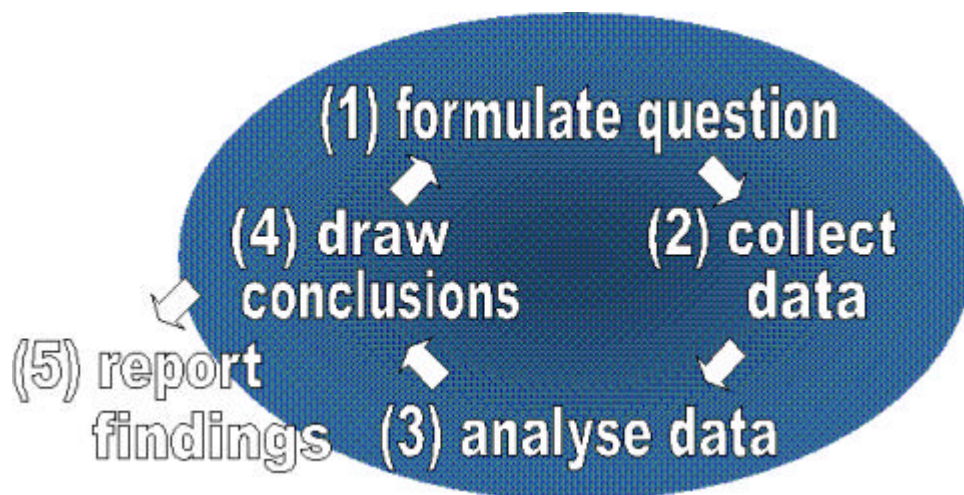




The evaluation cycle



In planning an evaluation you need to consider the following stages:

(1) Formulating the question

WHY am I carrying out this evaluation? (identify objectives; designate stakeholders)

WHAT information do I need? (define evaluation goals or research questions)

(2) Collecting the data

WHO can provide the information? (identify resources, e.g. students, other staff involved in the project, an independent observer)

HOW can I best collect this information? (choose a data collection strategy)

WHEN should it be collected? (e.g. before, during and after a learning activity, or at different points in a module)

(3) Analysing the data

HOW will I analyse the data? (select appropriate analysis techniques, bearing in mind the nature of the data collected and the evaluation goals)

(4) Drawing conclusions and reporting on findings

WHAT does my evaluation mean? (reflect on implications for own practice; draw recommendations or lessons for others)

WHO needs to know this information? (return to list of stakeholders; consider also the wider disciplinary, institutional and professional communities)

HOW can I reach them? (identify dissemination opportunities)

This guide is designed to help you think about each question in more detail, and to suggest tools that can help you at each stage.

1. Formulating the question

WHY carry out evaluation?

Some common **objectives** for evaluation include:

- determining the effectiveness of a particular intervention
- finding out how well students are learning
- identifying improvements which could be made to a specific course, learning activity or learning resource
- satisfying internal or external auditing requirements
- demonstrating value to stakeholders (which might include project funders)
- reflecting on professional practice in a structured way
- building evidence for a portfolio (e.g. career development, teaching fellowship)
- producing guidelines for colleagues (internal and external) who might want to carry out a similar innovation
- generating data for a research study or publication
- investigating an issue of personal, intellectual or professional interest

Answer this question should lead you to a list of key **stakeholders** in the evaluation process, i.e. people who have an interest in your findings. Stakeholders are important not only when you formulate your evaluation question(s) but also when you look for people to help collect evaluation data and when you think about your audience for reporting the findings.

Identifying and involving the stakeholders

Stakeholders in your project might include any of the following:

Students: these might be sub-divided into past and current students, or into other relevant groups (for example students with different learning needs, students studying on campus or at a distance, mature students and those straight from school).

Tutors/lecturers: as well as those directly involved in the project, you may want to collect data from other members of the department, faculty or even institution, who after all have a stake in how your students learn. Data might include things like attitudes to learning technology, current teaching problems and issues, student needs and how these are seen to be changing.

Learning technology specialists: if a specialist member of staff is involved, s/he is likely to be a valuable source of data and also of hypotheses and questions to investigate. S/he might also be willing to observe students using the technology in the classroom and may even have expertise in evaluating learning technologies in use.

Support staff (including technical support staff): particularly if you are interested to evaluate the time and cost effectiveness of a particular application or its sustainability across a number of departmental users, these people will be important sources of data.

Future employers of course graduates or of the University in general. These people may be directly involved in the project or may be a source of contextualising data, for example about the IT and learning skills likely to be needed by graduates.

Future clients, patients or students (as applicable): this is a particularly important perspective on professional and vocational courses where the quality of education can be evaluated in large part by looking at how students go on to conduct their professional relationships.

Managers and funders: these people are likely to have a stake in the efficient use of resources and in the quality of student learning: they may also be sources of comparative data to help you evaluate the effectiveness of your own learning technology project in relation to others.

Any of these people can provide data to help you to evaluate your project. They can also act as co-evaluators, for example by:

- helping you define your evaluation objectives and goals
- observing your teaching with technology
- collecting data on your behalf
- road-testing questionnaires, structured interviews and other data collection instruments
- acting as witnesses, mentors or critical colleagues – particularly useful if you are using an action research approach (see below).

WHAT information do I need?

Once you have identified your objectives you can formulate an evaluation **question** or **issue**. The nature of this will depend on your objectives.

- For professional development purposes you might ask: *How well did my students learn? How enjoyable was the experience for students? Is there evidence of students developing new skills? How could the design of this session, course or resource be improved?*
- If your key audience are your colleagues, you might want to explore the process of development and identify the barriers and opportunities for change: *What can be learned about the process of embedding the new virtual learning environment into the curriculum? How much time did I invest? What are the stumbling blocks? What new skills did I need to acquire?*
- To inform the strategic priorities of your department or institution, or to satisfy the requirements of project funders, your questions might revolve around quality issues, such as: *Did the use of this learning technology help students acquire transferable skills? Did the use of computer-marked assignments save tutor time overall? Is there evidence that this resource supported a range of learning styles and needs?*
- In the case of a research study you will probably want to develop a more formal hypothesis: for example your reading of the literature may lead you to hypothesise that *introducing web-based resources alongside your lecture and seminar programme will encourage students to study more independently.*

2. Collecting the data

Breaking down your evaluation question(s) into component parts enables you to identify the information you need. Some of the most crucial information - such as quality of student learning - is likely to be very hard to measure, which is why educational evaluation uses processes which may differ from those you are familiar with in (for example) natural sciences, social sciences or text based investigations.

Key concept 2: triangulation

A key concept in educational research design is **triangulation**. Any learning situation involves a complex range of interacting factors, such as subject studied, student motivation, tutor input, institutional and physical context, resources available etc. It is not usually practical, or even ethical, to collect data about these different aspects in isolation from one another. Any data you collect will therefore only give a snapshot of a very complex picture. However, if you collect various different kinds of data, at different points in the learning cycle, and from different perspectives, then you are far more likely to be able to see the interrelated elements that make up the whole picture.

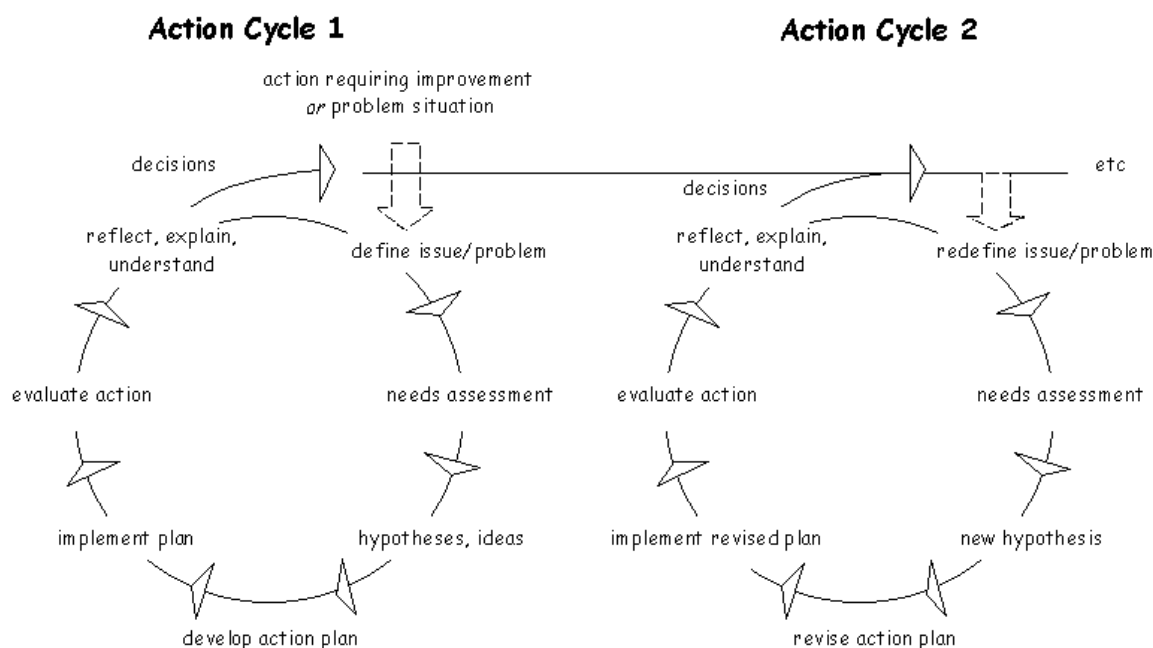
Triangulation looks at three aspects of data: the **data collection method** used, the **people** involved and the **time** when the data is collected. Each one has its own bias. For example, tick-box questionnaires allow you to collect quite a lot of data quite quickly, but they do not allow you to get at complex ideas or subjective impressions of what is going on. Tutors will look at what is happening in the classroom from one perspective, while students will look at it from another. Learning outcomes may be different immediately after an activity and several days or weeks later when the learning has been assimilated with other aspects of the course.

Providing you collect data using **a range of methods**, involving **a number of stakeholders or evaluators**, and over **a period of time**, you will overcome the problems of bias and present a much more complete picture of the situation you are investigating.

Key concept 3: Action Research

Action research is not a specific evaluation methodology, but a general approach to evaluation that has been found particularly useful by practitioners seeking to evaluate the impact of their own work in a professional context. Action research can be summarised as a *'small scale intervention in the functioning of the real world and a close examination of the effects of such intervention'* (Cohen and Manion, 1996). In other words, action research is designed to investigate real issues and problems arising in a professional context.

As McKernan's time-process model (below) shows, action research begins with the identification of a problem situation or an issue in professional practice which can be improved. The first cycle of action research involves definition of the issue or problem, followed by a needs assessment and generation of a hypothesis. An initial plan of action is carried out and evaluated, leading to a deeper understanding of the original issue. This is followed by further cycles, in each of which the understanding of the issue is refined, practice is improved or developed, and new evidence is produced through evaluation and reflection.



Action researchers make use of the full range of data collection and analysis techniques described below, but some are particularly valuable to professionals carrying out evaluation while fully engaged in the activities they are studying. These include reflective learning logs, dialogues, narratives and informal observations. Background papers on [action research methodology](#) are hosted at Southern Cross University.

HOW do I collect the information I need?

The purpose of this section is to help you narrow down those methods which you feel confident to use and which can realistically be implemented as part of your project work. Look through the following methods and note any which seem particularly appropriate or which you already know how to use. Your learning technology service (or equivalent) may be able to offer help with data collection and analysis. Take note of the skills and support you will need to use each method effectively. There is no point carrying out and transcribing interviews if you have no experience in qualitative data analysis, or have not identified someone who can help you with this.

Your learning log. Whatever other data collection methods you employ, you should keep a record of critical actions or incidents during your project, any outcomes that result, and your own reflections and observations. These will form an important record for evaluation. Bob Dick has compiled a series of [reflective questions](#) that can be used as prompts before and after a learning and teaching intervention.

Student learning logs. You can also ask students to keep a journal of their own reflections, typically as part of a course 'learning skills' element, though if students already have experience of this technique it will provide useful practice and reinforcement.

Questionnaires. This is often the first tool to be reached for, and a well designed questionnaire can indeed provide a great deal of data for relatively little investment of time. However, see the LTDI article on [advantages and disadvantages](#) of questionnaires to help decide if this is really the best approach. First you will need to ask whether is it realistic to survey the whole population (e.g. all students on a course) or whether you should select a

sample group. If the latter, how will you make sure it is really representative? The LTDI also has an article on [selecting your sample](#).

Next you need to decide what sort of questions will yield the most useful data. **Closed** questions limit responses to a range of predetermined answers, which can readily be converted to a numerical score for analysis. **Open** questions invite respondents to give their own answers, which may be anything from a single word to several lines. You can review these answers for common themes or code them to allow more formal analysis – though this can be a skilled process. A [likert scale](#) is useful for measuring attitudes as it asks respondents to indicate their feelings about a certain issue on a scale (usually from one to five). The LTDI cookbook has an article on [writing good questions](#) for a questionnaire and there is also a useful guide to [types of questions](#) on the Research Methods Knowledge Database. [Survey design](#) covers selection and ordering of questions for both questionnaires and structured interviews (see below).

Finally, questionnaires can be administered on paper, by email or online. You will need to think carefully about the context in which the questionnaire will be received and returned if you want to maximise your response rate. Giving out paper-based questionnaires at the end of the last scheduled class of a module can be a recipe for a low response. Email questionnaires allow for the possibility of follow-up afterwards. For practical advice on design and administration, see the LTDI tutorials on [checklists](#) and [questionnaires](#).

Interviews. As with questionnaires, you begin by clarifying your aims and objectives and identifying your target population. Interviews may be structured, semi-structured or unstructured. **Structured** interviews aim to standardise the questions asked and the order in which they are asked so as to produce comparable data, while **unstructured** interviews allow unanticipated responses to be explored and new issues to emerge. There are of course several shades in between. With action research, you may well decide to carry out unstructured interviews with a range of stakeholders as and when the opportunity arises, but it is still a good idea to script some starter questions beforehand.

Different possible approaches are discussed in the LTDI [interviews](#) tutorial. The LTDI also has some [practical hints for interviewers](#) on recording what was said. The Research Methods Knowledge Database has an extensive page on [conducting interviews](#), which is aimed at large-scale research efforts but has some useful hints for the individual researcher. Email and CMC provide alternative ways of interviewing which can be more practical than face-to-face and have the added advantage of producing their own pre-digitised record for analysis.

Dialogues. Interviews assume a non-equal relationship between the interviewer, who has a specific agenda to investigate, and the interviewee, who is a source of 'data'. Dialogues are a more equal encounter in which it is assumed that both people have things to find out from one another and both have a say in how the encounter is structured. A dialogue can be used both as a source of qualitative data and a means of reaching a shared understanding on a particular issue. Note however that the negotiated nature of dialogue makes it more difficult to find out exactly what you want to know, or to compare responses from more than one person.

Narratives are an important resource in action research. A narrative account may be given verbally or in written form, and you may choose to collect narrative accounts from different stakeholders in your own development project, or find out about another project for the purposes of comparison. A narrative is basically one person's 'story' of what happened and you can use techniques such as diary-keeping, brainstorming, or even fiction-writing to encourage them to reflect more deeply on events.

Focus groups are essentially group-based, unstructured interviews that canvas a range of opinions about the issue under discussion. They are good for generating new hypotheses and evaluating processes or products, and unlike individual interviews they provide an opportunity for a group of people to discuss and reach consensus on an issue. Again, you need to identify a target population from among your stakeholders and decide whether to use mixed groups or to have similar people working together to develop a number of distinct viewpoints. [Focus group interviews in qualitative research](#) is a useful review from the University of Sydney. You should also refer to the LTDI's short tutorial on [focus groups](#) for some practical hints. [Nominal group technique](#) can be a powerful way of collecting data from a range of stakeholders and encouraging them to discuss their different perspectives on the same issue.

Observations. You can arrange for peer review by another teacher or a learning professional (e.g. your mentor or critical friend), or you can ask a member of the ELT team to observe you teaching. Either way the observer will spend time beforehand discussing which aspects of the teaching situation you are interested to have evaluated. This is not a test of your abilities but an opportunity for you to find out what impact your use of learning technology is having in the classroom. Alternatives to peer observation include participant observation - in this case someone involved in the learning situation (yourself, another member of staff or a student) takes notes during or immediately after a learning activity - or the use of a field worker to construct an objective record of events.

Whoever is carrying out the observation, it is a good idea to design a proforma to ensure they get down the information you are interested in (the Observation Form including in the Interactive Documents section offers one example). The LTDI have a useful checklist for carrying out [supplemental observation](#) of students using learning technologies. Other approaches include **video or audio recordings** which can be transcribed or directly analysed after the event. You might want to encourage an observer to take notes of what students are doing, rather than to focus solely on your own input.

Phenomenographic research (sometimes termed ethnographic research) is a more formal approach, involving close observation of individuals in a learning situation. Data can be collected by direct observation, audio and video recording, or by taking field notes and transcribing interviews. This kind of investigation requires a dedicated and experienced observer who can sit in on learning sessions, ask questions *in situ* or conduct interviews over a period of time. It is not possible to collect ethnographic data about more than a few individuals as the data collection process is so intensive. The LTDI has published a useful article on [ethnographic research](#) as part of its Evaluation Cookbook.

Student tracking data. If you are using software with tracking facilities, such as some virtual learning environments, you can gather data on student usage automatically via the system log. Depending on the functionality available, you may be able to collect data on how often and for how long students use a resource, which parts of it are most heavily used, and how individual students perform on embedded assessment tasks. Really 'low level' logging will even monitor key strokes and navigation choices. As with all data, though, you need to be clear how you will interpret this data if you are to achieve any useful findings.

Assessing learning outcomes. One of the most important measures of any learning situation is the learning outcomes for the student, but these are notoriously difficult to measure. One approach is to look at student achievements on assessment tasks, and this can provide statistically useful data. It assumes, however, that the assessment tasks accurately measure those aspects of the learning process in which you are interested. A popular tool when writing and assessing learning outcomes is the [Structure of Observed Learning Outcomes](#) or SOLO

taxonomy, based on the work of Bloom. Using this taxonomy will not only provide useful evaluation measures, it will help to ensure that your assessment and teaching practices encourage deep learning in your students. Data for analysis may also come from student presentations, essays and reports, web pages, contributions to seminars or CMC discussion lists.

If you wish to assess how a specific learning activity or experience influences aspects of students' performance, you might consider [pre- and post-testing](#) before and after the activity.

Student confidence logs. Rather than rely on assessment tasks, which tend to have negative connotations for students, you might prefer to administer self-assessment tests at different points in the course or around a specific learning activity. Confidence logs usually take the form of short statements which students are asked to rate on a likert scale. For example, you might present a series of statements about the course and ask students to indicate how much they agree, from 1 (strongly disagree) to 5 (strongly agree). Or you might list different aspects of course content and ask students to rate their confidence from 1 (not at all confident) to 4 (very confident). Four-point scales avoid over-use of the 'neutral' middle option. See the LTDI tutorial on [confidence logs](#).

Existing documentation: as discussed in previous sessions, course documentation and departmental or faculty records provide important information about your students. It makes no sense to design elaborate surveys to find out something that a query to the admin office could tell you in a matter of hours.

WHEN should I collect data?

Pre and post testing is the administration of the same data collection tool before and after a learning activity takes place. In some cases it may be interesting to apply the assessment tool at a range of times before, during and after a significant activity. Remember that what students take from a learning activity can be very different immediately afterwards and at a later date when they have had a chance to assimilate the information (or alternatively to forget it!). You might find, for example, that the benefits of using a multimedia resource are not evident until you come to test their retention in the end-of-term examination. Some questions may need to be changed to take account of the different times at which they are administered, but on the whole the more similar the evaluation tool the easier it will be to draw meaningful comparisons.

In practice, you are unlikely to hold students' attention for extensive evaluation at different points during a course, and you will not want to sacrifice too much learning time to such activities. Think about when an evaluation activity is likely to be most informative to you, and most acceptable to them. Shortly before the end of a course or module, when students have had time enough to engage with the learning activities but before panic over deadlines has set in, is often an effective window of opportunity.

3. Analysing the data

HOW will I analyse the data?

Having collected the information, you need to ask what it means in the context of your original evaluation issue or research hypothesis. This might be quite straightforward. For example, in the case of student confidence logs and other likert scales, it is a simple matter to find the mean of subject scores and to compare responses on different issues. You will be able to conclude, for example, that students rated the discussion board more highly than the links section in your online learning environment. You still need to be aware of how to interpret this finding. Why did they rate this aspect of the experience more highly? Do such ratings actually translate into effective learning? Triangulating with other data, such as transcripts of online discussion, will help you to add depth to this finding.

More complex data may require statistical analysis, for example to find correlations between different responses or to determine the significance of a particular finding. Computer-based programmes such as Microsoft Excel or the more specialist [SPSS](#) are generally used. A helpful [web site on statistical data analysis](#) is provided by Manchester Metropolitan University, but you are advised to seek help with statistical analysis unless you already have skills in this area.

With qualitative data you have several options. One is simply to use quotations from this data to support points you want to raise, perhaps as a result of more quantitative findings. People often find it easier to understand and relate to evaluation data if they have a feel for the ‘real people’ involved in the process. A second option is to collect responses together according to common themes. This allows you to get a sense of the relative importance of each theme to the participants – by counting responses – but also to develop a deeper understanding of the theme by reviewing the different points of view. Finally, you can undertake more formal data analysis using a manual coding system or a computer-based tool such as [CAQDAS](#) or [NUD*IST](#). Again, previous experience or outside expertise is advised. There is a useful LTDI tutorial on [transcribing](#) (interviews, focus groups and open-ended data from questionnaires).

(4) Drawing conclusions and reporting on findings

WHAT does my evaluation data mean?

To some extent you will already have reflected on this issue with the questions you have asked during data analysis. These might include:

- To what extent does the data validate the hypothesis or answer the question? Is a different hypothesis or question called for?
- Did my intervention make a difference to the student learning experience? What has the impact been? How significant is it?
- Is it possible to assess which aspects of the learning situation were most effective?
- Are there significant differences among different classes of respondent (e.g. between different types of student, or between students and staff)? How significant are they?
- What patterns, if any, emerge from the data?
- Were any problems identified? Do any unexpected issues or findings emerge from the data?

- Is the data inconclusive or contradictory? How can I explain this?
- Is the data of good enough quality (e.g. was there triangulation? is the data representative?) What qualifications do I need to make when presenting my findings?
- What other data would help to explain these findings or to make the situation clearer?

Implications for practice

Returning to your original objectives for the evaluation, you were concerned to find out about a specific aspect of learning and teaching practice, or about a specific learning technology or resource in order to inform practice for the future. It is important now to assess the implications of your evaluation. For example, you may reflect on your own use of learning technologies and decide to make some changes. You may decide that your findings are important enough to share with your colleagues, via a lunchtime seminar or a short case study. Or you may want a wider audience, for example through publication in a journal or presentation at a conference. In this case you must feel confident that what you have to say relates to wider issues in learning and teaching, and/or can be made relevant to practice in different contexts from your own.

Other parts of this web site contain information about dissemination opportunities for evaluation outcomes, case studies and action research reports in learning technologies.

References and resources

All citations of the Research Methods Knowledge base refer to Trochim, William M, *The Research Methods Knowledge Base*, at <http://trochim.human.cornell.edu/kb/index.htm> (version current as of July 11 2003).

All citations of the LTDI Evaluation Cookbook refer to the Learning Technology Dissemination Initiative *Evaluation Cookbook*, online at <http://www.icbl.hw.ac.uk/ltdi/cookbook/contents.html>, copyright the original authors, 1999.