

FDTL Phase 3

Proposal

Electrical and Electronic Engineering Assessment Network

(E³AN)

Integrating On-line Assessment into the Engineering Curriculum

University of Southampton

Bournemouth University

Southampton Institute

University of Portsmouth

Table of Contents

FDTL PHASE THREE: APPLICATION FORM	3
11. SUPPORTING STATEMENT	10
11.1 BACKGROUND	10
11.2 AIMS AND OBJECTIVES	12
11.2.1 Aims	12
11.2.2 Objectives	12
11.3 INSTITUTIONAL COMMITMENT	13
11.4 STAFFING	14
11.5 PROJECT ACTIVITY	16
11.5.1 Overview	16
11.5.2 Work Period 1 Planning	16
11.5.3 Work Period 2 Local Pilots	17
11.5.4 Work Period 3 Local and National Activity	17
11.5.5 Work Period 4 Consolidation	17
11.5.6 Outcomes	18
11.5.7 Outputs (see also 11.8 dissemination for details)	18
11.5.8 Deliverables	18
11.6 PROJECT MANAGEMENT STRATEGY	19
11.6.1 Steering Group	19
11.7 EVALUATION STRATEGY	19
11.8 DISSEMINATION STRATEGY	20
11.8.1 Audience	20
11.8.2 Targets	20
11.8.2 Methods	21
11.9 CONTINUATION STRATEGY	22
11.10 LINKS WITH LTSN	22
11.11 ACCESSIBILITY	22
INSTITUTIONAL SIGNATURE	23
BENCHMARKING STATEMENT FOR ENGINEERING: APPENDIX A	24
PROJECT WORK PLANS: APPENDIX B	25
DETAILED COSTINGS: APPENDIX C	26
STEERING GROUP MEMBERSHIP: APPENDIX D	28
SUPPORTING STATEMENT FROM LTSN ENGINEERING: APPENDIX E	29
LETTERS OF SUPPORT/COMMITMENT: APPENDIX F	30
GLOSSARY OF ABBREVIATIONS USED: APPENDIX G	31
REFERENCES	32

FDTL phase three: application form

Applications should be returned no later than midday on Friday 10 March 2000. Applications should be sent to:

Colette Dartford
FDTL/TLTP Project Manager
HEFCE
Northavon House
Coldharbour Lane
Bristol BS16 1QD

Please type your responses or complete in black ink.

1. Principal applicant

Title	Initials	Surname
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Post held

Department

Institution

Full Address

Telephone number, including STD code and extension

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Signature of the principal applicant

Date

Day	Month	Year
09	03	2000

2. Co-applicants (if applicable)

Please include full details for **all** co-applicants within consortium applications

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3. Title of project

Electrical and Electronic Engineering Assessment Network (E³AN): Integrating On-Line Assessment into the Engineering Curriculum
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4. Summary description of project (maximum 150 words).

This project will develop student learning through the integration of effective assessment practices into the electrical and electronic engineering (EEE) curriculum with a special focus on the use of automated methods for both formative and summative assessment.

The project consortium will collaborate with professional bodies, relevant subject networks and the National CAA Centre and work with electrical and electronic engineering educators in the following ways:

- establishing a network which will identify, promote and disseminate current good practice in EEE assessment;
- working with EEE educators as consultants to collate and establish an electronically stored bank of peer reviewed, classified test questions for paper and electronic use in the EEE curriculum;
- identifying effective methods for the integration of innovative assessment into the EEE curriculum;
- identifying the most appropriate costing models for free or nominal costed maintenance, distribution and use of the testbank.

5. Unit(s) of assessment covered in the project (please tick appropriate boxes)

Agriculture, Forestry and Agricultural Sciences	
Food Science	
Mechanical, Aeronautical and Manufacturing Engineering	
Civil Engineering	
Electrical and Electronic Engineering	✓
General Engineering	
Materials Technology	
Building	
Town and Country Planning and Landscape	
Land and Property Management	
American Studies	
Middle Eastern and African Studies	
East and South Asian Studies	
History of Art, Architecture and Design	
Communication and Media Studies	
Drama, Dance and Cinematics	

6. Aspect(s) of provision covered in the project (please tick appropriate boxes)

Curriculum design, content and organisation	✓
Teaching, learning and assessment	✓
Student progression and achievement	✓
Student support and guidance	
Learning resources	✓
Quality assurance and enhancement	✓

7. Total amount requested

8. Financial details (year 1 = 1 August 1999 to 31 July 2000)

Summary of funds requested	Year 1 (£)	Year 2 (£)	Year 3 (£)	Year 4 (£)	Total (£)
Staff	8,294	51,498	54,263	42,294	156,350
Travel and subsistence*	1,825	2,950	3,250	2,325	10,350
Dissemination	0	1,000	3,000	3,000	7,000
Evaluation	1,000	3,000	3,000	2,000	9,000
Equipment	1,800	0	0	0	1,800
Other costs (please detail)	1,500	21,000	33,500	9,500	65,500
Total	17,419	79,448	97,013	59,119	250,000

*costs to include £1,000 each year to cover attendance at FDTL annual conference and centrally organised seminars. Details costings are attached in Appendix C

9. Project Start date

Day	Month	Year
01	05	2000

10. Period requested Months

11. Supporting statement

11.1 Background

Assessment in all its forms is a key part of Higher Education processes. Assessment shapes and drives students' learning¹. Assessment must test the integration of appropriate knowledge and skills in a meaningful way. In order to facilitate student acquisition of these appropriate skills and abilities, effective teaching and assessment processes are necessary to promote optimal learning².

Students frequently demand more feedback to shape their learning. Lecturers need to be able to draw on a range of materials which cover the entirety of the curriculum and test and develop all levels of cognitive skills. In addition it is essential that any feedback is provided in a timely manner. Students quickly adapt their learning to enable them to pass examinations and so it is vital that assessments accurately reflect what students should have learned. For this reason, the development of appropriate assessments should go hand in hand with course design and should have equal importance in the curriculum.

From the academic's point of view, the design, delivery, marking and moderation of summative assessments and coursework take up large chunks of a teaching workload, which must be repeated on a regular basis. The additional work needed to produce and mark diagnostic and formative assessments means that in some cases such assessments are reduced, avoided, or abandoned in the face of increasing student numbers.

From the point of view an institution, professional bodies and prospective employers, there needs to be confidence that the students have been tested throughout the course and that the contents of the assessment match the agreed requirements of the curriculum.

The subject review overview report on Electrical and Electronic Engineering³ identified a number of issues associated with assessment.

"In the best examples the use of directed and independent learning is well integrated with taught elements. ...In the best examples of assessment, assignments provide an appropriate level of challenge and feedback to students on coursework is prompt and informative. In other cases, there are delays in the return of marked work and inconsistencies in the quality of feedback."

The proposals contained in this project directly address the issues raised above. The project will identify and disseminate subject-specific good practice in the area of electrical and electronic engineering (EEE) assessment. In addition it will establish a UK-wide electronically accessible peer reviewed question bank for the EEE curriculum for use in both computer based and conventional assessment contexts and seek to encourage and develop the appropriate and effective use of a wide range of assessment methods including automated assessment.

A good deal of work has already been done in the area of assessment, in particular initiatives funded by FDTL, TLTP and the JISC. At least two universities with strong engineering teaching have major internal assessment projects (Bristol and Loughborough). There have been several studies on the use of available tools for computer assisted assessment (CAA) e.g. the SHEFC funded Scottish CAA Network SCAAN⁴ and CAA was identified as a key area in a recent JISC funding call.

A number FDTL projects across a range of subject areas focus on assessment, notably SAPHE and TRIADS. Under all phases of TLTP assessment focussed projects can be found including the generic ALTER project and initiatives in areas such as Biology and Computer Science. In addition many projects (e.g. StoMP, ELEN and EDEC) have included work with assessment as part of their wider objectives. Phase 3 of TLTP included a project to establish a national CAA Centre⁵. The

Clyde Virtual University (CVU) developed an assessment tool which is in use in a number of Scottish Universities, while the JISC have supported CASTLE and Teach and Learn through their Technology Application Programme (JTAP). However these two latter projects have been more concerned with the technologies of CAA than the content of assessments.

Any number of technically sound systems to deliver questions electronically will be useless without a sizeable bank of questions to populate the system. In addition a well designed testbank of peer reviewed questions will be of use to academics irrespective of whether they choose to use a technological method to actually carry out their assessments.

Although there are doubtless large quantities of EEE questions which are regularly used in various (predominantly paper based) forms and formats across UK HEIs, there is no evidence of any extensive collections. Amongst UK CAA projects there has been work to establish collections of question banks. Subject areas covered so far include Chemistry, Biological Sciences, Geography, Medicine and Mathematics.

A number of major companies in the electronics and computing industry (e.g. Microsoft, CISCO, SUN) run programmes which use automated testing techniques in subject areas relevant to the EEE curriculum. Testbanks for such courses exist both as part of these systems and as a part of associated study programmes. There has been an initiative to create a question bank for testing conceptual understanding in physics at Swinburne University, Australia⁶ which has collaborated with some American Universities (notably Purdue). The American Society of Engineering Education is the sponsor of the production of a set of engineering case studies⁷ and associated support materials which might also be relevant to the project. A number of American textbooks have associated testbanks. These latter materials are within the cognate areas related to the EEE curriculum.

Discussion among the project proposers has identified a range of topics across the engineering curriculum in which it would be useful to collate question banks and assessment resources.

In drawing together testbanks and support materials we will draw extensively on the wide range of existing knowledge, skills and expertise which resides in the project partners and across the EEE community at large. We will investigate the possibility of question purchase from publishers and the associated copyright implications. Possible distribution modes include a cost free copyleft agreement, a system of microcharges, or via some kind of membership organisation run in collaboration with the LTSN Engineering or the IEE.

In addition to the practical aspects of question collation and distribution, it is well recognised that the integration and embedding of technology based methods into existing practices raises major issues of culture change. The dissemination and networking aspects of our project are designed to address these issues head on.

11.2 Aims and Objectives

11.2.1 Aims

This project will develop student learning by integrating effective assessment practices into the electrical and electronic engineering (EEE) curriculum with a focus of developing of peer reviewed testbanks and the use of automated methods for both formative and summative assessment. The project will address some of the areas for improvement identified in the Electrical and Electronic Engineering Subject Overview Report and developments will take account of the emerging Engineering Benchmarking Standards⁸ (see Appendix A).

11.2.2 Objectives

The project consortium will collaborate with professional bodies, relevant subject networks and the National CAA Centre and work with electrical and electronic engineering educators in the following ways:

- identifying current good practice in EEE assessment, to promote its widest possible dissemination, take-up and implementation;
- establishing a network which will promote and disseminate good practice in the area of assessment in EEE in Higher Education;
- working with EEE educators as consultants to collate and establish an electronically stored bank of peer reviewed, classified test questions for paper and electronic use in the EEE curriculum;
- identifying effective techniques for the integration of innovative assessment methods including automated assessment into the EEE curriculum;
- identifying the most appropriate costing models for free or nominal costed maintenance, distribution and use of the testbank;
- sustaining the work of the network beyond the funding lifespan.

Although the project objectives are directed at the EEE curriculum, many will have applicability throughout the engineering curriculum and some may be applicable across the sector as a whole.

11.3 Institutional Commitment

All members of the project consortium are fully committed to the objectives of the Assessment Network (see attached letters).

The Faculty of Engineering and Applied Science at the University of Southampton will host the project which has the full backing of the Faculty and the Departments of Electrical Engineering and Electronics and Computer Science. The departments were awarded 24/24 in the EEE assessment. The Faculty has recently established a Task Force to implement the University's Learning and Teaching Strategy, to disseminate good practice in learning and teaching. The Task Force will address a range of innovations in the engineering curriculum, including the systematic use of automated assessment in the curriculum.

Bournemouth University's School of Design Engineering and Computing is actively engaged in exploring many forms of curriculum delivery. The school is committed to the use of integrated formative assessment to support student learning and as a key part of teaching quality enhancement. The school use Question Mark Perception for online objective testing, multiple choice question generation and marking and have a special interest in developing this work into the area of Engineering CPD.

Portsmouth's Department of Electrical and Electronic Engineering has been developing and monitoring the use of automated assessment for several years. It is managing a project on improving group work assessment, with particular emphasis on automated assessment. The department believes the wider experience-base that comes from regional collaboration will lead to increased confidence in the use of such methods across a broader range of topics than is feasible in a single institution

The Systems Engineering Faculty at Southampton Institute is strongly committed to support this project as the provision of timely and effective formative feedback has been shown to enhance and shape student learning. Such formative feedback is particularly valuable when students joining a programme have diverse educational backgrounds and learning styles. Southampton Institute is itself strongly supportive of innovation in learning, teaching and assessment, with this commitment articulated in the Institute's Strategy for Learning, Teaching and Curriculum Development.

11.4 Staffing

The core project team based at the University of Southampton will comprise Su White, Hugh Davis and Richard Crowder.

Su White will direct the project. Su is Learning and Teaching Co-ordinator for the Faculty of Engineering and Applied Science and was previously based in the Centre for Learning and Teaching. Su was manager of The Scholar Project, a Southampton based TLTP1 project. She subsequently became the Southampton co-ordinator for the Teaching and Learning Technology Support Network. Over the past year she has been seconded part time to the to the FDTL/TLTP National Co-ordination team. Su is a qualified teacher with more than fifteen years experience in further and higher education. She is an active member of the steering group of a number of teaching and learning projects and an executive member of the Staff and Educational Development Association as Events Co-ordinator.

Dr Hugh Davis is Director of Learning and Teaching in the Faculty of Engineering and Applied Science and learning and teaching co-ordinator for the Department of Electronics and Computer Science (ECS). He holds a teaching qualification and taught in schools for six years. As a lecturer in ECS for the past 12 years, he has brought about a number of curriculum innovations. His research area is technologies for learning, teaching and training.

Dr Richard Crowder is currently the senior lecturer in Robotics and Control with the Department of Electrical Engineering. He currently is responsible for all aspects of teaching provision within the Department. As the chair of the Course Management Committee he is responsible to the Head of Department for the day-to-day delivery and quality of the Departments six courses, as well as the development of current and future undergraduate courses. With the responsibilities for teaching quality he was deeply involved in the QAE visit (where the Department was awarded 24/24), IEE accreditation and the University's internal assessment of departmental performance. He currently teaches four undergraduate courses and is an active researcher. He is an active member of the IEE.

Jim Roach, is Head of the Computing and Electronics Academic Group, in the School of Design, Engineering and Computing at Bournemouth University. He has developed strong links between the University and industry and is active on a large number of teaching company local management boards. Jim has taught EEE subjects for the last twenty years. He has been external examiner in three other UK Electronics undergraduate courses. He has published on the use of Computers in EEE and is actively engaged in exploring the use of the Web as a teaching medium.

Tim Morgan from the University of Portsmouth has recently become Head of Department of Electronic and Electrical Engineering. He had been Programme Area Director for the previous five years with responsibility, among other things, for the curriculum and its development. He oversaw the introduction of many new courses and a number of developments in teaching and learning. He was also responsible for the preparation for the Department's previous two IEE accreditation visits.

Djamel Azzi is a Senior Lecturer and BSc/HND course leader Portsmouth. He has been teaching for the past four years and is currently involved in a project aimed at reducing staff workload through the use of group work.

Sean Wellington leads the Electronics and Communications Engineering group within the Systems Engineering Faculty at Southampton Institute. He has more that ten years teaching experience. He has been responsible for introducing innovative teaching, learning and assessment methods within the electronic engineering curriculum and has lead the development of several new programmes, including BSc (Hons) Computer Systems & Networks and BEng (Hons) Electronic Engineering which received full accreditation from the IEE. Sean is also a member of the steering group for Southampton Institute's Postgraduate Certificate in Teaching and Learning in Higher Education

and an evaluator for the Teaching and Learning Development Scheme. He is external examiner for two undergraduate programmes and serves on several IEE committees and boards. Former committee memberships include the IEE Science, Education and Technology Divisional Board.

We also intend to make extensive use of academic consultants in collecting and reviewing the question bank and in the design and delivery of dissemination events. Consultants will be selected by a rigorous selection procedure and payment will be dependent upon satisfactory completion of the contractual obligation.

11.5 Project Activity

11.5.1 Overview

A major thrust of the project is using better assessment methods to improve the student learning experience as summarised in column A in section 11.5.6 below.

The collation of testbanks of questions will act as a driver to bring about the raising of awareness of assessment issues across the EEE community and to initiate innovation in both the processes and method of assessments.

In the first phase, one subject specialist from each site will each become a "theme leader" responsible for collating questions from one of the subject themes (see candidate themes below). In phase two, specialist teachers drawn from the partners or regional institutions will be recruited as consultants to join the theme teams. Theme leaders will brief their team on the working methods. They will then work together to:

- Identify sub themes within the main theme;
- Agree an appropriate mix of types, level and focus;
- Allocate responsibility for the target 300 questions per theme (six sets of 50);
- Produce the questions;
- Review the questions produced by their colleagues;
- Evaluate the question bank with their own students.

Themes and sub themes selected will cover the range of subjects typically taught across the EEE curriculum.

In phase three, further theme leaders will be identified from the project team or consultants. New consultants will be recruited both locally and nationally and the process above will be repeated for another six themes. The consultants will become ad-hoc members of the project team, but will also constitute a User Group in their own right.

The network will be developed through the test bank production, complemented by extensive consultations with the community. The findings and experiences of the network will be consolidated into a set of technical reports, assessment guides and case studies. There will be an extensive dissemination programme (see 11.8). See Appendix B for a schematic project plan.

1.5.2 Work Period 1 Planning

The first six months will be used to establish working models and make initial contact with our target community. The evaluation framework will be agreed with the evaluators and discussed at the initial steering group meeting. Initial meetings of the project team and steering group will take place and a detailed workplan will be drawn up.

The project will agree four themes for the initial testbanks. Candidate topics include:

- Analogue Electronics
- Digital Electronics & Microprocessors
- Circuit Theory
- Power Electronics
- Signal Processing
- Electromagnetism
- Maths for Engineers
- Computer Programming for Engineers
- Control Engineering

The themes will be categorised into a set of sub themes which are typically taught in a more advanced or specialised manner. Question types will include:

- objective tests including multiple choice, multiple response, true/false, selection/association, assertion/reason, text matching/visual identification;
- Numerical questions;
- Analysis (e.g. of circuits);
- Open ended design study question;
- Assignment/coursework questions;
- Questions based on the design of engineering solutions to real world problems;
- Typical exam questions;
- Exemplar practical assignments;
- Case studies with questions.

The testbank will be stored electronically, with data held in a secure format, accessible only to registered and authenticated users. Questions in the bank will fall into three broad categories:

- a) questions which are in a format suitable for import and use by the most commonly used objective testing engines;
- b) questions, with model answers which can be used in conventional assessment contexts (such as indicated above) either by conventional or online delivery
- c) problems and solutions which may be solved by using commonly available EEE software including MatLab, Spice and Opera.

Time will be needed to produce or collate example questions and to agree a standard way of structuring and categorising questions for factors such as content, level and skills tested.

11.5.3 Work Period 2 Local Pilots

The project will recruit and train the team of testbank consultants who collate and review questions, design and deliver dissemination consultancies and contribute to a series of guides to assessment issues. The first consultants from within the region will predominantly be drawn from the four partner institutions. With the core team they will lodge at least 1200 questions in the testbank which will be trialed and evaluated into the next work period.

Contributors will be required to provide an appropriate marking scheme, model answer or list of key points which must be addressed and to confirm that they have copyright of the materials they provide.

Consultations with the community to identify authors and agree content for guides and case studies. There will be associated workshops and consultations on assessment strategies in the engineering curriculum to include development, implementation and use of testbanks.

11.5.4 Work Period 3 Local and National Activity

The project will select further topics. The theme teams will be extended to include appropriate consultants from other institutions on a national basis. This enlarged team will identify and review another 1800 questions. Consultation activities with the community will continue, guides and case studies will be drafted.

11.5.5 Work Period 4 Consolidation

The project will publish guides and case studies, participate in final dissemination events and attend to wind down activities such as report writing and continuation handover.

11.5.6 Outcomes

A) Outcomes which impact on student learning	B) General project outcomes
<ul style="list-style-type: none"> • Encouraging practice which supports the integration of directed and independent learning; • Collating question banks to achieve appropriate levels of challenge and feedback on coursework; • Introducing question banks to provide consistency in the quality of feedback; • Using formative assessment to stem relatively high failure rates in years 1&2; • Introducing automated assessments to remove delays in returned work. 	<ul style="list-style-type: none"> • Creation of a self-sustaining network to support and develop the use of question banks for the EEE curriculum; • Integration of project activities into other subject networks; • Distribution or dissemination of project deliverables via subject information gateways; • Identification of an acceptable method of continuing the work of the project.

11.5.7 Outputs (see also 11.8 dissemination for details)

- A minimum of forty consultancies or seminars on effective assessment strategies and the use of testbanks associated with commissioned support visits
- Commissioned workshops on developing and maintaining question banks;
- Three regional workshops to disseminate to each relevant institution in the sector.
- Annual participation in relevant engineering and educational conferences to disseminate project activities;
- Publication of academic papers in relevant scholarly journals.

11.5.8 Deliverables

- A set of electronic and paper guides and case studies on assessment strategies in the EEE curriculum;
- Technical reports on question bank formats and copyright and distribution issues;
- A question bank of at least 3000 questions covering ten subject themes;
- Web site and electronic newsletter on assessment in the EEE curriculum.

11.6 Project Management Strategy

Su White will lead the project. She will work closely with the project team and will co-ordinate reports to the monthly project team meetings which will monitor progress via a standard agenda. The project team will also report to the steering group. The steering group will receive copies of regular progress reports and will take responsibility for overseeing the financial management of the project and progress monitoring. The project will follow the workplan outlined in section 11.5 and summarised in Appendix B. Detailed financial costings are in Appendix C.

11.6.1 Steering Group

The project steering group will comprise representatives of senior academics from each of the partner institutions, evaluators and a number of specialist advisors. The project manager and representatives of the project team will attend meetings. The steering group will first meet early in the project lifecycle to determine and agree wider project objectives and detailed milestones for the first year. Subsequently the group would expect to meet on a six monthly basis. Details of steering group membership are given in Appendix D

11.7 Evaluation Strategy

The project has identified two evaluators. Professor Peter Ashburn Professor of Microelectronics is Chair of ECS Academic Committee is the internal evaluator. He is actively involved in Teaching Quality Assessment and IEE and BCS accreditation for the Electronic Engineering and Computer Engineering degrees.

Liz McDowell is the external evaluator. Liz has a background in both education and information management and is Director of Research & Evaluation at the Centre for Advances in HE at the University of Northumbria in Newcastle. She is an experienced educational developer and researcher in learning, teaching and assessment in Higher Education. In recent years she has worked particularly on innovative assessment, has published widely on this topic⁹ She has a strong interest in technology-assisted learning and electronic information. She is also currently seconded part-time within UNN to manage the UNNFURL project, developing technology-assisted flexible and distance learning. She is the academic director of the Northumbria Assessment Conferences.

The project team will meet with the evaluators during the first six weeks of the project to agree the evaluation framework. The project will be evaluated in the following ways

Formative: Monitoring attainment of interim project goals and methods to influence the future direction and ongoing development of the project. Formative evaluation will be performed by the evaluators' feedback, project team reporting on activities and via feedback and discussion with the steering group and the executive group.

Summative: Accounting for the achievement of project goals will satisfy the various stakeholders that the goals were achieved. The external evaluator, the steering group and project team will produce the summative evaluation by project activity reports.

Reflective: Learning from the experience of the project to inform longer-term project development and future learning and teaching developments across the university. Reflective evaluation will be performed by feedback from the evaluators, the project team reporting on activities and via feedback and discussion with the steering group and the executive group. Where appropriate and response to feedback will be included in revised project plans.

Evaluation reports will be submitted towards the end of each work period for discussion by the project team and the steering group. Where appropriate response to feedback will be included in revised project plans. A large part of this evaluation and review will fall to the steering group (11.6)

11.8 Dissemination Strategy

11.8.1 Audience

The primary audience for dissemination is EEE academic and technical support staff across UK HE and FE institutions identified in the subject review. According to HESA¹⁰ there were almost 5000 staff FTE's under the electrical, electronic and computer engineering cost centre during the academic year 1997-98. Clearly not all of these staff will be working in areas directly relevant to the focus of the network, although this provides us with some indication of the scale of dissemination target.

We also expect the project to be of some relevance and interest to academics across engineering and applied science disciplines

In addition to our primary audience, the project will seek to inform educational developers and support staff with a responsibility for aspects of assessment, working in collaboration with the proposed Generic Learning and Teaching Centre (see note in section 11.10 below). Outside the University sector key targets for dissemination include professional bodies, schools and colleges.

The project team will differentiate between dissemination for awareness, understanding and action. Dissemination within the EEE community will be for all three objectives; dissemination to the wider engineering community will be for awareness and understanding, dissemination to the wider community will be for awareness.

11.8.2 Targets

The subject review overview document identifies 76 departments which were assessed at the last review. We will target all relevant staff in all these institutions. We will gear our dissemination processes and events accordingly to make direct contact with close to 100 percent of the EEE community thereby creating a high level of awareness of the Network across the discipline. It is difficult to predict the profile of awareness among our wider target communities, however our approach working in conjunction with other FDTL projects and the LTSN engineering will be thorough. (see also sections 11.8.3, 11.9 and 11.10 below).

Within the EEE community we intend that consultative focus groups, the recruitment of consultants, collaborative production of guides and case studies and our participation in subject educational conferences and publications will achieve involvement in the project. We intend to achieve an understanding of the project aims among some 20-40% of EEE teachers and support staff, making a high level contact with staff in 75% of the institutions in our target groups.

It is anticipated that the direct participation of collaborating academics in the identification, production and review of questions will ensure a high level of engagement in the Assessment Network across the EEE academic community. By this means we will expect to achieve active use of materials and participation in the network from the project in at least 25 percent of the targeted departments.

We will collect measures of numbers of staff contacted, web hits and mailbase traffic, numbers and categories of staff who attend our dissemination events and analyse participation by institution. This data will be used to review our progress and steer the direction of ongoing activity.

11.8.2 Methods

Methods by which the dissemination will be achieved will include:

- Project website;
- Consultancies seminars, workshops and events;
- Regular email to discussion lists;
- Discussion meetings, focus groups;
- Conferences presentations and workshops;
- Publication of newsletter, articles, papers, guides and technical reports;
- Active participation in the network;
- Attracting funding for associated projects.

Our network of contacts for dissemination includes professional bodies (primarily IEE with whom we have already held outline discussions, see attached letter) the Engineering Professors' special interest groups, such as The Educational ECAD User Group (EEUG).¹¹ These will be used to both identify and qualify our list of contacts. We also have strong links into both the staff development community, via SEDA and UCoSDA and the teaching and learning community via the CAA Centre, SRHE, involvement in previous TLTP projects and through ALT.

The project will work closely and actively collaborate with the LTSN Engineering (see attached letter and Appendix E) existing networks and special interest groups within the Engineering discipline and will disseminate to other centres in the cognate area.

With the LTSN Engineering we will establish and maintain a detailed mailing list of senior academic contacts (Head of Department, Head of Group etc) for each targeted institution. We will make use of the web, existing mailbase lists, telephone enquiry and the networks of contacts of the project team to individually identify staff for whom our project will be interesting and relevant. Work with the IEE, the LTSN Engineering and the proposed network within engineering FDTL projects will enable us to target our audiences across engineering.

We will undertake some general dissemination via publicity booklets distributed with conference programmes and in journal mailings. We will create a mailbase discussion list which contacts will be invited to join, similarly individuals accessing our web pages will be invited to register to be informed of significant updates.

We believe that direct contact with academics, via letter and emails which include pointers to our dissemination events and our project web site and its publications may be most effective for awareness dissemination. Direct personal contact is essential for dissemination for understanding and use and this will be achieved through our network activities of collating the test banks, providing consultancies and commissioned workshops and seminars and through the authoring of guides and case studies.

11.9 Continuation Strategy

The project will use its dissemination strategy to create a self sustaining EEE assessment network, actively collaborating with the IEE, the Generic Learning and Teaching Centre, the National CAA Centre and the LTSN for Engineering. This work will also take account of developments in other subject specialist networks (e.g. those funded by the DfEE) and other learning and teaching projects in cognate areas. Clearly the most appropriate way in which this network can be perpetuated will be one of the outcomes of the project which will emerge as the Network is established and the testbanks and support materials are accumulated. The project would expect to take the advice of its steering group in this matter.

The Department of Electronics and Computer Science at Southampton is prepared to host the electronic version of the testbank after the end of project funding, but would be happy to hand this task over to the LTSN engineering or the IEE if that were appropriate. The project aims to identify an effective method of sustaining maintenance and development of the testbank, likely solutions include collaboration with publishers, low cost licensing, micro-charging, or club membership. The team expect to continue to identify examples of good practice and offer full cost workshops after HEFCE funding has ceased. This work may be organised independently, or in conjunction with the various organisations identified above.

11.10 Links with LTSN

The project planning team has had discussions on the proposals with both the LTSN Subject Centre for Engineering and with the programme director. The project will work closely with both these organisations to ensure a high level of participation and dissemination of good practice to the wider Higher Education Community.

Following discussion with Cliff Allan, the LTSN programme director, it is clear that the new generic learning and teaching centre as part of the LTSN will be developing a national overview on assessment practice in Higher Education and will look to co-ordinate closely with projects and initiatives which focus on assessment, with a view to disseminating effective assessment strategies to the sector as a whole.

Following discussions with Fiona Lamb from the LTSN Engineering it is clear that the centre is planning to co-ordinate a discipline based network amongst successful FDTL proposals, along the style of the languages network currently co-ordinated by CITL. The project recognised the potential benefit of working together with other FDTL projects, particularly those in the area of engineering and E3AN would be very happy to work within this collaborative framework. Obviously it is difficult to identify exactly the ways in which this activity will take place prior to the funding decisions being made. The project would expect to participate in the centre's subject specific working groups, contribute to the publications such as the bulletin and journal as appropriate and be an active participant at the proposed annual conference.

11.11 Accessibility

The project is aware of the ways in which the use of different assessment methods may be more or less accessible by learners with different specific educational needs. The guides and case studies will explicitly address these issues. The availability of a range of resources for assessment and an increase in awareness of the appropriate uses for different assessment methods and an increase in the use of formative assessments offer a significant benefit to academics and institutions supporting a diverse student population.

Institutional Signature

12. Name of a member of the senior management team in your institution confirming support for the application

Professor Kate McLuskie (Deputy Vice Chancellor, Chair of the Teaching and Learning Strategy Committee)
--

13. Signature

--

14. Date

Day	Month	Year
8	March	2000

Benchmarking Statement for Engineering: Appendix A

"Assessment is the means by which students are measured against benchmark criteria and should also form a constructive part of the learning process.... it is important to take a strategic, whole course approach so that assessment is based on sampling and does not increase in quantity"

Engineer's skills

This list was extracted from section 2 "The skills, attributes and qualities of an engineer" (p6-7)

- Knowledge and Understanding
- Intellectual abilities
- Practical Skills
- General transferable skills

List of Assessment Methods

This list was taken from Annex A

- Unseen examinations
- Laboratory examinations
- Oral examinations
- Synoptic examination
- Multiple-choice tests
- Problem solving exercises
- Essay assignments
- Other types of extended writing
- Oral presentations
- Student-led seminars/discussions
- Design tasks
- Computer-based exercises
- Work placement reports
- Learning logs/diaries
- Learning portfolios
- Exhibition/poster displays
- Groups projects
- Independent projects

Student Attainment

Divided into three levels:

Threshold

- Routine
- What has been taught

Good

- An understanding
- Beyond taught

Excellent

- A profound understanding
- Innovative
- Aware of limitations

Project Work Plans: Appendix B

Key Tasks	Frequency	
Regular Meetings		
Steering group	Six monthly	
Meeting – project team	Monthly	
Meeting – Local Consultants Group	Bi-Monthly	

Key Tasks/Milestones	Time	Who
Work Period One (M1-M6) yr2000		
Establish project working methods	M1/M2	All
Initial Meetings executive group, steering group	M1/M2	All
Agree evaluation framework	M1/M2	All/LizM/PA
Identify possible copyright/distribution models/existing questions	M3	UoS
Identify question formats, test format model	M2-6	UoS/all
Launch project and web site	M3	All
Consultations with sector, recruit consultants	M3-5	All
Annual CAA conference	M2	
Collate trawl responses, publish and disseminate work in progress	M6	All
Work Period 2 (M7-M18) yr2001		
Establish local consultants	M7	All
Plan workshops and seminars	M7-8	All
Collate initial question banks	M8-M16	All
Annual conferences (CAA, EEE, ALT etc)	M14-17	
Review and test question banks	M16-17	All
Draft and publish technical reports	M7-18	UoS
Invited seminars, workshops and consultancies	M7-18	All
Work Period 3 (M19-M30) yr2002		
Establish national consultants	M19	All
Regional seminars and workshops	M19-30	UoS
Draft guides and case studies	M19-30	All
Annual conferences (CAA, EEE, ALT etc)	M26-29	
Regular meetings national/local consultants	M21-28	All
Collate national & local consortium question banks	M28	All
Invited seminars, workshops and consultancies	M19-30	All
Review and test question banks	M29-30	UoS
Work Period 4 (M31-M36) yr2003		
Publish guides and case studies	M31-36	UoS
Disseminate project outcomes/conclusions via conferences	M31-M36	UoS
Project Wind down, report writing, continuation handover	M33-36	All

Detailed Costings: Appendix C

	Year 1	Year 2	Year 3	Year 4	Total
	May 00 - July 00	Aug 00 - July 01	Aug 01 - July 02	Aug 02 - April 03	
Staffing					
Southampton					
Research Assistant FT Grade 1B pt 4 with incs	0	20,087	21,906	17,487	59,480
Technical Assistance AOR3 pt 18 for 0.1 FT	918	3,701	3,812	2,923	11,355
Clerical Assistance Grade 3 pt 17 for 0.1 FT	371	1,494	1,539	1,180	4,583
Recruitment of staff	500	0	0	0	500
Partners					
Bournemouth	1,250	5,038	5,190	3,978	15,456
Portsmouth	1,250	5,038	5,190	3,978	15,456
Southampton Institute	1,250	5,038	5,190	3,978	15,456
Project Management					
Manager - 0.3 FT @36k AOR3 pt 18	2,755	11,103	11,437	8,769	34,064
Total Staff	8,294	51,498	54,263	42,294	156,350
Travel and Subsistence					
Steering group meetings	225	450	450	225	1,350
Travel to consultative meetings and other dissemination events	0	700	1,000	1,300	3,000
FDTL conference	1,000	1,000	1,000	0	3,000
conferences	600	800	800	800	3,000
Total Travel and Subsistence	1,825	2,950	3,250	2,325	10,350
	0	1,000	3,000	3,000	7,000
Dissemination					
	1,000	3,000	3,000	2,000	9,000
External Evaluation					
	1,800	0	0	0	1,800
Equipment (Computer)					
Others					
Software	1,000	3,000	2,000	0	6,000
stationary, post, phones, photocopy, printing	500	1,000	1,500	1,500	4,500
Local consultants	0	15,000	13,000	2,000	30,000
National Consultants	0	0	15,000	5,000	20,000
Purchase of Questions/Copyright Clearance		2,000	2,000	1,000	5,000
Total Others	1,500	21,000	33,500	9,500	65,500
TOTAL	17,419	79,448	97,013	59,119	250,000

Matching Funding.

Each of the 5 departmental staff involved on the project team of this bid will spend about 0.1 of full time on the work; at an approximate cost value of £19,000. All staff except the Research Assistant, who will be employed specifically for this project, will have the benefit of fully equipped offices and support systems and

computing facilities provided by their institutions. In addition there will hopefully be a large number of staff not named on the project who will become involved in trialing the outputs on their students.

Support Costs

This project will involve handling a large number of meetings, preparation of progress reports and financial statements. The project has requested a small amount of clerical assistance at Southampton to deal with this routine organisation. Similarly, although this is not a technical project as such, from time to time the project will need assistance from departmental system programmers to install and deliver working testing systems to trial the testbanks.

Consultants

We are expecting to use consultants to assist develop ten themes of at least 300 questions each.

4 themes will be developed in work period 2, 6 themes will be developed in work period 3

Each team member (including the team leader) will produce 50 questions.

Each team leader will recruit five consultants to work on the theme

We are working to the assumption that £1000 will buy 50 questions.

Consultants will only be paid on the satisfactory delivery of an agreed set of questions. Accompanied by a satisfactory model answer, mark scheme or acceptable and appropriate equivalent

The fee will cover:

- One day attendance for induction/training

- Unspecified amount of time for the collation of questions, preparation of model answers etc

- One day attendance at review meeting

Consultants will also be involved in related consultations, seminars and workshops

We have therefore budgeted for five consultants per theme - £5,000 per theme

Value for money

Those involved in developing question banks will also contribute to the development of the network and to the production of guides and case studies and the delivery of consultancies, seminars and workshops.

Consultant involvement is designed assist in the development of the network and to involve academics throughout the sector, which is an intrinsic part of the dissemination of good practice.

Total consultant costs

	Year 1	Year 2	Year 3	Year 4
Local		15k	13k	2k
National			15k	5k

Costs broken down by work period and quarter

	Wp1		wp2				wp3				wp4	
	q4	q1	q2	q3	q4	q1	q2	q3	q4	q1	q2	q3
Local			5k	5k	5k	5k	3k	3k	2k	2k		
National							5k	5k	5k	5k		

Question production related to expenditure on consultants

wp2 - Production focuses on local and regional consultants

wp3 - Production focuses on national consultants

	wp1	wp2	Wp3	wp4
Local	-	20k	10k	-
Local	-	1000 questions	500 questions	-
National	-	-	15k	-
National	-	-	1000 questions	-
extra		200 from team leaders	300 from team leaders	
totals		Total 1200 questions	Total 1800 questions	

Steering Group Membership: Appendix D

Project Consortium	
Dr Rex Knight	Academic Registrar, University of Southampton.
Paul Light	Pro Vice Chancellor Academic, Bournemouth University. He has been external evaluator to a number of projects concerned with introducing innovations into learning and teaching
David Heffer	Dean of the Systems Engineering Faculty, Southampton Institute. He is an active member of IEE and member of the QAA Engineering subject benchmark working party.
David Arrell	Dean of the Faculty of Technology, Portsmouth University
Evaluators	
Professor Peter Ashburn Southampton	Professor of Microelectronics, Chair of ECS Academic Committee. He is actively involved in Teaching Quality Assessment and IEE and BCS accreditation for the Electronic Engineering and Computer Engineering degrees.
Liz McDowell University of Northumbria in Newcastle.	Manager of the UNNFURL project, Liz has published widely on assessment issues and considerable experience in the wider perspective of assessment in the curriculum.
Externals	
Professor Erik Dagless University of Bristol	External examiner at Southampton for the MSc electronics courses. He was one of the QAAHE subject specialist assessors in Electrical and Electronic Engineering; he is Honorary Editor of IEE Proceedings, Computers and Digital Techniques (CDT) and a member of the TLTP EDEC project consortium focusing on digital design.
Dr Jo Bull University of Luton	Director of the UK CAA Centre, she will advise on CAA.
Other	
Stakeholders	The group may also co-opt specialists to input to specific areas of debate.
Fiona Lamb LTSN Engineering Loughborough University	Because of the large number of FDTL engineering projects it will not be practicable for the centre to commit to attend steering group meetings. However they will receive a full set of papers for comment and may attend any meeting where it seems most appropriate-See detailed notes in section 11.10 below and attached letter.
Leslie Goldstone IEE deputy secretary	Dr Goldstone has met with project team representatives and expressed a keen interest in the project (see attached letter).

Supporting Statement from LTSN Engineering: Appendix E

LTSN Engineering and FDTL Phase 3



LTSN Engineering is part of the new Learning and Teaching Support Network (LTSN) funded by the UK Higher Education funding bodies at £5.2M per annum and comprising 24 subject centres and a Generic Learning and Teaching Centre. The current round of FDTL bids have come at the inception of the LTSN network, when the staffing is not complete and development of working practices is evolving. LTSN Engineering is keen to take an active role in supporting the funded projects and this document has been prepared to give an initial overview of our position. We will wish to negotiate in far more detail with funded projects when they are announced so that we can work together to build a collaborative dissemination strategy.

Our role is to provide subject-based support for the engineering academic community in the area of learning and teaching. We want to get actively involved with projects and help them to disseminate their expertise and embed themselves into the community. We will not take a monitoring role or undertake evaluation activities.

Within the resources available we will provide FDTL projects with a basic dissemination service which will include:

- Basic awareness of your project by Centre staff.
- Advice and support, for example, help in identifying conferences, suggestions of people who might like to get involved with your project, provision of any baseline data we may have.
- Project listings on LTSN Engineering web-site, consortium listings in databases of expertise.
- Basic project promotion e.g. distribution of fliers and other publicity material at conferences we attend or through any publications we send out.
- Encouragement of projects to publish through LTSN Engineering.
- Liaison with services such as staff development units to try and avoid duplication or confusion.

Unfortunately, we cannot offer to be on your Steering Group at this stage. We anticipate that about 9 projects will get funded which could mean 27 Steering Group meetings a year! However, we do hope that we can meet this need in other ways, for example providing a written report for meetings if required, ensuring that we arrange formal meetings at events that we will all be attending anyway and through regular email and telephone communication.

Beyond this basic service, we do feel that LTSN Engineering would provide an effective focus for the identification of potential collaborative opportunities between FDTL projects to avoid duplication of efforts and more efficient use of resource. Among the activities could be included:

- A collaborative professional workshop programme and joint newsletter.
- Project promotion that focuses on the need addressed rather than advertising the project itself.
- Single baseline data survey.
- Help in identification of end users.
- Liaison with professional bodies, industry and other stakeholders.

This could be organised in a similar way to the discipline based network established for the FDTL Phase 2 language projects run by CILT through a Co-ordination Group.

Fiona Lamb, Centre Manager, LTSN Engineering
f.m.lamb@lboro.ac.uk, (01509) 228388

Letters of Support/Commitment: Appendix F

The following letters of support accompany the bid

Southampton	
Faculty of Engineering and Applied Science	Dean Tony Hey
Department of Electronics and Computer Science	HOD Chris Harris
Department of Electrical Engineering	HOD
Learning and teaching evaluator	Peter Ashburn
Bournemouth	
Pro Vice Chancellor - Academic	PVC Paul Light
School of Design, Engineering and Computing	Professor Peter Hogarth, acting Head of School
Head of Learning and Teaching (DEC)	Janice Hurne
Portsmouth	
Faculty of Technology	Dean David Arrell
Department of Electrical and Electronic Engineering	HOD Tim Morgan
Southampton Institute	
Systems Engineering Faculty	Dean David Heffer
Academic Services	Claire Donovan
Other	
IEE - Deputy Secretary	Dr Leslie Goldstone
Steering group external and IEE member	Erik Dagless
LTSN Engineering, Loughborough	Fiona Lamb, Manager
Steering group external - CAA Centre director	Jo Bull - Director, University of Luton
Steering group - external evaluator	Liz McDowell, University of Northumbria at Newcastle

Glossary of Abbreviations used: Appendix G

ALTER	Assessment of Learning through Technology for Efficiency and Rigour TLTP 1 project
C&IT	Communications and Information Technology
CAA	Computer Aided Assessment
CASTLE	COMPUTER ASSISTED Teaching and LEARNING originally JTAP project at Leicester
CPD	Continuing Professional Development
DfEE	Department for Education and Employment
EEE	Electrical and Electronic Engineering
ELEN	Extended Learning Environment Network TLTP 3, lead site Lincoln and Humberside
FDTL	Fund for the Development of Teaching and Learning
FTE	Full Time Equivalent
GLTC	Generic Learning and Teaching Centre
HEI	Higher Education Institutions
HESA	Higher Education Statistics Agency
IEE	Institution of Electrical Engineers
ILT	Institute for Learning and Teaching
IMS	Instructional Management System
JISC	Joint Information Systems Committee
JTAP	JISC Technology Application Programme
LTSN	Learning and Teaching Support Network
QAA	Quality Assurance Assessment
QAAHE	Quality Assurance Agency for Higher Education
SAPHE	Self Assessment in Professional and Higher Education FDTL1 Project, lead site Bristol
SCAAN	Scottish Computer Assisted Assessment Network led from Heriot Watt
SEDA	Staff and Educational Developers Association
SHEFC	Scottish Higher Education Funding Council
SRHE	Society for Research into Higher Education
SToMP	Software Teaching of Modular Physics TLTP 1 project, lead site Surrey
TLTP	Teaching and Learning Technology Programme
TRIADS	Tripartite Interactive Assessment Delivery System FDTL1 Project
UCoSDA	University and Colleges Staff Development Agency

15. Four copies of each application, on white A4, one of which (for ease of photocopying) must be single sided and unbound, with all pages numbered, must be submitted by post. Applications should be returned no midday on Friday 10th March 2000. We will not accept late applications or facsimile copies.

Applications should be sent to:

Colette Dartford
FDTL/TLTP Project Manager
HEFCE
Coldharbour Lane
Northavon House
Bristol BS16 1QD

References

- ¹ Gibbs, G. (1995) Improving student learning through assessment and evaluation, Oxford Centre for Staff Development, Oxford Brookes University, Oxford
- ² Ramsden, P. (1992) Learning to Teach in Higher Education, Routledge, London
- ³ The Quality Assurance Agency for Higher Education, Subject Overview Report QO16/98 Quality Assessment of Electrical and Electronic Engineering 1996 to 1998
- ⁴ Details of SCAAN can be found at <http://www.scaan.ac.uk/>
- ⁵ Details of the CAA Centre can be found at <http://www.caacentre.ac.uk/>
- ⁶ Testing Conceptual Understanding in Physics (TCUP) 1998 project developed by the Education Research and Development Group in the School of Biophysical Sciences and Electrical Engineering
<http://www.swin.edu.au/bsee/mazzo/tcup/>
- ⁷ the collection of a set of case studies are housed at the Rose Hulman Institute of Technology at Carleton University in Canada. <http://www.civeng.carleton.ca/ECL/>. The Engineering Case Program originated at Stanford University in 1964 with the support of the National Science Foundation. It continues under the sponsorship of the American Society for Engineering Education (ASEE).
- ⁸ Benchmark Statement for Engineering, January 2000 p20-21
- ⁹ McDowell, L. & Sambell, K. (1999) The experience of innovative assessment: student perspectives. Pp.71-82 in S. Brown & A. Glasner (Eds) Assessment matters in Higher Education. Buckingham: SRHE & Open University Press.
McDowell, L. & Sambell, K. (1999) Fitness for purpose in the assessment of learning: students as stakeholders. Quality in Higher Education, 5(2), pp. 107-123
- ¹⁰ HESA Institutional Management Information tables (<http://www.hesa.ac.uk/acuk/maninfo/maninfo.htm>)
- ¹¹ EEUG The Educational ECAD User Group <http://www.eeug.ecs.soton.ac.uk/>