Annual Report 2000

TLTP 85

Computer-assisted Assessment Centre

(The Implementation and Evaluation of Computer-assisted Assessment)

University of Luton

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Contents

Appendices

Section 2

2.1 Activities, Outputs and Achievements

2.1.1 Introduction

The *main activities* and *outputs* of the project over the last year have been the:
- production of a second and third draft of the Blueprint for CAA (see attached)
- refinement and re-drafting of the models of implementation (see Appendices G and H of the Blueprint.)
- focus groups and interviews
- planning and initial work on the pilot projects in each consortium institution
- re-design of the CAA Centre web-site (http://caacentre.ac.uk)
- design, publication and dissemination of issues one and two of the Centre's newsletter, Testing Times (http://caacentre.ac.uk/latest.shtml)
- 4th International CAA Conference planning, running and dissemination

Further details of each of these activities are given below.

Percentage of project resources expended on each activity

Many of the activities of the project are inter-related, the main resource expended has been staff time and it is problematic to apportion this to specific activities. A financial estimation of the expenditure of project resources on each activity is given below. However it should be noted that the financial cost does not represent the real cost of resources.

Activity	Percentage of resources
Blueprint	25
Models	10
Focus groups/interviews	10
Pilot projects	10
CAA Centre web-site	15
4th International Conference	15
Dissemination	15

A revised version of the project plan is given in Appendix 1. The changes to targets and objectives are as follows:

- Extension of the time allocated to analysing the survey data
- Extension of the time allocated to evaluating the models and supporting documentation by consortium partners
- The delivery of workshop to consortium partners has been revised to the provision of appropriate support throughout the period of piloting.
- Objectives under reports and papers have been amended to reflect the development and dissemination of the Blueprint for CAA.
- The objective of researching and publishing outcomes of disability research has been moved to later in the project to allow evaluation from the pilots and text web-site development to be incorporated.

3

All the targets have been successfully achieved, with the exception that some of the pilots are not as far progressed as anticipated. However this will not effect the final outcome of the project as a time delay was anticipated and allowed for in original planning.

The decision to expand and enhance the supporting documentation for the models has led to the development of the Blueprint for CAA. The Blueprint has attracted great interest, nationally and internationally. The redesign and re-launch of the web-site has proved to be very successful (see Appendix 2 for web-site statistics). The 4th International CAA Conference, held in June 2000 was very well attended, attracting participants from Australia, Europe and Canada as well as a wide audience from the UK. Evaluations are positive (see Appendix 3 for further details). The interview and focus groups, conducted to supplement questionnaire data of the survey have revealed some interesting findings which will be incorporated into further analysis of the survey data. Dissemination has been widespread with many requests for participation at seminars, workshops and conferences. (See section 2.1.6 below for further details.)

2.1.2   Main Activities

Blueprint for CAA and Models of Implementation

A major achievement of the project in the last year has been the documentation of good practice in CAA, drawing on a comprehensive literature review and extensive national survey.

The Blueprint for CAA (see attached booklet) aims to provide all staff who may be engaged in some form of CAA activity with a well-grounded point of reference, whether they be academic staff, senior managers, administrators, staff developers, technical support staff or learning technologists. In addition, three models for implementing CAA have been developed to provide a structured pathway through the pedagogical, operational, technical and organisational issues which need to be addressed in order to effectively implement CAA in higher education.

The models detail the implementation of
- web-based,
- optically-based and
- PC-based CAA systems.

Each model is cross-referenced to the Blueprint to help provide both an over-arching perspective as well as a detailed methodology which can be easily followed.

The Blueprint for CAA is currently being piloted in consortium member institutions where it is being used to support the implementation of CAA in a range of different disciplines. The Blueprint provides advice and guidance to potential and existing users of CAA, covering a wide range of issues.

The key issues surrounding the use of CAA in higher education are discussed with a view to encouraging appropriate adoption of CAA as one of a balance of assessment methods. There is discussion of the pedagogical issues associated with objective testing and the structuring of tests and questions as part of a wider assessment strategy. Practical advice concerning the construction of tests and questions is offered and basic and complex question types are addressed within the context of Bloom's taxonomy (Bloom, 1956). Techniques for scoring tests and techniques for making effective use of statistical reports which are commonly generated through the use of CAA are also discussed.

The Blueprint provides an overview of the range of technologies available with which to deliver CAA and explores related activities, such as computer-mediated communication which provide the opportunity to broaden the scope and potential of CAA to effectively assess student learning.

Other chapters discuss in detail the operational and technical issues associated with delivering CAA, particularly in a summative context. The appendices contain examples, schedules and instructions for CAA examinations and workshops. The need for effective staff development for all staff (academic and support) is highlighted as is the need to provide clear and adequate student support.

Final chapters provide an overview of methods of evaluating CAA and discuss quality assurance issues as well as considering implementing CAA on a strategic level and managing change within an institution.

Piloting

Consortium members at Oxford Brookes University began piloting different types of CAA following staff development workshops delivered by the project last spring.   Pilots at Loughborough, Glasgow and Luton universities are currently in preparation for the coming academic year. The pilots involve both academic and support staff in implementing CAA in a range of different disciplines. The pilots include:
*   providing an Electronic Language Level Analysis for diagnostic and placement purposes for prospective and placement students;
*   introducing CAA for summative assessment in an interdisciplinary module using an optical mark reader;
*   the use of question banks for self-assessment in sociology;
*   the introduction of formative and summative assessments in literary studies;
*   the development of web-based grammar tests in French, German and Spanish;
*   providing self and summative assessment to distance learning students in nursing and midwifery.

The pilots will inform the further development of the Blueprint and associated staff development materials.

National Survey – focus groups and interviews

The national survey conducted between January and May 1999 has been followed up by a series of focus groups and interviews. Focus groups were held at Loughborough and Glasgow Universities and interviews have taken place with 13 staff at 5 the following institutions:
*   University of Portsmouth
*   Cheltenham and Gloucester College of Higher Education
*   Brunel University
*   University of Westminster
*   University of Glasgow

The focus groups and interviews were conducted to allow an exploration of particular issues which were raised in the responses to the national survey. They have permitted the collation of in-depth qualitative data which will enhance the quantitative and qualitative data of the national survey.

Web-site – redesign

The Centre's web-site was substantially re-designed to included the following features:

- News items,
- Getting started pages,
- Extensive FAQ
- Electronic mailing form for centre mail list
- Extensive Resources – including:
    - select and searchable bibliographies
    - Resources generated by the Centre (including Testing Times)
- On-line resources:
    - Subject-specific Resources
    - General Information Sites
    - HE Research Projects
    - Software
    - Case Studies
    - Software Reviews
    - Disabilities and Special Needs
    - CAA/CAL Hybrids
    - Mailing Lists
    - Plagiarism

The web-site was re-launched in November 1999 and server statistics indicated that by February traffic on the site has increased dramatically (on average 300 per cent) from the previous period. The site's new electronic registration form has resulted in substantial growth of the Centre mailing list (over 600). Since re-launching the site we have continued to up-date the contents and add new information and resources as appropriate. A number of project deliverables have been made available through the web site and download statistics indicate a high level of take up. Positive feedback has been received from a variety of sources about the design and content of the site. See Appendix 2 for recent web-site statistics.

4th International CAA Conference

The 4th International Computer-assisted Assessment Conference took place on the 21 and 22 June 2000 at Burleigh Court, Loughbourgh University. The Conference was organised by Loughborough project team members and all project team members contributed to the format and structure of the 2-day conference, refereed papers, chaired sessions and presented papers and workshops. Approximately 100 developers and users of CAA attended the conference, including participants from Australia, Canada, Singapore and Europe.

Please see: http://www.loughborough.ac.uk/service/fli/flicaa/conf2000/index.html
For details of the programme, abstracts and papers. Appendix 3 provides further information about the conference including publicity materials, delegate list and evaluation summary.

Planning for the 5th CAA conference will beginning in the autumn.

Dissemination

The project has continued its wide spread dissemination activities which have included the workshops, presentations, conference papers, journal articles, newsletters, newflashes to our mailing list and web-site activity. In addition we advise and support individual stafff across the sector by answering personally on average between 10 – 15 queries by telephone or email each month.

Further details of specific activity are given below.

Workshops

Bull, J. 2 workshops - 'Designing effective objective test questions', The Royal Veterinary College, November, 2000.

Bull, J. '*Computer-assisted Assessment in Higher Education'*, Computer-assisted Assessment Conference, November, 1999, University of Northumbria

Bull, J. Virtual conference facilitator, '*RGU Year of Assessment Conference*', Robert Gordon University

Bull, J. 2 workshops – '*Designing and Using Objective Tests for Computer-Assisted Assessment'*, Robert Gordon University, January 2000.

Bull, J. '*Designing and Using Objective Tests'*, Royal Melbourne Institute of Technology, Melbourne, January 2000.

Bull, J. '*Institutional Implications of Computer-Assisted Assessment'*, Royal Melbourne Institute of Technology, Melbourne, January 2000.

Bull, J. '*Evaluating CAA'*, Royal Melbourne Institute of Technology, Melbourne, January 2000.

Bull, J. '*Designing and Using Objective Tests'*, Queensland University of Technology, Queensland, January 2000.

McKenna, C. '*Designing Effective Objective Test Questions'*, Huddersfield University, November, 1999.

McKenna, C. '*Discussion session on Computer-assisted Assessment'* , TALENT Conference, University of Leicester, March 2000.

McKenna, C. '*An introduction to CAA'*, Finance Systems and Operations Departmental Away Day, University of Luton, July 2000.

Whittington, D. 'Workshop on CAA', Faculty of Science and Engineering, Dublin City University, March, 2000.

ALT one-day workshop, '*Question Mark Perception'*, hosted and chaired by the CAA Centre, University of Luton, March, 2000

Publications

Brown, S., **Bull, J**. and Race, P. (Eds) (1999) *Computer-assisted Assessment in Higher Education*, Kogan Page: London.

Bull, J. (1999) 'A glimpse of the future' in *Computer-assisted Assessment in Higher Education*, Brown, Bull and Race (Eds) Kogan Page: London p.193-197.

Danson, M. (1999) Optical mark reading as CAA: experiences at Loughborough University in

Computer-assisted Assessment in Higher Education, Brown, Bull and Race (Eds) Kogan Page: London p.121-131.

Dawson, B. (1999) 'How To Save Hours Of Marking' in Teaching and Learning Innovation, Loughborough University. http://www.lboro.ac.uk/service/fli/services/lt/innov/Newsltr4.pdf

McKenna, C. and Bull. J. (2000) 'Good Question Design for Objective Testing', *Interact*, Learning Technology Support Service newsletter, February 2000, University of Bristol.

McKenna, C. and Bull, J. (2000) 'Quality assurance of computer-assisted assessment: practical and strategic issues', *Quality Assurance in Higher Education*, Vol.8 No.1.

McKenna, C. and Bull, J. (2000) 'The Institutional Implementation of Computer-assisted Assessment (CAA)', *Computers in Physics Education*, No. 19.

McKenna, C. and Hesketh, I. (2000) 'A review of on-line resources for computer-assisted assessment, *Educational Developments*, Issue 1(2), April 2000.

Phelps, J. M. and **Danson, M**. (2000) 'Provision of quality assured CAA systems: a co-operative approach', *Quality Assurance in Higher Education*, Vol.8 No.1.

Steven, C. and **Hesketh, I**. (1999) Increasing learner responsibility and support with the aid of adaptive formative assessment using QM Designer software, in *Computer-assisted Assessment in Higher Education*, Brown, Bull and Race (Eds) Kogan Page: London p. 103-112.

Whittington, D. (1999) 'Technical and security issues' in *Computer-assisted Assessment in Higher Education*, Brown, Bull and Race (Eds) Kogan Page: London p. 21 – 28.

Whittington, D. (2000) 'Evaluating three years' use of a virtual university', *Quality Assurance in Higher Education*, Vol.8 No.1.

Conferences and Presentations

The following papers were given at ALT-C 99, September 1999, at the University of Bristol:

- Bull, J., McKenna, C., Stephens, D. and Whittington, D., '*Putting Technology on Trial'*.
- McKenna, C. and Bull, J.. '*Computer-assisted assessment centre national survey: current practice in UK HE*'.
- Whittington, D. '*The IMS question and test interoperability standard'*.

Bull, J. (2000) '*CAA: Implications for Institutional Implementation'*, University of Huddersfield, May, 2000.

Bull, J. and McKenna, C. (2000) 'CAA Centre Update', keynote presentation, *4th International CAA Conference*, Loughborough University, June 2000. http://www.loughborough.ac.uk/service/fli/flicaa/conf2000/index.html

Bull, J., McKenna, C., Stephens, D. and Whittington, D. (2000) 'Technology on Trial', *4th International CAA Conference*, Loughborough University, June 2000. http://www.loughborough.ac.uk/service/fli/flicaa/conf2000/index.html

McKenna, C. (2000) 'CAA Workshop' at *Assessment of Student Learning Conference*, University

of Ulster and Queen's University of Belfast, May, 2000.

McKenna, C. (2000) 'Computer-assisted Assessment: practical issues and current activities', Keynote presentation at *Computer-assisted Information Day*, Dublin Institute of Technology, May, 2000.

McKenna, C. (2000) *'Using Virtual Seminars for Teaching and Assessment in English Literature: a case study'*, Library Association 1-day seminar '*Going Digital: Issues for Managers or Why Digitise?*'

McKenna, C., Hesketh, I. and Bull, J. (2000) 'The CAA Centre and the National Survey iinto the use of CAA in UK Higher Education', *1st Annual Teaching and Learning Conference*, University of Luton, July 2000.

McKenna, C. (2000) 'Computer-assisted Assessment', *On-line Learning: Here and Now*, Oxford Brookes University, July 2000.

Whittington, D., Bull, J. and Danson, M. (2000) 'Web-based Assessment: Two UK Initiatives', *AusWeb2K - The Sixth Australian World Wide Web Conference*, Cairns, Australia, 12-17 June 2000
http://ausweb.scu.edu.au/aw2k/papers/whittington/index.html

Mentioned in the following articles:

'ALT-C 99:a Conference of Contrasts' in ALT-N, Issue No. 27. November, 1999

'On-line assessment', IT Skills, London, September, 1999

'Remember this?' Simon Midgley, Guardian Higher, 11 January 2000

'Online will mix the old with the Web', David Charter and Simon Midgley, The Times, 14th April, 2000, 12-13.

'Computer-assisted Assessment in Higher Education Book Review, Peter Breeze, AUT Look, Issue 215, April 2000

Visitors

Visitors to project in the last year have included:

- Anne Hughes, Head of the JISC Information Strategy Committee.
- John Ball, Associate Dean (Academic) and Director of Teaching Quality, Royal Melbourne Institute of Technology, Australia.
- Members Slovakian Universities collaborating in a Leonardo project with the University of Luton
- Representatives from the DfEE
- Representatives from City and Guilds and OCR
- A delegation of staff from Ngee Ann Polytechnic, Singapore

2.2   Institutional 'embedding' of learning technologies

We have found the following to be effective methods of embedding CAA:

1. Emphasising the pedagogical benefits of a range of assessment methods
2. Explaining the potential for enhancing student feedback and motivation
3. Providing academics with practical examples of materials in their own discipline
4. Explaining the range of technical solutions in non-technical language
5. Emphasising the educational effectiveness rather than the technological developments.
6. Working with staff collaboratively to help them overcome the organisational challenges of implementing CAA

The main barriers to implementing CAA are:

- Lack of understanding of the limitations and potential of the method of assessment.
- An assumption that it is not possible to test higher order skills using CAA

Strategies and tactics to overcome these barriers include staff development at a generic and departmental level, delivered in a variety of formats. Providing good examples of materials in a particular discipline is a powerful way to dispel the lack of understanding and assumption that CAA can not test higher order skills; however, because of the high level of skill needed to create such materials, these are difficult to locate.

- Time to develop skills in writing questions and developing tests
- Time to create assessment materials prior to the assessment event.

Suggesting ways in which staff can build up banks of questions and draw on existing material goes some way to overcoming these barriers. However assessment needs to be recognised as a valid and timetabled activity. CAA requires an investment of time prior to the event which often clashes with other activities and requirements. Until it becomes a mainstream activity the impetus to re-organise activities to release time will be lacking.

- Access to banks of questions

The time taken to develop high quality materials means that implementation is often impeded. Request for sources of questions, question sharing and common discipline banks are common. The availability of appropriate materials is low. Although there are potentially thousands of questions, tests and other materials being used across the sector, issues of security, copyright and organisation present a serious barrier to effective utilisation of question banks. Nationally co-ordinated and supported question banks would help alleviate this problem.

- Access to adequate pedagogical and technical support

The nature of CAA means that it often fails to fit well within any particular individual or departmental remit. The skills and knowledge about both the technology and the pedagogy of CAA are often not present, in early stages of development or lie with specfic individuals who may not be in an institutional role. The development of the Blueprint has attempted to overcome these difficulties by creating an accessible document for all those involved in CAA. Its effectiveness can not be measured presently. The provision of effective staff development sessions, resources, advice and guidance has gone some way to overcoming this barrier. In addition the annual CAA conferences and Centre mailing list have helped to create a network of colleagues who can provide some support and advice to each other. There is clearly a need for support on both a national, discipline and institutional level.

- Concern over security issues

Concern over security issues is often as a result of 'techno panic', a phenomenon which manifests itself as a demand for much more stringent security measures than would be adopted for paper-based assessments. The causes can be: an inherent unwillingness to participate resulting in identifying difficulties and reasons for failure; unrealistic expectations of technology; and a misguided belief that students will only consider cheating if they are using technology.

The strategies to overcome this are to encourage a more realistic approach to security measures, within the context of assessment practices and strategies generally. Information and advice about particular issues and measures which can be used to overcome these are important. Awareness of developments in technology which aid the security of examinations are also important provided these are taken within the context of assessment strategies.

- Organisational structures which inhibit effective and scaleable implementation.

This is perhaps the most problematic of all the barriers to overcome. Each institution's organisational structure, culture and ethos can have a dramatic effect on the extent to which CAA can be successfully implemented. Strategies to help overcome this barrier include:
- identifying key individuals from throughout the institution,
- working with enthusiasts,
- adopting an appropriate initial assessment methods for the culture of the institution (eg. implementing formative assessment initially may be more effective in some institutions than summative, and vice versa),
- providing CAA as a partial or whole solution to a particular problem or issue (eg. rapid feedback on student performance to identify students at academic risk impacting on student retention rates)
- streamlining implementation with other initiatives, policies and strategies.

Influence of institutional strategies

At Luton both the Teaching and Learning Strategy and emerging Information Systems strategy reflect the high level of use of computer-based assessment. This provides support for the work of the project, but it must be acknowledged that CAA was an existing part of the culture prior to the start of the project. However the emphasis within the strategies has raised the profile of the project and helped to secure senior management support. The work of the project has been enhanced by recognition of the need for improved quality assurance measures for the CBA and the appointment of an external evaluator for the CBA process.

At Oxford Brookes University the project has been boosted in the last year by several institutional initiatives directed at supporting on-line learning developments. These are:

1) the inception of the Brookes Virtual project http://www.brookes.ac.uk/virtual/
2) the amendment of the Teaching and Learning Strategy with regard to C&IT (see Section 7 http://www.brookes.ac.uk/brookes/LTS.html)
3) the creation of the Media Workshop to support implementation of the Brookes Virtual Plan
4) adoption of WebCT as Brookes' on-line managed learning environment
5) a programme of awareness-raising and dissemination events, including seminars, workshops and a one-day conference (http://www.brookes.ac.uk/virtual/events/index.html) which included presentations by CAA project participants at Brookes and from the Centre
6) installation of CASTLE 2 Toolkit on a centrally supported Brookes server

7) a TLTP EFFECTS-supported 4-day intensive staff development programme on embedding learning technologies (due to commence on Sept 12th 2000).

2.3   Educational Effectiveness

Our understanding of educational effectiveness related to learning technologies has developed in that several key issues have been reinforced. The importance of adopting balance of teaching, learning and assessment approaches and conveying the message that there is no one solution to the challenge of educating effectively. The need to ensure educational effectiveness through appropriate, practical and supportable implementation is clear. Technology can enable innovative and effective education. However, the negative impact of under performance often outweighs the positive impact of success. The changing and developing role of academic and support staff and the extent to which this is recognised and valued within institutions will affect the educational effectiveness of learning technologies.

Examples of successful uses of learning technologies (systems, products, services etc.) to enhance teaching and learning

In the field of CAA, the proceedings of the 3rd and 4th International CAA conferences provide an excellent overview of a wide range of examples of successful CAA systems and products currently being used in higher education. There has been a progression from individual towards departmental implementation of particular systems and products in a number of higher education institutions.

Cost effectiveness of learning technology

We have learnt that it is problematic to identify costs related to learning technology systems as many of the costs are hidden and relevant technologies and infrastructure may already exist in whole or part. The technical and pedagogical support which is required to effectively implement learning technology is costly because it requires a long term commitment. Academic staff time in supporting student interaction is another cost which is difficult to identify, measure and calculate. In addition there are costs associated with staff development which should be considered but again are interdependent with other activities and problematic to measure.

2.4   Management and Partnership

Main management difficulties encountered this year

There have been no significant management difficulties encountered this year. The only area which has been problematic has been in managing demand from the sector for dissemination activities on the limited budget and staffing available. The generic nature of assessment means prioritising demand is difficult and at times the balance between dissemination and research has been hard to maintain.

Effective partnerships

The partnership has been a very effective method of implementing and delivering the project's plans. The specific strengths of each consortium member have benefited the project as a whole and individual institutions have been able to draw on the expertise of the group. The sharing of experiences and resources has benefited individuals and groups within each institution.

Strong project management and leadership from the lead institution have ensured the smooth

running of the project. A clear understanding of the objectives was established at the outset and group decision making has reinforced the coherence of approach across the consortium. Maintaining frequent, but not over whelming communication through the email list and meeting regularly at project or other related events has ensured the success of the partnership.

Intended implementation, use and applicability across the partnership and across sites.

There has been no significant unevenness in the intended implementation of CAA across the consortium. Because our main activities have generated generically applicable outcomes use and applicability across the consortium and wider HE community has proved high.

2.5   Evaluation

Evaluation and reflection have continued to inform the work of the project at all levels. The development of the Blueprint for CAA was as a result of project teams identifying the need for more comprehensive documentation to support and enhance the implementation models under development.

The main change to our evaluation plans has been to expand our evaluation strategy to include an evaluation of student experience of undertaking CAA. The literature review and national survey revealed that little research has been conducted in this area. To address this we recently conducted a survey of over one hundred students who took computerised examinations and are currently analysing the results. The outcomes of this evaluation will be incorporated with the evaluation of the Blueprint and models and help inform the revision of relevant sections and staff development materials. Over the last year we have developed a series of evaluation questionnaires which have been distributed to consortium members to aid their evaluation of the pilots currently underway. The questionnaires seek to provide an evaluation of the staff and student experience of implementing and using CAA (see Appendix 4 for copies of the questionnaires). The questionnaires address the following issues:

Staff
- Experience of using CAA previously
- Experience of using objective tests
- Software
- Time and support needed for implementation
- Effect on student learning
- Resource issues
- Type and level of use
- Use of the Blueprint for CAA

Students
- Use of software
- Support from staff
- Impact on approach to learning
- Confidence logs (adapted from the TILT project).

We have also identified the need to allocate more funds to support the appointment of an external evaluator for the final year of the project to ensure a thorough and meaningful evaluation.

We have also received considerable external evaluation from workshop participants, through our CAA Centre mailing list (over 600 members) and through the web site. We use feedback from workshops to refine and develop future workshops and use comments and suggestions obtained

from the mailing list and web-site to help steer future development.

The success of the web-site has led us to regularly review web-site statistics as one method of determining the success of some of the project deliverables. Unsolicited feedback on the web-site has always been positive. It is planned to use the information gathered from the web site to further focus our dissemination strategy in the coming year.

There have been no particular constraints on evaluation this year, in part because the majority of evaluation activities have been conducted by consortium members themselves during the development of materials, following workshops and as part of specific activities.

2.6   Future Plans and Sustainability

We are seeking both external and institutional funding to maintain the CAA Centre after the end of TLTP funding. We will also work towards developing a consultancy strand to our activities to generate income, but it is not anticipated that this would maintain the Centre in itself. We have also approached the GLTC to discuss collaboration but have yet to make any headway.

The main constraints on sustainability are funding sources, both institutionally and nationally.

2.7   Future Support

Although our key contact at NCT has changed a number of times over the life of the project we have always found their input and advice to be very supportive and helpful. We have participated in a number of TLTP events this year and made very useful contacts with a number of other projects, particularly of a generic nature with whom we have shared experiences and advice. This has been valuable but also frustrating. We often plan to collaborate and work together to explore particular issues and compare findings and outcomes. There is rarely the time or the opportunity to pursue this and we feel that it is a loss to the programme as a whole.