Online Tutoring e-Book

Editor Carol Higgison

Chapter 5
Evaluation

Dr Jen Harvey, Dublin Institute of Technology, Eire

Carol Higgison, Heriot-Watt University, UK

Dr Cathy Gunn, University of Auckland, New Zealand

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Contact information

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Preface

It is essential that we understand how online environments can support and enhance learning if we are to use them effectively. Evaluation is the key to achieving this understanding and to developing a better understanding of factors that influence and affect the embedding process if we are to integrate these new learning technologies into the educational process.

The OTiS e-Workshop[1] established a community of online practitioners including academics, faculty, lecturers, instructors, staff developers, facilitators and trainers from education and business who shared their experiences of evaluation.

Through the e-workshop case studies and online discussions we attempted to clarify appropriate methodologies and methods for evaluating online learning and tutoring. This chapter is a synthesis of these discussions.

The co-authors of this chapter - Dr Jen Harvey from the Dublin Institute of Technology, Eire and Dr Cathy Gunn from the University of Auckland, New Zealand - are former colleagues at Heriot-Watt University. Both are involved in staff development and have written extensively about the evaluation of learning technologies.

The success of the e-workshop was due to the interest and enthusiasm of the participants and their generosity and willingness to share their experiences and expertise. My sincere thanks to all the participants and, in particular, Jen Harvey and Cathy Gunn, colleagues and friends who gave freely of their expertise and time.

Carol Higgison
(editor)

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[1] The OTiS International e-Workshop on Developing Online Tutoring Skills was held between 8–12 May 2000. It was organised by Heriot–Watt University, Edinburgh and The Robert Gordon University, Aberdeen, UK.

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5 Evaluation

Jen Harvey, Carol Higgison, Cathy Gunn

1 Introduction

Interest in educational evaluation has increased over the last few years. Nationally and internationally government policies have promoted the embedding of learning technologies in education and considerable amounts of money have been invested with patchy results (Dearing, 1997). Investing in learning technology is expensive and users are looking for ways to develop a better understanding of factors which influence and affect this embedding process (for example the UK Technology in Teaching and Learning Programme phase 3 http://www.ncteam.ac.uk/projects/tltp/index.htm and the European Union Socrates programme http://europa.eu.int/comm/education/socrates.html). Evaluation is seen as the key to this understanding (Oliver and Harvey, 2000).

However, despite this increasing interest in evaluation, there is often little variation in the methodologies we use in the evaluation process, particularly when evaluating new learning technologies. Frequently, an evaluation comprises an end of module questionnaire devised with little thought as to content or the purpose of collecting this information. This limited approach can result from time or resource constraints, perhaps a lack of experience or just insufficient design of an appropriate evaluation strategy in advance. A last minute feel good questionnaire can be very comforting in providing us with positive feedback but does not help us to make improvements or find out how we might help our students in the learning process.

This chapter draws on the experiences of the e-workshop participants and on published literature to present a clearer understanding of the role and methods of evaluation in online learning and teaching.

References given without dates are references to OTiS e-workshop case study contributions. Details are given in Appendix A.

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2 What is Evaluation?

Evaluation is the process through which we examine the learning opportunities and experiences we offer our students and make judgements about their effectiveness and value. In the context of learning technology "these judgements usually concern the educational value of innovation, or the pragmatics of introducing novel teaching techniques and resources. Less frequent, but still important, are judgements about the costs of such innovations" (Oliver, 2000). Oliver (*ibid*) defines learning technology as "the use of technology to support innovations in learning and teaching" which includes online learning and tutoring.

Evaluation can provide a range of different and useful information to assist in future course design, planning and implementation. This can include:

- measuring achievement of a course against specific learning outcomes,
- identifying any problems which occur in the development or running of a course with the aim of providing solutions,
- carrying out a needs analysis to justify a decision to invest in additional resources,
- selecting new resources and improving the way in which they are used within a course,
- exploring the materials or course to identify issues relating to the context in which they are used,
- establishing whether materials have met specific quality assurance criteria.

Evaluation can be carried out at different times, for different audiences and for different purposes, including:

- formative evaluation,
- summative evaluation,
- interpretive or illuminative evaluation (Partlett and Hamilton, 1972),
- integrative evaluation (Draper *et al*, 1996).

2.1 Formative and summative evaluation

Formative and summative evaluations are differentiated both by their timing and purpose:

> "When a cook tastes the soup, it is formative evaluation; when the dinner guest tastes the soup, it is summative evaluation." (Harvey, 1998)

Laurillard (1993) offers working definitions for formative and summative evaluation:

- **formative evaluation** describes the evaluation of course materials or learning environments with the objective of providing information for improvement during the design and implementation phases,
- **summative evaluation** describes the evaluation of course materials or learning environments with the objective of providing information on the outcomes of implementation and use by students.

The OTiS case studies provide examples of both formative and summative evaluation:

- **formative evaluation**

  "An independent evaluation team undertook constant formative evaluation, which was fed back to tutors, facilitators, the course co-ordinator and the course team. This allowed fine-tuning of the course delivery and prompt identification of key issues and problems." (Higgison)

  "One of the greatest enablers of success was a willingness to make changes during the course process, based on the feedback from the participants." (McKenzie)

  "I regularly request input from students on how the course is working for them and use their feedback to help shape the course as the semester progresses." (Hird)

- **summative evaluation**

  "Student pass rates remained stable and high, although the first running of the module revealed dissatisfaction with modes of delivery, which were due mainly to difficulties with support systems and frequent hardware computer crashes and delivery problems… Some students in the first running of the module expressed discomfort with the module's dependence on virtual tutorials, and suggested the possibility of building in the occasional real tutorial to help them feel more at ease with disparities in asynchronous and synchronous learning methods. The second running of the module addressed these issues, and surveys undertaken after module delivery suggested general satisfaction with the combination offered." (Finkelstein)

  "A Final Report was written 'Discover VET in Schools, LearnScope Project 1999' … which provides an in-depth evaluation of the process from the participants' and tutors' perspectives." (Murray)

The distinction between formative and summative studies is useful in some cases. However, it may be more appropriate to treat evaluation as a continuous process (Gunn, 1999) with a shifting focus appropriate to the phase of design, development or implementation reached as, for example, described by Salmon:

> "We … put in a 'point of learning' conference at each of the five stages, where trainees are deliberately asked to reflect on their experience of the programme to date. In addition, we monitored the work of the trainees after they commenced facilitation online with their students. This has enabled the training programme to be updated and improved week on week and over four years." (Salmon)

2.2 Illuminative evaluation

'Illuminative evaluation' is an observational approach to evaluation that is inspired by ethnographic research and methods (Parlett and Hamilton, 1972). Its aim is to discover the factors and issues that are important to the participants in a particular situation rather than how well an innovation performs against standard measures of evaluation. It attempts to explain new learning practice in terms of theories and beliefs about the learning of knowledge, skills and attitudes (ELICT, 2000).

An illuminative approach to evaluation allows us to report on factors important in a particular context and to identify unexpected factors or outcomes. Several OTiS case studies reported the use of methods which support the process of illuminative evaluation by encouraging participants to reflect on their experiences through journals (eg White and Moussou) and reflective logs (eg Cowan). Nurmela describes how participants were encouraged to self-evaluate and develop personal study plans to focus on their concerns and perceptions rather than those of the tutor:

> "We use personal study plans and self-evaluations in many of our courses ... I think it is most useful to focus the evaluation more to something the student is doing themselves and not just the tutor/teacher outside the student. . . . self-evaluation is intended to focus on the content itself, tutoring and learning online (practices and principles). Questions participants considered included: how has their attitude towards learning and tutoring online been changing during the course and what new practices they have discovered." (Nurmela)

Ewing, in *e-learning is not always easy learning*, describes how factors and issues identified by students as important are made available to the next year's cohort:

> "Student comments on how to overcome this unhelpful perception have been video-recorded for use with the following year's cohort." (Ewing)

2.3 Integrative evaluation

Integrative evaluation aims to improve teaching and learning by integrating innovative materials and techniques into the overall situation more effectively, "'to discover how an education intervention performs' by observing and measuring the teaching and learning process" (Draper *et al*, 1996). This approach to evaluation is discussed in Section 3.2.1.

2.4 Evaluation and assessment

It is important at this point to stress the distinction between assessment and evaluation. Although assessment data is one of the inputs to evaluation, the purposes are rather different, as noted by Phillips et al (2000):

> "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."

Indeed, planning for the inclusion of course assessment as a method of evaluation data collection keeps quality issues clearly in focus and puts fewer demands on students than other methods that yield them no personal gain.

Assessment can be the focus of the evaluation, for example it is useful to verify that the assessment process is consistent across the course:

> "Although double marking of assignments was not used, on several occasions the tutors inadvertently marked the same assignment (discovered before the sending of the mark to the student) and it was noted they were within a few points of each other and with consistent comments, each time." (Janes)

And assessment can be used as a measure of the educational impact of a new innovation by comparing the results of assessments across years or comparing results with a similar group:

> "Course marks for the module were also compared with course marks for other modules in the Masters programme." (Clarke)

3 A Theoretical Framework for Evaluation

This section provides an overview of the evolution of the theoretical perspectives (Section 3.1) that have influenced the development of contemporary evaluation methodologies (Section 3.2) and in particular those methodologies used to evaluate the deployment of learning technologies in the educational process. The section concludes with some recommendations and guidance on key questions and an overview of evaluation methods (Section 3.3).

3.1 Evolution of evaluation methodologies

Educational research literature records a fundamental shift over the last fifty years in evaluation methodologies from quantitative experimental approaches to a predominance of qualitative methods. Many current evaluations adopt a hybrid approach that combines qualitative and quantitative methods that support the shift towards evaluation of authentic learning experiences in their natural context. This has resulted in a shift from evaluation as an external process to a more collaborative process between evaluator and practitioner aimed at building a mutual understanding of what is occurring.

3.1.1 Quantitative and qualitative approaches

Quantitative evaluation focuses on measurement, is externally directed and value-free. Examples of preferred indicators include student pass rates, student retention and student progression, for example:

> "Eighty percent of enrolments still active online at the end of the course; sixty percent of enrolments submit a portfolio and achieve accreditation. For the period 1998–1999, we have consistently exceeded the targets." (Pickering and Duggleby)
>
> “Initial reaction to this method of delivery was negative due to the complex nature of the WebCT version used at this time. This complex method of delivery resulted in a thirty per cent drop out rate…” (McFarlane)
>
> “The completion rate from this course is ninety percent and eighty-six percent of students surveyed stated that they would recommend our course to friends. A significant number of students wish to continue their studies with us by distance learning to MSc level.” (Kennedy and Duffy)

Qualitative evaluation focuses on the educational process, is directed by the user and takes account of values. Preferred indicators include student comments and evidence for reasons for change, for example:

> "We used an extended form of Stop/Start/Continue enquiry, asking our students to tell us what they wanted us to stop doing – and why? What they would like us to start doing, which we were not then doing – and why they thought that could be useful to them. And what they wanted us to continue doing, with an explanation of the ways in which that was helpful to them. We stressed that the reasons were the important part of this feedback, and that we might come back for clarification of anything we did not understand. We undertook to modify our commenting accordingly." (Cowan)
>
> “The evaluation revealed that although the emphasis on collaborative learning did not suit all students, they appreciated the integration of activities with assessment, because it guaranteed the involvement of all students.” (Macdonald)

Essentially qualitative and quantitative approaches to evaluation complement each other with qualitative techniques being well suited to exploring, identifying and explaining and quantitative techniques to demonstrating, measuring and generalising (Oliver, 1997).

3.1.2 Early experimental approaches to evaluation

The early days of computer supported learning evaluation in the 1960s and 70s followed the traditions of educational research that were prevalent at that point in time. Until the 1960s, the majority of evaluation studies were conducted in contrived and ostensibly controlled environments. As such, evaluations were mainly concerned with quantitative experimental studies designed to measure effects and to make comparisons between different educational approaches and materials. This approach was based on the assumption that learning is an objective phenomenon. It required large study populations so that results could be generalised, isolation of the effects of one resource or intervention and balancing of all other variable factors so their effects could be discounted. The basis of this approach is in the physical sciences and early studies highlighted serious limitations as a means to evaluate human behaviour in learning situations (Laurillard, 1978). Studies produced adequate evidence of the outcomes that occurred but gave little insight into the causal factors or the process through which they were achieved so were of little use in planning and design. The majority of evaluations reported in the OTiS case studies look beyond the quantitative data for reasons to explain the figures:

> "Progression rates through the programme are higher than the client has seen in previous attempts at this sort of training. We believe that the drop out rate in terms of distance learning is relatively low due to the high level of interpersonal support that was provided….
>
> "Student focus groups and evaluations suggest a changing degree of acceptance of the technology, and participation rates give an indication that the online collaborative process improves gradually over the course of the programme." (MacKenzie)

3.1.3 Evolution of contextual approaches to evaluation

The beginnings of a contemporary preference for authentic settings with real target users and an evaluative approach coincides with the early days of computer assisted learning – before the advent of the Internet. It was gradually accepted that a more holistic approach was needed to support examination of the range of influential factors including individual and situational ones.

> "Additional issues relating more directly to the online medium include the way in which web resources are integrated with discussions, their personal experience of the discussions, and the tutor's management of these. Support issues also become much more significant in this situation, and the students are asked to evaluate technical, pedagogical and information (library) support structures, all of which are provided at a distance." (Creanor-D, 9 May 2000)

There were also many practical and pragmatic reasons for this shift. Setting up large experimental studies was resource intensive and although they could identify what was happening they could not really explain why or how.

> "We use statistical analysis of results, comparing the results gained by students undertaking exactly the same modules, and undertaking exactly the same assignments, by distance learning and by classroom based learning." (Kennedy and Duffy)

Although not set in a 'laboratory' using this performance indicator in isolation, it would be difficult for Kennedy and Duffy to attribute the cause of any differences in performance between the two groups to online learning. In their case study they discuss other potential causes, for example differences in student population, particularly nationality, the local context and motivational factors.

The increasing use of computers, initially to deliver programmed instruction and later multimedia, computer mediated communication and online interaction and the corresponding increase in the investment in innovative teaching methods, demands a more fine-grained approach to evaluation. The need to define and achieve effectiveness is increasing as academic institutions strive to make informed choices about course presentation and to maintain their position in a competitive global market. Also, where face-to-face contact between teachers and learners may be minimal or non-existent (as in Kennedy and Duffy) then conducting experimental studies in these situations is both impractical and impossible.

3.1.4 Evaluation and online learning

Online learning has essentially grown out of recent educational theory and practice with the addition of new tools and methods (see Chapter 1: *Learning Online* (Cornelius, 2001)). It would be reasonable to expect that evaluation has evolved in a similar way. In some respects this is true, however, the most common form of evaluation of courses and teaching relies rather heavily on one source of data – the 'student questionnaire'. Conducted once at the end of each module or course, it has been suggested that this method is to evaluation what exams are to assessment of learning, namely convenient, simple to administer and easily reduced to comparable outcomes but largely inadequate as a means of measuring effectiveness and identifying influencing factors for success. Recent research suggests that even the most useful of these instruments are not geared to evaluation of online teaching and learning. This concern was raised during the e-workshop.

> "One concern that I have is the fit between the departmental course evaluation form students complete in all their courses and the online course… there may be a need to develop an evaluation form specific to online courses. One recommendation that I would have for anyone involved in new online course design is to make provisions for evaluation above and beyond that which is provided by the department or institution. What I have learned is that there are critical questions specific to online learning that need to be asked ... Student feedback relating to the amount of time spent on the course, the level of technical support needed, and the effectiveness of each online assignment is needed to improve the course … Another issue that is essential to explore is the extent to which online learning options affect the student's choice of institution." (Hird)

There are however, many other contemporary approaches to evaluation that are more suitable for evaluating online teaching and learning. New environments and new methods of teaching can be well served by re-purposing established evaluation practice (Section 3.2 and 3.3).

3.1.5 Further reading on the theory

Evaluation of learning and teaching which incorporates the use of learning technologies is complex and our approach will depend on our underlying assumptions about learning and teaching. If you wish to explore the theoretical underpinnings of evaluation methodologies the following readings provide a useful starting point.

For a historical overview of the parallel developments in technology and evaluation methods, see *Isolation or Integration* by Cathy Gunn in the *LTDI Evaluation Cookbook Online* (1998), Jen Harvey (ed) at http://www.icbl.hw.ac.uk/ltdi/cookbook/info_isolation_or_integration/index.html#endhead

Reeves (1997) has mapped the dominant paradigms, which are used in evaluation studies, and the models researchers use within these paradigms. These are concisely summarised and presented by Phillips et al (2000) in Table 1.3 on page 1.5 in their *Handbook for Learning-centred Evaluation of Computer-facilitated Learning Projects in Higher Education* available online at http://cleo.murdoch.edu.au/projects/cutsd99.

Martin Oliver (1997) provides an in-depth review of the main evaluation methodologies in *A framework for evaluation the use of Learning Technology* available online at http://www.unl.ac.uk/elt/elt1.htm.

Martin Oliver (2000) also summarises the important debates and complex issues surrounding the evaluation of learning technologies in *An Introduction to the Evaluation of Learning Technology*, Educational Technology & Society 3(4) online at http://ifets.massey.ac.nz/periodical/vol_4_2000/intro.html.

3.2 Contemporary approaches to evaluation

The complexity of situations addressed by evaluation studies demands a range of approaches to suit different purposes and it is a case of selecting the most appropriate for the circumstances.

Common features of evaluations

Reviews of contemporary approaches to evaluation and appropriate areas of application are offered by Oliver (1997) and Oliver and Harvey (2000). Features common to most contemporary approaches include:

- the need to evaluate in authentic contexts,
- use of a range of data sources,
- the importance of integration,
- study of complete learning environments,
- focus on individual and situational aspects.

These features characterise the evaluation strategy reported by Morrison in her case study *T171: the pilot year experience,* which is based on the OU evaluation methodology - CIAO! - described in Section 3.2.6:

> "At the end of each of the three modules, the student completed a web page questionnaire which collected their comments about the materials, the tutor group activities and the module assignment. Summarised results of these questionnaires were notified to the tutors in the national tutor conference, together with statistical information about drop-out rates.

> "In addition, approximately half way through the course, the tutor emailed each student a message with two questionnaires to be completed and returned either by email or by post. One concentrated on the student's progress and concerns and the second on the tutor-student relationship. The most common comment was on the benefit to the student of being able to work wherever and whenever was most suitable to them.
>
> "Tutors also completed a web page questionnaire at the end of each module and discussed suggested improvements to the course in the national tutor conferences." (Morrison)

Selection criteria for choosing an evaluation methodology

Oliver and Conole (1998) suggest three qualities that can be used to select an appropriate methodology (Figure 3.1) for the situation being evaluated:

- **authenticity**: how closely the methodology can capture the context of an existing course,
- **exploration**: the extent to which the methodology supports evaluating an open problem or a well defined hypothesis,
- **scale**: the number of participants which can easily be incorporated into the study.

	Authenticity		**Exploration**		**Scale**	
	Low	**High**	**Low**	**High**	**Low**	**High**
Experimental (not described)	X		X			X
Illuminative evaluation (s2.2)		X		X		X
Integrative evaluation (s3.2.1)		X		X		X
Situated evaluation (SECAL) (s3.2.2)		X		X	X	
Action inquiry (s3.2.3)		X		X	X	
Case study (s3.2.4)		X		X	X	X
Flashlight (s3.2.5)		X	X			X
UK Open University CIAO! (s3.2.6)		X	X			X
Cost benefit (s3.2.7)	X		X		X	

Figure 3.1 Selection criteria for choosing an evaluation methodology*

* Please note that the ELT toolkit (s3.2.8), the LTDI Evaluation Cookbook (s3.2.9) and the Evaluation Toolkit for Practitioners (s3.2.10) are meta level toolkits which guide practitioners in selecting the methodology most appropriate to their evaluation study.

The theoretical models and frameworks that support this contemporary approach result from parallel developments in different parts of the world and are known by different names. The ones cited here are featured because of perceived generality, familiarity and subjective choice. Others defined by different names may fit the bill equally well.

3.2.1 Integrative evaluation

The TILT (Teaching with Independent Learning Technologies) framework (Draper *et al*, 1994, 1996, 1997) is based on the illuminative approach to evaluation (Parlett and Dearden, 1977 and s2.2) and aims to improve learning by integrating educational technology as effectively as possible into the learning environment. Integrative evaluation adopts Laurillard's (1993) conversational framework as a model for student-teacher interactions, allowing the framework to focus on educational interactions.

This framework aims to evaluate each course as a whole, rather than simply the resource(s) being used, and improve learning by integrating learning materials as effectively as possible. The main aim is "to help teachers make better use of CAL by adjusting how it is used" (Draper et al, 1996) and "by providing better information than is ordinarily available about what is going on and its effects" (*ibid*). The evaluation is viewed as an active collaboration involving the evaluators, the teachers and the students. The teachers' co-operation is seen as essential and their stated learning outcomes are central to framing the evaluation questions. Integrative evaluation is an empirical approach based on observing learning in an authentic context which draws on a range of qualitative and quantitative methods (Section 3.3.3) including questionnaires (pre and post session, computer and task experience, learning resource), observations, confidence logs, knowledge quizzes, focus groups and interviews.

Integrative evaluation is distinct (Draper *et al*, 1994, 1996, 1997) because:

- it focuses on the student and observes what they actually do and feel,
- it attempts to measure learning for each learning objective,
- it makes substantial and systematic use of open-ended observation to identify unforeseen factors.

This is exemplified by the approach described in White and Moussou:

> "I think we do a good job of process evaluation, short-term experiences of the learner etc. The student response, especially in the journals, tipped us off to areas of student concern, what they were 'getting' and what was not clear, allowing us to adjust the pacing, content or style of presentation. The feedback is such a help from a tutor perspective. I do not think we would get such feedback, however, without the journals. They seem to be key – a safe and designated place for such feedback."

3.2.2 Situated evaluation of computer assisted learning (SECAL)

The Situated Evaluation of Computer Assisted Learning (SECAL) (Gunn 1996, 1997) is a framework for designing case based evaluation activities. The framework recognizes the impact of situational factors on learning and attempts to capture rather than balance and disregard the complex range of variables at play in a given situation. The range of variables includes factors intrinsic to learning situations such as instructional design and strategies (Merrill, 2000), content coverage, presentation, quality, motivational aspects (Keller, 1987) and learning support. Other factors less directly causal, though with equal potential to influence outcomes, include institutional context and support, classroom culture and overall integration of activities and resources within courses (Draper *et al*, 1996).

The SECAL framework adopts methods and techniques as appropriate and is ideally used with small sample sizes. It aims to provide rapid and immediately applicable results. It is these two features that distinguish it from illuminative evaluation (Oliver and Harvey, 2000).

3.2.3 Action inquiry

Action research brings together stakeholders from different disciplines for the purpose of conducting research that will inform strategies for ongoing development. The following definition of 'action research' is offered by Zuber-Skerritt (1990):

- Critical (and self critical) collaborative enquiry by
- Reflective practitioners being
- Accountable and making the results of their enquiry public,
- Self evaluating their practice and engaged in
- Participative problem-solving and continuing professional development.

Action research (Kember and Kelly, 1993) reflects a dialectical relationship between educational theory and practice where action and practical experience provide the basis for research. This research informs practice that leads to further action. The model is well suited to evaluating innovations because it can advance knowledge and understanding on the basis of practical, collaborative experience and at the same time, contributes to development of grounded theory (Glaser and Strauss, 1967).

The action research process consists of repeated cycles of **planning, action, observation** and **reflection**. The final stage, reflection on outcome and process, is where new plans evolve and a new cycle is initiated. The major strengths of action research in this context are:

- its practical and collaborative nature,
- the critical and self-critical approach of those involved,
- the interpretive treatment of results,
- the iterative nature of the model,
- the systematic approach to monitoring the effects of change in learning environments.

Action inquiry in practice

The Australian Committee for University Teaching and Staff Development (CUTSD) has adopted this learner centred action research model for evaluating learning technology innovations. It has produced a *Handbook for Learning-centred Evaluation of Computer-facilitated Learning Projects in Higher Education* (Phillips *et al*, 2000), which is available at http://cleo.murdoch.edu.au/projects/cutsd99.

A consortium of Australian Universities and the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) developed the handbook. They have taken a pragmatic approach to the evaluation process and ensured that the handbook would be used effectively within their institutions. The handbook guides the user through a series of questions about the evaluation then focuses on four key areas:

- **Analysis and design**: curriculum analysis, teaching-for-learning analysis, specification of innovation.
- **Development**: formative monitoring of learning environment, formative monitoring of learning process.
- **Implementation**: summative evaluation of learning process, summative evaluation of learning outcome, summative evaluation of innovation appropriateness.
- **Institutionalisation**: impact evaluation, maintenance evaluation.

Cowan in his case study *Personal Development Planning* documents some of the benefits of using an action research approach to evaluation:

> "What made this a successful piece of staff and curriculum development? I suggest that:
>
> - "we had experienced action researchers in our number,
> - "we were willing to learn from and with the students, and let that be seen by them,
> - "the students knew that the immediate outcome of the action research was fed into improvement of the tutorial support that they received,
> - "we made attempts to generalise what we found, to provide some (admittedly particular) theoretical underpinning." (Cowan)

3.2.4 Case study

The case study is "an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 1993 p52).

Yin (1991) offers a technical description of a case study as an investigation of a contemporary phenomenon within its real life context when the boundaries between the phenomenon and context are not clearly evident and in which multiple sources of evidence are used. In the current context:

- online teaching is a contemporary phenomenon which is reaching across the spectrum of learning environments,
- it is already clear that some methods that work for some students in some situations do not work for or in others. Narrow focus is the only way to identify what factors drive this success and failure, (Laurillard 1978),
- triangulation of data from multiple sources provides support for assumptions and conclusions where, in most cases, statistical proof is not an available option.

Within the methodological framework, a variety of data collection methods may be used to support:

- the qualitative, descriptive approach,
- its inductive nature,
- recognition that all influential variables may not be anticipated at the start of an evaluation.

Case study evaluations should also be related to current literature in order to conceptualise issues, design appropriate studies and interpret results. This also helps to identify what is common and may contribute to grounded theory, and what is case specific and non-generalisable.

At one end of the scale, case study research allows attention to minute levels of detail in specific contexts. At the other, it offers methods for production of less fine-grained and more standardised data. The reality it must be designed to cope with is that the outcomes of evaluation, like the range of influences on learning, are not always intrinsic or educational ones. While a single case study is treated as a project in itself, publication of methods and findings allows the experience to be shared, theory constructed and attempts at generalisation made.

Case studies in practice

The OTiS e-Workshop is based on a case study approach. The OTiS Case Studies (http://otis.scotcit.ac.uk/casestudy) record experiences of online tutoring from a range of practitioner perspectives. Authors were provided with a template (http://otis.scotcit.ac.uk/casestudy/example.html) which enabled us to identify common themes and factors but also provided the flexibility to record individual factors and circumstances.

The online book (http://otis.scotcit.ac.uk/onlinebook/) attempts to link these practitioners' experiences to current literature, to conceptualise issues and to identify what is common and may contribute to the 'common body' of knowledge and effective practice in online learning and teaching.

3.2.5 The Flashlight Project

The Flashlight project, supported by the American Association for Higher Education (AAHE), has developed a framework that provides a simple structure for the evaluation of learning technology innovations by practitioners. The framework is based on the premise that "very different educators need to ask similar questions" (Ehrmann, 1999a). It relies on an analysis of three elements (Oliver and Harvey, 2000):

- a technology,
- an activity for which is used,
- the educational outcome of the activity.

The focus of the tool is to identify and develop appropriate questions which can be used (in questionnaires or structured interviews) to generate the data necessary to address the focus of the evaluation.

> "**The Flashlight:** The act of program evaluation in education is like using a small dim flashlight to decide what sort of animal might be in front of you in a pitch black cave…The relative brightness (rigor) of the flashlight (evaluation) is less important than where one points the beam (asking the right evaluative question). Each evaluative question is equivalent of pointing the tiny beam in a particular direction and waiting to see what walks into the light." (Ehrmann, 1997)

Questions are generated through focussed brainstorming activities and drawn from existing questionnaire banks such as the Student Inventory, a repository of questions developed by other users of the Flashlight toolkit. The tool can be used for a variety of applications including (Ehrmann, 1997):

- guiding and improvement of courses,
- evaluating funded projects,
- improving technology based support services,
- supporting strategic thinking about the curriculum and technology services,
- preparing for accreditation,
- helping faculty, departments and institutions compare their uses of technology and outcomes,
- redesigning student evaluations of faculty.

The Flashlight toolkit is documented in the *Flashlight Evaluation Handbook* by Stephen Ehrmann (1999b).

Many OTiS case studies reported the use of questionnaires including Muirhead, Blom and Jarosleva and Milulecka, all of whom include their questionnaires in their studies. Questionnaires can be used for formative and summative feedback (Webster), to find out about a diverse range of topics including technical and pedagogical issues (Creanor), preferred learning styles (Whittington and Dewar), online activities, students' progress and concerns (Morrison), and styles of communication (Muirhead).

3.2.6 The context, interactions and outcomes (CIAO!) framework

The CIAO! evaluation framework (Scanlon *et al*, 2000) has been developed by the UK Open University over a period of twenty-five years to evaluate information and communications technologies for learning. It focuses on context, interactions and outcomes. The CIAO! model (Jones *et al*, 1996) is reproduced in Figure 3.2 below. It draws on a variety of methods including: large-scale pre and post questionnaires; interviews with staff, students and course designers; and automated data collection of computer usage times. Morrison's and Macdonald's case studies report evaluations based on this framework.

	Context	Interactions	Outcomes
Rationale	In order to evaluate learning technologies (LT) we must know about its aims and the context of its use.	Need to observe and examine the learning interactions in order to focus on the learning process.	Need to assess the achievement of learning outcomes (changes in cognitive and affective) and attempt to attribute these to the use of LT.
Data	Course/CAL designers' aims, policy documents and meeting records.	Records of student interactions, student diaries and online logs.	Measures of learning, changes in students' attitudes and perceptions.
Methods	Interviews with course/CAL designers, analysis of policy documents.	Observation, diaries, video/audio recordings and computer logs.	Interviews, questionnaires, tests.

Figure 3.2 – CIAO! evaluation framework, UK Open University

This model has been adapted and used to evaluate the used of learning technologies in the UK Further Education sector (Jones and Scanlon, 1999). Barnard *et al* (2000) have produced a generic set of evaluation tools, which consists of questionnaire templates for managers, lecturers and students, which can be customized easily. The approach recommends that the following features be considered in any evaluation:

- that findings are more persuasive if data is gathered from as many different sources as possible and the conclusions are reached by a process of triangulation (Section 3.3.3),
- evaluation should be directed by each manager's or lecturer's objectives,
- evaluation should involve real students in real situations,

- open-ended questions should be included to investigate unanticipated issues,
- strategies to develop ownership of the evaluation need to be developed.

3.2.7 Evaluating cost effectiveness

Many current evaluation methodologies do not address the issue of the costs. The *Cost of Networked Learning* project (http://www.shu.ac.uk/cnl/) aims to establish the true costs of implementing learning technologies, including hidden costs, for all participants. The project is currently recommending an **activity-based** costing model. The first report (http://www.shu.ac.uk/cnl/report1.html) includes a suggested framework for evaluating costs and the second report (http://www.shu.ac.uk/cnl/report2.html available from September 2001) presents the results of applying this framework in an authentic context.

None of the OTiS cases studies reported evaluations of cost effectiveness or cost benefits.

3.2.8 Evaluation of Learning Technology (ELT) Framework

The BP funded ELT framework is a meta-toolkit which outlines a model for evaluating learning technologies (Oliver *et al*, 1998; Oliver and Conole, 1998) focusing on the 'qualities' associated with the different evaluation methods, types and data capture and data analysis (Oliver and Harvey, 2000). The move towards evaluating learning technologies in authentic learning and teaching contexts means that the teachers often become the (inexperienced) evaluators. This toolkit helps novice evaluators select from the many evaluation methodologies available and choose the one most appropriate to their needs. The framework provides a model of the evaluation process and provides tools to help evaluators make decisions at key points in this process scaffolding the evaluator through the entire process. The evaluation toolkit consists of six steps:

- identification of the audience for the evaluation (the stakeholders),
- selecting and refining the evaluation question,
- selecting an evaluation methodology,
- selecting appropriate data capture methods,
- selecting appropriate data analysis methods,
- selecting an appropriate format to present the findings.

In essence, the needs of the audience, ie the stakeholders, drive the evaluation process. Each step is supported by tools and activities that allow the evaluator to make informed decisions and move forward to the next step. The ELT toolkit is available in paper-based format (Oliver, 1999a) downloadable from http://www.unl.ac.uk/tltc/elt/toolkit.pdf.

3.2.9 The LTDI Evaluation Cookbook

The *LTDI Evaluation Cookbook* (Harvey, 1998) is a practical guide to evaluation for non-specialist evaluators including lecturers, tutors, developers and other learning support staff. The cookbook (a meta toolkit) includes a range of information, guidance, resources, ideas and suggestions to help the user design an evaluation process that meets their specific needs. The cookbook is arranged to present this information in a variety of ways:

- **Preparation pages** that provide a framework for planning and preparing an evaluation.
- **Recipe pages** that provide a summary of the main applications for each evaluation method including guidance on time, effort and resources involved.
- **Information pages** provide practical suggestions and advice on the different evaluation methods.
- **Tasting, refining and presentation pages** provide guidance on interpreting and using the outcomes of the evaluation and suggesting ways of acting on the results.
- **Serving suggestions** provide descriptions of evaluations in practice from some of the contributing authors.

The *LTDI Evaluation Cookbook Online* is available at http://www.icbl.hw.ac.uk/ltdi/cookbook/contents.html

3.2.10 Evaluation Toolkit for Practitioners (online)

The *Evaluation Toolkit for Practitioners* was funded by the UK Join Information Systems Committee for Awareness, Liaison and Training. This web based guide builds on the existing work of the ELT framework (Section 3.2.8) and the LTDI Evaluation Cookbook (Section 3.2.9). The online toolkit combines the process model, tools and activities to support decision making with a knowledge base on methods, data capture and analysis techniques to provide an online guide for the evaluation process. It removes the need for the evaluator to have a detailed understanding of each stage of an evaluation and provides a method that guides them through the selection and application process. The toolkit consists of:

- an evaluation planner,
- an evaluation advisor,
- an evaluation presenter.

An overview of *The Evaluation Toolkit for Practitioners* is available at http://www.ltss.bris.ac.uk/interact21/in21p06.htm and the toolkit is available at http://www.ltss.bris.ac.uk/jcalt.

3.3 Choosing your method – getting started

"Clarity is the key to successful evaluation." (Phillips *et al*, 2000, p1.3)

It is essential to be clear about (Phillips *et al*, 2000; Oliver, 1999a):

- What are the aims or purposes of the evaluation?
- The target audience(s) – who is the evaluation for?
- Who should take part?
- What outcomes are you aiming for?
- Who will read the results of the evaluation?
- How will you take action on the results of the evaluation?

(Milne and Heath, 1998) define evaluation procedures and methods suitable for assessing the impact of teaching innovations. General guidelines are that an evaluation plan for an innovative learning environment must identify:

- the specific learning (or other) objectives the environment was designed to achieve,
- the available range of data sources and methods for continuous study of learning process and outcomes with minimal imposition of extra workloads on staff and students,
- suitable means of assessing software related issues throughout the development, implementation and operation phases,
- the range of situational factors that may influence learning and the means of measuring their impact,
- anticipated results, stakeholders' interests and means of dissemination of findings.

3.3.1 The stakeholders

Identifying the relevant and appropriate stakeholders (as participants or targets for the evaluation report) is key to a successful evaluation. If we can identify the key people involved, we can then focus the evaluation on the key questions they want answered. In an educational context these stakeholders are likely to include some or all of lecturers/teachers, students, managers, funders and support staff stakeholders. These are shown in Figure 3.3 with issues they may be interested in exploring (ELT toolkit, Oliver, 1999a).

Phillips *et al* (2000) consider these issues from the perspective of the vested interests of stakeholders and extend the stakeholders to include employers and professional accrediting bodies.

Stakeholder	Issues/questions
Lecturer/teacher	• The quality of the students educational experience. • The time spent on the activity. • Suitability of the resource technically and in terms of contents. • The extent to which the resource is integrated with the other aspects of the course.
Students	• The time required. • Whether this will help them pass their assessments. • Whether the resource is easy to use. • Whether other course activities depend on them having used the resource.
Managers (course, subject, faculty co-ordinators)	• Efficiency (is this the best use of time and resources?) • Cost-benefits (do the benefits justify the resources required?) • Student retention and progression. • Development of key and employability skills.
Senior managers Funding bodies	• Does it support/contribute to the institution's strategic mission? (eg Learning and teaching, key skills, widening participation and diversity). • Quality of the learning experience. • Value for money.
Support staff	• What additional support and maintenance is required? • Is the resource properly integrated with other services?

Figure 3.3 - typical stakeholders and their concerns

3.3.2 Formulating the evaluation questions

A detailed statement of objectives is the starting point for any evaluation study. This allows us to identify the achievable means of measuring these objectives. The choice of question can have a considerable impact on the evaluation (Oliver, 1999a). Typical objectives of evaluation studies, stated in general terms, might include:

- to evaluate learning outcomes,
- to assess the quality, accessibility and usability of resources,
- to assess the educational merit of the instructional strategies employed,
- to reflect on how evaluation findings relate to current theoretical understanding.

The questions should be derived form the list of stakeholder concerns previously identified. We need to formulate a question that addresses a concern, which has the following characteristics (*ibid*):

- question format – what, when, for whom, in what situation, and so on,
- involves a comparison,
- involves some type of measurement.

An evaluation plan should include detailed descriptions of the objectives as well as the specific criteria that will be used for measurement.

Gwynne and Chester considered some very explicit evaluation questions in their case study *Personal Identity and Community in Cyberspace*:

- "How might our sense of who we are be constrained in interactions where the body does not exist? How might it be more fully realised?
- "What are the implications of the ease of identity play in the virtual context for real interactions?
- "Without conventional geographic and ethnic markers, are new kinds of communities beginning to emerge? How do these new communities inform their real life counterparts?
- "In considering the best mode of delivery, the lecturers decided to use the medium of cyberspace as both the content and the process of the subject. The aim was to immerse the students in the technology; to have the process of the subject, that is researching and interacting in cyberspace, become the content through a practice of critical self-reflexivity.
- "Finally, the decision to present the subject via electronic mode was also informed by an increasing pressure to get aboard the technological bandwagon. Concerned by the possible economic imperatives driving this agenda, the lecturers were keen to evaluate online delivery and consider the implications of such changes for both students and teachers. Could online delivery provide a quality teaching and learning experience?" (Gwynne and Chester)

3.3.3 Evaluation methods – capture, analysis and triangulation

There is a range of data collection and analysis methods that is common to all qualitative approaches. The differences lie in the types of data collected, the basis for analysis used, the purposes served and the time and resources involved. Oliver and Conole (1998) and Oliver (1999a) distinguish between data capture and data analysis methods.

Data capture methods

An important underlying principle is to make evaluation as unobtrusive and integrated as possible to ensure the integrity of the data. Students and staff may not appreciate having demands put on their time with little perceived benefit, and the quality of responses may suffer as a result.

Different methods of data capture make different demands on the evaluator and participants in terms of time and the resources needed for data collection. Oliver and Conole (1998, p21) suggest three criteria for ranking various methods:

- time,
- objectivity,
- focus.

The main selection criterion is often the **time** each method takes – the researchers' time, not the participants'. The **focus** criterion relates to whether or not the method collects specific data or can take into account unexpected or unanticipated data. **Objectivity** relates to whether or not the data collected can be replicated and independently verified. Methods which meet both the high and low measures for a specific criterion (Figure 3.4) are flexible enough to support a range of designs, for example interviews which can be unstructured or semi-structured.

Harvey (1998, p15) provides resource overviews for a range of evaluation methods which indicate preparation time, student time, time to administer, time for analysis, additional resources – available online at http://www.icbl.hw.ac.uk/ltdi/cookbook/.

It is often appropriate to use several different methods of data collection to address all the requirements of the evaluation process.

Data capture methods	Time Required		Objectivity		Focus	
	Low	High	Low	High	Low	High
Access policy documents	X			X		X
Checklist	X		X			X
Concept maps	X		X		X	
Confidence logs	X		X			X
Cost-effectiveness	X		X	X		X
Experiment	X			X		X
Focus group	X		X		X	
Nominal group	X		X		X	
Observation		X		X	X	
Test	X			X		X
Questionnaire	X		X		X	X
Video log	X			X	X	
Audio log	X			X	X	
Interview		X	X		X	X
Student diary/journal	X		X		X	
System log data	X			X		X
Attitude surveys	X		X			X
Expert/peer review	X			X		X
Discussion (online)	X			X	X	X
Resource use patterns	X		X	X		X

Figure 3.4 Data capture methods - selection criteria

Analysis of Data

Once the data has been collected, we need to decide the how best to analyse it, since most data can be analysed in a variety of ways. Two possible selection criteria (Oliver and Conole 1998) are the **time** it takes the evaluator to analyse the data and level of **abstraction**, that is the level of interpretation of the data and how far removed the reported conclusions are from the raw data. A range of data analysis methods are categorised in Figure 3.5 below.

Data analysis method	Time required		Level of Abstraction	
	Low	High	Low	High
Classification into pre-defined categories	X		X	
Categorisation		X	X	
Descriptive statistics	X			X
Statistical comparisons		X		X
Selected illustrative quotations	X		X	
Reflective narrative	X		X	
Grounded theorising		X	X	

Figure 3.5 Data analysis methods – selection criteria

Findings from different data sources – triangulation

Each of these evaluation methods produces a different type of data and it is common in qualitative studies for findings from different sources to be triangulated to produce stronger evidence than that yielded by any single method.

> "Student feedback, instructor's online journal, standard course evaluation survey, feedback from outside observer (faculty member from another institution) will be used over time to assess effectiveness of course strategies." (Hird)

Many case studies document the use of multiple data sources to derive findings and draw conclusions eg Morrison, Wishart, Macdonald, Saunders and Tammelin. Typical examples from Street and Clarke illustrate this approach:

> "A triangulated approach was taken to measure the success of this online module. Included were:
>
> - "Comparison of course results with others taken by a group of students who also attended face-to-face courses as part of the same degree.
> - "Qualitative analysis of email messages.
> - "Online and telephonic interviews with course participants.
> - "Online interview with the course facilitator." (Clarke)
>
> "Evaluation of this case study includes:
>
> - "informal discussion with students during the conference process,
> - "evaluation of students' experience initially through a questionnaire,

- "focus group discussions with students after the conference,
- "the inclusion of student reflection on the conference experience and their learning in the assessment,
- "interviews with staff,
- "discussions with the staff team for debriefing and development of the delivery for the subsequent year." (Street)

The result of using multiple sources of data is a rich description of the situation, the factors that impact on success and identification of areas for possible improvement.

Presentation of data from all sources allows readers to focus on aspects of particular interest and to draw their own conclusions about the validity of findings where weight of numbers and generalisation are not available.

3.3.4 Evaluation methods for online tutoring

Within the general methodologies described above, there is a range of data collection methods that may be used to evaluate online tutoring, for example:

- **Questionnaires**: To obtain student and peer feedback on the effectiveness of tutoring.
- **Online discussion**: To invite student reactions to online tutoring and interpret questionnaire responses.
- **Analysis of discussion**: To assess contribution levels of tutors and students, issues raised and type and frequency of support requests.
- **User tracking**: To provide objective data on frequency and length of participation and resource use.
- **Assessment results**: To assess how effective tutoring seems to have been in terms of support for and achievement of learning objectives.

The next section addresses some of the practical issues and implications of evaluating online learning and teaching. Section 5 draws together the experiences of OTiS participants in using specific methods for evaluating online learning and tutoring.

4 Practical Issues and Implications

This section addresses some of the key practical issues and implications that influence how effectively new learning technologies can be embedded into the learning and teaching process. It draws on a case study of a formative evaluation (Harvey, Higgison and Hols-Elder, 1999) and experiences of the OTiS e-Workshop participants to illustrate and illuminate these issues.

4.1 Introduction

Given the range of different potential roles for evaluation discussed in the preceding sections, identifying the reason(s) for initiating a study and what exactly you want to evaluate is the first and most important step of the evaluation design. This should be linked to who you are carrying out the evaluation for and what you are going to do with the data once collected. With each decision made during this planning and design stage, a number of practical issues will need to be considered. Some of these are related to the process of evaluation and some related to the mode of delivery.

4.1.1 Evaluation Case Study – LOLA

This case study describes a formative evaluation (Harvey *et al*, 1999) carried out on the Learning about Open Learning Online (LOLA) staff development course created by Heriot-Watt University and delivered over a period of four months during 1999. The course was developed for participants across eleven Central European countries participating in the EU funded Phare programme (http://europa.eu.int/comm/education/tempus/whatphar.htm).

This course was designed to enable approximately four hundred registered participants from the eleven participating countries to learn about the techniques of Open Learning via technology-supported open and distance learning methods. Each country had an EU tutor who communicated with the participants electronically and a National Facilitator (NF) who provided local support as well as organising and leading two face-to-face tutorial sessions. WebCT (http://www.webct.com) was used to provide the online learning environment for the course. An evaluation section was established within this online environment.

During the project, a number of different people were involved in collecting the evaluation data. The Scottish design team based at Heriot-Watt University appointed four evaluators to carry out the formative study of the course, one based in the same department as the delivery team, two tutors and one external evaluator from the Open University to evaluate the course materials. The tutor team leader carried out a summative evaluation.

This course is described from a tutor's perspective in the case study *Tutor constraints in a mixed mode course* (Higgison).

Wishart in her case study *The Leicestershire Consortium New Opportunities Funded ICT Training in Schools* describes a similar evaluation strategy to that used in the LOLA formative evaluation:

> "The Consortium Internal Evaluator will be working with a research assistant to collate and analyse data collected from the following sources:
>
> 1. Completed online and paper questionnaires from the participants (paper-based for initial baseline self assessment of competence and confidence in the areas to be covered by the module and electronic for the end of module review).
> 2. The module trainers who will see the above feedback from their group and have the opportunity to put forward their comments to the evaluator.

3. Head teacher's [*NFs*] feedback, paper-based, once a school staff has completed their training.
4. Focus groups (one for primary and one for secondary age phases) will be organised annually to provide strategic overview of NOF training from clients' point of view.
5. Examples of exemplary practice in NOF training to be disseminated in evaluator's report.
6. Online comments posted to discussion groups by participating teachers as part of their training.
7. Statistical information on web site access from Technical Manager." (Wishart)

4.2 Developing a new course

Any innovation or new programme needs to consider practical issues relating to its implementation as well as obtain feedback relating to course content and student learning. When a course is running for the first time it can be tempting to try and evaluate everything just in case. However over-evaluating and not taking action on any feedback can start to make any evaluation procedures become irrelevant. It better to put your efforts into trying to involve all the stakeholders, including the students or participants, in the evaluation. This can make the process more meaningful and more effective.

A range of stakeholders might have an interest in the running of a new course and each of these will have a range of concerns that could be addressed. For example, instructional designers will want to know whether the materials are effective and where there are areas for improvement. Tutors might want to know if the online resources are supporting the achievement of specific learning objectives. Students could be interested in how well a new online discussion section links into the rest of the course. Managers are likely to want to find out whether the new module is more cost-effective than the previous year's face-to-face module.

Identifying key stakeholders and their main concerns at an early stage assists in focussing an evaluation study and makes the data collected more useful and relevant (Patton, 1997). For example, what kind of information is likely to provide the best evidence you need to support a decision to use a particular resource and what are the key issues you need to explore? Are illustrative quotes or statistical data going to be the most persuasive for the people interested in the evaluation? Do you need to demonstrate that the benefits are only achieved under certain conditions? Some potential stakeholders are and their concerns are suggested in Section 3.3.1.

One approach is to carry out a pilot study with a small number of participants as recommended by Juwah:

> "Run a pilot course, evaluate the course, modify as appropriate then roll out your standard course." (Juwah)

Gradually building up resources and evaluating at each stage of the process to help respond to your stakeholders' concerns can be an easier option than working with a completely new course involving a large number of students. Glass adopted this approach in her case study *Professional Development for VET teachers:*

> "Last year [*1999*] was WestOne's pilot year and this time last year we had one module online and had not even begun the professional development program. Today we have over thirty modules online and seventy-eight people have completed the professional development short course (with another

> twenty-sex currently doing the course). We have had sixteen complete the six months course and another fourteen have started."

Working on a smaller scale can help identify some of the technical issues relating to the running of an online course or the introduction of any new materials as they are introduced.

> "These pilots have largely been as much a discovery of technical constraints and ways of overcoming them but we have also learned much about promoting interaction in this kind of multi-cultural environment." (Webster)

4.2.1 Issues related to timing

Planning an evaluation study well in advance enables data to be collected at the appropriate time and from the appropriate people. For example, it could be useful to collect information about students before they use a software package or undertake a programme of study in order to provide a baseline for their development.

> "Students fill out a pre-course survey (so we can customize the content to a limited extent) and are asked and encouraged to submit an online post-evaluation of the course. We also seek input during the course and incorporate our learnings in 'real time'." (White and Moussou)

Perhaps you need to record the pattern of usage of materials at different stages of a programme or perhaps the key people or the necessary equipment for collecting data will only be available at certain, specific times. It is essential to plan the kind of data and the nature of the data that is going to be collected, as well as planning when and how it will be collected.

> "Participant feedback was obtained via a detailed questionnaire, covering aspects of the participants' background, personal learning outcomes, course delivery, the exercises, course content, and issues of access and study patterns." (Webster)

> "We undertook three consecutive annual surveys with a major focus on student perceptions of the impact of learning and student support of the web-based communication component. The 1999 survey comprised twenty-seven 5-point Likert scale…twelve [*items*] covered the area of interaction; two were concerned with the lecturer's role; seven covered the way students support each other; six covered use of Web CT tools …" (Anderson and Simpson)

In order to do this you need to establish who is going to be interested in the data collected, and how and when to deliver the results to them. Deciding what you want to know and the nature of the data can also save time by helping to avoid collecting irrelevant information at inappropriate times.

LOLA case study

Before the course started the evaluation team worked with the LOLA course design team, the EU tutors and the national facilitators, to develop a strategy for the formative evaluation of the course. The evaluation was designed in a way that would provide feedback and data at appropriate times during the course. A pre-course meeting of the EU tutors provided an opportunity to ask about any concerns they might have about the course and the kind of data they would like to have as the course progressed. This enabled relevant and appropriate information to be made available either by email, through the online evaluation area or during face-to-face meetings. It was hoped that this kind of strategy would identify any problems at an early stage and enable any modifications to be made as the course progressed in order that

the resources would better meet the needs of the participants. For example, tutors asked for feedback from their colleagues who were the first to deliver the face-to-face workshops to flag up key issues and problems that had arisen. Feedback from trialling the online environment at the first workshops resulted in the discussion forum software being changed to one more suited to the number of participants on the course and volume of message postings.

Planned feedback was requested from all tutors, national facilitators and participants after the initial workshops and at the end of the course. In addition further feedback was solicited from selected groups of participants after each tutor marked assignment (TMA) at the end of a module, via an online form. However not all responses fell within the planned pattern with some participants completing more than one form, mainly towards the end of the course rather than the intended time – directly after the TMA submission.

4.2.2 Practical and technical issues

Whether deciding to introduce an online component into an existing course or deliver a course entirely online, additional technical, administrative and financial support is going to be required at some level. This might involve finding student mentors, other course tutors and members of staff from other departments or institutions to enable things to run smoothly.

As well as fostering collaboration this will also introduce a number of new people who may have an interest or desire to be involved in an evaluation as described by Littlejohn:

> "Group interviews followed by an online evaluation study took place upon completion of the Web Based Teaching module in May 1999 and March 2000. Those who participated in the online evaluation included academic staff, a librarian, a web developer, a learning support officer and audio visual staff." (Littlejohn)

Instructional designers will want to know whether the course is working and where there are areas for improvement. Lecturers might want to know if the online resources are effective in achieving specific learning objectives. Students will be interested in how this new online discussion section links into the rest of the course. Management will be keen to find out whether the new module is more cost-effective than the previous year's face to face module.

Moving online will also introduce technical considerations such as compatibility of software and hardware and online access. Do all students have access to all the resources at a time which suits them at a cost they can afford? Can they obtain appropriate technical support when required? These particular issues are discussed in Chapter 7: *Institutional Issues* (Templeton, 2001)

LOLA case study

During the LOLA course, Internet access and the place of study were important factors in determining whether participants completed the course. Although as a prerequisite for the course participants had completed an online form saying that they had easy access to a PC with a reliable Internet connection, in reality this was not always the case. Some participants were allowed to study at work and therefore did not have to pay for access, although one work-based location lost its Internet access for over a month. Other participants tried to work from home but experienced a range of access difficulties and the additional costs of increased telephone bills. Almost immediately after the course started, these problems were identified via tutor/NF evaluation feedback through the Tutor/NF online forum and alternative methods of providing some of the materials had to be developed. A print version of the learning materials was made available online. These were downloaded locally by the national facilitators who made arrangements to have them printed, copied and distributed to participants in their country. Some of these issues are discussed in Higgison's case study.

Tutors and national facilitators were also asked to keep a weekly record of their course activities including online time, answering participants' queries and marking assignments. We aimed to monitor the range and frequency of activities across the duration of the course in order to establish whether the time allowances allocated to tutors and facilitators were appropriate and whether or not additional/alternative types of learner support should be provided.

However, the reasons behind this data collection method were probably misinterpreted and although a number of records were received during the first month, only one tutor (out of eleven) and one national facilitator (out of thirteen) maintained records in this way throughout the course.

Different countries had different levels of technical infrastructure and support. Some National Facilitators were able to provide additional online support for their participants, eg in one instance the facilitator set up an online discussion group conducted in the national language instead of English.

4.2.3 Issues relating to access

In order to carry out an evaluation study evaluators need access to the course participants. Where learners are studying via open and flexible learning, ie are not always attending classes at specific times, or at a distance, the evaluation will require planning in advance. The methods used should try and take into account the nature and mode of delivery in order that evaluation becomes an integral part of the course and is not seen as being separate and different.

In some cases the mode of study will limit the choice of the data collection methods available to the evaluator. Access to a group of students might only be possible during face-to-face tutorial sessions at particular stages of the course or for a few minutes while they log on to the online learning environment to download material or check for messages. Informal observational feedback and face-to-face focus groups or interviews to discuss the use of a new piece of equipment/software/learning task might be impractical or difficult to organise. Neal describes some of these problems in her case study *Best Practices in the Development and Delivery of e-learning:*

> "It was hard to gauge how much the students were learning since the threaded discussions and tests did not provide as much feedback on students' grasp of the concepts as did real-time [*face-to-face*] discussions. Although our students' positive feedback was gratifying, we were nevertheless surprised by the amount of adaptation that was necessary because of the absence of traditional classroom behaviours that teachers and students take for granted. For example, the comparatively simple teacher-student feedback loops that enable teachers to evaluate how the class and particular individuals are progressing are largely absent. Essential questions, such as the efficiency with which students learn and how satisfied they are with the course, go largely unanswered until end-of-class class evaluations are available." (Neal)

At the same time, a number of alternative online options can be considered which might not always be available on traditional courses:

> "The evaluation data consisted of all the text-based messages sent during the course, the videotaped recordings of the videoconferences and the text-based transcripts of the videoconferences. In addition to the observations made by the two tutors and the course assistant, the data included the final course reports written by the Helsinki group students in which they reflected on their experience and learning process." (Tammelin)

Other examples include tracking students' activities and resource usage via a virtual learning environment and online forms that can be easily administered and collected to obtain data.

> "Because all the material was in the WebCT environment it is meaningful to look at the time spent in those areas of learning environment. There was a total of 848 visits to the material pages and participants spent 240 hours there (time doesn't tell all because web-pages can be open while the student is doing something else)." (Nurmela)

> "At the end of each of the three modules, the student completed a web page questionnaire which collected their comments about the materials, the tutor group activities and the module assignment. Summarised results of these questionnaires were notified to the tutors in the national tutor conference, together with statistical information about drop-out rates." (Morrison)

Discussion with students can be moved to online discussion fora to provide a permanent record, which can later be analysed in depth, and feedback videoconference sessions can be scheduled.

However as Oliver (2000) notes, the technology itself can have a subtle impact on the evaluation methods. For example, moving focus groups online can result in "a loss of spontaneity, the inability to take body language into consideration and the reliance on participant motivation to engage" (Cousin and Deepwell, 1998, cited in Oliver, 2000). This reflects Neal's experience described above.

LOLA Case Study

During the LOLA course, online forms were made available from an Evaluation area as part of the WebCT environment, files as attachments were emailed to the national facilitators based in each country for printing and distribution to participants. Participants were given the option of completing the questionnaires online or faxing/emailing/posting the questionnaires back to the evaluation team. Structured questions were provided for tutors to ask students at the introductory face-to-face tutorial sessions and at each stage in the course. Tutors were encouraged to feedback comments from their participants (normally received via email), discuss current issues within an online discussion fora and record their thoughts and activities in a reflective log which was also to be made available to the evaluation team.

4.2.4 Working with others

Whichever methods are used, evaluation involves working with others either as the providers or collectors of data. The evaluation process can be a useful opportunity to bring people together to discuss practical issues and obtain different perspectives on areas of mutual interest or concern.

A variety of group-based techniques (eg focus group, nominal group technique, online discussion) can stimulate discussion and allow exploration of a range of areas that may have been identified through other methods (eg, brainstorming, questionnaires, ad hoc comments). However, each of these methods may raise its own practical issues relating to the online environment that will need to be carefully considered, for example as in Neal, quoted above, and as experienced by White and Moussou:

> "I do not think we would get such feedback, however, without the journals. They seem to be key …We have tried to get feedback via email, but that has been less successful." (White and Moussou)

Running online group chats and discussions can be a useful way of exploring issues but the techniques involved are slightly different to those involved in running face-to-face sessions. (Chapter 2: *Tutor Roles* (Cornelius and Higgison, 2001) discusses the skills and techniques required for facilitating online discussions and Bowskill's case study addresses the skills needed to support real-time chats and suggests two methods for evaluating these.) Individual styles of the participants will also need to be taken into account, for example some people feel comfortable and are proficient at participating in real-time text-based chat sessions whereas others can feel left behind or want to have time to reflect on the interactions. An asynchronous (time independent) discussion may be more appropriate for these latter participants and would allow them to explore specific issues in more depth through separate threads of discussion.

These asynchronous discussion groups can be **open**, ie all participants have access and contribute, or **closed**, ie membership is limited to a particular group of participants. Closed or private groups can support group work and enable discussion relating to confidential issues such as student progress or sensitive issues such as difficulties with the organisation, administration, support or participants. These groups can be set up for the course participants, eg for tutorial groups, collaborative group projects and assessment, or specifically to obtain evaluation feedback. Allowing evaluators and other tutors to have access to the normal course discussion groups, with the agreement of the members, allows the collection of useful feedback and data relating to the course materials and activities at the time when they are being used.

There are advantages and disadvantages of working with your own or other people's students. Working as an online evaluator or with online groups that you have not had the opportunity to meet can have its difficulties. A non-participating observer lurking during discussions or posing intermittent questions could also be perceived as intimidating or intrusive. Try and make sure that you are introduced at the beginning of the course and try and get your profile included on any course team web pages so that students know who you are and why you are there. As an independent evaluator, learners however should feel comfortable to express their viewpoint and explain where they might have problems. But, you are going to have to gain their trust and probably have to actively encourage people to start to make contributions to an online evaluation group study.

> "Only three students felt a level of embarrassment at having their responses made openly available but several admitted to having overcome such feelings through the realisation that their own ideas were valuable and worth saying." (Ewing)

Again clarifying the objectives for the study and giving members options for returning comments to you can help persuade even to the most retiring of students.

The way in which the members interact and the kind of information gathered can be influenced by the way in which the sessions are organised and how all the individuals relate to each other. Students can feel intimidated by being recorded (taped, written record) or being asked to comment on what they perceive as a lecturer's teaching methods. In addition, if not co-ordinated effectively, such discussions can provide a forum for complaints and general negativity which may or may not be related to your evaluation study:

> "In both phone conversations and class evaluations, student feedback was largely positive, especially when students were asked to discuss the initial technical and administrative difficulties separately." (Neal)

Dominant individuals might start to dominate conversations and exclude others. It helps to tell participants exactly why you are carrying out the evaluation, what you are going to be doing with the data and structure the sessions appropriately. Try and keep the groups to the task at hand.

Structuring sessions so that students know what they are going to be discussing can enable students to decide what they might want to say before logging in. Basic courtesy such as welcoming each participant to the group and getting them to introduce themselves can also get over any initial worry about participating and encourage them to contribute. It can be easy to exclude individuals by mentioning others by name during chat but at the same time it can be important to try to get others to participate. Developing a group etiquette where you indicate by a symbol or word that you want to talk or just contributing in turns can help. Some courses have introduced the concept of anonymity for new participants to encourage them to participate and this can perhaps be considered for making students feel as if there will not be any retribution for voicing their comments.

If you have inherited groups who perhaps might have had a bad experience within this course or with a particular tutor you might have to make extra efforts to encourage participation. Also groups might have established their own identity and taken up particular roles leaving some members to lead the discussion and others remaining uncommunicative. Methods such as nominal group techniques or individual telephone interviews, chats or emails might help you to get information from the whole group if that is going to be important. Sometimes difficulties might be not related to a reticence to contribute, but related to practical considerations such as difficulties in being able to log on or participate at times when the rest of the group are available.

LOLA Case study

The WebBoard discussion software (http://www.webboard.com/whatiswebboard.cfm) was used to host the course discussions within the WebCT (http://www.webct.com/) learning environment. A number of different fora were set up for everyone who was involved in the course ranging from a group wide (LOLA) forum with over four hundred participants to individual tutor groups with ten participants. Everyone (participants, tutors, national facilitators, course team, evaluators) could access the main LOLA forum. Tutors could access a closed tutor forum (tutors, course team and evaluators) and a joint tutor/NF forum (same as the tutor forum but also included the national facilitators) as well as their group's national forum (eg Romania, Lithuania) and their own tutor groups. Participants had access to the main LOLA forum (~ 400 participants), their national group, eg Romania (~100 participants), and also their individual tutor working group, eg Romania 2 (~10 participants). The level of discussion, measured by the number of contributions, varied dramatically across the countries and across tutor groups within countries, and some fora were hardly used despite encouragement by their tutors. Others groups had an active discussion with a large number of message postings without any apparent external encouragement (some tutors used email prompts to encourage activity in the online fora).

In some countries with a more reliable and advanced technical infrastructure, some tutors organised real time chat or videoconference sessions while other tutors preferred students to email them or the national facilitators with any logistical problems or issues relating to the course materials. In many cases the choice was constrained by technical limitations. These informal sessions were not part of the formal course and consequently were not formally evaluated. However these local initiatives did highlight the possibilities offered by a more advanced technical infrastructure.

One measure we used to evaluate the extent to which students engaged with the course was the level and variation of their participation in online discussions within and across different fora (tutor group, nationally and across the programme). Major differences allowed us to identify areas for further investigation, in particular to explore and clarify the factors and reasons that influenced this variation. In the majority of cases a lack of participation reflected poor technical facilities and the high costs of accessing the online system. However in other cases it appeared that the online discussions were allocated a very low priority by busy professionals who were studying part-time with many conflicting demands on their time. The

online discussions were not an integral, essential and assessed part of the course because this would have disadvantaged those with restricted online access.

4.2.5 Involving others in the evaluation team

It is not always possible to collect your own evaluation data because of limited time or access to participants or communication difficulties. It may be necessary or more appropriate for someone else to carry out some of the evaluation work to overcome resource or time problems or, for example, to gain and alternative perspective.

> "The members of the team communicate and support each other extensively through a Tutor Conference in WebBoard. Participants are encouraged to feedback comments to tutors and one of the activities requires participants to reflect on the effectiveness of the course. Moderation of portfolios also occurs online. The External Verifier 'meets' with participants online via a questionnaire, which the participant may choose to share or not share with their tutor. The External Verifier also samples portfolios." (Pickering and Duggleby)

This in turn can introduce other considerations such as the individual's level of experience as well as logistical problems in co-ordinating and integrating evaluation activities in order to make the most effective use of the time available. If someone else does become involved it is important that the criteria for the evaluation are clear and unambiguous so everyone is collecting the same kind of data.

Obtaining advice from others within your institution or externally through discussion groups can also provide useful ideas and suggestions for carrying out an effective evaluation strategy. As a tutor, you might also like to get another person to provide you with evaluation feedback on your tutoring. Arranging with another member of staff to observe or sit in an online session can be really useful in identifying positive and negative ways in which you facilitated a discussion or chat session.

> "I have experienced evaluation of a real-time session… where one tutor sits in – virtually – on a session delivered by another tutor. This is …quite distinct from simply sharing the log amongst a group of tutors….I might sit in on one of the early sessions as an evaluator in a MOO system. This proved interesting because it provided not only an opportunity to witness another tutor's teaching but it gave me a window on the qualitative experience of that session for those involved. This is something distinct from understandings arising from a reading of the log for instance…. This could be followed up by developing an evaluative dialogue between tutor and evaluator online. We found that once the session was underway, participants did not notice the observer being too busy with the various activities." (Bowskill)

However, this does require an element of trust in another person, and if you are organising peer observation sessions for others, try and make sure that they are managed appropriately. Establish that tutors are comfortable about getting comments back on their teaching skills or giving negative feedback to colleagues about their pet subject area. Plan how best to structure this feedback so that specific aims are achieved.

If you would prefer to work with others, then consider setting up an evaluation group in your institution so that you can share experiences and discuss or present case studies.

LOLA Case study

For the people involved in collecting the evaluation data during the LOLA project, each was given different areas of responsibility and so there were few problems of trying to collect the same data. However, some of the data collection depended on the national facilitators within the eleven countries. Although the course materials and discussion fora were to be conducted in English, some of the facilitators set up discussion groups in their own language to encourage more involvement as in most cases English was the participants' second or third language. This created some communication and translation problems and meant that this feedback was not directly accessible to the evaluation team. The team was therefore dependent to some extent on the local facilitators to provide them with any feedback relevant to the course and for them to encourage the participants to complete and return any questionnaires. Fortunately the national facilitators were generally helpful in providing feedback to any evaluation questions and passing any relevant information to either their associated tutor or the evaluation team directly.

4.2.6 Working as individuals

Summative data collected after the course has finished can encourage people to reflect on the issues more deeply, for example, how the course materials and activities related to each other and the appropriateness of support provided. However, gathering feedback from individuals as a course progresses also provides useful information relevant to activities as they happen. This is a key feature of formative evaluation, and such feedback, if collected and acted on in a timely manner, can influence the development and delivery of subsequent modules or parts of the course. If individual participants are to be encouraged to provide online feedback then the methods for collecting the data must be easy to use, not take too much time and individuals must feel that some benefit is to be gained if they undertake such an activity, in other words it will have a direct benefit for them (for example by reducing the amount of assessment or changing the type of assessment). So an element of trust is going to be involved. Increasing the use of online forms and the collection of questionnaires by other staff and even the use of personal passwords can help encourage more honest opinions if you feel that this is likely to be an issue. However at the same time it is important to be trying to encourage students to be responsible for their own opinions. This is often helped by providing guidance as to what you expect from students so that they in turn can provide you with the data and the kind of feedback you require.

LOLA Case study

During the LOLA project, all participants, tutors and national facilitators were encouraged to record their thoughts in a reflective log. Tutors and national facilitators were asked to email their thoughts about each week's activities and comment on anything that had gone particularly well or badly during the previous week. Like the records of activities mentioned earlier, only a few people returned these logs with one national facilitator keeping a log throughout the course duration. The individual concerned mentioned that she liked to work in this way while the other tutors commented that they were too busy with other activities to keep a log.

The learners were also asked to keep an online reflective log. These were private – each of the four hundred participants was allocated a password protected reflective log page that was accessible by the learner, the tutor and the evaluation team. Given the limited Internet access of some participants, completing these logs did not count towards any assessment of the course. Some started to keep a regular record of their thoughts while others would use their personal space to keep notes about the course or information about resources. Others mentioned how they felt uncomfortable storing information in this way and that keeping a record on paper was easier and more spontaneous that logging on to access their e-log.

4.2.7 Working with data

Given the practicalities of online course delivery, it is important to devise methods whereby data can be collected and stored effectively. These methods need to be the most practical and the best way of collecting and storing the kind of information required without causing large logistical problems. For example, if it is important that students record their thoughts in a weekly reflective log or diary (Daele) which counts towards the course assessment, a number of options are available for collecting this data. Students could record their thoughts in a personal notebook and submit sections, summaries or the full workbook at the end of the course:

> "…completing a reflective evaluation tool – an integral component of the subject was the inclusion of student self-reflective assignment…"(Gilbert-Hunt and MacLaine)

If the course is primarily online, students could record their thoughts online either by email to the tutor or study group. Weekly logs could also be recorded in a password protected web page or by submitting an online form. Each of these methods will raise a number of practical issues relating to data collection, including the willingness of the learners to undertake these types of activities, especially if class numbers are high. For example many of the tracking systems available in virtual learning environments (VLEs) can provide you with extensive information which is likely to result in information overload. Deciding that you only want to know about students who have not logged on for more than a week or who have used a particular section is going to be more helpful than obtaining printouts of everything. This kind of information can then enable you to follow-up students who perhaps are having difficulties or to find out the reasons why certain parts of the course are being used more than others.

Each method has its own advantages and disadvantages. The paper based option is easiest to organise, but there is no guarantee that diaries are completed as directed. It can also be perceived as separate to the remaining online sections of the course. Going with the online options, however, introduces practical issues such as setting up online forms or password protected WWW pages. How can pages be made accessible to the students and in an easily readable format for the tutor to view but not other students? Can the data collected from forms be exported into a format that will allow for easy analysis at a later stage? How will you cope with lots of emails submitted by students on your course(s)? In addition, is the chosen format going to affect the kind of data collected? If students are online for short periods of time and paying for their online time then having to load up their reflective log might inhibit spontaneity and enthusiasm to record feelings.

LOLA Case study

The course materials were delivered from a server located in Scotland. The data collected from online forms was stored locally on this server and downloaded by the evaluators into a spreadsheet programme for analysis. As previously described password protected reflective log pages were set up for participants and tutors that only they and the evaluation team were able to view. Given that there were over four hundred participants registered initially on the courses, potentially a lot of information could be generated relating to their online activities. Therefore this meant that only selected data relating to their participants' activities was sent out to the tutors.

National facilitators were also given information about their students' online activities so that they could make contact by telephone with the individuals concerned if necessary. Although there were four hundred participants registered on the course, less than fifty percent were active in the online learning environment (although most of them were in direct email contact with their tutors) and so many of the anticipated problems with data storage did not arise.

4.2.8 Sampling and triangulation

In order to avoid a biased sample, it is going to be more effective to encourage all participants or relevant stakeholders if possible to be part of your study. This might not always be practical or easy to organise, particularly if a large number of people are involved. In such cases, it is more appropriate to take a smaller sample, for example if you wish to explore various evaluation issues in greater depth. It can be tempting to seek out those who might be more supportive of a project or volunteers might also be those who are more sympathetic to taking part in such a study. This can provide useful and persuasive data to present to management or if you want to make a decision whether or not to select a particular resource for inclusion in a course but the temptation must be resisted. Any findings or predictions are unlikely to hold true for future courses or groups of students.

Unless participation in an evaluation study is either assessed or mandatory, it is unlikely that everyone will respond or take part. Early in a course people might be keen to be involved, but as a course progresses this enthusiasm tends to wane as other pressures take over such as assessments, work and family commitments and so on. A self-selecting sample of these depleted numbers could include those who are more computer literate, more able or just people with more time than those who have not responded. In other instances you might want to consider collecting data from people who perhaps might have not such a positive attitude – for example, students who have dropped out of a course or not participated in an online discussion. You might want to follow-up individuals in order that students in subsequent years might not encounter similar problems.

Data from one source is useful to triangulate with data from a separate source (Section 3.3.3). For example, if you are interested in finding out which parts of the course the students are having difficulties with you can find out whether the staff feedback corresponds to the assignment marks and if these, in turn, correspond to the areas of difficulty mentioned by the students through reflective logs or through an online questionnaire.

> "The data is drawn from a desk study of innovative assessment practices in four networked courses (Macdonald, Weller & Mason, 2000), supplemented by evaluation data from a doctoral case study of student perspectives on the assessment on two of these courses (Macdonald, 1999). The case study of THD204: 'IT and Society' was undertaken over a three year period, with three cohorts of students and their tutors, and the findings were compared with a short study of student perspectives H802: 'Applications of IT in Open and Distance Education'. Data were gathered from twenty-one in depth interviews and observations followed by a series of computer conferences to which eight hundred students and fifty tutors were joined over two years, supplemented by one hundred telephone interviews." (Macdonald)

LOLA Case study

For the LOLA course all participants were asked to complete a questionnaire at the beginning and end of the course. During the course, random samples from different countries were asked to complete a short questionnaire, normally at the end of a module. Each short questionnaire had some questions in common and some which examined a particular feature of the course and the online environment. This approach allowed us to involve the entire population of learners in the evaluation but did not overburden each participant with evaluation questionnaires. In total each participant was asked for feedback via a questionnaire on four occasions: at the face-to-face start-up tutorial, before the online course started, at the end of one module (of six) and at the end of the course.

The end of module questionnaires, which were answered by subgroups of the participants, contained three sections in common:

- activities and contacts,
- usefulness of the course content,
- level of the course.

They also contained questions that examined different aspects of the course in more depth, for example the use of WebBoard for discussion, participation levels within the discussion groups, the use of reflective logs, and the use of the WebCT learning environment.

All these forms were made available from the Evaluation section of the Web Site. Although the groups involved were notified in advance of when they would be asked to complete a form, there were still a number of participants who completed all of the questionnaires and several of these did so after the course had finished.

4.2.9 Integrating evaluation strategies into courses

Involving learners in the evaluation process, especially during the initial stages of devising an evaluation plan, is a useful way of exploring a range of issues pertinent to the course. This strategy also encourages students to participate by making them feel more involved in the study. An evaluation discussion group could be set up or students could become involved in evaluating each other's work. From the start of a course, learners could be asked to set their own personal objectives and to measure their ongoing achievements against these objectives (eg Nurmela). Evaluation activities can be built into the course activities by asking participants to, for example, devise the evaluation criteria for the selection of new resources for sections of the course, determine whether an online discussion group is successful and decide the parameters of success or carry out a self-evaluation of their contribution to a number of course activities. Contributions towards the evaluation study could count towards the assessment or a requirement for course completion (eg Gilbert-Hunt and MacLaine). However, clarification and guidance will then become an important part of the course materials and activities in order that students are able to develop and refine their evaluative and reflective skills.

4.3 Working within an institution

Without institutional support, it can be problematic and time consuming to develop online courses. Although various commercial companies (for example Blackboard http://www.blackboard.com/ and WebCT http://www.webct.com) and UK national projects (eg TELRI: Technology-Enhanced Learning in Research-Led Institutions at http://www.warwick.ac.uk/ETS/TELRI/) will provide limited server space and software shells for individuals to use for course development it is preferable to be independent and have complete ownership of your own materials. An online learning environment needs to function in a way that facilitates the learning process and not detracts from it. In the initial stages evaluation studies are going to focus more on some of the practical issues than they will once the course is underway and you feel confident that all your students are afforded the same opportunities.

Initially, at an organisational and institutional level, you will probably need to establish that all future students will have access to appropriate hardware and the relevant software. If necessary, will all your students have individual email accounts, passwords and space to store materials on a server? Are options provided for students working from home who pay for their time online and who might have less direct access to resources? If students are to be assessed online then are their responses going to be recorded and stored in a secure way? Although these considerations might not be directly related to teaching and learning, these and other institutional issues such as levels of technical support, communication and access will probably need to be part of the monitoring evaluation strategy during the initial stages in

case students are experiencing difficulties which prevent them from participating fully in the course. Chapter 7: *Institutional Support* (Templeton, 2001) addresses some of these issues.

As mentioned earlier, moving to working online delivery also requires an investment in resources in terms of people, time, hardware and software. You are probably going to have to justify to your department a decision to move to using information and communication technologies (ICT) in your teaching. Although many institutions are supportive of online course delivery, you might find that you are some of the first to do so and therefore you have to either convince management or colleagues that this is going to be a cost-effective enterprise and/or a worthwhile investment of resources. Carrying out a needs analysis study to justify expenditure or demonstrate the effectiveness of the intervention can be an effective way of obtaining institutional support. Volunteering to give a seminar using evaluation data collected, publishing in departmental newsletters or journals can contribute to raise the profile of the use of ICT within your institution and/or perhaps gain you additional resources or technical help. Providing good effective evaluation data or case studies where the introduction of a piece of CAL has worked well will have more of an effect than trying to just persuade someone of the virtues of the use of technology with no supporting evidence.

5 What Do We Want to Evaluate and Why?

A range of methods was used to evaluate aspects of different online activities reported in various OTiS case studies. Practical and methodological issues relating to these and other methods were explored in some of the chat sessions and evaluation discussion group. This section aims to draw some of these experiences together under a number of section headings relating to the focus for an evaluation study and some of the methods used.

5.1 Evidence of success

A very common aim of any evaluation process is to provide data to justify a decision or proof that an intervention has worked or evidence to support a gut feeling that materials are really helping students to learn more effectively. In the OTiS case studies, each of the authors was asked to cite evidence of the success of their online course or module as well as describe how their materials were evaluated. A range of different examples of what they considered to be evidence was given. These ranged from, for example, course completion/success rates (Thompson and Rosie, Pickering and Duggleby), improved retention rates (McKenzie) comparisons between the achievement on the course compared to a similar or preceding one (Kennedy and Duffy, McFarlane), participants going on to put what they had learned into practice (Glass, Noakes), students deciding to register for another online course (Street), academics going on to write and/or present papers for conferences (Janes) and a high voluntary participation on the course (Doufexopoulou) in some cases even after course completion (Labour, Hird).

A lot of the feedback relating to the success of a course can be anecdotal with tutors feeling that they can tell whether a course is going well and knowing which parts require some modification. Evaluation studies are therefore a useful way of quantifying and exploring some of this kind of intuitive feeling and any informal feedback.

5.2 Course monitoring and tracking

For many of the case studies described in the OTiS e-workshop, it was considered important to evaluate the mechanics behind online course delivery and whether learners were able to access and use the learning environment easily and at a times which suited them. Many commercially available managed learning environments (MLEs) can provide extensive tracking of users' activities, for example monitoring login times and access to different parts of the course, resource usage and assessment performance. Although the number of hits on a web site does not reveal much about the quality of usage involved, it is necessary to monitor whether all students are logging into a course especially during the initial stages when some people might be having technical difficulties.

Similarly, if some students stop logging on or have not done so for a while, it is important to establish whether they are having access/technical problems or problems with the course content. Some learners liked the idea that someone, eg the tutor, was interested in what was going on in the course (Mohamad, Higgison) and got in touch to see how things are progressing.

Simple questionnaires and checklists are easy to administer in order to establish functionality and any bugs encountered during usage. These forms can be mailed to students or made available within the learning environment.

Informal feedback during online discussions or supporting tutorials can establish progress and participants' activities (Juwah). Surveys half way through a course (McFarlane) can also reveal useful data and enable action to be taken on any recurring issues such as the activity overload reported in Creanor.

More detailed information can be gleaned by asking students to maintain an e-log (Daele) This enables a tutor to better react by establishing the context for any problems and for, among other things, the students to record any problems as they occurred. Retrospectively, participants can be asked to reflect on a range of different aspects of a course such as appropriateness of support, usage and usefulness of resources once the course is completed:

> "The exit questionnaire provides simple feedback to us about the trainees' experience of the whole programme and has enabled us to make incremental adjustments and improvements over the years." (Salmon)

In the case study reported by Anderson and Simpson, Likert scales were used for students to record levels of importance of different aspects including tutor support within an online course.

5.3 Quality assurance and institutional standards

Draper *et al* (1996) describes how evaluation can contribute to institutional quality assurance in three ways:

- by providing detailed evidence about what has already been achieved,
- by demonstrating that quality is being actively monitored,
- by providing evidence of teachers acting on results to improve quality.

Most institutions have their own Quality Assurance standards and any new course will have to comply with these in order to ensure consistency between courses (Murray). If institutions are well established distance education providers then procedures will probably be in place to ascertain whether or not any new materials are fit for purpose (Juwah). Existing procedures can be adapted to the online environment, for example online staff/student committees (Creanor), enabling the 'External Verifier' to meet the students online (Pickering and Duggleby) and having external examiners scrutinise course outcomes (Ballantyne).

Courses may already be recognised as being of a high standard when delivered face to face but other methodologies might have to be employed to demonstrate whether the online equivalent has achieved the same standard (McFarlane). Developers might also have to demonstrate any benefits and improvements related to learning outcomes and identify which parts of the course could be improved (Gwynne and Chester) or even justify costs of using technology.

External professional bodies might also want to establish whether or not the course is of an appropriate standard for recognition towards certain levels of training or qualification. The UK Quality Assurance Agency (http://www.qaa.ac.uk) has developed a code of practice relating to the accessibility of materials for students with disabilities (http://www.qaa.ac.uk/public/COP/COPswd/contents.htm) as a guide for institutions and more recently a code of practice for open and distance learning (http://www.qaa.ac.uk/public/dlg/contents.htm). Bobby (http://www.cast.org/bobby) is a tool that analyses Web Pages for their accessibility to people with disabilities. The UK Joint Information Systems Committee has funded two projects to assist with ensuring access to online resources and learning for people with disabilities:

- DISinHE (Disability and Information Systems in Higher Education) available at http://www.disinhe.ac.uk/,
- TechDIS (Technologies for Disabilities Information Service) available at http://www.techdis.ac.uk/,

These are in addition to international guidelines for online sites available from the W3C Web Accessibility Initiative at http://www.w3.org/WAI/.

5.4 Online activities

Given the ease at which it is possible to collect data relating to students' level of usage of MLEs it can be tempting to concentrate on whether someone has carried out a particular activity rather than the quality of this task. For some courses, where the use of technology is fairly new and participants are becoming comfortable with using an online learning environment, it is probably sufficient to consider whether someone has been able to place a message within a discussion forum. However, in other courses the quality of their contribution is going to be of more importance and the way in which this process has been facilitated is more relevant. Providing a Learning Environment rather than a discussion forum will necessarily require the successful integration of a number of online activities and it is the relationship between these that will affect the quality of the learning.

MacDonald in her case study *Integrating online tuition with assessment at the UK Open University* for example, used the evaluation process to inform on the usefulness of a number of online activities such as the summarising of some of the online materials within a discussion forum. It was found that the quality of these summaries related to the subsequent quality of their assignments and that the activity was serving as a focus for the students.

5.5 Learning

Generally, the quality of student learning is measured by the attainment of specific course learning objectives. The success of a course could then be evaluated by the number of students who achieve these objectives and monitoring their attainment as a course progresses (Juwah). Setting out clear learning objectives and providing guidelines for techniques of summarising and participation at appropriate points can support the learning process (White and Moussou). In the same way, identifying learners' needs and expectations prior to a course can enable developers to set up an appropriate system to try and match up these needs.

A range of activities can be integrated into a course which will support the learning process as well as provide evaluative feedback. Asking students to maintain an online log or diary (Labour) or providing a reflection space (Murray) can encourage self-reflection (Gwynne and Chester) related to current online activities such as group work (Daele) as well as provide the tutor with useful information relating to the course delivery and content.

> "We learn a lot from our journals as both teachers and learners and they give the students places to tell us both their frustrations and what they enjoy/what works." (White and Moussou)

Reflection can become a significant part of the course architecture by asking students to open their own reflective journal topic (White and Moussou). In addition, setting up self-reflective assignments (Gilbert-Hunt and MacLaine) and triangulating these with questionnaire feedback or anecdotal evidence can help establish whether students are learning. Collecting personal records of ideas or thoughts can help not just in establishing any misconceptions, but be used as a diagnostic tool enabling guidance in the process of related application of theory to practice (Ballantyne). Asking students to develop their own course portfolio which includes personal reflections and examples of work modified as a result of these reflections can also be used as a combined learning and evaluative tool (Mohamad).

5.6 Online discussion

The availability and provision of asynchronous and synchronous discussion space enables a range of online activities to support the learning process. These can be organised, co-ordinated and maintained in a range of ways depending on the intended learning outcomes. In some instances, as mentioned earlier, participation in such fora might be sufficient, in other

courses the quality of the discussion, the way in which an individual has facilitated a group activity or summarised a discussion might be required (eg Morrison, Phillips). The evaluation of these processes can be problematic depending on the kind of data required.

Logs of interactions or summaries can be maintained with students recording text interactions (Gwynne and Chester) and tutors are able to monitor these interactions or analyse the discourse (Kennedy and Duffy). Records can also be made available for other participants or tutors to evaluate. Sharpe and Baume examined the content of the conference messages to see what types of interactions were occurring as related to the aims of the online component of the course, for example sharing of experiences, giving and receiving feedback and reflection.

In addition, the kinds and quality of interactions can be monitored in different ways. Zimmer and Alexander describe the use of Carl Roger's principles as a basis for evaluation of contributions and made the theoretical rationale behind this decision available to students in a manual prior to the course starting. Students appeared good at creative receptiveness but not of creative receptive understanding, ie that they understood what someone else had said.

5.7 Continuous professional development and self-evaluation

Providing online courses for staff can not only upgrade their skills in the use of technology to support their teaching but also contribute towards academic recognition of their work. This recognition might be through the subsequent publication of refereed papers (Janes), or contribute towards professional development storage of files, records and examples for evaluation or the development of a teaching portfolio as part of an accredited programme (Sharpe and Baume) such as the EFFECTS project (Effective Framework for Embedding C&IT using Targeted Support http://sh.plym.ac.uk/eds/effects/) reported by Bailey. Such methodologies can encourage the self-evaluation process by providing examples or making reference to other people's work, setting up mentoring systems or accredited programmes to support staff continuous professional development.

Another measure of success was the extent to which staff on these courses have further developed their skills and introduced technology based approaches to other aspects of their teaching, ie then went on to teach their own students online (Mottley, Salter, Littlejohn). What has not been addressed to any extent in the case studies is an evaluation of the quality of the online tutoring.

5.8 The tutor

> "One important variable is the tutor. We need to look at how the tutors organise their teaching and to what extent they understand and exploit the special features of web based teaching and learning. This is a question both of competence and attitude. It is also a question of organisation: how do we select our tutors, and are their working conditions favourable to a tutor role that is needed for web-based instruction?" (Blom)

We have argued in Chapter 2: *The tutor's role* (Cornelius and Higgison, 2001) that online teaching is significantly different from face-to-face teaching in terms of the tutor roles and skills. However very few case studies addressed the evaluation of the tutors – their competence and their impact on the online learning experience. The main forms of evaluation involve collecting the students' perceptions of the tutors' skills and support.

Littlejohn acknowledges the need for further evaluation to ascertain how many of the participants have changed their teaching practice but does not suggest how this can be achieved. Two suggested evaluation strategies were dialogue analysis and web site analysis:

- Ballantyne who reported on an analysis of the tutors' contributions to online discussions:

  "Content analysis of the online discussion demonstrates that the focus of contributions from tutors was not so much on correcting misunderstanding in relation to content knowledge, as on influencing the way students attempted to reason about cases and applied theory to practice." (Ballantyne)

- Salter who reported that after staff development workshops where indicators showed that an increased number of staff used online teaching a subsequent analysis of their teaching sites confirmed that minimal pedagogical changes were occurring.

Two additional case studies that suggest some link between evaluation of a tutor's performance and resultant action are Kulp and Ehmann, both of which describe commercial as opposed to academic environments:

> "Our evaluation survey questions are fairly standard – rate the course; its usefulness/applicability; the instructor; the medium. These are translated into 'quality' numbers and instructors are expected to maintain very high numbers." (Kulp)

> "There is a system of on-going assessment for tutors. The specialist coordinators of the writing and math programmes conduct bi-weekly evaluations of tutor performance by observing live tutorials as well as reviewing archived sessions. These written evaluations are followed by de-briefing sessions and complemented with less formal, daily monitoring of tutorial activities." (Ehmann)

5.9 Selecting evaluation methods

Whatever the questions and reasons for carrying out an evaluation, the methods used should try and take into account the nature and mode of delivery in order that evaluation becomes an integral part of the course and is not be seen as being separate and different.

Evaluation can be structured in such a way that it becomes part of the learning process as well as perhaps contributing towards any course assessments.

Setting appropriate deadlines and fora for contributions is going to be important rather than just suddenly trying to arrange a set of interviews or the completion of questionnaires. Building reminders into an online calendar can facilitate this process. An evaluation section in any WWW course pages can be developed where forms are available for students to complete or discussion fora are accessed. Complicated forms might be time-consuming for participants to complete online and so downloadable versions can be provided in this way for participants to fill in offline and return either by email or by post.

5.9.1 Which evaluation method is most appropriate?

A range of methodologies can be used to evaluate online course materials and a variety of toolkits are also available to assist in the process of deciding which is going to be most appropriate for a particular need. (See for example the LTDI Evaluation Cookbook http://www.icbl.hw.ac.uk/ltdi/cookbook and the Evaluation Toolkit http://www.lts.bris.ac.uk/jcalt both of which are described in Section 3.2). The OTiS case studies also provided examples of many of these methodologies in practice and discussion of the practicalities of their usage.

5.9.2 Questionnaires

Questionnaires were the method most commonly cited by OTiS participants as a way of collecting feedback but were used in different ways or in combination with other methods. See, for example, questionnaires used at each stage of the course (Creanor) linked to drop-out rates (Morrison), pre and post course questionnaires (Eger and Vacek,) anonymous questionnaires (Mottley), questionnaires and in depth interviews (Saunders) and the use of standard course evaluation forms with course questionnaires (Hird).

Ways of collecting responses from a representative sample of learners were discussed and issues relating to self-selecting samples and whether their familiarity with the use of technology might be colouring the feedback of some of the more computer literate students. Ideas such as payment of a small fee and a course completion certificate upon return of an exit questionnaire (Salmon) and making completion of evaluation forms a compulsory element of the course were put forward to try and increase questionnaire returns.

5.9.3 Reflective Logs

Given the nature and mode of delivery of the course, a number of authors had set up reflective e-logs, weekly log books or diaries as a method of encouraging students to reflect on their progress and for tutors to keep up to date with their activities. (See for example White and Moussou and Daele.) Some of the issues discussed during the conference related to the honesty and quality of contributions, their usefulness in encouraging reflection and the setting of appropriate criteria for learners to gauge their progress within these logs. Whether and how the logs could in some way contribute towards the course assessment and a number of different ways of using logs were also given. These included recording the course cycle of development by keeping notes after each session providing a communication tool between tutors and students and supporting the learning process (Daele) and assessing contributions against personal objectives (Noakes). The success of using these logs varied and Scheuermann *et al* commented that this method did not always get the kind of learning or reflections intended. However, Daele described that although the use of journals had varied between the two years that his course had been offered, in each case it had been viewed as a key experience within the course.

5.9.4 Analysing discussion (content analysis)

Analysing, monitoring and evaluating online discussion was also identified as a method to combine evaluative and learning processes (Sharpe and Baume). It was felt that as online tutoring skills such as effective questioning developed, so did the quality of the student interactions (Street) and the data collected. Discussion, if properly structured, could develop a number of skills including self-evaluation and reflective abilities as well as expose students to a broad range of levels of work. Records of discussions can be stored so that trainees could also be tracked through a course (Salmon), external messages not directed at the list could be monitored (Clarke) or content analysis used to look at tutor feedback.

Evidence of the success of providing online discussion fora was measured by the number of postings as well as the number of participants staying online after the course was finished (Labour, Hird). Listserv and mailbase conferences and groups were also set up by tutors and staff involved in supporting online courses in order that they could discuss any ongoing activities or reflect on any issues such as dealing with a diverse student population (Ehmann).

5.9.5 Interviews and focus groups

Interviews and focus groups were used to explore and identify difficulties and participants' expectations or reflections (Ballantyne) of the course. Course managers would in some cases

go out to watch face-to-face tutorial sessions or discuss course progress with groups of tutors. In some examples, students were observed as they worked through parts of the course and interviews, computer and telephone conferencing used to gain further evaluation feedback (MacDonald). Sessions by telephone, email or video-conferencing with students were also organised and often course teams would schedule regular staff meetings (Ehrmann) or maintain continual contact to discuss and reflect on the course (Tammelin).

5.9.6 Peer review

Asking another tutor to observe and make comments about an online chat session can be an informal way of obtaining feedback and establishing an evaluative dialogue (Bowskill). Posting real time logs for reflection and comments (Bowskill), issuing guest accounts for other tutors to review discussions (Hird) and undertaking biweekly evaluations of tutor performance (Ehmann) can be used to help develop and improve tutoring skills within the OTiS case studies. However, it was felt that for this kind of activity to be successful, timing was important, the way in which these sessions are integrated into the course as well as helping to develop your own evaluation criteria. Being able to explore a range of options and get feedback within a secure online environment also helped in the training of in-service tutors before going on to publish course materials (Lustigova and Zelenda).

5.9.7 Comparative studies

A number of case studies mentioned comparisons carried out between different courses, different delivery methods and use of different resources. Several of the online courses developed were able to look at their students' attainment of specific learning objectives compared to a course with the same content (Radic), courses delivered in different ways (Kennedy and Duffy) and a previous year's course taught on campus (Gwynne and Chester). Pre and post testing or questionnaires could also be used to compare the attitudes or skills before and after a particular intervention or completion of a course.

6 What next?

The evaluation process is a means to an end and not an end in itself. If the process is to be worthwhile and not a waste of money we must consider what actions, if any, we need to take as a result of the evaluation. We also need to consider how we are going to publicise the results and in what format.

6.1 Taking action

Evaluation should be part of a continuous process in the development and improvement of learning and teaching. This means that we need to consider the evaluation results to identify aspects of the innovation that work well, aspects where we could perhaps improve and aspects which may need to be reconsidered.

It may be tempting to focus on the positive aspects of the evaluation that confirm our feelings that an innovation is effective, eg it motivates and engages the students and improves their learning. However it is probable that there are still ways we could improve the experience. Extremely negative results, on the other hand, can be very demoralising. In all cases we need to consider the findings in context and identify all factors that contributed to the point of view including the timing of the evaluation study and how it was carried out. Finally the evaluation may throw up some unexpected results, especially an open, explorative evaluation. Again we need to consider these in the context of our module/course and consider how they affect our aims and objectives.

In all of these circumstances we need to take an honest, reflective approach to interpreting the results, considering not only the findings and the context of the evaluation, but also the evaluation approach itself. The very act of carrying out an evaluation can often affect the findings, for example by sending misleading signals to the students that part being evaluated is more important and carries greater weight than the rest course.

We need to understand whether or not the innovation is working as we intended and if not why not. We then need to use the evaluation evidence to help plan what steps to take and adjustments to make. Perhaps the students need additional skills to be able to use the learning technology effectively, they may need some additional help sheets, they may need increased access to the appropriate computer facilities, the assessment strategy may promote individual working while the innovation is attempting to promote group working. These are just a few of the many possible findings of an evaluation. Your findings will be specific to your context, your learners and your evaluation. Involving students can be a very constructive and productive approach in deciding on an appropriate response to the evaluation findings.

The evaluation process provides an opportunity to examine and reflect on our approaches to teaching. It allows us to focus on specific learning objectives and explore the most effective ways for our students to achieve these.

6.2 Presenting the findings

The findings of an evaluation study may influence policy, strategy or the implementation of learning technology innovations. Communicating these findings is an essential part of the evaluation process and it is important to present the findings and publicising the results appropriately.

The evaluation findings need to be communicated back to the stakeholders in suitable format to support action being taken. There are many ways to present evaluation findings (Oliver, 1999a) including oral and written reports and presentations involving, text, graphics and tables. Torres et al (1998, cited in Oliver 1999a) present a helpful list of alternatives:

- data sets,
- executive summary of the activity,
- narrative accounts of the evaluation,
- oral presentation including PowerPoint summaries,
- poster of findings,
- research reports,
- spreadsheets.

We need to consider which format is most appropriate for communicating each finding and which format will be most persuasive and convincing for our key stakeholders (Section 3.3.1).

The majority of evaluations produce a formal report, in addition to any tailored presentations and Morris (1987, cited in Harvey 1998) suggests a basic format for these reports:

- executive summary,
- background to the evaluation,
- description of the evaluation,
- results of the evaluation,
- discussion and interpretation of the results,
- costs and benefits of the innovation,
- conclusions.

The format we choose to present our findings will have a great impact on how the results of our evaluation are received and how much influence they will have on key decision makers.

7 OTiS Evaluation resources

7.1 Collections of online evaluation resources

http://www.slais.ubc.ca/courses/libr590/action.html

School of Library Archival and Information Studies University of British Columbia WWW site. Comprehensive collection of Resources in areas from Action research to interviewing and constructing effective questionnaires.

http://www.redrival.com/evaluation/

Collection of online resources for evaluation.

7.2 Evaluation guidelines

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

Online evaluation guide developed by the Centre for Learning and Teaching, University of Technology, Sydney. This guide is used to provide guidance and support for support provided by the CLT.

http://www.ucc.ie/hfrg/resources/qfaq1.html

A compilation of Frequently Asked Questions relating to the use of Questionnaires.

http://cleo.murdoch.edu.au/projects/cutsd99/

Participants will learn to evaluate student learning resulting from the use of their own CFL project, through cycles of action inquiry in which they develop an evaluation plan, carry out the evaluation, analyse the data and disseminate the results. Each participant is supported in the action inquiry process by a mentor, and the evaluation handbook.

7.3 Evaluation tools

http://www.acm.org/~perlman/question.html

Gary Perlman's CGI-script online forms available to administer and collect WWW usability data.

http://www.ucc.ie/hfrg/projects/respect/urmethods/methods.htm

Collection of evaluation methods constructed by the Respect project for the European Usability Support centres.

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

Selection of online tools developed by Jeff Heidler at the University of Georgia.

http://www.vuw.ac.nz/~agsmith/evaln/evaln.htm

This page contains pointers to criteria for evaluating information resources, particularly those on the Internet.

http://www.ltss.bris.ac.uk/jcalt/

The Evaluation Toolkit for Practitioners contains a step-by-step walkthrough of the process of designing an evaluation, supported by activities and resources at each stage, and builds on the *ELT Toolkit* and *Evaluation Cookbook.* It is freely available from the University of Bristol's web site.

http://www.unl.ac.uk/tltc/elt/toolkit.pdf

The Evaluation of Learning Technology (ELT) toolkit describes a practical six step process for planning and implementing and evaluation study. Each step is supported by suggested activities that allow the evaluator to make informed decisions and move forward to the next step. The ELT toolkit is available in paper-based format (Oliver, 1999a).

http://www.icbl.hw.ac.uk/ltdi/cookbook/

This page contains a practical guide for lecturers which includes recipes for different evaluation methods linked to useful information drawing on the expertise of a range of practising evaluators. Each recipe includes possible uses, a step-by-step "how to" guide, hints and suggested variations

http://www-iet.open.ac.uk/iet/PLUM/plum.html

Open University page about methods and practice of formative and summative evaluation of multimedia materials. The role of the Programme on Learner Use of Media is to investigate and develop an understanding of students' use of and learning from combinations of educational media (both current and anticipated) in distance education.

7.4 Evaluation reports and papers

http://www.elec.gla.ac.uk/TLTSN/evaluation.html

Source of papers relating to some of the research carried out as part of the TILT project based at Glasgow University and funded by the TLTP programme.

http://www.unl.ac.uk/tltc/elt/

Collection of Evaluation tools and reports developed by Grainne Conole and Martin Oliver as part of the BP LaTid project at the University of North London.

http://ericae.net/

Educational Resources Information Center (ERIC) Clearinghouse on Assessment and Evaluation is a project of the National Library of Education, US Department of Education

http://www.educationau.edu.au/archives/cp/REFS/reeves.htm

Online paper describing fourteen pedagogical dimensions of computer-based education (CBE), each based on some aspect of learning theory or learning concept, that can be used as criteria for evaluating different forms of CBE.

http://www.cti.ac.uk/publ/actlea/al8.html

This issue of Active Learning provides a thorough analysis of the issues, explores some different methodologies for evaluation, and includes a wealth of case study material for all those interested in using C&IT in their teaching.

7.5 Evaluation organisations and groups

http://socserv2.mcmaster.ca/srnet/evnet.htm

A partnership among 60 public, private, & non-profit organisations, and the Social Sciences and Humanities Research Council of Canada for the Evaluation of Education and Training Technologies.

http://www-iet.open.ac.uk/tltp/

TLTP Evaluation Forum. This website and discussion forum are managed by Dr. Robin Mason of The Institute of Educational Technology, UKOU, as part of the Evaluation Project with the Tavistock Institute.

http://www.tltgroup.org/programs/flashlight.html

The Flashlight Program helps institutions study and improve educational uses of technology while gaining control over the time, effort and money these applications require.

http://www.qaa.ac.uk/public/dlg/contents.htm

These guidelines offer advice on assuring the quality and academic standards of higher education programmes of study provided through distance learning.

7.6 Accessibility guidelines

http://www.qaa.ac.uk/public/COP/COPswd/contents.htm

The UK Quality Assurance Agency (http://www.qaa.ac.uk) has developed a code of practice relating to the accessibility of materials for students with disabilities as a guide for institutions.

http://www.cast.org/bobby

Bobby is a tool that analyses web pages for their accessibility to people with disabilities.

http://www.disinhe.ac.uk/ and http://www.techdis.ac.uk/

The UK Joint Information Systems Committee has funded two projects to assist with ensuring access to online resources and learning for people with disabilities:

- DISinHE (Disability and Information Systems in Higher Education).
- TechDIS (Technologies for Disabilities Information Service).

http://www.w3.org/WAI/

International guidelines for online sites available from the W3C Web Accessibility Initiative.

8 Executive Summary

Investment in learning technology is growing rapidly but does not always produce the expected benefits. Learning and teaching which incorporates the use of learning technologies is complex and evaluation is seen as the key to developing an understanding of the factors that influence its success.

An evaluation may involve us making a judgement about the educational value of an innovation or the pragmatics of introducing novel teaching techniques and resources or, less frequently, the costs of such innovations (Oliver, 2000). Each of these questions demands a different approach, a different strategy and different methods of data collection and analysis to enable us to make that judgement.. Choosing the wrong approach can make it difficult to produce reliable and useful results (Oliver, 1999). Evaluation is also expensive and we need to plan the process carefully to make the most effective use of our additional investment

Formative, summative and integrative evaluation

There are many types of evaluation and the three most common approaches to evaluating educational innovations are formative evaluation, summative evaluation and integrative evaluation.

Formative evaluation, such as in pilot studies or prototypes, involves making adjustments based on immediate feedback from the study to improve the students' experience or the teaching resource. Summative evaluation involves making a longer term judgement about the effectiveness of an innovation, with action being taken on the findings at the end of the course or module. Integrative evaluation involves examining the innovation as part of a complete learning experience and providing feedback to enable the innovation to be more effectively integrated.

Contemporary approaches to evaluation

Evaluation methodologies have evolved over the past fifty years from a predominantly experimental, quantitative approach designed to measure outcomes and generalise results to a more qualitative approach designed to explore, identify and explain. Most current evaluation methodologies adopt a hybrid approach, which combines qualitative and quantitative methods that support the shift towards evaluation of authentic learning experiences in their natural context. Evaluation has changed from an external process to a more collaborative process between evaluator and practitioner aimed at building a mutual understanding of what is occurring. This approach is reflected in many of the OTiS case studies.

Contemporary approaches to evaluation have a number of common features (Oliver, 1997; Oliver and Harvey, 2000):

- the need to evaluate in authentic contexts,
- use of a range of data sources,
- the importance of integration,
- study of complete learning environments,
- focus on individual and situational aspects.

Selecting frameworks and methods for the online environment

This chapter outlines seven evaluation frameworks that are representative of the methodologies currently in use to evaluate learning technology innovations in the UK,

Australia and the United States of America. It also describes three meta-toolkits, which help the inexperienced (and experienced) evaluator make appropriate choices from amongst these options. In particular the *ELT Toolkit* (Oliver, 1999a) suggests three qualities which can be used to characterise an evaluation study and match it to an appropriate methodology: authenticity, exploration and scale. The *LTDI Evaluation Cookbook* (Harvey, 1998) provides an overview of common methods of data collection and analysis as well as advice on combining and implementing these methods.

Our particular context is online learning and teaching which offers particular challenges and opportunities to evaluator and the choices available to them. Many existing evaluation methods need to be adapted to this new learning environment. For example, it may be impossible to meet learners face-to-face so methods such as interviews or focus groups need to be changed to accommodate the restrictions of the technology, eg be facilitated by video or audio conferencing, real-time text chats or asynchronous discussions. However, the online environment also offers new methods such as automated logs of learner activity and permanent records of group discussions and collaborative work.

In the context of online learning and tutoring particular methods that it may be appropriate to use, include:

- **Questionnaires**: To obtain student and peer feedback on the effectiveness of tutoring and the learning experience.
- **Online discussion**: To invite student reactions to online tutoring and learning and interpret questionnaire responses.
- **Analysis of discussion**: To assess contribution levels of tutors and students, issues raised and type and frequency of support requests.
- **User tracking**: To provide objective data on frequency and length of participation and resource use.
- **Assessment results**: To assess how effective tutoring and online learning seems to have been in terms of support for and achievement of learning objectives.

Most evaluation studies use more than one method each of which produces a different type of data. These findings from different sources can then be triangulated to produce stronger evidence than that produced by any single method. Many OTiS case studies document the use of multiple data sources to derive findings and draw conclusions eg, Clarke, Hird, Morrison, Macdonald, Saunders, Street, Tammelin and Wishart.

Planning and implementing an evaluation

In planning a successful evaluation essential pre-requisites include being clear about why the evaluation is being undertaken and who will be interested in the results, ie the stakeholders. Identifying the key stakeholders and their interests helps focus the evaluation study and generate the evaluation questions.

There are nine key steps in planning and implementing an evaluation:

1. Clearly identify the purpose of the evaluation,
2. Identify the stakeholders and their interests,
3. Identify the key questions,
4. Choose the evaluation methodology,
5. Choose the data collection methods,
6. Collect the data,
7. Choose the data analysis methods,

8. Analyse the data
9. Present the findings.

However evaluations have to be undertaken in real situations that have their own practical issues and implications. Some of these relate to the timing of the study and access to resources and learners, others relate to working relationships with colleagues, students and the institution. Experiences from a formative evaluation and the OTiS case studies illustrate some of these issues and suggest some effective approaches to meeting these challenges.

We can evaluate various aspects of online learning to contribute to our understanding of a learning innovation. Commonly evaluated aspects include evidence of success of the participants, course monitoring and tracking of participants' engagement and use of resources, compliance with institutional quality assurance procedures and standards, the impact and role of online learning activities, the extent and nature of the students' learning, the role of the tutor and the impact of professional development activities. The focus of any study and the selection of evaluation methods is driven by the aim of the study and the stakeholders.

The final task in the evaluation process or cycle is publicising these results and acting on them. If the findings of the evaluation are to have an impact they must be presented in an appropriate way that will be convincing to the target audience - normally the stakeholders. This often involves presenting specific findings in different ways to meet the needs of a particular audience, using a range of formats and platforms.

Summary

Evaluation is a continuous ongoing process (Gunn, 1999) that is "fundamentally about asking questions, and then designing ways to try and find useful answers" (Manwaring and Calverley, 1998). It is an expensive and time-consuming process and it is essential that it is worthwhile:

> "If the answer to the question 'why evaluate?' is that the results will lead to action to improve the teaching and learning within the course or institution, then all the effort will be worthwhile" (Shaw, 1998)

Appendix A References and Sources

A.1 Conference sources cited for this topic

References to OTiS Case Studies

The case studies quoted in this chapter are listed below and are published in

Higgison, Carol (ed) (2000) Practitioners' Experiences in Online Tutoring: Case Studies from the OTiS e-Workshop, May 2000, Heriot-Watt University and The Robert Gordon University, online at http://otis.scotcit.ac.uk/casestudy/ (accessed 12 Feb 2001).

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A.3 Authors' details

Dr Jen Harvey is currently the Distance Education Officer at the Dublin Institute of Technology in Eire. After graduating from Aberdeen University with a BSc in Zoology, she completed a part time MPhil in Immunology from Edinburgh University while working within the Department of Surgery. From here she moved to the Department of Biological Sciences at Napier University where she helped to set up a departmental resource centre and started to work as a part time lecturer. This led to her firstly enrolling on a Dip Ed Tech course at Dundee and then going on to complete a PhD in science education in association with Glasgow University. Her main research area is in investigating ways of encouraging students to develop higher cognitive skills such as creative and scientific thinking through the use of appropriate teaching and assessment methods. She has also been involved in developing student induction programmes and setting up study skills support teams. Jen joined LTDI in 1995 as Implementation Support Consultant for the Life Sciences and in July 1996 took over the responsibility for implementations involving assessment and evaluation, editing the LTDI Evaluation Cookbook in 1998.

Carol Higgison was based at the Institute for Computer Based Learning at Heriot–Watt University in Edinburgh where she advised staff on the use of information and communication technologies (ICT) for learning, teaching and research. Carol was project manager of the Online Tutoring Skills project (OTiS), in partnership with the Robert Gordon University, and is co-author and editor of the OTiS e-Workshop publications. Carol is an online tutor for Open University, teaching on the MA in Open and Distance Learning. Previously Carol co-ordinated a national staff development programme to support the effective application of ICT in higher education. Carol is now an Adviser on Academic Quality Enhancement at the University of Bradford.

Dr Cathy Gunn is a senior lecturer in the Centre for Professional Development at the University of Auckland, New Zealand. Cathy was appointed in February 1995 to promote the effective use of technology in teaching and learning across the university, and to teach on the Masters Degree in Adult and Higher Education. A background in Industrial Relations and Economics Journalism predated her move into Educational Psychology and Software Development in the 1980s. Qualifications in this field include a Masters in Human Computer Interaction and a PhD in Computer Based Learning Research focusing on evaluation of learning technologies, both from The Institute for Computer Based Learning at Heriot-Watt University in Edinburgh where Cathy was employed until 1995. Current research interests in the field of Education Technology include professional development, policy implementation, evaluation of learning effectiveness and institutional change. Responsibilities within CPD include coordination of the Education Technology Programme Workshops and the PETS (Pedagogy and Education Technology Services) Network. She also provides consultancy services on a range of technology related issues from development and integration projects to strategic planning exercises.