

Integrating Qualitative and Quantitative Information in an Evaluation

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Abstract

A key way to increase the rigour of an evaluation is through the integration of multiple methods in the study of the same phenomenon (“triangulation”). Triangulation of qualitative and quantitative data in evaluations often reveals richer results and insights than the use of either type of data alone. However, despite the benefits of triangulating qualitative and quantitative data in an evaluation, debate continues as to how to do this. This paper reviews a recent evaluation of a public sector educational initiative, the Computers for Teachers Trial in Queensland. The evaluation of the Trial involved the collection of longitudinal quantitative evaluation data from Queensland teachers over three waves of surveys (n=1,006 at final, with a response rate of 93.7%), supplemented by the collection of rich qualitative data through focus groups and interviews. This paper discusses the strategies used to integrate qualitative and quantitative data methods in the evaluation of the Trial, with a focus on formative, process and summative stages. The paper also discusses strategies for improving the integration of qualitative and quantitative information in evaluations to form defensible research conclusions without sacrificing methodological integrity or accuracy.

Integrating Qualitative and Quantitative Information in an Evaluation ("n-riching evaluation")

Todd Sansness, Jill Charker and David Firman

Introduction

Social science researchers have long debated the use of qualitative and quantitative research (Smith, J.K.1983; Bannister 1987; Hammersley 1989; Ross 1991). Historically, qualitative researchers have criticised quantitative studies for their irrelevance and misrepresentation of social reality. Conversely, quantitative researchers have suspected that qualitative research in evaluations is unreliable and invalid.

This paper aims to discuss, using an Australian quasi-experimental evaluation case study, reasons and methods for integrating qualitative and quantitative information in an evaluation. Throughout this paper, it is argued that: a) integration of qualitative and quantitative data can produce more meaningful and rigorous evaluation findings than use of either type of data alone; b) strategies for triangulation can be identified and implemented; and c) a recent evaluation conducted in Australia provides evidence for the utility of these strategies.

Qualitative and quantitative research

Qualitative research methods are commonly used in evaluations to scope issues and provide a context to develop understanding and meaning through opinion, narrative and observation. Methods may include observation, interviews, case studies, discussion or focus groups. Quantitative research methods can be used to scale issues developed and enable generalisability by establishing numerical trends. Methods may include counts, measures, surveys, quantification of opinions.

The integration of multiple methods in the study of the same phenomenon can be described as triangulation. Triangulation of qualitative and quantitative data in evaluations is a key way to increase the rigour and richness of an evaluation. Noteworthy proponents of the integration of qualitative and quantitative methods include Guba and Lincoln (1989), Heap (1992) and Smith, M.L. (1986).

Howe (1988) presented a paradigm which provided a framework for the compatibility of qualitative and quantitative methods. Green, Caracellie and Graham (1989) claimed that the use of qualitative and quantitative methods could provide additional richness and detail to better understand a phenomenon. Reichardt and Cook (1979) believed that, by using both methods, the weakness or shortcomings of single-method studies can be overcome.

Triangulation is more than the combination of research methods or the validation of findings. It involves using qualitative and quantitative research methods to inform each other and widen an understanding of findings (Kummerow 2000). In evaluation, triangulation of qualitative and quantitative data can provide a more complete picture of the issue being addressed, the target audience and the effectiveness of the program itself.

Case study in application for integrating qualitative and quantitative research

In 2006, the Queensland Department of Education, Training and the Arts (DETA) undertook a trial to provide computers for teachers in a limited number of Queensland state schools. The Computers for Teachers Trial involved the allocation of approximately 1,500 laptop computers to state school teachers in selected Trial districts in Queensland. DETA also provided additional development and training, infrastructure and support for teachers participating in the Trial.

The Office of the Economic and Statistical Research (OESR), Queensland Treasury was contracted to conduct an evaluation of the Trial. The objectives of the Trial were to enable teachers to access

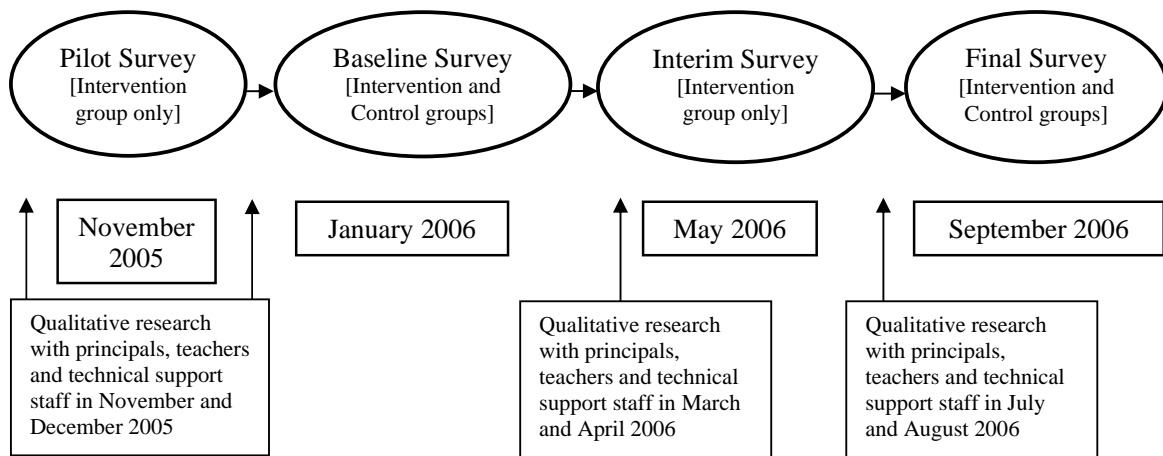
networked data, experiment with information and communication technologies (ICTs), and increase their frequency of electronic communication, planning, reporting and assessment.

The evaluation was based on the concepts of quasi-experimental design and was an investigation into the program (or Trial) effects related to outcomes of intervention (Trial participants) and control groups established over time. More specifically, the primary objective of the evaluation was to assess the impact of providing laptop computers to teachers who were participating in the Trial.

From a stakeholder-oriented viewpoint, the evaluation identified changes in access and usage of computers and their associated applications, and identified impacts on teachers' work practices, learning and ICT skills. From a policy maker-oriented viewpoint, the evaluation developed indicators used as measures of the Trial's key objectives to produce estimates of program effects.

OESR compared quantitative information collected from both the intervention and control groups at baseline and final waves. Qualitative research and an interim survey also gathered information from the intervention group to evaluate the nature of progressive change in teachers' behaviour resulting from use of the laptop computer (Figure 1).

Figure 1 Data collection timeframe



The evaluation used qualitative methods including:

- Focus group sessions: A total of 17 focus group sessions were conducted at intervention schools with approximately ten randomly selected participants per session. Participants represented a broad range of teaching experience, subject matter areas, demographics, school sizes and geographic locations. A total of 160 teachers from more than 60 per cent of Trial schools participated in focus group discussions over three waves throughout the evaluation;
- In-depth and semi-structured interviews with principals, teachers and regional technology staff;
- Open-ended questions in questionnaires; and
- Online discussion forums and blogs.

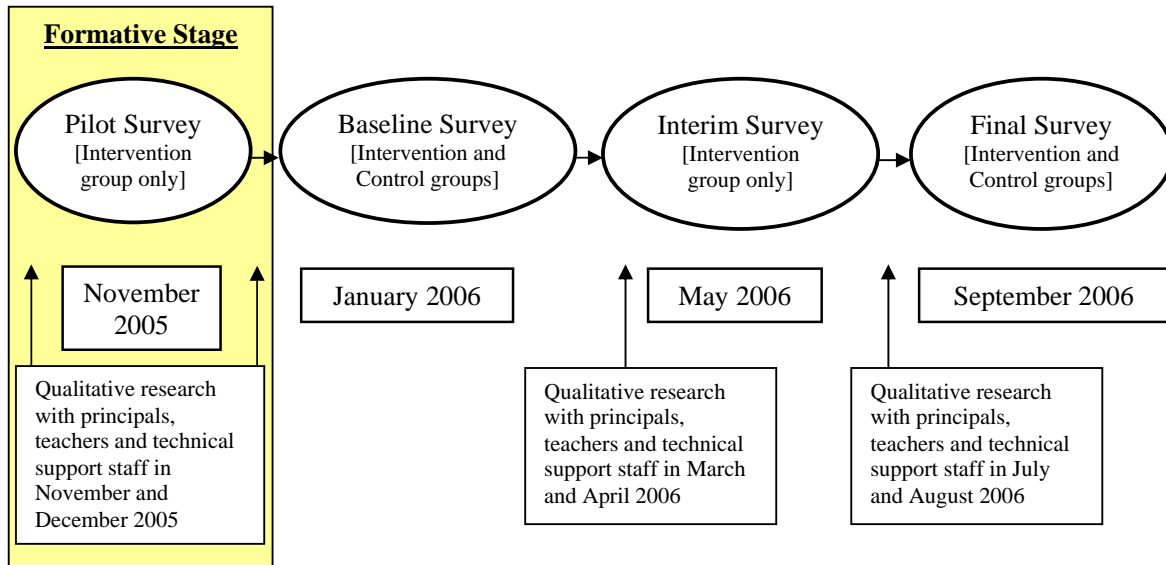
The primary quantitative method used for the evaluation was comprised of three waves of paper-based surveys, referred to as the baseline, interim and final, were administered to the intervention group (n=1,006 at final, with a response rate of 93.7%). The baseline and final survey were administered to the control group (n=325 at final, with a response rate of 96.2%).

As part of the evaluation, OESR integrated qualitative and quantitative research methods during formative, process and summative stages.

Strategies for triangulating qualitative and quantitative information – formative stage

As part of the formative stage of the evaluation (Figure 2), OESR used qualitative and quantitative methods to learn about the attitudes and behaviours of participants in relation to using computers and other ICTs for teaching purposes.

Figure 2 Data collection timeframe – Formative stage



In the formative stage of the evaluation, OESR used qualitative methods such as:

- In-depth and semi-structured interviews and information sessions with key stakeholders such as principals, teachers and regional executives to promote and foster much-needed support and ownership. This was a key element of the success of the evaluation in terms of response rates and participation for both qualitative and quantitative research methods;
- Focus groups and discussions to inform the development and design of the quantitative survey instruments and program logic and provide feedback on the pilot survey;
- Exploratory focus groups to:
 - clearly outline the purpose of the evaluation and the role of OESR as evaluators;
 - determine a process for conducting the evaluation that participants believed would work for them. This allowed OESR to pretest its messages and research methods for which participants could provide spontaneous reactions and explanations for their responses;
 - gain a better understanding of the environment in which the Trial was being conducted and identify potential confounding factors; and
 - assist in measurement development to capture a broader range of perspectives on the program than could have been identified in isolation by the evaluation team or program stakeholders.

In the formative stage of the evaluation, OESR conducted a quantitative pilot survey to:

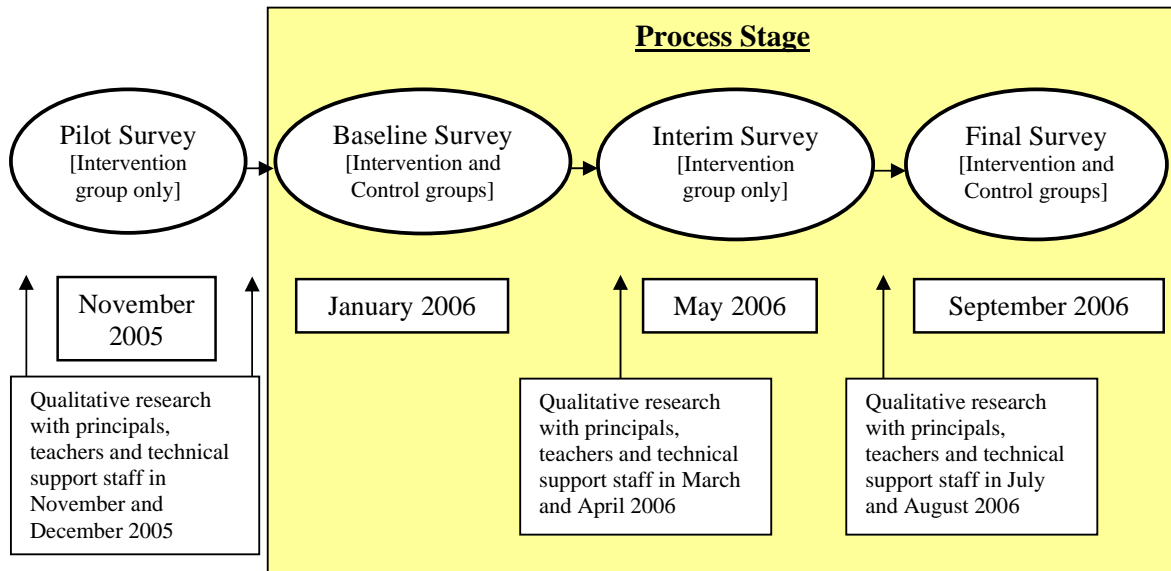
- determine respondent reaction to the survey and identify any problems with the survey;
- measure the time for survey completion;
- derive indicative baseline findings for the evaluation before the main baseline survey was administered;
- clarify the development of program logic.

Focus group feedback on the pilot survey enabled OESR to incorporate minor additions to the main baseline survey. Focus group feedback confirmed that the length and appropriateness of the questionnaire.

Strategies for triangulating qualitative and quantitative information – process stage

As part of the process stage of the evaluation (Figure 3), OESR used qualitative and quantitative methods to gain support from participants through ongoing communication, pre-approach letters, regular e-newsletters, and online communities specifically designed for facilitating discussion about the Trial. This ensured that the evaluation was kept on track and could respond to needs as they arose. OESR regularly kept in touch with schools to encourage optimal response rates, as part of the quantitative research and participation as part of the qualitative research.

Figure 3 Data collection timeframe – Process stage



In the process stage of the evaluation, OESR used qualitative methods such as:

- Focus groups and interviews to:
 - help OESR identify any concerns participants had with barriers or opportunities relating to the Trial;
 - help inform the survey design process;
 - gain feedback from respondents to supplement an understanding of survey responses made during the course of the Trial; and
 - allow OESR to identify important themes and to construct descriptive summaries of views and experiences on topics of interest to the evaluation;
- Observations which allowed OESR to identify the lack of infrastructure and inadequacy of facilities in some schools gave further context and meaning to survey responses on these issues. For example, as a result of other programs, some schools had power points reallocated to different sections in the school, which meant that some classrooms did not have a power source for teachers to charge their laptop to use;
- Information sessions, blogs, discussion forums; and
- Open-ended qualitative questions as part of the quantitative survey instruments to help interpret or explain the quantitative findings and discover rich contextual meaning.

In the process stage of the evaluation, OESR conducted three quantitative surveys to assess the status of outcomes throughout the year for both the intervention and control groups. The primary objective of the three surveys was to assess access, usage, behaviour and attitudes that teachers had towards using computers and their associated applications. The surveys also assessed the impact of other ICTs and peripherals which may have affected teachers' participation in the Trial.

OESR triangulated the qualitative and quantitative findings during the process stage to assess the impact that ICTs and peripherals were having on the Trial. For example, qualitative observations, interviews and focus groups identified an increase in the provision of training, support, ICTs and infrastructure for teachers at many schools after the baseline survey was administered. The interim survey confirmed an increase in use of the laptop for purposes relating to Trial objectives, which was correlated with an increase in the use of ICTs and peripheral support, training and infrastructure.

Ongoing discussion and engagement with schools, teachers and other key stakeholders as well as targeted survey questions, ensured OESR were able to evaluate program changes and their effects on the measures of the Trial objectives.

Strategies for triangulating qualitative and quantitative information – summative stage

As part of the summative stage of the evaluation, OESR triangulated its qualitative and quantitative data to provide more rigorous conclusions from the evaluation. In most cases, these data collection methods led to comparable conclusions.

A framework for reporting was developed to provide objective commentary based on statistical tables and charts supplemented by narrative qualitative commentary. The intent of the qualitative findings was to provide depth and richness to supplement and inform the quantitative survey responses. In many cases anecdotes were also used to illustrate analytical results. The intent of the quantitative findings was to enumerate the qualitative findings and provide representativeness from the results.

Qualitative research informed and helped to describe many of the quantitative findings. However, the quantitative findings provided the essential data for assessing the indicators used as measures of the Trial's key objectives to produce estimates of program effects. The program effects (or measurement of the effectiveness of the Trial) were critical in informing the decision making process for consideration of a State-wide immersion of the intervention.

Using quantitative data, OESR found a statistically significant effect size for almost all indicators used as measures of the Trial's objectives. In fact, the magnitude of the trial's effect size for several indicators was large and was largely a function of the large sample size in the intervention and control groups.

OESR was also able to conclude that differences in confidence and frequency of computer use between the intervention and control groups could be attributed to participation in the Trial, as opposed to any pre-existing differences at baseline.

By triangulating the qualitative and quantitative findings, OESR collected evidence which suggested that effect size estimates could be attributed to participation in the Trial as a whole, rather than provision of a laptop alone. OESR received rich supporting qualitative feedback from Trial participants which strongly confirmed the quantitative findings that the components of the Trial which were provided in addition to the laptop, such as training, infrastructure and support, were considered particularly critical for ensuring the Trial's objectives could be met.

For example, OESR identified, as part of the qualitative research conducted at schools, that some schools lacked proactive teaching or administrative staff to provide leadership which drove and supported the Trial initiative in their school. At these schools, teachers generally did not engage in the Trial until late in the Trial period (as evidenced in quantitative findings) and therefore showed relatively poor integration of the laptop or ICTs with their teaching practice.

Poor integration of ICTs in teaching practice at some schools was revealed from triangulation of quantitative and qualitative research findings. More specifically, OESR correlated survey data relating to frequency of using a computer for teaching tasks with feedback received from teachers in discussions and focus groups indicating schools with a lack of technological leadership.

It was this understanding from the qualitative research that assisted OESR's interpretation of the quantitative data relating to use and integration of the laptop and other ICTs into teaching practice among teachers and schools.

In another example where OESR relied on the triangulation of its qualitative and quantitative data, it was identified that interim survey results from schools located in the Cairns region were marginally affected by an external environmental event. More specifically, qualitative findings indicated that as a result of Cyclone Larry in March 2006, many schools in the Cairns region did not have power supply for up to three weeks. Consequently, teachers were unable to use their laptops for teaching purposes during this time. This had some effect on the survey responses from these teachers at interim, where they recorded slightly less progress than schools located outside of the cyclone affected areas.

Strategies to improve the integration of qualitative and quantitative information in evaluations

OESR conducted its evaluation to realise benefits from both qualitative and quantitative approaches. OESR applied a qualitative approach to:

- seek stakeholder commitment and engagement;
- inform the quantitative design and process development;
- consider the Trial in the broader environmental context;
- study meaning and validity influences; and
- provide insight into the reasons for observed variability.

OESR applied a quantitative approach to:

- provide objective, unbiased responses;
- provide reliability, validity and rigor;
- provide multiple outcome measures for policy consideration;
- enhance transparency of evaluation design and methodologies; and
- examine analytical data interactions.

OESR believe that a well constructed research design for capturing qualitative and quantitative information can establish a solid foundation from which to provide evaluation findings. A combination of both methods can exhibit construct validity, internal validity and external generalisability if rigorously designed.

As part of constructing a rigorous evaluation research design, OESR triangulated both qualitative and quantitative methods to overcome any shortcomings of using a single method. For example, although OESR received feedback in focus group sessions from a broad representation of teachers participating in the Trial, for some sessions it was not possible for a true random selection of teachers to be represented due to teacher commitments with their schools and scheduling of sessions. If focus groups were the only research method used for data collection, then the overall rigour and reliability of the evaluation findings may have been compromised.

Similarly, although OESR received very high rates of survey response and non-missing question response, if quantitative surveys were the only research method used for data collection, then an interpretation of the truth and relevance of survey findings may have been inaccurate or incomplete.

Integrating qualitative and quantitative research approaches can be time-consuming, labour-intensive and financially burdensome. Several factors worked in OESR's favour for effectively integrating the two research approaches:

- OESR received adequate resources to design and administer a rigorous quasi-experimental evaluation with well-matched comparison groups which could be effectively managed to deliver meaningful, valid and reliable results. This enabled the administration of longitudinal quantitative surveys, qualitative focus groups, semi-structured interviews and discussions with all participating schools;

- OESR were able to successfully negotiate and communicate with key stakeholders and Trial participants to determine appropriate timing for data collection activities, progress reports and the overall assessment period for evaluating the program. At the steering committee and cabinet committee levels, OESR negotiated an agreed timeframe of a year for the evaluation. Other stakeholders such as teacher union and schools representatives were also extensively consulted to ensure all timeframes and evaluation process were understood and agreed. OESR also received strong support for an integrative paradigm of qualitative and quantitative research methods; and
- OESR had a professional and high quality set of skills available for the evaluation to conduct both qualitative and quantitative research. OESR dedicated a team of professional Statisticians, qualitative researchers, trained computer assisted telephone interviewers, project managers and evaluators to support field work, analysis, reporting and communication.

Overall, OESR managed the evaluation in a consultative and communicative manner with clients, stakeholders and Trial participants, such that the three waves of surveys which were administered to the two well-matched comparison groups achieved average response rates of over 90%. Continuous communication with Trial participants and key stakeholders enabled participation in focus groups, interviews and online discussions from 160 Trial participants from more than 60% of Trial schools.

Conclusion

The success of the evaluation of this particular technological intervention program was largely due to the nature of the approach OESR took towards integrating and effectively triangulating qualitative and quantitative methods of data collection.

OESR achieved an evaluation outcome which provided a high degree of relevance to the study of how the intervention affected teachers and their practice. Qualitative research assisted OESR to accurately represent the depth and richness of teachers' opinions and attitudes experienced during the Trial. In addition, rigorous and objective quantitative research allowed OESR to ensure a high degree of reliability, validity and generalisability.

Rather than relying solely on one method and compromising the other, OESR believe the triangulation of mixed methods enhanced the richness and robustness of the evaluation and the overall quality of the evidence base available for decision making.

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