The ELT Toolkit

ALT Workshop, 14th December, 1998

This document contains a draft of the ELT toolkit, prepared for the ALT workshop on evaluating learning technology courseware. The resources in this document should be seen in the context of the development work described in the two accompanying papers (Oliver & Conole, 1998; Oliver, Conole & Kewell, 1998).

The document contains the following sections:

An example evaluation problem that can be used to work through this booklet.

The ELT toolkit, incorporating:

1. Stakeholder analysis: table of stakeholders and concerns
2. Refining the evaluation question: exercises relating to the selection of an evaluation question
3. Selecting a methodology: comparison table
4. Selecting data capture methods: comparison table
5. Selecting data analysis methods: comparison table
6. Presenting the findings: list of suggested formats

The activities in the toolkit can be viewed in two parts: those addressing context (1, 2 and 6) and those detailing the actual evaluation design (3-5).

It should be noted that the guidelines and recommendations made in the toolkit can be (and arguably should be) the basis of discussion. They are not intended to be absolute or prescriptive.

References

Oliver, M. & Conole, G. (1998) Evaluating Learning Technology: a toolkit for practitioners. *Active Learning* no. 8, pp. 3-8.

Oliver, M., Conole, G. & Kewell, B. (1998) An overview of an evaluation toolkit for learning technology use. Proceedings of the IEE workshop on Exploiting Learning Technologies.

An example evaluation problem

You're working with a lecturer whose line manager wants them to use some new software the department's bought. They've been told to show that it helps students, and to demonstrate that it can save the department money. However, the lecturer has not been given additional time to carry out the work, and will have to rely on existing resources within the university (and their own limited budget). Plan an evaluation that will allow the lecturer to do this.

Stakeholder analysis

This section contains a list of stakeholders. Although 'stakeholders' are sometimes defined as the groups who have the ability to influence the situation, in this toolkit, the term is used to refer to anyone who has a stake in the evaluation process.

The list is presented as a series of headings. Under each of these are possible common concerns of stakeholders. The list of stakeholders and of concerns is not intended to be authoritative or exhaustive; users should adapt the list to their own local circumstances, adding in groups and/or concerns as appropriate.

Activity: From this list, it is recommended that users select one or two key groups of stakeholders. This will then provide a shortlist of concerns, any of which could form the basis of the subsequent evaluation.

Yourself

- The quality of students' educational experience
- Time spend on the activity
- Suitability of the resource, both technically and in terms of its content
- The extend to which the resource is integrated with other aspects of the course

Students

- The time required
- Whether this will help them pass their exams
- Whether the resource is easy to use
- Whether other activities in the course depend on them having used the resource

Managers

- Efficiency (is this the best use of time and resources?)
- Cost-benefits (do the benefits justify the resources required?)
- Student retention
- Pass rates

Funding bodies

- Quality of the learning experience
- Value for money

Support staff

- Whether the resource will require additional support, maintenance, etc.
- Whether the resource is properly integrated with other services

Formulating the Evaluation Question

The choice of question can have a large impact on the design of the study. Additionally, certain types of questions will be seen as more persuasive than others by the different stakeholder groups.

For these reasons, it is important to be aware of the range of alternative questions that could be asked. This section contains a series of short activities that will help users to generate related questions and then select the one that they feel is most appropriate to their situation.

Activity: From the list of concerns of the key stakeholder groups identified in the last section, select the one(s) that you want to concentrate on. Devise a question that addresses this concern.

Activity: Rephrase this question so that it is exploring the concern. Trying using words and phrases such as, 'what', 'when', 'for whom', 'under which circumstances', and so on.

Activity: Rephrase the original question so that it involves a comparison, either with an alternative resource, using another 'type' of student, or involving some other related situation.

Activity: Rephrase the question so that it involves some sort of measurement. This can either be in terms of scores, perhaps on some test of performance, or could use some other type of data. Possibilities include cost, time, number of occurrences, number of errors, number of people satisfying certain conditions, and so on.

Activity: Rephrase the question so that it forms some sort of 'opposite' to the concern. So, for example, if the concern is about maximising benefits, think about limiting disadvantages. If it is about widening opportunities, think about possible exclusion. If it is about changing things, think about understanding what the current situation is.

Activity: From the range of possible evaluation questions generated above, consider which will be the most suitable for study. You may wish to consider combining different possibilities (e.g. comparing two groups of students on a measure of performance that contrasts the new resource with the current situation).

Supplementary activity: instead of simply considering the possible questions, carry out a risk assessment exercise. Weight each group of stakeholders according to how important you consider them to be (say, from 0 to 5, with 5 as most important), and then weight each possible question (using the same scale), considering how well it will address that stakeholder's concerns. Multiply these weightings to give an indication of which questions stand the best chance of addressing the concerns of your key stakeholders.

Selecting a methodology

An evaluation methodology is, broadly speaking, an approach to carrying out the study. Methodologies often reflect a particular philosophy, and usually specify the types of data capture and analysis methods that are considered appropriate.

The table below contains a selection of methodologies that could be used to evaluate learning technology courseware. The list is not exhaustive; further examples can be found in Oliver (1998) and in the LTDI Evaluation cookbook, details of which can be found on their website, at: http://www.icbl.hw.ac.uk/ltdi/

In the table, the following terms and scales are used:

Scale

'Scale' is an indication of the number of students who need to be involved in this type of evaluation. A plus sign indicates that the method will be applicable to any size group above this number.

Exploration

This quality is used to distinguish between methodologies that are essentially about testing (and hence dismissing or favouring options) and those that are about understanding (and hence increasing the range of options available). A 1-4 scale is used, with the following suggested meanings:

1: Testing a hypothesis
2: Considering a range of possibilities
3: Generating a range of possibilities, focused on a particular topic or issue
4: Generating possibilities based on an immersion in the context

Authenticity

This quality distinguishes methodologies that are about controlling possible influencing factors from those that are about understanding the effects of context. A 1-4 scale is used, with the following suggested meanings:

1: Any factors that could influence the intervention are controlled whenever possible
2: The group is sampled in some way, but beyond this, factors are not controlled
3: An existing group (such as a class) is used, but the evaluation is intrusive
4: The evaluation takes place without disturbing the existing context

References

Oliver, M (1998) Innovation in the Evaluation of Learning Technology. University of North London, London.

Methodology	Scale	Exploration	Authenticity
Action research	1+	4	4
Action research (only one cycle)	1+	3	4
Cost-benefit study	0	3	1
Ethnographic study	1+	4	4
Experiment*	30+	1	1
Expert walk-through*	0	4	1
Focus group	4-8	3	2
Grounded theorising	1+	4	3
'Open' questionnaire	10-30	3	2
Integrative evaluation	25+	3	3
Tick-box survey	30+	2	2

*Note that experiments should have at least 15 people per group being compared.

Guidance on methodologies can be found in a variety of books and research papers. However, a good starting point is the LTDI Evaluation cookbook. Further suggestions for reading can be provided by the ELT project team, on request.

Users of the toolkit are encouraged to add to this list of options.

Activity: Firstly, in the table above, eliminate the methodologies that are inappropriate due to the scale of the study. Next, use the table to choose which methodologies are best suited to your evaluation question, in terms of authenticity and exploration.

Selecting data capture methods

After having selected a methodology, the next step in the design of the evaluation is to decide how the data will be collected. In most cases, multiple sources of data will be required in order to check the findings of the study through a process of triangulation.

The table below suggests a range of data capture methods. These are described in terms of time taken, focus and objectivity. These terms should be understood as follows:

Time taken

This is a reckoning of the amount of additional time (i.e. that is required above and beyond the evaluator's usual involvement in the educational activity) to capture the data. Methods have been classified on the following basis:

1: Takes little or no additional time to gather the data
2: Takes a matter of hours to gather the data
3: Data capture will take days to carry out
4: Data capture will take weeks to complete

Focus

Whilst certain techniques capture very specific data, others can take account of all sorts of unexpected, peripheral or novel information, such as (for example) the effect that discussion of the previous night's T.V. might have on a class's attention, and hence its indirect impact on performance on an activity. Methods have been classified on the following basis:

1: No 'correct' type of data is specified in advance; any data that has a bearing on events is recorded
2: The method is intended to take account of unexpected or peripheral data
3: The method can cope with a limited range of data
4: The data to be gathered must be precisely specified in advance

Subjectivity

Data can be either subjective, such as students' preferences or beliefs, or objective, such as replicable and independently verifiable behaviour. The methods in the table have been classified according to whether they (typically) gather objective or subjective data.

Data capture method	Time taken	Focus	Subjectivity
Costing*	3	3	(varies)
Participant observation (other people's teaching)	4	1	Subjective
Participant observation (own teaching)	1	1	Subjective
Performance test	2	3	Objective
Questionnaire: closed questions	1	4	Subjective
Questionnaire: open questions	1	2	Subjective
Structured interview	2	3	Subjective
Student diaries**	1	1	Subjective
Transcribed structured interview	3	3	Subjective
Transcribed unstructured interview	3	1	Subjective
Transcribed video log***	3	2	Objective
Unstructured interview	2	1	Subjective
Video log	1	2	Objective

*Costings can be objective, limiting themselves to readily quantifiable measurements, but often seek to assign a subjective 'worth' to events or possibilities by asking questions such as, "what opportunities have been created or passed by, and what are they worth", or, "how much would an individual want to be paid in compensation if this service were removed".

**Student diaries involve little data capture time on the part of the evaluator, but a considerable time commitment from the students.

***Transcriptions of videos take an estimate of ten hours per hour of video to complete; transcriptions of audio tapes take around four hours per hour.

Users of the toolkit are encouraged to add to this list of options.

Activity: Using the table above, shortlist the data capture methods relevant to the methodology you have selected. From this shortlist, choose the methods best suited to gathering the data you will need to answer your evaluation question. If possible, given the practical constraints of time, select a range of methodologies that complement each other in terms of objectivity and focus.

Selecting data analysis methods

Once the data is gathered, it will need to be analysed. Most types of data can be analysed in any one of a number of ways. In this section, a table containing a selection of analytical methods is presented. This compares methods in terms of the time required and the degree of abstraction of results.

Time required

As in the previous section, the time needed to analyse the data has been estimated, and methods have been classified on the following basis:

1: Each hour's worth of data captured can be analysed in a matter of minutes
2: Each hour's worth of data captured will take about an hour to analyse
3: Each hour's worth of data captured will take several hours to analyse
4: Each hour's worth of data captured will take days to analyse

The abstraction of results

Data analysis can generate results that differ in the way they present information. Findings can be contextual and illustrative, or can describe the situation in terms of some abstract framework or system of measurement. For this quality, methods have been classified as follows:

1: The results are presented in a richly contextualised way
2: The results are presented in the form of key points or highlights, given in relation to a description of the context
3: The results are largely decontextualised, such as categories of response
4: The results are presented using an abstraction such as measures of proportion, difference, etc.

Data analysis method	Time required	Abstraction
Classification using ready-defined categories	1	3
Classification using categories that emerge from immersion in the data	4	2
Cost statement	1	4
Descriptive statistics (using a software tool)	2	4
Analytical statistics (using a software tool)	2	4
Selected illustrative quotations	2	2
Reflective narrative	3	1

As with the other tables, users are encouraged to extend the examples included.

Activity: Using the above table, select an appropriate method of analysis for each of the data sets that will be gathered.

Presenting the findings

Having analysed the data, the study's findings should have been identified. The final step in the process 'closes the loop' by linking the findings back to the stakeholders.

There are many ways to present findings; a good list of alternatives is provided by Torres (1998). Options for presenting findings include:

- Data sets
- Executive summary of activity
- Narrative account of the evaluation
- Oral presentation
- Poster of findings
- Research reports
- Spreadsheet of costings

Activity: Consider each of the above options to decide which would be suitable to present each set of findings that have been produced. Which of these options would be most convincing for your key stakeholders?

References

Torres, R., Preskill, H. & Piontek, M. (1998) Evaluation Strategies for Communicating and Reporting. Sage, London.