



## Project Document Cover Sheet

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## **Interim Reporting Template**

**Project Name:** Principles in Patterns (PiP), University of Strathclyde

**Report compiled by:** Jim Everett (Project Manager)

**With contributions from:** George Macgregor, Emma McCulloch, Donna Cullen

**Reporting period:** May 2011 – end of October 2011

### **Section One: Summary**

After a period of significant change in both the project and the university, outputs that have been under development for some time are entering their final stages of development and testing.

The online system, now built using SharePoint and InfoPath, is entering user testing with end user pilots about to begin. This change to the programming approach promises a robust and flexible infrastructure without the requirement for significant programming input in order to maintain and develop the system. The system was demonstrated at the October 2011 Programme Meeting.

The PiP (re-)focus on Business Process Improvement (BPI) supported by formal modelling approaches has been the inspiration for the SLEEK (Strathclyde's Lean approach to Efficiencies in Education Kit) business process improvement methodology, which is being adopted across the University of Strathclyde. Indeed, the SLEEK method is feeding back to the PiP project through a formal review of course and class approval processes that will in turn impact on the online system development.

The appointment of a Project Evaluator, George Macgregor, has concentrated significant energy on the evaluation, not only of the systems and process being developed through the project, but also the approaches taken by the project within the institutional context. The new Evaluation Plan provides a comprehensive framework for reflection on the project's activities and achievements, and for progressive enhancement of the outputs that are continuing to be developed.

### **Section Two: Activities and Progress**

#### ***System development***

The process of shifting development to InfoPath forms in SharePoint rather than a custom application developed in SharePoint was largely completed during this reporting period. Initial draft forms and workflows were demonstrated at the Programme Meeting (Nottingham, October 2011). Full details of the research and evaluation that led to this choice of approach will be disseminated in the technical report deliverable; however one of the principal reasons for InfoPath adoption was that the system could be developed and maintained without the need for specialist programming skills, using the toolset included in Microsoft Office SharePoint Server (MOSS) 2007 without compromising the sophistication of the data structures or the integration of supporting materials. Separate documentation will explain how the system is developed in this environment.

The system, which caters separately for both course and class approval, will be piloted with staff from at least two faculties (see Evaluation below). The current system is based on a synthesis of forms under development by the pilot faculties and it is expected that changes to form content will emerge during piloting. Similarly the workflows modelled by the system reflect those articulated by the two faculties; however these are currently in a state of flux in the wake of wide ranging organisational change and will be further impacted by further reviews undertaken through the SLEEK Business Process Improvement methodology. The challenge is currently to ensure that the pilot systems keep pace with - and contribute to - the development of revised forms and business processes as the pilots begin.

The development of a flexible web service architecture for corporate information systems has offered a new and simpler way for the PiP system to integrate with the locally developed Strathclyde Student Records System. The web service architecture allows any query against the corporate data to be returned as XML (and json). These XML web services can be consumed by InfoPath to populate options in the online forms. The web service architecture is still in testing, however initial tests have

been successful and the relevant feeds will be instantiated as soon as the architecture is available. The architecture supports writing back to the corporate data services. It is unlikely that this will be made available to the PiP system during the lifetime of the project. The subset of information collected through the approval process currently held in the Student Records System (SRS) will therefore continue to be entered manually, but from the PiP system.

### ***BPI and SLEEK***

As a result of the PiP team's involvement in mapping the current processes surrounding curriculum approval and making approaches to process review transparent, together with wider institutional recognition that a large amount of work needs to be done in the area of BPI, a further PiP-inspired initiative, SLEEK, has followed. SLEEK has been commissioned in recognition that a number of key institutional processes - those surrounding curriculum approval and design being extremely significant among these - are not being approached in a methodological way. Recognition has emerged that a new "One Strathclyde" holistic approach would aid staff engaged in BPI and ensure alignment with Strathclyde's core strategic objectives. SLEEK has gathered significant momentum and support within the institution as colleagues begin to recognise the possible benefits a more coherent and strategic approach to process improvement could have for key activities within the institution, none more important than those relating to the curriculum context.

SLEEK is developing a Lean based BPI methodology that will also utilise Six Sigma tools and method, thus using the approaches currently adopted by industry while recognising the need to tailor the approach to the HE sector. Staff across professional services, academic departments and senior management are now working together towards a shared understanding of key business processes and it is hoped this will be of great significance for the PiP project. Through SLEEK, PiP will re-investigate possible strategic level solutions to the challenges surrounding curriculum approval at Strathclyde, this time with a formal BPI methodology. As the staff engaged in both activities are working on both projects, indeed have been chosen for SLEEK among other reasons because of their involvement in PiP, the opportunities and likelihood of establishing and embedding new approaches to curriculum approval at the institution are significantly increased.

Given the size of the initiative, activities associated with SLEEK have so far been limited to planning, advocacy and training (see Section Seven for further details). The initiative has stimulated collaboration with the Department for Design, Manufacture & Engineering Management (DMEM) at the University of Strathclyde. The Lean Six Sigma research expertise of their staff members, in particular Professor Jiju Antony, has enabled a further benchmarking exercise to be undertaken as part of PiP and SLEEK. This exercise will identify indicators of good practice across HE in both BPI and quality management within curriculum design and approval and has also allowed PiP to establish new synergies with the PALET project in Cardiff. A site visit was held in August 2011 to explore opportunities to work together on outputs for the wider JISC Curriculum Design and Delivery programme.

### ***PiP Team***

Two new PiP team members have been recruited since the last interim report (delivered in March 2011):

- Project Evaluator (George Macgregor): The March interim report noted the need to recruit a dedicated project evaluator in order to undertake an intensive evaluation of PiP project outputs and outcomes. Such an evaluator was recruited and began in post on 03 October 2011.
- Project Assistant (Rehman Mohamed): Many aspects of the project evaluation feed into the overarching incremental design methodology that PiP has adopted (see Section Five). To ensure certain evaluative findings are implemented and general systems development can be intensified, a project assistant has been recruited. It is also anticipated that the assistant will support some evaluation activity. The Project Assistant is scheduled to begin in post on 01 December 2011.

Further to the announced project changes in the March 2011 interim report, Professor David Nicol is now scheduled to undertake and manage an agreed set of alternative pedagogical workpackages on behalf of the University of Ulster. This matter was discussed and approved at the PiP Steering Group meeting on 31 August 2011 and was arranged in coordination with JISC.

### **Section Three: Risks, Issues and Opportunities**

#### ***Opportunities***

The most significant opportunities to arise in the reporting period stem from the emergence of SLEEK as an institution-wide BPI methodology, with support through all levels of the senior management. Inspired by work done through the PiP Project, SLEEK offers two broad opportunities

- SLEEK provides a genuine opportunity to embed lessons learnt from PiP
- PiP and SLEEK together could help Strathclyde to take a more strategic and methodological approach to business processes, particularly in the areas of curriculum design and approval. This journey could provide lessons learned for the wider JISC Programme and HE Sector more generally.

#### ***Risks***

The following risks were identified in the Project Plan, and most have been addressed in the reporting period

Risks:

##### *Loss of project staff members*

Although the project underwent significant changes in the previous reporting period, the augmentation of the active team by recruiting a Project Evaluator and Project Assistant has significantly reduced this risk.

##### *Barriers to technical development*

The shift to InfoPath in SharePoint, coupled with the imminent release of webservices to access corporate data, significantly reduces this risk.

##### *System requirements are unclear and/or change*

Continued change in the assets and processes surrounding course and class approval has continued through this reporting period and is expected throughout the remainder of the project. The launch of the SLEEK Business Process Improvement methodology and its application to course and class approval promises to focus and systematise these changes; however, the structured review process is also likely to increase the rate and magnitude of the changes. To mitigate this risk PiP now has technical resource in place to respond appropriately (i.e. Project Assistant).

##### *Failure to engage pilots*

This reporting period has seen commitment by two of the four faculties to engage actively in the pilot. All faculties are also participating in SLEEK initiatives around course and class approval.

##### *Becoming disassociated from related institutional developments and initiatives*

With continued organisational change and significant changes in personnel in the main stakeholder groups, this continues to be a significant risk. The promotion of SLEEK as a University wide approach to BPI offers a real opportunity to mitigate this risk as SLEEK is championed and coordinated by Donna Cullen who is also a member of the PiP Team.

##### *Difficulty completing deliverables committed to JISC and lack of time to complete project*

Although PiP has made significant progress in the reporting period, reorganisation and refocusing within the project has meant that much of the work has become end loaded. The augmented team and active engagement of faculty partners mitigates the risk, however we are mindful of the challenge.

#### **Section Four: Outputs and Deliverables**

The PiP Project will produce the following deliverables. Updates on progress are provided where available.

A baseline map of the sequence of institutional processes and procedures that support decision-making and approval of curricula.

The original baseline was delivered at the beginning of the project; however, work has begun to review the baseline using a formal methodology (SLEEK) which will contribute towards the Evaluation. A revised baseline report will be delivered in the final period.

The original baseline was not approved for dissemination by the Steering Committee. The revised baseline activities will include the development of artefacts that can be shared on Design Studio.

A prototype online class and course approval workflow system that, as far as possible, reflects the needs of different constituencies involved in course approval processes.

The prototype was completed during this reporting period and demonstrated at the October 2011 Programme Meeting. The prototype will continue to be refined through the pilot process. A web-accessible version of the Programme Meeting presentation will be uploaded to Design Studio and updated as the pilot proceeds. The technical guide to developing the system will be referenced from Design Studio.

A sample of online support resources for academic staff involved in curriculum design and curriculum approval decisions.

Responsibility for populating the Learning and Teaching website, which will be the central point for support material in this domain, is owned primarily by the Strathclyde Education Strategy Committee rather than the PiP project, which is supporting the technical development and integration with the curriculum approval systems. During the reporting period the framework for the website (both internally and externally facing aspects) was finalised with the ESC and the shells have been built by PiP. As the sites are populated with relevant content they can be referenced on Design Studio.

Recommendations for the future of the online system, including a development roadmap and business plan to inform investment decisions.

Recommendations and a roadmap for future provision of support for curriculum development at the University of Strathclyde, drawing on the lessons learned in PiP.

Dissemination to institutional audiences, including senior managers, academic staff etc.

In the wake of far reaching restructuring and significant changes in personnel across the University, dissemination has been primarily internal with a concentration on (re-)engaging stakeholders, many of whom were in new roles and/or with new responsibilities. This strategy has elicited the commitment of two of the four faculties to participate in the pilot. Faculty staff have shared the forms they use/are developing for incorporation in the pilot and have participated in the elicitation of processes so that they can be implemented in the system workflow. These outputs have not been shared through Design Studio yet as they are working documents and subject to change throughout the pilot phase.

The project is also committed to working with the relevant strategic committees and institutional reviews to develop:

- A common core set of approval questions
- An online system that will allow faculties and departments to deliver the common core of approval/quality assurance information
- Information to the institutional management while allowing the integration of local approval requirements that extend or refine the core institutional requirements in a single system

The development of a core set of questions is clearly dependent on progress at an institutional level and this may not coincide with the timing of the project. The project will nevertheless be able to use existing model questions as a basis for development.

An additional output which also reflects the refocused institutional emphases is a commitment to integrate the approval workflow system with existing corporate information systems.

Deliverables most likely to be of interest to the wider community include:

- Recommendations about the development of online systems to support curriculum approval, focusing on BPI and organisational aspects
- A technical report reflecting on the various development/programming options explored and their strengths and weaknesses
- A technical report on the use of SharePoint/InfoPath in the piloted system including practical advice on developing the system, integration with corporate information systems using web services, etc.
- An evaluation report detailing successes and lessons learned.
- Interim and final reports to JISC
- Dissemination activities including conference participation, activities with cluster/programme partners, project website, etc.

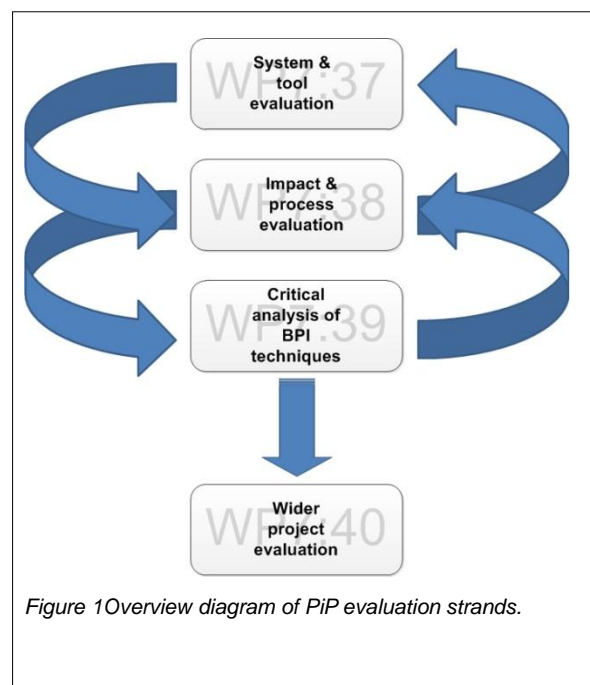
Outputs will be uploaded to the Design Studio wherever possible. While there is no concern over the community focused deliverables, some sensitivity has been expressed over the more institutionally specific outputs and public versions of these may need to be developed. Some outputs, specifically the technical reports, will also be disseminated through other channels to reach a broader audience.

To date the PiP project has engaged with Design Studio by posting project outputs (e.g. PiP process workflows, overview of the PiP Course and Class Approval System, an overview document of the SLEEK Six Sigma DMAIC methodology) and some dissemination outputs. It is expected that the volume of contributions is likely to increase in the final nine months of the project, as evaluation progresses and tangible project outputs become available.

### Section Five: Evaluation

To date the PiP project has employed formative evaluation techniques in order to capture and reflect on project outputs and deliverables. It is anticipated that this approach will continue throughout the remainder of the project. However, as detailed in the previous interim report, the project intends to embark on a phase of intensive evaluation. An embryonic evaluation proposal was initially included in the original PiP project plan. This, however, has largely been jettisoned owing to changes to the PiP project aims / objectives and deliverables, and the recruitment of a dedicated PiP project evaluator.

The purpose of the formal evaluation is to examine core project deliverables, to assess their fitness for purpose and their impact on wider institutional systems and processes. This will involve - among other things - systems testing, the gathering and analysis of user data (from key stakeholders) using a variety of research techniques in order to identify opportunities for system and process enhancements, interpreting the perceptions and reactions of primary and secondary stakeholders, and assessing the overall institutional impact of the project.



A dedicated project evaluator has now started in post. A detailed evaluation plan is currently being drafted and will fulfil WP7 activity 17 of the PiP workpackage report. Evaluation is expected to involve four phases, each based broadly on evaluation activities identified in the workpackage report:

1. System and tool evaluation;
2. Impact and process evaluation;
3. Critical assessment of business process improvement (BPI) techniques within the project, and;
4. Wider project evaluation.

The evaluation plan will broadly follow these workpackage phases as a means of structuring the chronology of the evaluation, with each containing several evaluative sub-phases. Although the phases within each workpackage activity are relatively self-contained, it is fully expected that some phases will gather and/or analyse data pertaining to one other phase, either because there is data overlap or because it is expedient to do so (see Figure 1). In some circumstances this will allow triangulation to occur thus corroborating findings from other phases.

Details of the first phase of evaluation (Evaluation of PiP systems pilot) has been finalised and an overview is provided below. Phase four will be a summative evaluation, providing an evaluative overview of all evidence gathered as well as a critical reflection of PiP's success. The principal output of phase four will be an evaluation report, fulfilling workpackage 7, activity 40.

### ***Evaluation: phase 1 (System and tool evaluation)***

#### ***Step 1: Heuristic evaluation of PiP CC approval system (Nov - Dec 2011)***

A heuristic evaluation of the PiP pilot CC approval system will be conducted. Heuristic evaluation is an established method of usability testing and is most commonly deployed in Human-Computer Interaction (HCI) research, e.g. to test user interface designs, technology systems testing, etc. Heuristic evaluation techniques enable a suitably trained evaluator to examine a system or interface and assess its compliance with recognised heuristic evaluation principles, thereby testing its usability. Results of the evaluation are then used to inform system modifications. The approach is favoured in incremental design methodologies as an informal and relatively rapid means of engaging in usability engineering, and is often used as a precursor to user testing, e.g. so that user testing focuses on deeper system issues rather than on those that can easily be debugged. Subsequent phases of the evaluation will involve user testing so heuristic evaluation techniques perform an important role in ensuring that subsequent user testing focuses on substantive systems issues.

#### ***Steps 2 - 4: Protocol analysis, stimulated recall, questionnaire instrument (Dec 2011 - Mar 2012)***

Steps 2 – 4 are considered together as data collection will occur during a single event, approximately 1.5 hours in duration. User participants will be recruited from key and primary stakeholder groups, i.e. academics, faculty manager, registry, etc. Participants will be exposed to three procedures: 2) protocol analysis, 3) stimulated recall, and 4) pre- and post-test questionnaires.

- Protocol analysis is a frequently deployed user testing methodology for software, interfaces, systems, etc. in which participants are asked to complete a series of tasks with the test/pilot system while simultaneously verbalising their thoughts. Verbalisations (or protocols) are sound recorded and transcribed for analysis. Additional data may also be gathered and it is anticipated that evaluator logs and screen capture data will also be gathered for analysis. Protocol analyses are based on direct participant observation and attempts to model users' real world interaction with a system. As such, evaluators gain an insight into users' cognitive processes as the methodology tends to expose a wide variety of user problems, assumptions or misconceptions, many of which would otherwise go undetected.
- Stimulated recall will be administered after the participant has completed the tasks for protocol analysis. Stimulated recall is similar to protocol analysis but differs in that data are not collected until after the participant has completed a set user task. A recorded screen capture of the participant's system interactions (e.g. taken during the protocol analysis tasks) is played back to the participant who is then asked to articulate their cognitive processes and actions at specific points of the recording. Protocol analysis offers many benefits (hence its intended use in the PiP evaluation); however, a drawback of protocol analysis is that some

verbalisations can be inadequate. This is often the case when the user is engaged in cognitively onerous tasks. Since many participants in the PiP evaluation will be engaging in a fictional but nonetheless cognitively onerous process of curriculum design, it is important that a brief stimulated recall phase of evaluation be included.

- A pre-test questionnaire will be administered prior to the commencement of step 2 to collect basic demographic information and capture participants' IT efficacy. It will also attempt to elicit the opinions of user stakeholders about the efficacy of the current curriculum approval process, its current issues and how PiP pilot could contribute to improvements in the process (i.e. its fitness for purpose). The post-test questionnaire will be administered after the completion of step 3. The post-test instrument will aim to capture data on users' success with the system and, in particular, gather definitive data on the features that participants found most useful and those they found least useful. Both questionnaire instruments will be administered using Bristol Online Surveys (BOS), an online survey tool.

### **Evaluation: phases 2 & 3**

#### **(Impact and process evaluation & Critical assessment of business process improvement (BPI) techniques within the project)**

Phases two and three of the evaluation are currently under development and are expected to be finalised in early November 2011. Aspects of phase two cannot commence until phase one has been completed and it is expected that phase one will commence while the planning of later phases is concluded. It is, nevertheless, possible to identify the following broad evaluative components for phases two and three:

- **Phase two:** This evaluation phase is primarily concerned with assessing the impact of the PiP system within specific stakeholder groups. Triangulating results from the systems testing phase (e.g. general system issues, corroborating questionnaire data, etc.) is an underlying objective; but more significantly it will seek to understand the potential impact of the PiP system among stakeholders and the extent to which the system is considered to support institutional processes. Qualitative data capture from key and primary stakeholders will be achieved via stakeholder specific group interviews. A variety of additional methodological approaches are currently being considered to optimise the data collected from the group interviews, including an adapted form of the Most Significant Change (MSC) methodology.

The PiP affiliated SLEEK project is also expected to contribute evaluative findings concerning the implications of PiP for other institutional processes.

- **Phase three:** Phase three will entail an analysis of the business process improvement (BPI) technique, as conducted by PiP. This will include assessing the efficacy of BPI as a methodology within the PiP project and HE sector more widely. Stage 6 of Kettinger et al.'s (1997)<sup>1</sup> Stage-Activity framework proposes a suite of process performance tools suitable for evaluating process reengineering impact. These include fishbone analysis, Pareto diagramming and auditing, all of which are expected to be deployed in the PiP evaluation. Recall also that aspects of evaluation phase 2 will feed into phase 3, and vice versa, e.g. findings from group interviews and MSC will contribute to our understanding of business process change and impact. Indeed, Kettinger's framework proposes the use of group method techniques (e.g. focus groups, group interview, etc.) as an essential component of performance evaluation.

A reflective essay pertaining to evaluation was posted on the PiP blog. See: <http://goo.gl/KeAE2>. Further documentation and results will be posted on the PiP website when finalised.

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<sup>1</sup> Kettinger, W., Teng, J. & Guha, S., 1997. Business process change: a study of methodologies, techniques, and tools. *MIS Quarterly*, 21(1), pp.55-80.



## Section Six: Outcomes and Lessons Learned

In addition to the lessons learned in the technical and BPI domains, a few themes have begun to emerge that will be explored and formalised over the coming months. At this stage we are only able to sketch the ideas, but they give a taste of what is emerging.

Our understanding of the role of the PiP Project as a *mediating artefact* emerged at the beginning of the year as it became clear that “PiP” was being used across the institution as shorthand for a bundle of ideas around business process analysis and technical solutions to document management; i.e. “...can’t PiP solve this problem for us?” It is clear that this has been useful for the organisation and it has also helped sustain the PiP Project, however through the evaluation we will be exploring in more detail the practical impacts of this appropriation (and perhaps misunderstanding) of the project. That this status as a mediating artefact within the organisation’s discourse is ephemeral has been made very clear recently as “SLEEK” has largely usurped “PiP” in this role.

Related to the notion of mediating artefact is a growing appreciation that PiP has experienced cycles of scope creep and scoop retrenchment; a balloon effect. The pattern seems to be

- In the complex interdependent domain of course and class approval it becomes clear that significant change can only be made if a large number of stakeholder groups and business processes change
- The scope of the project is expanded to encompass these wider changes, or develops dependencies on separate projects addressing these areas
- Concern develops that the scope of the project is too large and/or is dependent on changes in other areas over which the project has no control
- The project is refocused on a narrow set of issues and processes where the project is better positioned/resourced to have an impact
- It becomes clear that the impact of changes in this narrower scope will be limited
- The cycle begins again

This cycle of reasoning can be followed in the course of one meeting as objectives and strategy are discussed, however we have also reflected on longer cycles that have worked through largely subconsciously by the project team and key stakeholders.

At the heart of the balloon effect is the inverse relationship between scope and institutional impact. A broad scope is also inherently more risky and time consuming, especially in a time of significant organisational change. Determining the optimum balance between scope and potential impact has been a challenge for the project from its inception and we will look to explore the factors that have shaped this.

## Section Seven: Communication and Dissemination Activities

Internal dissemination has been the focus of this reporting period. The emergence of SLEEK (see section two for further details) has given rise to extensive internal communication efforts as attempts are made to advocate the PiP approach within key and primary stakeholder groups. This has included meetings with the University Management Team, members of which include the VC and Faculty Deans, and the involvement of the Department for Design, Manufacture & Engineering Management (DMEM). Lean Six Sigma is an area of research strength for DMEM and PiP/SLEEK has attracted the attention Prof. Jiju Antony. Prof. Antony’s involvement has facilitated departmental dissemination and the attention of postgraduate students, several of whom have been recruited to work on SLEEK benchmarking research. Advocacy for the PiP approach has also entailed the delivery of several large workshops (delivered by Donna Cullen) for key stakeholder groups. Workshops were designed to secure stakeholder buy-in and inform participants of the “PiP process”, the SLEEK initiative, and the role of Lean Six Sigma in improving institutional processes.

Preparation for the JISC Online Conference 2011 has also been undertaken during this reporting period.

## **Section Eight: Collaboration and Support**

### ***Interaction with the Programme***

Members of the PiP project team attended the JISC Programme Meeting in Nottingham (12-13 October 2011) at which project progress and achievements were communicated during a “marketplace” poster session. The PiP project team continue to maintain a blog on the project website (<http://www.principlesinpatterns.ac.uk/>) and make incremental contributions to the Design Studio. As the project enters a phase of intensive evaluation it is expected that its outputs will form the basis of future external dissemination activity. In addition we also participated in telephone meetings with members of the Programme team, including a Steering Group meeting attended (virtually) by Sarah Knight and Peter Bullen. Within the Programme communication with other projects has been primarily mediated through Cluster and Programme events, however we were able to arrange meetings with SRC and PALET that were very useful

### ***Support***

Valuable support has been provided during the reporting period in two areas. Rachel Harris and George Macgregor have discussed the evaluation approach and we expect this dialogue to continue through the remainder of the project. We have also received significant help with Design Studio from Helen Beetham and Marianne Sheppard.

### ***Critical Friend and Cluster***

The active role of Peter Bullen, critical friend to the Cluster, has been vital to the activity of the Cluster—without Peter’s prompting there would have been no Cluster. In addition Peter has been a great help in the recent refocusing of the project, providing valuable advice on the paths to pursue and acting a “conscience” to the project reminding us of some of the original goals and aspirations of the project that were sometimes in danger of being lost. He has always been accessible and responsive. The only improvement that could be offered is that the critical friend role be more clearly separated from that of the Programme Management Team as in the early stages there was sometimes less confidence that the critical friend’s role was to support the projects and help facilitate communication from them to the Programme Management Team

The value of the Cluster was most apparent in the early stages of the projects as we were all finding our way. Lately, as the projects diverged, the value has been less apparent. On reflection a cluster of just three projects was probably too small and we would have benefited from either a larger Cluster or more opportunities to develop effective relationships with projects outside the Cluster as it was more difficult to do this as the clusters crystallised and projects became established.

While PiP has found both the critical friend and Cluster structure valuable this is very much anecdotal reflection. We believe a more rigorous cost/value analysis of the support interventions and structures would yield more compelling evidence of success of this programme model.