

Handbook for Learning-centred Evaluation of Computer-facilitated Learning Projects in Higher Education

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The University of Melbourne
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and the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE).

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Section 1 INTRODUCTION

This handbook supports a project funded by the Australian Government Committee for University Teaching and Staff Development (CUTSD). The amended project title is “Staff Development in Evaluation of Technology-based Teaching Development Projects: An Action Inquiry Approach”. Full details about, and an ongoing record of the project are at <http://cleo.murdoch.edu.au/projects/cutsd99>.

The project is hosted by Murdoch University on behalf of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE), as a consortium of 11 universities.

The rationale of the project is to guide a group of university staff through the evaluation of a Computer-facilitated Learning (CFL¹) project by a process of action inquiry and mentoring, supported by the practical and theoretical material contained in this handbook. An overview of the process is shown in Fig. 1.1.

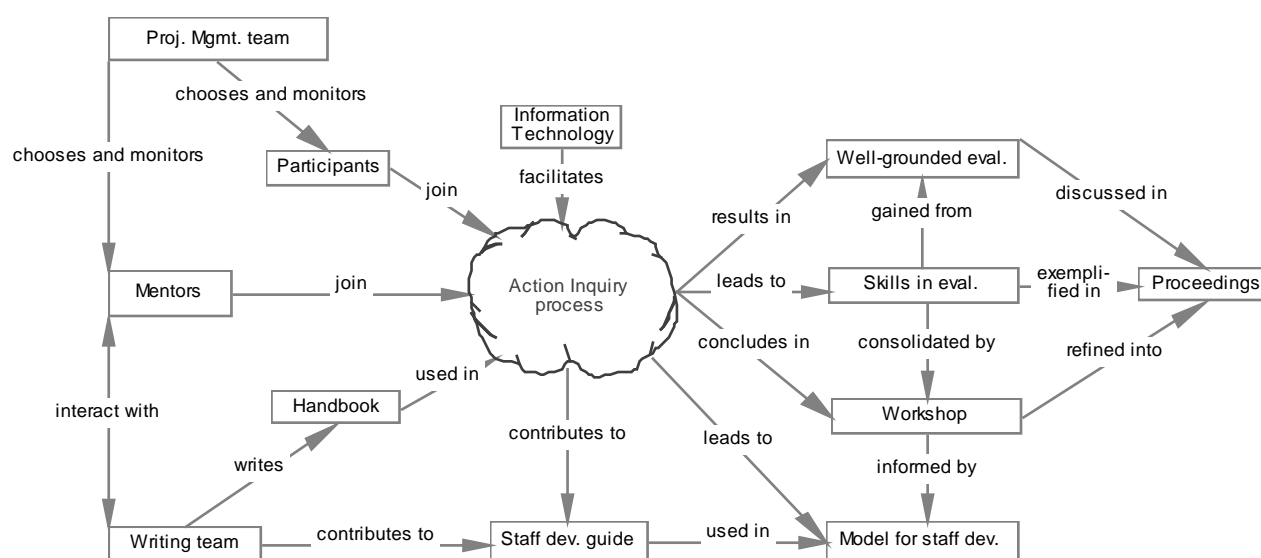


Figure 1.1. Schematic view of the project, showing roles and processes.

Participants will learn to evaluate student learning resulting from the use of their own CFL project, through a process in which they develop an evaluation plan, carry out the evaluation, analyse the data and disseminate the results. Specifically, participants will be expected to:

- Use this evaluation ‘handbook’, with support from their mentor, to develop their evaluation plan.
- Develop evaluation questions with the support of their mentor and other project stakeholders.
- Submit a costed evaluation plan in order to obtain a modest amount of funding.
- Carry out the evaluation study according to the timing requirements of their project (1st or 2nd semester, 2000), supported by their mentor.
- Submit regular reports about the progress of their project.
- Prepare for presentation and engagement at a workshop at the ASCILITE 2000 Conference.
- Collaborate with their mentor in the preparation of a paper for publication.

The set of evaluation studies chosen for this project is given in Table 1.1, together with the mentor assigned to each study, and a summary of the characteristics of the studies. The studies cover an extensive range of disciplines, years of study and study modes. The types of Information Technology (IT) used, and hence the nature of the CFL, vary widely. Some projects consist of one CD-based product, used in one week of semester; while others consist of a range of online resources used from week to week. There is considerable variation between these extremes. Different evaluation approaches will be needed, depending on the nature of the CFL and its educational context.

¹ The term computer-facilitated learning (CFL) is used to describe materials which use information technology in some way to facilitate teaching and learning, including: educational CD-ROMs; online course content materials; and the use of software for computer-mediated communication within a course.

Table 1.1. A list of the evaluation studies forming this project.

State/ University	Mentee	Mentor	Discipline	Year of study	Study mode	IT type
Victoria						
Deakin University	Christine Armatas	Mary Rice	Psychology	Undergrad.	Internal/ external	Mixed
Deakin University	Elizabeth Stacey	Mary Rice	Education	Postgrad.	Internal/ external	Online
Monash University	Ainslie Ellis	Tony Gilding	Computing	1 st year	Internal	CD
Monash University	Kathy Lynch Leighton Morris	Gregor Kennedy	Law	Undergrad.	Internal	CD
RMIT University	Judy Lyons	John Milton	Nursing	Postgrad.	Internal	CD
RMIT University	Lynn Murdoch Anne Douglas	Carmel McNaught	Information Literacy	Postgrad.	Internal/ external	Online
University of Melbourne	Debbie Weaver Peter Harris Lea Delbridge	Tony Gilding	Physiology	2 nd year	Internal	CD
New South Wales						
Charles Sturt University	David Ritchie	John Bain	Health Services	Postgrad.	External	Online
Charles Sturt University	Liz Smith	Carol Bowie	Student Learning	1 st year	External	Online
University of New England	Heiko Daniel Peter Lockwood	Catherine McLoughlin	Agriculture	2 nd year	Internal/ external	CD
University of New England	David Miron Mary O'Sullivan	Catherine McLoughlin	Computing	2 nd year	Internal/ external	Online
University of Wollongong	Jane Innes	Rod Sims	Law	Undergrad.	Internal	Online
University of Sydney	Mary Peat Sue Franklin	Rod Sims	Biology	1 st year	Internal	Online
Queensland						
Griffith University	Carol Bowie	John Bain	Flexible Learning	Postgrad.	Internal/ external	Online
Griffith University	Brendan Bartlett	Carol Bowie	Teacher Ed	1 st year	Internal	Online
James Cook University	Roisin O'Reilly	Robin McTaggart	Marine Biology	3 rd year Postgrad.	Internal	CD
West Aust.						
Murdoch University	Rob Phillips Ralf Cord-Ruwisch	David Tripp	Biotechnology	Undergrad.	Internal	Online
University of Western Aust.	Mike Fardon	David Tripp	Languages	Undergrad.	Internal	Student constructed
South Aust.						
Flinders University	Ingrid Scholten Alison Russell Paul McCormack	Carmel McNaught	Speech Pathology	3 rd year	Internal	CD
Aust. Cap. Terr.						
Australian National University	Tony Diller	Gregor Kennedy	Asian Languages	1 st year	Flexible	Mixed

WHAT IS EVALUATION?

In this handbook we will try to assist readers to understand the nature of evaluation, its complexity, and some strategies which can be used in order to obtain answers to evaluation questions.

As human beings we naturally ask questions about how useful and how valuable our activities are. We can think of evaluation as a process of considerably sharpening this natural activity of checking on our ongoing work. A more formal definition is to think of evaluation as ‘providing information to make decisions about the product or process’.

Evaluation is not equivalent to research, although it employs research techniques as a means of generating the necessary information, and uses similar criteria for the reliability and validity to judge the quality of the evidence. Also, evaluation tends to be broader than research, as it usually requires information about a range of situations, products and processes. However, the main difference between evaluation and research is that evaluation also involves making judgements about the value of what is being evaluated.

Evaluation in an educational setting is the process whereby we seek evidence that the learning experiences we have designed for students are effective. As we will discuss later, we evaluate educational activities for two overlapping reasons:

- to obtain information that can inform the ongoing design and development process (often referred to as formative evaluation);
- to decide whether an innovation is worth retaining (often referred to as summative evaluation). These forms of evaluation often meld together, and each can be difficult to undertake properly.

Indeed, the *Flashlight Evaluation Handbook*², (Ehrmann, 1999b) likens the process of evaluation to the use of a small torch to glimpse what sort of animal might be in front of you in a huge, dark cave. In this metaphor, the cave is the process being investigated, and the torch is the evaluation. The cave is large and complex, and the torch beam is narrow and weak; each evaluative question is equivalent to pointing the torch in a particular direction, to see what is there and what walks into the light.

Clarity is the key to successful evaluation because it determines what kind of a flashlight you use, who holds it and where it is pointed. It is particularly important to be clear about the following issues:

- What are the purposes of the evaluation? Who is the evaluation for? Who should participate and how?
- How can you unpack your own assumptions (about teaching and learning) so that you can check how these affect the evaluation?
- What specific outcomes are you aiming for? What audience/s do you wish the evaluation to reach and inform?

Let us consider each of these in turn, although they are really quite intertwined.

Who is the Evaluation for?

What do we mean by describing an educational experience as effective? From whose point of view is it effective?

The decision about effectiveness might be from several different angles. Evaluation, in general, is the process of finding out how effective or useful some activity is. Obviously the decision about how valuable something is depends on the perspectives and vested interests that various stakeholders have, and final decisions about effectiveness can vary quite markedly.

It is very important to ask who the evaluation is for. There are many stakeholders in the planning of university offerings and a variety of information may be sought. In educational innovations, there are

² A license for the Flashlight Project has been purchased for use by participants in this project. The Flashlight Project contains substantial amounts of relevant information about evaluation, particularly a database of questions.

several stakeholders. In Table 1.2 we have listed a range of possible stakeholders, and some of the interests they might have in an educational activity, whether this is an innovation in the curriculum or the continuation of existing practice. Each participant in an evaluation study in this project should scan Table 1.2 to see which stakeholders, other than teachers and students, need to be considered, and what implications that has for the information you will seek to gather.

Table 1.2. Description of various possible stakeholders in the types of evaluation studies addressed in the handbook.

Stakeholder	Examples of the vested interest of each stakeholder
Teachers	Professional satisfaction. Keeping a job.
Students	Learning something perceived to have value. Getting qualifications that can lead to employment.
Subject and course coordinators	Ensuring that the students' learning meets some quality assurance standards.
Faculty deans	Capacity to provide for increasing numbers of students. Meeting professional standards of the discipline area.
Members of the university's chancellery	Links to the university's strategic mission. Cost-effectiveness, especially in the provision of technology.
Funding body	Assuring that the product is congruent with the grant application.
Employers	A focus on graduate capabilities rather than all the intervening experiences.
Professional accrediting bodies	Standards relating to what skills and knowledge graduates require in particular professions for the 21st century.

Please note that this handbook places student learning at the centre of the evaluation enterprise and we will focus on discussing evaluation questions and strategies from that point of view.

How can you Unpack your own Assumptions about Teaching and Learning?

Evaluation of the educational impact of CFL is a complex field: different evaluators employ different paradigms and hence ask different questions when designing their evaluations. Whenever a measurement or observation is made, the situation being evaluated intrinsically alters (Keeves, 1988). This issue is rarely addressed in conventional evaluation. One must ask the extent to which the outcome of the evaluation was due to the evaluation design selected? In examining evaluation studies, there is a need to describe the context and clarify the educational rationale which has explicitly or implicitly been adopted by the evaluators.

Reeves, (1997) has mapped the dominant paradigms which are used in evaluation studies. He also describes models which researchers use within these paradigms. The paradigms are briefly summarised in Table 1.3, together with a commentary³. It is important that the members of each evaluation study spend time discussing their own paradigms, clarifying their own positions and explicitly looking at the assumptions underlying any models and associated methods they adopt. The role of the mentor is very important in this respect.

The Positivist-Quantitative Paradigm has been used in the majority of articles about evaluation of CFL projects. Surveys of articles in journals and conference proceedings were carried out by Reeves (1993), Alexander & Hedberg (1994) and Reeves (1995). They found that the majority of articles reported the use of experimental approaches, with control and treatment groups and quantitatively measured outcomes. Reeves (1993) and Alexander & Hedberg (1994) identified a range of serious methodological deficiencies in such studies and pointed towards the Constructivist-Interpretive-Qualitative Paradigm (Guba & Lincoln, 1989 and Patton, 1990) as being appropriate for evaluating the complexity of CFL materials.

Such evaluation is conducted in a naturalistic way (avoiding manipulation of the environment) with data produced largely through qualitative methods (sacrificing wide generalisability for richness and better understanding). While these characteristics can be contrasted to the experimental approach (manipulating the environment) with quantitative data collection (everything is measurable), current practice favours the

³ Readers sceptical about the different paradigms presented here are advised to read the original Reeves (1997) paper and refer to its extensive bibliography. Some of the issues presented are too complex for an introductory handbook.

Eclectic-Mixed Methods-Pragmatic Paradigm, involving a mixed approach to data production and analysis, with both qualitative and quantitative information obtained in the evaluation process.

The Constructivist-Interpretive-Qualitative approach requires a paradigm shift for many academics, whose fields of study are implicitly grounded in an objective, experimental view of the world.

Table 1.3. Brief summary of the dominant evaluation paradigms.

Paradigm	Assumptions	Comment
Positivist-Quantitative Paradigm	<ul style="list-style-type: none"> Problems can be defined <i>a priori</i>. The complexity of social situations can be reduced to a string of variables which are clearly operationalised. There is a reliance on controlled experimentation. Events can be explained in terms of cause and effect. There is one 'right' interpretation. 	<p>There can be value in seeking to quantify measures. However, people and the complexity of social interactions cannot be reduced to clearly defined variables, and it often is impossible to produce matched groups of people.</p> <p><i>We would advise participants not to adopt only quantitative strategies.</i></p>
Constructivist-Interpretive-Qualitative Paradigm	<ul style="list-style-type: none"> There is a focus on exploring the dynamics of interactions with the emphasis on the world as a socially constructed reality involving multiple perspectives. The perceptions and values of all the participants in a situation are needed in order to explore the various possible interpretations. 	<p>This paradigm has enriched our understanding of social situations a great deal.</p> <p>The main problem with the qualitative nature of this approach is that it does not necessarily focus on the areas which need change. Descriptions are made, but often without any form of judgment attached. This is at odds with the attempt to find appropriate ways to improve situations, which may be the purpose of the evaluation.</p>
Critical Theory- Postmodern-Paradigm	<ul style="list-style-type: none"> Critical theory aims to transcend the positivism of the traditional approach and the relativism of the interpretive approach by placing the process of critical reflection at the centre of the research process. The focus is on changing the world, not only describing it. The concept of praxis is important; praxis is action which is informed by theoretical ideas and by the process of reflection on existing practice. Theory and reflection feed into the formulation of new practice. 	<p>Action inquiry has strong links to critical theory.</p> <p>In both a Constructivist-Interpretive-Qualitative approach and Critical Theory-Postmodern approach, understanding the dynamics and multiple perspectives of those involved is important.</p> <p>Qualitative strategies are used in both, but the distinction lies in the purpose to which the evaluation will be put.</p>
Eclectic-Mixed Methods-Pragmatic Paradigm	<ul style="list-style-type: none"> This approach is more capable of handling the complexity of modern society and technology. The focus is on practical problems rather than on issues of reality and theories of society. It acknowledges the weakness of current evaluation tools. 	<p>Complex evaluation plans can result.</p> <p>The strength of this approach is the acknowledgment of the current state of the art of evaluation; there are no 'right' approaches and maintaining an open approach is essential.</p> <p><i>We recommend that participants look favourably at this pragmatic way of proceeding.</i></p>

What Specific Outcomes are you Aiming for?

It is important to focus on what is achievable in a project of this short timeframe. Evaluation is an ongoing activity, and we hope that this period of focused evaluation activity will lead to new ways of approaching the design, development, implementation and reflection on all teaching and learning activities. But, in 2000, what do you hope to achieve?

To answer this question, you will need to devise an evaluation plan, considering the scope of the evaluation, the questions you want answered and how you want to report your results. The learner-centred framework for evaluation proposed here, (see §2) will provide guidance in structuring your evaluation plan.

The evaluation plan will vary depending on the nature of your project. Some possibilities might be:

- Evidence of how some specific strategies or materials work with a given group of students. This might well be a subset of a full subject, e.g. just how students use threaded discussions and chat sessions, or how students use a simulation exercise.
- Evidence of how some specific strategies or materials work across diverse groups of students, for example, the process of implementing offshore teaching using existing resources already developed. The use of similar resources with both full-time, young students and part-time, mature age students could also be the focus of the evaluation.
- Evidence of how some specific strategies or materials assist students learn specific concepts or procedures.

Consideration of the nature of your project will help you to determine the scope of your evaluation study. This may result in the creation of a relatively long list of initial questions. The process of planning an evaluation is about the refinement of this list of questions using criteria such as: what is of most interest, what is feasible (in terms of paradigm of inquiry and methodology), what is practically possible, etc.

The *Flashlight Evaluation Handbook* (Ehrmann, 1999b) emphasises the importance of carefully designing the questions you ask:

“The process of laying the foundations for asking a good question is one of the most important and time-consuming aspects of any evaluation. The more you learn about your own perspectives on education, and those of the stakeholders in the evaluation, the more such values you will consider.”

Another relevant quote from Ehrmann (Ehrmann, 1999a) is:

“the quest for useful information about technology begins with an exacting search for the right questions”.

Besides defining the scope of the evaluation study and the evaluation questions, you need to think about how you intend to report your evaluation. We are encouraging participants to undertake a process leading to the writing of a formal paper, but you may wish to choose other appropriate reporting mechanisms. For example:

- The involvement of some students in evaluation might become a negotiated assessment task.
- The strategic value of your work within your own university should be considered. Which university committee might this work be of relevance to?

SOME COMMENTS ABOUT TERMINOLOGY

Before we move onto exploring the learner-centred framework in some detail, a few comments about terminology are important.

Distinction between Assessment and Evaluation

We need to be clear about the difference between assessment and evaluation. We are using evaluation in terms of looking at a broad range of evidence in order to gauge the effectiveness of a computer-facilitated learning project. Assessment is the process whereby teachers set specific tasks related to the learning

outcomes which students undertake to do. Students all undertake formal and informal assessment tasks in the subjects they are studying and so we always have assessment data to use in evaluation. Their success in these tasks provides evidence of how effective their learning has been. But assessment results make up only one set of measures and these need to be considered alongside other pieces of evidence. While all evaluation plans should contain assessment data, that is just one aspect of evaluation.

Bear in mind also that there can be problems with using assessment data in evaluations. These need to be considered carefully. The *Flashlight Evaluation Handbook* (Ehrmann, 1999b) identifies a range of problems in basing evaluations solely on assessment measures, including problems deriving from the assessments themselves and from using them in before and after comparisons:

- Few academics have been trained in the design of effective assessments;
- It is difficult to know if another marker would come to the same conclusion about a student's work;
- Some academics grade 'on the curve' so that one year's results cannot be compared to another's;
- Educational innovations often result in changes in teaching and learning practices and objectives, so that assessment results cannot be reliably compared before and after the innovation.

Distinction between Evaluation and Research

There are similarities between evaluation and evaluation research. The distinction can become rather fine. We argue that evaluation is an integral part of effective teaching. However, evaluation can be formalised to an extent that it becomes research. Indeed, the focus of this project, where we are seeking explicit evaluation plans, is close to research.

The problem with the label 'research' is that a great deal of evaluation research is flawed. Reeves (1993) lists several of these flaws:

- vague specification of primary independent variables;
- lack of linkage to robust theory;
- inadequate literature review;
- inadequate treatment time (conclusions are sometimes made after students use materials for <30 minutes);
- measurement flaws (precise measurement of easy-to-measure variables; more complex variables, which might be the crucial ones, are ignored);
- inconsequential outcome measures;
- small sample sizes;
- obscure statistical analysis.

For research to be rigorous, you need to specify who the stakeholders are, describe the paradigm on which you are basing your evaluation, determine the questions you want to ask, and how you are going to answer them. You will also want to specify the characteristics of the sample of students who will provide evidence to answer your questions.

Your mentor will assist you with these issues. We are asking you to do research which is of value. We are asking you to take a limited task, spend a lot of time thinking about the exercise and try to design an evaluation plan which enables you to get some answers to the questions you are asking, and then have an interesting and useful time actually carrying out the evaluation.

Section 2 A LEARNING-CENTRED FRAMEWORK FOR WHOLE PROJECT EVALUATION

The evaluation framework we have adopted (Alexander & Hedberg, 1994; Bain, 1999) is summarised in Table 2.1. It uses a distinction which is useful provided it is not drawn too strongly; namely between formative and summative evaluation. Evaluation that seeks to improve the project before it is fully implemented is commonly referred to as *formative evaluation*, to draw attention to the emphasis on the formation phases of the project. Evaluation that seeks to determine whether an innovation is worth retaining is often referred to as *summative evaluation*, to emphasise the need to make a judgment about the project's viability once it is up and running. In practice, these distinctions often blur, as we outline in later subsections, and we anticipate that most mini-projects will involve mixtures of both.

An aspect of the framework that is relatively unconventional is that it includes evaluation of the very first steps of project development (analysis and design) as well as of the more obvious phases that unfold as the project is being developed, implemented and incorporated into the fabric of the institution.

Table 2.1. A learning-centred framework for whole project evaluation (adapted from Alexander & Hedberg, (1994); Bain, (1999))

Phase	Focus	Purpose	Relevance to ASCILITE evaluation project
Analysis and Design	Curriculum analysis	To describe the inadequacies/ insufficiencies of the current curriculum, with particular attention to the shortfall in student learning.	Necessary background material to determine the nature of the remaining evaluation and the forms of the evidence.
	Teaching-for-learning analysis	To describe and justify the teaching/ learning/ assessment process likely to bring about the desired learning outcome.	Necessary background material to determine the nature of the remaining evaluation and the forms of the evidence.
	Specification of innovation	To describe and justify the proposed implementation, and indicate how it will facilitate the desired learning process and outcome.	Necessary background material to determine the nature of the remaining evaluation and the forms of the evidence.
Development	Formative monitoring of learning environment	To determine whether the innovation is functional in its context and accessible/ attractive to students (and modify as needed).	It has been assumed that CFL projects to be evaluated have already passed this stage, and that the CFL software is mature and usable.
	Formative monitoring of learning process	To determine whether the innovation is influencing the learning process as intended (and modify as needed).	Very relevant for projects in which the CFL is used regularly by students. Some projects may have already passed this stage.
Implementation	Summative evaluation of learning process	To determine whether the innovation is influencing the learning process as intended.	Very relevant.
	Summative evaluation of learning outcome	To determine whether the learning outcome is as intended.	Very relevant.
	Summative evaluation of innovation appropriateness	To determine whether the innovation is educationally appropriate in its immediate context.	Very relevant.
Institutionalisation	Impact evaluation	To determine the robustness of the learning and its transfer beyond the immediate context of the innovation.	May be relevant in some cases, depending on project.
	Maintenance evaluation	To determine the sustainability of the innovation in the context of the whole course.	May be relevant in some cases, depending on project.

These two quirks aside, an important reason for using the framework, given the focus of this project, is that it places learning at the centre of the evaluation enterprise by seeking evidence that:

- there is a learning need which the innovation is likely to satisfy (analysis and design);
- the teaching/ learning process can be influenced as intended (development/piloting);
- the learning process occurs as intended when the innovation is up and running, and learning outcomes are enhanced accordingly (implementation);
- there are ‘flow-on’ learning and organisational benefits (institutionalisation).

Each phase of the framework is discussed in detail below.

ANALYSIS AND DESIGN

Perhaps the least obvious phase in which evaluation appears to be useful is the analysis and design phase, because this is usually seen as preparation for what is to be developed and evaluated and hence not in need of separate evaluation in its own right. Yet, as a recent meta-analysis of CFL projects has demonstrated (Alexander, 1999; Alexander & McKenzie, 1998), many relatively unconvincing projects lack a clear learning rationale, and result in products for which few if any benefits can be claimed. This problem has led Alexander to conclude (1999):

“A greater emphasis on formative evaluation at the design stage could potentially reduce the wasted time and cost involved in producing these projects which are never likely to realise the intention of improving learning.” (p 181).

In other words, just as the development of the CFL should be enhanced through piloting and associated formative monitoring, so the conceptualisation of the whole project should be subject to the scrutiny of informed peers (focussing on plausibility informed by scholarship), in order that improvements can be made to the design before the project is commenced.

Unfortunately, there will be little opportunity for such a cycle of design improvement in the projects selected for ASCILITE evaluation because, to meet tight deadlines, participating projects must already be well under way. Even so, it is essential that a sound analysis and specification be included in the evaluation report because it provides the foundation for the remaining components of the evaluation.

Three questions need to be answered to the satisfaction of informed peers:

Curriculum Analysis

What was the learning need and why couldn't it be met with existing teaching/ learning arrangements? The curriculum analysis should result in a clear statement of the desired learning outcomes—i.e., the learning objectives.

Teaching-for-learning Analysis

What teaching/ learning/ assessment process is likely to meet the learning need? The teaching-for-learning analysis should be informed by the literature.

Specification of the Innovation

How does the CFL actualise the desired teaching/learning/ assessment process?

If these questions are answered satisfactorily, then the foundations for the remaining evaluation should be in place. That is, knowing what teaching/learning process is needed and how the CFL is supposed to provide it, it should be apparent what to look for as learning is underway, and what kinds of learning outcomes should be evident once the process is well advanced or completed.

Nevertheless, we realise that it is easier to ask such questions than to answer them. This is where the mentors have an important role to perform by probing participants' initial attempts to answer the questions and making suggestions for refinement. A scheme that might assist in sharpening some of the learning assumptions inherent in a project can be found in the article by Reeves and Laffey (Reeves & Laffey, 1999) and in the report by (Hargreaves, 1999). These papers provide bipolar learning and teaching dimensions upon which projects can be rated. It may be useful for the mentor and participants to rate the draft response (to the three questions above) on relevant dimensions, and explore the similarities and differences in their ratings as the basis for improving the draft. Interestingly, Hargreaves shows how it can be informative to compare staff and student ratings on these dimensions, after the project has been implemented.

Some approaches which may be used to resolve the questions raised in the Analysis and Design phase of the evaluation are shown in Fig. 2.2.

*Table 2.2. Obtaining evidence for the **Analysis and Design** phase of the whole project evaluation framework..*

Method and Purpose	Further Information
Documentation <i>To reveal the teacher's or course designer's assumptions and design decisions in structuring the project</i>	Teachers are asked to document and justify the decisions they have made at all stages of the design of their project. This documentation can be similar to the Design Specification of the software engineering discipline.
Nominal group technique <i>To identify key issues to be explored by other evaluation methods</i>	http://www.icbl.hw.ac.uk/lti/cookbook/nominal_group_technique/index.html#endhead
Analysis of Unit Materials <i>To analyse the outcomes, objectives and assessment methods of the unit</i>	http://www.clt.uts.edu.au/eval.html#analy

DEVELOPMENT

Consistent with the monitoring requirements of funding agencies like CAUT and CUTSD, the framework in Table 2.1 assumes that piloting will occur at well planned milestones during the development of the project, and that adjustments will be made to the CFL to optimise its use and functionality (i.e. it is assumed that the development process will be 'guided' towards its objectives, not launched like a 'ballistic' missile on the settings determined by the initial design). Two different sets of questions have to be addressed if formative monitoring is to be effective:

Formative Monitoring of the Learning Environment

Can students use the CFL easily (can they navigate, gain access to materials, perform the requisite tasks, etc) and do they find the CFL attractive, approachable and accessible? We assume this aspect of evaluation has occurred in most cases, and it will be useful to include a brief section in the final report summarising how the monitoring was undertaken and what was unearthed and changed as a consequence.

Formative Monitoring of the Learning Process

Does the manner in which students use the CFL encourage the desired learning process and is there evidence that the learning is occurring? This may not have been examined in all cases (e.g., in online discussions), so there may be scope for improvements using an action inquiry approach (see Section 3).

Note that 'learning process' refers primarily to the **cognitive** processes associated with learning (cognitive strategies, knowledge-building, higher-order thinking, problem-solving, reflection, etc.). However, it is often useful also to take note of the ways in which students make use of the CFL in the learning environment — the **contextual** aspects of the learning process (in pairs, sporadically, self-directed or with tutor support, etc.).

A common misconception has been to assume that monitoring based on the first set of questions (about the learning environment) will also address the second set (about the learning process), but this is not so (Alexander, 1999; Beattie, 1994; Gunn, 1999). Elegant software that has little impact on learning is as common as software that could enhance learning if only students would use it. Obviously, neither of these combinations is optimal. The aim of formative monitoring should be to ensure that the CFL has a sustainable and beneficial impact on learning, subject to verification once the CFL is fully operational.

Various methods are available to obtain evidence on the Development phase, i.e. evaluation of the learning environment and the learning process as the CFL is being developed. Some of the more useful methods are summarised in the Tables 2.3 and 2.4, and further information can be obtained from the web sites listed. Table 2.3 lists approaches which can be used to obtain evidence about formative monitoring of the learning *environment* and the contextual learning processes. Methods relevant to the cognitive learning *process* are listed in Table 2.4.

Table 2.3. Methods of obtaining evidence relevant to the *formative evaluation of both the learning environment and the contextual learning processes*.

Method and Purpose	Further Information
Interviews and questionnaires <i>To obtain student and peer comment on the attractiveness, usability and functionality of the CFL</i>	Interviews: http://www.icbl.hw.ac.uk/ltidi/cookbook/interviews/index.html#endhead Interface Questionnaire: http://mime1.marc.gatech.edu/MM_Tools/UIRF.html Resource Questionnaire: http://www.icbl.hw.ac.uk/ltidi/cookbook/resource_questionnaires/index.html#endhead Checklists: http://www.icbl.hw.ac.uk/ltidi/cookbook/checklists/index.html#endhead
Focus groups⁴ <i>To elicit a range of student reactions to the CFL and interpret and prioritise the difficulties, or to interpret questionnaire responses</i>	http://www.icbl.hw.ac.uk/ltidi/cookbook/focus_groups/index.html#endhead
Observation or video of students using the CFL <i>To obtain a detailed understanding of the ways students use the CFL and the problems they encounter</i>	Observation: http://www.icbl.hw.ac.uk/ltidi/cookbook/supplemental_observation/index.html#endhead http://mime1.marc.gatech.edu/MM_Tools/ARF.html Video: http://www.icbl.hw.ac.uk/ltidi/cookbook/split_screen_video/index.html#endhead
User tracking <i>To obtain a detailed understanding of problems that students experience in using the CFL, based on computer capture of the paths that students follow through the CFL. Requires specialised software</i>	http://www.icbl.hw.ac.uk/ltidi/cookbook/system_log_data/index.html#endhead

Table 2.4. Methods suitable for obtaining evidence relevant to the *formative evaluation of the cognitive learning process*.

Method and Purpose	Further Information
Student ratings of learning confidence <i>To judge how confident students are with CFL content</i>	http://www.icbl.hw.ac.uk/ltidi/cookbook/confidence_logs/index.html#endhead
Video of think aloud <i>To record how students are thinking as they use the CFL</i>	Students are asked to verbalise what they are thinking as they use the CFL. Useful when online thinking is not too demanding, but verbalising can ‘drop out’ under heavy cognitive loads.
Video-stimulated recall <i>To reveal how students are thinking as they use the CFL</i>	Students are shown a video of themselves using the CFL and asked to say what they were thinking and why (best used with the split screen technique so that the CFL and student actions are both visible). Less prone to the ‘drop out’ problem, but reliant on the video to cue memories rather than confabulations.
Teach-back <i>To reveal how a student’s understanding is linked to the CFL</i>	Students are asked to use the CFL to ‘teach’ the interviewer about the material, and in doing so to show how the CFL assisted their understanding. More useful in open-ended ‘constructive’ CFL than in highly structured practice environments, but can be used in the latter.
Discussion archive <i>To examine the nature of student discussion in ‘chat’ environments</i>	Analysis of the interchanges between students in real time and asynchronous discussions, examining the nature of the interaction process and the quality of what is said.
Reflective journals <i>To obtain students’ interpretations of the process of understanding and learning</i>	Students are asked to explain in writing how the CFL may have assisted them to develop their understanding and learning of key ideas, with emphasis upon the understanding and learning processes. Requires careful structuring and exemplification if the journal is to move beyond a fairly low-level description of events and experiences.

⁴ The term focus group is often used interchangeably. Technically, a focus group is a specialised form of a group interview.

IMPLEMENTATION

The transition from development to implementation, although strongly drawn in Table 2.1, is often not so clear in practice, if only because committed academic teachers take every opportunity to fine-tune their teaching and resources with each new cohort of students. In other words, a summative evaluation of one offering of a unit often has formative consequences for the next offering. Nevertheless, there is a shift in emphasis once the CFL is fully incorporated into a subject unit and no longer has ‘experimental’ status. Students perceive it as one of many aspects of the unit and can react quite differently when their achievements are the focus of attention rather than the CFL itself. Also, in these days where unit outlines act as contracts between universities and students, there often is little opportunity to make major changes ‘on the run’ as is possible during pilot work. So, when the CFL is incorporated into the unit, it tends to be relatively stable for the duration of the unit except for bug fixes and other minor improvements (it’s in this sense that the evaluation becomes ‘summative’ rather than ‘formative’ in emphasis). Three sets of questions now need to be answered:

Summative Evaluation of the Learning Process

Now that the CFL is part of the unit and not ‘experimental’, do students use it in the way intended? Does it encourage the desired cognitive learning process and is there evidence that the learning is occurring as the CFL is used? Are there unexpected cognitive benefits deriving from the ways in which the CFL is used (e.g. do students pose questions or connect ideas or create repetitive practice in ways that you didn’t anticipate)? Are contextual processes much as you expected, or not (e.g. are students using the CFL in self-formed groups when it was conceived as a single-user system; are students using the software minimally or erratically when you thought it would be highly engaging)? What is the influence of the contextual processes on students’ cognitive processes?

Summative Evaluation of the Learning Outcome

The questions under this heading shift from a focus on what is happening as the CFL is being used, to its impact on achievement towards the completion of the unit. For example, are improvements apparent in those assessment(s) that are directly based on the targeted learning? Are these improvements consistent with the learning objectives of the project, and can they be linked to the cognitive learning process fostered by the CFL? Have some unintended learning outcomes occurred, such as students forming self-study groups to bypass the poor quality of the CFL? Have other more ‘remote’ aspects of achievement benefited in understandable ways (e.g. curriculum flow-on or improvements in ‘generic’ capabilities)? Has there been a justifiable impact on pass rates or grade distributions in the unit? Are the benefits widespread or limited to some students?

Summative Evaluation of Innovation Appropriateness

Even if the CFL has the learning outcomes originally intended, other questions have to be answered before it can be claimed that the CFL is educationally appropriate in the context of its use. The following questions, although not exhaustive, give some sense of the additional matters to be considered:

Is the CFL integrated into the unit or does it function more as an adjunct, and what are the consequences? Do the learning benefits of the CFL outweigh its educational costs? For example, is the time allocated by students for use of the CFL appropriate given the other demands on their time? Is there evidence that students are trading-off the CFL area of the curriculum against other areas? If some aspect of the unit was displaced to make way for the CFL, is this omission appropriate given the objectives of the unit? Are there other educational cost benefits of the CFL? For example, has it allowed the reallocation of teaching time to other areas of the curriculum or enabled under-prepared students to be admitted to the unit? How have other aspects of the operation of the unit been affected by the presence of the CFL (e.g. impact on tutorials, seminars, exercises, group work, lecture attendance, etc)?

The methods relevant for summative evaluation of the learning process have been covered already in Tables 2.3 and 2.4, and are cross-referenced in Table 2.5. However, in the context of summative evaluation of the learning process, these caveats should be considered:

- Usually students have no difficulty revealing how their knowledge and understanding are changing when the focus is on the CFL, as is the case when it is under development, but they often need reassurance about how the information will be used when, directly or indirectly, their use of the CFL is being assessed. This is a quite proper concern and is often best handled by ensuring that the staff undertaking the marking of the students’ work are not involved in evaluation of the learning process.
- It often is difficult to make use of all the detailed information that process evaluation generates, especially when the individual probing methods are used (e.g. think aloud, stimulated recall and teach-back). In these cases particularly, the sample should be limited to a small, workable number of

students (between 6 and 12 is usually quite sufficient). To ensure that such a sample covers the range of student experience, it can be ‘stratified’ to include strugglers, those who are passing, and those who are doing well. If these distinctions cannot be made on formal grounds, then the students themselves can nominate which category they think they exemplify—most will be willing to do so provided the first caveat is satisfied.

- Finally, it should be remembered that dilatory or inappropriate use of the CFL, and consequent inadequacy in the learning process, may have its origin beyond the CFL itself, and hence students should be asked at appropriate junctures why they are using the CFL as they are and how useful it is for their learning in the unit. For example, why would students diligently use the CFL if the targeted learning appears to be peripheral to the curriculum, or if the learning is not obviously being assessed even if it is ‘core’, or if they are learning quite well without it?

The methods relevant to summative evaluation of learning outcomes are detailed in Table 2.6, and the most useful documentation and methods for summative evaluation of innovation appropriateness are listed in Table 2.7.

Table 2.5. Methods suitable for obtaining evidence for summative evaluation of the learning process.

Method and Purpose	Further Information
User tracking	See Table 2.3
Video + think aloud	See Table 2.4
Video + stimulated recall	See Table 2.4
Teach-back	See Table 2.4
Reflective journals	See Table 2.4

Table 2.6. Methods suitable for obtaining evidence for summative evaluation of learning outcomes.

Method and Purpose	Further Information
Student confidence ratings <i>To determine how confident students are with relevant areas of the unit</i>	http://www.icbl.hw.ac.uk/ltidi/cookbook/confidence_logs/index.html#endhead
Concept maps <i>To reveal how students interrelate and characterise key concepts</i>	http://www.icbl.hw.ac.uk/ltidi/cookbook/concept_maps/index.html#endhead
Clinical interview <i>To reveal how a student thinks about an idea or principle and/or how s/he reasons or solves problems</i>	This method is often used in phenomenographic studies of students’ conceptions of key ideas—see Lybeck, Marton, Stromdahl, & Tullberg (1988) for a detailed example. For general advice on interviewing: http://www.icbl.hw.ac.uk/ltidi/cookbook/interviews/index.html#endhead
Purpose-built assignments, exam questions <i>To determine whether the CFL influences conventional learning outcomes</i>	As noted in Section 1.x, standard assessments and grading procedures often are ill-suited to the evaluation of learning outcomes of new projects. Considerable care must be taken to ensure that the targeted learning is being tapped and graded appropriately—see McNaught, Whithear, & Browning (1999) and Reeves & Laffey (1999) for examples. Also see Biggs (1992) for an alternative way to grade.

INSTITUTIONALISATION

Questions concerned with the institutionalisation of CFL are rarely addressed in published evaluations, no doubt because they are difficult to produce evidence for, and because most projects are organisationally ‘brittle’—there is little uptake outside of the host department and most projects don’t survive the departure of the project champion (Alexander & McKenzie, 1998). Even so, it is hoped that some of the projects participating in the ASCILITE evaluation will be able to address some of the following questions, if only tentatively:

Impact evaluation:

What is the impact of CFL-enhanced learning on other aspects of the course? For example, have cognate units reported flow-on benefits (see (Gunn, 1999) for a positive instance, and (McNaught et al., 1999) for a negative case)? Is it possible to trace some improvements in ‘generic’ capabilities to the influence of the CFL? Have benefits been detected beyond the academy, for example in work placements or postgraduate employment? Are improvements in the grade distributions of the unit reflected in retention, progress and

pass rates for the course? Has the project been reported in the scholarly literature and have there been any scholarly benefits (citations, uptake)?

Maintenance evaluation:

Are the educational benefits of the CFL (within and beyond the unit) sustainable given its maintenance and opportunity costs? For example, does the CFL require specialised computing resources that have limited utility outside the unit? Is the unit being subsidised by other units in the course (or could they also attract similar levels of support)? Are the peak loads on support staff interfering with the needs of other units in ways that cannot be offset? Have there been any flow-back benefits from uptake in other departments or institutions (enhancements, cost-recovery)?

For general advice on the conduct of cost benefit analyses, see:

http://www.icbl.hw.ac.uk/ltidi/cookbook/cost_effectiveness/index.html#endhead

Table 2.7. Methods suitable for obtaining evidence for summative evaluation of innovation appropriateness.

Method/ Documentation and Purpose	Further Information/ Comment
Unit descriptions <i>To record changes in curriculum emphasis</i>	Before and after comparisons of syllabus structures and assessments. Should be compared with students' perceptions of emphases because of potential 'hidden curriculum' effects
Assessment records <i>To look for changes in the patterning of achievement across different areas of the curriculum</i>	It may be difficult to document changes in students' patterns of achievement if the assessments have been changed (from previous offerings of the unit) to optimise the fit with the CFL (see comments in relation to purpose built assessments in Table 2.6 above)
Student interviews <i>To obtain students' experiences of the curriculum, the emphases they adopted, and their reasons for doing so</i>	Individual: http://www.icbl.hw.ac.uk/ltidi/cookbook/interviews/index.html#endhead Group: http://www.icbl.hw.ac.uk/ltidi/cookbook/focus_groups/index.html#endhead
Student questionnaires <i>To obtain evidence on, the emphases adopted by students</i>	General advice on questionnaire construction: http://www.icbl.hw.ac.uk/ltidi/cookbook/questionnaires/index.html#endhead Flashlight Current Student Inventory: http://flashlightonline.wsu.edu/ (password available to project participants)
Peer and student ratings of pedagogical dimensions <i>To localise aspects of the CFL that may not be experienced as intended</i>	Refer to articles by Reeves & Laffey (1999) and (Hargreaves, 1999)
Staff allocation records <i>To note changes in patterns of staff support</i>	Before and after comparisons of staff deployment (quantum and pattern)

Section 3 ACTION INQUIRY

Action Inquiry is an umbrella term for the deliberate use of any kind of a *plan, act, describe, review* cycle for inquiry into action in a field of practice. This is illustrated in Figure 3.1. Reflective practice and action research are two kinds of action inquiry which are specifically aimed at learning about our professional practices with a view to improving them.

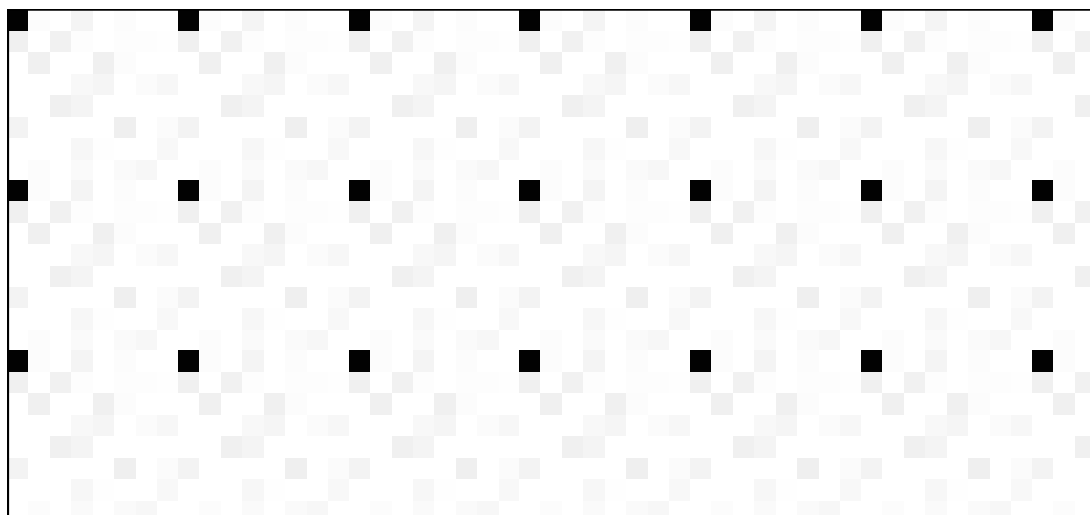


Figure 3.1. The action inquiry cycle.

Many people use terms like action research and action inquiry in a very loose way, often to refer to any process in which they have to think about what they are doing. However, a crucial defining characteristic of all action inquiry is strategic action – action based upon understanding achieved through the rational analysis of deliberately sought information. Strategic action stands in contrast to action which is instant, a result of habit, instinct, opinion, or mere whim.

The idea of deliberately seeking and analysing information is essential to all action inquiry, although the way in which we do this varies in different forms of action inquiry. For example, in *reflective practice*, it may simply be ensuring that we consciously look for certain information while engaging in practice (such as observing how actively students engage in online discussion forums). On the other hand, *action research* involves using a more formal method of data production, such as a needs analysis, or a survey of user satisfaction.

The important point in both cases, however, is that the planning of subsequent action is based upon appropriate and good quality information, and it is deliberative: possibilities are created, analysed, discussed, and chosen in a separate and clearly defined planning stage. Action, monitoring the results, and reflecting on them are also separate and equally clearly-defined stages. That is another defining characteristic of all action inquiry.

WHAT IS REFLECTIVE PRACTICE?

Reflective practice is one kind of action inquiry. Action inquiry is a whole family of different methods which are all similar in that they share the same basic cycle of activities (Fig. 3.1.).

When people first see this cycle, it seems very familiar to them, because they feel it is what they do when they are acting thoughtfully (rather than automatically). However, while thoughtful action may contain elements of planning, acting and reviewing, these are not consciously employed as a cycle. A comparison of the characteristics of thoughtful action and reflective practice is shown in Table 3.1. In short, whilst thoughtful action is not automatic, thinking about what one is doing does not change it into reflective

practice. On the other hand, we do act thoughtfully throughout the reflective practice cycle, so that reflective practice incorporates thoughtful action.

Table 3.1. Comparison of the characteristics of thoughtful action and reflective practice.

Thoughtful Action	Reflective Practice
It is instantaneous — one decides what to do next, thinking about it only for a split second.	It requires one to take time out to reflect. It involves a conscious attempt to plan, describe, and reflect on the process and outcomes of the action.
There is no cycle of clearly defined separate phases. It is an unpredictable sequence because one responds to events in the situation itself.	It is a clear cycle of separate moments in which one engages in completely different activities.
There is no describing moment, because one is engaged in acting.	As reflection occurs after action, one creates an observational record and describes the results of the action.
One is not aiming at an improvement to practice — one is thinking about how best to do what one always does.	The major aim is to produce an improvement to practice.
There is no element of inquiry and one is not deliberately setting out to learn something from the experience.	One designs and uses inquiry strategies to find out more about one's practice.

APPLICATION OF ACTION INQUIRY TO THIS PROJECT

Action inquiry is relevant to this project in a number of ways.

It is hoped that mentees will use an action inquiry cycle in becoming reflective practitioners in the way in which they learn skills in evaluation. This process will be assisted by the guidance of their mentor.

Mentors will also have the opportunity to apply reflective practice to their performance as a mentor, with the assistance of other mentors associated with the project.

Some of the projects to be evaluated will predominantly concern themselves with the development phase of the four phase evaluation model. That is, they will concern themselves with Formative Monitoring of the Learning Process, and, to a lesser extent, with Formative Monitoring of the Learning Environment. For example, some projects will investigate how students engage with an online learning environment, on a week-by-week basis. In such a case, it is wholly appropriate that the project would follow a reflective practice cycle, seeking improvement in practice over the duration of the course.

On the other hand, for some projects, such as the evaluation of the use of a specific CD-ROM in one week of a unit, an action inquiry process is not appropriate within the timeline of this project. One could argue that such a project corresponds to an action inquiry cycle with only *one* cycle, but this is drawing a long bow.

READINGS

The material in this section has been based on work produced for the SCOPE Programme (Self-directed Collegial On-going Personal Professional Effectiveness) (Tripp, 1996).

Other relevant readings on action inquiry are found in:

<http://www.scu.edu.au/schools/gcm/ar/arhome.html>

<http://www2.deakin.edu.au/dcad/ITEvaluation/Paradigms3.asp>

Improving teaching through action research (Kember & Kelly, 1993)

Section 4 PRAGMATIC PROCESSES OF EVALUATION

RESEARCH QUESTIONS

The purpose of research is to generate new knowledge. Knowledge includes both facts, concepts and explanations, and ways of regarding and organising them. Thus, new knowledge can be the production of new facts (*this is related to that in the following way because ...*), and new knowledge can also be the production of new ways of organising facts (*one can organise these things according to this principle in order to ...*). But new knowledge does not simply 'occur' – it has to be produced, and what makes us produce it is our noting a gap in our knowledge. We mark gaps with questions, so behind the pursuit of new knowledge there is always a question.

All research questions are composed of choices from amongst the following options:

What?
When?
Where?
Who?
Whom?
How?
Why?
If?

The evaluation framework proposed here will help to determine the overarching question or questions you want answered. For example, it might be to determine the extent to which midwifery students can recognise and react to complications in childbirth based on the use of a simulator. Once the broad questions have been identified, the analysis and design phase of the evaluation framework will assist you in developing the specific questions you would like answered. Once the questions have been identified, it is necessary to define measures by which data may be obtained to answer your questions, either positively or negatively.

While framing your questions and planning your data production strategy, a range of issues needs to be considered, as shown in Table 4.1. It is important to be able to document and defend a position on each of these issues in order to establish the rigour of your research. Your mentor will be able to assist you with this process.

Table 4.1. Issues for consideration in planning an evaluation.

Where is your answer situated?	Consider whether answering the question involves manipulating the situation or not, and whether the data should be quantitative or qualitative.
What are the phenomena in question?	In planning the evaluation, it is helpful to consider the various factors which influence the situation being evaluated. What is the context? Who are the people? What things are involved? What events? What are the relationships between these? These factors may be cross-referenced among each other through the use of a matrix.
How have you constructed the phenomena in question?	Are the phenomena objects or processes, and are they static or dynamic?
What is your view of the phenomena in question?	Are you on the outside or inside of the process under investigation, and are you looking inward or looking outward?
What are the participant relations in your research?	What is the relationship between the researcher and respondent? How much does each participate in the process, and how much does each react to it?

THE RESEARCH METHODOLOGY⁵

There has been an argument among researchers as to whether the paradigm of inquiry determines the methodology employed. Some, such as Guba and Lincoln (1988), contend that research and evaluation methodologies are determined by the paradigm of inquiry that is adopted, while others, such as Patton (1988), argue that, the paradigm of inquiry adopted does not necessitate a single, inflexible methodological position. Patton's point of view is supported by others (Shulman, 1988; Salomon, 1991), and is reflected in the eclectic, mixed method approach adopted here, which enables the most appropriate evaluative approach to be used for each situation.

A useful approach is to develop an evaluation matrix (Reeves, 1999) to help you consider the most appropriate and feasible data production method for each of the questions identified in your evaluation plan. The set of research questions is tabulated against a selection of possible analysis tools, with the questions on the vertical side of the matrix, and a list of feasible tools on the horizontal side of the matrix. As you consider each question carefully you can choose the most appropriate data production method.

However, decisions have to be made about whether to obtain quantitative or qualitative data to provide evidence for each question. Without going into the issue in detail, it is necessary to consider a major difference between qualitative and quantitative data that helps to determine which kind we need. Because we create data instead of 'collecting' it, the data we create is a function of how we set out to create them, that is, the method. One way into this essential idea is the understanding that what makes quantitative data look so different from qualitative data is simply a matter of selection. Just as a map of scale 1:1 has its limitations, we would not wish to include everything about everything in an evaluation, even if we could. Therefore, we have to include some things and exclude others. The fundamental quantitative/qualitative choice in data creation is determined by the way in which we select the number of different components of how many different cases to observe. In evaluation, the different 'components' of a program tend to be the people, things, events, circumstances (context) and relations. The amount of data we need to produce for each of these is determined by our questions. In a crude, bipolar form, the options are:

- **getting many examples of a few (of 'the same') components from many cases**
(ie. if one wanted to get every example of a phenomenon across a whole population over an extended period of time, one would produce the ultimate single dependent-variable statistical study);
- **getting few examples of many ('different') components from one case**
(ie. if one were to try to get data on every aspect of every component in and about a situation, one would produce the ultimate holistic case study. This would have to be qualitative, as statistics don't work that well on cells where $N=1$, and the sheer number of words necessary would confine it to a single case).

Being more realistic, an example tending towards the first pole might be recording the number of words posted by all tutors to all students during all the online teaching across the whole of a university system. A study tending towards the other pole would be an analysis of the content, reading and cognitive levels, style and tone, pedagogic processes, typographical errors, logical sequencing, phatic interaction, etc. of all words posted by a particular tutor to a particular student during an online university unit. What data we choose to get on which components of a situation is, of course, our construction, because our choice will be determined by what it is we want to know.

Further information will be added to this section based on mentee needs and mentor feedback.

⁵ The authors are indebted to Gregor Kennedy for his contribution to the development of this section.

Section 5 PROJECT PROCESSES

ORGANISATION

This project is managed by a project management team, coordinated from Murdoch University's Teaching and Learning Centre. It consists of:

Murdoch University	Rob Phillips Rick Cummings Jennie Bickmore-Brand Christine Bailey (coordination)
University of Wollongong	Helen Carter (vice-president, ASCILITE)
Queensland University of Technology	Jenn Winn (ASCILITE executive member)

This handbook has been put together by the Writing Team:

Murdoch University	Rob Phillips David Tripp
RMIT University	Carmel McNaught
Griffith University	John Bain
Deakin University	Mary Rice

MENTORS' RESPONSIBILITIES

Mentors have a range of responsibilities which they are expected to carry out in the project:

- Provide formative feedback on the evaluation handbook.
- Support participants in the action inquiry process:
 - Assist participants to understand the evaluation handbook.
 - Assist participants in examining their own paradigms about how to carry out an evaluation study.
 - Assist participants to develop their evaluation plan.
 - Assist participants to carry out the evaluation study.
 - Assist participants to analyse their data.
 - Assist participants in preparation of draft papers and presentations for ASCILITE 2000 Conference workshop.
- Collaborate with participants in the preparation of papers for publication.
- Assist in development of the staff development guide at the end of the project.

There are some potentially rewarding research spin-offs from participation as a mentor. There is also an honorarium of approximately \$4000 available to each mentor (\$2000 for those with only one mentee).

PARTICIPANTS' RESPONSIBILITIES

Participants (mentees) also have a range of responsibilities which they are expected to carry out in the project:

- Use this evaluation handbook, with support from their mentor, to develop an evaluation plan.
- Develop evaluation questions with the support of their mentor and other project stakeholders.
- Submit a costed evaluation plan in order to obtain funding.
- Carry out the evaluation study according to the timing requirements of their project (1st or 2nd semester, 2000), supported by their mentor.
- Submit regular reports about the progress of their project.
- Prepare for presentation and engagement at a workshop at the ASCILITE 2000 Conference.
- Collaborate with their mentor in the preparation of a paper for publication.

There are potentially rewarding research spin-offs to mentees from participation in this project.

Approximately \$2000 is available to support the implementation of the approved evaluation plan for each project. At an appropriate time, mentees will submit a budget for activities such as assistance in data production and in transcription of interviews. The funding is intended to act as an incentive to participate,

as it is expected that participants will carry out most of the activities associated with the evaluation themselves, with mentor supervision. For instance, while there will be no funding for assistance with analysis, the money may be used for relief from other duties.

ANTICIPATED OUTCOMES

The tangible outcomes of this project, consisting of four participant outcomes and two products, are shown below.

At the conclusion of this project, participants will have:

- gained transferable skills in conducting meaningful evaluation of CFL projects using high standards of practice;
- conducted a well-grounded evaluation of a CFL development project from the viewpoint of student learning outcomes;
- experienced the action inquiry process;
- published a scholarly paper on the results of the evaluation study.

The project will also result in deliverable products:

- a staff development guide which contains theoretical and practical aspects of evaluation in the form of a handbook; and process aspects of the evaluation derived from the action inquiry process;
- a volume of scholarly papers which details the results of the evaluation studies carried out as part of this project.

There are also broader benefits to the whole higher education sector, and to CUTSD in particular:

- the project will improve perceptions of the worth of the scholarship of teaching and learning;
- inter-institutional and inter-disciplinary collaboration and knowledge sharing will be fostered;
- an internet community of learners can serve as a model for future projects;
- the project will address wide-spread deficiencies in evaluation of CFL projects;
- the project potentially enables the achievement of improved student learning outcomes.

EVALUATION OF PROJECT OUTCOMES

Evaluation is one of the key aspects of the action inquiry approach, being used to inform further action at each stage of the cycle. The effectiveness of the project will be determined using the following methods at appropriate stages during the project.

- To evaluate whether participants have gained transferable skills in evaluation of CFL projects, they will be asked to describe their practice at the beginning and end of the project. Analysis of the differences will indicate the extent to which participants have developed new skills.
- The quality of participants' evaluation practices in respect to student learning outcomes will be gauged by analysis of reports from participants about the impact of CFL on student learning.
- To evaluate the usefulness of the action research process, participants will keep a journal which records their actions and reflections on that action. Analysis of journals will indicate the effectiveness of the action research process. Mentors and participants will be required to submit regular progress reports in an attempt to ensure the success of each evaluation project.
- Acceptance for publication of papers will provide evidence of the quality of participants' work.
- The staff development guide will be refined by feedback from mentors, outcomes from the action inquiry process and input from staff development experts.

Summative evaluation of the project will involve interviews with all participants and mentors. Further feedback will be sought from a colleague of each participant to provide objective evidence of new ways of practising evaluation. Additionally, independent observers will be asked to provide written feedback on the participants' workshops.

EVALUATION RESOURCES AND SUPPORT

Mentors and participants in the project will have access to both the Evaluation Cookbook produced by the U.K. based Learning Technology Dissemination Initiative, and the Flashlight Program, produced by the U.S. based Teaching and Learning Technology Program.

Evaluation Cookbook

The Learning Technology Dissemination Initiative at Heriot-Watt University, Edinburgh, has published a resource called the Evaluation Cookbook. As described on the website <http://www.icbl.hw.ac.uk/ltidi/cookbook/contents.html>, it is a practical guide to evaluation methods and includes:

- "recipes" for different evaluation methods;
- useful information drawing on the expertise of a range of practising evaluators;
- a framework for planning and preparing your evaluation;
- guidelines for reporting and acting on the results;
- short exemplars of evaluation studies using some of the methods described".

A printed version is supplied with this handbook, and frequent reference is made to the 'recipes' described therein.

Flashlight

As one of the Annenberg/CPB Projects, the Flashlight Program offers a comprehensive approach to the evaluation of technology-based projects. The website (http://www.tltgroup.org/programs/ftools.html#Flashlight_Online) provides links to the Current Student Inventory (CSI) which consists of an Evaluation Handbook and a well-tested bank of items for use in surveys and interviews. A license has been purchased for project participants and mentors to access the Flashlight materials. The comprehensive collection of questions may be particularly useful in designing an evaluation plan.

More useful evaluation resources are described in Appendix 1.

COLLABORATIVE SUPPORT

The ASCILITE Virtual Conferencing System (VCS) will be used for electronic communication within the ASCILITE CUTSD project. There are several dedicated 'streams' allocated to project members:

CUTSD-writers	For the writing team to share information and resources
CUTSD-mentors	For mentors to share information and resources
CUTSD-participants	For progress reporting and associated discussion about individual projects

Each VCS stream has three associated functions.

Messaging system

Messages are sent to the ASCILITE web server, and are stored there as a permanent record. Messages can optionally be sent on to all the members of this stream as emails.

Resources

Project documents can be uploaded to the central resources area, so they are stored centrally in case anyone loses theirs.

Chat

A synchronous chat facility is available for online meetings of mentors and mentees, for example.

Using the VCS

To use the VCS from a web browser, go to the ASCILITE web site (<http://www.ascilite.org.au>) and in the Members' Services section, login using your first initial, last name (eg rphillips) and 'ascilite' (no quotes) as the password.

There are several functions available on the main screen. However, it is recommended that you only use two:

Discussion	Shows a list of discussion streams that you are subscribed to in your profile (which you can edit in the 'people' section). This also allows access to the resources and chat associated with each stream.
People	Search for a member, edit your profile to add yourself to other streams, change your password, etc.

To look at, or add to, the CUTSD-participants discussion, click on Discussion, and choose the CUTSD-participants forum.

To look at, or add to, the CUTSD-participants resources, click on Discussion, and look for the CUTSD-participants forum. Then click on the Resources link.

ACTIVITIES AND DEADLINES

Period	Activity	Monitoring/ Evaluation
Mar-Oct 00	Participants study handbook with support from mentor, developing their evaluation plan. Participants carry out the evaluation study according to the timing requirements of their project (1st or 2nd semester), supported by their mentor.	Regular progress reports. Documentation of study. Reflective journals. Coordination by Project Management team.
Nov 00	Draft papers are written and presentations prepared for ASCILITE Conference workshop.	Production of papers/ attendance at workshop. Coordination by Project Management team.
Dec 00	Evaluation studies presented and critiqued at ASCILITE 2000 Conference workshop. Reflection on action inquiry process.	Reflective journals. Outcomes of workshop feeding into staff development guide process.
Dec 00	Mentors develop outline of staff development guide.	Progress reports.
Jan-Apr 01	Refinement of papers.	Progress reports.
Jan-Apr 01	Staff development guide (including revised handbook) produced.	Production of staff development guide.
Apr-May 01	Workshop proceedings edited and published.	Peer review of proceedings. Publication of proceedings.
June 01	Final project report written.	

APPENDIX 1. SUPPORT/EXTENSION MATERIAL

Support material and references relating to evaluation of educational technology are burgeoning. It is clearly beyond the scope of this handbook to provide a comprehensive list. However, you may find some of the following online resources helpful.

EVALUATION MODELS, PARADIGMS AND PRINCIPLES

There are a number of ways of conceptualising aspects of evaluation, some of which are presented on the following websites.

<http://coe.sdsu.edu/eet/Admin/TOC/start.htm>

The online Encyclopedia of Educational Technology contains an outline of Kirkpatrick's (Kirkpatrick, 1994) four levels of evaluation: reactions, learning, transfer and results. Text and graphics are used to present the concepts in an accessible and appealing way.

<http://itech1.coe.uga.edu/TEvaluation/models.html>

Detailed descriptions of various evaluation models are provided on this University of Georgia website.

Objectives-Based Evaluation Model

Experimental Evaluation Model

Qualitative Evaluation Model

Connoisseurship Evaluation Model

Responsive Evaluation Model

Multiple Methods Evaluation Model

<http://www2.deakin.edu.au/dcad/TEvaluation/Paradigms2.asp>

One of the seminal texts on the nature and evolution of evaluation practice is *Fourth Generation Evaluation* by (Guba & Lincoln, 1989). The four generations of evaluation articulated by them are briefly summarised on this website. Two other useful paradigms for evaluation practice, action research and clinical supervision, are also summarised here.

<http://www.cstudies.ubc.ca/facdev/services/senate.html>

The Centre for Teaching and Academic Growth at the University of British Columbia provides a website with the following general information.

- Suggested Principles and Guidelines for the Peer Review of Teaching
- Common Questions on Student Evaluation of Teaching Forms
- Effective Teaching Principles and Practices
- Responding to Information from Evaluations of Teaching

EVALUATION TOOLS

http://mime1.marc.gatech.edu/MM_Tools/evaluation.html

Georgia Tech Research Institute has provided a website that contains a number of evaluation tools suitable for use at various stages of a project. The following templates are available for gathering both quantitative and qualitative data:

Evaluation Matrix	Anecdotal Record Form
Expert Review Checklist	Focus Group Protocol
Formative Review Log	Implementation Log
Interview Protocol	Questionnaire
User Interface Rating Form	

<http://www.monash.edu.au/informatics/TechME/evaluati.htm#Evaluation%20>

An overview of evaluation is presented on this website. Formative and summative evaluation methods are briefly described and links are provided to a number of evaluation tools. While it relates specifically to medical education, a number of aspects are applicable to other discipline areas.

<http://iet.open.ac.uk/plum/evaluation/plum.html>

This website, produced by the Institute for Educational Technology at the Open University, UK, provides information about different types of evaluation findings, formative and summative evaluation processes and data collection methods. A number of pro-forma documents are available to help facilitate recording of evaluation data.

<http://www.clt.uts.edu.au/contentssfs.html>

The Centre for Learning and Teaching at UTS has produced an evaluation guide for their teaching staff. It offers a comprehensive approach to evaluation and contains information about data collection processes. Proformas are provided for several of the techniques described. A questionnaire item bank is also a useful feature.

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