Evaluation – data collection and analysis methods

Quantitative and qualitative data collection techniques

Both quantitative (numeric) and qualitative (usually words) data collection techniques can be adopted for an evaluation. The list below provides an overview of the main types used within process evaluation. However, process evaluation may not be the most appropriate evaluation technique and more information is provided of evaluation methods beneath the main data collection methods[1].

- **Interviews:** interview data may be qualitative or quantitative and can provide rich insights about attitudes, opinions and experiences of people involved in a policy, or intervention.
- **Group interviews:** similar to interview data but allows people to build and reflect on each other's opinions.
- **Observation/participation:** observing or participating in the intervention and recording in narrative form or in a pro-forma.
- **Questionnaire:** A questionnaire is a sequence of questions designed to elicit information on a subject from an informant.
- **Consultative and deliberative methods:** can combine a number of methods, often qualitative but go beyond people's views and behaviours to come up with appraisals, solutions or strategies. Often includes intensive exercises with small groups.
- **Statistical analysis of quantitative data:** a number of sources of quantitative data including administrative and monitoring data, survey data and numerical case files can provide statistical data on a policy's delivery, e.g. no. of participants receiving an intervention, characteristics and initial information about costs.
- **Document analysis:** access to and analysis of documents relevant to the policy/intervention being evaluated analysed using content analysis techniques.

It should be noted that in statistical analysis a variable can be classified as qualitative (categorical), or quantitative (numerical)[2] . A qualitative variable is a name or label and a quantitative represents a measurable quantity.

[1] The Magenta Book, pp 92. Available from: www.gov.uk/government/uploads/system/uploads/attachment_data/file/220542/magenta_book_combined.pdf

[2] What are variables, Stat Trek. Available from: http://stattrek.com/descriptive-statistics/variables.aspx?Tutorial=AP

There are a variety of approaches to evaluation, which vary in terms of the types of data they use (qualitative/quantitative), the analytical techniques required and the nature of results they provide. An evaluation will generally involve a mixture of these methods. Some of the main evaluation types, adopted from The Magenta Book[3] and the necessary data are outlined below:

- **Process evaluation:** use a variety of qualitative and quantitative techniques to explore the success of a policy or intervention.
- **Experimental or quasi experimental impact evaluation:** uses quantitative data to test whether a policy or intervention was associated with any significant changes to relevant outcomes.
- **Economic evaluation:** measuring the cost effectiveness of the policy or intervention by calculating the economic costs related to a policy or intervention and the economic value (estimated or measured) of impacts made to provide a full cost-benefit analysis.
- **Theory-based evaluation:** this can incorporate a wide range of qualitative and quantitative methods to systematically test the theory/assumption.

[3] The Magenta Book, pp 45. Available from: www.gov.uk/government/uploads/system/uploads/attachment_data/file/220542/magenta_book_combined.pdf

Quantitative analysis

Quantitative analysis can be used to generate numerical findings. This can be represented in tables, charts or other visual presentations.

Descriptive statistics

Descriptive statistics are used to describe the basic features of the data in a study[4]. Inferential statistics are used to try and reach conclusions that reach beyond the immediate data alone[5].

Descriptive statistics are used to provide summaries –usually in table format - about the sample group used in the study. They do not try and learn about the wider population which the sample is representing. Alongside graphs (or pie charts etc.) they provide the basis of almost every type of quantitative data analysis. They are a form of statistical analysis, and can include reporting the mode, mean and median and range of the sample group.

Inferential statistics

You will only be able to undertake inferential analysis if you have used random sampling to generate a representative sample. Inferential statistics investigate questions, models and hypotheses. They use the results gathered from a sample to try and make inferences about the results for a wider population.

In most research the analysis section follows three key phases[6]:

1. Description of how the data were prepared (usually brief)
2. Descriptive statistics usually carefully selected and organised into summary tables and graphs showing the key information.
3. Inferential analyses, where possible ie. where the sample used in the evaluation has been selected using random sampling.

Inferential statistics can be drawn from testing a hypothesis. This consists of four key steps[7]:

- State the hypotheses. This includes the null and alternative hypotheses – they must be opposite so that is one is true, the other is false.
- Design the data analysis plan – this describes how to use the sample data to evaluate the null hypothesis, often focused around a single test statistic.
- Analyse the data and find the value of the test statistic (mean score, proportion, t-score etc) as set out in the analysis plan.

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[4] Descriptive statistics, Research Methods Knowledge Base. Available from: http://www.socialresearchmethods.net/kb/statdesc.php
[5] Inferential statistics, Research Methods Knowledge Base. Available from: http://www.socialresearchmethods.net/kb/statinf.php
[6] Analysis. Research Methods Knowledge Base. Available from: http://www.socialresearchmethods.net/kb/analysis.php

- Interpret results. Confidence intervals and the statistical power will enable the null hypothesis to be accepted or rejected.

Further detail on inferential statistical analysis is not provided here, as it is something that requires training and experience in selecting and using the appropriate analytic technique. This is something that university partners will be able to undertake on your behalf if you do not have a member of staff experienced in statistical analysis.

Qualitative analysis using a framework approach[8]

This summary draws from Ritchie, J. & Lewis, J. (2004) Qualitative Research Practice: A guide for social science students and researchers. Sage: London. For more detailed guidance, please refer to the book, or Ritchie, J. & Spencer, L. (1994) "Qualitative data analysis for applied policy research" in *Analysing Qualitative Data*, Bryman, A. & Burgess, R. (eds) pp.173-194 Taylor & Francis Books Ltd. A presentation introducing this approach to analysis is produced by Surrey University's NatCen learning.

Before you can start, the data needs to be in a form you can analyse. For interviews, this means typing up transcripts – or good quality summaries – of interviews. Experienced analysts may be able to undertake analysis directly from an audio recording. You may also have notes from observation to write up.

A first step is to undertake a thorough review of the data, looking across all the cases and seeing how much 'depth' there is to the data. As you look through the different cases, you can start to identify a long list of relevant themes or concepts.

The next step is to construct an index. To do this, you need to identify links between the various themes or concepts in your long list, and group them into common categories. These can then be organised so there are main headings and subheadings. You should be aiming to have a manageable list of themes that can help in the next stages of analysis. The index can be further refined as you proceed with analysis and choose either to add, discard or combine certain categories. For an evaluation, pre-defined themes or concepts derived from the evaluation key questions can help in structuring your index. But other relevant themes and concepts from the data will make sure that the index reflects the actual data. This index development can be done using post-it notes manually on a bit sheet of paper or into a spreadsheet.

When doing qualitative analysis within an evaluation, for the purpose of efficiency, it is acceptable to restrict your analysis to themes and concepts that are relevant to the focus of the evaluation and not to pursue other emergent themes that you judge do not contribute to answering the evaluation questions. However, where apparently non-relevant themes do emerge strongly, it is worth reflecting whether they may help you to develop understanding in response to your key evaluation questions.

Once you have constructed an initial index, this can be applied to the data, either by marking it in the margin of the transcript, or by using software package. In some cases, where the topic guide or semi-structured interview means the responses are already very clearly ordered, it may be possible to move straight to sorting and synthesising the data. Equally where time is short, this stage may be left out.

[8] Ritchie, J. & Lewis, J. (2004) Qualitative Research Practice: A guide for social science students and researchers. Sage: London.

The next stage is to create a series of thematic charts, with one chart for each main theme of analysis. The chart headings will follow the index for the theme. Each row represents a case (e.g. an interview transcript). Then for each case, a synthesis of key points is inserted into the chart, reflecting the marked-up transcript. It is important to find a balance between inserting too much material that makes the chart unwieldy and over-condensing to the point that the explanatory richness of the data is lost. Keep a note of the page reference of each piece of data so you can refer back to the transcripts during the analysis. Use asterisks to identify quotations to use.

In an evaluation, the analysis of qualitative data can enable **descriptive** understanding of the circumstances of beneficiary households, how beneficiaries responded to an intervention and how beneficiaries talked about what differences the interventions had for their health.

By preparing a descriptive account of the themes and concepts, including using words, phrases or explanations actually used by interviewees, this can help to move the analysis forward towards identifying patterns and explanations.

Qualitative analysis can involve identifying **patterns**. For example, you may identify that people in similar circumstances tend to particularly emphasise or use the same sort of explanations for how they feel an intervention has helped improve their health. It can also involve developing **typologies**, where you are able to create categories of types of households which have differed in how they have experienced interventions and their understanding of associated health changes.

As you become increasingly familiar with the data and more confident with identifying themes, patterns, you may be able to begin to develop explanations for how or why an intervention has or hasn't worked, including identifying explanations for variations in how far the scheme intervention has made a difference in certain contexts. It is important to test such explanatory theories by looking back through the different cases to see how well it fits with the data, whether there are any cases that contradict this or whether there are gaps which make it hard to be certain. By going back through the data to check the patterns, typologies or explanations that you have identified, this will help you to further refine these or identify alternative explanations. Explanation in qualitative research for reasons for why things happened are not able to identify a single variable that directly causes an outcome, but can help clarify how the interrelationship between particular circumstances, attitudes and ways of understanding.

The completed analysis phase should allow you to answer evaluation questions about how change has been achieved and to provide qualitative explanations for how the intervention relates to associated health outcomes. It should also allow you to describe how this has varied by different types of household and may allow you to provide explanations of why certain interventions have been more or less associated with health benefits.