

Evaluating your **HE STEM** Project or Activity

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Suzanne Spicer and Harry Tolley



Foreword

Since its inception almost three years ago the National HE STEM Programme has facilitated the implementation of in excess of 450 individual projects across England and Wales. These higher education interventions are, broadly speaking, aiming to leave a legacy for this sector of good practice in increasing and widening participation, championing the STEM disciplines, and responding to the needs of both the current and future workforce. These projects are already having sustained and measurable impact across the sector. It is however critical to the legacy of the Programme that this impact is captured through proper application of evaluation methodologies. A planned and well structured approach to project evaluation is vital for obtaining the evidence based data that demonstrates this impact and to enable projects to disseminate 'what works and why' to the wider STEM stakeholder community. The guidance for evaluation and various supporting materials have been assembled largely through the contributions of expert practitioners and whilst the focus here is on STEM, this information is also of relevance to the wider HE sector where educational enhancement projects are increasingly attempting to demonstrate impact at a time of straitened resources.

Adrian Toland,
Assistant Regional Director
and chair of Evaluation Working Group
North West spoke

How to use this Guide

In January 2012, the National HE STEM Programme held a two-day workshop focused upon the theme of evaluation approaches and methodologies. The event formed a follow-up to a successful one-day conference held in September 2011, and was designed to support HE STEM project leads with their project level evaluations. A particular emphasis was placed upon evaluation methodologies and approaches, and mechanisms for collecting evidence and examples of impact.

This guide has been developed from the materials that were provided by the workshop facilitators. As such, they are a collection of individual documents, but have been collated into three sections. The first, *Planning for Evaluation*, describes a series of approaches and frameworks for designing a project-level evaluation; the second, *Evaluation techniques and methodologies*, outlines practical techniques for capturing information from those involved in all aspects of a project, be they beneficiaries, those involved in delivery, or other key stakeholders; the third and final section, *Disseminating your work*, describes the use of Creative Commons Licenses as a means of ensuring the learning and outcomes from a project remain accessible to others beyond its completion.

This guide is not necessarily intended to be read from cover-to-cover; the different authors present differing perspectives, opinions and approaches to evaluation. It is instead designed as a collection of resources to stimulate discussion and reflection amongst those seeking to evaluate educational enhancement activity or understand more about the evaluation process; it also seeks to provide frameworks, templates and resources for future use. As such, it will be useful to those who are both new to evaluation and those with prior experience.

Michael Grove
National HE STEM Programme Director

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Developing A Strategic Plan For Evaluation

Professor Harry Tolley

This document draws on work by Professor Harry Tolley and Peter Lewis of CDELL, School of Education, University of Nottingham, in connection with the evaluation of an NHS training and development initiative in 2004-5. Peter Lewis devised the accompanying diagram for use in the evaluation of an internal 'Robert's Report Project' at the University of Nottingham.

Developing a strategic plan for evaluation

1. These notes are intended to promote discussion, which will contribute to the development (and the subsequent implementation) of a strategic plan for evaluation. They are *not* offered as a fully worked-out set of ideas - more as an attempt to clarify some of the issues, which will need to be addressed as part of the process of developing such a plan.
2. Chelimsky's (1997) distinction between what she called evaluation 'perspectives', and which Saunders (2000) preferred to call 'uses', is a good place to start. The three main **uses** of evaluation they identify are:
 - Evaluation for purposes of **accountability** (e.g. measuring outcomes, effectiveness, efficiency and success).

- Evaluation for furthering **development** (e.g. of the curriculum) or affecting **improvement** (e.g. in students' learning experiences) by providing formative feedback, which in turn will facilitate improvements in the design and delivery of teaching and learning or a project's ongoing decision making.
- Evaluation for furthering **knowledge** by collecting and analysing data which leads to enhanced understanding in relation to specific pedagogic activities, aspect of educational policy or the planning and management of curriculum change.

Clearly, there are overlaps between evaluations undertaken for the purposes of furthering development and action research, and between evaluation aimed at advancing knowledge and understanding and pedagogic research.

3. It is suggested that project evaluation should encompass a combination of all three of the above uses, and that these can be linked with the following **levels** or **scales**:
 - Whole system e.g. **large-scale** evaluations conducted over particular periods or the whole life history of an intervention or programme, drawing upon the outcomes of related evaluations conducted at lower levels and related to the outcomes of an initial base line survey or a situation analysis of the 'antecedents'.

- Projects e.g. **medium-scale** studies related to particular interventions, drawing where relevant on the outcomes of evaluations conducted at lower levels.
 - Courses, events and activities e.g. **small-scale** studies undertaken for the purposes of making judgements about their quality and the contribution they are making to the projects/programmes/interventions of which they are a part.
 - **Micro-scale** evaluations/studies initiated and undertaken by individuals (or groups) as an integral part of their ongoing work for the purpose of problem solving, improving their professional practices and as a means of furthering their own continuing professional development (CPD).
4. Studies undertaken for the purposes of **accountability**:
 - Are mainly used for decision-making purposes and for reaching **summative** judgements about impact, results, policy alignment, legitimating, and accountability for funds received (conducted at whole system or programme levels).
 - Do not necessarily make use of particular methods, but are likely wherever possible to draw upon quantitative methods (such as a baseline survey/situation analysis of the antecedents), value for money (VFM) and cost effectiveness (CE) techniques.

- The outcomes are mainly used for strategic and reporting purposes and so tend to be ‘top-down’ in their design and implementation (and thus can be low on diagnostic value for practitioners).
5. Studies undertaken for the purposes of **development**:
- Are conducted mainly within the framework of an action research (e.g. Cousins, 2000 and Perrin & Powell, 2004) approach to curriculum development and improvement in teaching and learning.
 - Embody a concern with diagnosis and hence the ongoing development or continuous improvement (e.g. in students’ learning experiences or employability).
 - Offer the possibility for an inclusive or collaborative approach between different stakeholders (e.g. academics, students, employers, external evaluators).
 - Provide opportunities for work-based professional development (e.g. for new lecturers) through active participation in the action research process and collaboration with others in the community.
 - Are associated with the **formative** function of evaluation, and hence high use and value to practitioners.
 - Draw upon a wide range of **methods of data collection and analysis** including narrative styles, depictions, and stakeholder experiences (but otherwise are methodologically ‘neutral’).
- Are conducted in a systematic manner, including the documentation and other records needed to provide ‘**audit trails**’ (Baykut and Morehouse, 1994 and Lincoln and Guba, 1985).
 - Lend themselves to being written up as **case studies** for dissemination purposes and publication – such studies need to be rich in contextual detail (so-called ‘thick descriptions’), theoretically informed and referenced to the relevant literature.
6. Studies undertaken with a view to furthering **knowledge and understanding**:
- Are closely aligned/lead naturally into pedagogic research and as such involve collaboration between practitioners, evaluators and researchers.
 - Are based on continuing in-depth cumulative inquiry into particular problems, groups of projects or specific projects.
 - Increase knowledge and understanding about the factors underlying the problems of pedagogy it was seeking to address or to arrive at explanatory insights and abstract conceptualisation/theories about teaching and learning and educational change.
 - Lead to academic publications (‘official’ reports, journal articles), which in the longer term contribute to future funding bids and REF.
7. One problem that needs to be addressed in project evaluation is what an early writer on the subject (Stake, 1967) called the ‘**antecedents**’, that is the description/analysis of the situation, which existed prior to an initiative. In studies seeking to measure impact this is usually referred to as the ‘**baseline**’ against which comparisons can be made. The ‘descriptions’ can be qualitative as well as quantitative. For example, ‘before’ photographs or video recordings (e.g. prior to the refurbishment of a building or change in pedagogy) and depictions/accounts of relevant student and staff experiences before the start up of a project. The building of this antecedent picture provides a form of baseline data against which the impact of the project can be compared. In other cases there may be archived quantitative data (e.g. from student satisfaction surveys, retention studies, academic performance records) against which project-initiated changes can be evaluated.
8. Much evaluation activity relies on a narrow repertoire of research **methods** such as surveys, focus groups and interviews conducted by team members and external evaluators. Useful as these have proved to be, projects might want to consider supplementing them with other methods including the collection and use of photographs and video recordings, narrative accounts of experience, reflective diaries – and drawing other staff and students into the evaluation and dissemination process.
9. Project evaluation activities for whatever purpose should be conducted within the framework of an **evaluation protocol**, which addresses such **ethical**

issues as confidentiality, anonymity and the storage and use of evaluation/research data.

10. In developing a strategic plan for evaluation it may be helpful to begin by considering the questions listed below and in so doing work systematically through an iterative process that will address the issues raised in the accompanying diagram.

- How will we demonstrate the impact, effectiveness and efficiency of what we have done to those to whom we are accountable?
- How will we evaluate the project for development and improvement as it progresses?
- How will we learn from the project so as to make recommendations for the future?
- How are we evaluating each of the activities within the project as well as the project as a whole?
- Who are the different audiences for each of the evaluation activities?
- Who needs to know what and when?
- What information and evidence do we readily have to hand?
- What are the requirements of funding body/ institutional Senior Management in terms of quality measures and final report data?
- What sorts of information do we need to start collecting now in order to answer the longer-term questions we will be interested in answering later?

- Who will be responsible for different aspects of the evaluation and what is involved in conducting it?
- How will the results of the evaluation be reported and disseminated?

References

Baykut, P and Morehouse, R (1994) *Beginning Qualitative Research: A Philosophical and Practical Guide*, London, The Falmer Press

Chelimsky, E (1997) Thoughts for a new Evaluation Society in *Evaluation* 3, 1, 97-109

Cousins, G (2000?) *Strengthening Action Research for Educational Development*

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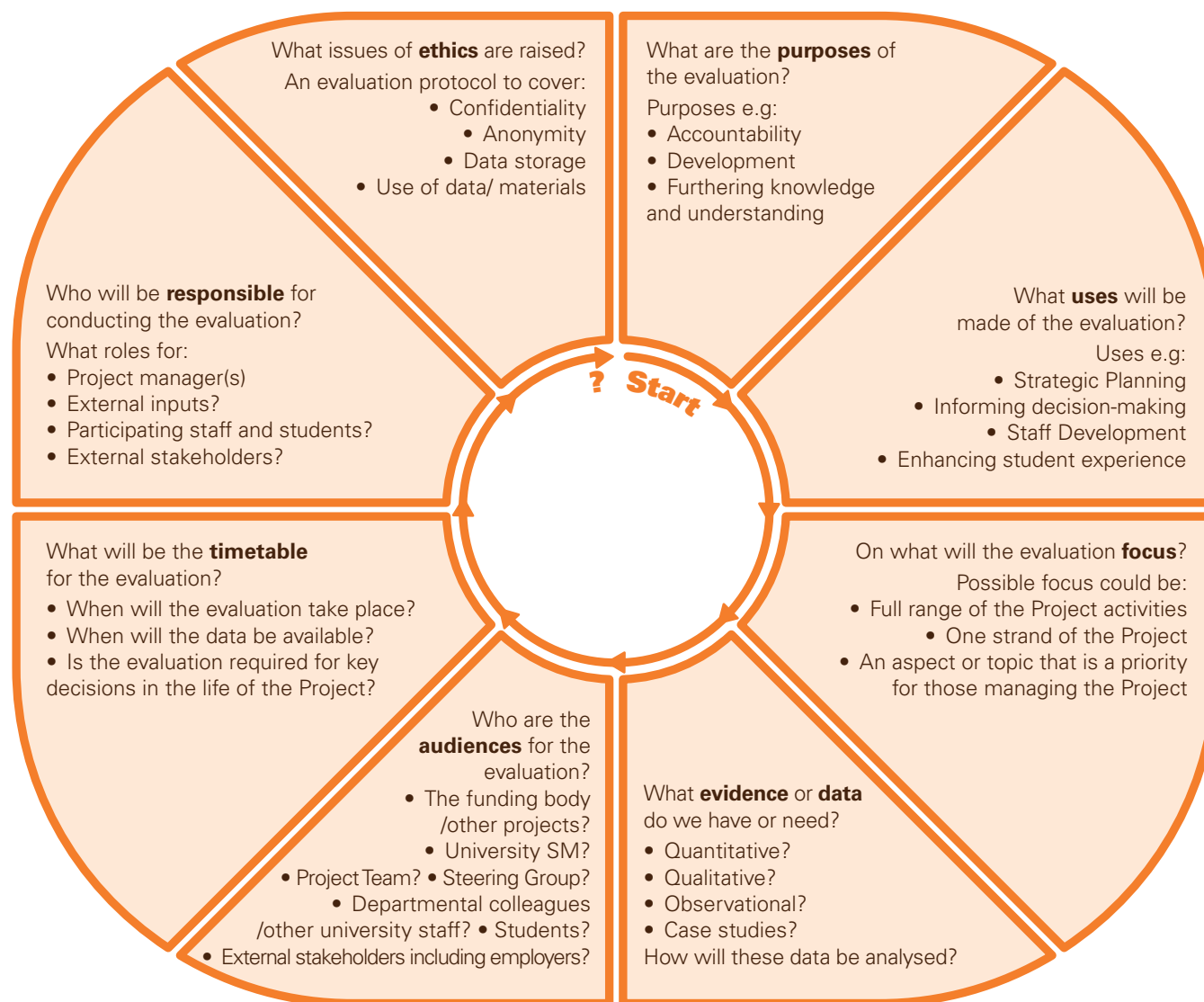
Perrin, L and Powell, B (2004) Short-term intervention, long-term gain: Using action research projects for quality improvement in adult and community education, Learning and Skills Development Agency (LSDA)

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Evaluation mindmap



An Impact Framework Approach to Project Level Evaluation

Michael Grove, University of Birmingham

It is often the case that the evaluation of a project or activity is one of the last stages of the educational enhancement process to be considered. Sometimes this is only undertaken once a project is in its final stages, or on other occasions it may take place once a project has completed. Planning the evaluation during the design stage of a project and embedding it throughout offers many additional benefits. It provides formative feedback that can enhance delivery or give rise to additional, and often unintended, benefits; it enables evidence of impact and effectiveness to be collected naturally; provides a level of external, and stakeholder, input to the design, development and delivery of the activity; and can identify additional areas for further work or study. As well as identifying what has worked, and more importantly why it has worked, it can enable an understanding to be developed of why some approaches aren't as effective as perhaps might have been reasonably expected at the outset. Additionally, undertaking a robust evaluation is critical to ensuring appropriate recognition not only for the project and its learning, but also for those individuals involved in the work taking place.

Project level evaluation, of either a single activity or a collection of activities, can be designed around an impact framework. All projects are typically required to demonstrate visible impact if their longer-term sustainability is to be ensured, or if they are to attract

additional support and investment. In particular, any new educational enhancement activity needs to demonstrate its value beyond previous practice. Such value might be financial, in terms of cost savings, but may also be the additional effectiveness of the approach at achieving a desired outcome, or increased efficiency of delivery.

The evaluation framework described in Table 1 builds upon a model first developed by Donald Kirkpatrick, and applied to the evaluation of Higher Education Academy Subject Centres in 2008/2009 by David Baume. It is based upon a hierarchical application of what might be termed key performance indicators that move towards increased levels of impact for a project or activity. At its lower levels, the framework explores general awareness of a project and wider engagement with the work taking place. At its higher levels it explores the acquisition and application of learning, the influence of the project upon activity and practice, and concludes at the highest level with the longer-term sustainability of the activities and practices initiated by the project.

The framework defines a series of indicators against which those undertaking educational enhancement activities should consider collecting evidence during their work; not all indicators will be relevant for every project. For each indicator, the question should be asked '*How will I know if this level has been successfully achieved?*' This will help define a series of evaluation questions that might be asked and begin to define the evidence or information that could potentially be collected. Such information might then be incorporated within a case study or published article arising from the work undertaken.

Underpinning each question is the need to obtain data and evidence which will be both qualitative and quantitative, and which is required to justify and validate any statements, conclusions or findings identified by the work. The framework does not describe the types of evidence that might be collected or indeed even how they might be collected as this will vary from one activity to another; a variety of methods are available to project leads and not all will be equally appropriate.

References

Evaluating Training Programs: A Collection of Articles, Donald L. Kirkpatrick (1975)

Baume, D. (2009); Private correspondence

| Level | Key Performance Indicator | Explores | Questions to Consider |
|-------|---------------------------|---|---|
| 1 | Awareness | <p>The extent of awareness of the project, its resources and opportunities. This may be localised, for example a department or faculty, or may be wider to encompass an institution, range of institutions or educational sectors. It will extend beyond exploration of the awareness of the existence of the project to exploring wider understanding of what it is seeking to achieve.</p> | <p>To what extent are key stakeholders aware of the work being undertaken?</p> <p>Is the awareness effective? Do others understand what the project is seeking to achieve?</p> <p>Does more need to be done to raise awareness of the project and in what sectors?</p> <p>Are there opportunities for others to contribute?</p> |
| 2 | Perceptions | <p>The current reaction or perception of others to the activities, resources and opportunities made available by the project. This explores the views of others towards the project and may be provided at its outset (baseline), at its conclusion, or at strategic points in between. It provides an opportunity to generate engagement with others, and might include a consultation to help shape or develop an activity, or obtain direct feedback from staff or students as to the perceived benefit or impact or an activity or resource. Such an analysis is important for understanding and managing the expectations of others.</p> | <p>What do wider stakeholders think of the project?</p> <p>Do external perceptions align with the scale and scope of project activities?</p> <p>Do external expectations need managing, or internal (institutional) expectations revising?</p> |
| 3 | Engagement | <p>The extent to which the project has engaged others in its work. Each project might have a core delivery team, but others may become involved in its work; this could include staff, students, employers, or senior management. Each will be involved in differing ways, for example it might be the extent to which a senior manager has championed or supported the activity, the number of students who have participated in delivery, the number of individuals who have attended events or contributed examples of practice. Often, engagement extends beyond the original identified stakeholders and beyond the planned institutions; all are such examples of additional impact.</p> | <p>How has the project worked with its target stakeholders?</p> <p>What wider opportunities for engagement has it provided?</p> <p>To what extent have others been involved or become involved in the project? How has such engagement arisen?</p> |

| Level | Key Performance Indicator | Explores | Questions to Consider |
|-------|---------------------------|---|---|
| 4 | Dissemination | The extent to which the project or activity has shared its learning and findings. Dissemination is an important part of the educational enhancement process, and is a clear indicator of impact. It might include the number of resources produced, events offered, funding provided, engagement with a project website, or networking opportunities provided to others. Data captured should extend beyond only quantitative data (for example number of events, resources, or website 'hits') but should explore qualitative aspects, for example, who were the audiences for dissemination and how did they contribute? | <p>What has the project done to disseminate its work?</p> <p>Has the project enabled the sharing of ideas and effective practices with others?</p> <p>Who were the stakeholders for dissemination and to what extent has there been internal and external dissemination?</p> |
| 5 | Learning | An analysis of the learning that has emerged from the work and its wider implications. This includes 'knowing' what the project is doing/has done, but also understanding what the findings and outcomes from the activities are and their potential wider implications. This will include intended outcomes, but also unintended ones. Identifying learning will include 'what works' (and why) but it is equally important for informing the activities of others to identify 'what doesn't'. | <p>What has the project achieved? Has it had the desired impact? How do you know it has had this impact?</p> <p>Has it met its aims and objectives? How do you know?</p> <p>What is known now that perhaps wasn't before? Or is evidence now available to support (or contradict) a particular hypothesis or 'position'?</p> <p>What additional learning has been generated beyond the original intended outcomes?</p> <p>How does the learning align with existing literature or theory?</p> |
| 6 | Application of Learning | The extent to which the learning has been applied or will be applied. This might include how the learning has influenced and informed the project as it has developed, or how the ideas have been subsequently utilised by others. It may include intent (ideas and proposals) for additional work that builds upon the learning generated, or where learning has been (or will be) applied in a different, or wider context. For example, work at module level might have influenced activities at a programme or departmental level. | <p>What wider interest has there been in the findings from the work by others? What have others done with this learning?</p> <p>Are the outcomes or outputs from the work being utilised by others? What impact has this had? Is there intent from others to do so?</p> <p>What enhancements or changes have been made as a result of the activity?</p> <p>Is there an intent to apply findings more widely or extend the project to a different context?</p> <p>How was the project modified in response to the learning that emerged?</p> <p>What would you advise others repeating the activity to do differently and why?</p> <p>How have the staff, students or other stakeholders involved benefited from the activity?</p> |

| Level | Key Performance Indicator | Explores | Questions to Consider |
|-------|---------------------------|--|--|
| 7 | Practice Change | The extent to which the project or its activities have influenced future practice and policy. This extends beyond intent to change, and describes the direct consequences of the activity undertaken upon the future practices of both individuals and higher education institutions. It explores how the activities have influenced policy (at departmental, faculty or institutional levels) or enhanced staff capability or capacity. It will describe what is now different or will be different as a result of the work and represents a direct commitment to continued application of the learning and activity. It may also describe changes that have taken place beyond the original organisations and individuals involved (wider influence). | <p>What is now taking place within higher education institutions that wasn't previously and can be directly attributed to the work of the project?</p> <p>How has the project helped changed the practice of HEIs?</p> <p>How has it influenced the practices of other members of staff?</p> <p>How has the learning or activity influenced (current or future) policy at departmental, faculty or institutional levels?</p> |
| 8 | Sustainability | The extent to which the activities initiated or supported will continue beyond their funded lifetime. This describes the commitment of the institution and individuals within it to continuing the activity or embedding the learning more widely. It may be that the activity continues in a modified or alternative form based upon the learning that has been generated or due to wider circumstances; this too should be captured and recorded as an indicator of impact. | <p>Will the practices developed be sustainable (continue) beyond the funded lifetime of the project? Will this be in its current or modified form?</p> <p>How has, or will sustainability be achieved? What indicates sustainability has been realised?</p> <p>What is the commitment of the HEI or the individuals within it to both the activity and its future legacy?</p> |

Table 1: Project Level Impact Evaluation Framework

Making evaluation planning decisions using RUFDATA¹

Professors Harry Tolley and David Greatbatch

1. What are our **REASONS AND PURPOSES** for evaluation?

[These could be planning, managing, learning, developing, accountability]

2. What will be the **USES** of our evaluation?

[These might be to capture and learn from good practice, staff development, strategic planning, and project management]

3. What will be the **FOCI** of our evaluation?

[These could include the range of activities, aspects or emphasis to be evaluated. They should be aligned to/connect with other aspects of the evaluation and should lead to the formulation of the questions our evaluation will address in relation to them.]

4. What will be our **DATA** and **EVIDENCE** for our evaluation(s)?

[Numerical, qualitative, observational, case study accounts? What methodology will we use to answer our evaluation questions? What methods will we use? What sampling strategies (if any) will be necessary? How will the data be collected and analysed?]

5. Who will be the **AUDIENCE** for our evaluations?

[Yourselves, communities of practice, funding body? How will this be reflected in what is written as an outcome of the evaluation?]

6. What will be the **TIMING** for our evaluation?

[When exactly should evaluation take place e.g. to coincide with decision-making cycles, lifecycle of the project?]

7. Who should be the **AGENCY** conducting the evaluations?

[Yourselves, external evaluators, or a combination? Who will be included in/excluded from your evaluation? Who will be responsible for collecting data? Who will analyse the data? Who will write the report/case study?]

8. Going forward, what will be our main **challenges** in evaluating our project?

9. What **concerns** do we have at this stage?

10. What further **help and support** do we feel we will need in evaluating our project?



¹Saunders, M. (2000) Beginning an evaluation with RUFDATA: theorising a practical approach to evaluation planning; in Evaluation, 6, 1, pp 7-21

Developing an evaluation plan – a single page approach

Based on evaluation guidance and case studies produced by David Shakespeare for the National STEM Centre www.nationalstemcentre.org.uk/stem-programme/evaluation

David Shakespeare

Your activity or project:

Before starting... rationale to evaluate?

What is to be evaluated?... aims? objectives?
...evaluation questions?

How is it to be evaluated?... resources? quantitative/qualitative/both?

Your methodology?... the instruments you will use? how you will sample?

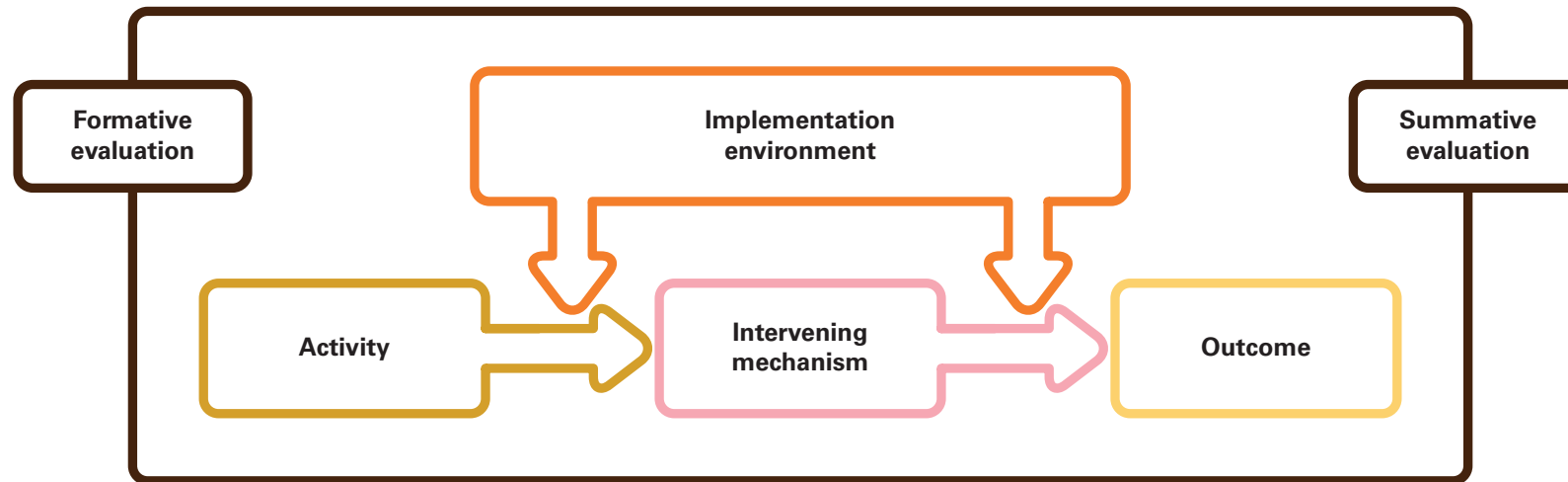
Feedback/publication?... what type of conclusions? ... how to compile, analyse, summarise, report?

What next?...
how might this influence the future?

Some evaluation theory...

Laura Grant

This is a model of the different aspects of an activity that we might wish to evaluate.



- **Activity** is your activity. Sometimes described by evaluators as an 'intervention' or 'treatment'.
- **Intervening mechanisms** – describe and unpack how it works (or not). For example, an element of a project that is surprising to participants might leave a lasting impression or stimulate learning.
- **Outcomes** are the effects of the activity, but this also depends on the...
- **Implementation environment**, which can be something simple like a rainy day meaning attendance to an outdoor activity is poor, to the complex pre-existing ideas and beliefs held by audiences
- **Generalising evaluation** explores how the outcomes and mechanisms associated with an activity might transfer from the 'research system' (denoted by the large grey box) to the wider world.

Evaluators also talk about **formative** and **summative** evaluations – which focus on improving an activity or proving effectiveness respectively. Many evaluations have an element of both. Evaluations can also be described as ‘normative’ or ‘causative’:

Use these ideas to help you come up with good evaluation questions. If your activity and its outcomes are well understood, you might explore intervening mechanisms or questions around generalising. If it is the first time you are running an activity, questions about the activity delivery itself might be at the top of your list. A comprehensive evaluation might include exploration of most or all of the elements of this model.

| Domain | | Definition |
|-----------|----------------------------|--|
| Normative | Treatment (Activity) | Treatment is the action or element that produces the change within a programme |
| | Implementation environment | Describes the environment within which a treatment is implemented |
| | Outcome | The intended and unintended outcomes of a programme |
| Causative | Impact | Assesses the impact of the treatment on the outcome |
| | Intervening mechanism | Investigates the mechanisms relating implemented treatment with outcome |
| | Generalisation | Provides information on how evaluation results can be generalised to apply to future systems |

Reference:

Chen, HT (1990) *Theory-driven evaluations* Newbury Park CA, Sage

Evaluation guidance and examples from the National HE STEM Programme South West Spoke

Dr. Sarah Chatwin

About this guide

This document aims to provide brief guidance on evaluating projects and is intended for use alongside information provided by the National HE STEM Programme and other guidance material that has been recommended, including:

- Useful evaluation resources listed on the National HE STEM website
<http://www.hestem.ac.uk/evaluationtools>
- Sustainability, dissemination and evaluation matrix
- National HE STEM evaluation guidance and template
- HE STEM Evaluation event: **Conference in support of project level evaluation of university led educational activities** (21st September 2011)

Some evaluation techniques used in a variety of SW HE STEM projects have been included, providing real-life examples of evaluation in practice and demonstrating some of the options and approaches available to you in the evaluation of your project. The case studies used provide context, which is important in understanding why the specific evaluation approaches demonstrated are appropriate.

Using this guide

A selection of some of the most common project objectives or activities has been included in this document, alongside other more in-depth reading or useful resources and a related case study from the SW. Each objective or activity includes a list of key points and prompts to consider when planning or undertaking evaluation in that area.

Use this document as a quick reference guide, dipping into sections most relevant to your project.

The guide is in no way exhaustive and there will be additional ways that your project can be evaluated to highlight impacts unique to your project or based on your in-depth knowledge of the project. Choose an approach that best suits your project; your choice of evaluation technique should always aim to 'prove' the effectiveness and impact of the project and detail how objectives* integral to the project, have been achieved and how you know this.

*Project objectives were set in the original project proposal.

1. Curriculum material

Much of the information below is generally held or known by departments internally and available either formally or informally within the institution. Where projects have developed materials, it is important to understand the context so that evaluation is meaningful.

Points you may want to consider when evaluating curriculum material that has been developed.

- Developed in consultation:
 - o Employers
 - o 'Critical friends' used
 - o Professional bodies/support from accreditation bodies
- Compulsory or optional unit?
- With whom has it been piloted?
 - o Number of students (including % of cohort)
 - o Discipline and year of study
- Information on student marks or pass-rates
 - o Are these as expected and if not why not?
 - o Does this have an impact on student achievement in other units?
- Feedback on both curriculum content and accessibility (delivery) from students, staff and any external stakeholders e.g. employers
 - o Surveys
 - o Quotes
 - o Focus groups
 - o Reflective logs
- Consider making student feedback an integral part of the course
 - o Reflective diaries or blogs
 - o Video/audio logs

Useful guidance on choosing evaluation methods, especially gathering feedback is available through the National HE STEM Programme guide to teaching evaluation

- Has the activity been embedded into the curriculum?
 - o Does a unit description exist?
 - o How many credits is it worth?
- Will it be expanded or enhanced in the future?
- Any lesson learnt, changes planned or suggestions for developing or running similar units?
- Could the activity be easily transferred to another department or HEI?
 - o Consider whether this is appropriate and how it could be achieved
 - o List interested parties or any plans for the future
 - o Add a Creative Commons License to clearly indicate how the materials can be used/adapted
 - o Record details of any articles produced for publication or presentations given

Related information and tools on evaluating i) resources for academics and ii) educational development units and their work are available through the Higher Education Academy STEM Subject Centres Evaluation Toolkit (sections 7 and 11 respectively).

Case study 1:

The project **Design a Fireworks Show! Using Context and Problem Based Learning** (CPBL) has used a range of contacts to inform the development of new undergraduate chemistry CPBL materials, consulting with: two academic CPBL experts with well-established links to the Higher Education Academy CPBL Special Interest Group; academic experts in the field of pyrotechnics and regional fireworks companies. Such extensive consultation has ensured that the resultant materials are grounded in reality with learning objectives that complement the curriculum. In addition, the resources will be further trialled and adapted at a CPBL workshop at the University of Leicester in June 2012; this will provide an opportunity for independent comment on the resources and reflection on lessons learnt. The materials are sustainable in that they are embedded in the University of Bath's Chemistry curriculum. The project leads have also forged a close working relationship with the Royal Society of Chemistry (RSC) with the result that materials will be hosted on the RSC website beyond the Programme end within a suite of related CPBL teaching resources.

Case study 2:

In the project **Enhancing Workplace Statistical Literacy**, two different delivery modes were compared as part of a pilot course: entirely online and a blended approach. Feedback was provided by the 24 employees from Devon County Council who followed the pilot course in two groups of 12. The Project Leader collected responses via focus groups and an online web survey and these were used to evaluate the different delivery approaches. Participants fed back that there were concepts within the course that needed the type of discussion which could not be facilitated electronically, and therefore, influenced how future course developments with employers will be delivered. The fact that elements of the workbased statistical course are now being used within undergraduate courses at Plymouth University and within Devon County Council's own Critical Appraisal Skills course demonstrates the course material's impact.

2. Inform/Influence Future Institutional Strategies

It is hoped that projects and pilot activities are proven to be successful and worthwhile by the evaluation information collected. Evaluation information requires analysis and reporting in an accessible manner so that others can benefit from the project lessons.

Points you may want to consider when evaluating whether your project has been effective in informing, influencing or even changing institutional strategies.

- New practices embedded in the curriculum?
- Uptake of new practices across whole departments/faculties or institution
 - o Staff trained in new practices
[SEE UP-SKILLING STAFF SECTION]
 - o Toolkits widely available to enable new practice
[SEE UP-SKILLING STAFF SECTION]
- Are there 'champions' representing your case in strategic positions e.g.
 - o Management positions
 - o Across a range of departments, faculties or central services
- Is information fed to the correct people for institutional change?
 - o Governance changes or new committees set up
 - o Changes in reporting
 - o Project findings or recommendations presented to senior-level groups

- Is there potential for project strategy/approach to be incorporated into Institutional Strategy e.g. policy changes?
 - o How will this be/has this been achieved?
- Feedback from stakeholders
 - o Semi-structured interviews
 - o Surveys
- Record details of any articles produced for publication or presentations given

Case study:

The University of Bath Legacy project **Strengthening, extending and embedding employer engagement** is concerned with increasing and enhancing student exposure to employers to build on the student experience and their employability skills. One of the aims of the project, supported at a senior management level, is to build upon the University's established and strong placement practices. This is being carried out in consultation with faculty-level placement managers to ensure that good practice identified within STEM is spread across the whole institution.

Since the inception of the project, a new sub-committee of the University Learning and Teaching Quality Committee has been set up to monitor and make recommendations, formally feeding information on employability and careers into the University's governance structure. This committee is also responsible for proposing enhancements and disseminating good practice relating to careers education, employability skills development and placement and work-based learning across the University.

3. Upskill Staff/Create Future Leaders & Champions

It is a general assumption that training addresses a need, so it is vital to know what this need is and understand why it has come about in order to evaluate its effectiveness.

- Be very clear in the purpose and benefits of any training – why is it important?
 - o New information or to build expertise?
- Who is the target audience and who will benefit from the increase in expertise?
 - o Targeting existing groups or networks
 - o Staff with a professional interest (part of their job remit)
 - Compulsory or optional?

Points you may want to consider when evaluating how effective methods to upskill or train staff have been

- What were the (staff) perceived skills gaps that needed addressing?
 - o Did training provide the skills perceived to be lacking?
 - o Would further or advanced training be welcome?
- Types of advice, support and guidance provided:
 - o Toolkits
 - o Mentoring
 - o 1:1 training
 - o PDR
 - o Workshops [SEE EVENTS SECTION]

- How is learning from the training being used?
 - o Semi-structured interviews
 - o Follow-up surveys
 - o Creative Learning Journey (where applicable)
- How transferable are the means of training?
 - o Where possible, show that materials have been created with wider adoption and practice transferability of practice in mind to prevent unnecessary adaptations post-production
 - o Where are they available and to whom?
 - o Use the Creative Commons License to identify how resources can be used/adapted
- Formal mechanisms of getting other HEIs involved e.g. funding calls
- Evaluate how accessible information is as well as the content of the material
- Consult to ensure ease of transferability (e.g. critical friend approach)
 - o Record details of any articles produced for publication or presentations given

Useful information and tools on evaluating i) resources for academics and ii) educational development units and their work are available through the Higher Education Academy STEM Subject Centres Evaluation Toolkit (sections 7 and 11 respectively).

Case study:

The project **Enhancing STEM Academics' Public Engagement Skills** started with a very clear premise that many postgraduate students and academics knew little about primary school curricula, pedagogies and learning styles and therefore struggled to design and deliver effective outreach workshops for key stage 1 – 3 pupils. Outreach skills were in existence but more targeted at secondary age pupils rather than primary.

To address this, an online guide to **Delivering Effective STEM Public Engagement** has been produced, complemented by two training workshops. The first workshop demystifies the primary school phase through: an overview of the national curriculum; consideration of the 'perfect' learning experience for pupils; discussion of key pedagogies and finally, various skills for engaging active learning. The second encourages attendees to apply what they have learnt in the first to the planning and development of their own public engagement activity. As the training is based on generic skills development, it is highly transferable to other disciplines and HEIs. Indeed, the HE STEM Practice Transfer Adopter scheme is being utilised to formally embed the training in six other HEIs. Via this scheme, the project leads will take a critical friend approach to ensure learning is maximised amongst individuals.

4. Creating Communities of Practice (CoPs), regional forum or networks

Personal links with individuals who share an area of interest, have valuable related experience, or who are trying to achieve a similar objectives are well recognised as being very beneficial. It is also recognised that forming groups is not always easy or successful and honest evaluation of CoPs is incredibly valuable to inform future practice, both personally and for a wider audience.

Points you may want to consider when evaluating how effective the bringing together of practitioners has been and the impacts the group has made

- What was the main initial remit of the group?
 - o Delivering projects together (collaborative work)
 - o Learning from other practitioners
 - o Consultation – critical friends role/peer review
 - o Making new/strengthening links
- What was the initial focus of the group?
 - o Single or evolving focus?
- Did networks already exist based on another focus?
- Number of meetings and attendance
- Type of meetings and benefits of each:
 - o Face-to-face
 - o Video conferencing
 - o Teleconferencing
- What impacts has the group made/allowed?
 - o What have been the results?
 - New people working together
 - Members taking on learning from the group and using it within their work/transferring to different disciplines
 - Members passing on learning or links from the group to colleagues
 - o Note unexpected impacts as well as expected impacts
 - Working together outside of the HE STEM project
- Potential CoP and/or extension of project working group beyond the close of project?
- Potential for wider adoption and embedding by other HEIs
 - o Record details of any articles produced for publication or presentations given

Case study:

The project **Creating a Community of Practice (CoP) for STEM Outreach and WP Practitioners** came from the loss of Aimhigher and the subsequent desire not to lose all expertise and contacts generated by this programme. The project has so far held two events, bringing together over 70 STEM practitioners willing to share ideas and best practice as to how to improve STEM outreach. These events have provided structured activities and showcasing of STEM outreach methodologies as well as open spaces for individuals to network.

Improving the effectiveness of outreach has remained the focus of the CoP and relationships between individuals within the community have been developed outside of events through: a JISC Mail group, a website, and shadowing and peer review schemes that have provided funding for individuals to visit one another to learn from each other's outreach activities. A particular success of the community has been the forging of cross-sector relationships (for example, between HEIs and other STEM-related organisations such as museums and STEMNET) and the pan-STEM approach that the community has taken. The model is being extended to three other HEIs through the Practice Transfer Adopter scheme and is informing the development of plans for a national community of practice between HEIs and third sector organisations.

5. Events

It is standard for events to be evaluated by a feedback form, however more in-depth information (generally information known by the organiser and delegates) is very valuable in giving non-delegates and other potential organisers an insight into the approach taken and the reasons why, so that a wider group can learn from the activity.

- Plan your evaluation approach whilst the event is in the process of being organised (prior to the event)
- Be very clear on the main event aim e.g.:
 - o Dissemination
 - o Information from event shaping or informing other objectives of the project
 - o Creating or strengthening a network or community of practice
 - o Launch of funding call or potential project involvement
 - o Training/guidance
- Plan how the event will be publicised to ensure good attendance from the target audience (will you use a very targeted approach e.g. relevant existing networks or promote widely, and how?)
 - o Include information on who and what the event is for on the invitation/publicity material

Points you may want to consider when evaluating an event to identify whether the aim of the event was fulfilled for both the organisers and the delegates

- Was the promotion of the event effective?
 - o Any lessons learnt?
 - o Different publicity channels that have since come to light?
- Number of attendees compared to expected uptake (qualitative)
 - o an understanding of why
- Who were the audience and did they fit with your intended target audience?
 - o Useful delegate lists are those which detail:
 - Institution – gives information on type of HEIs attending (Russell Group / post 1992 / 1994 Group etc.) and location (regional audience, national etc.)
 - Department (spread of disciplines you have attracted)
 - Role – teacher fellow, lecturer, senior management etc.
 - Email address for potential future contact
 - Consider requesting permission to follow up with delegates after the event

A short summary on this information is useful

- Do you know what the delegates wanted to achieve out of the day and do you know if this was fulfilled?
 - o Consider asking delegates upon registration what they want to achieve – pre-event work
 - o Quotes from delegates
 - o Survey feedback (quantitative and qualitative)
- What impact has the event had?
 - o What have been the results?
 - New people working together
 - Information collated from delegates e.g. for resource development
 - Increase in uptake of funding
 - Delegates taking on learning from the event and using it within their teaching
 - Delegates passing on learning from the event to colleagues/transferring to different disciplines
 - Increased 'hits' on website
 - o Note unexpected impacts as well as expected impacts

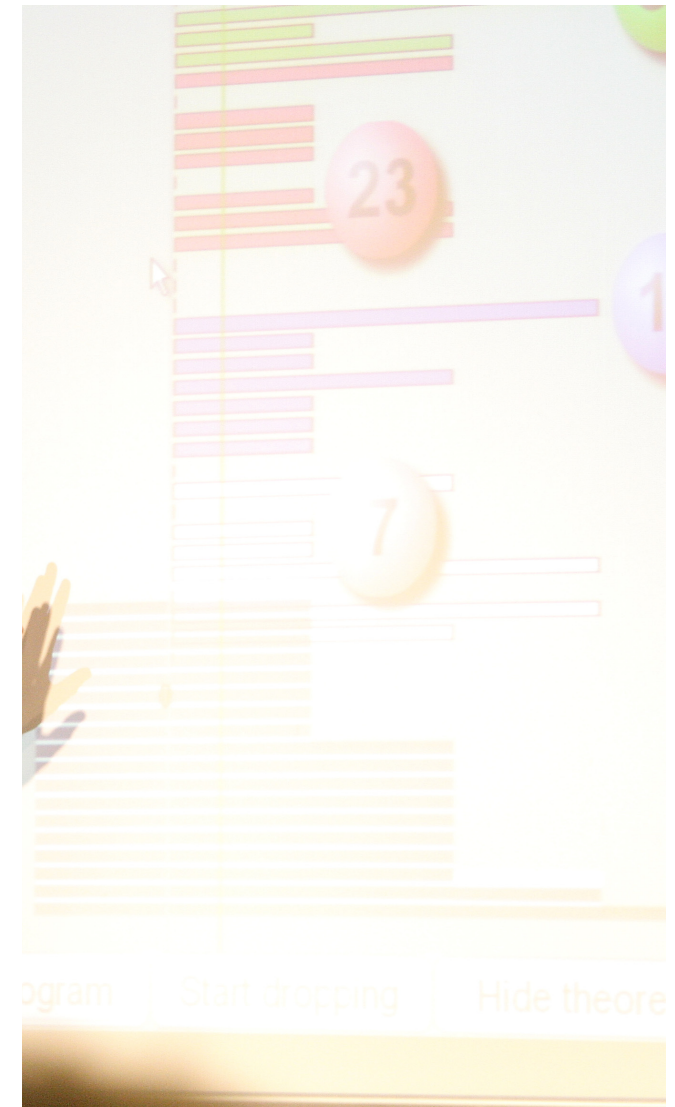
More useful information and event evaluation tools are available through the Higher Education Academy STEM Subject Centres Evaluation Toolkit (sections 3, 4 and 9).

Case study:

The **Transition and Induction Experiences of WP Students** project in conjunction with the **Peer Assisted Learning and STEM** project is delivering four seminars targeted at those HE professionals interested in the first year experience. The seminars aim to share research findings from the projects as well as to stimulate best practice sharing and a regional network of practitioners (an associated JISCMail list has been established).

Seminars are promoted 4-6 weeks in advance, initially around relevant practitioner networks but then more widely through national organisations (e.g. Action on Access) and national JISCMail groups. Those who sign up are given 'homework', questions to think around in advance of the seminar. This is a good way to ensure that people engage with the topic before arriving and it helps the project lead to assess learning that has taken place.

Following the seminar, delegates are encouraged to highlight any specific learning and to identify any changes in practice. Following the first seminar, continued discussions through the JISCMail group on Maths Cafes led to the University of Bath establishing their own. A briefing paper is also produced following each seminar to capture project progress and learning from the event, for use more widely.



6. Build Upon/Sustain Capacity

Sustainability is a key factor for all HE STEM initiated projects, with each project having to demonstrate how their activities, processes or outputs will be continued past the end of the Programme lifetime. However, there may be some projects where building on or sustaining capacity is the main aim.

- Understand the need
 - o Why is increasing capacity important?
 - o To what is it responding?
- Know the baseline information for comparison
- Be clear whether the main focus of your project is to increase numbers or enhance work that is going on
- Set SMART targets (Specific, Measurable, Attainable, Relevant, Time-bound)
- Take into account what approaches have been used in the past or good practice from other institutions

Points you may want to consider when evaluating whether capacity has been built upon or sustained and how this has been achieved.

- How far has the project come to achieving the SMART targets; have these been exceeded even?
- Has the activity been embedded into the curriculum or other ways of working?
 - o Has activity been 'formalised' in any other manner?
- Will it be expanded or enhanced further in the future?

- Could the activity be easily transferred to another department or HEI?
 - o Consider whether this is appropriate and how it could be achieved
 - o List interested parties or any plans for the future
 - o Add a Creative Commons License to clearly indicate how the materials can be used/adapted
 - o Record details of any articles produced for publication or presentations given

Case study:

The **Hydrographic Academy** project has developed a method of online distance learning to upskill employees within the offshore survey and engineering industry. Within the duration of the project, significant steps have been taken to demonstrate and increase the likelihood of sustainability. There were 13 students registered to start on the first 10 credit trial module before the end of 2011, and a further 35 signed up for April 2012. Market research has been undertaken in conjunction with Fugro, the employer partner in the project, and sustainability in terms of student uptake appears to be very positive.

The project is also working towards gaining accreditation from the International Hydrographic Organisation, the Chartered Institute of Civil Engineering Surveyors and the Institute of Marine Engineering, Science and Technology, which demonstrates clearly the project team's commitment to making the outputs sustainable in the long term.

(Version 2 – amended by the Programme hub)

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This activity was undertaken as a part of the National **HE STEM** Programme, via the South West Spoke. For more information on South West Spoke projects, please see www.hestem-sw.org.uk. For more information on the overall national programme, please see www.hestem.ac.uk.

Checklist for observation-based evaluation

Lou Comerford Boyes

| | | |
|--|---|--|
| General background | What is observation? | A way of directly and systematically capturing information (through the senses of the researcher/observer). The goal of observation is to try and capture something real and actual (i.e. a social situation/interaction) unfolding. |
| | What sort of evaluative research can observation support? | Observation is good for capturing behaviour, engagement and delivery in action – either to test a theory or to help the researcher understand something more deeply. |
| | What else can observation achieve? | Not only does observation allow you to capture live activity, it is also a useful way of getting additional data to support other methods. For example, it can help a researcher work out good interview questions, it can provide data to back up or challenge self-report data (questionnaire) etc. In addition it will frequently capture evidence of practices that may not be discussed in depth during interviews and focus groups – or may be totally ignored. |
| | What sort of data will it give you? | Depending on how you set the observation up, you can use observation to capture quantitative or qualitative data. |
| What sort of observation is best? | Quantitative or qualitative? | Depends on what you want to capture. If you want to count up instances of whether and/or how often something happens, an inventory with columns and rows allows you to keep a tally. You can use also observation to draft descriptive, qualitative detail where the goal might not be ‘proving a theory’ but simply understanding a situation more deeply. With the latter, it’s useful if two people observe the same thing independently then confer to check for interpretation etc. |
| Type of observation continued... | Participant or non-participant observation? | Things to consider include: the impact that observer presence can have on what is being observed – being observed can lead to changes in behaviour. One way of lessening the effect is to habituate people to being observed with some pilot observation before proper data capture actual starts. Participant observation – one of the issues here is a question as to whether the researcher-participant is really a true participant, and the potential conflict of interest and tensions that this can cause. |
| How to capture it all? | Video methods, detailed note taking etc. | You can’t deliver and observe at the same time – observation works better if the context is co-teaching, co-facilitation of a project. Permissions for video need to be gained. Digital capture can be off-putting – but people do get used to it. Factor in time/ resource costs of watching and analysing footage. An hour of film takes hours to analyse. Analysis is better if more than one person can check out any assumptions and interpretations. Video methodology has proved to be highly effective in capturing evidence of practices in a variety of authentic settings such as workplaces that otherwise would have gone unnoticed. As a consequence they may not be discussed in depth during interviews or focus groups – or may be overlooked completely. |
| Analysis of the data you get | Qualitative data - thematic analysis? Quantitative data – counting up, descriptive statistics | Reporting findings and getting to the heart of headline findings with accessible summaries – harder with qualitative data |
| Finally..... | Is observation the best way to get the data you need? | What other data collection methods are available – are they more suitable? What else could you do in addition to observation? |

Observation Methods Case Study

Professor Harry Tolley

Introduction

1. Observation provides an opportunity to gather evaluation data from 'live' situations – to look at (and listen to) what is taking place **in situ** in authentic settings such as teaching spaces and workplaces rather than at second hand through the eyes and ears of interview subjects or respondents to questionnaires (Patton, 1990). This enables the evaluator to understand the context in which activities under consideration take place and to see and hear things that might otherwise be unconsciously missed, to surface things that participants might not freely talk about in an interview of focus group (Cohen et al, 2000). Observation therefore can be used to complement other methods of data collection. For example, in this instance the outcomes of the observation were used to devise the questions that framed the agenda for a subsequent student focus group, and to triangulate with self-report data obtained by means of a questionnaire.
2. The observation was undertaken as part of the formative evaluation of a curriculum development initiative in a university engineering department. Surveys of the student experience had identified a series of issues relating to assessment including delay in receiving feedback on their coursework, and the exercise under consideration here was an integral part of the planned response. The problems that were being addressed were related to the marking of lab

reports – the large class size making it difficult for the tutor to assess, grade and return them within a short space of time. A paper giving a detailed account of the peer marking of lab reports submitted by Bioscience students was thought to offer a potential solution to the problem, and one of the tutors volunteered to pilot the approach with a view to its widespread adoption. The process of 'practice transfer' was initiated with a group of Year 2 students at an induction session delivered by the tutor and observed by a colleague from another department acting as the evaluator.

Aim

3. The **aim** of the observation (within the wider plan for evaluation) was **formative** i.e. to provide feedback that could be used to inform future decision making with regard to a plan for the adoption and implementation of the peer marking of student lab reports. Its **purpose** was therefore the ongoing enhancement of professional practice aimed at improving the students' experience.

Methodology

4. The tutor and the observer met in advance to discuss the session and it was agreed that:
 - The observation would be at the non-participant end of the *complete participant-complete observer* spectrum – or 'non-interventionist' (Adler and Adler, 1994).
 - As with the routine peer observation of teaching as practised in the department, the tutor would identify the evaluator and give a brief explanation

of his presence to the students at the start of the session.

- The observer would sit and make 'field notes' the aim of which would be to provide feedback that could be used in the formative evaluation of the implementation of peer marking. In the event they were similar in their content/structure to the checklist offered by Spradley (1980):

| | |
|-------------------|--|
| Space | The physical setting |
| Actors | The people in the situation |
| Activities | The sets of related acts that took place |
| Objects | The artifacts and physical things that were there/used |
| Acts | The specific actions in which the participants engaged |
| Events | The sets of activities that occurred |
| Goals | What the participants were trying to achieve |
| Feelings | What the participants felt and how this was expressed |

What the observer noted

5. The session took place where the class was routinely timetabled to meet – a tiered lecture theatre. This proved to be a **physical space** that was unsuitable for the group discussion phase that was integral to the session – it was difficult for the students to form into groups, to establish and maintain eye contact etc.

6. **Attendance** was good – 57 out of a maximum of 60 (or so) students being present. The group included a high proportion of international students – some from the university's campus in Malaysia.
7. The **resources** used consisted of:
 - Photocopies of three lab reports (chosen to illustrate different levels of achievement/standards of work) to be marked individually by the students as part of the exercise.
 - Marking scheme that included flow diagrams illustrating the alternative routes students could take in solving the problems that had been set.
 - Bank of feedback comments, which could be used/adapted by the students when marking and commenting on the scripts.
8. The session was **structured** into three phases as follows:
 - **Introduction** (40 minutes): The tutor gave a PowerPoint presentation in which he explained the reasoning behind the decision to experiment with peer marking, introduced the students to the resources and then guided them through the procedures for marking the sample scripts. In so doing he gave them detailed feedback on alternative methods for tackling the problems they had been set in the lab work and identified common errors that students had made.
 - **Trial marking** (50 minutes): Working independently, the students marked the three lab reports using the guidance materials provided. They took full advantage of the freedom they had been given

to consult with other students and the tutor was available to help the latecomers (there were a few 'stragglers') and to deal with any problems encountered by students (in the event very few). There was much work-related discussion between students on the task in hand. The students made frequent references to their own work – especially to how they had tackled the problems compared with the lab reports they were marking.

- **Group discussion and plenary** (20 minutes): Groups were quickly formed by those sitting in close proximity to each other - but in the physical setting of a tiered lecture theatre it was not easy to integrate those seated at the margins. The tutor set the students tasks such as comparing the marks they had allocated (and why) and the feedback comments they had given – the resultant interactions were lively and animated. He then got the groups (chosen at random) to report on the decisions they had made compared with his.
9. It transpired that the marks allocated by students were very close to those awarded by the tutor on two of the three scripts; the reasons for the differences on the third script were explored – the students being more critical of it because it was less-well presented than the other two reports whereas the tutor had focused more on the actual content. In addition the student markers had made use of a wider range of feedback comments than the tutor. Finally, there was some discussion of what lessons could be learned from the exercise and how these could be applied (as 'feed forward') when doing the next lab report.

Final comments

10. The **student response** throughout the session was very positive – there was no evidence of resistance to engaging in the activity or questioning its value. Individuals said in the plenary discussion that they thought they had learned a lot from the experience and that the feedback would help them not just with their lab reports, but also with future coursework assignments.
11. After the session, the **tutor** said that from his perspective it had '*gone as well as I could have hoped for*'. He attributed the effectiveness to careful preparation – pointing out that a substantial proportion of the time saved on marking the lab reports would be taken up with advance planning. Nevertheless, in his view the experiment would be worth repeating – but not in the lecture theatre.

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Video-based Methods Case Study

Professor David Greatbatch

Introduction

1. In recent years there has been a growing interest in video-based studies of the use of tools and technologies in organisational settings. The use of video recordings enables researchers to:
 - Subject system use to repeated and detailed scrutiny.
 - Re-examine the performance of tasks and activities in the light of new findings and in terms of different research questions and interests.
 - Evaluate the strength and accuracy of each other's analyses by cross-referencing to the 'raw' data.
 - Build collections of recordings of a range of different tasks being performed by different individuals in different settings including teaching spaces and workplaces.

By using video-recordings in conjunction with other data, researchers have been able to analyse practices and modes of reasoning that otherwise remain hidden from view. Among other things this has enabled them to explore the tacit or unnoticed aspects of *in situ* human conduct in the workplace and to delineate requirements for technological innovation (e.g. see Luff, Heath and Greatbatch 1994; Heath and Luff 2000; Greatbatch et al 2001).

Aim

2. The **aim** of the evaluation activity described in this case study was formative i.e. to examine the feasibility of using video-based methods for the collection of evidence on the use of an e-tool¹, including such issues as its functionality with a small sample of potential end users. The exercise involved making and analysing video recordings during the pre-piloting evaluation of the tool with a view to providing feedback that could be used to enhance its ongoing development.

Methodology

3. Two video recordings were made of a pre-piloting evaluation session involving four academics. One camera focussed on the whole group. The purpose of this recording was to capture any interactions that might occur as the academics used the tool. It transpired that little or no explicit interaction occurred between the users or others as the tasks were being performed. It should be noted, however, that when computers are used in natural settings, users often interact with others and video provides a means through which one can examine how these interactions impact on system use. **[Note:** The author has undertaken work of this kind in relation to the use of computers in medical settings, and this has shown that even seemingly individualistic use of computers can be shaped in important ways by users' interactions with others.]
4. A second camera focussed on an individual who agreed to describe what he did and thought as he used the tool to address the pre-piloting evaluation

tasks. The purpose of recording an individual user describing his use of the system in real time was to:

- Capture his immediate reactions to different aspects of the tool.
- Provide access to the details of how he used the tool.
- Reveal his processes of reasoning (which would otherwise remain largely hidden from view).
- Establish the extent to which the details of his use of the tool can be used to explain the user's reactions and provide insights that can inform the future development of the tool.

The findings reported in the next section are based on a preliminary analysis of this recording, which lasted approximately **45 minutes**.

Findings

5. Part of the user's discussion of **Task 2** and most of his discussion of **Task 3** is barely audible due to background noise. In future this problem could be overcome by using a dedicated microphone and/or video recording users in isolation from one another. For the purposes of this exercise, the analysis was restricted to **Task 1**, which comprised 4 scenarios (see pre-piloting evaluation documents).

Scenario 1

In completing **Scenario 1** (00.00.00-11.43.00) the user experienced problems locating the relevant information. He felt that the information was not easily accessible and he "*struggled*" to find it (11.12.00). As he used the tool he indicated that he

¹DART = Disabilities Academic Resource Tool developed at Loughborough University

could see what the problems were but that he was having difficulty accessing information concerning how he might overcome them (09.34.00).

Scenario 2

In completing **Scenario 2** – (11.43.00-20.00.00), the user expressed a degree of uncertainty concerning his understanding of the scenario (13.50) but nonetheless proceeded to search for advice. Although he was able to find the advice without difficulty and found it helpful, he felt that more specific advice is needed (14.00.00) and subsequently, whilst reviewing Case Study 1, he encountered difficulties locating information concerning lecturing to dyslexic students. He concluded that although this information *“is there (it) is difficult to access”* (20.00.00).

Scenario 3

The user did not complete **Scenario 3** because, although he thought the relevant information was available, he did not believe he would have sufficient time to complete the task.

“I would have to plough through all the disabilities (with regards to learning methods). I don’t fancy doing that, it would take ages.” (21.40.00)

He moved directly to **Scenario 4**.

Scenario 4

The user was unable to locate the relevant information for **Scenario 4**. He drew attention to limitations regarding the navigational support offered by the tool (23.30.00 and 24.38.00).

“I didn’t realise that. I could have done that at the start.” (23.39.00)

“It doesn’t tell me. I need something up on screen to tell me how and what to actually do.” (24.38.00)

“Now I know it’s not a problem, but I could have done with that earlier.” (25.10.00).

The user also experienced difficulties finding alternative assessment strategies (27.10.00+).

“Where are they?” (28.52.00)

“Where am I going to get an alternative?” (29.55.00)

After three minutes, he was still struggling to locate alternative assessment strategies, as he tried clicking on a number of links (30.10) and then considered the possibility of using the case studies before observing that they *“don’t show the alternatives per se”* (30.30). He then decided to move on to Task 2.

Conclusions

6. The use of video recording enabled us to capture the reasoning and practices used by the user on a moment-by-moment basis as he used the e-tool to undertake the pre-Pilot Evaluation tasks. In order to capitalise on the opportunities of recordings of this kind, those who analyse them need to be familiar with the tool that is being used, so that they can track and assess each of the user’s actions. By subjecting the recordings to repeated and detailed scrutiny, using slow motion and pause facilities, it would be possible not just to capture the immediate reactions and experiences of users to different aspects of the tool but also to examine the user’s actions on a moment-by-moment basis. Transcripts would be required to facilitate this process.

7. Whilst analyse of the data would be undertaken in large part by individual researchers, the following activities could also prove helpful:
 - Data analysis workshops in which co-researchers present and discuss excerpts from video recordings.
 - Participant workshops in which the researcher asks people to clarify why particular events occur when they do, or just what individuals were doing at particular moments.
8. The decision to focus on recording an individual user as they describe their actions and articulate their thoughts was based on the nature of this particular exercise. In other settings and situations it might also make sense to video record the use of the tool in naturalistic conditions. This would enable one to identify the constraints and contingencies that may arise as a tool is being used in real world settings and situations.

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Focus Group: Process

Professor Harry Tolley

1. Define the issues on which to focus attention

- Start with broad issues/themes, which can be made explicit to the group(s) in the form of an agenda/list of topics for discussion. Make sure that this is aligned with the aims of the activity.
- Under each heading make a checklist of individual points of concern to be used by the facilitator as prompts, if they do not emerge naturally in the discussion.

2. Identify participants from relevant population(s)

- Try to ensure that those chosen are representative of the relevant stakeholder groups (e.g. full-time students, part-time students, academics, employer representatives).

3. Design and plan the session(s)

- Set group size - between 4 and 12 is usually recommended.
- Decide on a composition of the groups that will best serve the aims of the evaluation activity e.g. whether to have homogeneous (e.g. all students) or heterogeneous groups (e.g. a mix of students, academic staff and employers).

- In the light of the aims of the activity decide on a strategy for its delivery e.g. one or two broad topics to be explored, or a longer list to structure discussion within pre-determined timeslots.
- In the focus group itself the aim of the facilitator should be to 'let the conversation flow', if the purpose is the exploration of a topic. However, if there is a longer agenda the aim should be to elicit an adequate response to each topic by ensuring that each one is discussed in sequence within its allocated timeslot.
- Decide on method(s) of data capture: notes taken by a 'scribe' (either freehand or using a template based on the agenda items); audio recording; video recording; by a combination of methods.
- In the light of the aims of the activity and the available resources define required methods/ levels of analysis.
- Secure the use of a suitable room in which to stage the focus group(s) – preferably one in which those attending can sit comfortably (e.g. round a table) with clear views of each other and the facilitator.

4. Run the focus group session(s)

Facilitators are responsible for:

- Clarifying the purposes of the activity and putting it into context.

- Negotiating the 'ground rules' with the participants for the conduct of the focus group (e.g. listening to what the others are saying, not interrupting, taking turns etc).
- Managing the use of time and keeping to the agenda.
- Encouraging those present to participate constructively by voicing their own opinions, listening to what others are saying, seeking clarification, asking questions, and building on what has been said.

5. Process and analyse the data

- Listen to/watch the audio/video recordings and transcribe verbatim as written text, or in the form of notes recorded under headings/sub-headings derived from the items in the agenda.
- Analyse the resultant transcripts/notes by examining them closely in terms of the aims/ intended outcomes of the evaluation. Two broad possibilities are to analyse the data by looking closely at what was said under each topic/ theme or at the contributions made by different participant types - a process that can be helped by plotting the data on a spreadsheet or using a computer software package¹.
- Interpret findings and Integrate them with outcomes derived from the complementary methods used to collect data in the evaluation (e.g. questionnaires and interviews).

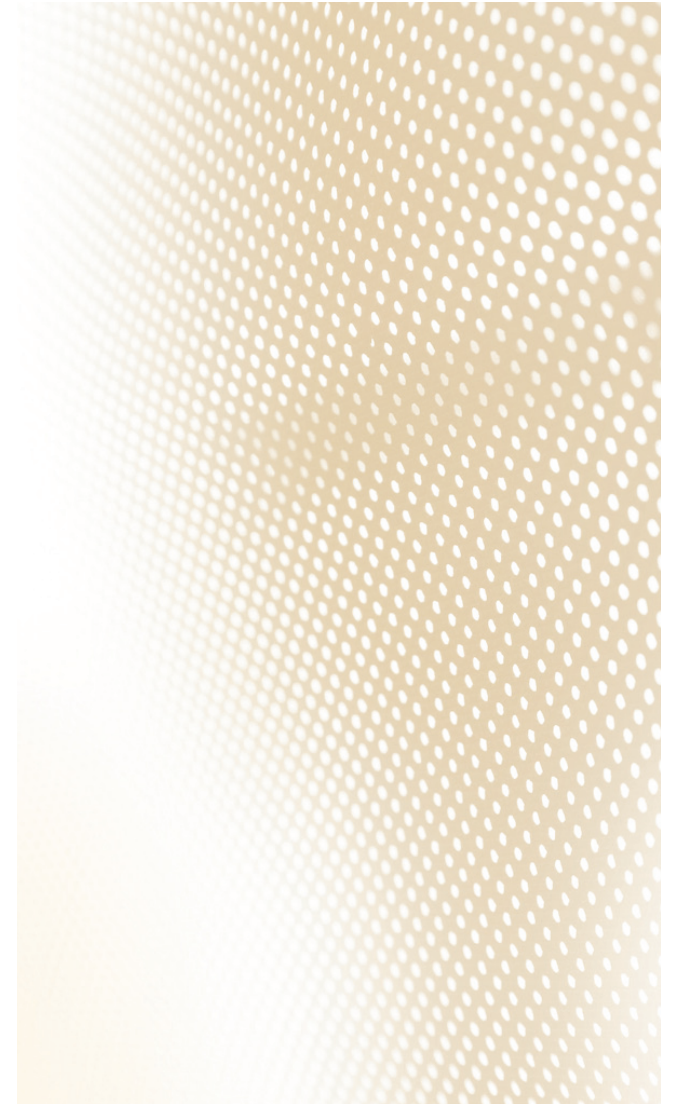
¹NVivo is a qualitative data analysis (QDA) computer software package designed for use in qualitative research involving rich text-based information, where deep levels of analysis on small or large volumes of data are required.

6. Write up the report

References

Krueger, R.A. (1988) Focus Groups: A Practical Guide for Applied Research. Beverley Hills: Sage Publications.

Morgan, D.L. (1988) Focus Groups as Qualitative Research. Beverley Hills: Sage Publications.



Nominal Group Technique (NGT)

Professor Harry Tolley

1. **Introduction:** The Nominal Group Technique is a structured activity that can be used as an alternative to Focus Groups. A facilitator, acting as a neutral receiver of information and ideas, is responsible for the conduct of an NGT session. Whilst there is no single precise format an NGT session is usually broken down into several distinct phases (see below) and takes 60-90 minutes to complete. Group sizes can vary but 10-15 is usually enough to provide a variety of perspectives whilst still being manageable – the larger the group the more the effectiveness of the process diminishes.
2. **Presentation of the Task:** The facilitator provides an overview of the NGT and introduces the task to the group or the key questions that need to be addressed e.g. “What are the strengths of the current approach to lab work or work experience?” and “How might that approach be further improved?” Each question is then addressed individually following the steps described below.
3. **Nominal or silent phase:** Individuals consider the questions and without any discussion write down their responses – the aim at this stage being to generate as many ideas as possible. No fixed time limit to this phase – it is up to the facilitator to determine when to move on to the next activity.
4. **Item generation phase (1):** The ideas generated by the individuals are then shared within the group – the facilitator asking each member in turn to present an idea in the form of a succinct phrase. A person acting as a scribe records the ideas verbatim on whiteboard or flip chart until no new ideas are forthcoming. Participants are allowed to ‘pass’ when they have exhausted their list of ideas but can contribute later if something new occurs to them.
5. **Item generation phase (2):** Sub-groups are formed to share ideas and form composite lists from those generated in the first phase. Each group identifies a leader to co-ordinate the activity and feed ideas back to the rest of the group in the same round robin procedure used in phase 1. Experience suggests that the number of items generated in this way in one session can vary depending on the size of the group and the strength of feeling about the issues under discussion – but the range 6-12 is not uncommon.
6. **Discussion and clarification phase:** The aim in this phase is to enable participants to ask questions, seek clarification and indicate areas of agreement/ disagreement with items on the list. To this end each item in the list is discussed in turn and the group can decide e.g. to combine items with similar meaning or eliminate those which are thought to be duplicated. The facilitator’s role is to ensure that items are discussed in an orderly manner, that everyone is given an opportunity to express an opinion and that no one is allowed to dominate the decision-making.
7. **Voting phase:** Each participant is asked to select a number of items – say 5 – from the list generated in the previous phase and to rank them in order of priority, assigning a value of 1 to the most important and 5 to the least important. This is done independently without discussion – and can be done on paper or electronically as can the determination of the group’s overall ranking.
8. **Use of the outcomes:** Voting patterns can be fed back to the group so that they are aware of the final results. The items and the results that have been generated in this way can be used as evaluation data and as the basis of decision making by relevant stakeholders.
9. **Strengths of NGT:**
 - Focus on the participants’ point of view - unlike questionnaires in which those designing the instruments determine what questions should be asked.
 - By facilitating interaction NGT allow for the development of an elaborated group view, which is gained by building on individual ideas and opinions – an approach that is in keeping with ‘goal-free’ evaluation (Scriven, 1991).
 - During the nominal phase individuals have time for uninterrupted thought in which to frame their own ideas thus helping to counteract any pressure towards group conformity.

- The silent generation of ideas followed by the round robin phase and private voting reduces the opportunities for individuals to hijack the discussion and decision-making.
- The process allows the initial views offered by individuals to be developed through critical discussion – it is more than just a source of evaluation data, therefore it is a means of furthering individual and collective understanding.
- The outcomes can be compared/integrated with the findings of other evaluation methods such as questionnaires and in-depth interviews.
- A skilled and knowledgeable facilitator is needed in order to understand the points the participants are making, and help them to amalgamate the ideas they are generating.
- Whilst NGT data can generate ideas of immediate relevance to the participants (e.g. students) their responses tend to ignore the concerns of other stakeholders (e.g. academics or employers).
- The voting stage can be problematic for some participants i.e. they find it difficult to prioritise items which they regard as being of equal importance and being inter-connected.

10. Limitations of NGT:

- It is only effective if the resultant items are representative of the views of the wider population – the size and composition of the NGT groups and when they are held are important issues to be addressed.
- Facilitators need to guard against 'group' or 'peer pressure' being allowed to influence the contributions made by participants during the discussion phase of the process.
- Facilitators can have difficulty in deciding how strict and directive they need to be in each stage of the NGT process. An 'authority' figure can inhibit the process whereas the opposite can allow discussion to drift.

References

- Chapple, M. & Murphy, R. (1996) The Nominal Group Technique: extending the evaluation of students' teaching and learning experiences; *Assessment & Evaluation in Higher Education*, Vol. 21, No. 2.
- Scriven, M. (1991) Beyond formative and summative evaluation, in: McLaughlin, M.W. & Phillips, D.C. (Eds) *Evaluation and Education: a quarter century* (Chicago, University of Chicago)

Questionnaires: top tips

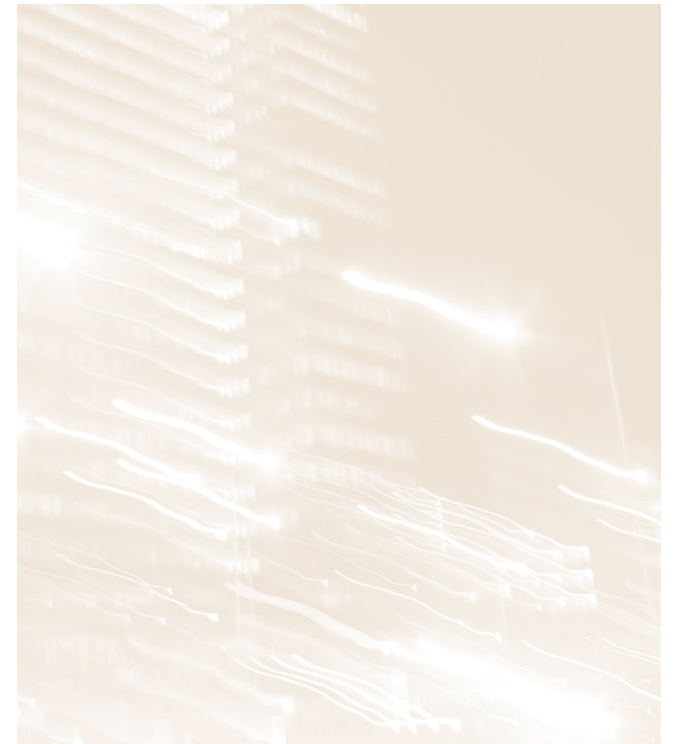
Laura Grant and Suzanne Spicer, with input from delegates at the evaluation seminar in January 2012

Do

- ✓ Think about whether a questionnaire is the best way to collect your evaluation data.
- ✓ Explain the purpose of the questionnaire at the start, including who will see the feedback. It's also nice to thank respondents at the end of the questionnaire. You can do this verbally when distributing the questionnaire as well as in an introductory paragraph on the survey form itself.
- ✓ Think about the structure and layout of the questionnaire to make it easy for respondents to complete.
- ✓ Group questions dealing with similar aspects of your programme together. Ask objective questions such as which parts of the project a respondent has been involved in first, moving on to more subjective and reflective questions later in the questionnaire.
- ✓ Keep it as brief as possible and make the most of every item in your questionnaire. Go back to your evaluation questions and check that each item on your questionnaire addresses one of them. If not, cut the questionnaire item.
- ✓ Be balanced. Include positive and negative options in response scales, and if you are going to ask respondents to list a positive aspect of the project, ask them to list something that could be improved as well.
- ✓ Consider the mix of closed (multiple-choice) and open (free response) questions in the questionnaire. Closed items are quicker to analyse, but do not allow respondents to qualify their responses as they can in an open question.
- ✓ Think about following up a tick box with an open question that asks for further comments.
- ✓ Use clear unambiguous language in questions and response scales to ensure the meaning of the question is effectively communicated.
- ✓ Use clear instructions e.g. whether respondents can tick more than one box.
- ✓ If you must ask for personal information, be clear about how it will be used.
- ✓ In multiple-choice questions, include an 'other: please specify' option to capture unexpected responses.
- ✓ Leave an appropriate amount of space for respondents to answer open questions.
- ✓ Know your audience: consider who your questionnaire is for and ensure it is tailored for them.
- ✓ Pilot your questionnaire, even if this is limited to asking a couple of colleagues to try it out.
- ✓ Think about sampling. Does everyone need to complete the questionnaire? Or could you ask a sample to do so? How will you make sure that the sample is not self-selecting?
- ✓ If distributing the survey electronically, sending a reminder email works well to boost response rates.
- ✓ Numbering your questions will be helpful at the analysis stage.

Don't

- ✗ Use jargon or acronyms in your questions.
- ✗ Ask for unnecessary personal information – in fact keep the questionnaire anonymous if you can.
- ✗ Cut and paste from a previous questionnaire without going through each question to make sure it is relevant.
- ✗ Put respondents off with poorly laid-out questionnaires or unpopular fonts.
- ✗ Introduce bias by asking leading questions. Critically review your questionnaire to check for this and/or seek feedback from colleagues. You should avoid loaded words and phrases and keep wording as neutral as possible throughout.
- ✗ Include your own assumptions (e.g. that a project has had a particular impact, or any impact at all) when writing questions.
- ✗ Combine two or more questions into a single item.
- ✗ Let your completed questionnaires sit on a shelf. Use and share the data formally or informally.
- ✗ Report quantitative data as percentages if you have a small sample as this can be misleading.
- ✗ Imply that your sample is representative when it is not. As an evaluator you have a responsibility to report findings with the minimum possible bias.
- ✗ Panic if you have collected too much information. If you do not have the capacity to fully analyse all of the questionnaire data, pick out a few of the most relevant questions and focus on them (and design a shorter questionnaire next time).



Creative Commons and the National HE STEM Programme

Alex Fenlon

a. Free Sharing of Resources

The National HE STEM Programme has an obligation to ensure that any and all resources from the Programme are freely available to be used by institutions across England and Wales as a requirement from the funders HEFCE (& HEFCW). The Programme has therefore taken the view that all of the resources and outputs produced by the Programme should be released under open licences to enable such reuse of the resources.

The licence the Programme has chosen to use for resources is the Creative Commons suite of licences. This decision creates a link with other HEFCE funded programmes such as the Higher Education Academy /JISC managed 'UK Open Educational Resources Programme', and further aligns with recent decisions to ensure research outputs are available openly.

Creative Commons develops, supports, and stewards legal and technical infrastructure that maximizes digital creativity, sharing, and innovation.

Creative Commons licences should be applied to all materials arising from the Programme, where possible, so that the community, and indeed the public, may take advantage of and use the resources arising from the numerous projects that form a part of the Programme.

Creative Commons (CC) licences are a specific type of open licence, used commonly with Open Educational

Resources (OER). More information, and the opportunity to generate and download CC licences, can be found on their website <http://creativecommons.org/>.

Creative Commons licences are a suite of permissions that balances the traditional 'all rights reserved' with open/free sharing. The licences;

'give everyone from individual creators to large companies and institutions a simple, standardized way to keep their copyright while allowing certain uses of their work — a "some rights reserved" approach to copyright'.

b. How it Works¹

CC licences are free to use, as well as subsequently permitting free use of works under which they are issued. They also allow authors, scientists, artists, educators and other creators to grant permission easily for use of their works, by using user-friendly symbols. A simple digest of terms and conditions enables users to recognise the types of usage the rights owner is inviting them to undertake.

CC licences allow rights holders to maintain a basic level of control by offering something between an 'all rights reserved' copyright licence and waiving all of their rights.

The main CC licences offer a series of 'baseline rights' together with four 'licence elements' that can be mixed

and matched to produce a licence through a point-and-click web interface.

Attribution now forms a part of all current licences, thus these four elements form the six basic CC licences, with their common abbreviations in brackets:

| |
|---|
| Attribution only (BY) |
| Attribution – No Derivatives (BY-ND) |
| Attribution – Non-Commercial – No Derivatives (BY-NC-ND) |
| Attribution – Non-Commercial (BY-NC) |
| Attribution – Non-Commercial – Share Alike (BY-NC-SA) |
| Attribution – Share Alike (BY-SA) |

We would like all resources arising from the Programme to use the most open of the licences- a CC BY licence - however there may be certain circumstance in which more restrictive licensing may be required. For example;

- Case Studies need to retain their integrity rather than be cut and paste- able. Therefore a 'no derivatives' variant may be the more appropriate.
- Teaching templates need to be edited by the users to suit their requirements, therefore the 'no derivatives' licence would not be suitable. A 'share alike' condition would be a good idea so that new resources contribute to the pool of materials available for use.

| Attribution (BY) | Non-Commercial (NC) | No-Derivatives(ND) | Share Alike (SA) |
|---|--|---|--|
| You must credit the licensor of the work. | You can only use the work for non-commercial purposes. | You may not create adaptations of the work. | You may create adaptations of the work, but these must be under the same licence as this work. |

¹'How it works' is based upon 'The Nuts and Bolts' section of '1.1 Creative Commons Licences – Briefing Paper' from Jisc, written by Naomi Korn and Charles Oppenheim 2009, © HEFCE, on behalf of JISC, reused under a Creative Commons Attribution-Non-Commercial 2.0 UK: England & Wales Licence.

Where a person has created a resource they want to release under a Creative Commons licence, and they are allowed to do so, then it is simply a case of selecting which licence they wish to use and adding the details to the resource. This can be done by adding the name of the licence and a web address to the licence text alongside the usual copyright notice.

There are various tools that explain this in more detail and some that simplify this process, listed in the 'Useful Resources' section below.

c. Support for Projects

In order for Creative Commons to be successfully implemented in the programme there might be a need for Partners and projects to visit events and training sessions such as those offered by SCORE and JISC Legal. The Programme will be available to provide guidance as necessary if required by partners and projects but there are many different sources of information relating to Creative Commons licensing, Open Educational Resources and Open Access.

JISC, as a part of the UKOER Programme, produced an **Infokit** which contains a lot of useful information about OER, how to produce OER and issues surrounding the release of resources in this way. A large number of institutions engaged with the UKOER programme so it might be that there are Creative Commons experts within your own institutions who may be able to provide advice.

Support Centre for Open Resources in Education

(SCORE) at the Open University provides dedicated assistance for those looking at open resources including running numerous training events across the country.

STEM OER Guidance Wiki was produced by several of the HEA Subject Centres specifically for the STEM subjects during phases 1 & 2 of the UKOER Programme.

OER for Educators 1.0 is also a useful tool.

Xerte is a software suite to help developers releasing content under open licences.

Open Attribute is similar to Xerte in that it provides a number of tools to successfully implement Creative Commons in to working practices.

There is also a useful Microsoft plug-in that can be installed that allows creators to automatically add CC licences to work they create in MSOffice packages.

<http://www.microsoft.com/download/en/details.aspx?displaylang=en.&id=18413>

The Programme is currently arranging for support for project leads and Partners to be provided by SCORE and the UKOER support structures. This support will include a series of workshops organised in each of the 6 spokes to provide training on Creative Commons and a number of contacts to help with any queries projects may have with Creative Commons and related issues.

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