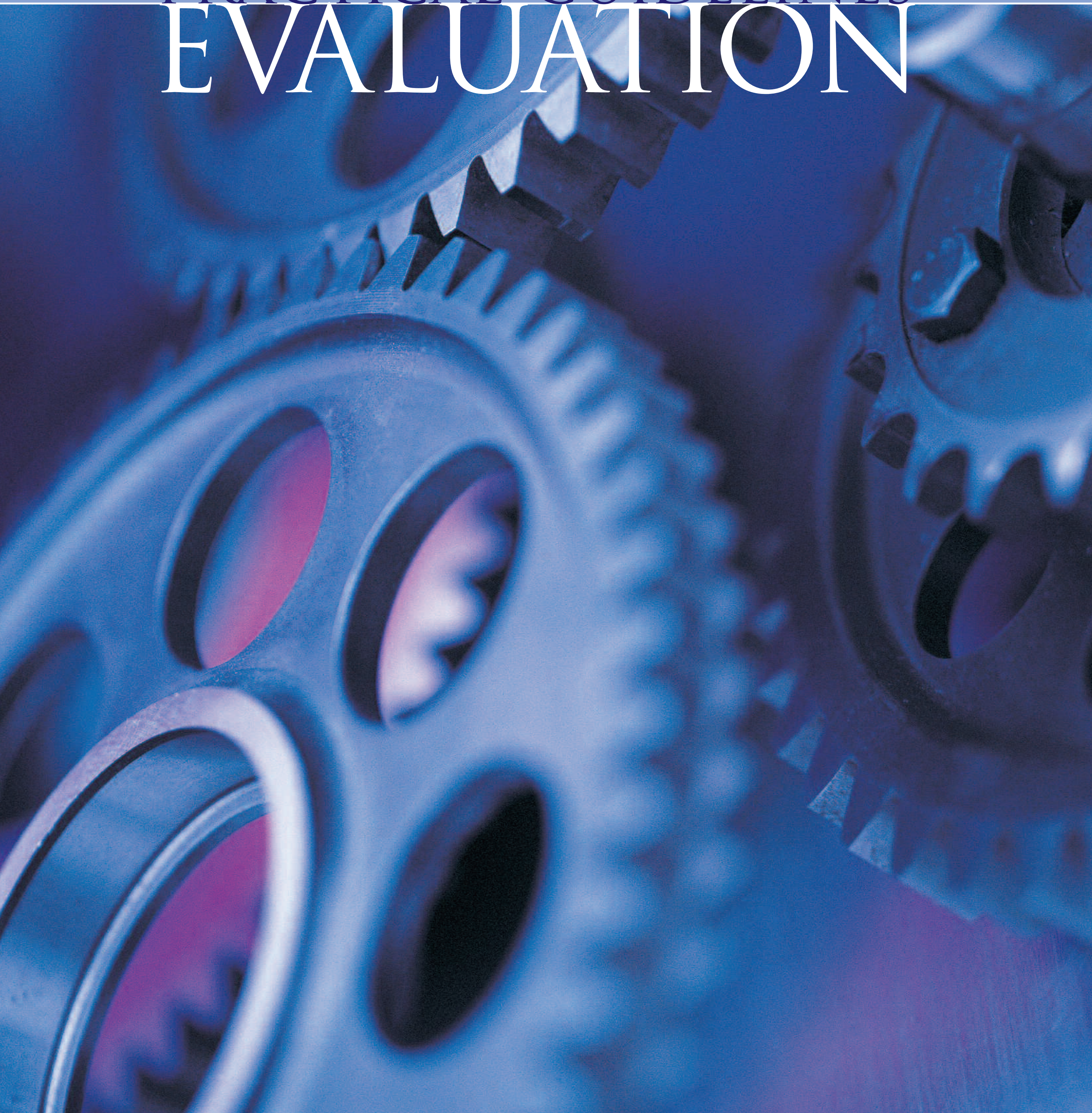
RESEARCH
COUNCILS UK

PRACTICAL GUIDELINES
EVALUATION



EVALUATION:
PRACTICAL GUIDELINES

RESEARCH COUNCILS UK

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The Research Councils UK and The Office of Science and Technology

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FOREWORD

We need this guide! Anyone wanting to talk with the public about issues around science should read this before starting. Certainly anyone seeking funding for engaging with the public should heed the advice here before writing any proposals. You'll be more successful in getting money and having more impact if you do.

The whole arena of engaging with different publics is full of good ideas and committed people wanting to make a difference. But as a community we haven't been good at capturing the impact of what we do, nor sharing good practice. It's not enough to do activities because we think they're worthwhile; we must be clear about the impacts we are trying to have and then go about trying to measure and assess them, and the processes we're using. Then we must reflect and consider how we might change and improve what we do and share what we've learned.

As well as recommending this study, it's also worth looking at the previous set of practical guidelines* which offer ideas on encouraging two-way communication with the public.

The guide here provides excellent support to help us not only evaluate the impact of what we do, but also to think through our approaches, motives and strategies. If we all use the guide properly and share what we learn, we'll improve the quality of activities, increase the impact of what we do and earn the right to be taken seriously as a learning, reflective community who really can make a difference.

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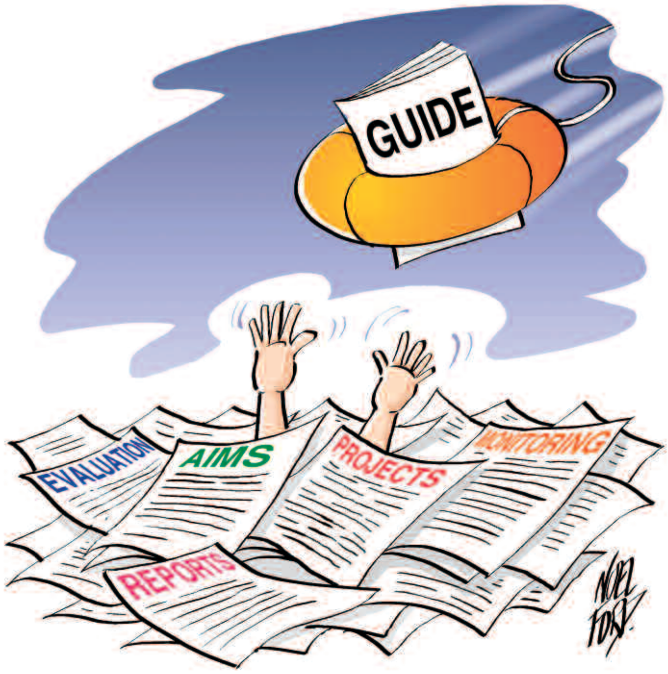
**Dialogue with the public: Practical guidelines, RCUK 2002.*

1 INTRODUCTION



Who is this guide for?

This guide is designed for those who lead projects intended to engage general audiences in science, social science, engineering and technology and the social, ethical and political issues that new research in these areas raises. It is intended to help project managers evaluate individual projects, regardless of their experience of evaluation. If you run, or oversee, lots of projects and report on them as a group, then you should also look at the companion publication designed for programme managers.

Evaluation techniques are based on social and market research methods, so even though some material will be familiar to some readers, the questions posed and the thought processes suggested, ought to be relevant to all project managers.

The evaluation approaches covered in this guide are suitable for a range of projects including:

- talks
- shows
- teachers' packs
- hands-on events
- websites/CD-ROMs
- exhibitions
- open days

and all the other ingenious ways that you are using to engage people with science.

Evaluation strategies should be integral to the project design process and it might be important to talk to potential funders about evaluation when preparing grant applications.

Using this guide

The guide has five main sections and a series of annexes.

Section 2 looks at building an evaluation strategy and also provides an overview of evaluation – what it's about, what it can do, what it can't do and how you should report your findings. It should also help you in making an application for funding. You may be tempted to skip this section and get straight into the sections on tools and techniques. PLEASE DON'T.

Section 3 focuses on data collection. This section describes the different techniques, all of which stem from market and social research. It explains what different techniques can do and how you can make them work together.

Section 4 gives guidance on how to analyse the data you've collected.

Section 5 looks at how to draft your report.

Annex 1 provides some detailed advice on constructing questionnaires and phrasing questions.

Annex 2 provides an overview of what techniques to use depending on the information you want.

Annex 3 is a glossary of terms.

Annex 4 suggests some further reading.

There is no magic formula for evaluation. In order to construct an evaluation strategy, you need to think about your objectives, the data you can collect and the reports you have to make. Done well, constructing an evaluation strategy is every bit as satisfying as designing the project of which it is a part.

2 BUILDING AN EVALUATION STRATEGY

This section should help you to plan your evaluation and support your grant application.

Sub-section	Contents
Objectives of evaluation	Making sure you know what you can achieve through your evaluation and that you meet everyone's requirements
Monitoring	Clarifying what is evaluation and what is monitoring
Setting aims	Being clear about the difference between aims and objectives
Setting objectives	
Evaluating your project	Deciding where evaluation can help your project
How much evaluation	Being clear about what you can evaluate
Reporting	Making sure you're meeting everyone's needs
In-house or independent	Can you manage the evaluation you think your project needs and your funders want?
Confidentiality	Making sure you comply with research ethics and the Data Protection Act
If you run into trouble	What to do if your project starts to go wrong

Evaluation is said to be 'very important', described as 'very difficult' and often not done very well. People tend to be frightened of evaluation because they see it as a test and a threat. In essence though, evaluation seeks to '*prove*' and '*improve*'. If you see it as an opportunity to prove whether you achieved what you set out to achieve, how well you did it and what impact your project has had and an opportunity to improve what you do, you'll get far more out of it.

Objectives of evaluation

The objective of an evaluation should be to:

- establish whether the objectives of a project or programme have been met;
- identify whether anything has changed as a result of the project or programme (often termed summative evaluation);
- identify how the project could have been more effective;
- identify whether there have been unintended outcomes and what these were; and
- support the development of a project as part of the research and development process (sometimes known as formative evaluation).

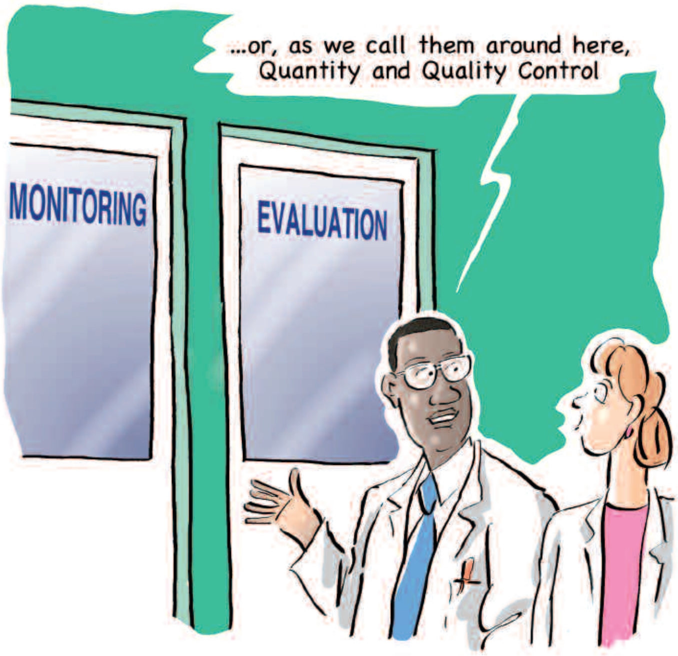
Evaluation is a process that takes place before, during and after a project. It includes looking at the quality of the content, the delivery process and the impact of the project or programme on the audience(s). It requires baselines to be set, quality criteria and thresholds to be determined and an understanding of where to find, and how to collect, relevant data and analyse it in a meaningful way. Knowing what, if anything, has changed as a result of a project is not enough. It is also important to know why something has changed and how a project can be improved.

Who is your evaluation for?

As well as being useful to you, your evaluation may be required by funders or other stakeholders, so you'll need to check whether you're meeting all your obligations.

- Has the funder set specific reporting requirements?
- Does your institution require certain data or do your partners/stakeholders want to know particular things?

Make sure these are covered by your strategy.



Monitoring

There is often confusion between monitoring and evaluation data. This may well arise because they can both be gathered in similar ways. In essence monitoring is about counting things and ensuring your project is on track. Evaluation is about the impact of your project and ensuring it is well designed to make the maximum impact.

Things like audience numbers and numbers of events, numbers of CD ROMs distributed, etc. are monitoring data, not evaluation data. However, you may need to do research to establish some of these figures, which means you might think of it as evaluation data. The same basic tools for gathering and analysing data can be used for evaluation and monitoring information, often achieving both at the same time.

Setting aims

The first thing you need to do is to clarify your aim(s). What do you want to achieve? This is big picture stuff. There are several reasons why people and organisations want to develop activities to communicate science to a wider audience. They may aim to:

1. raise awareness of science and science-based issues;
2. promote an individual organisation;
3. be publicly accountable;
4. raise funding;
5. recruit the next generation of scientists and engineers;
6. explain science to non-specialists;
7. build appreciation of science and new technologies; and
8. obtain public views on science and science-based issues.

Most project managers will recognise one or more of the aims listed above as representing their driving force(s).

Setting objectives

Next you need to set objectives – these are the things you need to do to achieve your aim. Each of the motivating factors listed above will yield different types of objectives. For example, an organisation that wishes to promote itself will set a degree of brand recognition as an objective but this may be irrelevant to an organisation seeking to recruit the next generation of scientists and engineers.

Your objectives are the things against which you will be evaluating yourself and against which other people (including funders) will be assessing you. Setting objectives is an art. At the application stage, funders (whether internal or external) will want to see that you're going to give them a lot for their money, but if you oversell at the beginning, can you deliver at the end? Good objective setting helps you think through not just the evaluation strategy, but the whole process of running the project. A nice by-product of this is that it will help you to construct a clear application/proposal.

Make your objectives SMART, that is:

- **S**pecific;
- **M**easurable;
- **A**chievable;
- **R**elevant; and
- **T**ime-bound.

Each objective should be all of these, and they inter-relate. For example, an objective might not be sufficiently specific to be measurable, so it can never be clear to what extent it was achieved. Similarly, an objective set with a timescale that is beyond the scope of the programme to measure is not relevant. Considering each element of SMART provides a process for establishing whether or not an objective is appropriate.

In setting objectives the two main pitfalls are: setting objectives that you believe are important, but against which you can't measure your success; and setting objectives because you know they are measurable, but are actually of little relevance. Remember things like audience numbers and numbers of events are monitoring data, not evaluation data. So, although you will be setting targets for these things, that follow the SMART criteria, you need to consider the impact of your project for your evaluation strategy.

Bear in mind that your funder may have higher level, overarching objectives and you need to ensure that your project is supporting the funder's objectives.

Evaluating your project

There are three roles for your evaluation:

- To support the development of your project (Formative evaluation)
- To ensure you do it better next time (Evaluation of your processes); and
- To assess the final impact of your project (Summative evaluation).

Formative evaluation

Some people call formative evaluation market research or research and development. You should be using formative evaluation during the development of the project to test ideas, concepts and prototypes on representatives of the audience. This will help you to assess what sort of 'product and delivery channel' is going to be most effective at reaching and engaging your target audiences. You may need to test things out with a sample audience several times during your project's development. What you might regard as nothing more than good practice in project management or product development is in fact a central part of an evaluation strategy.

The emphasis at this stage is likely to be on discussion-based tools (qualitative research) that will give you an in-depth understanding of your audiences. If you are designing an exhibit, a CD or a website then watching people interacting with a prototype can also provide useful input for finalising the structure. Qualitative input at this stage can be crucial to understanding how to change your project to improve its appeal. To make improvements, it's no good knowing people didn't like it unless you know what they didn't like and understand why they didn't like it.

However, don't over-egg the pudding. You need to think about when formative evaluation is really needed as it will add time and cost to your project. If you're using a tried and tested formula, such as a debate format, you may not need to include formative evaluation in your project plan. A good guide is, if you have any doubt about how something will be received by your audience, test it out first.

Evaluation of processes

You should be evaluating the process of managing and delivering your project. This will help you to see what lessons can be learned for next time. This information is also useful to peers and colleagues, and should be shared with the wider community of science communicators, so that they can learn from your experiences.

For many projects, this type of evaluation can be handled entirely by the project team. If you think of the analogy of keeping lab books as a record of what's going on within a research project, it becomes easy to see how this aspect of evaluation can become easy to manage. If there are a number of people involved, make sure that you have scheduled in to the work programme opportunities to talk through progress and any difficulties or issues that are arising. Don't forget to include this time when you're costing a project, it will be time well spent and when presented as part of your overall evaluation strategy will show people making funding decisions that you're on top of the project and know how to make it a success.

Summative evaluation

Summative evaluation is the type of evaluation that people are most familiar with. This looks at the outcomes and measures whether or not you have had any impact on the audience. You'll be interested in questions such as:

The Kirkpatrick model

- **Reaction** - the initial response to participation (in your case this would include immediate feedback on the project including things like facilities, such as the venue).
- **Learning** - changes in people's understanding, or raising their awareness of an issue (you might here be looking for what people had gained from engaging with your project).
- **Behaviour** - whether people subsequently modify what they do.
- **Results** - to track the long-term impacts of the project on measurable outcomes e.g. exam results.

- How much did the audience enjoy what you provided?
- Did it change people's understanding/knowledge or attitudes?
- Has it influenced their actions/behaviour?
- How big an impact did it have on those who engaged?

So the emphasis is likely to be on numerical data but depth of understanding can be important at this summative stage. Qualitative data can be crucial in explaining what lies behind your quantitative data. There is no reason why questionnaires cannot ask questions that will help you to understand 'why' people give certain responses. This is especially true if you have qualitative research, perhaps from your formative evaluation, on which to base your questions.

You need to think very carefully about the impacts you're aiming to achieve because to be able to evaluate impacts they must be measurable. You need to think about the realistic level of impact that you can make and the practicalities of identifying that impact.

Remember, summative evaluation is mainly about impacts. This means that the counting of outputs such as number of CDs distributed, number of people at an event, number of hits on a website, etc. is not part of your evaluation. This is monitoring data, not evaluation data as discussed on page 7.

Benchmarking and baselines

It sounds obvious but if you're trying to change something, then you need to know the state of affairs before people interacted with your project, so that you can see if there's been a change afterwards. If you want to measure change, you'll need quantitative data.

How much evaluation?

Impact can be instantaneous or it can be longer-term. As a project manager you'll need to think about what sort of impact your project could have and whether or not it is practical to measure it. The Kirkpatrick model, first developed in 1975, is helpful in setting out four levels of potential impact in the box above.

For projects of up to about £150,000 it may not be practical or cost effective, to evaluate on all four levels. Factors that you will need to consider are:

- the depth of interaction you'll have with your audiences;
- how long you'll stay in contact with them; and
- whether your actions are likely to play a large or small part in shaping attitudes and behaviour.

Reaction – the initial response

At the reaction level you may want to set objectives regarding things like perceived levels of enjoyment and usefulness. These are important if the project is to have an extended life, as this is what will bring people back and encourage them to recommend your project to others.

It is hard to imagine that any project manager will not want to gather evaluation data at this level. Indeed, for many project managers, this will be the only practical and appropriate level at which to evaluate. You can assess reaction in three main ways: by getting people to write down their responses – usually using a structured questionnaire; by talking to them one-to-one or in (focus) groups; and finally by observing them. One, two or all three might be appropriate for you and Annex 2 contains a schema to help you think about which technique(s) to use.

There is a danger that evaluation of initial reactions can become a simplistic assessment of whether people enjoyed the project. Enjoyment is important and you will want to know this, but you can learn much more than this from initial reactions.

2 BUILDING AN EVALUATION STRATEGY

If you want to know whether people enjoyed the project/found it useful/learnt something, you can also find out what they particularly did or didn't enjoy, what was most and least useful and in particular what they would change and why. Now, as well as knowing what people thought of your project, you'll also have a good deal of data on how you can more effectively meet your audience's needs later in this project or in subsequent activities. You can also get feedback on the environment, for example on the comfort of the venue and quality of refreshments. All of these issues can be investigated using one or more of the three basic techniques.

The easiest time to get initial reactions is when people are taking part in your project, whether this is attending an event or using a product such as a website or CD. However, you may also find that it is worthwhile getting a slightly more considered response a short period of time after the actual interaction, when people have had a chance to reflect. This will be more complex to arrange but it might give you additional information.

Increasingly funders are trying to capture data about what works, or doesn't, and why, so that they can spread good practice. They want project managers to learn from the experiences of others as well as through their own. It may be true that we learn by our mistakes, but there is no need for all of us to learn by making the same mistakes. Funders will appreciate evaluation strategies that will provide feedback on lessons learned, good practice, successful and unsuccessful approaches. People don't like to report negative outcomes from their projects but if you understand why something went wrong, this will help not only you but your funder and your peers in the future. Presenting this as 'lessons learned' will enable better practices to evolve.

Learning – changes in understanding/raising awareness (what people have gained from your project)

Information exchange plays a part in science and society dialogue-based events and many science communication activities are designed to be overtly educational. You might be trying to raise people's awareness of an issue or an area of science rather than just impart 'facts' but you should be learning what the public thinks as well. Knowing what different participants have gained from the project, whether about an issue, a subject or from one another will be an important part of the evaluation.

If you want to know **how much people have learnt**, then you need to know what they knew before they interacted with your project (the baseline) and what they knew after they'd finished. If you're considering looking for this amount of detail, you may also want to know how long the effect has lasted, so you may also want to find out how much they still know, perhaps six months after your project has finished. This is starting to become a significant amount of work. It may be necessary and if it is you'll need to look carefully at how much this will cost and how you build data collection into the project timetable.

For learning amongst young people, it might be possible to compare predicted exam grades with actual results, or whether there is any improvement over a previous level of testing. However, this data is very sensitive at the individual level and schools are not likely to provide it, so you will have to work with teachers to collect it.

If, however, you're more interested in **what, if anything, people think that they have learnt**, rather than trying to measure objectively how much they have learnt, then this is the sort of issue that can be investigated as part of gathering initial, or considered, reactions. You can ask people to tell you what they think they have gained or whether they have a more complete view or understanding of the issue.

Behaviour – do people change what they do?

At the third level of evaluation, we are starting to talk about quite profound factors. You need to think quite seriously about whether or not your project is likely to have an effect on the way people behave, and even if it does, is it practical to track and measure this? Unfortunately there is no simple formula that will give you an answer to whether or not you should be trying to track your project's impact on behaviour.

At the extremes it's easy to tell. A hands-on science funfair with a budget of a few thousand pounds that attracts some hundreds of visitors is looking to inspire and enthuse people and maybe encourage some young people to think about educational and career options that they might not otherwise consider. So changing behaviour is a real and legitimate aim, but it is quickly apparent that the resources that would have to be devoted to measuring whether or not such changes had occurred would be entirely disproportionate to the scale of investment in the project. For this sort of project, the first two levels of evaluation are likely to be adequate.

At the other end of the scale a multi-million pound investment in the development of products to support science teaching may have changing the behaviour of teachers as its primary focus. Such an initiative or programme needs to undertake evaluation that shows the impact on behaviour because of the size of the investment and presumed seriousness of the problem.

In the middle ground, you need to think about just how important it is to know about the impact you're having on behaviour. If it is really important, then what are the resource implications and can you, your partners and your funders provide these resources and access to the appropriate expertise?

If you want to assess changes in behaviour you'll need to know what the baselines were and you'll certainly need some sort of ongoing contact to monitor change. You might rely on self-reporting but you might want independent verification. Either way you will have to identify resources and expertise capable of delivering this sort of evidence.

Results – long term impact

While we all hope that our activities will have a major impact on people's lives, in reality they will be just one factor among many that influence people's attitudes and behaviour. At this level of evaluation there can be profound resource and methodological issues to address. The apparently straightforward way to assess your long-term impact is to track the people with whom you have engaged over an extended period. However if you only track the people you've engaged with, there is no 'control group' to allow you to ascribe changes to your project rather than to other influences. The resource implications of tracking people that you've engaged with are considerable. Add a control group and it quickly becomes clear that this approach is only practical for large scale projects that have budgets to match.

To track school students' performance it is relatively easy to get national data on performance in different subjects and some data on individual schools from the Department for Education and Skills website. Other national data sets are commissioned by other Departments – for example the Labour Force Survey, managed by the Department of Trade and Industry provides detailed data on the number of people in different occupations and can provide trend data.

However, you need to be reaching an awful lot of people and having a big impact on them for this to show up in national statistics. Moreover, disentangling your impact from the many other things that affect people's behaviour is a difficult and highly skilled task, unlikely to be appropriate for most, if not all, individual science and society projects.

Resources

If you're going to run focus groups you'll need to allow:

- Time to prepare
- Time to run the group
- Time to analyse the conversation
- Time to write-up the results
- The cost of a venue (including refreshments)
- Payment of participants (if appropriate)
- The finding/recruitment of participants

For a quantitative piece of work you'll need:

- Time to write a questionnaire
- Time to find people to test it on
- Time to re-draft it
- To distribute it (which might take some time and budget)
- To collect and possibly 'chase' responses
- Time to analyse the data
- Time to write-up the results.

It is difficult to provide indicative figures of reasonable costs for different elements of an evaluation and they will vary depending on whether you contact them yourself or commission someone external. For example, a 'standard' focus group might cost £2,500 or more if commissioned commercially.

The resources available may constrain what evaluation you can do. There is sometimes a tendency to set a budgetary limit on evaluation, 10% of the project budget is often quoted. This may not always be sensible because in small projects this means you can do almost nothing. Also, if this is the first time you've done something it might be worth investing more in a good evaluation so that you can improve your project, you can then run smaller evaluations in the future. If you're providing your time free of charge, don't forget to impute a value to this to get the total budget.

It's better to think about what information you need, how it can be collected and analysed and then to consider whether the effort and cost of this work is commensurate with the project. If it is not, are you being too ambitious or not ambitious enough with your evaluation? See sections 3 and 4 for more details of what's involved.

What is the right level for you?

This is a judgement that only you can make. However, a broad recommendation is that all project managers should include 'reaction' in their strategies; some should also include 'learning', but very few 'behaviour' or 'results'. Don't be afraid to say that it is not possible or practical to evaluate at some levels, but don't try to use this argument to avoid undertaking work that is easily achievable and that will, if done properly, provide you and your stakeholders with much useful information.

Reporting

Gathering and analysing data is all very well, but until you start to make it work, you might as well have not bothered. Reporting, or sharing the data, is where the benefits of good evaluation start to be realised. There are four main audiences for your evaluation:

- You and your team;
- Your funder;
- Other stakeholders; and
- Your peers

Choose the most suitable format for your report. It may be in writing, but it may be that a presentation enables the team to reflect on their experiences.

You and your team

From the start we have emphasised the importance of evaluation helping you to improve. So, the primary audience for much of the evaluation is your team. What have you learnt? How will you apply this in the future? Are there things that you've learnt that read across not just to other science and society activities but to your other work or your interactions with funders and users?

Your funder

Whoever has provided the resources for your project will probably want to know what they've got for their money, so the first aim of your evaluation report is to show this. However, funders are increasingly interested in sharing good practice, so if there are important pieces of learning, share them.

Your funder may well have given you a standard format for your report. You should use it, even if it is constrictive. They probably use the standard format to allow them to sum data from across different projects, so they can report to their seniors and justify their budgets. If there are other things that you want to say, then send an additional note or report. Few funders are likely to complain about getting too much feedback. You never know, you might want to approach them again, in which case you want to have left the memory of how effectively you managed the project and how thoroughly you evaluated it and reported on it.

Other stakeholders

You may have had partners who contributed resources, people or expertise to the event. Make sure that you share your evaluation results with them. It will help them to assess the value of their contributions and may influence their future decisions on getting involved in future activities, either with you or others.

Your peers

Finally, there are your peers who are getting involved in communication work. You may know some directly, but also talk to your funder about any networks they have for sharing good practice. Your evaluation could provide the answers that someone else has been looking for. It might be that you've cracked a problem, or that you stumbled into a trap that you can help others to avoid. It takes some courage to admit the latter, but people will be very grateful and in the future they may repay you with valuable advice.

What is the right level for you?

This is a judgement that only you can make. However, a broad recommendation is that all project managers should include 'reaction' in their strategies; some should also include 'learning', but very few 'behaviour' or 'results'. Don't be afraid to say that it is not possible or practical to evaluate at some levels, but don't try to use this argument to avoid undertaking work that is easily achievable and that will, if done properly, provide you and your stakeholders with much useful information.

In-house or independent?

A frequently asked question is do I need an independent evaluation? Maybe - there are pros and cons to both options. Some people believe that if evaluation is a tool by which to improve, then there are clear benefits to self-evaluation. The feedback is direct and you will have a real depth of understanding of your audience, although you may have to recognise that there are limitations to the data gathering and analysis skills to which you have access. You may need to bring in an outsider with specialist skills if you want to answer more difficult questions about impact.

On the other hand, some people believe that if you evaluate your own project you will cheat to make it look good, maybe even without realising it. Also, you should consider whether people might give you more favourable answers because they don't want to hurt your feelings.

If it is crucial that the evaluation is seen to be unbiased then an independent evaluation may be the only option. Indeed, funders may well stipulate that an independent evaluation is required, perhaps because of the large sums of money involved or because they are trying to compare the merits of different approaches. This is where having clear objectives will really help. If you haven't got any, external evaluators will bring their own value judgements to bear.

The need for confidentiality may also influence your choice of internal or external evaluation.

Confidentiality

Market and social research operates from the premise that information given by respondents in research projects is confidential. Questionnaires usually reassure people that they will not receive marketing information or sales calls as a result of taking part and that no one will know what they personally have said, other than the people processing the data.

People may be happy to put their name to their views and responding to an evaluation of a science and society project is unlikely to cause problems for respondents. Nevertheless, there may be cases where people feel that you will pass on their views to others and this may be detrimental to them in some way. Offering confidentiality doesn't usually cause problems in reporting and can be beneficial but it may mean you can't do the evaluation in-house.

Asking people their views in front of others may restrict what they are prepared to say, depending on the topic. Some people may be more forthcoming to someone unrelated to the project – another case for an independent evaluator.

You also need to be aware of the Data Protection Act see: www.informationcommissioner.gov.uk

If you run into trouble

We've interviewed some funders while preparing this guide. In general funders want the projects they're supporting to be successful. So if you're not reaching your objectives, but you know why and can set out a plan that will help you get back on track, most funders will give you a sympathetic hearing. You might want to revise the objectives now that you know more about the impact you're having. Of course, the earlier in the project you tell them what's happening, the more sympathetic they're likely to be. Remember, in most cases the programme manager is there to help you.

When setting objectives, the SMART criteria will drive you to be specific, but if this is your first experience you may not know what represents an attainable and realistic target. You will have to use your judgement and make sure that your formative and process evaluations give you the data to explain why you are over or under-achieving, and in the case of the latter what you can do about it. As evaluation databanks grow, funders may be able to provide advice that will give benchmarks. In the future your data will help others with this conundrum.

3 GATHERING DATA
TOOLS AND TECHNIQUES

Working through the process of developing SMART targets and objectives should have started you thinking about tools for collecting the information you will need. The basic tools and techniques are based in social and market research methods. Researchers in these fields use certain terms with a common understanding of what they mean and we've tried to give you that language here. It will help if you want to commission an evaluation or if your funder commissions an evaluation. You'll all be speaking the same language.

The main methods used in evaluation are:

- Quantitative
- Qualitative
- Observational
- Record keeping
- Visitors books
- Media impact

Quantitative research

Quantitative research is best suited to answering questions about how many people did or thought something. You can also ask them how much, to what extent and other 'measure' type questions. There are two underlying principles to quantitative research:

- every respondent should be asked the same questions in the same way so that the answers can be added together; and
- the information you collect should be representative of all the people that took part in, or used, your project.

The questions can be asked by an interviewer face-to-face or over the telephone or people can complete a questionnaire themselves either on paper or through the Internet. Whatever the method, the questions are highly structured to ensure consistency. You can use this structured questionnaire format to collect factual and attitudinal data and to explore the reasons behind people's initial answers. Often people can do the same thing but for different reasons and being able to compare those with different rationales can be important in making decisions on how to improve a project.

Quantitative sampling

Strictly speaking, when drawing a sample to be representative of your 'users' everyone you reach with your project should have an equal chance of being asked to respond, although there is a cost-quality trade-off and some sampling methods are better at this than others. Really this is about avoiding bias and only getting responses from certain types of people or people who liked your project. Just having a lot of respondents is not good enough if they are not representative of your audience.

The types of sampling techniques you'll be most likely to use to collect quantitative data that is representative of your users are:

Census – collecting information from everyone who engaged with the project.

Systematic sampling – taking every 'nth' person who passes a particular spot or accesses a website,

Quantitative research

Quantitative research is best suited to answering questions about how many people did or thought something. You can also ask them how much, to what extent and other 'measure' type questions. There are two underlying principles to quantitative research:

- every respondent should be asked the same questions in the same way so that the answers can be added together; and
- the information you collect is representative of all the people that took part in, or used, your project.

Strictly speaking, when drawing a sample to be representative of your 'users' everyone you reach with your project should have an equal chance of being asked to respond, although there is a cost-quality trade-off and some sampling methods are better at this than others. Really this is about avoiding bias and only getting responses from certain types of people or people who liked your project. It is important to note that just having a lot of respondents is not good enough if they are not representative of your audience.

requests a pack or whatever.

Quota sampling – if you know that 50% of your audience will be girls (perhaps a school has told you) then you set a quota of 50% of your sample to be girls. Which girls you ask is then 'random'; that is, there is no particular reason why those you ask should be different from those you don't ask.

You can also use very simple methods to select a sample, like those born on a certain date in the month. For example, taking everyone born on the fifth, fifteenth and twenty-fifth of every month of the year has been found to consistently yield a 10% sample.

These methods are all very well but you will find that not everyone you ask to take part will do so. The main issue will be that those who enjoyed your project will be more likely to respond than those who didn't. Using interviewers means you can get a more representative sample than relying on self-completion as there is a bit of pressure on people to take part because they won't (generally) want to be rude. But if you can't be sure that those who didn't respond are no different from those who did, make sure you include the limitations of your data in your report. And you need to ask at least 100 people before you can start stating percentages, even if you ask everyone who took part.

Quantitative data collection techniques

Having constructed your sample, or decided on a census approach, you need to think about which data collection technique to use. There are four basic quantitative data collection techniques, each of which has strengths and weaknesses. The four options are:

- Face-to-face interviews
- Telephone interviews
- Self-completion on paper
- Self-completion electronically (e-mail or Internet)

For small, live events, the most likely method will be self-completion on paper, where questionnaires are distributed and attendees are encouraged to complete and return them at the end of the event or post them back later. For some events, face-to-face interviews with a sample of attendees is another option. These are tools for gathering instant feedback, but you may want a considered response, in which case posting out paper questionnaires, using telephone or e-mail follow-ups or sending interviewers out to conduct face-to-face interviews are all possible options. The table below sets out basic strengths and weaknesses of the different options.

Quantitative data collection techniques

Type of Survey	Strengths	Weaknesses
Face to Face	High quality data. You can be more confident that interviewees have understood the question. You can repeat questions that interviewees have not understood. You can use additional material such as show cards or pictures to help people respond. You know the right people have responded. You can use longer questionnaires so investigate more issues (up to 45 minutes) Interviewers with different language skills can help you to access communities whose first language is not English.	Resource intensive so most expensive.

Quantitative data collection techniques cont.

Telephone	Moderately high quality data. You can repeat questions that interviewees have not understood. Interviewers with different language skills can help you to access communities whose first language is not English. You have a good chance of making sure the right people have responded.	Quite resource intensive so expensive but cheaper than face-to-face. You cannot be as confident that interviewees have understood the question as with face-to-face. You cannot use additional material such as show cards or pictures to help people respond although it might be possible to post, fax or email materials in advance. You need to use fairly short questionnaires (10-15 minutes is a general maximum). Many people (30%-40%) are ex-directory and younger people may not have a fixed phone.
Self-completion on paper	Moderate quality data. Relatively cheap to undertake (but remember postal costs if using this approach). You can use longer questionnaires but you will get a better response if they are short. Translation can help you to access communities whose first language is not English.	You cannot be confident that interviewees have understood the question. People can look ahead at the questions, which might bias their answers to some questions. You cannot be sure that the right people have responded.
Internet/email	Moderate quality data. You can use additional material such as pictures to help people respond. Relatively cheap to undertake.	You cannot be confident that interviewees have understood the question. People can look ahead at the questions, which might bias their answers to some questions. You cannot be sure that the right people have responded. Only respondents with Internet access can take part.

3 GATHERING DATA - TOOLS AND TECHNIQUES

You probably want to be thinking about doing exit surveys as people leave events or follow-up surveys by telephone, post or email – depending on what information you have about people. If you've developed a website you can implant what are called 'pop-up' questionnaires to collect data from every nth visitor or collect email addresses to send a questionnaire later. Our experience is that emails sent to specific individuals yield higher response rates than pop-up questionnaires.

Constructing a questionnaire

There are many factors to be considered in designing a questionnaire. The length, structure and layout (for self-completion questionnaires) will impact on the response rate. Remember that the questions you ask will influence people's answers to later questions, so you need to think about the order in which you ask questions. Questions can be 'pre-coded' where the respondent selects an answer from a list or 'open-ended' where respondents can write in their own comments. Some pre-coded questions also allow an 'other, specify' category where those who have not found a pre-code to tick can write in their views. Remember, if you use open-ended questions, someone will have to read all the responses.

Annex 1 looks at the factors to be considered and questioning techniques, such as attitude statements and scales, that will give you appropriate data. Although Annex 1 is written for self-completion paper questionnaires, the same basic principles apply for all data collection methods.

Qualitative research

Qualitative methods enable you to address the deeper questions, such as why people did or didn't like a project, why they felt it was good or bad and what you could change about it.

Social and market researchers use the term 'qualitative research' to refer to individual, one-to-one in-depth interviews and group discussions/focus groups conducted by someone who has been involved in the whole process of the evaluation and who therefore has a deep understanding of the objectives of the project. This is likely to be either you or one of your team and because qualitative methods allow you to interact directly with 'users' you can test out ideas that you form during the evaluation process.

In-depth interviews are useful for talking to those with busy diaries and in situations where replies may be sensitive, so people would be reluctant to say things in front of others. They are also ideal when you want to collect details that are likely to be individual, such as work histories.

Group discussions are ideal for situations where you want people to bounce ideas off one another and bring different perspectives and experiences to bear. They can be particularly useful in formative evaluation as this type of research can give you quick feedback on how potential audiences view your emerging ideas. You should use small groups (6-8 people) to encourage discussion. Some people won't talk in a big group. The groups can be constructed in a number of ways. You might put similar people together to encourage them to explore the issues in depth from similar perspectives. Alternatively, you might create mixed groups to give people exposure to different viewpoints. Men tend to dominate mixed-gender discussions, so you should think carefully about separating men from women in discussion groups.

Usual practice in qualitative research is for a facilitator/moderator to use a 'topic guide' to manage the discussions. This sets out the issues you think you'll want to cover in the session and any information that

Qualitative research

Qualitative methods enable you to address the deeper questions, such as why people did or didn't like a project, why they felt it was good or bad and what you could change about it.

Qualitative research is about depth of understanding, so samples tend to be small. You'll find that you don't need to talk to very many people before you stop getting new information. People tend to be selected to give you a cross-section of your audience rather than a representative sample.

you think you'll need to give people, but unlike in a quantitative survey there is not a set pattern to follow. The facilitator should respond to the participants/interviewees, following up issues that they raise, whilst also ensuring that you cover all the issues you want to. This approach allows respondents to add in things you might not have thought to ask about by allowing them to take the lead rather than being led by a structured questionnaire.

Attention also needs to be paid to how the discussion will be recorded, particularly if using an external facilitator. Since the facilitator needs to focus on directing the group, a tape-recording of the event is usually essential. At the same time, a second observer is sometimes useful to take notes during the discussion, as well as to provide support to the facilitator in bringing up issues that have not been covered (although be aware that this may alter the dynamic of the group). The facilitator should also keep a record of their thoughts immediately after the event. Direct quotes can be useful in reporting to funders as they often give a flavour of the project, participants and how things went.

Qualitative sampling

Qualitative research is about depth of understanding, so samples tend to be small. You'll find that you don't need to talk to very many people before you stop getting new information. People tend to be selected to give you a cross-section of your audience rather than a representative sample. Instead of using the structured approaches described above to select people, you pick people who meet your criteria for inclusion as and when you find them. The small size of your sample and the way it has been selected means that the results are not statistically representative of the group your participants 'represent'. Not only might you have missed some marginal views because your sample is small, you have no idea what percentage of the total population will hold any of the views you identify because of the way in which they have been selected.

To ensure that you include the right sorts of people, you should think about the main variables, or characteristics, that you think will be important, given your project. For example, are men and women likely to respond differently? Are younger people likely to be different from older people? Are those in urban areas likely to be different from those in rural areas? If the answer to these types of questions is yes, then you need to make sure you include men and women, younger and older people and urban and rural dwellers in your sample. And although more people in Britain live in urban areas than live in rural areas, you might include the same number of each group in your research. However, you don't need to cover every segment you identify explicitly – so you don't need older men in rural areas, older women in rural areas, and so on. You could just have older men in rural areas and younger women in rural areas with younger men in urban areas and older women in urban areas. Running focus groups can be very expensive, especially if you use an outside contractor, so you may need to prioritise your groups.

Anecdote

While any feedback is better than none, you need to be careful about how you interpret ad hoc comments. Qualitative research is not anecdotal. The sample and the discussion are structured by researchers against clear objectives for the project.

The sample is constructed to ensure it is balanced because you need to make sure that the feedback you are getting is balanced and that the one teacher who made a comment is not atypical. The issues you cover should meet your agenda and you should bear in mind that any single individual may have their own agenda.

However, given the budgets that are sometimes available for science and society activities, you should think of conversations in the margins of an event as providing useful feedback, and as providing ideas to be investigated more thoroughly.

Observational research

Observation involves the planned watching, recording, and analysis of observed behaviour as it occurs in a 'natural' setting. In most cases you will be observing people interacting with your project. It is particularly useful for understanding how people use websites and CD ROMS or flow through an exhibition, as well as to explore how to get more people to more actively engage with talks and discussions.

Observation throughout the evaluation process:

- enables evaluators to:
  - understand individuals' engagement with specific tasks and processes;
  - understand individuals' attitudes and relationships in context;
  - define key issues that may be followed-up in interviews and surveys;
- helps the evaluator to form relationships with the participants, which will help with any follow-up interviewing;
- eliminates the bias of self-reporting inherent in interviews and surveys.

You can observe and make notes on how individuals interact with your project but you can also use observational methods to compare group dynamics across events. This is done by having a structure against which to record details in which you are interested, for example: the order in which web pages are accessed, the number and type of participants at an event, level of input to discussions, types of people who actively participate, main subjects of concern and so on.

Visitors' book

A visitors' book is a good way of capturing the thoughts of visitors and getting feedback. However, only those who are highly motivated will give comments. So the comments, while helpful in the development of your project and similar, future projects, will not be representative of your achieved audience or your initial target audience.

Record keeping

Record keeping involves reflection and might be thought of as self-observation. At its simplest you could keep a "field diary", which records your thoughts and feelings throughout the process as well as your reflections on the process itself. This forms a record of what happened and when, and is a useful resource when looking at how you could do things better in the future. You could also ask users of your product to keep records of their interactions and their thoughts over a period of time.

Media impact

If you want to raise awareness you might set an objective about press or media coverage. Measuring the impact of this can be very difficult. Some people measure column inches and use the sales or readership figures of the publication to estimate the numbers reached. However, not everyone reads every page of a newspaper or magazine and the impact on readers is generally unknown.

When it comes to television and radio programmes, viewing and listening figures may be available. Nevertheless, even in television, where there is a considerable amount of programme research, data on impact rather than enjoyment, is unlikely to be available.

4 DATA HANDLING
TOOLS AND TECHNIQUES

The previous section has looked at the various methods for collecting data. Here we look at how you can analyse it. For the purposes of this guide, we will assume that data collection and analysis is being handled in-house rather than through specialist sub-contractors. If you are using sub-contractors but they are not providing you with a final report, then you will need to specify the analysis that you want and the format in which you want the data. Remember that you may need to turn it into a format required by your funder.

Quantitative data

Coding

The first thing to do with your questionnaires is to code any questions where respondents have entered their own answers rather than ticking a box. Read through each question at a time, that is, look at all the responses to Question 1 together, all those to Question 2 together and so on. You should be looking for similar responses so that you can draw-up a 'code frame' for the question. This allows you to add together similar responses from different people. Once you have your code frame you will give each code a number. Then you need to read each questionnaire and put the appropriate code or codes (people may have said more than one thing) by the side of the question. It is this number that you will enter in your spreadsheet, not the verbatim comments.

Data entry

If you are using paper questionnaires you will have to input your data. Data entry is a time consuming and relatively specialist task. You have to make very sure you don't make mistakes. For small amounts of data you might do it in-house, for larger amounts consider using a specialist data entry firm, the speed and quality of entry is likely to yield dividends and the cost is only going to be a few hundred pounds for the size of job you're likely to have.

If you only have a small number of respondents, perhaps less than 50, you could do your analysis by hand by just counting through the questionnaires. However, if you want to do any analysis beyond total counts of how many people gave each answer, or you have more respondents, then the simplest way to analyse small datasets is to use spreadsheets. It really is worth the time to enter the data.

Analysis

Figure 1 overleaf shows an example spreadsheet with the raw data entered. Each column represents a single respondent and each row a possible answer to a

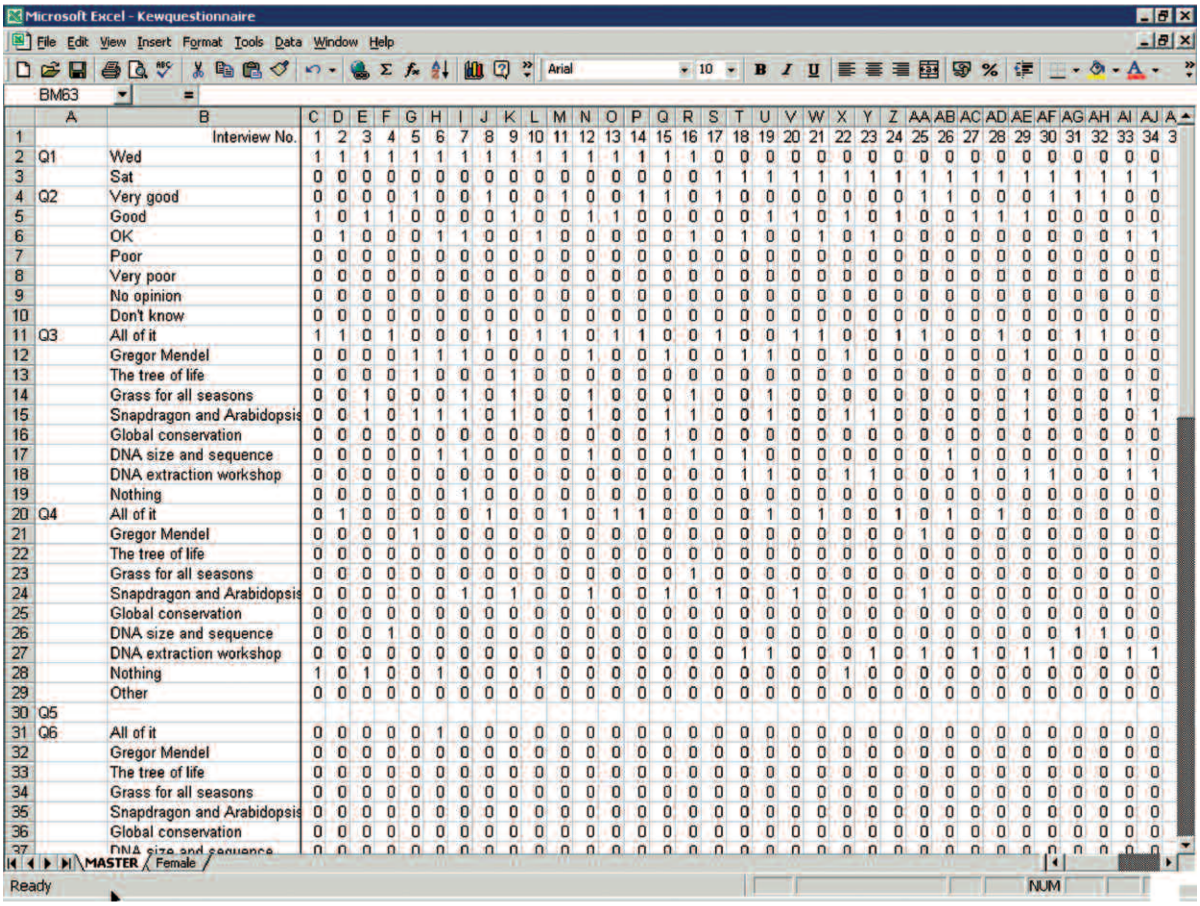
Quantitative data

The first thing to do with your questionnaires is to code any questions where respondents have entered their own answers rather than ticking a box.

If you are using paper questionnaires you will have to input your data.

If you only have a small number of respondents, perhaps less than 50, you could do your analysis by hand by just counting through the questionnaires.

Figure 1. Raw Data.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	A
1		Interview No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	3
2	Q1	Wed	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3		Sat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
4	Q2	Very good	0	0	0	0	1	0	0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	
5		Good	1	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	1	0	1	0	1	0	0	1	1	1	0	0	0	0	0	
6		OK	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	
7		Poor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8		Very poor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9		No opinion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10		Don't know	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	Q3	All of it	1	1	0	1	0	0	0	1	0	1	1	0	1	1	0	0	1	0	0	1	1	0	0	1	1	0	0	1	0	0	1	1	0	0	
12		Gregor Mendel	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	
13		The tree of life	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14		Grass for all seasons	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	
15		Snapdragon and Arabidopsis	0	0	1	0	1	1	1	0	1	0	0	1	0	0	1	1	0	0	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	
16		Global conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17		DNA size and sequence	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	
18		DNA extraction workshop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	0	1	1	0	0	1	1	
19		Nothing	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	Q4	All of it	0	1	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	1	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	
21		Gregor Mendel	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
22		The tree of life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23		Grass for all seasons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24		Snapdragon and Arabidopsis	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
25		Global conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26		DNA size and sequence	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	
27		DNA extraction workshop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	1	0	1	1	0	0	1	1	
28		Nothing	1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
29		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30	Q5																																				
31	Q6	All of it	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
32		Gregor Mendel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
33		The tree of life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
34		Grass for all seasons	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
35		Snapdragon and Arabidopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
36		Global conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
37		DNA size and sequence	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

question. So, for example, for Q1 the possible answers are Wed and Sat. '1' indicates the answer is 'yes' and '0' that it is 'no'. So the person whose answers are entered in column 'C' said 'yes' to 'Wed' and 'no' to 'Sat'.

Summing across the rows gives you the total number of responses for that answer across the sample. However, you're quite likely to want to analyse the data against key variables, such as age or gender. Copying the raw data into another sheet (keep a master copy of the raw data just in case), will allow you to sort responses, for example by gender. As Figure 2 opposite shows, you now know what your female participants thought for every question.

For large datasets and complex surveys it is better to use bespoke packages for data analysis, but for the purposes of this guide, we'll assume that if you are gathering this much data you already have expertise in that area or are buying it in from a survey company.

Qualitative data

Qualitative data is gathered by recording the discussions. Recording may be literal through audio or video (in either case permission should be sought from the respondents before recording starts) or via note-taking to record key points. Bear in mind that if you choose to take notes rather than tape record, you will loose some of the richness of the data and you will never be able to recapture it. Most social and market researchers will tape record focus groups and interviews so they can concentrate on responding to, and observing, the interviewee.

You can use flip charts in a group situation and this

Figure 2. Female responses.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
40		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
41	Q7																											0
42	Q8	All of it	1	0	1	1	1	0	0	0	1	1	1	1	0	0	1	1	0	1	0	0	1	1	0	1	0	14
43		Gregor Mendel	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
44		The tree of life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45		Grass for all seasons	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
46		Snapdragon and Arabidopsis	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3
47		Global conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48		DNA size and sequence	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
49		DNA extraction workshop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50		Nothing	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	5
51		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
52	Q9	Very easy	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	1	7
53		Quite easy	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	0	1	0	1	1	1	1	1	0	18
54		Not at all easy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55		Impossible	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56		Don't know	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	Q10	Yes	1	0	1	1	1	1	0	1	0	1	0	1	1	0	0	0	1	1	1	1	0	0	1	1	0	15
58		No	0	1	0	0	0	0	1	0	1	0	1	0	0	1	1	1	0	0	0	0	1	1	0	0	1	10
59		Not sure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	Q11	Leaflet	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
61		Press advert	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62		TV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63		Word of mouth	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
64		Posters at the gate	1	0	1	1	1	1	0	1	0	1	0	1	0	0	0	0	1	1	0	1	0	0	1	1	0	13
65		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
66	Q12	15-24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
67		25-40	0	1	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	10
68		41-55	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	4
69		55-70	0	0	0	1	0	0	1	1	1	1	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	9
70		Over 70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
71	Q13	12 times a year	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
72		4-11 times a year	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
73		1-3 times a year	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0	1	7
74		Less than once a year	0	1	0	1	0	0	1	0	1	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	0	9
75		Never visited before	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	6
76																												0

allows respondents to confirm that you have accurately recorded what they meant. This approach also means that some analysis is being undertaken in situ as key points are identified and recorded by the group supported to a greater or lesser extent by the facilitator.

Analysis of recorded conversations can be undertaken by making transcripts or by listening back to the tapes, making notes and recording quotes.

What to look for:

- main and sub-themes and issues (across different groups/individuals);
- ideas from participants that will support the development of your project;
- tracking individual views through the discussion, exploring how and why views change (if they do) and any preconceived or hyperbolic views;
- the context, and thus the interpretation, of comments;
- illustrative quotes for use in the final report; and
- the language used – this will help with the design of quantitative questionnaires.

It is unlikely that you will be using qualitative data to prove or disprove a hypothesis, rather you will be looking at the data to see what issues emerge from it. So the approach is not '*Was the event boring because the speaker was no good?*' rather it is '*How enjoyable was the event?*', '*Why was it enjoyable/not enjoyable?*'

In essence, interview data can be treated in two ways. Some people take comments at face value and categorise the text into themes. It is important to remember though, that qualitative research is about more than just what people say. People do not always express themselves clearly, may contradict themselves and their body language will add to your understanding of what they mean. Your understanding of what they mean is important but you need to recognise that it is *your understanding*.

One of the simplest ways to analyse qualitative data, that allows you to incorporate the context of the discussion, is 'charting'. Listening back to the tapes or working through transcripts, you identify the main issues or themes raised in the discussions. You plot who made each (relevant) comment, leading you to be able to identify the type of person who raised each issue and therefore for whom this was an important point. However, as you work through each discussion charting it, you take into account context and intended meaning as well as the pure text.

Observational data

Observational data provides a useful context for understanding the results that emerge from surveys and focus groups. There is an old adage in social research which states that 'what people do is not what necessarily what they say they do' and observational data, taken with other information, can highlight these inconsistencies. For example, a facilitator's observations of group members' behaviour will reveal whether a particular individual who had not been contributing to the discussion did so because they felt alienated by the process or simply because they were shy.

As mentioned on page 20, observational data can take a number of forms. The hand-written notes or field diaries taken by the evaluator throughout the process forms a record that can be subjected to analysis in the same way as qualitative data from interviews and focus groups. At the same time, systematised observations can range from quite simple tallies of attendance at an event and basic demographic information, to fairly complex categorisations and codings of behaviour. This data can be fairly straightforwardly analysed in a standard spreadsheet package.

What to look for:

- main and sub-themes and issues (across different groups/individuals);
- ideas from participants that will support the development of your project;
- tracking individual views through the discussion, exploring how and why views change (if they do) and any preconceived or hyperbolic views;
- the context, and thus the interpretation, of comments;
- illustrative quotes for use in the final report; and
- the language used – this will help with the design of quantitative questionnaires.

5 REPORTING

Your report should be structured around the questions/objectives your evaluation set out to address. These should stem from the objectives you set for your project. Monitoring information is also likely to have a role in your final report. For clarity, you should have:

Section	Content
Executive summary	Some people, especially senior people in funding organisations or those on assessment panels, will only read this section. It should pull out the key points but the structure should mirror the structure of the full report so that anyone who wants more information on a certain section can easily find it. This means you should write this section last.
Introduction	Sets out: ● the background to your project ● why you wanted to do the project ● what you hoped to achieve and why ● the aims and objectives of the project ● the aims and objectives of the evaluation ● the structure of the remainder of the report.
The project	A brief description of the project
Objective 1	The objective and data relating to whether it was met with some discussion as to why the actual outcome occurred
Objective 2, 3 etc.	As above
Unexpected outcomes	Describe any unexpected outcomes and whether they are good or bad.
Conclusions	A summing up of the key achievements of your project, its strengths and weaknesses
Lessons learnt	What you would do differently next time and why Key learning points for others Include discussion of unexpected outcomes and how to ensure they either occur again or not, as appropriate
Annexes	Include: ● full details of your methodology ● how you selected your sample ● copies of questionnaires and topic guides ● some information about how you analysed your data

5 REPORTING

For the sections on the objectives, try to turn the objective into a question or several questions. Then assess all the information you have from both monitoring and the evaluation and allocate each piece of information to a section of the report. If you have information that doesn't add anything, ignore it. Don't feel you have to report every piece of detail. It can be useful to have short 'conclusions' at the end of each main section that sums up the main points from the section.

The use of charts to illustrate numerical data, which can easily be derived if you have your data in a spreadsheet such as Excel, will help you and the reader identify highs and lows and trends. Think about how you would present numerical data from your research. Use bullet points under tables, charts and graphs to highlight the main points. Quotes from interviews and focus groups will serve to bring to life the spirit of the project. Again, think about how you might use images to illustrate your research findings.

Some people like to have this sort of detail in annexes to keep the main report short. You'll find that different people have different preferences about how data is presented, so it's sensible to check with key readers, such as your funder, to see what they prefer.

The conclusions section should pull together all the data and get to the nub of 'what does it all mean'? 'So what?' What do the preceding sections tell you in a nutshell? Some people will only read this section, especially if there isn't an executive summary.

You should use Plain English. You want your report to be accessible to as many people as possible. The main audiences will be other people like you and your team and your funder. Remember, many funders will not be evaluation experts either.

Don't be tempted to use jargon. There are occasions however, when you'll want to use very precise terms. If you do, make sure you define them somewhere so all your readers know what you mean.

Don't be afraid to make value judgements or give your views, especially when you're considering how you might do things differently next time. Remember, you have learnt a lot from doing your project and can speak with some authority, especially if you've backed it up with good evaluation data.

6 ANNEXES

1 EVALUATION QUESTIONS AND QUESTIONNAIRES

Designing questionnaires for self completion quantitative surveys

Length

- Keep it focused, simple to complete, and as short as possible – one to two pages. This will maximise the response rate.
- It is tempting to throw in lots of questions – but the longer the questionnaire, the less likely people are to fill it in, and the more likely that you will have missing answers. It will also take you longer to analyse and process the information.

Make the respondent's experience positive

- You should make sure that the respondent finds the experience straightforward and useful; they may even gain something from the process.
- If you are using pre-coded questions, you need to be confident that the categories chosen reflect the spectrum of actual experience. If you ask people what their favourite subjects were at school and offer 'maths', 'science', 'design and technology' and 'other' as options, but your project was based in an art gallery, you're not likely to get a very accurate picture of people's real favourites. You can always have an 'other, write in' category to capture anything you've missed but remember you'll have to read it before you can analyse it.
- Make sure that your language is appropriate to your audience. This is especially important with younger audiences, but also bear in mind that general literacy levels are not the same as those enjoyed by graduates and that for some people English may not be their first language.
- Use colour, pictures, cartoon "smiley faces" or other lighter approaches to match the mood of your event.
- Make sure your respondent has the chance to say what is on their mind eg by using a general open-ended question at the end – which we suggest you always include.
- If possible, pilot the questionnaire on a few people before circulating it widely; piloting will help you identify any difficulties with wording or concepts. You'll be using formative evaluation to improve your summative evaluation. Even piloting it on your colleagues, friends or family will provide some useful feedback on how to clarify the questions and the way you ask them.

Structure

- Design the questionnaire as a funnel, moving from simple, unthreatening and non-sensitive questions, to those that require more thought from respondents and maybe more personal information.
- Most questionnaires will benefit from a mix of closed (pre-coded) and open questions, where people enter their response in their own words.
- Avoid long batteries of scales, as respondents will drift into automatic pilot - break up questions visually, if the questionnaire is long.
- Sensitive and demographic data (eg facts about age, sex, education, ethnicity) are usually best placed at the end
- **Do not ask for information that you do not plan to use**: it wastes everyone's time

Analysis

- Plan the time and resource needed for coding, data entry, analysis and reporting. This will help you to decide whether you can handle the evaluation yourself, or whether it might be best to have it managed by a third party.
- A simple spreadsheet will allow you to do quite a lot of analysis of the data.

Maximising the response rate

- Distribute questionnaires at the start of the event, and ask people to complete it before they leave.
- Make it short, simple and relevant.
- Consider providing an incentive to complete the questionnaire - something like a free gift may be appropriate.
- Use pre-paid envelopes to increase response where you have had to distribute questionnaires by mail or where you think people will want to post back the questionnaire.
- Follow-up by telephone can be relatively quick and improve the response rate significantly. It can be done by an administrator, if they are well briefed and have a structured proforma for questioning and recording responses.

Issues in questionnaire design

Most people like to put themselves and their behaviour in a good light. If you ask a question which embarrasses the respondent or makes him/her feel stupid, they may massage the truth.

So, for example, asking '*How often do you eat chips?*' rather than '*Do you eat chips?*' gives people permission to say that they do and those that don't, just say never!

Reluctance to give feedback

This can be the curse of feedback questionnaires – people either don't want to hurt your feelings, so tone down their comments; or forget themselves and launch scathing attacks that don't really help you to improve. The key is to ensure that people understand that their feedback is important and can help you. Emphasise that critical feedback will help you get better and that it won't hurt your feelings (even though it might) and that positive feedback also helps, because it shows you what works well.

The problem with leaving questionnaires for the audience to complete on leaving an event is that those who had a great time are most likely to fill it in. Those who hated it are more likely to fill it in than those who had an OK time. So unless you have some way of randomly selecting people and ensuring that a high proportion of those you target complete the questionnaire, you must be aware that the results will not necessarily be representative of your whole audience and you will not be able to tell in what ways or to what extent the results are biased.

This is not to say that the data is useless but it needs careful interpretation. One thing to take into account is the proportion of your sample that responded, assuming your sample was properly selected. The higher the response rate, the more representative the results will be. If everyone who engaged with your project responded, the data is robust, even if there were only six people. Just don't try percentaging on this many.

Confidentiality/data protection

You must take all reasonable steps to make sure that the respondent is not adversely affected by taking part in evaluation. You must keep their responses confidential, unless you have their permission, and you must not do anything with their responses that you have not informed them about. So unless you made it clear when you gave them the questionnaire or on the questionnaire itself, you cannot use the results to build a database for marketing, for example. You need to take particular care with children and teenagers.

There are two useful sources of information: the Data Protection website, and the Market Research Society, which has various codes of conduct relating to data protection and confidentiality issues.

For the Data Protection Commissioner:
www.informationcommissioner.gov.uk

For market research guidelines:
www.mrs.org.uk

Avoiding bias

There are many different sources of potential bias in research. These include:

- Interviewer/questionnaire bias (leading questions)
- Methodological bias (for example, Internet surveys exclude people who do not have internet access)
- Sampling bias (for example, asking for feedback only from those who asked questions at an event may be a very poor indication of how the audience as a whole felt)
- Response bias (those who complete questionnaires may be very different from those who don't). This is a major issue for self-completion forms.
- In qualitative research, the way that you frame discussions and who is present in the group, as well as the way you look and speak – can have a significant effect on response. It's impossible to entirely neutralise these things, but you can at least be aware of the effect you may have.

Using scales

The 1-5 **Likert scale** is the most commonly used form of rating. It is simple to understand and relatively discriminating. The scale is commonly anchored descriptively eg 5= Agree strongly, 4= agree, 3= neither agree nor disagree, 2 = disagree, 1 = disagree strongly. You can also add a 'don't know' category, if it seems a likely answer. Other scales that are used include scoring on a line of one to ten or a percentage score.

Another way of differentiating between people's view is to present them with statements that the respondent chooses between. These are often ordered on an implicit scale but you are asking the respondent to tick the one that best fits their view when in fact they may not agree with any of those presented. An example of this type of question is:

Which of the following statements best reflects your feelings about science today?

a) *It's continually making our lives safer and better*
b) *It's changed many things for good, but I wonder how much more there is that can be achieved.*
c) *It's producing lots of new things but I'm not sure we need them all*
d) *It's out of control and damaging our lives and environment*

When it comes to the analysis all you can really do is present the percentage of respondents who agree with each statement.

Rank ordering is best avoided – many respondents won't do it properly, unless you stick to asking for first, second and third choices. Otherwise people get confused and get pushed in to declaring preferences they don't really have or they may just give up. You can get round this by asking how important an issue is, using a Likert scale; however, it can be difficult for this kind of question to be discriminating.

With **attitudinal questions**, if you have a set of them, some should be positive about your project and an equal number should be negative. In general people are more likely to agree with statements than to disagree and you need to be aware of this in your analysis. Be careful not to have statements such as '*Science is not good*'. It's very difficult for people to know whether they should agree or disagree. If you're using negative statements keep it short – for example, '*Science is bad*'.

Asking people to complete their questionnaires at the end of engaging with your project will increase your response rate and may improve the quality of the information you gather. But it will mean that you can only ask relatively few questions because people will only be prepared to give a limited amount of time. You also need to think about the time people have for reflection. You may get a more considered response when people have had a chance to think about the project later.

Who was there?

There are a tremendous number of variables that can be explored. You need to focus on what matters in relation to your objectives. Is it people from a geographic location, of a particular age or a certain mindset that were important to you? Did you want a mix of gender and/or ethnicity or were you specifically targeting one group? To get basic socio-demographic information use simple tick boxes, some examples of which are shown below.

Are you

Male ☐
Female ☐

Are you

Employed – full-time ☐
Employed – part-time ☐
Not currently employed but looking for work ☐
Retired ☐
Other ☐

Which of the groups listed below do you consider yourself to belong to

White ☐
Asian British ☐
Indian ☐
Pakistani ☐
Bangladeshi ☐
Black British ☐
Caribbean ☐
African ☐
Chinese ☐
Mixed race ☐
Any other ethnic group ☐

And you can add any other groups you are particularly interested in targeting.

What was your age last birthday?

Less than 16 ☐
16 - 30 ☐
31 - 45 ☐
46 - 50 ☐
51- 65 ☐
Over 65 ☐

What were they like?

For attitudinal information it is probably more appropriate to use Likert scales and some examples are shown overleaf:

For the following statements do you agree strongly, agree, neither agree nor disagree, disagree or disagree strongly?

Statement	Agree Strongly	Agree	Neither	Disagree	Disagree Strongly	Don't Know
The speed of development in science and technology means that it cannot be properly controlled by Government						
Science is getting out of control and there is nothing we can do to stop it						
It is important that young people have a grasp of science and technology						
The benefits of science are greater than the harmful effects						
Science and technology are making our lives healthier, easier and more comfortable						

There are many more examples of attitude statements that have been used in the past in Science and the Public: A review of science communication and public attitudes to science in Britain, The Office of Science and Technology and The Wellcome Trust, October 2000. ISBN 1 841290 25 4. That report also gives the figures for the responses of a nationally representative sample of adults to these statements. This means that you can develop a picture of how typical your audience is of the wider public.

Did the event work?

At one level you might want to know if people simply enjoyed the engaging with the project. Give them the chance to tell you, but you can get more value by following up the question as shown below.

	Strongly agree	Agree	Disagree	Strongly disagree
I enjoyed the event				
Please write in which part of the event you enjoyed the most				
Please write in which part of the event you enjoyed the least				
What do you think I should change about the event?				

This 'write in' approach works best for small numbers of respondents, because of the amount of data that it generates that you'll need to analyse. For larger numbers you can think about likely answers and develop these as 'pre-coded' responses that people can choose from, but always leave open the "other" option so that you can capture answers that you hadn't thought of.

You might be looking for more sophisticated feedback. If the primary function of the project was to give participants the chance to contribute their views and comments, it is important to see whether this has been achieved and what factors have enabled, or hindered, effective participation.

Were you able to express your views freely and openly?

Please put X in the appropriate box

Yes completely ☐

Yes but sometimes I felt nervous ☐

Not as much as I would have liked ☐
(if you tick this please say why in the box below)

Not at all ☐
(if you tick this please say why in the box below)

Don't Know ☐

Why was this?

If information provision was part of the process was it accessible and useful? Similarly, if you were using 'experts' how was their contribution rated?

You might also think about what the experts experienced. Did they enjoy the process, what have they learned, have their attitudes changed?

The next examples show some of the questions that you might consider asking. For these 'did it work for you?' questions, the most valuable bit of feedback can be the why or why not that underpins the yes or no answer, so it is always worth leaving some space for this.

Did you understand the explanation of the science?

Please put X in the appropriate box

Yes, easily ☐

Yes, but only after the discussion ☐

Not very well ☐
(if you tick this please say what might have helped in the box below)

Not at all ☐
(if you tick this please say what might have helped in the box below)

Don't Know ☐

What might have helped you understand the science more easily?

Did you find the experts . . . . . . ?

Please put X in any box you agree with

Helpful ☐
Confusing ☐
Able to answer my questions ☐
Self important ☐
Did not want to listen to my opinions ☐
Able to explain themselves clearly ☐
Eager to listen ☐

If you'd like to say anything else about the experts, please write it in the box below

Designing open-ended questions

- Use broad openers: Who, what, where, when, and (especially) why
- Balanced open questions (what did you like, what did you dislike) help the respondent structure an answer without feeling pressured to give a particular reply
- In face-to-face interviews conducted by an interviewer, using open phrases such as 'Tell me about' or 'Tell me more..' encourages people to talk
- Avoid questions that can be answered with a simple yes or no
- Avoid asking more than one question at the same time

6

2 SUMMATIVE EVALUATION SCHEMA

Here we set out a schema to help you think about the type of information you want depending on the delivery method you are using and how you might obtain information to see whether or not you've met your objectives.

	Discussion/ Meeting/ Talk	Website	Products eg poster/ CDROM/video	Exhibition/ Open day	Show/Play	Competition
Monitoring Data						
Number of people	Count people on entry	Count hits	Number distributed	Count people on entry	Count audience	Count entries
Types of people	Categorise people at registration or by observation or questionnaire	Pop-up questionnaires on the site or registration procedures	Use of order/ request forms and questionnaires	Categorise people on entry by registration or questionnaire	Use ticket sales or booking mechanisms to gather information	Use entries to gather data on types of entrants
Evaluation Data						
Benchmark	To measure change you need to have a baseline from before the audience engaged with your project and another set of data taken after they took part in your project. You will need to ask the same questions before and after.					
Change views/attitudes Change behaviour Increase interest Increase knowledge	Ask people for baseline views on a paper questionnaire while they wait for the event to start or when they register to come.	Registration question-naire on the site to gather information.	Distribution methods will affect the ability to collect initial data. Using an ordering mechanism allows data to be gathered.	Ask for baseline views on a paper or e-mail questionnaire when people register to come or buy tickets.	Ask for baseline views on a paper or e-mail questionnaire when people book or buy tickets.	Building in an initial data gathering exercise to the competition process will allow baseline data to be gathered.
Quality/fit for purpose						
Strengths Weaknesses	Observe the event. Use exit questionnaires and/or follow-up focus groups or questionnaires.	Include questions on this in a questionnaire hosted on the site. Record dwell time per page and page requests.	Follow-up questionnaires and focus groups.	Exit or follow-up questionnaires. Short face-to-face interviews during the event. Observation.	Follow-up questionnaires. Group discussions.	Use entry mechanism to gather feedback.
Interaction with project	Observation of dynamics will help you plan better events in the future.	Record the order in which pages are accessed and dwell time per page.	Observation of users and questionnaires.	Observation. In-depth interviews or focus groups and questionnaires. Feedback from staff/colleagues.	Observation. Questionnaires	Implicit in taking part, use entry numbers as a measure.
Dialogue						
Obtain views on issue	Listening to the conversations, record key points.	An interactive email facility will allow this.	Not a good medium for getting people's views. Can use these as a stimulus and then use group discussions and questionnaires	Comment books and exit questionnaires. Build in opportunities for staff/colleagues to engage with visitors.	Not usually designed for giving feedback. Can use debate after the performance.	Can build this in to entry process, but not a normal mechanism for getting people's views.

3 GLOSSARY

Aim
The aim of your activity is what you ultimately want to achieve. The aim is supported by a number of objectives that will help you to realise the overall goal.

Audience
The audience is the people with whom you are trying to engage.

Baseline
A measure at the beginning of a project that enables determination of change, if any.

Census
A survey that collects data from everyone.

Charting
A method for analysing qualitative research data.

Data
Information collected through monitoring and research.

Evaluation
Evaluation helps you to see whether or not you have achieved your objectives and to identify ways to improve what you do.

Evaluation strategy
The plan through which you will determine whether or not you have achieved your objectives.

Exit survey
A survey of people undertaken as they leave an event, exhibition, etc. Usually conducted by an interviewer rather than a researcher.

Face-to-face interviews
Used in market and social research to mean structured quantitative surveys conducted face-to-face.

Focus group
A research method that involves a group of usually 6-8 people convened to discuss a particular topic.

Formative evaluation
Research that takes place during the development of a project to ensure it meets the audiences' needs.

Funders
The funders are the people who provide the resources that allow you to undertake your project.

In-depth interview
An interview conducted by a researcher using a topic guide, which allows respondents to express themselves in their own way and raise issues the researcher has not considered.

Interviewer
A person who conducts interviews following a predetermined questionnaire designed by a researcher.

Milestones
Milestones are interim measures that allow you to monitor whether or not you are on track to meet your objectives.

Observation
Formalised observation of behaviour, either directly or from a recording.

Objectives
Objectives are the tangible things through which you will achieve your overall aim.

Outcomes
Outcomes are measures of the impact you have had on people.

Outputs
Outputs are the things that you produce as part of the activity e.g. a website, a leaflet.

Pop-up questionnaire
A questionnaire that literally 'pops-up' on entering a website to collect information about users and usage of the site.

Programme
There is no blueprint for a programme, it is likely to contain one or more of the following features:

- A funding mechanism to which other people or organisations can apply;
- A budget to commission specific pieces of work;
- Resources to undertake in-house activities; and
- A reporting process, through which the programme manager bids for resources and accounts for their use.

Programme manager
Someone who has overall responsibility for delivering against a set of pre-determined objectives, and uses a variety of activities and actions to achieve these objectives.

Project
Unless a specific project or approach is being discussed, we use the term project as an all-encompassing phrase for talks, shows, teachers' packs, hands-on events, websites and the many other ways that scientists are using to engage general audiences.

Project management
Project management in this context is simply the procedures through which you ensure that you deliver your project.

Project manager
The project manager is the person ultimately responsible for the activity.

Qualitative research
Techniques that allow people to express themselves in their own words and to raise their concerns, usually via in-depth interviews and focus groups conducted by researchers, helps you understand why people do or say what they do or say.

Quantitative research
Techniques that ask people the same questions in such a way as to enable the answers to be added together for a sample that is representative of the target group, thus providing numerical data on the percentage of people with particular views or behaviour.

6 3 GLOSSARY

Questionnaire
A structured set of questions calling for a precise response that allows answers from all those who complete it to be added together.

Quota sampling
Setting 'quotas' to ensure a sample has the same percentage of people with specific characteristics as the population of interest. Requires other data giving the information on the population.

Researcher
A person who is involved in designing and overseeing a research or evaluation project.

Sampling
A way of selecting people to take part in research that ensures they are chosen to be representative of the population of interest, although not always in a statistical sense.

SMART
All objectives should be SMART, which stands for:

- Specific;
- Measurable;
- Achievable;
- Relevant; and
- Time-bound.

Stakeholders
Those who have a legitimate interest in your activity, e.g. audiences and funders.

Sub-contractors
Sub-contractors are people or organisations employed by the project manager to deliver specifically defined products or services.

Summative evaluation
Evaluation at the end of a project that determines whether or not the objectives have been met.

Systematic sampling
Taking every 'nth' person who engages with a project. Produces a statistically representative sample.

Topic guide
A list of questions and issues a researcher wants to cover during an in-depth interview or focus group.

User
For the purposes of this guide, someone who engages with a project.

4 FURTHER READING

Finding information on evaluation

The term 'evaluation' is used widely in education, social policy, and training, and it is in these areas that one can find papers and books devoted to evaluation as a distinct tradition. Elsewhere, tools and techniques used in evaluation are simply the application of research methodologies. There is little written that is specific to issues in science communication – it is often a case of borrowing and adapting methods that have been used successfully in other fields.

In the following sections we offer suggestions for further reading, grouped by topic. Where possible, we offer a brief review of the contents, with an indication of length and level of difficulty.

Evaluation Methods

Breakwell, G. and Millward, L, (1995) Basic evaluation methods BPS Books, Leicester. 145 pp

A good general introduction to evaluation, which can be applied in a range of settings. Contains case studies and examples that are relevant to science communication, e.g. evaluation of a museum exhibition, and covers a wide range of research methods, including questionnaire construction and time series. Contains an interesting section on the politics of communicating evaluation results to audiences.

Rossi, P, Lipsey, M and Freeman, H. (2004) Evaluation: a systematic approach. Sage, Thousand Oaks, 470 pp.

US textbook on programme evaluation for education and social policy. Moderately heavyweight, but extremely thorough and readable.

General introductions to research methods

There are numerous books on data collection, project design and statistical analysis out there, and to some extent it is a case of simply going to a large city bookshop and having a look at what's available and what kind of approach suits your own way of thinking. Here are some possibilities. Most of these, inevitably, are aimed at students.

Quick general reads

Allison, B. O'Sullivan, B. Owen, A, Rice, J Rothwell, A and Saunders, C. (1998) Research skills for students. Kogan Page, 124 pp

A very practical overview of research methods in the social sciences, which is particularly good on the mechanics of sampling, surveys, and questionnaire design. An introductory level which assumes no prior experience.

Bell, J. (1993) Doing your research project. OUP, Buckingham, 176 pp

This is (or was) a set text for introductory courses on research methods for undergraduate and postgraduate students in education and social science. A useful and practical overview of data collection methods (questionnaires, diaries and observation studies). The sections on literature review and defining research questions are likely to be less useful.

Longer general handbooks

Hussey, J. and Hussey, R. (1997). Business Research. London, MacMillan.

Chapter 6 (Collecting the original data) has a good overview of how to construct a quantitative questionnaire, along with basic aspects of sampling. Quite simple and straightforward advice. Although it assumes an academic purpose (like conducting an MBA project) it also assumes no prior knowledge.

Neuman, W. L., Ed. (2000). Social research methods: qualitative and quantitative approaches, Needham Heights.

Includes a chapter on 'Science and Research.' Straightforward and sound introduction to social research methods, aimed at undergraduates.

Wilkinson, D and Birmingham, P. (2003) Using research instruments: a guide for researchers. Routledge Falmer, London.

This book has very good sections on designing questionnaires and discussion guides.

Graziano, A. and Raulin, M. (5th ed 2004) Research methods: a process of enquiry. Allyn and Bacon, Boston. 452 pp.

'Explains the entire range of research methodologies in psychology'; also comes with a free CD-Rom. Very clear and well-written, and comprehensive in its coverage of social science methodology. Includes a chapter on doing program evaluation using control groups and experimental designs. Probably more detailed than most practitioners would need, but written in a style that can take the reader from introductory level to advanced level. Also contains accessible chapters on philosophical and methodological issues.

Qualitative methods

Vaughn, S, Schumm, JS and Sinagub, J. (1996) Focus group interviews in education and psychology. Sage, Thousand Oaks. 170 pp

A thorough guide to setting, running and analysing group discussions, which includes a chapter on special issues to consider when interviewing children and young people. Concentrates on how to set-up and facilitate sessions, rather than the analysis and interpretation side.

Cassell, C. and G. Symon, Eds. (2003). Qualitative methods in organizational research: a practical guide. London, Sage.

While aimed at organizational researchers, this is a practical guide to a wide range of qualitative research techniques.

Research and evaluation in education

Articles and textbooks written with teachers and curriculum developers in mind will be directly relevant to some Research Council audiences. Those outside education may find the thinking about evaluation relevant.

Bennet, J. (2003). Evaluation methods in research. London, Continuum.

This short guide to evaluation methods is aimed at a teacher/researcher audience, and contains an excellent chapter on planning and conducting an evaluation. The style is informal, aiming to provide a realistic, jargon-free introduction to questionnaires, interviews, and observational studies. Contains some very helpful examples of real questionnaires and other materials.

Gorard, S. (2001) Quantitative methods in educational research. The role of numbers made easy. Continuum Press, New York. 200 pp

A comprehensive guide to quantitative research methods and basic studies, written from an educational research perspective. Includes a chapter on experimental designs. Useful across a range of experience levels, and written in a straightforward, accessible style.

Research and evaluation in training

Training (i.e. adult skills training or managerial training provided in the workplace) may not seem immediately relevant to engagement with science, but there are a number of parallels that make literature on training evaluation quite relevant to scientists.

Easterby-Smith, M. (1994). Evaluating management development, training and education. Aldershot, Gower.

Easterby-Smith is an academic and evaluation guru, who has written a number of guides to evaluation.

Research and evaluation in health and social care

Pope, C and Mays, N (2000) Qualitative research in health care. BMJ Books, 1996. 107 pp

A useful introduction to qualitative methods for scientists, explaining where and how qualitative methods can be used to understand behaviour. Includes chapters on interviews, focus groups, observation, Delphi methods, case studies and action research. There is also a discussion on judging quality.

Gomm, R. and Davies, C. (2000) Using evidence in health and social care. OUP/Sage. 175 pp

A critical examination, at an introductory level, of evidence-based practice within the sector. Good discussion of the issues involved in putting good-quality approaches into practice in the field. Plenty of case studies and examples.

Market research methods

Knowledge of market research methods is quite helpful for people creating projects that engage with the public, because many market research techniques involve researching attitudes amongst samples of the public. There are some simple introductory books available, mainly aimed at people in business who want to research new products. Unfortunately, there are very few good books that explain survey research: much of the knowledge remains with the agencies that set-up market research projects.

Hague, P and Harris, P (1994) Sampling and statistics. Kogan Page, London. 128 pp

Written from a market research/opinion survey point of view, this short book explains the basics of sampling theory and sampling frames as applied to research with the public. It covers sampling error and confidence limits in some detail.

Other approaches

Action research

In action research, members of a project team conduct a project engaging in a cycle of reflection, learning and adaptation, which is intended to improve the project as they go. Within social policy research, action research usually refers to a process of practitioners conducting small experimental projects, with plenty of input from grass-roots users. The strength of action research is the way in which it encourages those new to research to create experiments and learn from them. The weaknesses, mostly perceived from outside the paradigm, are that action research projects may fail to learn from other people's experience (because of the focus on learning as you go).

Costello, P. (2003) Action research. Continuum, London.

A simple and extremely practical guide to setting up and running an action research project. Assumes a teacher audience, but the generality of the approach makes it useful for any discipline.

McNiff, J. (2002) Action research: principles and practice. Routledge Falmer, London. 163 pp.

An introduction to action research, but more extensive and detailed than Costello's book. Through the author's examples of her own action research projects in practice this book brings action research to life as an approach.

Case study research

Stake, R. (1995) The art of case study research. Sage, Thousand Oaks. 175 pp

A discursive treatment of case studies in educational research, which covers both the practicalities of case study research, and the academic methodological issues that it raises.

Web Resources

The main web resources are the websites of various evaluation societies (usually specialising in educational or social policy research). There are also some useful 'hints and tips' sites, mostly US-based, written by academics and general enthusiasts.

www.evaluation.org.uk
Website of the UK Evaluation society, with a document on best practice.

www.eval.org
The American Evaluation Association has an excellent website with links to plenty of full-text documents on evaluation.

www.reviewing.co.uk/evaluation/index.htm
General articles on getting the best out of course evaluation, with tips and links.

http://gsociology.icaap.org/methods/
Set of links to US-based evaluation resources.

www.hm-treasury.gov.uk/spending_review/spend_sr04/associated_documents/spending_sr04_science.cfm
The UK Treasury 'Green Book' is a useful guide on how evaluation fits into a project cycle.

www.mrs.org.uk
The UK Market Research Society's website is a good place to find information on selecting suppliers, and up-to-date guidance on ethics and confidentiality in interviewing the public.

www.dfes.gov.uk
Department of Education and Skills has data on individual school examination results at various Key Stages, GCSE and 'A' level.

THE RESEARCH COUNCILS ARE:

- Biotechnology and Biological Sciences Research Council
  www.bbsrc.ac.uk
- Council for the Central Laboratory of the Research Councils
  www.cclrc.ac.uk
- Economic and Social Research Council
  www.esrc.ac.uk
- Engineering and Physical Sciences Research Council
  www.epsrc.ac.uk
- Medical Research Council
  www.mrc.ac.uk
- Natural Environment Research Council
  www.nerc.ac.uk
- Particle Physics and Astronomy Research Council
  www.pparc.ac.uk
- The Arts and Humanities Research Board
  www.ahrb.ac.uk

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