

Staff Development in Learning-centred Evaluation of Computer-facilitated Learning Projects

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***Abstract:** This paper reports on a complex educational development project aimed at improving the evaluation of student learning in teaching activities supported by new technologies. The acknowledged shortcomings in this area were addressed by a staff development programme which assisted participants to develop and carry out an evaluation plan with the help of a mentor. Twenty evaluation studies were undertaken, from universities from around Australia.*

The development of evaluation plans was facilitated through the use of a Learning-centred Evaluation Framework, which assists in the framing of appropriate and answerable evaluation questions, by breaking down the lifecycle of an educational innovation into phases and explicitly considering different aspects of learning.

The paper also summarises the characteristics of each evaluation study carried out in terms of the discipline, year of study, study mode and IT-type. It then evaluates the outcomes of the project as a whole, and provides evidence of the benefits that participants gained from the project.

***Keywords:** Evaluation; Learning; Computer-facilitated Learning*

Introduction

“We never really know how effective we are in our teaching... we really have no idea about our students’ understandings.” [Lecturer participant in an evaluation study]

While we can assess students’ ability to answer examination questions, and survey students’ perceptions about courses of study, it is problematic to determine what students actually understand, as illustrated by the quote above. When it comes to evaluating the efficacy of the use of new technologies in a course of study, the issue becomes more complex. Several authors (Reeves (1993), Alexander & Hedberg (1994) Reeves (1995), Alexander & McKenzie (1998), Bain, (1999)) have reported shortcomings in the evaluation of Computer-facilitated Learning (CFL¹) projects.

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

In a report “An Evaluation of Information Technology Projects for University Learning”, Alexander and McKenzie (1998) recommended that: “*Staff development opportunities be provided in the areas of ... evaluation of IT projects... for current and potential project leaders*”.

The project reported here addressed this recommendation, by providing staff development in evaluation of CFL projects, proceeding from the premise that academics in most discipline areas generally have neither the skills nor expertise to carry out scholarly evaluations of student learning. We sought to promote the scholarship of Teaching and Learning in Higher Education.

In April 1999, Murdoch University, on behalf of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) and a consortium² of 10 other universities, submitted an application for funding to the Australian Government Committee for University Teaching and Staff Development (CUTSD). Funding of \$101,740 was allocated to the project, entitled “Staff Development in Evaluation of Technology-based Teaching Development Projects: An Action Inquiry Approach”, in September 1999.

This paper attempts to “tell the story” of this complex staff development project, and summarise its outcomes, reported fully in Phillips (2002).

Overview of the staff development project

The project set out to guide a group of university staff through the evaluation of a Computer-facilitated Learning project by a process of action inquiry and mentoring, supported by a range of practical and theoretical material. The intention was to evaluate *student learning*, rather than student *perceptions* of learning. That is, rather than simply eliciting student’s feelings about their learning, we wanted to derive firm evidence of learning processes and outcomes, and the role of the innovation in supporting that learning.

Prospective participants submitted their CFL projects as potential evaluation studies. Funding was available for 20 projects, from around Australia. Each project was assigned a mentor, experienced in evaluation, to guide them through their study. Participants and mentors were assisted in their work by a practical Evaluation Handbook (Phillips, Bain, McNaught, Rice, & Tripp, 2000), and other resources, such as the Flashlight materials (Ehrmann, 1999), the LTDI Evaluation Cookbook (Harvey, 1998) and a number of web sites.

Participants were expected to develop an evaluation plan, carry out the evaluation, analyse the data and disseminate the results during 2000. It was intended that participants (mentees) would use an action inquiry approach to learning about evaluation. Mentors would assist mentees to reflect about various aspects of evaluation, and coach them on how to carry out an evaluation. It was hoped that participants would become reflective practitioners in their role as evaluators and that they would also gain skills in evaluation. Mentors would also have the opportunity to apply reflective practice to their performance, both as a mentor and as an evaluator. Mentees and mentors would, together, conduct a well-grounded evaluation, the results of which would be published in a paper. All mentees and mentors were to meet at a

² The following institutions were part of the consortium which submitted the grant: ASCILITE, Charles Sturt University, Deakin University, Griffith University, Murdoch University, Queensland University of Technology, RMIT University, University of Wollongong, University of New England, the Australian National University, the University of Melbourne, and the University of Western Australia,

face-to-face workshop after the conclusion of the evaluation studies, to consolidate lessons learned.

Overall, staff from 17 Australian universities contributed to the project. 41 mentees and 11 mentors were involved in the 20 evaluation studies. Efforts were made to allocate mentors to projects in the same city as the mentees, to facilitate the mentoring and communication process. This was possible in 14 of the 20 cases.

Most aspects of the project were facilitated by Information Technology, in the form of the ASCILITE Virtual Conferencing System, which provided messaging and resource sharing for three separate sets of project participants: mentees, mentors and writers.

Activities and timelines

The project was planned to adhere to strict timelines. Two major milestones constrained the project – the ASCILITE conferences in December 1999 and 2000, respectively. The 1999 Conference provided an opportunity to seek participants in the project, and it was an obvious starting point. The Conference also provided an opportunity for the key members of the writing team to meet and gain a shared understanding of the directions in which the project was to evolve.

The 2000 Conference provided a logical opportunity for project participants to meet to discuss their projects and their learning about evaluation at a pre-conference workshop.

The twelve-month cycle in which the project had to proceed imposed strains on all people involved with the project in terms of finishing their work on time. On the other hand, it could be argued that the deadlines also resulted in more work being finished than might have otherwise been the case. Table 1 outlines and comments on the various deadlines imposed throughout the project.

Table 1. Project milestones

| Milestone | Comment |
|--|--|
| Initial Meeting December 1999 | Over 50 people attended a special session at the 1999 ASCILITE Conference which described the project and asked potential participants to submit applications for evaluation studies. |
| Applications for Evaluation Projects March 2000 | 22 applications were received and 20 were selected. Applicants were informed in early March 2000. |
| Handbook May 2000 | An Evaluation Handbook (Phillips et al., 2000) was produced in draft form. The purpose of the handbook was to generate guiding principles about evaluation across all participants and mentors, based on contemporary research. |
| Conduct of Evaluation Projects April-November 2000 | Most evaluation studies were conducted in semester 2, 2000. However, some projects began in first semester, and then carried out a second cycle of evaluation in second semester. Two projects withdrew before starting, because of workload pressures. One other project ceased in October because the participant went on extended leave. |
| Draft Papers December 2000 | Participants were expected to submit draft papers of their evaluation results prior to the workshop in December, so that feedback could be given at the workshop. Thirteen papers were submitted before the workshop. Because of workload and the volume of data collected in each study, most draft papers concerned themselves with descriptions of the study rather than presentation of results. |

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| Workshop December 2000 | <p>The workshop was attended by 37 project participants, and four guests, who acted as independent observers and note-takers.</p> <p>The workshop enabled attendees :</p> <ul style="list-style-type: none"> • to receive feedback on the work done, to identify areas needing more work and obtain assistance from the group as a whole; • to receive affirmation from peers about the value of their work and contribution to the project; • to summarise, review and reflect on the CUTSD project as a whole. |
| Revised papers submitted to Project Report April 2001 | The results of each evaluation study were submitted for publication in the final project report (Phillips, 2002). The draft papers were refined, based on feedback received at the workshop and reviews provided by mentors. Other papers not presented at the workshop were also submitted, so that eventually 16 of the 17 projects submitted papers |
| Further revision of papers for AJET August 2001 | Participants were given the opportunity to submit their papers to a further round of scholarly review. Ten papers were resubmitted and reviewed by two mentors and suggestions made for further improvements. Eight papers were refined according to the reviewers' comments, and submitted for publication in a special issue of the Australian Journal of Educational Technology (AJET), for a further, independent double-blind reviewing process. |

Paradigms and frameworks

It is important in any evaluation study to identify the research paradigm under which one works. There is an extensive literature about paradigms of inquiry (Guba & Lincoln, 1988; Shulman, 1988; Guba & Lincoln, 1989; Patton, 1990; Salomon, 1991), but Reeves (1997) has summarised the dominant paradigms which are used in evaluation studies:

- the Positivist-Quantitative Paradigm
- the Constructivist-Interpretive-Qualitative
- the Critical Theory- Postmodern- Paradigm

Reeves identifies strengths and weaknesses in each of the paradigms, and proposes the Eclectic-Mixed Methods-Pragmatic Paradigm. In this approach, the focus is on practical problems rather than on issues of reality and theories of society. It acknowledges the weakness of current evaluation tools, and is more capable of handling the complexity of human learning. A strength of this approach is the acknowledgment of the current state of the art of evaluation; there are no 'right' approaches and maintaining an open approach is essential.

Learning-centred Evaluation Framework

Within this paradigm, the Evaluation Handbook (Phillips et al., 2000, Section 2) advocated the Learning-centred Evaluation (LCE) Framework. This framework, derived from earlier work by Alexander & Hedberg (1994) and Bain (1999), has four main characteristics:

- it presumes that evaluation will occur in each of the major phases of an educational development project (design, development, implementation, and institutionalisation);
- it focusses attention on three aspects of learning:
 - the learning environment (*where* people learn, or the CFL innovation);
 - the learning process (*how* people learn)
 - the learning outcome (*what* people learn)
- it encourages evaluators to frame appropriate and answerable evaluation questions;
- it outlines the types of evidence and methods that may be appropriate for each question.

The characteristics of the LCE Framework are summarised in Table 2. Given one or two broad evaluation questions, the LCE Framework acts as a scaffold for the development of specific questions, by breaking down the lifecycle of an educational innovation into phases. Furthermore, the framework explicitly distinguishes the roles of the learning environment, the learning process and the learning outcome, making it easier to focus on specific aspects of the educational situation.

The framework can be used to develop an evaluation matrix, where the specific evaluation questions are matched to sources of data which provide appropriate evidence to answer each of them. In accordance with the Eclectic-Mixed Methods-Pragmatic Paradigm, both qualitative and quantitative sources of data are used, where appropriate. A specific example (derived from Valdrighi, Fardon, & Phillips (2002)) of the use of the framework to develop an evaluation matrix is shown in Table 3. The matrix matches specific evaluation questions to the phases and foci of Table 2, together with the data production methods used to provide answers to each question.

While experienced evaluators may be able to implicitly develop an evaluation plan, this is not the case for novices. The strength of the LCE Framework is that it makes the implicit explicit.

Nature of the evaluation studies

The 17 completed evaluation studies reported in Phillips (2002, Chapter3) had a range of characteristics. Nine disciplines were represented. Of the 17 projects, 5 addressed a postgraduate student cohort, 11 were aimed at undergraduates and one was aimed at both. Similarly, nine projects were aimed at purely internal (on-campus, face-to-face teaching) students, one was for external (distance education, off-campus) students, and six were targeted at a mixture of study modes.

Table2. Overview of the learning-centred framework for whole project evaluation

| Phase | Focus | Purpose |
|----------------------|--|--|
| Analysis and Design | Curriculum analysis | To describe the inadequacies/ insufficiencies of the current curriculum, with particular attention to the shortfall in student learning. |
| | Teaching-for-learning analysis | To describe and justify the teaching/ learning/ assessment process likely to bring about the desired learning outcome. |
| | Specification of innovation | To describe and justify the proposed implementation, and indicate how it will facilitate the desired learning process and outcome. |
| Development | Formative monitoring of learning environment | To determine whether the innovation is functional in its context and accessible/ attractive to students (and modify as needed). |
| | Formative monitoring of learning process | To determine whether the innovation is influencing the learning process as intended (and modify as needed). |
| Implementation | Summative evaluation of learning process | To determine whether the innovation is influencing the learning process as intended. |
| | Summative evaluation of learning outcome | To determine whether the learning outcome is as intended. |
| | Summative evaluation of innovation appropriateness | To determine whether the innovation is educationally appropriate in its immediate context. |
| Institutionalisation | Impact evaluation | To determine the robustness of the learning and its transfer beyond the immediate context of the innovation. |
| | Maintenance evaluation | To determine the sustainability of the innovation in the context of the whole course. |

Furthermore, the types of Information Technology (IT) used, and hence the nature of the CFL, varied widely. Some projects consisted of one CD-based product, used in one week of semester; while others consisted of a range of online resources used from week to week. There was considerable variation between these extremes, and one project required students to develop their own multimedia resources.

It is also interesting to note that five of the evaluation studies were carried out by general staff (non-academic, technical support staff). This points to the increasing blurring of the distinction between academic and general staff. Some general staff involved in this project have moved into academic positions, partly due to their participation in this project.

The 16 completed studies achieved a range of outcomes. Given that some projects posed multiple questions, ten projects asked questions that were summative in nature, and eight projects asked questions of a formative nature. However, every project reported areas of improvement in the way the CFL innovation was used. In addition, in three cases, project teams identified improvements in the way that the subject was taught or in the way that the innovation was integrated into the curriculum.

Of the projects which posed summative questions, two resulted in unexpectedly formative results. That is, the innovation was not used by students in the way intended, and the development teams had to rethink the design of their CFL, and the way it was used in the teaching context.

Many participants in this project found that the evaluation study caused them to reflect deeply about teaching practice in general. For example:

“I learnt that evaluation had to be integral part of my teaching practice and it is not only a summative process conducted at the end of the semester as is usually done or simply focussed on the project. It emphasised that evaluation had to be continuous and situated in the total learning experience of the students. Thus, learning-centred evaluation was not just evaluation of the educational media but of my teaching practice, the learning environment created to facilitate student learning and the process that students engaged in while interacting with the learning environment.”

“In this project I have felt the excitement of assisting to make practical and effective, a genuinely innovative teaching development. In addition, my own learning - about the complexities of the interaction between teacher, learning environments and students – has maintained my interest and sense of fulfilment through the project. I cannot see any joint project between educational designer and lecturer being successful if learning is not equally the focus of both parties.”

“this project in itself has afforded unexpected new ways of looking at learning and how it is achieved. The reflective analysis which this study has awakened provides a new range of reference points and possibilities to consider in the process of future instructional design.”

Table 3: A typical evaluation matrix, taken from an evaluation of the Interactive Stories model (Valdrighi, Fardon, & Phillips, 2002).

| Phase | Focus | Questions | Data Production Methods | | | | | |
|----------------------|--|--|-------------------------|---------------|--------------------------------|-------------------|----------|-------------|
| | | | Assessment | Documentation | Staff Focus Group | Student Interview | Journals | Observation |
| Analysis and Design | Curriculum analysis | 1. What learning outcomes are appropriate? What do students need to be learning? 2. How will the learning outcomes be achieved through the use of the Interactive Stories approach? 3. What are the assessment processes and marking criteria? 4. What is a good script and why? 5. What are the pro's and con's of the Interactive Stories approach? 6. What evidence from the 1999 trial can be used to improve the Interactive Stories approach 7. How easy is it for the students to use the technology? | | | F1 | | | |
| | Teaching-for-learning analysis & Specification of innovation | | A | | F1 & F2 F1 & F2 F1 F2 | | | |
| Development | Formative monitoring of learning environment Formative monitoring of learning process | 8. How does lecturer input throughout the process influence the students' work? | | | F2 | I2 | TJ & SJ | MO |
| Implementation | Summative evaluation of learning process | 9. How are dialogues constructed? | | SP | | I1 & I2 | SJ | |
| | Summative evaluation of learning outcome | 10. How much (and what sort of) team work and reflection occurs? | | VF | F2 | I2 | TJ & SJ | TO & MO |
| Institutionalisation | Summative evaluation of learning outcome | 11. How well do students meet the learning objectives? | A | SP VF | F2 | | | TO & MO |
| | Summative evaluation of innovation appropriateness | 12. What are the educational benefits of the Interactive Stories approach? | A | VF SP | F2 | I2 | | TO & MO |
| | Maintenance evaluation | 13. Do the educational benefits match the workload of the students? | | | F2 | I2 | TJ & SJ | TO & MO |
| | | 14. Could the Interactive Stories approach be improved and how? | | | F2 | I2 | TJ & SJ | TO & MO |
| | | 15. Can this model be used equally well across a variety of language units? | | | F2 | | | |
| | | 16. What factors determine the sustainability of the "interactive conversations" model? | | | F2 | | | |

KEY TO ABBREVIATIONS OF DATA COLLECTION METHODS:

A = assessment; F1 = first round focus group; F2 = second round of focus group; I1 = interview 1; I2 = interview 2; MO = class observation by MMC staff member; SJ = student journal; SP = student projects/final product; TJ = teacher journal; TO = teacher's observation of events; VF = video footage collected by students.

Conducting Collaborative Projects at a Distance

The project described here was highly collaborative, involving people from most states and territories in Australia. ASCILITE's virtual conferencing system was intended to provide an online communication facility for all aspects of the project and to facilitate the building of a sense of community among project participants. Without the online facility, it would have been almost impossible to conduct a project of this nature.

However, while online communication tools facilitate project work at a distance, it is still considerably less efficient than face-to-face work. While it is relatively easy for a skilled chairperson to ensure that members at a face-to-face meeting have a shared understanding of the issues, this is considerably more difficult when communicating solely in text.

When communicating in text-only form, it is essential that the message be written very precisely, to maximise the chance that the message be understood by the other party. Furthermore, information needs to be described in much more detail than required in a face-to-face meeting, to preempt any questions which might be asked. These issues make it much more time-consuming to manage a distributed project than a local project.

A second aspect necessary for successful online collaboration is the building of a sense of community among participants. This was difficult to achieve online in this project, where both mentees and mentors were reluctant to contribute to discussion about evaluation issues. Many people were moving into new areas of scholarship, and didn't feel 'safe' to express their views. At the December workshop, on the other hand, discussions were very open and forthright from early in the day.

Ideally, participants should have met face-to-face at the commencement of the project. With the advantage of having met each other, and having put a face to a name, they would have been more likely to contribute ideas and comments about the work of others. However, it was not possible, given the timelines and budget of this project to hold a face-to-face meeting at the start of the project. This is an important consideration for future projects.

Summary

This paper has reported on the progress of a two year-long staff development activity on evaluating the educational effectiveness of CFL innovations. Participants developed plans for and carried out evaluation studies on their CFL innovations. The Learning-centred Evaluation Framework was found to be of great assistance in scaffolding the development of evaluation plans and questions, and an example was given. The strength of the LCE Framework is that it makes the implicit explicit, by assisting the development of:

- a small number of broad evaluation questions;
- specific and answerable evaluation questions;
- the sources of data to provide evidence to answer these questions.

Of the 20 evaluation studies making up this project, 16 resulted in scholarly papers being published in the project report (Phillips, 2002). This is a commendable success rate given the high workload of university academics in Australia.

Overwhelmingly, the participants found the experience very rewarding and gained a range of skills in evaluation which they will be able to transfer to future situations. While everybody

involved will surely do things differently (and better) next time, this project has hopefully raised the profile of evaluation of CFL in Australian universities. Only time will tell whether such improvements in the scholarship of Teaching and Learning will become more widespread.

Acknowledgments

This was a complex project, requiring much goodwill from all people involved with it. Thankfully, this goodwill was provided freely and in large measure. I would like to personally thank all the 52 people involved in the project, and particularly the authors of the individual chapters of the report.

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