Graham Attwell (ed.)

Evaluating E-learning

A Guide to the

Evaluation of E-learning

Evaluate Europe Handbook Series Volume 2

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Contents

Preface

Evaluating e-learning
A guide to the evaluation of e-learning

Who produced this guide?

This guide has been produced as a report on the work of the Models and Instruments for the evaluation of e-learning and ICT supported learning (E-VAL) project. The project took place between 2002 and 2005 and was sponsored by the European Commission Leonardo da Vinci programme. The project was coordinated by Pontydysgu from Wales.

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Who is this guide for and how can it be used?

This guide is for anyone interested in the evaluation of e-learning.

More specifically it may of interest and value to teachers and trainers involved in e-learning, to education, pedagogy and educational technology students and researchers, to policy makers and planners and to institutional managers.

Whilst the Models and Instruments for the evaluation of e-learning and ICT supported learning (E-VAL) project was primarily focused on research, the project resulted in the development of a number of new models and tools, which were tested in the final stages of the project.

This guide provides an overview of the research results of the project including the outcomes of an extensive literature review and an overview of different models and approaches to the evaluation of e-learning and a short review of the different models and tools developed through the project.

Thus, it may be of interest to those involved in the more theoretical research approaches to e-learning and to those who are looking for ways of evaluating e-learning programmes and courses.

The primary focus for the Leonardo da Vinci programme, which funded the project is vocational education and training. But we are aware that vocational learning takes place in a variety of different contexts and institutional settings. The use of new technologies is contributing to the breakdown of the divides between different sectors of education and leading to a widening of the contexts in which learning takes place. The models and tools outlined in this guide have been tested in Small and Medium enterprises and in community education, as well as in the more traditional vocational college and university settings.

The format of this guide has designed to be flexible, to allow users to dip in and out of different sections. Nevertheless, we would urge those whose primary interests are the practical and applied evaluation of e-learning to at least quickly look at the more research oriented sections of the guide and vive versa, those whose focus is more on research, to examine the different models and tools which have been developed. It is our strongly held belief that one problem in e-learning, and especially the evaluation of e-learning, is the lack of iteration between theory and practice.

The guide does not claim to be the final answer to the issue of evaluating e-learning. We claim only to have made some modest progress towards solving a number of important issues. We hope that others will build on our work in developing new insights and new models and tools in the forthcoming period. The project partners are continuing to develop the different models and tools described in the guide and the evaluate-europe web site will provide up to date information on those developments.

The guide itself is only a summary of what was produced for the project. Access to more detailed papers and to the full models and tools themselves is provided through the project web site and different sections of the report index links to section to that site.

Contents of the guide

Section 1

Introduction – why do we need new models and tools for the evaluation of e-learning

Development of e-learning products is one of the most rapidly expanding areas of education and training

Is e-learning effective?

E-learning is also one of the areas that attracts the most research and development funding

The development of e-learning products and the provision of e-learning opportunities is one of the most rapidly expanding areas of education and training. Whether this is through an intranet, the internet, multimedia, interactive TV or computer based training, the growth of e-learning is accelerating. However, what is known about these innovative approaches to training has been limited by the shortage of scientifically credible evaluation. Is e-learning effective? In what contexts? For what groups of learners? How do different learners respond? Are there marked differences between different ICT platforms? Does the socio-cultural environment make a difference? Considering the costs of implementing ICT based training, is there a positive return on investment? What are the perceptions of VET professionals? What problems has it created for them?

E-learning is also one of the areas that attracts the most research and development funding. If this investment is to be maximised, it is imperative that we generate robust models for the evaluation of e-learning and tools which are flexible in use but consistent in results.

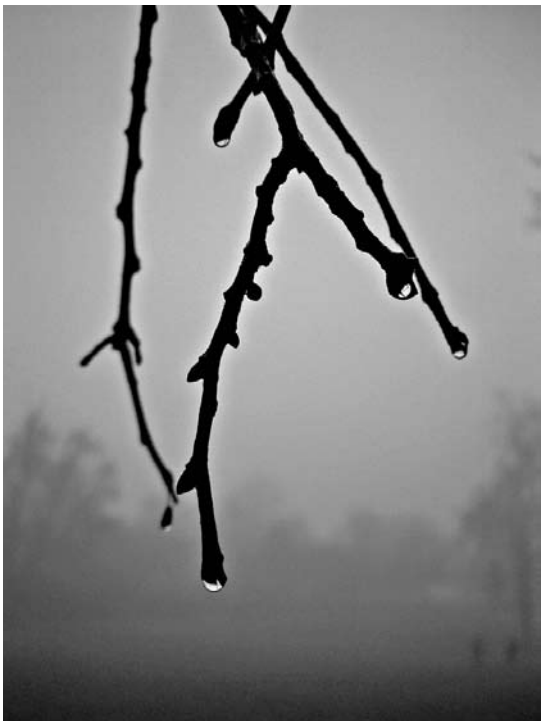
> *"Although recent attention has increased e-learning evaluation, the current research base for evaluating e-learning is inadequate … Due to the initial cost of implementing e-learning programs, it is important to conduct evaluation studies."*
>
> *(American Society for Training and Development, 2001).*

The Capitalisation report on the Leonardo da Vinci 1 programme, one of the biggest sponsors of innovative e-learning projects in European VET, also identified the lack of systematic evaluation as being the major weakness in e-learning projects.

However, whilst some have been desperately seeking answers to the question 'What works and what doesn't work?' and looking for ways of improving the quality of e-learning, the response by a large sector of the community of e-learning developers and practitioners has been a growing preoccupation with software and platforms. There has been only limited attention to pedagogy and learning. The development of models and tools for the evaluation of e-learning can help in improving the quality of e-learning and in informing and shaping future development in policy and practice.

Section 2

Evaluating e-learning – what does the literature tell us?



The Evaluation of e-learning project undertook a collaborative review of literature on the subject. Over one hundred reviews have been added to the project database and may be accessed through the project web site. This is what we found out.

Categorising the literature

In general there is an overwhelming preponderance on the evaluation of technology, usually through ethnographic research methods (questionnaires to participants).

However, it is possible to identify identified ten main categories of literature.

Case studies of specific e-training programmes

For the most part these are descriptive rather than analytic or predictive, predominantly American, mainly located in a Higher Education rather than vocational training environment and focused on the 'virtual classroom' model. They also tend to be restricted to particular subject areas, in particular IT, languages and engineering disciplines. (This is not necessarily to say that e-learning is restricted to these areas, rather that they are over-represented in evaluation reports.)

Comparisons with traditional learning

There are some (but surprisingly few) systematic studies that compare e-learning effectiveness with traditional learning and which are empirically robust. Those that exist are mainly small-scale studies, often using a matched pairs design and are frequently of very specific instances of e-learning in which the e-learning methodologies are idiosyncratic and the conclusions cannot be generalised.

Tools and instruments for evaluation of e-learning

There is an abundance of literature detailing tools for the evaluation of e-learning. However, these are mainly divided into two types. Firstly there are many on-line data gathering instruments for assessing, typically, the user interface characteristics of software (e.g. student perception questionnaires) or secondly, there are devices to record and analyse usage by duration and frequency of log-in, pages accessed, user profile etc. Many of these are sophisticated in their design and ingenuity but lack guidance on interpretation and analysis.

Return on Investment (ROI) reports

There are surprisingly few ROI reports, considering the huge investments into e-learning at all levels. The majority of those that exist draw mainly from industry based examples and are written from an HRD perspective. The conclusion is inevitably that the investment was cost-effective and represented value-for-money but often the savings are defined in efficiency rather than effectiveness with no long-term impact analysis that takes account of unintended outcomes and consequences. It is also difficult to compare figures across reports because the distinctions between net and gross costs, capital and revenue costs, displacement of existing funds, costs over time etc. are often blurred or missing. Many ROI type evaluation reports appear to be justifying investment rather than evaluating it and more geared to an audience of shareholders rather than researchers.

Benchmarking models

There have been several attempts to generate sets of criteria for quality assuring e-learning. However, these tend to be skewed towards proposing quality standards for e-learning systems and software which often disregard key variables in the wider learning environment or are based on criteria associated with evaluating traditional learning processes (and which disregard the technology) or criteria associated with measuring learner achievement through traditional pedagogies. An additional problem is that the designers of these benchmarking systems are often locked in to a particular model of e-learning which limits their transferability.

Product evaluation

By far the greatest number of `hits' on evaluation of e-learning are reports describing (and extolling the virtues of) particular education software. The vast majority of these reports are commissioned or published by the software developers. This is not to question the usefulness of these reports or necessarily to doubt their validity but evaluation of 'de-contextualised' software is not an acceptable substitute for the rigorous evaluation of e-learning systems.

Performance evaluation

Scrivens (2000) in the USA, uses the term 'performance evaluation' for what would, in European terms, be called student assessment. Whilst it is true that an examination of student performance is a powerful indicator of the effectiveness of e-learning, it is by no means the only one. Moreover, a survey of reports on performance evaluation in the context of e-learning were mainly concerned with on-line tools and instruments for examining knowledge-based learner performance and could therefore be categorised under that heading.

Handbooks for the evaluation of e-learning

There is an increasing number of handbooks for e-learning which focus primarily on evaluation. The evaluation methods and tools differ widely. What they do have in common is that they recognise the importance of evaluation and many propose that evaluation should be an integral part of any e-learning initiatives or development. In this regard, they tend toward a management model of evaluation; the primary aim of the evaluation is to provide feedback to influence e-learning implementation and future development.

Many of the handbooks appear to have been produced by education advisors and advisory

services and agencies. They are frequently quite basic and lack a theoretical approach. A surprising number cite The Evaluation Cookbook and appear to have borrowed many of their ideas from this influential publication. More worrying is the technology centred approach that many of the guides espouse.

Meta-studies

There are a number of meta-studies of the evaluation of e-learning, all of them based on US literature. These are attempting to answer the question of the effectiveness of e-learning by combining or bringing together the results of a series of different studies to provide a larger sample base. Although, obviously, the methodology is open to some question, these studies are interesting and offer a new approach to the issue,

Studies on the contribution of evaluation to metadata

This cannot be called a category of literature on evaluation as such, as this literature only includes evaluation as one of the factors to be taken into consideration in developing metadata. But, it is very important for the future of e-learning evaluation and will be explored further in the notes below.

Disciplinary backgrounds

It was notable that there are considerable differences in the disciplinary background of the authors and in the journals in which they were published or conferences they were presented at. These include:

- Education and training journals and conferences
- Journals and conferences relating to the use of Information and Communication Technologies for learning
- Specialist evaluation journals and conferences
- Journals and conferences around the psychology of learning.

The disciplinary background of the researchers/authors tends to determine their approach to evaluation. For instance there is more likelihood that learning technologists focus on the development of tools for evaluation, whist those coming from evaluation studies are more likely to consider how traditional models of evaluation can be applied to e-learning. Psychologists are more likely to undertake comparative studies. What is the importance of this? It suggests that we need teams of evaluators or of researchers from different disciplines to develop cross-disciplinary approaches to the evaluation of e-learning

Issues and gaps

First, the positive things which have emerged form the literature review.

There appears to be a growing realisation of the importance of evaluation. This seems to be linked to concerns that e-learning is not succeeding in the way that had been expected. Evaluation is needed to gain a better understanding of the problems and issues regarding e-learning.

There is also an increasing focus on evaluation methodologies and a realisation that the evaluation of e-learning is complex and requires the development of new models and approaches.

Evaluation and assessment

However there remains confusion between evaluation and assessment. To some extent this can be explained by different understandings of evaluation in different countries and by the linguistic confusions between the two processes. However, I think it goes further than this. There appears to be an over reliance on assessment or achievement as the basis for evaluation. That is not to say that learner achievement is not an evaluation factor. But the assumption that if something has not been assessed it has not been learnt is surely wrong. Furthermore, such an approach misses informal learning and learning not included in the assessments.

Pedagogic and curricular approaches

Two big gaps stand out in the literature reviewed. The first is the complete lack of any

evaluation – or attempts to evaluate – pedagogic approaches of e-learning. This is in contradiction to the increasing emphasis of e-learning researchers and developers on the pedagogy of e-learning.

Evaluation approaches still tend to focus on the functionality of the learning technologies and not on the learning which is facilitated by the functionality. If pedagogy is such an important factor in e-learning, then an important role for evaluation is to assist researchers through providing an understanding of the impact of different pedagogic approaches. At the same time, in the European literature there is often an assumption that constructivism is the proven and best pedagogy for e-learning. Furthermore, it is often hard to know what the authors mean or understand by constructivism. In the way the term is being used constructivism is only a means of describing in one category all the varieties of creative, perceptive and innovative approaches to facilitating the acquisition of new knowledge.

Linked to this lack of clear focus on pedagogy is a similar gap in the evaluation of curricular approaches. Why is this important? In the technical developers world a debate has been raging for the last three years over something called learning objects. Learning objects have been seen as one of the main answers to the problem of sustainable content creation. A learning object is any digital, reproducible and addressable resource used to perform learning activities or learning support activities, made available for others to use. The problem is that is order to develop reusability, objects need to be granular. This means that e-learning developers are promoting modularity as a curricular process, driven by technical need. Many critics are concerned that modularisation and granular learning object will challenge the coherence of learning programmes. Since this is such a key debate in fort e-learning development, surely evaluation should focus on what is happening and whether modular programmes built from learning object can work.

Perhaps the lack of such studies just reflects a time delay, before evaluation catches up with technical and e-learning development. Yet I think it reflects the need for accompanying evaluation where evaluation takes place alongside technical development and innovation. Secondly, it suggests to me that a discourse is needed between technical developers and innovators and evaluators with a better understanding or both of what the other is doing.

Programme and policy evaluation

The second gap in the literature review is programme and policy evaluation. Every country and most large institutions have active policy driven programmes to develop e-learning. However, there are few programme level evaluation reports, and still less models or theoretical approaches for evaluating e-learning policy. This is both surprising and worrying. Without evaluation, how do we know which policy approaches are working and which are not? I remain suspicious that e-learning is merely seen by policy makers as a 'good thing' and that money is being invested with little understanding of where or why.

Metadata

As I mentioned earlier there are a growing number of references to evaluation in the technical literature around metadata. I think this is a significant development. Metadata is simply data about data. However, it is crucial in allowing computers to know what exists on other computers and providing a machine-readable description of learning resources. At first it had been assumed that creators of learning resources would provide the metadata according to some kind of agreed common schema or standard. More recently, is a realisation that in education many different people have an interest and role in providing the metadata associated with any given object – developers, teachers, trainers, curriculum developers, technical developers, librarians and archivist, students and trainees and evaluators. Clearly, it would be absurd

to expect material developers or creators to add an objective description of the quality of their own learning materials and evaluation may play a critical role in describing quality. Technically the debate is around distributed metadata and how all the different data which becomes naturally associated with an object or learning materials in the course of their development, deployment and use, can be found and aggregated.

Once more, I think this growing debate shows a necessity for evaluators to work alongside technical developers and at a more theoretical level for a discourse around ideas.

Section 3
A framework for the evaluation of e-learning

What framework?

What factors are being disregarded or edited out of the framework?

How might this framework be used?

From a baseline of practice of attempting to evaluate many e-learning programmes, one of the biggest problems has proved to be handling the number of variables which potentially impact on the effectiveness of the programme and deciding what constitutes dependent, independent and irrelevant variables in a given situation.

Literature reviews and the study of existing evaluation practice, suggests that many evaluation tools and schema tend to disregard – consciously or otherwise many of these variables. Much of existing practice is overly focused on the technology – and on learner reaction to the use of technology. Socio-economic factors such as class or gender are seldom considered and even learning environment variables such as the subject environment are all too often ignored.

Not only does this result in limitations in the data available on the use of ICT in learning but the limited recognition of the different variables can distort analysis of the weaknesses (and strengths) in current e-learning provision.

The evaluation of e-learning project has developed a more comprehensive framework. Over several e-learning evaluation projects, five major clusters of variables have emerged; individual learner variables, environmental variables, technology variables contextual variables and pedagogic variables. Each of these can be disaggregated into more precise groups and further disaggregated until individual variables can be identified and isolated.

Of course we recognise that no single evaluation model or tool, much less evaluation study, can address every variable. But, we believe in approaching and designing any evaluation it is important to be conscious of

what factors are being disregarded or edited out of the framework.

Individual learner variables include

- physical characteristics (e.g. age, sex, physical abilities)
- learning history, (negative/positive experience, level of attainment, duration, recency etc.)
- learner attitude (positive/negative)
- learner motivation (high/low)
- familiarity with the technology

Learning environment variables include

- the immediate (physical) learning environment
- the organisational or institutional environment
- the subject environment

Contextual variables include

- socio-economic factors (e.g. class, gender,)
- the political context (e.g. who is funding/paying for the e-learning and for what reason?)
- cultural background (e.g. how highly is learning/e-learning valued?)
- geographic location (e.g. country, language, urban/rural)

Technology variables include

- hardware
- software,
- connectivity,
- the media
- mode of delivery,

Pedagogic variables include

- Level and nature of learner support systems
- accessibility issues.
- Methodologies
- Flexibility
- Learner autonomy
- Selection and recruitment
- Assessment and examination
- Accreditation and certification

How might this framework be used ?

Firstly the framework can be used to develop a robust classification system with clearly identified levels of aggregation, (which themselves may be context determined) for mapping and coding existing work into the effectiveness, efficiency and economy of e-learning irrespective of whether this is an evaluation or an independent research study. Methodologies are cross-referenced against the variables being studied and major areas of omission can be identified that in turn will suggest a future research agenda.

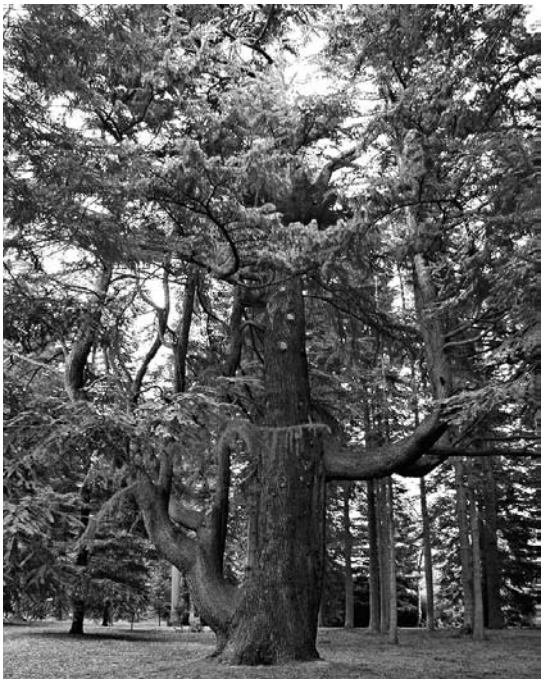
Secondly we are using the clusters of variables can be sued for proposing and testing hypotheses. Any one cluster can act as the dependent variable; the other four then operate as independent variables. For example, at the micro level, part of the Eval project has tested the hypothesis that the effectiveness of different e-learning pedagogies will depend on particular individual learning histories. Another survey explored whether the effectiveness of particular technologies depends on gender. At a macro level we are also interested in whether the presence (or absence) of some individual variables or clusters of variables are more significant than others in determining the effectiveness of e-learning and, if so, can they be weighted in some way? Is the profile of the learner more significant than the nature of the learning environment? Is the effectiveness of the technological solution outweighed or enhanced by particular environmental variables? Which is more important – getting the software right or the learner support right? Can we use statistical techniques such as factor analysis to see which variables 'cluster' together and impact on each other?

We were not able to test every variable in the limited time and resources available to us through he project. However, the research we were able to undertake proved the value of the framework as a tool for research and confirmed the validity of the framework design.

Thirdly, we have found it a useful framework for evaluating and researching the effectiveness of specific e-learning projects and programmes. The evaluation of e-learning, and research into the evaluation of e-learning, has been dominated by descriptive ethnographic studies, rather than interpretation and analyses

and there is a predominance of ethno-methodological approaches, in particular, heavily contextualised case studies. The relatively small number of empirical studies has focussed on a limited number of variables. The best of these have controlled for variables other than those under study; the worst have simply discounted them. As the databank of research results is built up, particularly as the different variables are 'weighted', it becomes easier to identify the irrelevant variables and allow for the impact of others. It also allows predictions to be made which can short circuit the search for an appropriate evaluation methodology.

Section 4
Models and theories of evaluation



Evolution of evaluation theory

Philosophical /ideological difference

Differences based on defining value or worth

Differences according to discipline or field of application

Differences in practice

A classification schemata for evaluation approaches

Evolution of evaluation theory

Evaluation as a formal activity that we would recognise, has existed for a surprisingly long time. One of the earliest recorded was the evaluation of the effectiveness of lime-juice in preventing scurvy in sailors – commissioned by the British navy in the 18th century! The French make even earlier claim and say that the Norman armies conducted an evaluation of the relative effectiveness of the crossbow and the longbow. Unfortunately, on the basis of the evaluation findings, the management decision was to go for the crossbow and the rest, as they say, is history!

However, evaluation has only become a recognised area of academic study since about the 1960's. It is probably true to say that evaluation started as a field of practice and the theory was derived from it. As it evolved, so ideological disputes developed alongside disagreements on definitions, terminology, ethics and so on. FitzPatrick, Sanders and Worthern in 2004 identified nearly 60 different models in the 30 years between 1960 and 1990 alone. This proliferation of models was bewildering for the practitioner, especially as many of these models and the tools they generated had no obvious theoretical perspective.

Why is this a problem? Why should practitioners need a theoretical framework? Simply, a 'good' theory will set out the assumptions that it is making and on which its logic is predicated. Different theories make different assumption and generate models that will be based on different pre-conceptions and definitions of evaluation, which in turn lead to very different practices.

Deriving a taxonomy of evaluation approaches

Many researchers have tried to make sense of this huge diversity of models and theories and to find some way of classifying them. However, even they could not agree so now we have the problem of trying to classify the classification systems!

All this is by way of saying that what follows is only one framework for distinguishing between different theories of evaluation and you may well come across others. This framework, which we find comprehensive and useable, was devised by FitzPatrick, Sanders and Worthen (2004) who we have quoted at length.

Philosophical/ideological differences

Approaches to evaluation may differ fundamentally because their underpinning philosophy or ideological base is different. That is, different evaluation theories will be based on different assumptions about the way the world works and so the models and practices based on those theories will be different as well. By and large, we can locate them on a continuum from objectivist to subjectivist.

Objectivism is equivalent to the empirical tradition in scientific research (positivism) and focuses on data collection and analysis techniques that produce results that are reproducible and verifiable by other evaluators and to generate conclusions that are evidence based and which can be 'scientifically' justified. So the evaluation is 'external' to the evaluator who is simply someone technically competent and proficient in the application of procedures.

Subjectivism is based on:

> *"... an appeal to experience rather than to scientific method. Knowledge [of the evaluator] is conceived as being largely tacit rather than scientific."*
>
> *(House 1980 in FitzPatrick, Sanders and Worthen 2004)*

The validity of a subjectivist evaluation depends on the relevance of the evaluators' background, their experience and expertise, the keenness of their perceptions and their insightfulness in generating interpretations and conclusions. Thus, the evaluation procedures are 'internal' to each evaluator and are not explicitly understood or reproducible by others.

Until 20 years ago, objectivism in evaluation was a goal to be aspired to. However, the same criticisms levelled at the usefulness of positivism in the social sciences in general were also applied to objectivism in evaluation.

Campbell (1984) summed it up:

> *"twenty years ago positivism dominated the philosophy of science...Today the tide has completely turned among the theorists of science in philosophy, sociology, and elsewhere. Logical positivism is almost universally rejected."*

This point of view has been upheld by many writers on evaluation and even if it is not universally subscribed to, probably represents a general trend. The major argument is that unlike traditional scientific research, evaluation has to deal with complex phenomena in real world settings, take into account a multiplicity of stakeholders, unstable and unpredictable systems and requires a high level of human interactivity.

The other criticism is that objectivism depends for its validity on its 'scientific' methodology and is only credible if you happen to value that methodology. We would argue that objectivism conceals hidden values and biases of which many evaluators are unaware – even the choice of data collection techniques and instruments is not value-neutral but this is not recognised or else ignored by many so-called objective evaluations.

Despite the reaction of the theorists, however, the message does not seem to have filtered through to the client base and the majority of evaluation consumers, particularly in education (and the public sector in general), are still wedded to the idea of objective evaluation and 'finding the facts'.

The major criticism is that subjectivist evaluation often leads to contradictory conclusions that cannot be reconciled because the processes which led to the conclusions is largely inside the evaluators head and so cannot be replicated.

Differences based on defining value or worth

We can also distinguish between different theoretical approaches depending on how they define value and make judgements, rather than on their philosophical differences. This time the continuum extends from 'utilitarian' to 'intuitionist-pluralist'.

'Utilitarianism' is a philosophy based on maximising happiness in society. Utilitarian approaches to evaluation are based on the premise that the best programmes are those that achieve the greatest good for the greatest number. The evaluator will try and assess overall impact in terms of total group gains by using average outcome scores against the criteria selected to determine worth. Again, governments and the public sector tend to be adherents of this type of evaluation as it lends itself to large-scale comparisons of programmes and mass aggregation of data. Managers and public programme administrators tend to be the main audiences.

According to FitzPatrick et al, the intuitionist-pluralist approach is at the other end of the spectrum and is based on the premise that value depends on the impact of a programme on each individual and the 'greatest good' is that which maximises the benefits for all stakeholders. This evaluation focus will be on the distribution of gains (for example by cultural or sub-cultural demographic groups such as ethnicity or gender or age) or distribution of benefit across stakeholders (e.g. learners, administrators, delivery agencies, funding bodies, the public). There can be no common index of 'good' but rather a plurality of criteria and judges. The evaluator is no longer an impartial 'averager' but a portrayer of different values and needs. The merit or worth of any programme depends on the values and perspectives of whoever is judging it and all stakeholders are legitimate judges.

Methodological differences

Although there is a strong correlation between an evaluator's ideological approach and the methodology and techniques they will use (because of necessity one drives the other), there are other major divides based on methodological differences that are not necessarily rooted in a particular philosophical approach. For example, many evaluators (both theoreticians and practitioners) and also many clients tend to view qualitative and quantitative approaches as different paradigms. We do not subscribe to this view, believing that this is not a fundamental divide but simply a way of describing evaluation approaches by types of data that are used. Nevertheless, we recognise this as an important distinction for others and one that impacts on the overall evaluation methodology and the tools used.

Differences according to discipline or field of application

Evaluation is a relatively young field and still draws heavily on methodologies adapted from anthropology, sociology, psychology, philosophy, economics and mathematics. One of the consequences is that evaluation approaches can be grouped around their parent discipline so we tend to find 'mathematical approaches' or 'sociological approaches'. More recently the search for new models has widened its net and evaluation theorists such as Smith (1981) are trawling newer disciplines such as investigative journalism, photography, storytellling, philosophical analysis, forensic pathology and literary criticism for new ideas.

Evaluation theory has also developed in a social context and practitioners work in different cultures, different sectors, with different target groups and different audiences. Consequently, different approaches and models have tended to emerge based on these factors. For example, 'education programme' evaluation has developed along a different trajectory than, for example, the health services. Whilst many writers would argue that this is not a true theoretical divide, 'theory-in-practice' is a powerful determinant of evaluation approach and also stakeholders perceptions and expectations of the evaluation process.

Differences in practice

The above distinctions are all based (loosely) on theoretical divisions. However, FitzPatrick et al also point out that differences in approach can be practice-driven.

Firstly, evaluators disagree about whether evaluators should simply provide information so that decision makers can make the value judgements. Others, would say that the evaluator's report to decision makers is incomplete if it does not contain a value judgement.

Secondly, evaluators differ in their perception of their own role and their place in the evaluation process. Who has authority and responsibility for the evaluation and to whom should the evaluator be accountable and answerable? If one evaluator sees his role as a 'critical friend' and another as 'inspector' or 'judge', then this will obviously influence the way they conduct an evaluation and also the conclusions they draw.

Thirdly, evaluators will be limited by their prior experience both in evaluation and also by their own discipline or professional background. Evaluation skills and knowledge are cumulative. Previous exposure to frequently recurring problems will affect the way an evaluator works. On the one hand it will probably mean the evaluator is quicker to detect problems, to identify issues of concern and make more insightful judgements. On the other hand, it will also mean that the evaluator's perceptions in a new situation are unlikely to be 'neutral'.

Fourthly, evaluators have different views about what skills and expertise they should possess. Evaluators are frequently chosen on the basis of their expertise or practitioner base in the field being evaluated rather than on the basis of their skills and experience as an evaluator. This is gradually changing but as evaluation is becoming increasingly professionalised and recognised as a specialist area in its own right, so professional evaluators are becoming specialised within the area. Some evaluators would argue that specialist knowledge of the field being evaluated is a pre-requisite for the credibility of the whole process of evaluation. Others claim that not only is this unnecessary but can, on occasions, be unhelpful.

A classification system

The above analysis is interesting and helps understand the major theoretical divides in evaluation. However, it does not get us far in terms of systematically examining the variation between particular evaluation approaches because although those approaches could be positioned on each of the above 'dimensions', their location would vary from one dimension to another. The next section tries to provide some answers.

Many evaluation theorists have attempted this but we are going to stick with the solution put forward by Fitzpatrick, Sanders and Worthen (1983). We are proposing to use their work – with some modifications – partly in the interests of consistency (having referenced them heavily so far) and partly because they set out very clearly the thinking and rationale underpinning their classification system.

For the purist it is a less than satisfactory taxonomy as the approaches do not necessarily differ from one another along the same dimension. However, they are pragmatic as they conveniently represent the major clusters of models and approaches in use today.

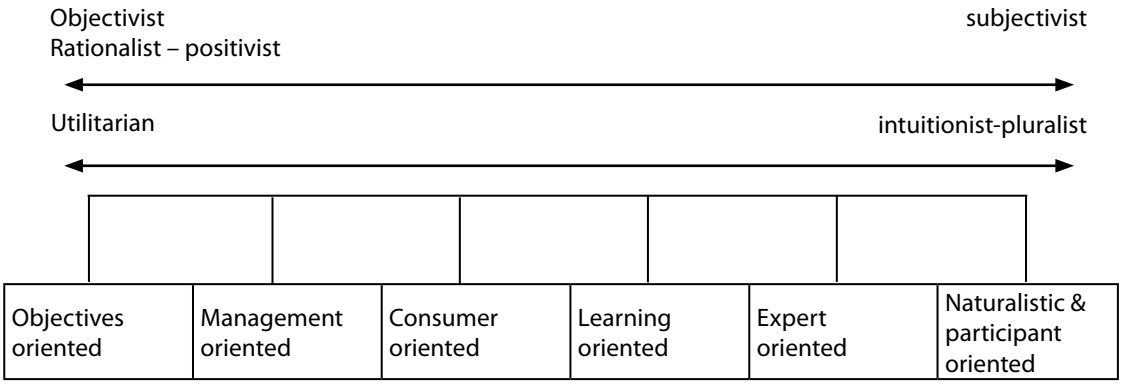
A classification schemata for evaluation approaches

FitzPatrick et al identify 5 major clusters of evaluation approaches:

- Objectives oriented approaches
- Management oriented approaches
- Consumer oriented approaches
- Expertise oriented approaches
- Participant oriented approaches

However, to this we propose to add Van der Knapp's 'learning oriented approach'.

These 6 categories fall more or less along a continuum from utilitarian to intuitionist-pluralist so there is some logical basis in addition to its convenience and accessibility (see figure 1).



A Continuum of Evaluation Models

Figure 1: A Continuum of Evaluation Models

Objectives orientated evaluation approaches

Objectives-orientated evaluation is based on the idea that the purposes, goals or targets of a project are determined at the start and the evaluation process should establish whether these have actually been achieved – and, if not, why not. It is very similar to another approach known as 'a systems approach' to evaluation and both are very popular with public sector agencies who are concerned with justifying expenditure and performance measurement. It is sometimes called 'goal-driven' evaluation, in contrast with other approaches, which are called 'goal-free'.

There are many examples of objectives orientated models; the earliest is probably Tyler's and more recently, Provus's Discrepancy Model.

The disadvantages are that this sort of approach can miss important outcomes if they were not included in the original objectives nor does it challenge the value of the objectives themselves

Management orientated evaluation approaches

The management-orientated approach to evaluation is meant to serve decision makers. Its rationale is that evaluation information is an essential part of good decision making and that the evaluator can be most effective by focussing the evaluation products on the needs of managers, policy-makers, administrators and practitioners.

Developers of this approach have traditionally relied on a systems approach to evaluation in which decisions are made about inputs, processes and outputs based on logic models and cybernetic theory. However, more recent developments have highlighted different levels of decision and decision makers and have focussed on who will use the evaluation results, how they will use them and what aspect(s) of the system they are making decisions about.

Not surprisingly, it is the model preferred by many managers and management committees but the downside is that the needs of other stakeholders are ignored.

Stufflebeam's CIPP model is one of the most popular in management-orientated evaluation.

Consumer orientated approaches

Consumer orientated approaches to evaluation adopt the perspective of the end user of whatever service or product is being provided. For this reason they tend to be summative, rather than formative and are concerned primarily with product evaluation. Consumer-orientated evaluation relies heavily on criteria referenced evaluation techniques such as benchmarking or kite marking and is understandably popular with standards agencies and 'watchdog' organisations.

Michael Scrivens 'Key Evaluation Checklist' is probably the best-known example.
The major disadvantage of a consumer-orientated approach is that it is a 'backward-mapping' approach and does not help make predictions about future impacts. It also tends to play down the nature of human interaction with the products being evaluated.

Expertise orientated approaches

Expertise orientated evaluation is based on the notion of 'connoisseurship' and criticism and relies on the subjective professional judgement and expert knowledge of the evaluator. This is the oldest form of evaluation and is still very popular despite its limitations.

Expertise-orientated evaluation may be formal or informal, based on individual expertise or, more usually, on the collective expertise of a panel. The opinions of multiple experts is popularly believed to minimise bias, though this does not always follow! It relies far less on external tools and instruments than other forms of evaluation and more on the experience and wisdom of the evaluator.

Many public systems are based on expertise orientated evaluation – for example the jury system, school inspection system, licensing agencies, review boards, the refereeing system for academic journals, national commissions and enquiries and so on.

Many organisations expect this type of evaluation if they employ an external evaluator and the notion of evaluation by 'peer review' is still the dominant model in most professional associations.
The disadvantages are obviously the high reliance on the assumed expertise of the evaluator and a lack of explicit and published standards. Also, the credibility of results is affected by the status of the evaluator but equally the credibility of the evaluator is often affected by the results.

Learning-orientated evaluation approaches

This is a relatively new group of approaches and not one that was included in FitzPatrick et al's classification. Nevertheless we have included it because it is an approach that we personally use more than any other.

The operating principle is that the purpose of evaluation is to contribute to some form of collective or organisational learning. Different models within this overall approach are based on different theories and types of learning including 'corrective' or behavioural learning, cognitive learning and social learning. The outputs and processes of the evaluation form the inputs of the learning.

The pioneer of work in this field was Peter Van der Knaap. More recently we have extended the approach to include evaluation as a contributor to knowledge creation in an organisation.

Learning-orientated evaluation approaches are still not widespread but are beginning to gather momentum in the social agency sector, in education establishments and in voluntary organisations.

The main limitations of this approach is that it does not lend itself to 'mass surveys' as it relies heavily on personal interaction between the evaluator and the project team and the evaluator's understanding of the learning needs of the organisation. Also, within this overall approach there are very disparate models, some requiring a high level of commitment to the process, which may be lacking.

Participant-orientated evaluation approaches

An increasingly popular approach that differs fundamentally from all the others as it takes the needs of project participants as its starting point. This is not to say that the other approaches ignore participant needs but that for the most part benefits for participants represent the end point of the evaluation and not the beginning.

Participants are not simply the direct beneficiary target group of a project but will also include other stakeholders and potential beneficiaries. Thus, an educational project for women returners would include the learners themselves, the project staff, the management team and the funders but may also include the wider community, the learners families,

the schools attended by the learners' children, childcare agencies or whatever.

Participant-orientated evaluation does not usually follow a formal plan drawn up in advance; rather it looks for patterns in the data as the evaluation progresses. Data is gathered in a variety of ways, using a range of techniques and culled from many different sources. Understandings grow from observation and bottom up investigation rather than rational deductive processes. The evaluator's role is to represent multiple realities and values rather than singular perspectives.

Participant-orientated evaluation includes many sub-groups that share all or some of the above characteristics including Responsive Evaluation, Naturalistic Evaluation, Utilisation Focussed evaluation and Empowerment Evaluation. Of all the models, probably the best known and one of the most useful is Stakes Countenance Framework.

Criticisms of this approach are many; bureaucrats tend to hate it because of its lack of 'objectivity' and because the outputs of the evaluation are unpredictable. It is difficult to cost and control. Without a very experienced evaluator to facilitate the process, it can degenerate from an 'organic' approach to one which is chaotic and lacking in focus. Also, there may be concentration on process at the expense of outputs.

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Section 5
New models and tools for the evaluation of e-learning – an overview

Models and tools for evaluation of e-Learning in higher vocational education

Models and tools for evaluating e-learning policy

Tool for the evaluation of the effectiveness of e-learning programmes in small and medium sized enterprises (SMEs)

Evalact

The SPEAK model and tool

The remainder of this guide is given over to a description of the different models and tools developed through the project. We do not suggest this is a comprehensive selection – but it does illustrate the different models and tools which can be deployed. Central to our project's findings are that evaluating e-learning is no different than evaluating any other form of learning – but that there are many variables and that the models and tools must take account of the different aims of the evaluations and contexts in which e-learning is taking place.

The following models and tools have been developed through the project and are described in more detail in the following section.

Models and tools for evaluation of e-Learning in higher vocational education

The learner-benchmarking tool developed for the evaluation of e-learning in higher vocational education is a consumer tool in order to evaluate the use of Virtual Learning Environments (VLE). It is based on an on-line questionnaire including items on the appraisal of the VLE used by the teachers in their courses.

The Learner Evaluation tool is focused on the guidance or scaffolding teachers provide within the VLE and is based on constructivist principles.

A management oriented approach to the evaluation of e-learning

The management oriented approach to the evaluation of e-learning is a model and tool designed to provide formative feedback for

decision making in developing and implementing an e-learning programme. It is based on the CIPP model. There are three variants of the tool for a) Educational institutions; b) small and medium enterprises; d) Large companies

Models and tools for evaluating e-learning policy

The models and tools for evaluating e-learning policy are based on the framework for the evaluation of e-learning. The five different groups of variables are further broken down to provide differentiating factors or criteria against which a policy can be evaluated. The tool is designed for uses in policy evaluation at any level – national, regional or institutional.

Tool for the evaluation of the effectiveness of e-learning programmes in small and medium sized enterprises (SMEs)

The model and tool for the evaluation of the effectiveness of e-Learning programs in SMEs has been designed to provide an easy-to-use instrument to carry out a retrospective evaluation of an e-learning program. This retrospective analysis should enable enterprises to detect weaknesses and strengths of their learning program with regard to its organisational, pedagogic and technological implications.

Evalact

Evalact is an electronic tool, designed to allow facilitate the evaluation of individual learning. It allows the creation of on-line questionnaires and provides rich feedback and statistical evidence for evaluators. It also allows the comparison of different evaluation instances and provides graphical interfaces for assisting in the analysis of evaluation data.

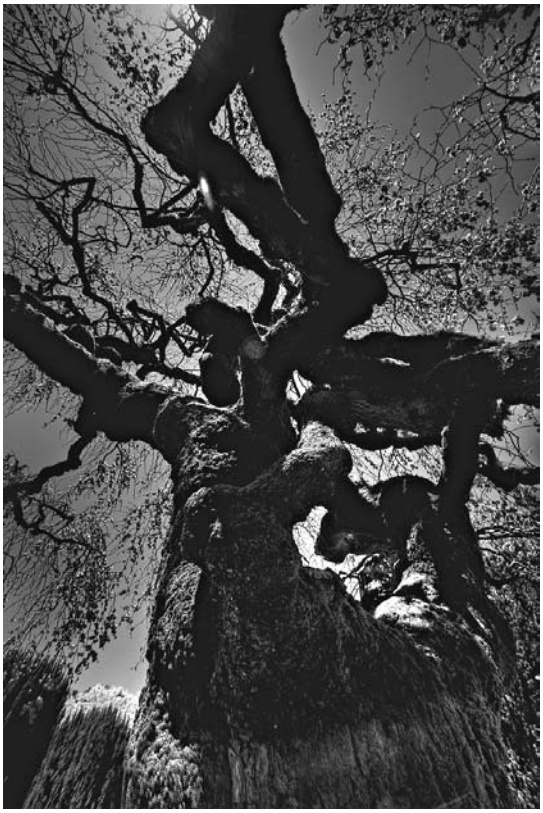
The SPEAK model and tool

SPEAK is a model and tool for the self evaluation of learning in a group and community context. It is designed both to facilitate group discussion and self evaluation and to provide accumulative data for programme evaluation. The SPEAK system has been designed to incorporate a number of inter-related functions within a logical framework.

- Strategic Planning: producing information to assist both staff and management to make informed decisions.
- Evaluation: ongoing internal review; cross project periodic assessments; with a facility for external inputs.
- Knowledge: networking based on sharing information between institutes, countries, regions and themes.

The SPEAK model has been developed as an electronic tool distributed by a CD ROM. Data can be aggregated and queries through a server application.

Section 6
The SPEAK model and tool



The SPEAK model and tool has been developed by the Nexus Research Co-operative, Dublin, Ireland.

Description of the Tool

The SPEAK system has been designed to incorporate a number of inter-related functions within a logical framework

- Strategic Planning: producing information to assist both staff and management to make informed decisions
- Evaluation: ongoing internal review; cross project periodic assessments; with a facility for external inputs.
- And Knowledge: networking based on sharing information between institutes, countries, regions and themes.

The tool relies on a logical framework, linking these functions within an overall planning or review context. The diagram presents an overview of the framework. (see figure 2)

SPEAK incorporates both monitoring and evaluation functions.

The left hand part of the chart is mainly about description: an 'audit' of the particular course of project and the environment in which it operates. It allows for analysis to be made across both these fields: Are resource commitments and focus at 'course' level (B1) consistent with an understanding of broader issues and challenges in A1? – these issues or challenges could be linked to regional development, industrial sector of even institutional needs, for example.

The right hand side is about review/evaluation: measuring firstly what the course or project has achieved in relation to its stated objectives and 'target groups', and, secondly, what impact this work has had at the macro level. Again there is the facility to link these analytically: which immediate outputs or

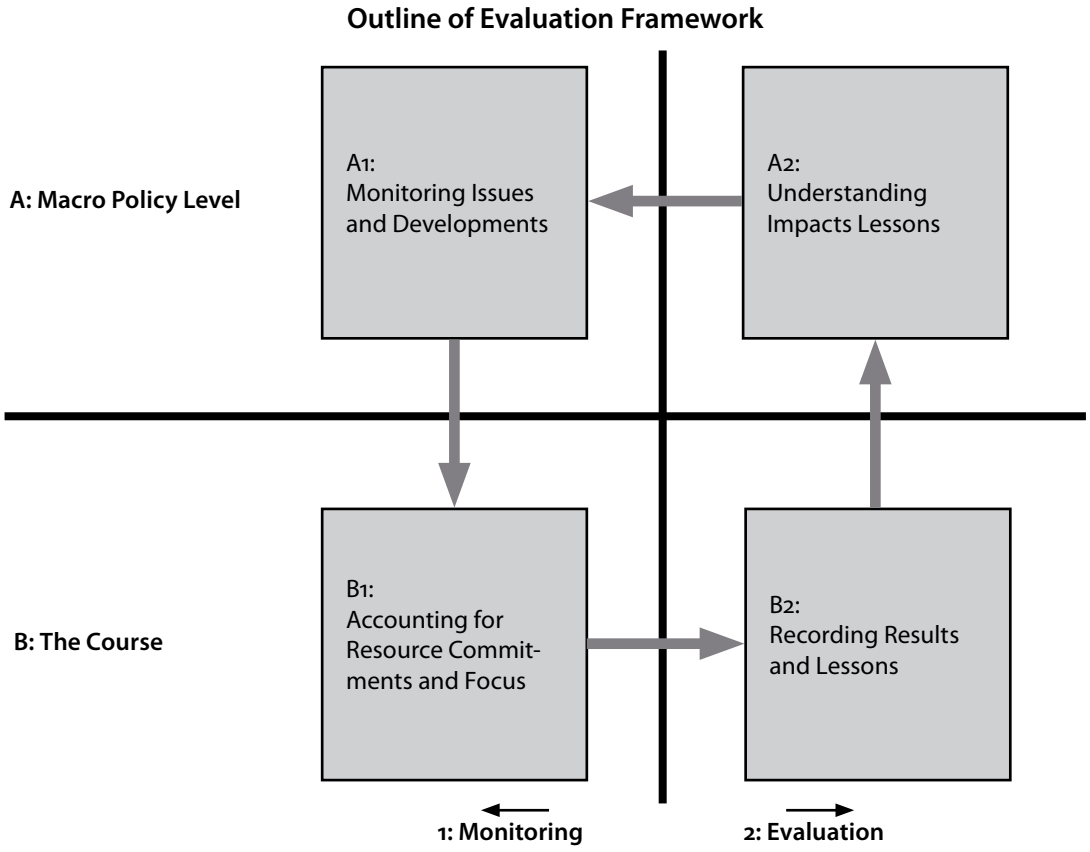


Figure 2: Outline of Evaluation Framework

course results (B2) contributed to which longer-term trends at sectoral or regional levels (A2)? Conversely, what can longer-term trends in subsequent 'graduate' placement and progression tell programme organisers about output planning and targets?

It also allows for ongoing evaluation at course level (B); as well as longer-term review (at three or four-year intervals in some cases) at broader policy, programme or institutional level (A).

But of most importance is the process is circular – it begins by facilitating an analysis of what the broader level issues and challenges are in the VET environment (A1); provides a vehicle and tools for monitoring course and programme inputs consistent with this analysis (B1); makes provision for ongoing recording results (B2); and prompts an analysis of impacts in the longer term (A2) – going around full circle to assess whether the macro-policy context (A1) has changed, and how the course or project may have contributed to this change.

Implementing SPEAK

Software based-versions of SPEAK have been developed for a number of settings already, in all cases:

- Allowing for full participation of all stake-holders – students, teachers and programme managers: with clear guidance on who needs to be involved in which parts of the process, and
- Emphasising ease of access, making use of charts and visual images to help ensure clarity in the data collection and results analysis.

Testing the tool in practice

The tool has been tested in a community education setting. Most feedback was positive, pointing to strengths of the tool in relation to its capacity to:

- Link different evaluation elements, as well as linking evaluation and planning, in a way that made sense to those with very different 'stakes' in the process.
- Actually contribute to learning about evaluation and planning in its own right – as well as using the tool to collect information, discussion about how it should be designed and implemented increased a sense of ownership, as well as providing a platform for a lively exchange of ideas on evaluation and planning in VET generally.
- Produce reports: SPEAK has a report generator function, and this can 'take the misery out of' what we can all see as a chore.
- Be consistent and relevant in the distance learning environment: the tool allows for the possibility of sharing information or 'knowledge networking' amongst stakeholders on an electronic basis.

Only one weakness was identified – but this is critical in terms of future development.

Because successful implementation of the model depends heavily upon the full active involvement of ALL stakeholders, it takes time for each. This did not pose a problem for most stakeholders (in fact in the case of Steering Group members and managers, for example, it was agreed that using the model actually saved time). However, tutors responsible for delivering modules in the course are contacted for no more than teaching hours; and the application of SPEAK becomes a major problem (even though the commitment per tutor amounts to no more than 1 day annually).

Future development

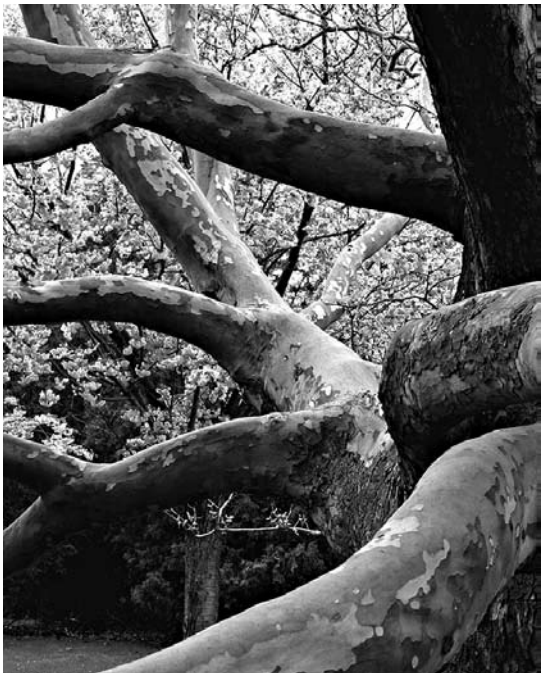
Development of the SPEAK tool is continuing. Current effort is being expended in facilitating transferability to different contexts and settings. The present tool is CD ROM based and it is hoped that a web based version will be available by the end of 2005.

Finding out more

More details of the SPEAK model and tool are available on the models and tools section of the evaluate-europe web site. If you would like to test SPEAK yourself contact Brian Dillon – brian@nexus.ie.

Section 7

Tool for the evaluation of the effectiveness of e-learning programmes in small and medium sized enterprises (SMEs)



Easy-to-use instrument

Three dimensions for each phase of the evaluation

Organisation, pedagogy and technology

Help managers of SMEs detect strengths and weaknesses of the e-learning programme

The Tool for the evaluation of the effectiveness of e-learning programmes in small- and medium-sized enterprises has been developed by the Institute for Future Studies, Innsbruck.

Introduction

The evaluation tool has been designed to provide an easy-to-use instrument to carry out a retrospective evaluation of an e-learning programme. This retrospective analysis should enable enterprises to detect the weaknesses and strengths of their learning programme with regard to its organisational, pedagogic and technological implications.

The tool is based on Daniel Stufflebeam's CIPP Model, a model which is often used for evaluation in education. In order to gain a more specific view of e-learning measures in small and medium-sized enterprises (SME), however, the model had to be adapted, and besides other minor changes, three dimensions were introduced for each phase of the evaluation: organisation, pedagogy and technology.

These three dimensions reflect central fields of concern in connection with the introduction of e-learning in SME. Through this division a multi-facetted view of the introductory stages of the new programme is gained, which enables the evaluator to track down both potential problem areas and structures supportive to the programme in a more detailed way. Consequently, control mechanisms and measures to revise and adapt certain areas of concern may be applied in a more specific manner.

The design of the tool is based on a set of questions incorporating central fields of concern in the introduction of e-learning measures in SMEs. The sets of questions developed for the tool are intended as a guideline for the evaluation of relevant aspects of the respective e-learning programme. The evaluation questions were not intended to be too precise or prescriptive, in order to enable flexibility in the application of the tool. Consequently, the questions have to be adapted to the specific circumstances characterizing an enterprise's e-learning program. This adaptation may involve a reformulation or even the omission of sets of questions.

The main aim of the evaluation is to help managers of SMEs detect strengths and weaknesses of the e-learning programme they are currently running, and thus providing them with particular information on organisational, pedagogic and technological implications of the training measure.

The structure of the CIPP Model, on which the tool is based, allows for a well-structured evaluation of planning-, structuring-, implementing- and recycling decisions. Therefore, the tool may be applied to track down possible weaknesses at a certain point of the program-cycle and assist (programme) managers in the introduction of potential adaptive measures. Above all, the aim of the in-depth analysis of the various stages of the programme cycle is the improvement of the training programme as a whole, and at the same time providing a precise tool for the detection of possible weaknesses and strengths within the cycle.

Furthermore, the amount to which the e-learning program was successful or not is identified through the retrospective evaluative perspective of the tool. This especially applies to the issue of knowledge acquisition and the appropriateness of learning measures. Therefore, another main point of the evaluation is whether the e-learning measures applied by the enterprise assisted the acquisition of knowledge and fulfilled the training needs defined at the beginning of the training programme. If the training results do not correspond with the training needs outlined at the start of the programme, possible factors which led to the unsatisfactory results can be traced back to certain phases within the programme cycle. Through this analysis both learner and tutor satisfaction can be measured.

In addition to the points mentioned above, evaluation findings should provide enterprises with additional information on a successful implementation of e-learning products as well as providing help for future acquisitions of e-learning products. This also implies the detection of an e-learning strategy that best suits the purpose of the respective enterprise.

Moreover, the evaluation aims at supporting the enterprise in finding ways of making training programmes more sustainable. For this purpose not only the training budget is scrutinized, but also other organisational, pedagogic and technological matters are checked. Eventually, the question is raised of whether the programme itself or certain aspects within the programme could be transferred to other areas within the enterprise..

Finding out more

More details of the SME model and tool are available on the models and tools section of the evaluate-europe web site. If you would like to test the tool yourself contact Friedrich Schuermann – office@friedrich-scheuermann.net.

Section 8

Models and tools for evaluation of e-Learning in higher vocational education

Models and tools for evaluation of eLearning in higher vocational education were developed by the Centre for ICT in education, IVLOS, Utrecht University.

Introduction

In the Netherlands, the use of virtual leaning environments (VLEs) in higher education is an issue. It is the most common practice for e-learning in higher education: VLEs are used in almost all courses and programmes across the entire curriculum of all higher educational institutions. Most universities choose Blackboard as the main or only VLE; others use WebCT. Utrecht University has agreed on the option of two VLEs: Blackboard and WebCT, at least until 2007. In order to ground the policy making in this respect, the use of the VLEs has to be evaluated.

Within the framework of the EU project E-VAL3, the project partner (IVLOS) developed three models and tested and evaluated two tools. The first model refers to evaluation from a perspective of the learning process to be triggered by the use of the particular VLE. The second model includes an evaluation of the teachers' pedagogy in the VLE affecting students' learning process. The third model is a consumer model including an evaluation in terms of the teachers' (users) satisfaction with (elements of) the VLE.

Models for evaluation of virtual leaning environments

Model on learning process in virtual learning environments

We are not 'value-free' in choosing what kind of aspects of the students' learning process we

evaluate. As designers of learning environment (in higher education) we want to promote the so-called new learning. These innovative ideas have been developed last decades from the more traditional teaching (guided learning) into experiential and action learning (see, Simons, Van der Linden, & Duffy, 2000).

From guided learning to experiential and action learning

In guided learning a trainer or teacher takes all the relevant decisions and the learner can and should follow him or her. He decides about the goals of learning, the learning strategies, the way to measure learning outcomes, and he takes cae of feedback, judgment and rewards. Success factors for guided learning are, for example:

- Taking differences in interests, prior knowledge and abilities into account,
- Good commitment to learning goals through good communication about it,
- Good communication about learning strategies, and
- Timing and quality of rewards and judgment systems.

Guided learning is like organizing a collective traveling journey in which the guide is an expert who knows the way and who plans the trip.

In experiential learning, it is not so much a teacher or a predetermined goal that controls the learning. Rather circumstances, personal motivation, other people, innovations, discoveries, experiments, etc. determine what and how one learns. Learning is a side effect of the activities one undertakes. Success factors of experiential learning are, for example:

- Interests, knowledge and action-plans of participants are put central;
- The experience itself is the goal. There are no explicit learning goals;
- Each learner can have his/her own tempo;
- Team learning from and with each other is important, and
- Reward and judgment systems are tuned to discoveries and innovations.

Experiential learning is like a trekking journey in which a group of people undertakes a trip without planning and organizing at forehand.

In action learning there is a much more active and explicit role for learners and learning goals than in experiential learning. Learning is central and not a side-effect, but the learners themselves determine the goals of learning according to needs arising in their actions (at work or elsewhere). It is self-organized and self-planned. Success factors for action learning are, for example:

- Control of learning by learners;
- Opportunities to reflect on learning goals and learning strategies;
- Self-responsibility for their own learning, and
- Opportunity for self-testing.

Action learning is exploring like pioneers who explore new land. It is the need to find a suitable surrounding to start a new life that guides them. There is a sense of urgency that determines the route and destination in a certain perspective.

Learning from a (social)constructive perspective

Within the framework of the recent developments of experiential and action learning, there are many theoretical as well as practical perspectives on learning and how to support the learning process. (Social)Constructivism is one of the most cited, and misused terms to incorporate innovate ideas about teaching and learning. Jonassen, Peck and Wilson (1999) describe principles educational designers or teachers use in the design of learning environments from a constructivist perspective. These principles are in line with the recent ideas Utrecht University has about teaching and learning in her university. These ideas are formulated in the framework of the harmonizing European educational system, which has been started some years ago as a results of the Bologna agreement. Jonassen and colleagues also relate the constructivist principles and the use of ICT in teaching and learning. They argue that ICT supported learning is

Moderator Role	Emphasis of different functions		
	Organisational	**Social**	**Intellectual**
Goal setter	high		
Discriminator			high
Host	high		
Pace setter	high		high
Explainer			high
Entertainer		high	
Lecturer		low	high
Tutor	high		high
Facilitator	high	high	high
Mediator	high	high	
Mentor	low		high
Provocateur			high
Observer	low	low	low
Participant	low		

Table 1: Moderator roles and functions in computer conferences (after Paulsen, 1995)

only useful (effective and efficient) is learning is active, constructive, reflective, intentional, authentic (contextual and complex), conversational and interactive.

Active learning means that learners are actively manipulating their learning environment and observing the effects of what they have done. So, learners are responsible for thee results of their learning. Learning meaningful imply actions, but actions are not enough. Learners have reflect on their actions and their observations. These reflections could or should lead to the integration of new experiences and ideas with existing knowledge or should at least leads to insight into what the learner has to learn (constructive learning). It is this combination of active and constructive learning what makes learning meaningful. Learning is not a results of only practicing; learners also have to elaborate their knowledge and skills and create or construct new insights. The authenticity of the learning environment not only leads to a better understanding of cases or principles, but also results in a better transformation of learning outcomes to other cases and contexts. To make a learning environment authentic, it should include complex and open tasks, as well as simple ones. Like in the 'real' world or job-related practice, people work together and interact in order to learn, and solve problems. Cooperation between learners (both collaboration and conversation) is seen as important as a goal of learning as well as a mean of learning other content. Especially in a formal educational programme like the university curriculum, learning has to be intentional (although unintentional learning is welcomed also). It is important that learners know what their learning goals are and how they will be striving for them.

Model of the teachers' pedagogy in virtual learning environments

The model of the pedagogy used in VLEs is based on the extensive literature teachers' moderating in computer-mediated communication (see, e.g., Admiraal, Lockhorst, Wubbels, Korthagen, & Veen, 1998) and on that of Paulsen (1995) in particular. Based on literature on computer conferencing, Paulsen describes three essential functions of computer conferencing moderators: the organisational function; the social function; and the intellectual function. The organisational function refers to structuring the conferences, including setting the agenda (the objectives of the discussion,

the timetable and procedural rules). As in most conferences, managing the computer conferences is considered a sine qua non of a varied and extensive communication. Another essential moderator function is creating a friendly, social environment for learning, including sending welcome messages at the beginning and encouraging participation throughout, as well as providing lots of feedback on students' input and using a friendly tone. The most important function of a moderator is that of the educational facilitator (designated as intellectual function by Paulsen): a moderator should focus discussions on crucial points, ask questions and stimulate students to expand and build on comments. Combining these three functions characterises various moderator roles, each with organisational, social and intellectual elements (see Table 1).

Consumer model for teachers in virtual learning environments

In higher education, a much-used model for the evaluation of educational programmes is the consumer model, based on information of the end-users of a particular programme (mostly students). As the VLEs in university teaching has been used by teachers, they will be the source of information for the evaluation within this model. Although there is always a risk of getting only happy sheets from teachers looking back on their own teaching, this model provides a starting point for further analysis of the functionalities and aspects of VLEs. Consumer-oriented evaluation relies heavily on criteria referenced evaluation techniques such as benchmarking.

Methods for developing and testing the tools

We developed and tested two tools to evaluate virtual learning environments in Utrecht University. The first one is a tool to evaluate the learning and teaching process as it has been visualised in the use of a virtual learning environment in higher vocational education, more specific in its teacher education programmes. In this we focuses on what kind of (student) learning has been triggered and how this was done. The second tool is a benchmark tool focusing on the evaluation of virtual learning environments (VLEs) by the teachers (the consumers).

Tool 1: Evaluation of the learning and teaching process

In this tool, we start from the ideas form Jonassen, Peck and Wilson (1999). They describe several principles educational designers or teachers need to use when designing learning environments from a (socio-)constructivist perspective. They also relate these principles to the use of ICT in teaching and learning and conclude that ICT supported learning is only useful (effective and efficient) when learning is active, constructive, reflective, intentional, authentic (contextual and complex), conversational and interactive.

We used a mix of a grounded theory approach and theory-driven approach, working with sensitizing concepts from the theoretical work of Jonassen et al. formulating and reformulating these concepts. Thus, the seven principles mentioned above are the starting point for our design and redesign of the tool.

The first phase in the process was to analyse two courses from the post-graduated teacher education programme that were developed and presented in a VLE (WebCT Vista). This resulted in the clustering of some concepts and a first description of categories. The remaining four concepts are: (1) active learning, (2) constructive, critical thinking and reflective learning, (3) authentic learning and (4) collaborative and conversational learning. An example of a description of the authentic learning concept is: the teacher offers that what has to be learned, for instance, knowledge and competences, in a meaningful, real-life context or in a relevant professional environment. Examples of this context are the daily teaching practice or a case-based and/or problem-based learning environment.

In the second phase of the research, this perspective on the learning process has been combined with three functions of the teachers' moderating in the VLE, as distinguished by Paulsen: organisational, social and intellectual.

Teaching →

Learning ↓

	Organisational	Social	Intellectual
Active			
Reflective			
Authentic			
Collaborative			

Table 2. Tool for evaluation of the learning and teaching process in VLEs

Combining these three moderater functions with the four principles of learning, resulted in a matrix with 12 cells. This is a ' high inference' tool, meaning that a lot of interpretation of the evaluator is needed in order to come to a reliable and valid assessment of e-learning as can be observed in the VLEs (see Table 2).

In the third phase of developing and testing the tool, the instructions for the observers using the matrix have been reformulated and standardized in terms of evaluating VLEs in higher vocational education.

Tool 2: On-line benchmark questionnaire

Our second tool is a on-line questionnaire including items on the appraisal of the VLE used by the teachers in their courses. The questionnaire will be administered with all teachers of the Utrecht University (some 6,000) using a VLE (WebCT Vista or Blackboard) in their courses. The items refer to the possibilities of the VLEs, the usability, and the frequency teachers use the VLE and parts of it in their courses. All departments use the same questionnaire and have some additional items which can be different for each department. The questionnaire will be administered within the VLE (see for the questionnaire, http://www2.ivlos.uu.nl/ictexpertisecentrum/index.html; click on Services/European projects/EVAL3/Questionnaire evaluating VLEs). The questionnaire includes six sections with items with mostly pre-structured answering options on a 5-point Likert type scale:

1. Use of functionalities of the VLE;
2. Teaching in the VLE;
3. Appraisal of the VLE;
4. Policy aspects of the use of the VLE;
5. Additional open questions, and
6. Department specific items.

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Section 9
The policy model and tool

Variables impacting on the quality of e-learning

Individual learner variables

Learning environment variables

Contextual variables

Technology variables

Pedagogic variables

The policy model and tool has been developed by CRED and Pontydysgu, both based in Wales.

Background

In developing a Framework for the evaluation of e-learning. we recognised the breadth of variables impacting on the quality of e-learning. Five groups of variables were identified:
Individual learner variables include

- physical characteristics (e.g. age, sex, physical abilities)
- learning history, (negative/positive experience, level of attainment, duration, recency etc.)
- learner attitude (positive/negative)
- learner motivation (high/low)
- familiarity with the technology

Learning environment variables include

- the immediate (physical) learning environment
- the organisational or institutional environment
- the subject environment

Contextual variables include

- socio-economic factors (e.g. class, gender,)
- the political context (e.g. who is funding/paying for the e-learning and for what reason ?)
- cultural background (e.g. how highly is learning/e-learning valued ?)
- geographic location (e.g. country, language, urban/rural)

Technology variables include

- hardware
- software,
- connectivity,
- the media
- mode of delivery,

Individual variables	
IMPACT	**DIFFERENTIATION**
Does the policy take account of the fact that the physical characteristics of individuals impacts on their behaviour as e-learners?	Does the policy recognise that • age makes a difference? • gender makes a difference? • physical disability / ability makes a difference?
Does the policy take account of the fact that the learning history of individuals impacts on their behaviour as e-learners	Does the policy recognise that • learners' previous level of attainment makes a difference? • the quantity / duration of the learners' previous learning makes a difference? • The learners' response to and experience of, previous learning makes a difference? • the frequency or recency of their learning experiences makes a difference?
Does the policy take account of the fact that the attitude and motivation of the learner impacts on their e-learning behaviour?	Does the policy recognise that • learners' reasons for undertaking e-learning makes a difference? • learners' expectations of an e-learning experience make a difference? • learners' perceptions of e-learning make a difference? • learners' commitment and application make a difference?
Does the policy take account of the fact that Learners familiarity with the technology and the learning environment impacts on their e-learning behaviour?	Does the policy recognise that • the learners' existing competence in the use of technology makes a difference? • the learners familiarity with the technology makes a difference? • whether the learners have a positive or negative attitude towards the technology makes a difference? • whether the learners have previous experience of e-learning makes a difference?

Table 3: Individual variables

Pedagogic variables include

- Level and nature of learner support systems
- accessibility issues.
- Methodologies
- Flexibility
- Learner autonomy
- Selection and recruitment
- Assessment and examination
- Accreditation and certification

We were concerned that the unconscious disregarding of many of these variables diminished the quality of many models and tools for evaluating e-learning. This is even more so when it comes to evaluating e-learning policy, which by its very nature, may impact on many different aspects of teaching and learning.

Therefore, in seeking to develop a model and tool for evaluating e-learning policy, we wished to find a means of measuring all the different variables, or at least a means of expressing the value of the different variables, even if all could not be studied in any single evaluation report.

Developing the model and tool

The first stage was to take each of the variables – which we called impact variables and to derive the differentiating factors for that variable.

An example of this is given in table 3 for the individual variables.

Secondly we recognised that each variable would impact on each other. Thus it was possible to develop differentiating variables for individual variables when combined with – for example technology variables – and to identify what should be key factors in any e-learning policy development. This is illustrated in the table 4.

Using the tool

In theory it is possible to look at every one of the different variables produced by the model. But in reality this is somewhat unlikely – there are simply too many. However, any policy development is likely to be viewed from one of a number of different perspectives. Different stakeholders will have different viewpoints on what a policy should contain and what it should achieve.

Each of the groups of variables and respective list of evaluation issues will have a different associated stakeholder (or group of stakeholders) perspective:

Learners
- Individual learners
- Collectivities of learners
- Social partners
- Funding bodies

Context
- Government and government agencies (Agencies affected by the outputs of e-learning or provide inputs)
- Policy bodies both educational and economic
- 'public'

Environmental (the institutions that create the learning environment)
- institutional managers
- learning system designers
- content developers

Technology
- standards bodies
- software designers
- infrastructure providers
- technical staff inc decision makers and technicians

Individual x technology variables

Hardware
The e-learning policy should
- ensure learners have access to computers and other hardware of a quality and a quantity sufficient to meet their e-learning needs.
- ensure learners have technical support for hardware systems.
- promote mechanisms to improve stability and robustness of hardware systems to minimise disruption to e-learning.

Software
The e-learning policy should
- promote the development of different types of e-learning software to support different learning processes.
- support measures to improve the quality of the ICT learning environment.
- ensure there is effective communication between e-learners and between e-learners and teachers /tutors.
- promote mechanisms to improve stability and robustness of software to minimise disruption to e-learning.

Bandwidth and connectivity
The e-learning policy should
- ensure sufficient bandwidth is available to support the type of online learning applications being used.
- support different options in providing connectivity and bandwidth.
- promote economies of scale and increased user access through partnership solutions.

Types/combinations of media/modes of delivery
The e-learning policy should
- ensure e-learners have opportunities for face to face experiences in conjunction with their e-learning.
- Support e-learning which is not course based
- Be flexible enough to support learning programmes that combine different e-learning opportunities, different media and/or are blended with non-ICT media and materials.

Table 4: Individual x technology variables

Pedagogy

- individual teachers
- other education professionals e.g. advisors, administrators, researchers, counsellors
- learners
- communities of learners
- examining and validating bodies
- quality assurance bodies
- 'guardians' of subject knowledge
- community of practice of teaching (both formal and informal)
- gatekeepers.

This approach has the strength of recognising multiple viewpoints and perspectives in evaluation of policy. An evaluator does not have to be a member of the different stakeholder group they represent in undertaking an evaluation. It is enough that the different perspectives are recognised in selecting the evaluation questions to be asked.

Even when the variables are narrowed to those of a particular perspective it is recognised that the range and quantity of evaluation issues and questions may still be too large for many evaluation initiatives and it may prove necessary to select from the range of questions on offer. But, at least now this selection is a conscious one, rather than evaluation perspectives and variables having been unconsciously disregarded.

Testing the model and tool

Two tests were made of the tool – one in Finland and the other in Wales. In both instances the testers found the initial model a little hard to grasp. However, both agreed on the value of the approach in providing a comprehensive yardstick against which to measure a policy.

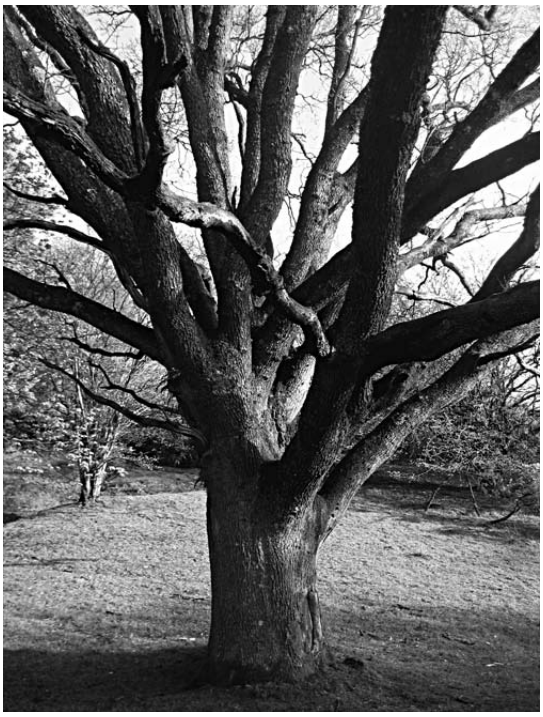
It was not easy to find policies with which to test the tool and it emerged that policy development in this field is often haphazard and often documentation is sketchy. One recommendation from the testing is that the tool may best be used as part of a process of policy formation, rather than of post formation evaluation.

Want to find out more?

The model and tool can be downloaded from the models and tools section of the evaluate-europe web site.

Section 10

A management oriented approach to the evaluation of e-learning



Theoretical framework

Types of evaluation

CIPP model

Using the tool

The management oriented approach was developed by CRED and Pontydysgu from Wales.

Background and introduction

The management-orientated approach to evaluation is meant to serve decision makers. Its rationale is that evaluation information is an essential part of good decision-making and that the evaluator can be most effective by focussing the evaluation products on the needs of managers, policymakers, administrators and practitioners. (Fitzpatrick, Sanders and Worthen 2004)

Although it ignores the needs of other stakeholders, we believe it can be a useful and appropriate approach to the evaluation of e-learning. Managers of VET institutions, owners of SME and human resource professionals in large companies are having to make decisions about the introduction and use of e-learning when e-learning itself is still in a stage of rapid evolution and instability. Major paradigm shifts are taking place in the pedagogical thinking underpinning e-learning, new ideas and policies are emerging on how e-learning should be developed and financed and there are continuing advances in information and communication technologies.

It is in this context that managers are having to make decisions about investing in e-learning and one in which the consequences of making the wrong decision are increasingly costly. Thus ... the decision maker is the audience to whom a management-oriented evaluation is directed and the decision makers concerns, informational needs and criteria for effectiveness

guide the direction of the study. (Fitzpatrick, Sanders and Worthen 2004)

We are not advocating a management oriented approach to the evaluation of e-learning as being preferable to any other, rather that it has specific advantages which can be appropriate in particular contexts.

- It is particularly suited to evaluators and managers who are most comfortable with a rational and orderly approach
- It gives a sharp focus to an evaluation and limits the range of data to that which is relevant to the pending decisions of the managers
- It stresses the importance of the utility of the information
- Connecting decision-making and evaluation underscores the purpose of evaluation
- Focussing an evaluation on the decisions a manager must make prevents the evaluator from pursuing unfruitful lines of enquiry that are not of interest to decision makers or over which they have no decision making control
- Instrumental in showing evaluators and managers that they need not wait until a programme has run its course before evaluating it and emphasising that evaluation should begin when ideas for programmes are first discussed
- Preferred choice in eyes of most managers and executive bodies – which is hardly surprising as it puts their needs in pole position
- Answers a common criticism of evaluation - that it does not provide useful information
  (from Fitzpatrick, Sanders and Worthen 2004)

Basic assumptions underpinning management oriented evaluation

Alkin (1991) based much of his practice on the following assumptions

- Evaluation is a process of gathering information
- The information collected in an evaluation will be used primarily to make decisions about alternative courses of action.
- Evaluation information should be presented to the decision-maker in a form that he can use effectively and that is designed to help rather than confuse or mislead him
- Different kinds of decisions will need different kinds of evaluation procedures

We were comfortable with taking these as our starting point and what follows is predicated on the above assumptions

Theoretical framework

We have based this tool on Daniel Stufflebeam's CIPP model, which suggests that there are four types of evaluation:

- Context evaluation
- Input evaluation
- Process evaluation
- Product evaluation

Each one is linked to a particular stage in the lifecycle of a project or programme and is designed to inform particular sorts of management decision (see Table 5).

Type of decision to be informed (CIPP)	Type of evaluation	Purpose
Context evaluation	Planning decisions	Helps define objectives
Input evaluation	Structuring decisions	Facilitates programme design
Process evaluation	Implementing decisions	Allows procedures to be monitored, controlled and refined
Product evaluation	Recycling decisions	Enables programme attainments to be judged and informs transfer and dissemination

Table 5: CIPP model

Context Evaluation determines what needs or problems are to be addressed by the programme, what sort of responses already exist and thus, what the objectives of the programme should be. This can embrace, for example, *position auditing, ex-ante evaluation.*

Input Evaluation determines what resources are available, what alternative strategies should be considered and what plan seems to have the best potential for meeting the needs. This will inform the programme design. Methods could include *scoping studies or feasibility studies.*

Process Evaluation determines how well the plan is being implemented, what barriers threaten its success and what revisions might be needed. This will provide the monitoring framework for the programme. Tools such as *SWOT analysis* may be used.

Product evaluation determines what results were achieved, to what extent was the problem solved or the needs reduced and what should be done with the programme after it has finished. That is, what should be sustained, developed and transferred. This may involve *capitalisation, dissemination* and *valorisation* studies being undertaken.

Using the tool

We have based our tool on the sorts of planning, structuring, implementing and recycling decisions that managers responsible for e-learning may have to take. Obviously, particular managers will be faced with particular decisions and this tool can only provide a template that each evaluator will want to adjust to reflect individual circumstances. There will be decisions which, in reality, managers will have to take which do not appear in our schema and there will be decisions that we have included that will not be relevant to all e-learning managers. However, the tool can at least provide a starting point and a systematic way of approaching the evaluation of an e-learning programme.

Another problem is that although we can identify four types of evaluation, the reality is that evaluators may be brought in at any stage of the program life-cycle. So an evaluator may be brought at the beginning of the planning stage in order to gather information that will inform planning decisions. This is often perceived as a consultancy rather than an evaluation role. Conversely, an evaluator may be brought in at the end of the planning phase to review the planning process and generate information which will inform the next stage or which can inform similar planning decisions in the future. These are quite different roles and for that reason the model (which tries to support all of these possibilities), suffers from having to make choices about, for example, syntax and tenses. We have ended up with a compromise, assuming the viewpoint of an evaluator who is retrospectively looking different stages of an e-learning programme in order to inform future decisions. Individuals should adjust the questions if this is not the context and timeframe in which they are operating.

Want to know more?

The tool can be downloaded from the models and tools section of the evaluate-europe web site. There are three variants of the tool – one for evaluating e-learning development in Small and Medium Enterprises, a second for e-learning in large companies and a third for e-learning development in institutions.

Section 11
Individual learning model and tool

Background and design

The individual learning model and tool was developed by Pontydysgu, Wales. The survey of present evaluation revealed that most tools focus excessively on the technology, which whilst one of the factors which impinge on learning, fails to recognise the range of possible variables which influence individual learning experience and outcomes.

Background research

In developing a policy tools for evaluation we looked at the range of potential variables based on the position of different stakeholders. One of these was the individual learner. (see Table 6)

Furthermore we undertook a short research project looking at the influence of learning styles and motivation on e-learning (Middleton, 2004)

In a third step we undertook a series of interviews in five countries using a semi structured questionnaire to empirically examine what made e-learning effective and what mitigated against the effectiveness of e-learning. These interviews were examined and the following common factors emerged as key determinants of effective e-learning:

- level and depth of content,
- motivation,
- support for learner,
- time and opportunities for learning,
- interesting and engaging and engaging materials,
- easy of use of materials,
- reliability and ease of use of technology,
- contact with other learners,
- and relevance of learning to work or future work.

Individual variables	
IMPACT	**DIFFERENTIATION**
Does the policy take account of the fact that the physical characteristics of individuals impacts on their behaviour as e-learners?	Does the policy recognise that • age makes a difference? • gender makes a difference? • physical disability / ability makes a difference?
Does the policy take account of the fact that the learning history of individuals impacts on their behaviour as e-learners	Does the policy recognise that • learners' previous level of attainment makes a difference? • the quantity / duration of the learners' previous learning makes a difference? • The learners' response to and experience of, previous learning makes a difference? • the frequency or recency of their learning experiences makes a difference?
Does the policy take account of the fact that the attitude and motivation of the learner impacts on their e-learning behaviour?	Does the policy recognise that • learners' reasons for undertaking e-learning makes a difference? • learners' expectations of an e-learning experience make a difference? • learners' perceptions of e-learning make a difference? • learners' commitment and application make a difference?
Does the policy take account of the fact that Learners familiarity with the technology and the learning environment impacts on their e-learning behaviour?	Does the policy recognise that • the learners' existing competence in the use of technology makes a difference? • the learners familiarity with the technology makes a difference? • whether the learners have a positive or negative attitude towards the technology makes a difference? • whether the learners have previous experience of e-learning makes a difference?

Table 6: Individual variables

Developing an electronic tool

Surveying individual learners is time-consuming. More so, the aggregation of individual leaner responses is a lengthy process. Therefore we have developed an electronic tool – evalact to support the evaluation of individual learners. In designing the electronic tool we were concerned that the tool would be light weight – in terms of demands it made on technical support staff, evaluators and learners and flexible. Our aim was to design a tool that could be administered by teachers and trainers themselves, without needing recourse to technical advice and assistance. At the same time we wished to develop a programme which could easily be further developed and adapted in the future and could potentially be installed to work alongside mainstream e-learning programmes.

We wished to provide evaluators with easily accessible data and with graphic interfaces to querying that data. We also wished to develop a tool which would allow the comparison of different data sets – for example the efficiency and effectiveness of an e-learning programme or project – and would also allow the com-

parison of data over time. From the outset, we were aware that no electronic tool can replace the skills and interpretative abilities of an evaluator, but could assist the evaluator in making judgements.

The eval-act tool

The eval-act tool has been developed in php. It provides four main interfaces:

- An interface for setting up groups for evaluation.
- An interface for adding evaluation questions.
- An interface for filling in evaluation questions.
- An interface for viewing the results of evaluation.

Some of the tasks involved in data gathering have been automated, for example the system can be set to automatically remind those who have not yet completed the evaluation to do so.

Testing the tool

The tool has been extensively tested. The outcomes of the tests have resulted in a number of bug fixes and also further feature requests. The tool has proved more flexible in practice than was originally anticipated – and it has been used for project evaluation as well as for individual leaner evaluation. On the other hand, individual evaluators have tended to use that flexibility to move away form our original design of evaluation questions. However, it has met most of the original design remote and functions well in practice.

Want to find out more

Further details of the tool can be found on the evaluate-europe web site. If you would like to test the tool in practice you will need an account on the eval-act server. Please contact Graham Attwell – graham10@mac.com.

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