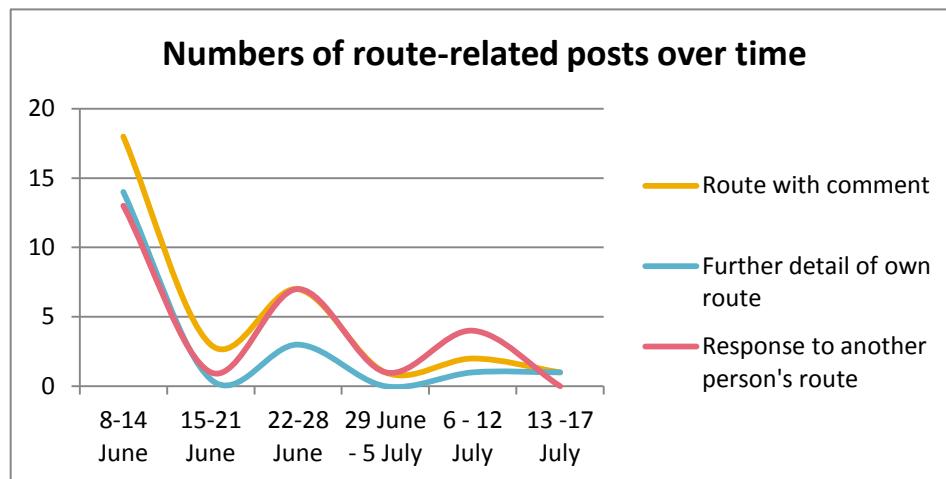
http://www.bristolstreets.co.uk/#h/news/legal_index.php

Please note however, that your browsing activity on the website will be automatically recorded during the course of the project in order to provide the researcher with basic quantitative data, such as the most and least frequently looked at routes and comments on the website. This will cease immediately upon completion of the project. Any such data will be anonymised and securely stored.

Appendix K – Categories of website post over time

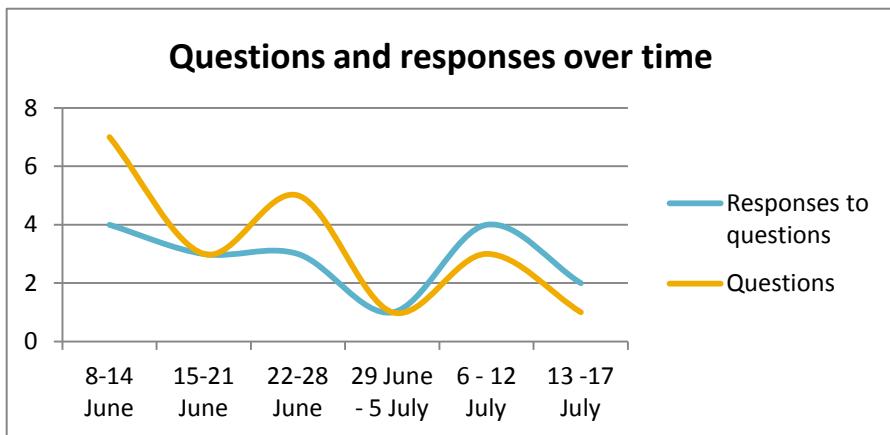
The charts below show how the three groups of message categories depicted in Figure 8-4 were distributed over the six weeks of the project. Figure K 1 shows that all route-related posts peaked in the first week.

Figure K 1: Numbers of route-related posts over time



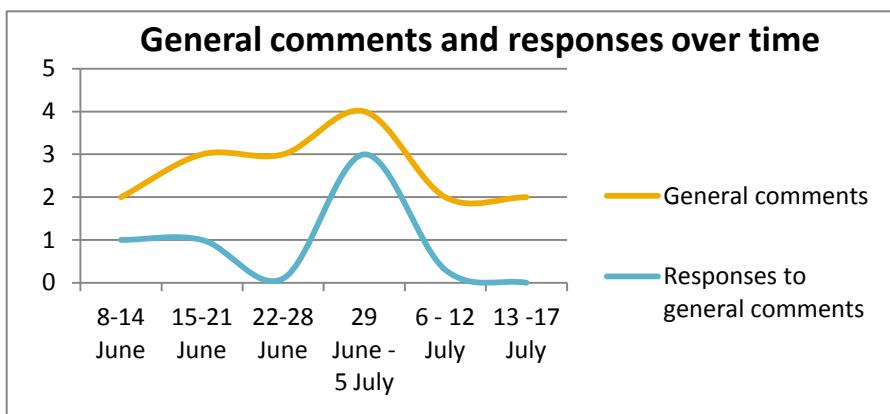
The second group of categories, shown in Figure K 2, comprise direct questions and responses to them; many of the questions concerned routes (and therefore are not entirely distinct from the “route-related” categories), but they also covered a broader range of topics, such as taking bicycles on trains or the Bristol Cycling City scheme. There were slightly more questions than answers, and a slight time lag between the two, with most questions in the first and third week and most responses in the fifth week.

Figure K 2: Questions and responses over time



The third group of categories (general comments and responses), shown in Figure K 3, comprised proactive comments concerning non-route related matters, plus a small number (5) of responses to them. These included comments about the behaviour of other road users, warnings (such as broken glass), notification of an event, and sharing experiences such as seeing deer along the cycle path, or the friendliness of cyclists in the rain. The pattern of these postings over time is shown in . The discrepancy in numbers between these types of proactive comment and the responses to them may be explained by the fact that many did not directly invite a response. Alternatively, this may be an indication that the website was not seen primarily as a forum for general social exchange, but rather as a place to share specific information and ask and answer specific questions.

Figure K 3: General comments and responses over time



Appendix L – List of NVivo codes, Phase 2

1.	Anonymity issues	
2.	Behavioural and attitudinal effects of Cycology	Complaining or lobbying for change Heeding warnings Looking for things to tell people Looking out for features which others have mentioned Real world contacts Reasons for no effects Reinforcing existing attitudes and behaviours Showed Bristolstreets to others Thinking of others cycling the same route Trying new routes
3.	Comparison between cycling and other transport info	
	Comparison with cycling discussion forums	
4.	Comparisons with other types of map or planner	Comparing map with user comments with a normal map Comparing map with user comments with journey planners
		Google maps
5.	Consequences of this being a research project	How it did not change things How it changed things
6.	Cycling culture within the workplace	
7.	Cycology as encouragement for cycling	Practical information Social support Too many other barriers Would have been useful when starting or going somewhere new
8.	Effects of group size and diversity	Effects of group size Within workplace or involving others
9.	Evaluation of Cycology project	Campaigning potential

	Comments on social interaction Effects of the focus on commuting Friendly Getting something out of it (or not) How project could have been improved Informative, useful (or not) Liked or enjoyed it Not being a sociable person OK or negative
10. Evaluation of specific postings	Advice on practical matters Amusing Community building and support Crazy Creating a particular image of the route Disapproving, patronising or rude Helpful, useful (or not) No particular impression Personal Pointless Reserved Sharing a good or bad experience Warnings Youngish
11. Evaluation of technical aspects	Overall evaluation Suggested improvements Technology as a draw of the project Things which did not work well Things which worked well
12. FTF interactions about cycling 13. Getting an impression of other participants	Assuming postings are written by men Cycling activists or experts Difference between cycling in town and country Different cycling styles
	gendered perceptions of cycling Seeing more men than women cycling

	Different levels of confidence, experience and fitness Friendly Hard to get any impression Ordinary people Use of portraits or icons Use of pseudonyms Working out who they are
14. How the Cycology system was used	Digest and website For advising, getting advice or both Looking while at work Only reading what was geographically relevant Relying on the email digest
15. Participants' general cycling activity and attitudes	cycling as local transport cycling for leisure Equipment Participants' reasons for cycling (as transport) Because it is quicker or take a guaranteed time Cost Cycling makes life easier Enjoyment Environment Health and wellbeing
	perceptions of safety Wanting to encourage others to cycle
16. Perceptions of different types of cyclist	Boasting Evangelical Fitness Friendly, helpful Lunatics Smugness
17. Reasons for contributing to website	Encouraging people Give and take

- Just to make a contribution to the project
 - Knowing another participant
 - Nice to help people
 - Seeking moral support
 - Taking the glory
 - Wanting to share a gripe
 - Wanting to share pleasant things
18. Reasons for not contributing to website
- Feeling criticised
 - Lack of time
 - Limited knowledge
 - Not wanting colleagues to think they are wasting time
 - Not wishing to give inappropriate advice
 - Preferring to read rather than write
 - Technically awkward
19. Reliability of information
- Assuming everyone's intentions are good
 - Comparison with credibility of an open site
 - Comparison with own experience
 - Level of detail
 - Perceived attributes, views, experience of informant
 - Reliable but no explanation
 - Up-to-date
 - User info is more reliable than official info
20. Sense of community
- Communities of other transport users
 - Community of cyclists generally
 - Community of cyclists within the project
 - Community of people who had volunteered for the project
 - Compared or contrasted with open forums
 - Feeling excluded from project community
 - People with similar cycling styles to me
 - Work-based community

Appendix M – Titles of posts and threads added to the Cycology website

Chronological as they appeared on the website, coded by theme:

- W Wayfaring (route information)
- I Infrastructure
- S Safety (vehicles or personal security)
- SS Sharing space with other road/path users
- S/A Sensory/aesthetic/affective descriptions
- O Other (includes events, warnings, wider discussion points)

Clifton Village to Dupont Building UWE	W I S
Little Stoke to UWE	W I S
Redland to UWE	W
Holly Bush Lane (Stoke Gifford to UWE (Frenchay)	W
Building works	W I SS
YMCA cricket ground	W I SS
Not a cycle path	I SS
Fishponds to UWE	W S S/A
Quiet bridge over railway	W S SS
Footpath/cycle path	I SS S/A
Winterbourne Road Crossing	S
Three Brooks Nature Reserve	W S
Brook Way	SS
BRI to UWE	W
Staple Hill to Frenchay	W S/A
Gloucester Rd (bottom) to Clifton with minimal hills	W
Horfield to Stoke Gifford	W S SS
Stapleton Road quieter?	S
Whitehall to UWE Alternative Fishponds to UWE route	W SS
Alternative Fishponds to UWE route	W S S/A
Staple Hill to UWE, route 2	W S SS S/A

Cycle shops	O I
Horfield to UWE Frenchay campus	W I S
Gainsborough Square	S/A
Rocks	S/A
View across Bristol	S/A
Signalling	S S/A
Gates	I
Dovercourt Road	S/A
Staple Hill to UWE	W S/A
Caution	S
Montpelier to UWE	W
Through the park	W S
Kingswood to UWE	W
Annoying!	I
Bromley heath to HP/UWE	W S
Hambrook to HP/UWE	W S/A
Arches to Clifton village	W
HBishopston to Bristol/Bath railway path	W SS S/A
Cycle days out	W S/A
East-West access	I
Staple Hill to Keynsham	W S
Big Bike Breakfast	O
Cycling in the rain	S/A
Traffic tie-up question	I SS
Redland to UWE	W SS S/A
Horfield to HP/MoD/UWE	W S SS
Muller Road to UWE	W S/A
Downend to HEFCE	W S
St Andrews to UWE	W I S/A
St Andrews to UWE (via Lockleaze Hill)	W I S/A
St Andrews to UWE (short n' nasty)	W S/A
BIKE THIEF	O
BS32 to BS16 (UWE)	W
Scenic view	S/A
Cycle path	S S/A
Traffic island is too narrow	I

Cycle lane not very helpful	I
Bishopston to UWE	W
UWE to Bishopston	W
Eighth Avenue – can you get through here yet?	I
Gripe with pedestrians	I
Broken glass on this small roundabout this morning	O S
Mangotsfield station – fun for young kids	S/A
Montpelier to Temple Meads	W
Bikes on a train	O
BRI – Lime Kilm Close, Filton	W
Cycling for Leisure	W S/A
Stoke Bishop to Temple Meads	W
Less traffic alternative to (most of) Whiteladies Road	W S/A
Adding photos?	O
Deadly roundabout	I S
Any info on this area?	W
Bristol Cycling City Award	O
Oh deer!	S S/A
Route when feeding neighbour's cat	W
Road resurfacing	I