Informing transport research by the use of social media

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Abstract

Social media has become a way for individuals to interact with many other people simultaneously, independently of their geographical location. This presentation, based on the author's doctoral thesis, illustrates the way it can contribute to a survey which is interested in current attitudes as well as attitudes at a specific time in the past. It describes the manner in which interview data was collected for a study of motorists' reactions to a reduction in road capacity and compares it with data collected via social media.

The study consisted of a qualitative survey of motorists who drove along Epping Road in Lane Cove, Sydney, both before and after the reduction in capacity of the road associated with the opening of the Lane Cove Tunnel in 2007. The space that was taken was reallocated to other modes.

Interviewees were recruited in a convenience sample and provided foundation attitudinal data by describing how the changes to the network had influenced their behaviour. Other opinions came from e-mail comments and telephone calls to the researcher, and social forums devoted to the changes that were made to Epping Road. These additional opinions in most cases did not suggest any new themes, but did suggest that the interviewees' recollections were reasonable.

Given the problems associated with using social media, particularly the inability to select or control the topic of discussion, it is clear that social media can never be the most important source of information for any (qualitative) survey. Nevertheless, social media can confirm that respondents' recollections are reasonable, and, since qualitative surveys are interested in the range in attitudes, may provide a useful addition to the range of opinions open to the researcher.

Key words

qualitative survey
retrospective survey
social media
reduction in road capacity
Lane Cove Tunnel

1. Introduction

With the advent of the Internet, e-mail and social media, it has become increasingly easy for individuals to offer opinions to a wide audience. Social media, such as social forums and social networking sites, has become a way for individuals to interact with many other people simultaneously. It is independent of the person's geographical location and unimpeded by individuals who might otherwise edit or filter opinions in public spheres. Although the audience for social media sites is likely to be people with a specific interest in the topic, because of the public nature of the Internet, the conversations are open to researchers as well. However, the use of social media in transport research is only just beginning.

Social media is of particular interest to business and marketing people (e.g. Sterne 2010) because it enables them to better understand their customers. Transport organizations also offer services and could thus also profit from a better understanding of their customers. Examples of the use of social media in transport research include tracking the movement of people by analysing the phone calls they make with Smartphones (Hopkin *et al* 2014) and finding respondents for a (quantitative) survey (Efthymiou & Antoniou 2012).

The object of this paper is to illustrate one use of social media. It aims to demonstrate the manner in which social media can contribute to a qualitative survey which is concerned with current attitudes as well as attitudes at a specific time in the past. The paper lists some of the lessons this may offer for other studies which need to consider past attitudes.

This paper is structured as follows: Section 2 gives a brief overview of qualitative surveys and retrospectivity in surveys. Section 3 discusses social media and its advantages and disadvantages for surveys, particularly as they related to circumstances in 2011-12, when the study described was undertaken. Section 4 gives a brief introduction to the author's doctoral study, concentrating on the manner in which social media was used to supplement the interviews which provided the basic data for the study (the findings of the study have been discussed in papers presented at previous ATRF conferences (Sharples 2010; Sharples 2013)). Section 5 draws conclusions.

2. Retrospective, qualitative surveys

2.1. The nature of qualitative surveys

Qualitative surveys are concerned with the descriptive quality of respondents' experience, rather than simply the quantity of experiences or attitudes which fall into particular categories. The experience is described in the respondents' own words rather than, for example, the respondent being asked to agree with statements on a Likert scale (e.g. Bryman 2004); ("... qualitative research asks how the world works in the eyes of the subjects ..." (Silverman 2013)). Qualitative surveys are designed to gather a range of opinions and are complementary to quantitative surveys, rather than a substitute (Grosvenor 2000).

2.2. The advantages of qualitative surveys

Qualitative surveys:

- are open ended;
- are flexible; and
- promote depth of understanding.

They can tap the creativity of participants – they are about sampling ideas as well as people. A major benefit of qualitative surveys is that respondents use their own words in their answers. By doing so, they indicate aspects of the situation which are important to them.

2.3. **The disadvantages of qualitative surveys**

Qualitative surveys have a number of disadvantages. They can be time and labour intensive:

- for the researcher and the participants, while the survey is being carried out; and
- for the researcher in terms of finding participants, interviewing them and transcribing the resulting conversations.

In particular, interviews and focus groups:

- are not strictly repeatable;
- may present problems with what interviewees are prepared to say because of their attitude toward the interviewer (for example, as an authority figure);
- the value of the results is partly dependent on the researcher's skill in conducting interviews, including their understanding of the non-verbal aspects of communication; and
- require commitment in terms of cost of travel for the interviewer.

Qualitative surveys are almost inevitably biased because they do not represent the whole population. However, as they are intended to identify aspects of the topic that might not be uncovered if the survey was confined to a set of predetermined questions, this is not considered to be a problem. They have the potential to show how people think about the topic and the choices that are associated with that topic (*ibid.*; Clifton & Handy 2001).

2.4. Retrospective surveys

Understanding the past can provide a guide to meeting the challenges of the future. Behrens & Del Mistro (2006) define retrospective surveys as once-off surveys of individuals which ask respondents to recall past behavioural changes and the events and circumstances surrounding these changes.

When asking people to comment on past actions and attitudes, there is a possibility that they may either have no recollection of why they made changes, or may attempt to justify their actions retrospectively. However, Behrens & Del Mistro (2010) and Lanzendorf (2010) found that travel behaviour associated with life events (i.e. events which cause people to reconsider their current behaviour (van der Waerden, Timmermans & Borgers 2003)) was recalled with some certainty, because the nature of the life events was so memorable. Retrospective surveys also allow data to be gathered efficiently, with the minimum of administrative complexity, and the minimum time delay, rather than having to be gathered of a period of time using panel surveys (Lanzendorf 2010, Verhoeven *et al* 2008). They are not dependent on the existence of existing datasets (*ibid.*).

3. Using social media

3.1. What is social media?

Social media is the set of Internet-based applications which allow users to create on-line communities. The community members interact in order to share information, ideas,

personal messages and other content such as photos or videos (Pitta & Fowler 2005; Kaplan & Haenlein 2010). Sterne (2010, pp. xvi-xix) categorizes it seven ways:

1) forums and message boards (e.g. bulletin boards);
2) review and opinion sites (e.g. online rating applications such as hotel review sites);
3) social networks (e.g. Facebook and LinkedIn);
4) blogging (e.g. personal websites (with comment pages));
5) micro-blogging (characterized by short posts, such as Twitter);
6) bookmarking (allowing individuals to tag items of interest to them, such as Pin it); and
7) media sharing (e.g. photo: Instagram; video: YouTube).

The principle type of social media of interest to this paper is the discussion forum, whereby a topic is posited by the organization controlling the site, and people respond (for examples, see Table 2). As the conversation continues, individuals may respond to the initial topic or something that one of the previous respondents has written. In the latter case, it is possible for a conversation to be sidetracked. The respondents may use their own name or invent an alias (one or more). The conversation will continue until either the operator closes it down or it peters out of its own accord.

Normally in a discussion forum, all contributions are posted, except those which breach the rules of the forum (Pitta & Fowler 2005). However, on a personal website, selective posting may occur, based on the personal preferences of whoever controls the website. Therefore it is not possible for a reader to know what has been selected for display and what omitted.

As social media develops, new sites may come to prominence and existing sites may fall out of use. However, similar principles are expected to apply to new as for existing sites.

3.2. Who uses it?

As described in s.1 and s.3.1, there are many applications of social media. The following section is concerned with those users who are relevant to retrospective, qualitative surveys.

3.2.1. Individuals

The Australian Bureau of Statistics (ABS) estimated that 79% of households in Australia had access to the Internet in 2010 – 2011 (ABS 2014). A survey of the use of social media in Australia in 2011 (Sensis Pty Ltd 2011) found that 62% of Internet users had a presence on some form of social networking site, which compares with the ABS's finding (*op. cit.*) that about 66% of the population were involved in social networking in 2012-2013. Statistics on the use of social media in Australia have been collected since 2010 (Cowling 2010; Cowling 2014) although they refer for the most part to social networking using established services such as LinkedIn (a business oriented social networking service (https://au.linkedin.com/), rather than discussion forums established by special interest groups.

Thus, although social networking was widespread among Internet users in Australia in 2011, it was not universal. The statistics given above imply that less than half of all Australian households used social media in 2011-2012. In particular, certain people may not use social media because of concerns such as:

- privacy;
- copyright; and
- flaming (aggressive reactions from other contributors) (Norton 2012).

These potential biases must be borne in mind when analysing the findings of a qualitative survey.

3.2.2. Organizations

Data gathering

In order to conduct attitudinal research, it is necessary to gather opinion data for further analysis. There are several ways to gather data for a qualitative survey (Clifton & Handy 2001). Possibilities include:

- individual interviews;
- household interviews; and
- focus groups.

Participants are often recruited by alerting people to the need for survey respondents and inviting them to contribute. Efthymiou & Antoniou (2012) describe the use of social media to recruit respondents for a survey of car and bike sharing. This method can also be used for qualitative surveys. In addition to making researchers' their needs known by means of publicity on their web site organizations can generate publicity by means of a corporate Twitter alert (e.g. @UTSEngage, Figure 1).

Figure 1 Tweet from the University of Technology, Sydney, asking for motorists to take part in a survey
Source: https://twitter.com/search?q=been%20driving%20on%20epping%20rd&src=typd

Posting information

Social networking is also used by authorities to inform the public of changing situations under their jurisdiction. Figure 2 gives an example of the transport authority warning of delays to a bus service:

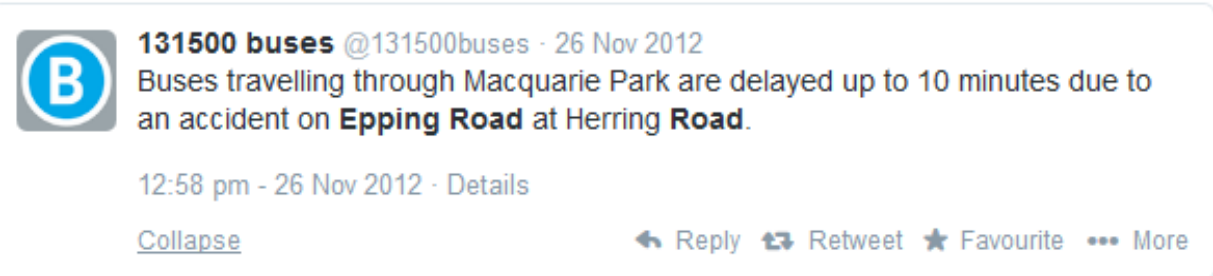

Figure 2 Tweet from transport authority warning of delays to buses travelling through Macquarie Park in Sydney
Source: https://twitter.com/search?q=epping%20road&src=typd

3.3. Advantages of social media for attitudinal surveys

The advantages of social media for researchers who are looking for attitudinal data, include the fact that it exists independent of the study being conducted, it is in the public domain, and the (potential) ease of data collection.

3.3.1. Naturally occurring data

Attitudes expressed on social media are:

- naturally occurring data;
- not edited by a third partly (e.g. disc jockeys, editors); and
- a free source of data (Silverman 2013).

It may be feasible for a researcher wishing to collect data from social media to set up a discussion topic in an appropriate forum. However, in the case of a retrospective survey, researchers are likely to be using opinions on a topic that was set up for other reasons and is therefore effectively 'natural' data. The value of such data will depend on serendipity.

Although opinions on social media are not normally edited, a moderator may take down a posting; for example, comments which are regarded as offensive (Pitta & Fowler 2005).

3.3.2. Ethics

When collecting data for a survey it is usual to provide anonymity for the respondents at the reporting stage and to regard their opinions as confidential during the analysis stage (Bryman 2004). However, opinions expressed on social media which are in the public domain (e.g. on Internet forums or web sites) are, *ipso facto*, available for perusal and use by members of the public, including researchers, without any restrictions. Thus, by using data from public social media, the ethics requirements for this section of a survey are minimized. However, it should be noted that social network sites generally require membership of the group and can contain both private and public material. The private material may not be accessible to researchers. In fact, it may be a breach of the social network rules to use private material in a survey (Pitta & Fowler 2005).

3.3.3. Potential ease of collection

Opinions from social media can be easier to collect than opinions solicited via interviews or focus groups. They can be found by conducting a key word search on the Internet or the specific site. The results may include the data and time that the opinion was posted. The search can be done through any computer attached to the Internet (*ibid.*). It does not require the organization and expenditure of time and money that other methods of qualitative research such as interviews and focus groups entail. However, it may be necessary to discard some of the (less relevant) material found. In addition, opinions on social media are posted because the writer has something they wish to say. Therefore, incentives are not needed in order to encourage people to take part in a survey.

Thus the potential practical advantages of social media for researchers include:

- acquiring opinions requires little work on the researcher's part;
- opinions are still available after the topic has ceased to be newsworthy;
- opinions may be dated and timed; and
- it is not necessary to provide incentives to encourage people to take part in the survey.

3.4. Disadvantages of social media for surveys

The disadvantages of social media for surveys relate to either the topic under discussion or the people responding to the discussion.

3.4.1. Topic of discussion

A major disadvantage of social media for surveys is the lack of control over the topic of discussion, at all stages of the conversation:

- a reliance on serendipity for the choice of topic initially under discussion;
- an inability to keep a discussion on topic (i.e. lack of control); and
- an inability to explore the topic (and therefore no opportunity to indulge in reflection or justification).

It may be possible to set up a discussion if it is known that opinions on the topic will be of some interest in the future (e.g. a Facebook 'event': see Efthymiou & Antoniou 2012). However, when undertaking a retrospective survey, a discussion will generally have preceded the intention to use the opinions. Therefore it will be necessary to accept whatever is available. Serendipity will dictate how relevant the discussion to the research topic. This may mean that the conversation does not address the research topic directly, or even substantially. Even if initial postings address the topic directly, there is no guarantee that the posting will stay on topic. This lack of control and dependence on serendipity means that it may not be possible to explore particular topics of interest.

In using social media, it is necessary to remember that the topics discussed may be set by other people; and they may change, or veer off the track, as the discussion progresses. The discussion may also cause people to change their opinion over time.

3.4.2. Respondents

Social media is open to anyone to become involved in the conversation (with the proviso that access to the discussion may be restricted to a certain group of people). However, there are several points to consider about respondents when using comments obtained this way:

- social media is not open to people without access to the Internet. Other people choose not to become involved in social media (Norton 2012);
- those who do use social media are a self-selected (i.e. convenience) sample and therefore not representative of the posting sample population with respect to, for example, age, income of gender;
- the conversation may be monopolized by a few noisy individuals;
- posts cannot be assumed to be a representative reflection of individuals' concerns;
- there is a lack of context for respondents. Hence, it is not possible to be sure that they are who or what they say they are. They may be, for example, contributors from the other side of the world or political workers trying to disseminate their message;
- associated with this, the use of aliases may hide the user's identity;
- hence, few demographic details can be inferred from the comments that are recorded;
- aggression. It is recognized that people can become more aggressive on the Internet than they would be in face to face encounters. In that case, it is necessary to ask which is the more accurate expression of their opinions and attitudes (i.e. the one upon which respondents base their actions)? (Wallace 1999);
- if the site is not updated, opinions may alter without the changes being reflected in what appears on the site.

Clearly, there is the potential for serious problems with lack of representativeness, whether related to:

- lack of input from sections of the community who cannot or who do not wish to use social media;
- the distribution of demographic characteristics of those who do respond to the topic under consideration; or
- the number of responses from any individual.

However, this is less likely to be a problem with qualitative surveys than quantitative surveys since the former do not aim for statistical representativeness.

The lack of context for respondents means that it is not possible to judge what an individual's qualification for commenting on the topic is. While everyone is entitled to an opinion, not everyone has practical experience of the situation under discussion that would result in an informed opinion.

The use of aliases can be a problem for two reasons:

- the person may make more than one contribution under different names, thus inflating the apparent number of responses ('sock puppets'); and
- the person may make comments that do not reflect their actual opinion, either in order to be provocative, or because they feel that both opinions should be represented. However, the latter situation may be of advantage to the researcher, in that qualitative surveys seek to gather a wide range of opinions (Grosvenor 2000).

Finally, it is possible that respondents' attitudes may have changed with the passage of time. This may or may not be a problem.

4. Research Project

4.1. Introduction

The doctoral research (Sharples 2014) on which this paper is based was concerned with the effect on motorists of a reduction in road capacity. Specifically, the research questions included:

1) How do motorists' reactions (in terms of travel behaviour) in a case of reduced road capacity relate to their existing travel habits? and
2) How can the trips be identified, which, in order to reduce the volume of motor traffic to acceptable levels, are most likely to disappear after a network event such as a reduction in road capacity?

It was felt that the behavioural aspects of these research questions would best be dealt with by undertaking qualitative surveys with motorists who had experienced a reduction in road capacity.

The location for the study (*ibid.*) was that part of Epping Road which is situated in Lane Cove in Sydney. The capacity of this road was reduced when the Lane Cove Tunnel (which runs parallel to Epping Road) was opened in 2007. The construction of the Lane Cove Tunnel provided the final link in the Sydney Orbital Motorway, for which the substitute had initially been Epping Road in Lane Cove. The latter was a road of arterial standard which ran through residential, commercial, industrial and national park areas and was heavily congested. As part of the Lane Cove Tunnel scheme, capacity on Epping Road in Lane

Cove was reduced for non-bus motor vehicles by narrowing the road to one lane in each direction, except at points where it was felt that additional capacity was required. The overall capacity in the Epping Road corridor (Epping Road plus tunnel) for motor vehicles increased. The space that was taken from general motor traffic was reallocated to other modes.

4.2. Method and data collection

4.2.1. Introduction

In order to gather attitudinal data, motorists who felt that they had been affected when Epping Road was reduced in capacity from three lanes to one lane in each direction were surveyed with semi-structured interviews during the period 2011-2012. Ten interviewees were found by means of a convenience sample (their characteristics are listed in Table 1). They were asked to describe their travel behaviour on Epping Road before it was narrowed, including which routes they used, and why and which modes they used. They were then asked how the changes to the road network had influenced their behaviour, in particular their choice of route, mode, time of travel and origin or destination. The transcriptions of the interviews were summarized in order to obtain a feel for the interviewee's responses. Common themes were tabulated and grouped and analysed systematically. Interviewees appeared to have little difficulty remembering the changes they had made after Epping Road was narrowed.

Table 1 Demographic details of interviewees at the time of their interview

Interviewee	Gender	Age range	Employment status	Income range (A$)	Connection to Lane Cove area
IN1	F	56-65	part time	>104,000	resident
IN2	F	>65	retired	20,800-52,000	resident
IN3	M	56-65	full time	52,000-104,000	passing through
IN4	F	46-55	full time	>104,000	passing through
IN5	M	56-65	part time	<20,800	resident
IN6	M	26-35	full time	52,000-104,000	passing through
IN7	M	36-45	full time	>104,000	resident
IN8	F	56-65	full time	>104,000	resident
IN9	M	56-65	part time	52,000-104,000	resident
IN10	F	46-65	full time	52,000-104,000	passing through

The interviewees were connected to Epping Road in Lane Cove either because they lived there (60%) or because they passed through regularly (40%). It did not prove possible to find interviewees who had only sporadic contact with Epping Road.

Half the interviewees were men and half were women. The majority of interviewees were over 45 years old and only two were younger than this. There were no interviewees under 25. It has been suggested that this distribution of ages may result in a bias against the use of electronic aids to route finding and avoidance of congestion. Most of the interviewees were in full time employment at the time of the interviewees and there was no-one classified as unemployed, although one interviewee was retired. This might be expected to bias the sample towards the need to travel at peak hours. Unsurprisingly, this skewed the sample towards higher incomes.

Publicity for the survey was obtained by a variety of means, including:

- word of mouth;
- mention on several websites;
- articles or letters in the local free newspapers; and
- a request on Twitter for motorists to take part in the survey via @UTSEngage.

As a result of this publicity, e-mails and telephone calls were received from people, who although not suitable as interviewees, still had opinions that were relevant to the study.

A qualitative survey looks for a range of ideas rather than size of each category of ideas. The opinions canvassed in interviews and received as a result of publicity were not (expected to be) statistically representative of motorists using Epping Road. Since the study considered some statistically unrepresentative opinions received by electronic means, it was felt that there might be merit in examining another source which was also not statistically representative; that is, considering what the contributors to social media opined, unprompted by an interviewer.

4.2.2. Social and electronic media used

The instances of social media included in this study were found by undertaking an Internet search on the term 'Epping Road' or 'Epping Rd' (using two search engines, Google and Bing) and selecting results which included contributions relevant to the changes associated with the opening of the Lane Cove Tunnel in 2007. Social networking sites (e.g. Facebook) were not searched. Since the opinions from social media were secondary to interviews and e-mail related material (i.e. solicited opinions) it was not considered necessary to go into great depth as part of the search for extra data.

The construction of the Lane Cove Tunnel had prompted the *Sydney Morning Herald* to create a social forum which asked respondents whether they thought the tunnel would work (SMH 2006). The newspaper set up a second forum on the Lane Cove Tunnel when it opened in March 2007. This canvassed people's reactions to the tunnel and the traffic remaining on Epping Road (SMH 2007). The local motoring organization set up a discussion on the shared use path after construction began (NRMA 2008). These forums were contemporary with the work being discussed and the contributions were dated and timed, indicating when the attitude was current.

Epping Road was built by the New South Wales (NSW) government and operates as an untolled link. The Lane Cove Tunnel is tolled, and operated by a private consortium (Transurban 2014). Given the contentious nature of the project (e.g. Findlay 2007; NRMA 2008; Zapata 2008; Besser 2008) it is not surprising that the Lane Cove Tunnel scheme became a topic of conversation in other social media. Subjects discussed included many aspects of the design and construction of the tunnel itself (especially ventilation) and the cyclepath (*sic*) on the south side of Epping Road (the shared aspect of this was rarely considered) (BNA 2008). There was little discussion of the narrowing of Epping Road or the extra bus lanes that related specifically to the interests of bus users, motorists, motorcyclists and pedestrians; that is, cyclists appeared to be the most prolific users of social media with respect to Epping Road. However, the search was conducted in 2011, four years after the road layout was altered in 2007-2008. It is possible that comments posted at the time of the changes were no longer available.

A personal website (Zapata 2008) which incorporates users' comments was also examined. However, as the comments have been edited by the owner of the website, it cannot strictly be viewed as social media because of the potential for selective editing and possible distortion of the original message.

These sources, in addition to the comments from e-mails and telephone calls, provided opinions additional to those of the interviewees. In most cases they did not suggest any new themes, but did suggest that the interviewees' recollections were reasonable.

4.2.3. Ethics

Material gathered from discussion forums and web pages was treated as being in the public domain and therefore available without constraint. The comments provided via e-mail or telephone were treated as confidential in the same way that interview conversations were.

4.2.4. Relevance of opinions on social media

The social media selected were chosen because they included material relevant to the subject of the study. Therefore, by definition, the site was relevant to the subject of the study. However, because of the on-going nature of conversations in social forums, they are liable to move away from the original topic under consideration. Similarly, only selected portions of the websites viewed were relevant to the study. In particular, in the NRMA forum (NRMA 2008), the discussion on the changes to Epping Road degenerated into an argument about the pros and cons of cycling, which was not relevant to the research being undertaken. However, many of the earlier postings were relevant to the topic.

One of the contributors to the *Sydney Morning Herald*'s 2007 social forum on the Lane Cove Tunnel (SMH 2007) lived in Canberra, rather than Sydney. However, he explained why he no longer lived in the Lane Cove area. This represented an opinion which was relevant to the topic of interest, but which would not have been available if the sample had only consisted of people local to the field study area. That is, it represents those people who have taken action to avoid an unwanted situation, and is therefore relevant to authorities who are interested in how people have responded to the problems that they perceive.

4.3. Findings

4.3.1. Introduction

The opinions expressed in the interviews were analysed and grouped into themes and used as the principal set of data for this study. The opinions expressed via social media were analysed and compared with interviewees' opinions in order to ascertain how they related to these themes. The findings of the doctoral study are discussed in more detail in previous papers and the thesis (Sharples 2010; Sharples 2013; Sharples 2014).

4.3.2. Common themes

Topics which were common to both interviewees and social media respondents included attitudes towards:

- the Lane Cove Tunnel;
- the design of the reconfigured road;
- traffic on Epping Road, both within Lane Cove and further west;
- the benefits or otherwise of the changes to Epping Road;
- bodies responsible for changes noticed;
- route considerations;
- mode considerations;
- timing considerations;
- considerations of origin and destinations; and
- aspects of motorists' manner of driving.

The respondents also had a variety of affective reactions to the changes (Sharples 2014).

Comments relating to benefits of changes to Epping Road are given here as an example of similar responses received from all sources:

> *"... it personally was .... the reduction in traffic, the reduction in noise, ... the air quality improved, ... it was much easier to get on to Epping Road ..." (interviewee)*
>
> *... I have new sound reducing perspex windows as well as the glass windows to reduce the traffic noise from Epping Road. As you can imagine, any traffic noise reduction from Epping Road is good for me. (by e-mail)*
>
> *As a resident of Lane Cove, I'm all for reducing the width of Epping Road. Before the tunnel, Epping Road was a complete nightmare, with wall-to-wall traffic. One of the promises of the tunnel for local residents was that it would remove much of the through-traffic from Epping road [sic]. That's only going to happen if the existing road is narrowed. Hey, some of us have to live in the suburb. How would you like a six-lane carpark next to your place? (NRMA 2008, Suzy Jackson)*

It can be seen that although opinions are not identical, the general direction is similar – the environment improved for these respondents after the construction of the Lane Cove Tunnel.

4.3.3. Differences

However there were some differences between interviewees and other respondents. Not all of the 'sub-themes' discussed by interviewees were mentioned by contributors to social media. For example, the timing of the traffic signals at junctions along Epping Road were not mentioned by any of the contributors to the social forums, although they were mentioned by some of the e-mail and telephone respondents. In particular, none of the interviewees said that they refused to use the Lane Cove Tunnel on principle, whereas several of the e-mail respondents did. One of the e-mail respondents didn't see many buses in the bus lane, but several of the interviewees were enthusiastic about the frequency of the buses.

The time at which the opinions were expressed in social forums meant that some topics, such as the long term effect of narrowing Epping Road, would not have been relevant when contributors were making their points. No attempt was made to explore further the reasons for these and other differences.

4.4. Benefits of social media for the study

The benefits to this study of additional opinions derived from social media included:

- extending the quantity of input;
- opinions that were contemporary to the time the subject was topical;
- opinions not coloured by hindsight; and
- some opinions relevant to the topic from outside the 'normal' sample population which might otherwise not have been captured.

The correlation between the opinions expressed by interviewees and the opinions expressed in the social media forums provided:

- confidence that the major themes had all been covered; and
- reassurance that any particular response was not unique to one person.

4.5. Study conclusion

The conclusions drawn from the responses to the survey are discussed in detail elsewhere. Briefly, based on the totality of data collected, two hypotheses were generated (Sharples 2013; Sharples 2014) to explain the empirical observation that after an incident of reduced road capacity, traffic disappears but only to the extent that it needs to (Cairns, Hass-Klau & Goodwin 1998). Social media comments also contributed to the conclusion that was drawn regarding transport sustainability in the thesis (Sharples 2010).

5. Conclusion

Social media is a way for persons with access to the Internet to communicate with a (potentially) world-wide audience. Although social media may be used to share content such as opinions on services offered to the public, photos and videos, in the main only content relating to transport infrastructure and services was discussed here.

The use of social media to investigate attitudes has a number of disadvantages, in particular the inability of the researcher to control the direction of the conversation, the differences between on-line and real life personas and, unless the researcher instigates the subject, the need for serendipity in the availability of a relevant discussion.

However, social media have a number of significant advantages. In particular, the opinions expressed are naturally occurring data which have not been filtered or otherwise edited and are not coloured by hindsight and are easy to access.

Given the problems associated with using it, particularly the inability to select or control the topic of discussion, it is clear that social media can never be the most important source of data for a qualitative survey. This paper has sought to show how social media can be used to confirm that respondents' recollections are reasonable and therefore present a valid set of attitudes from which to draw conclusions. Since qualitative surveys are concerned with the range of attitudes, it may also provide a useful addition to the range of opinions open to the researcher.

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References

Australian Bureau of Statistics (ABS) (2014) *8146.0 Household use of Information Technology, Australia, 2012-13* Canberra: Australian Bureau of Statistics

Behrens, R and Del Mistro, R (2006) Methodological problems in the analysis of changing habitual behaviour over time. Paper presented at the *25th Southern African Transport Conference (SATC 2006)* Pretoria, South Africa

Behrens, R and Del Mistro, R (2010) Shocking habits: methodological issues in analyzing changing personal travel behavior over time *International Journal of Sustainable Transportation* 4(5), pp. 253-271

Besser, L. (2008) Test for tunnel as lane closure expected to cause road chaos *Sydney Morning Herald (News)* 10th March, p. 6

Bicycles Network Australia (BNA) 2008 *Epping Road Bike Path* [Online]. Sydney: Bicycles Network Australia (BNA). Available: http://www.bicycles.net.au/forums/viewtopic.php?t=5149 [Accessed 30/3/2014]

Bryman, A (2004) *Social Research Methods* (2nd ed) Oxford: Oxford University Press

Cairns, S Hass-Klau, C and Goodwin, P (1998) *Traffic Impact of Highway Capacity Reductions: Assessment of the Evidence* London: Landor Publishing

Clifton, K J and Handy, S L (2001) Qualitative methods in travel behavior research. Paper presented at the *International Conference on Transport Survey Quality and Innovation* Kruger National Park, South Africa

Cowling, D (2010) Social Media stats in Australia - Facebook, Blogger, MySpace. Available: http://www.socialmedianews.com.au/social-media-stats-in-australia-facebook-blogger-myspace/ [Accessed 30/9/2014]

Cowling, D (2014) Social Media Statistics. Available: http://www.socialmedianews.com.au/social-media-statistics/ [Accessed 30/9/2014]

Efthymiou, D and Antoniou, C (2012) Use of social media for transport data collection *Procedia- Social and Behavioral Sciences 48*, 775-785

Findlay, F (2007) Forcing drivers to use toll roads, *Northern District Times (Opinion)* 14th February

Grosvenor, T (2000) Workshop on qualitative/quantitative methods. *Qualitative Research in the Transport Sector*

Hopkin, J Ball, S D Hannay, A Hutchins, R Palmer, D Rahman, S Naberezhynykh, D Longhi, D (2014) *Pilot Trial of a Transport Crowdsourcing Smartphone App* Wokingham, Berkshire: Transport Research Laboratory.

Kaplan, A M and Haenlein, M (2010) Users of the world, unite! The challenges and opportunities of Social Media *Business Horizons* 53(1), 59-68

Lanzendorf, M (2010) Key events and their effect on mobility biographies: the case of childbirth *International Journal of Sustainable Transportation* 4(5), 272-292

National Roads and Motorists Association (NRMA) (2008) *Epping Road's cycleway - good, bad or mad? NRMA motoring blog* [Online]. Available: http://www.mynrmacommunity.com/motoring/2008/01/18/epping-roads-cycleway-%e2%80%93-good-bad-or-mad/ [Accessed 30/1/2012]

Norton, A (2012) *10 reasons why I avoid social networking services* [On-line] USA:CBS Interactive. Available: http://www.techrepublic.com/blog/10-things/10-reasons-why-i-avoid-social-networking-services/ [Accessed 6/1/2015]

Pitta, D A and Fowler, D (2005) Internet community forums: an untapped resource for consumer marketers *Journal of Consumer Marketing* 22(5), 265-274

Sensis Pty Ltd (2011) *Sensis® Social Media Report: What Australian people and businesses are doing with social media* Melbourne: Sensis Pty Ltd

Sharples, R A (2010) Travel competence: a requirement for transport sustainability. *Paper presented to the 33rd Australasian Transport Research Forum* Canberra: ATRF

Sharples, R A (2013) Route finding as a consequence of a reduction in road capacity. *Paper presented to the 36th Australasian Transport Research Forum* Brisbane: ATRF

Sharples, R A (2014) *As Needs Must: A Qualitative Study of Motorists' Habitual Traffic Behaviour in a Situation of Reduced Road Capacity*. PhD Research Sydney: University of Technology, Sydney

Silverman, D (2013) *Doing Qualitative Research* (4th ed) London: SAGE Publications Ltd

Sydney Morning Herald (SMH) (2006) *Lane Cove Tunnel* [Online] Sydney: Fairfax Media Ltd Available: http://blogs.smh.com.au/newsblog/archives/your_say/005640.html?page=fullpage [Accessed 21/2/2014]

Sydney Morning Herald (SMH) (2007) *Lane Cove Tunnel* [Online] Sydney: Fairfax Media Ltd Available: http://blogs.smh.com.au/newsblog/archives/your_say/010535.html [Accessed 21/2/2014]

van der Waerden, P Timmermans, H and Borgers, A (2003) The influence of key events and critical incidents on transport mode choice switching behaviour: a descriptive analysis *Paper presented at the Moving Through Nets: The physical and social dimensions of travel -10th International Conference on Travel Behaviour Research* Lucerne, Switzerland

Verhoeven, M Arentze, T A Timmermans, H J P and Van der Waerden, P (2008) Retrospective Surveys: Some Experiences in the Context of Measuring Lifecycle Events. *Paper presented at the 87th Annual Meeting of the Transportation Research Board* Washington, DC: ABJ40-Committee on Travel Survey Methods

Wallace, P (1999) *The Psychology of the Internet* Cambridge: Cambridge University Press

Zapata, Z (2008) *Citizens Against Road Ripoffs (CARR)* [Online]. Sydney: Zapata, Ziggy. Available: www.carr.org.au [Accessed 21/2/2012].