

ONLINE SURVEYS—POSSIBILITIES, PITFALLS AND PRACTICALITIES: THE EXPERIENCE OF THE TELA EVALUATION

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ABSTRACT Surveys are a commonly used strategy for gaining insights into teacher perspectives. They are often seen as cost effective in terms of time and resources required, but the challenges involved in conducting and processing paper-based surveys can be considerable. Online surveys offer an alternative, particularly now that people have better access to computers and the Internet, and also since the available software has recently become more user-friendly and in some cases, free to the user. In this paper, the research process used in a large longitudinal evaluation study is discussed, where teachers increasingly opted to participate in an online survey in preference to a paper survey. The possibilities of choosing to use an online survey were attractive but they came with pitfalls. The practical strategies that proved effective in engaging teachers in an online survey process and in managing online responses are discussed and considered in the light of current research literature.

KEY WORDS:

Online survey, web-based survey, paper-based survey, methodologies, survey design, analysing data, evaluation research

INTRODUCTION

Online surveys (sometimes called web-based surveys or web surveys) are becoming the preferred way of gathering written perceptions from survey respondents in research. There are many reasons for choosing to offer an online survey. Online surveys are perceived to be easier to administer than paper surveys, the response rates seem to be higher and there is apparently less work to do in terms of posting out and data entry. This paper summarises some of the methodological challenges of online surveys and links these with the research literature, through the various phases of a typical longitudinal research project, from design to analysis.

THE TELA EVALUATION PROJECT

The TELA laptops evaluation project (Cowie et al., 2008) was designed to assess the value of a New Zealand Government initiative where teachers were offered a laptop computer at a minimal lease cost. This was a six-year (2003-2008) national evaluation of the impact of the TELA laptops on New Zealand teachers' professional lives carried out by research at The University of Waikato. The evaluation also sought to explicate factors that enabled and constrained teacher

laptop use. The research orientation was to use an empirical mixed-methods approach, with data collected over three-year cycles of nationwide surveys and regional focus groups targeting teachers at four different levels across the compulsory education sector: Years 1 to 3, Years 4 to 6, Years 7 and 8, and Years 9 to 13. Longitudinal school case studies were conducted in eight Year 9 to 13 secondary schools (case studies in primary schools were conducted by other research groups). Data from over 1400 teachers who participated in the TELA scheme between 2003 and 2008 were included in the evaluation. The number of schools and responding teachers over the three cycles of surveys is shown in Table 1.

Table 1. TELA laptops for teachers evaluation 2003-2008

Year	Level	Respondent schools	Non-laptop returns	Paper laptop returns	Online laptop returns	Total laptop returns
2003	Y9-13	49	166	688	NA	688
2004	Y9-13	48	NA	744	NA	744
2005	Y9-13	50	NA	690	NA	690
2004	Y7&8	37	11	55	120	175
2005	Y7&8	43	NA	56	97	153
2006	Y7&8	70	NA	10	139	149
2005	Y4-6	101	13	67	133	200
2006	Y4-6	112	NA	48	231	279
2007	Y4-6	131	NA	21	332	353
2006	Y1-3	102	NA	58	213	271
2007	Y1-3	119	NA	27	313	340
2008	Y1-3	100	NA	33	284	317

Table 1 shows how an increasing number of teachers over the three-year evaluation at each year level chose to respond online from the time an online survey was first offered in 2004.

Survey data were analysed using the Statistical Package for Social Sciences (SPSS). Frequencies and ratios were calculated. Qualitative data from free-response questions were coded into categories. Frequencies and ratios were calculated, but reporting these data was designed to highlight particular trends and weightings given in teachers' responses.

METHODOLOGICAL CHALLENGES OF THE TELA SURVEY

Methodological challenges arose at each stage of the survey, from the design stage through to the data collection stage.

The survey questions

The main challenge for the development of a survey instrument in a longitudinal project such as the TELA evaluation is to maintain consistency across the years while including new developments as they arise. At the beginning of each year of the TELA evaluation, a researcher was responsible for the development of the survey instrument after a meeting of the evaluation team to establish at first a design brief, and in subsequent years to reflect on the data and to alter questions as new developments arose. The survey questions reflected issues that the Ministry of Education needed feedback on, such as how teachers at each year level had increased their laptop use over the three years that the evaluation project had lasted. Many of the questions were therefore the same each year, so that the researcher could report any changes. However, each year there were new questions as the evaluation team saw the need to find out more about something that may have come up in teachers' qualitative comments the year before, or in the focus groups held each year with a small group of teachers at the corresponding level. The survey measured current laptop use, and so the specific questions varied from one cycle to the next to reflect the changes in technology that became available to teachers in New Zealand schools; for example, data projectors and then interactive whiteboards. Consequently, the survey design needed to be adjusted each year.

Deciding to move to an online survey

Administering a paper-based survey to a large population brings its own challenges, particularly in terms of time taken to deal with sending out the survey and then to enter data for a large population. The TELA research began in 2003 with Year 9-13 teachers, and at that time there was no thought of using an online survey. Paper surveys were administered to the secondary population over a three-year period and the evaluation team became efficient at the process of at first designing the survey, then in later years adapting and changing it as the need arose. They also became proficient at printing, packaging and posting out the paper surveys, although it did take four people three days to manage this task when there were over 600 teachers from 50 secondary schools in the sample. In the second year of the evaluation, when the team became reluctant to continue this labour-intensive exercise, knowing that there were still two more years of secondary surveys as well as three levels of primary school teachers to be surveyed over the following four years, the search for an alternative began.

The advantages of using an online survey

Web-based online surveys have been available since 1994 (Andrews, Nonnecke & Preece, 2003) and are able to automatically verify and store survey responses using database technology and an HTML (hypertext markup language) user interface.

During the past decade there has been increasing use of online surveys in social and private sector market research (Spitz, Niles & Adler, 2006). Glover and Bush (2005) suggest that this may be because potential respondents can be drawn from an ever-widening audience. It is also true that online surveys are often easier and less expensive to administer than alternative survey methods, and that they have the potential to offer more flexibility and features than other survey methods (Spitz et al., 2006).

Capiluppi's 2002 paper on computer-assisted longitudinal survey design argues that computer-assisted interviewing allows for handling the complexity of a longitudinal survey, virtually without errors, even in self-administered interviewing, through the programming logic built into a software system. By means of automated question flow, administration and online consistency checks this method guarantees better control on extra-sampling survey errors, providing a significant gain in survey data quality. Because online surveys provide the ability to transfer survey responses directly into a database, transcription errors are eliminated. Andrews et al. (2003) reviewed literature that showed that the cost per response decreases significantly as the sample size increases, and that electronic surveys provide strong advantages of speedy distribution and response cycles.

Comparison between paper and online surveys

A paper by Adam, McDonald and Zadeh (2003) reported findings of a study on relationships between business and end customers, which gave confidence to users of online surveys that despite differences in demographic profiles of online respondents and postal survey respondents, there was a degree of similarity in the responses of the two groups on the measures used in the study. Eaton and Struthers (2002) reported fuller and more incisive answers to an online survey compared with a paper-based survey, where this was actually a goal of the evaluation. Glover and Bush (2005) agreed that the greatest value of the online survey was that it encouraged deeper reflection than that developed in paper-based surveys where people responded according to space available. They concluded that their online survey offered fuller answers at a relatively cheaper cost and from a wider respondent group. Because there was no need for the transcription or data entry that characterises interviews and paper-based surveys, it offered time economy for both respondent and analyst. They believed that their use of an online survey in educational research elicited subjective and reflective responses with efficiency.

Finding an online survey

It was not a straightforward task to find an online survey that would work alongside the TELA paper-based survey. An online survey available on The University of Waikato server was investigated and worked on over several months but trialling it with the assistance of IT personnel ended when the results of the trials were not able to be transferred into Excel for analysis. One of the evaluation team, who had been away on leave at this time, suggested on his return that as he knew how to write in HTML he might see if he could set up the survey to be answered online. There remained the requirement to be able to ask the right questions to gain the

information that was sought. So the preparation time to set up the format of the survey was not only necessary, it was actually more involved, as the possible links that the responses online might take had to be taken into account. The researcher and the writer needed to work in tandem to ensure that the online survey results would be the same as they would be had the respondent chosen to answer a paper survey. Working together, the survey took four days to be ready for trialling. It was decided to continue exclusively with paper surveys for the secondary sample, but to give primary teachers the option of answering a paper or an online version of the survey from their first year in the evaluation. For this reason there needed to be synchronisation with the paper survey throughout the three years of each level's participation. The program SPSS had been used to analyse the survey from the beginning of the evaluation, so the online survey also needed to be set up so that the answers could be transferred to SPSS via Excel, and to be added to the answers from the paper surveys that would be entered manually.

CAUTIONS ON USING AN ONLINE SURVEY

Over the years, the discussion about the value of using online surveys has become more positive in tone, but there are still issues that the researcher needs to be aware of in choosing to use an online survey, such as the apparent length of an online survey when the respondent first enters the website (Glover & Bush, 2005; Toepoel, Das & Van Soest, 2009).

Instrument design

Many of the issues surrounding the use of online surveys are the same as any other data-collecting tool. The principles of good survey design still apply to electronic surveys, although screen design is more complex as it must be developed in HTML, and support scripting and database languages, particularly since they have additional format and response control. Capiluppi (2002) argues that in computer-assisted longitudinal surveys, even more than in common surveys, the key element is instrument design. The survey designer has to carefully identify the best data model definition to fit the survey variables in order to avoid redundancy and inconsistency. A correct data model ensures not only a more efficient way to store the survey data, but also better usability of the collected information at the next waves of the survey. Some of the special considerations that arose for the TELA researcher when designing the online survey were

- making sure that when transforming text into codes they would be the same as those used in the data entry of the paper surveys;
- conditional questions—ensuring that if a respondent ticked “no” in a “yes/no” answer, they would not be able to continue their response as if they had actually ticked “yes”;
- allowing enough space for the respondent to write a lengthy answer in a free-response question;

- leaving an identifiable code column in the database where the survey data would be stored, where there needed to be manual coding such as school ID or regional locality;
- including a “please type here” command wherever a free response was expected;
- ensuring that where the respondent was asked to tick one box of, say, five, there was no opportunity for more than one box to be selected; and
- ensuring that the names of the questions were the same as those for the paper surveys, so that when the results were transferred to Excel the file could be sent to SPSS and the responses would all end up in the correct place.

Accessibility

Selwyn and Robinson (1998) were early advocates of using email as a research tool, but recognised that unless the researcher knew for certain that the potential respondents had access to technology and were capable users, there could be a biased population in terms of income, age, gender and race. The same can be said for online surveys—respondents need to have access to the Internet and be able to follow the instructions about completing and submitting the online survey (Selwyn & Robinson, 1998; Spitz et al., 2006). There may be some concern that paper-based surveys elicit different responses from online surveys; however, an Australian study examining this found that while the profiles of two groups of respondents differed significantly, the findings gave confidence that an online study would bring forth results that almost match those of a postal survey (Adam et al., 2003).

Spitz et al. (2006) caution that spam issues are a concern that must be addressed when conducting online surveys. Care must be taken to avoid a survey invitation being tagged as spam and filtered out of a respondent’s mail in-box before it is even seen. Other issues include people not checking their email very often, multiple email addresses and server errors.

Forsman and Varedian (2002), who discuss the cost and response rate of mail and online surveys in Sweden, report that survey design is a particularly important and difficult issue in online surveys compared to other modes of data collection. Online survey design may include a variety of verbal, visual and interactive elements. It is, however, not possible to take full advantage of these opportunities since the respondents use various hardware and software systems and may not be able to download a “fancy” survey in a reasonable time. Moreover, many respondents, even in a highly educated population, may not have the computer experience to take advantage of advanced facilities. Glover and Bush (2005) recommend that the technical design of the online survey should ensure that the form is clearly presented, and that it will load quickly and run for the majority of users. To balance the variety of opportunities and limitations is a unique challenge for the online survey researcher.

Sampling

It is essential to take care with selecting a sample to participate in an online survey—some groups may see an online survey as an intrusion of privacy if, for example, the survey asks questions about health-related issues; some may have technical difficulties in responding online; and others may make a judgment after starting the survey and not complete it (Andrews et al., 2003). It is critically important to prove to respondents that the survey agency requesting their participation is a legitimate organisation and not a front or some sort of scam, and to enhance the credibility of online research, respondents must be assured that their data will be transmitted securely, kept confidential and not sold to third parties (Spitz et al., 2006).

Contacting the participants

It may seem that once the survey is written (and posted online in the case of an online survey) that is all there is to do except to wait for the responses to come in; however, this is not the case at all. Before the TELA survey could be sent out, schools in the sample needed to be advised of the survey and its purpose, and asked if they would participate. Each year, a letter was sent to the principal explaining where the evaluation was up to and how the school could participate. A summary of the previous year's results for that year level was sent in the second and third year of the evaluation to show how the teachers' voice had been reported to the Ministry of Education. Principals or the school's chosen "contact person" would send back the attached consent form showing details of how many teachers wanted to answer the survey on paper and how many preferred to answer online. Slips were included with the information sent to schools as to how to get onto the web page, so that all the contact person needed to do was give each teacher a slip of paper. By the second year of using an online survey this letter was sent to the schools as soon as the online survey had been trialled and set up on an external web page, and would include a URL so that teachers could start to respond at their convenience. If a school wanted paper surveys to be sent, this was recorded and they were sent out by return post when the research team received the information. By the second year of the last level in the evaluation (Year 1–3 teachers), there were only 50 teachers who requested paper surveys and the remaining 700 answered the survey online. Each year, the schools that had not replied were contacted again, first by fax and then by telephone, to encourage them to participate. This usually resulted in an influx of respondents.

Strategies to increase response rates

Pandi (2002), in a discussion of the use of online versus conventional surveys, reported that a number of strategies were used to increase response rates to the online survey: a welcoming email note, posters, letter of notification and a reward of free internet surfing time to participants. Shannon and Bradshaw (2002) found that respondents were more likely to respond quickly and more readily to an online survey after a reminder than to a paper-based survey. In the same way, Forsman and Varedian (2002) report the results of both a conventional and an online survey on

housing conditions for university students in Sweden and attribute an increased response rate after a telephone follow-up of the surveys. Spitz et al. (2006) used several strategies to support respondents to a survey of their client population, including a “help desk” facility accessed by a toll-free telephone number placed on every page of the survey. They also checked the database regularly to see if respondents were encountering any technical problems, and to review data coming in with a view to following up respondents who required or requested follow-up on their responses.

ONLINE SURVEY DESIGN

Although the same questions can be asked via paper or online surveys, this does not mean that there is automatic translation between the two media. The researcher needs to be experienced, skilled and have an aesthetic sense in order to design an effective online survey. Online survey construction has been compared with the way that desktop publishing was approached several years ago

As soon as low-cost desktop publishing software, printers, etc. became available, publishing came within easy reach of nearly everyone. But, as it turned out, the availability of powerful publishing tools simply made good publishers more productive; it did not turn bad publishers into good ones. (Schafer, 2002, p. 12)

Issues to consider

Andrews et al. (2003), in their discussion of online survey design, development and implementation guidelines, say that “survey design, subject privacy and confidentiality, sampling and subject solicitation, distribution methods and response rates and survey piloting are critical methodological components that must be addressed in order to conduct sound online research” (p. 1). Every question, question sequence and scale used in the survey must be tested and re-tested as improvements are made. In addition, the question layout, instructions to respondents, answer categories, question numbering systems and reliability of the “submit button” should be tested.

Question design

Glover and Bush (2005), in their online evaluation of a training and development of head teachers in England and Wales, considered each topic in their online survey against three criteria

- Could this answer be more effectively sought in another way?
- Has the right question been asked to secure the evidence of opinion that is being sought?
- Have the right responses been offered so that the respondents give consistent answers?

Eamon (2001) cautioned that respondents to an online survey were more likely to interpret questions in their own way; a problem perhaps for analysis, but an

advantage in that this allowed for responses to be grounded in experience. He indicated that care needed to be taken in the design and analysis of more open-ended questions in an online survey.

The coding guide

Attention must be paid from the very beginning to how the answers will be used. In the TELA evaluation, SPSS was used from the beginning to enter the data from the surveys and then to describe the data using frequencies and counts. It was, however, felt that Excel provided clearer graphic representation of data; so after tables were made in SPSS, the data were transferred to Excel and bar graphs constructed for reporting purposes. Setting up the SPSS program to receive data was a time-consuming task that started after the questions were formulated—content and question type decided. A coding guide was written using a paper version of the survey, with every question being given a name and codes assigned to all possible responses. This coding guide was then used to help the online survey writer translate all details into HTML as well as find shortcuts and ways of helping respondents to answer the questions accurately.

The trial period to check responses and to collect the data

A trial period was vital, with firstly the evaluation team trying out the questions. The researcher who was to receive the responses then collected all the data from the email folder set up to receive emails. Clicking on the URL at the bottom of each email collected these and a file was saved onto the desktop. Each time this was done, all the responses to date would appear in a .csv file. Sometimes there was a problem with the receiving of data. Once, 28 responses were “lost” and had to be collected individually from the emails, as the URL had become inactive for some reason. When the computer support people were informed, a “miracle” was performed and all the data from then on came in correctly. However, had the researcher not been checking every second day or so to see how many emails had been received, it may not have been evident that some that had come in did not appear on the .csv file.

Cleaning the online response file to synchronise with paper data entry

Care needed to be taken to ensure that the data arriving from the online respondents fitted the SPSS file and that the codes were the same as the paper responses. At the front of each response there were extra columns for date and time of arrival that needed to be deleted for the data to fit into the SPSS file that had been set up for data entry. Before transferring data to SPSS it was efficacious to remove all commands such as “please type here”, as it was easier to do this globally using “find and replace” than singly and later in SPSS. Many people responding to the online survey did not realise that they could type over these commands and left them in situ—had these commands not been deleted the researcher may not have noticed responses such as this

Please type here. Just being able to have information available when needed and a valuable instrument for showing children resources on the net. I couldn't do without my laptop.

THE TELA ONLINE SURVEY–THE RIGHT CHOICE

The TELA online survey was ideal for the population being surveyed, as all teachers responding had easy access to a laptop and to the Internet, either at school and/or at home. Respondents tended to write more considered responses in the free-response sections of the online survey than they did in the same questions in the paper survey, where they were limited by the space available. By the third year of the team administering the primary survey, the responses online far outweighed the number of paper surveys requested (see Table 1). One researcher was now required to deal with the administration of the survey compared to the four people required to package up and send the paper surveys to the secondary school teacher sample in the first year of the TELA project. The HTML writer was able to alter the questions as necessary each year with very little effort and although the researcher receiving the online responses needed to be vigilant throughout, this monitoring took hours rather than the weeks that data entry of paper surveys would have taken.

POSSIBILITIES FOR THE FUTURE USE OF ONLINE SURVEYS

Up until recently, publicly available online surveys did not allow for a researcher to implement the survey data model according to his conceptual design (Capiluppi, 2002) and were limited to a format designed by the web designer. With open-source software now available, the researcher may choose question types and design a survey in the same way as a paper-based survey, but with the added advantages of being able to control for certain things such as conditional questions. Now, more commonly, included in the package is a data model that takes into account both the database theory and the survey routing logic.

It is important to realise that instrument design is especially important for longitudinal surveys because all the data collected at one time may have to be used at following times, to customise the next interviews. Conceptual modelling is a different way to consider the survey, so that not only do the questions flow but there is also a data model; that is, a set of data entities and relations among them. Capiluppi (2002) explains how the survey designer has to "carefully identify the best data model definition to fit the questionnaire variables in order to avoid redundancy and inconsistency" (p. 2). A correct data model ensures not only a more efficient way to store the survey data, but also better usability of the collected information at the next waves of the survey. Further, it is important the data are directly usable, without the need of manipulations, such as variable renaming, cut and paste of records between data files, or any other rearranging by manual operations.

In recent times, online surveys have become more user-friendly and may now be considered as an efficient and accurate method of data collection. Developments in open-source software now mean that more people have free access to better online surveys. There are several options available to you if you have decided to

use an online survey: write the survey from scratch using HTML, find a ready-made survey, or find a tool that will help you design the survey.

- To write a survey from scratch you need to be familiar with HTML. You assemble the HTML to suit your survey needs. The web design program Dreamweaver can help you write in HTML code from scratch, or you may know a friendly computer science student who can help ...
- Alternatively, you could find a ready-made survey on the web. Finding one that will give you the information that you need could be difficult unless it is very simple or standard; for example, an IQ test or a demographic survey. If what you are doing has been done a hundred times before, there is probably an online survey available to you somewhere.
- You can find increasingly user-friendly software that is designed specifically to help you put together surveys—the built-in features are called up and it generates the question type. An example of this is the open source software LimeSurvey. This survey also allows the researcher to view results in the form of percentage response, with or without graphical detail. However, you will need a web host or computer support team to assist you to manage the survey: <http://www.limesurvey.org/>
- You can access commercial software products such as http://www.surveymonkey.com/Home_FeaturesDesign.aspx, for which you would not need a web host or computer support team. However, there is usually a cost for more than the nominal number of questions and responses and any extra features such as survey templates and detailed analysis.

What is open source software?

Open source software (OSS) projects are built and maintained by a network of volunteer programmers. *Wikipedia* explains that the open source model of operation and decision-making allows concurrent input of different agendas, approaches and priorities. The principles and practices are commonly applied to the peer production development of source code for software that is made available for public collaboration.

Most survey software is built for the lowest common denominator and most computers are better at being able to receive information. Browsers are becoming more standardised with similar functionality, so that is not very often that a respondent would not be able to access an open-source online survey.

Open-source software that is totally functional has not been around very long. It is now getting to the stage, where it is better than any other manually coded software, which previously was the only way of getting exactly what you wanted. That was because they could not ask questions such as conditionals, where the content is only visible to the respondents who answer a trigger question in a certain way. It is probably 99% now. With the manually coded surveys (written in HTML) you had to trial them yourself; now the computer does the checking. In an open-source community, there are hundreds of people working on the software so any one of them could pick up a problem. A community of people develop the software free to use, so someone starts with an idea and they all work on this idea, then it

becomes available for everyone to use with a licence. You can use it and modify it to your own purpose. Many people can use it and modify it, update it, or they find a bug, submit it (if you are good enough) and others can see it and say, “Yes, that’s a good way.” Then the rest of the community can download the new patch.

Is it really that easy?

In short, the answer is “No”. The reason for this is that although there are many question types to choose from, it can take a long time to work out which best suits your question. Question variety is not only a good idea to prevent boredom, but also to get the most relevant answer. If you give a series of choices and none fit what the respondent wants to say, you will miss out on information that might be very useful, so some open-ended free-response questions may be necessary. Format of an online survey is also important. It can appear longer if the respondent needs to scroll down the page because you have put so many questions in a section without a break, so you need to trial how many questions you should put on one page. Toepoel et al. (2009) found that non-response increased with the number of items appearing on a single screen. Taking care to ensure that conditional questions are set up correctly is vital and many of the cautions mentioned in this paper apply equally to designing an online survey via open-source software. In particular, the careful communication with your prospective respondents, the monitoring of responses and reminders when close to closing date can all raise response rates. If a problem arises there is always someone in cyberspace who will talk to you about the possible solutions. The open-source software can do simple analysis for you as well—counts and percentages—and you can lift off the open-ended responses for qualitative analysis. Some software will do more detailed analysis for a fee, but if you plan the survey using a coding guide as detailed in this paper you can export the responses to Excel or to SPSS and conduct the analysis that fits your needs. The process is so much easier, however, that once you have got your first survey out and get a high response rate, you will never send out a paper survey again!

CONCLUSION

It is clear from the preceding discussion that merely using an online survey does not eliminate any of the standard issues involved in designing a survey. Aside from the problems of finding someone to write in HTML or finding a survey online, the researcher must establish a set of procedures to guide the inquiry through a maze of potential pitfalls. A number of strategies can be used to increase response rates, but the whole process from design through to collection of data needs to be carefully monitored. The TELA researcher found that the online survey was an excellent tool for this evaluation. Yet, like all tools, online surveys have strengths and limitations. Realising the strengths requires attention to detail in the design phase and synchronising if a paper survey is also administered or offered as an option. Counteracting the limitations requires attention to the potential weaknesses of the data delivery system and a constant vigil over the incoming data. In a longitudinal project, the advantages of an online survey increase by the year as people get used to digital ways and find this way of responding to surveys to be easier, less time

consuming and more efficient. For researchers, although they are required to be vigilant throughout, the advantages are that more data seems to come in more quickly, more accurately, and the need for data entry time is eliminated.

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