


Cover Sheet for Proposals			
Name of Tender:	Formative assessment process modelling		
Name of Bidder:	Institute of Education, London		
Name of Proposed Project:	Scoping a vision for formative e-assessment		
Name(s) of Project Partner(s):	n/a		
Full Contact Details for Primary Contact: Name: Dr Norbert Pachler Position: Reader in Education Email: n.pachler@ioe.ac.uk Address: 20 Bedford Way, London WC1H 0AL Tel: 02076126712 Fax: 02076126177			
Length of Project:	8 months		
Project Start Date:	June 1, 2008	Project End Date:	January 31, 2008
Total Funding Requested from JISC:	£39,805		
Outline Project Description This study, based on a combination of desk-based research, case study building based on empirical data gathered from practice, will survey existing literature as well as sample practice in the field of formative e-assessment based on previous work of members of the research team in formative assessment (Assessment for Learning). Formative e-assessment, for the purposes of this study, is understood as the use of ICT to support the iterative process of gathering and analysing information about student learning by teachers as well as learners and of evaluating it in relation to prior achievement and attainment of intended, as well as unintended learning outcomes. On the basis of this survey of theory and practice, which will also set out a number of case studies and process models, the study will provide a set of detailed requirements to enable future developments formative e-assessment systems.			

Background to and statement of purpose for this proposal

Assessment is integral to teaching and learning. It plays a prominent role in educational policy making, in particular in the context of attempts of successive governments of raising standards. There also exists a substantial amount of significant research into assessment. The main outcomes of this research, conducted inter alia by members of the project team (see e.g. Black and Wiliam, 1998a, b and Black et al, 2002, 2003), have included a distinct focus, certainly in maintained settings such as schools, on assessment for learning, i.e. assessment practices and techniques which actively move the learner on to make progress and improve their understanding of how and why they are learning in the way they are. Assessment for learning has evolved from formative assessment and is contrasted with assessment of learning, the broad equivalent of summative assessment. There is increasingly a recognition, articulated also in the invitation to tender for this proposal, that the important work on formative assessment and assessment for learning should find more widespread inclusion in post-16 pedagogy. Despite sustained efforts, for example, of Subject Centres and the Higher Education Academy¹, summative approaches to assessment still prevail, in particular in the form of end-of module assignments and unseen time-constrained written examinations and tests (see e.g. Brown and Glasner, 1999 and Whitelock, 2007), and where formative assessment often remains conceptualised simply as distributed summative assessment. One challenge, therefore, for post-16 education remains the alignment of assessment practice with the insights and recommendations of research findings which clearly show that assessment for learning is premised on the notion that learners will improve most if they understand the aims and processes of their learning, i.e. possess a certain amount of reflexivity at a meta-level, know where they are positioned in relation to the intended learning outcomes and how they can achieve them or close the gap in their knowledge, skills and/or understanding. It centres on activities by teachers and/or learners that provide information that yield feedback suitable to make necessary modifications to teaching and learning activities, i.e. those that lead to learners having a better understanding of what they are trying to learn, what is expected of them and how to make improvements. Ostensibly, assessment for learning can be seen to be premised on high quality interactions, including questioning, listening, responding and reflecting, between teacher and learners, learners and learners as well as learners with themselves. In this way, assessment can be seen to be integral to much of what goes on in a classroom.

With the increasing prevalence of ICT in teaching and learning a further challenge pertains to the integration of the insights in the area of assessment in technology-enhanced settings, be they characterised by the use of ICT in classroom context, mixed-mode provision or, indeed, online or distance learning or even self-study. The increased use of virtual learning environments and online tools in teaching and learning poses various challenges and opportunities. In the UK policy context, e-assessment tends to be understood as 'end-to-end electronic assessment processes where ICT is used for the presentation of assessment activity, and the recording of responses' (JISC, 2007, p. 6). The focus of work has been on institutional strategy, the development of standards² as well as on technical infrastructure and learning support and much less on the pedagogical dimension. The latter is on the increase, though, not least in view of a recent policy focus on personalisation and e-portfolios. We argue that in addition to increased efficiency in the provision of on-demand assessment opportunities and attendant feedback, effective e-assessment also needs to take account of the human-centric, social dimension as well as the data-centric perspective. With reference to the state-of-the-art pedagogical literature on formative assessment we will show in this project that learning, of which assessment is an integral part, is a social as well as a cognitive process. Effective formative assessment opportunities are fundamentally premised on human interpretation as well as the mediation of data for diagnosis and forward planning. For this reason we will in particular look at the use of handheld devices and classroom aggregation technologies (see e.g. Roschelle and Pea, 2002 and Fies and Marshall, 2006) as well as other computer-assisted (instead of only computer-based) methods and applications, including participation in online discussion and group tasks, for example using blogs. This clearly poses considerable challenges for e-assessment as defined above but also requires a broadening of the definitional base and current scope of e-assessment, all of which the current project aims to provide. Indeed, it is the dialogic processes involved in formative assessment, which we consider to be an area where the current bid can make a significant contribution to process modelling, which, in turn, can be fed into technological design. The project will examine the changes to assessment development processes and outputs required for formative content and how ICT tools should support this across Further and Higher

¹ See e.g. <http://www.jisc.ac.uk/assessment.html>, <http://www.heacademy.ac.uk/ourwork/learning/assessment> and <http://www.ukcle.ac.uk/resources/assessment/series.html>

² See <http://www.frema.ecs.soton.ac.uk/>

Education in the UK as well as the English-speaking world more widely; it will also look at formative assessment in work-based contexts and on work-related courses.

Project aims

This project aims to:

- summarise the most significant research findings in relation to formative assessment and assessment for learning,
- summarise the growing work on e-assessment,
- survey and analyse prevailing assessment practice in technology-enhanced post-16 contexts (excluding e-portfolios) in relation to the findings from research,
- compile case studies of existing practice in formative e-assessment in a diverse range of settings, in particular across FE and HE, medical education and adult and community education, and analyse them according to innovative and desirable features,
- delineate a set of key processes involved in effective formative (e-)assessment practice, drawing on key learning design literature (e.g. Almond, Steinberg and Mislevy, 2002), the work of the e-learning framework reference model as well as the case studies, to delineate a set of key processes involved in effective formative (e-)assessment practice; and
- provide a set of detailed technical requirements for formative assessment systems, components and processes taking account of the above.

Building on existing work in the field, including the resources outlined in the tender document, this study will not only delineate technical requirements underpinning innovative and effective formative e-assessment but do so on the basis of an in-depth analysis of existing work in the field of general pedagogical formative assessment research with a view to drawing up a research and development agenda for the future. The set of case studies will describe proven pedagogical practice as a foundation for this.

Methodology

The study will consist mainly of a desk-based, literature review to extend the resources and cases suggested by JISC in paragraph 13 of the Call and to examine relevant studies and documentary evidence (e.g. journal articles, internet resources, course programmes and evaluation). In addition, the course team will organise, and host at the WLE Centre, a Practical Enquiry Day into innovative formative e-assessment to share research and practice and scope case studies to which a small number (n=15) of practitioners working in the field across the UK and across post-16 education would be invited. This event will enable multimodal capturing of innovative practice not currently available in documented form.

The research team is aware of the ethical issues involved in conducting research and will adhere to the Ethical Guidelines provided by the British Educational Research Association.

Project team

The project builds on the excellent track record of the team in research, evaluation and teaching of assessment for learning and e-learning programmes. For pen profiles of key personnel, see Appendix 1.

The **Institute of Education, London** is one of the premier international institutions in the fields of teacher education and of research into all aspects of educational practice, theory and policy. The main activities of the IoE include research and scholarship of national and international significance, which builds on the Institute's strong research base; high quality, innovative postgraduate and post-experience teaching programmes; the promotion of new ideas in policy and professional practice grounded in its research and teaching expertise; consultancy and other services to support the quality of the educational system as a whole. The Institute has consistently been awarded the very highest rank in the UK for its research activity. Members of staff at the Institute have extensive experience in working on JISC-related projects, in particular as concerns the JISC e-Framework Programme.

The **Centre for Excellence in Work-based Learning for Education Professionals** works with key partners to transform current models of work-based learning. This responds to the diversity of professional learning needs emerging not only in education, but also in fields such as accountancy, medicine, nursing, pharmaceuticals, finance and management. The Centre undertakes and uses research to enhance professional practice and focuses inter alia on the use of new technologies to innovate teaching and learning as well as on assessment. The Centre has a strong network of Associates, in particular in the fields of health

education a number of whom are experienced practitioners of formative e-assessment. The Centre has also got ready access to the innovative work of the national CETL network and is able, through its networks, to draw on practice in a range of international partner institutions.

The **London Knowledge Lab** is a unique collaboration between the Institute of Education, London and Birkbeck. The Lab brings together computer and social scientists from a very broad range of fields, including education, sociology, semiotics, data mining, information management, personalisation and ubiquitous technologies. This allows the Lab to tackle issues from many different perspectives, and this is reflected in its mission, to understand the place of digital technologies and media in our cultural, social and educational relationships with knowledge – finding, acquiring, creating, and sharing it; design, build and evaluate systems, processes and interfaces that enhance learning, both formal and informal, throughout life; and examine critically the assumptions about knowledge and learning that underlie the increasingly wide range of applications of digital technologies. The Lab's research aims to explore and invent the roles of technology in the processes of learning and teaching, and to understand how technology relates to broader social, economic and cultural factors.

Project deliverables

	Description of deliverable
1	A description of current proven practice in formative assessment in the form of a set of case studies across FE, HE and adult/community education (national and international) using the template developed by the JISC e-learning programme (n=10-12)
2	A set of process models, expressed in Unified Modelling Language, that synthesise the case studies and model desirable future processes, and detail system and service requirements (n= up to 5: e.g. teacher/system-student, student-teacher/system, peer-to-peer)
3	A concise final report (less than 40 pages) that outlines the vision of formative e-assessment, as informed by the case studies and process models. The report will sketch out what interoperability agreements would be required to take the described 'as is' process models to the idealised 'future' process models.

Domain maps (informal) or Models (formal); knowledge & understanding of an area of work	√
Good practice / workflow / process models, both 'as is' and 'to-be'	√
Functional models of software applications	
Case studies , scenarios, use cases and descriptions of designs for software applications	√

Project management

The project will be managed by the Project Director using the well-established infrastructure of the WLE Centre, where monthly meetings of the project team will be held. The project team will establish a CMS within the WLE infrastructure which will support the work of the project team and function as communications portal as well as a repository for e-copies of material to be used by the project team and for project-related documentation.

Steering Group

There will be a Steering Group which will meet three times. Its membership will include all members of the research team as well as Prof. Diana Laurillard from the London Knowledge Lab and one JISC nominee. It will be chaired by the Project Director. Its remit will be to:

- steer the project;
- liaise with JISC Project Management team;
- resolve any strategically significant issues which emerge during the course of the project;
- sign off project deliverables;
- authorise any significant deviations from the project plan.

Research Team

The Research team will comprise Dr Norbert Pachler, Reader in Education, Prof Dylan Wiliam, Acting Director of the Institute and Professor of Educational Assessment, Dr Harvey Mellor, Senior Lecturer in Educational Computing, Dr Caroline Daly, Senior Lecturer in Education, and Yishay Mor, Researcher and programmer, all from the Institute of Education who, during the period of June 2008 and January 2009, will carry out the work of the project. Being able to draw on the expertise of Prof Wiliam as well as the London

Knowledge Lab, the project team is uniquely placed to develop a vision for formative e-assessment processes. The research team have a significant track record in the acquisition of external research funding and the successful completion of attendant research projects; they also are extensively networked nationally in Further and Higher Education and through the Higher Education Academy and internationally (in particular in the US, Australia and Scandinavia) which is key to gaining access to relevant sites of practice for case study. One member of the project team (Winters and Mor, 2008) has been involved in capturing and describing processes and practices for the last two years and has developed a methodology which incorporates case studies, scenarios, domain maps, and design patterns. This methodology originated in the Learning Patterns project, and has since been adopted by the Pattern Language Network project (Planet, funded by JISC Emerge). It is still evolving, through work on Como and interactions with the pattern languages community. Design patterns have traditionally been associated with object-oriented programming, and thus linked to modelling languages such as UML, BPML and BPEL4WS. The Planet system is planned to also support PLML as a standard format for pattern interchange.

There will be monthly face-to-face meetings of the project team, regular email exchange and use will be made of an online CMS to facilitate the collation of relevant sources and the smooth handling of project-related data. The meetings will be chaired by the Project Director. Its remit will be to:

- produce project deliverables on time and to a high standard and
- deal with operational issues which emerge during the course of the project.

Work plan

<i>Activities</i>	<i>Key personnel</i>	<i>Due date</i>
Detailed workplan incl. planned scope of research on formative assessment pedagogy, existing tools, services and studies	Project Director, JISC Programme Manager	July 1, 2008
Practical enquiry day into formative e-assessment to share research and practice and scope case studies	Project Director and one member of the project team; invited practitioners in the field of e-assessment (n=15)	Early July 2008
Monthly informal updates and teleconferencing with the JISC Programme Manager	Project Director, JISC Programme Manager	August 1 and every 1 st day of month until December 2008
Internal report outlining recommendations of suitable available technology	Project Director and team members	September 30, 2008
Report outlining recommendations for the case study work	Project Director and team members	September 30, 2008
Interim report summarizing findings of the desk-based research	Project Director and team members	October 6, 2008
Design of process models	Project Director and team members	November 30, 2008
Analysis of implications of process models in terms of system requirements	Project Director and team members	November 30, 2008
Draft of the final report	Project Director and team members	December 31, 2009
Revision of draft and submission of final report	Project Director and team members	January 31, 2009
Publication of the deliverables on the WLE website	Project Director	Early February 2009
Submission of deliverables to the Innovation Knowledge Base	JISC Programme Manager	Early February 2009
Dissemination event at the WLE Centre in conjunction with LKL and JISC	Project Director and team members	Early Spring 2009
Monthly research team meetings	Project Director and team members	June 2008 to January 2009

Two Steering Group meetings	Project Director and team members, internal consultant, JISC nominee	July and November 2008
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Budget

In line with Institute requirements, the project is costed on an FEC basis. There is an institutional contribution of 19% which arises through a mixture of opportunity cost and contributions to certain staffing and non-salary costs as well as the provision of an internal consultant to attend Steering Group meetings (0.5 person days).

In recognition of the mutual interests of JISC and the host institution in terms of work-based learning developments, the IoE contribution includes considerable subsidy in particular on the input of Professor Wiliam to the project and its outcomes (whose opportunity cost is not explicitly shown in the budget and not reflected in the financial contribution), as well as contributing meeting time, some technical and administrative costs to the project and enhancing quality by hosting the Practical Enquiry Day to enrich the collection and capture of cases and establish a network of practitioners involved in formative e-assessment initiatives to carry forward developments with the Work-Based Learning Centre.

The costings are set out in the proforma provided.

Risk assessment

Risk	Assessment	Countermeasures and contingencies
Members of research team move posts	Likelihood: low Impact: high	Countermeasures: The research is based within a centre of expertise within teams including individuals with considerable experience of research in the field who could be drawn upon to support the project. Individual staff moving to another institution can remain within the team. Contingency plan: posts would be replaced with academics with similar expertise.
Technical aspects of the project too complex	Likelihood: low Impact: high	Countermeasures: the research team has considerable expertise and experience in the field of technical requirements. Contingency plan: posts would be replaced with technical experts with similar expertise
Inability to identify adequate number of cases of innovative e-assessment practice	Likelihood: medium Impact: high	Countermeasures: to model ideal formative assessment through fictitious case studies Contingency plan: a greater emphasis be placed on practice outside the UK

References

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- Brown, S. and Glasner, A. (eds) (1999) *Assessment Matters in Higher Education: Choosing and Using Diverse Approaches*. Open University Press, Buckingham
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- Winters, N. and Mor, Y. (2008) 'IDR: a participatory methodology for interdisciplinary design in technology-enhanced learning.' In *Computers and Education* 50(2), pp. 579-600

APPENDIX 1

Pen profiles of project team

Dr Norbert Pachler (Project Director) is Reader in Education and Co-Director for the Centre for Excellence in Work-based Learning for Education Professionals (WLE Centre) at the Institute of Education, London. Norbert has extensive experience in developing, implementing and researching e-learning provision. He is a member of the Association for Learning Technologists and currently works a book for Continuum on key issues in e-learning with a particular focus on pedagogical research. Together with colleagues from the WLE Centre, where he oversees and commissions numerous projects on pedagogical innovation using new technologies every year, he has recently held grants from the Centre for Distance Education of the University of London to research the student experience on mixed-mode and online Masters-level courses. He has a keen interest in digital technologies, in particular e-learning and mobile learning, and has published widely incl. on assessment and/of ICT, inter alia *Learning to teach using ICT in the Secondary School* (Routledge 1999 and 2005; with Marilyn Leask) and numerous journal articles and book chapters. He supervises extensively in the field of new technologies in education, is involved in international, inter-disciplinary research networks in mobile learning, and has led an EU-funded research project on the use of ICT in FL education. His previous work on e-learning affords him a good overview of e-learning and learning design research.

Prof Dylan William is Deputy Director, and Professor of Educational Assessment, at the Institute of Education, University of London. Dr. William received his Ph.D. from London University in 1993. He was a high-school teacher of mathematics and physics before joining King's College London in 1984, and he continued teaching at the college level until 2003, when he joined the Educational Testing Service, Princeton, NJ as senior research director. Before that, he served as dean and head of the School of Education at King's College for five years before advancing to assistant principal there. He is the author of more than 250 articles, books and papers on education, and is regarded as one of the world's leading authorities on the use of assessment to support learning.

Dr Harvey Mellor is a Senior Lecturer in Educational Computing and leads the Learning Technologies Unit (<http://www.lkl.ac.uk/ltu/index.php>) at the Institute of Education. He has extensive experience in the use of e-learning in Higher Education, in Further Education and Adult and Community Learning. He led a series of projects funded by the DfES/ESF for the National Research and Development Centre in adult literacy and numeracy looking at the use of e-learning with adult learners. Recent work also includes work with the HEA/JISC Benchmarking of e-Learning Pilot, the follow-on HEA/JISC Pilot Pathfinder project PREEL (from Pedagogic Research to Embedded e-Learning) and extension Pathfinder Networking project on QA/QE in e-learning.

Dr Caroline Daly is a Senior Lecturer in Education and Assistant Director of the WLE CETL. Her research background is in professional learning in e-learning contexts. Recent research includes leading projects funded by the Centre for Distance Education, University of London, involving the construction of cases used as research tools in e-learning contexts. She was a member of the HEA/JISC Pathfinder project (PREEL) team at the IoE. Her CETL role involves co-ordinating research project development and dissemination to practitioner, researcher and academic audiences. She has published widely in the field of learning with digital technologies, for both research and practitioner audiences and is currently co-authoring with Norbert Pachler a book on key issues in e-learning which focuses on pedagogical research.

Yishay Mor holds an MSc in Computer Science from the Hebrew University, Jerusalem, and has 6 years as senior developer in the software industry, where he designed and took leading roles in the development of large scale network management systems. Yishay introduced UML to his unit in Cisco (of about 40 engineers) and lead its integration into the development process. He also led engineer training courses in design patterns using UML. Yishay has been leading software projects of various scale since 1995. In his roles he had been responsible for system specification, design, procurement and development. Examples include the development of an advanced proxy server for AgentSoft, specification, design and development of components of a quality of service network management suite for Cisco systems, specification and design of the WebReports web-based collaborative system, the Learning patterns collaborative system, and development for the London Pedagogy Planner (JISC funded). Currently, Yishay is leading the specification and development of a system for collaborative authoring of pattern languages for the JISC funded Pattern Language Network.

<http://weblabs.org.uk/wlplone>

<http://lp.noe-kaleidoscope.org/outcomes/final/>

<http://sites.google.com/a/patternlanguagenetwork.org/specs>

<http://patternlanguagenetwork.org/about/>

<http://pedagogyplanner.org.uk>

APPENDIX 2: PROJECT BUDGET

Directly Incurred	June - July 08	Aug – Jan 09	TOTAL £
Staff			
Yishay Mor, Grade 8, Sp42 17 days at £248 (average) per day			
Total Directly Incurred Staff (A)			
Non-Staff	June - July 08	Aug – Dec 08	TOTAL £
Travel and expenses			
Practical enquiry day: travel costs for 15 participants			
Practical enquiry day: catering, room and equipment			
Travel to 2 programme meetings Bristol			
Catering for team and steering group meetings			
Dissemination event			
Office costs: printing, reprographics, telephone			
Publication and hosting of deliverables on WLE website			
Total Directly Incurred Non-Staff (B)			
Directly Incurred Total (C)			
Directly Allocated	June - July 08	Aug – Dec 08	TOTAL £
Staff			
Norbert Pachler (Grade 10 Sp52) : 8.5 days at £428 per day			
Dylan Wiliam : 9 days at £745 per day			
Caroline Daly (Grade 9 Sp44): 14.5 days at £271 per day			
Harvey Mellar (Grade 9 Sp50): 15 days at £327 per day			
Administrator (Grade 5 Sp22): 8 days at £152 per day			
Estates: 73 days at £22 per day			
Directly Allocated Total (D)			
Indirect Costs: 73 days at £186 per day (E)			
Total Project Cost (C+D+E)	£7,568	£41,875	£49,443
Amount Requested from JISC	£120	£39,685	£39,805
Institutional Contributions	£7,448	£2,190	£9,637
Percentage Contributions over the life of the project	IOE 19%	JISC 81%	Total 100%

Notes:

The salary of Norbert Pachler includes a responsibility allowance of £19,000 and those of Caroline Daly and Harvey Mellar responsibility allowances of £2,000 and £2,500.

We are a HEI tendering for support for a research activity, which is outside the scope of VAT for the Institute.

APPENDIX 3

Letter of support

Dr Mary Stiasny
Assistant Director, Learning and Teaching

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15 April 2008

JISC/HEFCE
Northavon House
Coldharbour Lane
Bristol
BS16 1QD

Dear Sir,

JISC e-Learning Programme: Formative Assessment Process Modelling

I am pleased to give my enthusiastic support to the bid submitted under the JISC e-Learning Programme by the Institute of Education, University of London.

The Institute of Education will build on existing experience and will bring together the substantial expertise to enable future developments in formative e-assessment systems.

Yours sincerely,

A handwritten signature in blue ink that reads 'Mary Stiasny'.

Dr Mary Stiasny
Acting Deputy Director