JISC Project Plan

Project Information			
Project Acronym	PEER		
Project Title	Peer Evaluation in Education Review [PEER]		
Start Date	1st July 2010	**End Date**	June 30th 2011
Lead Institution	University of Strathclyde		
Project Director	Professor David Nicol, d.j.nicol@strath.ac.uk		
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Partner Institutions	N/A		
Project Web URL	tbc		
Programme Name (and number)	Learning and Teaching Innovation Grants (LTDEVA01)		
Programme Manager	Sarah Davies, JISC		

Document Name			
Document Title	Project Plan		
Reporting Period			
Author(s) & project role	Professor David Nicol		
Date	16th August 2010	**Filename**	Project Plan: PEER
URL			
Access	☐ Project and JISC internal	☐ General dissemination	

Document History		
Version	**Date**	**Comments**

Overview of Project

1. Background

Introduction

The UK National Student Survey has shown that students are more dissatisfied with the feedback they receive than with any other aspect of course provision. As a result, a great deal of HE work has been directed at improving teacher feedback and tools have been developed to support this (e.g. databanks of feedback comments). However, recent educational research shows that merely 'telling' students about the quality of their work through the provision of teacher feedback ultimately leaves some students unprepared for life beyond the university (Sadler, 2010; Nicol, 2010). Feedback as 'telling' does not help develop students' own high-level evaluative skills in complex learning domains and it might even foster dependency on the teacher (Orsmond and Merry, 2010).

If students are to become lifelong learners they must develop the skills to think critically and to appraise the quality of their own work both during and after its production. The most efficient way of developing these skills is by giving students regular opportunities to appraise the work of peers. Indeed, appraising the work of others is precisely how teachers develop the skills required to make evaluative judgements.

In order to support the development of peer evaluation for extended written assignments (e.g. essays, reports) where student numbers are large, software support is essential. At core, what is required is a tool that would allow students to submit an assignment and for it to be distributed to a number of other students who would provide feedback comments on it in relation to defined criteria. After the feedback has been provided, the student who produced the assignment would receive all the comments from peers. There are however many ways in which peer review might be implemented: e.g., students might identify questions about which they would like feedback, they might produce criteria themselves for peer review, they might rate the feedback provided by peers or the ability to peer review might be calibrated before peer review begins.

To date, the different ways of implementing peer evaluation have not been articulated nor is there a clear source for, or means of, selecting peer review software. Some systems are available but there is little information about their functionality, only a few are available to buy and no fully functioning open source system has been identified. Furthermore, tools to support peer evaluation are not fully developed within market-leading Learning Environments (e.g. Blackboard). While some features are supported, these are often associated with grading rather than with appraisal and feedback processes, and hence they do not fit the primary requirements of this project which is on peer feedback rather than peer grading. In summary, anyone wishing to implement peer evaluation - which is a highly powerful way of developing critical thinking, improving writing, developing graduate attributes and students' evaluative skills – has little guidance about software options or about best educational methods of implementation.

<u>Research on Feedback and Learning</u>

The evidence base for this project draws on recent research on feedback and learning. Ormond and Merry (2009) have shown that too much teacher feedback can make weaker students more dependent on teachers. They argue that the way out of this dilemma is to enhance students' own ability to evaluate work and produce feedback. Nicol (2010a,b) has amassed evidence to show that producing feedback is likely to be more beneficial to learning than receiving it, as it is cognitively more demanding and engages students more actively in higher-order thinking. He has also shown that critical evaluative skills underpin the development of graduate attributes. Sadler (2010) has argued that reciprocal peer review develops in students the essential skills for employment and for life beyond HE, where they will invariably set goals and evaluate their own and others' achievement of these goals.

Prior Research and Development: Technology and Peer Review

Several JISC projects will inform this proposal. UKCDR (www.ukcdr.manchester.ac.uk/) provides a way of mapping the functionality and comparing different software systems. The REAP project (www.reap.ac.uk) has shown the benefits of assessment principles and of technologies to support the development of learner self-regulation. This project will build on REAP as it involves developing and testing what might be the core process behind the REAP principles (i.e. peer review, the students ability to evaluate the quality and impact of their own and other's work). Some promising work on peer review has been carried out in the US using 'Calibrated Peer Review' software. Research suggests that this software has produced learning benefits in some disciplines. The National Science Foundation supported the development of CPR but surprisingly, it seems that no one is using this system in the UK, although it can be run freely from the US server.

In the UK, Peer Pigeon, a distribution engine for peer activities was developed with JISC funding by David Millard (http://www.peerpigeon.ecs.soton.ac.uk/). WebPA was also developed with JISC funding although this primarily supports peer assessment of contributions to group working. John Hamer from New Zealand, now in the UK, developed Aropa. The developers of Peer Pigeon and Aropa will advise and contribute to this project. The PEER project will also draw on other JISC-funded work on audio feedback (Optimising audio feedback, Aberystwyth) and on electronic voting (Feedback for All, Edinburgh).

It should be noted that in this project the terms peer evaluation, peer review and peer appraisal are used interchangeably to describe a judgement performed by one student about the work of another student. Peer feedback is a specific focus of this project: this refers to the provision of qualitative information (i.e. comments) by one student to another on the quality or impact of his or her work.

2. Aims and Objectives

Higher education teachers acquire complex assessment skills by making hundreds of evaluative judgements about students' assignments each year and by constructing personalized feedback on those assignments. If we want students to develop critical thinking and autonomy in assignment production then they should be provided with high-level evaluative experiences similar to those of teachers.

The aims of the PEER project are to identify educational designs and evaluate software tools that support student peer-review processes, and to pilot peer review supported by software in at least two different disciplines.

The specific objectives of the PEER project are to:

- Review the literature on peer review using technology and identify the educational features, core and optional, of effective peer review.
- Identify and map the available software systems that support peer review to the educational features.
- Pilot and evaluate peer review using software in two academic departments
- Produce guidelines for the effective implementation of peer review using software in two disciplines with large student numbers.
- Disseminate the project findings nationally and internationally (e.g. through publications, a website, workshops, seminars and conferences) and provide evidence-based information for others wishing to implement peer review.

3. Overall Approach

This project has three phases. The first phase will involve the development of a framework and the identification of a set of educational designs for peer review as well as a mapping and evaluation of existing software systems that support peer review. The second phase will be a pilot implementation and evaluation of peer review in at least two different disciplinary areas. The third phase will involve the production of outputs, in particular, guidelines on how to implement peer review using software, including some advice on how to implement one (or more) of these systems into Moodle.

Throughout the project other outputs will be produced and disseminated through the website, workshops and events, journal articles and project reports.

Phase 1:
A framework will be developed and a set of prototypical educational designs for peer review using software will be produced: at least 10 designs are envisaged drawn from a literature review of relevant case studies. In parallel, a review of current software systems for peer review will be carried out and core/optional software functions will be identified. The output will be a pedagogical framework, a set of educational designs for peer review, software requirements and a mapping of educational features to software systems currently available. In preparing the bid for JISC funding 10 systems were identified: Aropa, Sparkplus, Calibarated Peer Review, PeerMark, Peer Pigeon, PeerWise, TaskStream, Computerised Peer Assessment, TeCTra and WebPA. [The PEER project will focus on peer review as a developmental process rather than peer assessment with students marking others' work].

Phase 2
A system will be selected and pilot-tested in two different academic disciplines with over 200 students. The actual choice of system will be determined in Phase 1 but the intention would be to utilise a system that would enable the testing of contrasting peer review features. The implementation will be evaluated from an educational and user perspective examining input, educational process and output characteristics (e.g. satisfaction, learning benefits).

Phase 3
Guidelines will be produced for those wishing to implement peer review. These guidelines will include the rationale for peer review, a framework outlining the architecture of peer review and including guiding principles, examples of design and implementation and recommendations for good practice.. The educational, technical and user requirements of a useful peer review system will also be specified.

Scalable, Replicable and Sustainable
Establishing the scalability of peer review with large student numbers is an objective of this project. Replicability will be shown through the analysis of prior studies on technology-supported peer review and the identification of their success factors. Technical sustainability will be established through the mapping of functional features against a clear educational framework; other teachers can then map their own use-cases or new technology tools in the future. Sustainability will also depend on the pedagogical value of peer review and the usefulness of the software in making peer review more efficient.

Critical success factors
The critical success factors are related to the aims and objectives of the PEER project and include:

- The identification of an educational framework and a set of learning designs that will exemplify good practice in technology-supported peer review.
- A set of pilot implementations that would enable technology-supported peer review to be assessed and reported on.
- A set of guidelines for technology-supported peer review that will be of value to academics and to the higher and further education community in general.

4. Project Outputs

Tangible outputs

1. A framework and a set of educational designs for peer review using technology including the rationale and the benefits of peer review
2. A matrix of features of peer review mapped to available software systems: A review of current software systems for peer review and the mapping of these against features of good educational design.

3. A set of guidelines for and examples of peer review implementation. A short manual for the implementation of peer review for teachers including educational benefits, modes of implementation, pitfalls and software systems etc.
4. A brief report on the integration opportunities for selected peer software systems within Virtual Learning Environments
5. A project website outlining developments and hosting resources.
6. Dissemination events for the HE/FE sector (workshops, conference presentations, webinars) on Peer Review and relevant software tools as well as internal events at Strathclyde and across the Scottish HE sector..
7. An Elluminate session on peer review for those involved in the JISC curriculum design and delivery project.
8. Two project reports, mid term and final.
9. Refereed journal article on literature review and on the pilot implementation.

Knowledge and experience outputs

- Clearer understanding than currently exists of the state of play of peer review using online tools.
- An inventory of the main peer review tools and their strengths and limitations.

5. Project Outcomes

- Raised awareness and improved understanding of the educational value of peer review across the HE/FE community.
- A framework and implementation models for peer review across a range of disciplines
- Ways of efficiently implementing peer review at a distance and when student numbers are large
- An overview of the state-of play of software support for peer review and advice for integration within Moodle, the most common learning platform.
- Useful summary of the literature on peer review using technology for academics and the research community.
- Scope the work that needs to be done in future to support peer review technically.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
Teachers in higher and further education	Information/advice about how to implement peer review educationally and technically	High
Learning technologists in FE and HE	Information/advice about how to implement peer review and the software support	High
Learners	Guidance/information that would enable learners to get most out of peer review	High
Educational developers in FE/HE	Guidance to support academics and students wishing to implement peer review	High
Senior managers in FE/HE	Tools to support educational processes	Medium
Researchers in education	Source of systematic research on peer review	High
HE/FE Community	Transferability and sustainability of results	Medium
JISC, Higher Education Academy, European, Australian and US developers and researchers.	The project adds to the portfolio of useful advice on assessment and will complement the new publication 'Assessment in a Digital Age'.	High/medium

7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Staffing: Departure of project team members	2	3	6	Most staff are replaceable except the Project Director but he is not leaving
Organisational: Internal departmental partners do not deliver/pilot peer review	3	5	15	Find alternative partners or use published literature as a proxy.
Not able to evaluate 10 software systems in project budget	3	3	9	Select and evaluate a smaller number that have real potential for the HE/FE sector
Difficult to bring together those with expertise in peer software	3	2	6	Hold telephone interviews with consultants to get feedback or carry out site visits

8. Standards

Name of standard or specification	Version	Notes

9. Technical Development

No technical development in this project except necessary integration of peer review tools with university VLE to pilot use of peer software. Some technical analysis will be provided for other institutions.

10. Intellectual Property Rights

The literature review will establish some copyright for the ownership of the ideas generated.

Project Resources

11. Project Partners

Critical friends: subcontracted to help with specific tasks. These inputs will establish a broad basis to the project even beyond the UK and will ensure that what is developed takes account of and builds on prior work.

Consultant	Address	Expertise	Role	Time commitment
Dr David Millard dem@ecs.soton.ac.uk	Learning Services Lab, School of Electronics and Computer Science, University of	Expert consultant/critical friend on Peer Software: Peer Pigeon	Help in mapping software tools to educational designs	2 days

	Southampton.			
Dr John Hamer jham005@cs.auckland.ac.nz	Home page: http://www.cs.auckland.ac.nz/~j-hamer/ Department of Computer Science, University of Auckland.	Expert consultant/critical friend on Aropa peer software	Help in mapping tools to educational designs and in linking tools to moodle and with pilot implementation	5 days
Dr Steve Draper s.draper@psy.gla.ac.uk	Home page: http://www.psy.gla.ac.uk/~steve/ Department of Psychology, University of Glasgow	Expert and critical friend on human computer interaction and on educational matters	Help in mapping the software to education features. Steve will also act as critical friend for the literature review, the guidebook and the implementation plans.	6 days
AN other (no contact made as yet)		Expert on Calibrated Peer Review (US software)	Help in mapping CPR to educational designs	2 days
Dr Beatriz Gallego Noche beatriz.gallego@ucs.es	University of Cadiz, Facultad de Ciencias de la Educacion, Avda Republica Saharui,11519 Puerto Real	Expert on Peer Review (developed Evalcomix) and educational literature on peer review.	Help in mapping software features, critical friend for literature review and help in disseminating findings in Europe.	2 days

Some events will be organised to bring together experts in peer review and in the software support of peer review at a UK location to share findings and to discuss gaps in project and to help map the educational features to available software systems.

12. Project Management

The PEER project will be directed by Professor David Nicol and managed by both Catherine Milligan and David Nicol. The group is small and the project has two distinct phases. In the first phase (literature review and scooping of software) most of the work rests with Professor Nicol who will manage and deliver the early outputs (0.15FTE). In the later phase Catherine Milligan will take a greater lead in managing the implementation and evaluation with the help of David Nicol.

Catherine Milligan is the line manager for Scott Walker and Caroline Breslin, two learning technologists who will work with academic departments at the University of Strathclyde on the implementation of peer review using software.

This project will report to Professor Ray Land, Head of Centre for Academic Practice and Learning Enhancement (CAPLE) at the University of Strathclyde and through the Educational Strategy Committtee of the University of Strathclyde.

Project Team

Team Member	Role and Responsibility	Contact
David Nicol, Professor of Higher Education, Centre for Academic Practice and Learning Enhancement (CAPLE), University of Strathclyde	Project Director Will carry out literature review of peer review supported by software and will develop guidelines for implementation.	d.j.nicol@strath.ac.uk, 0141 548 4060
Catherine Milligan Head of Learning Technology Enhancement, CAPLE, University of Strathclyde.	Project Manager Manage the project and report internally and manage the learning technology team and ensure departmental support for the pilots.	c.milligan@strath.ac.uk 0141 548 3770
Caroline Breslin, Learning Technology Adviser, CAPLE, University of Strathclyde	Learning Technology Advisor will support implementation and evaluation of peer review in academic departments.	caroline.breslin@strath.ac.uk 0141 548 3776
Scott Walker, Learning Technology Adviser, CAPLE, University of Strathclyde	Learning Technology Advisor, will support implementation and evaluation of peer review in academic departments	scott.walker@strath.ac.uk 0141 548 3190

Address for all staff
Centre for Academic Practice and Learning Enhancement
Graham Hills Building
University of Strathclyde
50 George Street
Glasgow G1 1QE

13. Programme Support

Keeping the project team informed of related developments through JISC work would be valuable as would providing opportunities to present our developing work to different groups (e.g. the Pedagogy forum)

14. Budget

The project budget is presented in Appendix A. It is consistent with the original proposal.

Detailed Project Planning

15. Workpackages

Appendix B provides the detailed work packages

16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
Aug 2010 to Feb 2011	Literature review of good practice in technology supported peer review	Has the project actually identified good practice in technology supported peer review?	Peer review of developing outputs. Publication of literature review in a refereed	Publication of review in peer reviewed journal Citations of journal article over next few years

			journal	
Sept 2010 to Feb 2011	Identification and analysis of software systems for peer review	Has the project identified and mapped tools available for peer review support?	Bring experts together to examine and contribute to software mapping	Framework produced, mapping carried out and feedback from experts utilised.
Feb 2011 to June 2011	Guidelines that are produced for those wishing to implement peer review	Are the guidelines helpful and usable?	Workshops where feedback from potential users is sought	Use of guidelines could be ascertained initially through web downloads and through links to assessment websites.
Feb 2011 to June 2011	Technical information about peer software and VLE integration	Will information about VLE integration be usable to technical staff?	Peer feedback will be sought throughout.	Technical information produced and peers think it useful

17. Quality Plan

Output	**Literature Review of peer review supported by technology**				
Timing	**Quality criteria**	**QA method(s)**	**Evidence of compliance**	**Quality responsibilities**	**Quality tools (if applicable)**
January 2011	Published in peer reviewed journal	Peer review during its development	Accepted for publication	Project Director	

Output	**Matrix analysis of software to support peer review**				
Timing	**Quality criteria**	**QA method(s)**	**Evidence of compliance**	**Quality responsibilities**	**Quality tools (if applicable)**
January 2011	Helps staff identify what is important about software now and in future	Consultation with developers and users	Informal feedback and use of matrix by individuals and departments. Ratings of usefulness given at workshops.	Project director	

Output	**Guidelines for the implementation of peer review using software**				
Timing	**Quality criteria**	**QA method(s)**	**Evidence of compliance**	**Quality responsibilities**	**Quality tools (if applicable)**
June 2011	Academic staff and learning technologists believe the guidelines help and use them	Consultation with academics and with learning technologists	Informal feedback and take up at the University of Strathclyde	Project director	

Output	Implementation of peer review in academic departments using software				
Timing	**Quality criteria**	**QA method(s)**	**Evidence of compliance**	**Quality responsibilities**	**Quality tools (if applicable)**
June 2011	The implementation is beneficial to student learning and is perceived as more efficient by staff using peer software	Staff and student satisfaction and alignment of implementation with course objectives	Departments will continue to use these methods beyond the project clyde	Project manager and project team	

18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
Project start	Create project website template accessible via JISC.	Practitioners, educators, educational developers and researchers, LT Advisors in HE/FE and JISC and other communities.	Raise project profile	Why PEER project important and what it hopes to achieve
Aug 2010 to June 2011	Set up and maintain website at University of Strathclyde and link to REAP website	As above and national, international community	Keep interested parties informed of all developments	
Jan 2010 to June 2011	Share findings of literature review at workshops and conferences (e.g. Scottish Quality Enhancement events, HEA and JISC)	Educators and learning technologists	Share and get feedback	Value of peer review educationally. Good practice in design of peer review.
Jan 2010 to June 2011	Share findings regarding software for peer review through CETIS events, Elluminate event and through e-pedagogy group etc.	Learning technologists and educators	Share and get feedback	Value of software in enhancing efficiency of peer review implementations.
March 2011 – June 2011	Explore production of video on peer review for presentation and JISC website. Example: 'how to do peer review' or 'stakeholder views on peer review' including employers.	HE/FE sector and wider community with key audience being busy senior managers, VPs.	Utilise alternative dissemination strategy: high-impact, time-efficient 'selling' of an important idea.	Fundamental value of peer review as core part of any curriculum.
Jan 2010	Submit review to academic journal	Those interested in assessment	Establish credibility of the	Analysis of Peer project to date

to June 2011		nationally and internationally – practitioners and researchers.	project work	

19. Exit and Sustainability Plans

Project Outputs	Action for Take-up & Embedding	Action for Exit
Guidelines for implementing technology supported peer review with technology support	Dissemination via project website, workshops and conferences and in journal papers.	Continued free availability from project website and through journal publications.
Matrix for analysing peer review software	Dissemination through project website, workshops, conferences and journal papers.	Availability through JISC and to future related projects.

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
Guidelines for implementing technology-supported peer review	Market need in FE and HE sector	Making links to all relevant assessment websites. Testing guidelines use in other institutional settings	Funding for further work if successful in project context.
Matrix for analysing peer review software	Useful even as new software is developed or old software refined.	Demonstrating value of matrix as tool for software selection.	Encouraging use of matrix to support thinking about technology use in peer review.

Appendixes

Appendix A. Project Budget

Appendix B. Workpackages