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Planet: Pattern Language Network for Web 2.0 in Learning

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Users and Innovation Programme

Planet: Pattern Language Network for Web 2.0 in Learning

Final Report

March 2009

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- Centre of Excellence in Teaching and Learning: Active Learning in Computing (CETL ALiC)
- Eduserv Digital Identities
- JISC E-Formative Assessment
- JISC EXTEND
- Leeds Metropolitan University Teacher Fellows

In addition, CETL ALiC, JISC E-Formative Assessment and Eduserv all hosted workshops and EXTEND supported the production of a video explaining the Planet project.

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Executive summary

The Planet (Pattern Language Network for Web 2.0 in Learning) project aimed to develop and demonstrate an effective community-based mechanism for capturing and sharing successful practice, based on the pattern approach. A pattern describes an effective solution to a recurrent problem embedded in a specific context and is characterised by being drawn from successful practice rather than from theory. Patterns are easy and intuitive to use, so supporting transfer of practice to new contexts. However, the process of eliciting and capturing patterns from authentic practice is not trivial and is rarely an inclusive community-based activity. It is this problem that Planet has sought to address.

To achieve its aims the project worked with a wide range of educational practitioners to develop an effective process for pattern capture. The overall approach of the project was to invite practitioners to provide case studies of their successful practices, particularly around web 2.0 and education. These practitioners then attended a series of workshops designed to facilitate the process of identifying and refining potential patterns evident in that practice. The case studies and emerging patterns were captured, stored and edited through a community wiki-based platform, which provides templates to guide practitioners, together with shared editing and commenting facilities. The quality of the emerging patterns was maintained by moderation and review by the project team. Once a body of patterns was available they were categorised against a representation of the learning design process, again by groups of practitioners. This led to the creation of a number of organising structures that are closely allied to the needs of practitioners. In addition, cases, patterns and scenarios are tagged using a structured tagging framework.

The final Planet methodology that has emerged through this process has four key stages: sharing and exploring case stories from practice; eliciting and elaborating candidate patterns by examining commonalities across the case stories; mapping the relationship between patterns and learning design processes; and applying patterns to new problem scenarios. Each of these is supported by a set of facilitation activities that can be applied in a workshop setting. The Planet methodology is expressed as a set of patterns, which are available at <http://purl.org/planet/Outcomes/Methodology>.

The Planet process has been very successful in enabling practitioners to share practice effectively. Feedback has been overwhelmingly positive about the workshops and activities in this regard. However it is also clear from the evaluation that the workshop-based elicitation process has been more important than the pattern products for practitioners. This is perhaps inevitable in a relatively short project: the interactive and iterative nature of our activity meant that, although there are many case stories and candidate patterns under development, there are still relatively few fully developed patterns. The process of editing, reviewing and expanding patterns is continuing, as part of the sustainable plan for the project, and through interaction with other funded projects, for example, CETL ALiC (CETL ALiC, 2005-2010) and the NTFS project, Share (Share Project, 2008-2011), led by University of Kent.

Findings from the project show that many potential patterns arising from web 2.0 examples of practice are actually more generally applicable, for example to other areas of communication and collaboration in assessment, learning and teaching. The organising frameworks for patterns are also able to accommodate existing pedagogical pattern collections, such as those arising from the Pedagogical Patterns Project (Pedagogical Patterns Project), allowing for the possibility of a much broader scoped integrated pedagogical patterns resource. Additionally the outcome of other JISC Users and Innovation projects could undergo a shortened version of the pattern identification process and be represented as part of the pattern framework. An example would be the AWESOME project, where their good practices for extended student essay and dissertation work could be moderated against the criteria for identifying patterns and, where appropriate, represented as patterns. Similarly there is evidence that the process of facilitated sharing of stories of practice is beneficial in itself and could be adapted for use in other areas where reflection on practice is required.

1 Introduction

This report provides a summary of the work and outputs of the Planet: Pattern Language Network for Web 2.0 in Learning Project funded by JISC under the Users and Innovation programme. We begin by outlining the background to the project and the problem it was attempting to address. We outline the original aims and objectives of the project, which have not changed significantly as the project has progressed, and summarises the achievements of the project against these. The Pattern Language Network section focuses on the three key elements of the project: the Planet methodology for pattern elicitation; the Planet wiki platform; and the patterns and organising structures themselves. For each of these the methodology used, the implementation approach and outputs produced are considered. We then discuss the evaluation of the project and consider issues relating to project management. The report closes with a consideration of the outcomes, conclusions and implications for future work.

2 Background

As practitioners start to make more extensive use of Web 2.0 technologies in their assessment, learning and teaching (ALT) practice, it is important that successful examples can be identified and shared to enable effective transfer to different contexts and to avoid “reinventing the wheel”. Such transfer of practice requires an effective representation that is intuitive to understand and use, strongly rooted in examples of successful practice and that makes explicit the aspects of the practice that have contributed to its success. Previous projects have recognised the need, and lack, of a usable and useful mechanism for reusing successful practice. For example, the JISC-funded Mod4L project reports that “an effective representation for sharing and reuse has not, so far, been developed, even in FE where sharing and reuse are institutional norms” (Falconer et al., 2007). Mod4L also identified supporting community engagement around representations as a key user need.

The pattern language approach (Alexander et al., 1977; Dearden & Finlay, 2006) offers the potential to provide such a representation. A pattern describes an effective solution to a recurrent problem embedded in a specific context and is characterised by being drawn from successful practice rather than from theory. Patterns are easy and intuitive to use, so support transfer of practice to new contexts. However, the process of eliciting and capturing patterns from authentic practice is not trivial and, although it has been attempted by a number of groups of educators (for example, E-LEN Project, 2005; Pedagogical Patterns Project) it has rarely been a broad-based community activity. The Planet methodology develops and extends the work of the Learning Patterns project (Mor & Winters, 2007). This project explored a workshop methodology for capturing patterns for the design of learning games but engagement with practitioner groups was limited to relatively short, single workshops. In contrast, Planet aimed to engage with groups of users over an extended period in order to enable genuinely collaborative elicitation and authoring of patterns.

Planet aimed to develop a Pattern Language Network, comprising a collaborative software platform, clear methodologies for the creation and use of a pattern language, and the language itself. The pattern language, software and methodologies were developed iteratively through engagement with a community of practitioners who are using Web 2.0 technologies in learning. It is this extensive community engagement in all aspects of the pattern language development, together with the provision of integrated support tools and processes, which particularly distinguishes this project from other pedagogical patterns projects. Our community patterns platform has nearly 200 registered users and we have held in excess of 20 face-to-face one day workshops together with 5 online sessions, with participants from at least 40 UK Higher Education institutions (HEI), 10 international HEIs as well as other organisations, including the Ministry of Education, Singapore, ALT, JISC CETIS, the TUC and the Scottish Qualifications Authority and several consultancies and SMEs. We have also had representatives from at least three CETLs attending (ALiC, ALPS and LIVE). Participation has been international with delegates from the UK, Germany, Austria, Portugal, Netherlands, Singapore, Australia, Mexico and the United States. For a list of our main workshop activities, please see Appendix D.

3 Aims and objectives

The original aim of the project was to demonstrate an effective community-based mechanism for sharing successful practice in order to encourage greater transfer of practice across different contexts. This has been achieved as will be evidenced later in the report.

This was to be achieved through the following specific objectives (outputs are in bold):

1. To develop a **pattern language** for the domain of learning through Web 2.0 technologies. This domain is chosen as a new area within learning where the pattern language initiative will have most impact on the future use of technologies and development of emerging practices.
2. To develop a **collaborative software platform** to facilitate community based pattern creation and use, together with **supporting methodologies** for these activities.
3. To support and engage a **community of practice** to sustain the pattern activity in the longer term.
4. To evaluate the **pattern language approach** in terms of its appropriateness, ease of use and impact on the development of learning experiences.
5. To contribute to the e-framework semantic wiki, by indicating the types of services needed to support the patterns and relationships expressed in the language, for example through developing **use cases**.
6. To disseminate successful practice in Web 2.0, and in pattern creation and use, both through Planet itself and through **workshops** and **conference presentations**.

These objectives did not change as the project progressed and have largely been achieved. One variation has been that the scope of the patterns collected is broader than Web 2.0 in learning, due to the interests and experiences of the users who engaged with our process. We will revisit the aims and objectives in section 7.1 where we consider in more detail the project's achievements against each.

4 The Pattern Language Network: methodology, implementation and outputs

4.1 Overview

The project took a user-centred, participatory, iterative approach to developing a pattern elicitation process, support platform and, through these, a collection of patterns and organising structures. These three elements were developed in an integrated fashion but for the purposes of this report, each will be considered separately in terms of the methodology used to develop it, how this was implemented in practice and the specific outputs produced. Although project members had specific responsibilities, all members contributed to all areas. Our development process was transparent and open to scrutiny.

The primary methodological approach taken on the project overall was iterative participatory design, where users and other stakeholders were invited to engage in the design and development of project outputs alongside the project team. The involvement of users in this approach is more active and intensive than would be the case for a consultation-only approach and is more direct than simply involving users as evaluators and testers, though both of these elements are involved. In a participatory approach, users become active members of the design "team" and can contribute to developments on an equal footing. This was particularly evident in the development of the pattern collection and structures, where users developed patterns directly, sometimes without reference to the Planet team. However all elements of the project relied on this close active involvement from users through their engagement in workshops and inter-workshop activities.

As well as being participatory our approach to design was also iterative. All project elements, including the workshop-based methodology, the wiki platform, and the patterns and structures have been developed in iterative prototyping cycles through engagement with users. An initial prototype (of

both methodology and platform) was developed based on user feedback on previous projects (Learning Patterns Project). This was then iteratively evaluated and adapted until a stable effective version had been achieved. These versions of platform and methodology were then documented and made available for wider release. This is in keeping with the iterative UIDM methodology (UIDM, 2007-2009). The patterns and organising structure are also developed iteratively, through a workshop and review cycle.

In summary our approach to all work on the project can be characterised as being:

- Participatory: Users have the opportunity to contribute as partners.
- Iterative: The project progresses by numerous tight cycles of specification, design, development, deployment and evaluation.
- User-centred: The needs of users, as defined by them, are the driving force behind all choices.
- Transparent: All aspects of the project work are transparent and subject to public scrutiny. We welcome others to benefit not just from the fruit of our work, but also from observing how these came to be. The only exceptions to this principle are where there may be legal limitations, or a compromise of privacy.
- Collaborative: All aspects of the project assume a joint effort by all members. While it is natural for members to focus their effort in their domain of expertise, the design of tools and procedures must assume that more than one, and potentially all, would contribute to any goal.
- Distributed: Contributors are spread across several physical locations.
- Integrated: All aspects of the project are interlinked.

4.2 The Participatory Pattern Workshop methodology

4.2.1 Developing the process

Our starting point in developing the *Participatory Pattern Workshop* methodology was our collective experience from previous projects on sharing practice in general and patterns in particular (for example, Falconer et al., 2007; Mor & Winters, 2007; Finlay et al., 2002) and from our analysis of the literature in the area (for a review see Dearden & Finlay, 2006). From this it was clear that we needed to develop the process through community engagement and provide clear support for each stage in the process, since pattern elicitation is a non-trivial activity, even for those familiar with the approach. The *IDR methodology*, developed by the Learning Patterns project (Learning Patterns Project), was therefore chosen as our starting point. The Learning Patterns model used a single workshop with each group of participants.

The process of eliciting patterns must begin with capturing authentic and successful practice from the community, since patterns are distinguished by the fact that they arise from practice rather than from theory and that they represent successful solutions to problems. Once a number of instances of successful practice have been identified, patterns are proposed by identifying common elements across these examples. These candidate patterns are then refined and developed with clear problem and solution statements, and a rationale and supporting evidence. When a candidate pattern has at least three examples to support it, it can be considered a pattern. Patterns can then be validated through application to other situations and contexts.

Our aim was to develop a participatory workshop-based process to support these activities and to develop this process iteratively through user engagement in the process.

Our initial plan was to include two workshops: one for pattern capture, the second for pattern use. This had the following structure and was initially trialled on the project team and a number of user groups, during the early months of the project:

- Pre-workshop activity: participants submit a case story of their practice to the Planet wiki.
- Face-to-face workshop 1: participants discuss, elaborate and compare their case stories and identify "candidate patterns" to enter into the Planet wiki.
- Post-workshop activity: participants refine and extend the candidate patterns into full patterns, supported by the project team.
- Face-to-face workshop 2: participants review the complete set of patterns and apply them to new problem scenarios around the design and delivery of learning experiences.

In practice, however, there were a number of problems with this approach, when we trialled it with users. Firstly, while it generated many case stories, many were inappropriate in that they tended to describe a whole project rather than a specific story of successful practice. Secondly, it became clear that, while participants were happy to engage in pre-workshop story telling activities, they were much less confident in working on post-workshop activities relating to pattern refinement. To some extent this was also evident in the workshops, where there was uncertainty about what constituted a pattern, how to move from a case study to a candidate pattern, and how to write a pattern. Finally, a single workshop proved not to be long enough to move from case stories to full patterns.

To address these issues we revised the workshop process to include three stages. We also developed much more specific scaffolding in terms of templates, guidelines and prompts to support participants in submitting case stories, analysing them and identifying possible candidate patterns. This second phase process was used with multiple user groups in the second half of the project, with each group returning to participate in follow on workshops. The revised workshop process had the following structure:

- Pre-workshop activity: participants submit a case story of their practice to the Planet wiki. Additional support is provided to ensure appropriate granularity of description (for example, the STARR template – see Table 1, section 4.2.3). Much greater emphasis is placed on identifying successful practice.
- Face-to-face workshop 1: participants discuss, elaborate and compare their case stories, seeking to move from contextualised good practice to a more abstract view, facilitated by team members. “Candidate patterns” are identified and entered into the Planet wiki.
- Inter-workshop activity: Planet team review the case stories and candidate patterns and identify commonalities between these and those from previous workshops.
- Face-to-face workshop 2: participants and facilitators consider the emerging patterns from the previous workshop, using structured templates and prompts to refine them, and consider the relationship between these and existing patterns.
- Face-to-face workshop 3: participants review the complete set of patterns and apply them to new problem scenarios around the design and delivery of learning experiences.

Time constraints and the nature of our iterative and interactive activity meant that we had more experience with workshops 1 and 2 than workshop 3. However our initial experience with workshop 3 suggests that an additional activity is also required: that of mapping the patterns to make explicit the relationships between them and their point of applicability in the design of learning activities. This is necessary to enable participants to make sense of the pattern collection and apply it to their own problem scenarios. This phase was included both as an additional activity in a first or second workshop and as an additional workshop in its own right. More detail on this process is given as a pattern, which is summarised in Table 1, section 4.2.3 and expanded in detail at <http://purl.org/planet/Outcomes/Methodology>. However it is becoming clear that this mapping activity needs to occur as early as possible, if not as the first activity in the process, where a concept map of the domain area could then be used to guide the selection of cases that are submitted by participants. These issues are discussed further in section 4.3.1.

4.2.2 Current implementation of the *Participatory Pattern Workshop* methodology

The process described in section 4.2.1 has continued to evolve as we have worked with users. Although the Planet project is complete, a number of user groups, including CETL ALiC, are committed to taking this process forward and refining it further. The implementation of the process described here, and documented in section 4.2.3 therefore represents our thinking at the end of the Planet project and is offered to the community with the expectation that it will be adjusted and refined in future.

The *Participatory Pattern Workshop* methodology covers pattern elicitation and use and is represented in Figure 1 where the oval boxes represent synchronous facilitated workshops (usually face-to-face but we have also run these online successfully) and the rectangular boxes represent activity outside a workshop, either by participants, facilitators or both. The third workshop may lead

into another iteration of the activity as the pattern language grows and is refined. The domain mapping activity is shown as a synchronous facilitated activity, which may be included in or prior to any of the workshops, either as a workshop in its own right or a component of a workshop.

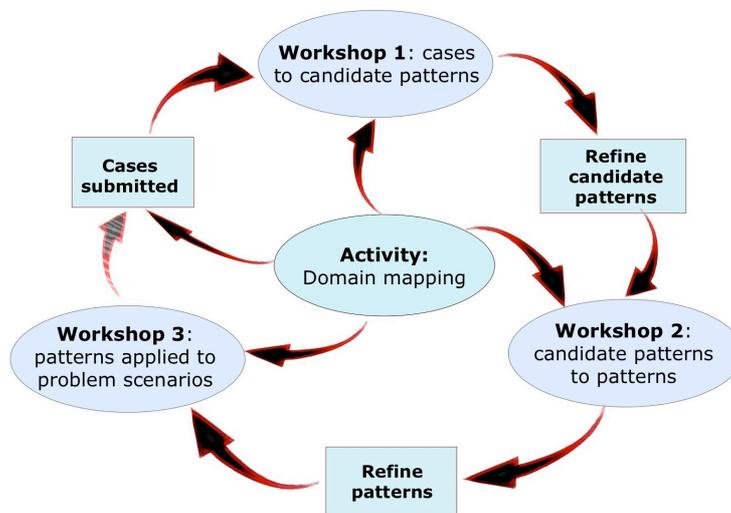


Figure 1: The *Participatory Pattern Workshop* methodology

Each of these workshops has a number of key activities, which are documented in section 4.2.3. In our implementation we worked with thematic user groups with interests in specific and coherent areas, relating to pedagogic, disciplinary or technology areas. These included: e-formative assessment, digital identity, active learning, teaching computing, sustaining learning communities, multi-user games and environments. We also developed patterns based on our own experiences of running the workshops to document the project.

Most of our workshops lasted one day with approximately one month between workshops to allow for inter-workshop activity. However we have also used activities in much shorter sessions from one hour down to a few minutes, with some success. This is particularly true of the story telling activity, which lends itself to a range of implementations and can produce useful and meaningful interaction in a short period of time.

The role of the facilitator is an important one in the process. Our observation is that participants find it relatively easy to produce useful case stories and to understand and use patterns but find it much more difficult to author patterns. It is likely therefore that this activity that will continue to require synchronous interaction or facilitation. However, there is evidence from some groups (for example, EXTEND) that simply focusing on the story telling activity, without attempting to elicit patterns, is, in and of itself, a valuable process. There is scope therefore for some of these activities to be used independently outside the *Participatory Pattern Workshop* methodology.

4.2.3 Documentation of the *Participatory Pattern Workshop* methodology as patterns

The *Participatory Pattern Workshop* methodology is available for use by other groups. It has been documented initially using patterns. The current versions of these are available at <http://purl.org/planet/Outcomes/Methodology>. The core patterns are summarised below in Table 1, which shows the name of each pattern, a summary of its contents, and the core activities that it encompasses. There is also a set of supplementary patterns, which represent the range of activities used in the workshops. These are also available at <http://purl.org/planet/Outcomes/Methodology>.

In addition, a “do it yourself” *Participatory Pattern Workshop* methodology pack is being produced, which will include resources to support those wishing to use the methodology with others. This will include activity resources and multimedia presentations as well as the patterns themselves. Examples of these resources are available at <http://purl.org/planet/Outcomes/DIYpack>.

PATTERN NAME	Pattern summary	Key features and activities
COLLABORATIVE REFLECTION WORKSHOP	Elicit design knowledge by sharing, analysing and scrutinising personal experiences. This is the base structure, the “super-pattern” for all workshops.	<p>Comprises pre- and post- workshop activities, as well as facilitated synchronous activities in the workshop. Typical activities include:</p> <ul style="list-style-type: none"> • <i>Pre-workshop</i>: establish group communication and identity, elicit contributions from participants • <i>On the day</i>: work in small groups to elaborate and explore contributions, report back in plenary, produce artefact. • <i>Post-workshop</i>: add, elaborate, comment on contributions <p>There are three variations of this workshop:</p> <ul style="list-style-type: none"> • CASE STUDY WORKSHOP • PATTERN MINING WORKSHOP • FUTURE SCENARIOS WORKSHOP
CASE STORY WORKSHOP	Engender collaborative reflection among practitioners by a structured process of sharing stories	<p><i>Pre-workshop</i>: Elicit stories of practice from participants using the STARR template:</p> <p style="margin-left: 40px;">Situation Task Action Results Reflections</p> <p><i>On the day</i>: group reflection on the case stories, comparing and identifying commonalities. Use guided questions to explore cases e.g.</p> <ul style="list-style-type: none"> • What is the story about? • What is it an example of? • What was successful, what was not so successful? • What was the critical element of design behind success? • What was the critical contextual factor? • When would it fail? <p>Identify potential candidate patterns. <i>Post-workshop</i>: contribute case to wiki, consider relationships between cases.</p>
PATTERN MINING WORKSHOP	Use comparative analysis of case stories to refine candidate patterns. Elaborate the candidate patterns to full patterns, by articulating the problem, context, core of the solution and related patterns.	<p><i>Pre-workshop</i>: collate cases and review <i>On the day</i>: Map cases according to domain concepts, identify parallels between cases, encourage capture of these as candidate patterns, focusing on problem, context and solution. Use an annotated pattern</p>

		template to assist. <i>Post-workshop:</i> contribute candidate patterns to wiki
FUTURE SCENARIOS WORKSHOP	Put patterns to the test by applying them to novel real problems in real contexts.	<i>Pre-workshop:</i> participants contribute a new problem scenario using a template <i>On the day:</i> tag scenarios or map to domain maps, use tags or domain mapping to identify relevant patterns, attempt to use patterns to construct solution to scenario. <i>Post-workshop:</i> contribute new cases, patterns or completed scenarios. Identify gaps in pattern collection.
Table 1: Summary of main <i>Participatory Pattern Workshop</i> methodology patterns		

4.3 Patterns and organising structures

4.3.1 Methodology for identifying patterns and organising structures

The methodology for eliciting patterns as a community activity has already been elaborated (see section 4.2). This was implemented using a series of structured templates, which will be discussed in section 4.3.2.

However, individual patterns on their own are not enough. They need to be organised in a way that captures the relationship between them, allowing users to negotiate a path through them to generate a design solution. A good organising structure will allow relevant patterns to be easily located and will help identify “gaps” in the pattern language where a pattern may be needed but has not yet been elaborated.

As the project progressed and we started to consider pattern use as well as pattern elicitation, the issue of devising such an organising structure (the “language” part of a pattern language) became increasingly important. However, finding a suitable organising structure for patterns is a challenging problem. Merely listing patterns in an indexed table is inappropriate as it scales very poorly and results in users needing to know what is in the pattern collection in order to find what they need. In addition, a simple index cannot help with the problem of identifying gaps for which patterns can then be sought. The issue is further complicated by the fact that patterns may be at different levels of abstraction e.g. subject-specific versus subject-independent, and also may represent different levels of granularity e.g. classroom-based activities versus award-level decisions.

These issues were discussed at a two-day Planet event for recognised pattern and learning and teaching experts, who were external to the project. They were invited to review the pattern identification processes and the existing organisation. Feedback on the processes and the platform was very positive; the consensus of opinion regarding the pattern organisation was that some form of organising principle was required. More specifically it was agreed that this framework should be as close as possible to the way that the intended users of patterns work, in order to minimise the extra work needed to take advantage of available patterns. Several possible organising principles were suggested including Diana Laurillard’s “Conversational Framework” (Laurillard, 2002), a decision-based view organised along a time base proposed by Sally Fincher (see Appendix A) and a bottom-up approach proposed by Jim Hensman (Hensman, 2009). A further structure that was considered was taken from the structure of the Disciplinary Commons (Disciplinary Commons) in which reflections on teaching practice focused around the themes: context, content, instructional design, delivery, assessment, and evaluation. Each of these approaches was investigated in parallel by pairs of team members with a view to identifying the most useful within the aims of the project.

Papers outlining the experiences of the pairs of team members are available at <http://www.patternlanguagenetwork.org/pattern-maps>. In summary, however the Conversational Framework and Fincher's decision map proved too complex as they stood, so simplified tabular structures were adopted. One of these mapped patterns against time and activity. This mapping uses the categories applied in the Disciplinary Commons Project together with a view of the phases involved with the design and implementation of a learning activity taken from Fincher's model. Another used key processes against participants in the learning activity. In addition, mapping activities within workshops have suggested domain maps for specific areas of interest. For more information on this aspect please see <http://www.patternlanguagenetwork.org/pattern-maps>.

4.3.2 Implementation of patterns and organising structures

The case stories, candidate patterns and patterns have been implemented through a series of templates which are available both within the wiki and in paper versions to support the creation and development of the particular representation. The simplest template is the case story, which uses the STARR template (see Table 1, section 4.2.3). The pattern template is based on the PLML pattern standard (Fincher, 2003) with a few additions and has the following elements:

- Name (to be short and memorable but not so obscure as to be meaningless to anyone outside the initial discussion)
- Icon (to illustrate the pattern in the pattern listing)
- Illustration (a picture showing an instantiation of the pattern in real life - so a photo, screenshot, video - rather than a diagrammatic representation)
- Summary (to give an overview of the pattern)
- Confidence (how sure are we this is a pattern)
- Group (the user group from which the pattern originated)
- Problem (the design challenge the pattern will address)
- Context (the kind of situation this pattern will apply to)
- Solution (the instruction that resolves or addresses the challenge expressed in the problem)
- Diagram (a schematic or diagrammatic representation that captures the essence of what the pattern is about - could be a sketch or a more formal representation)
- Related patterns (patterns within the language – or another – that this one extends, is part of, contains, is the same as)
- Evidence - to include sections:
 - Source and other supporting cases (cases where this pattern is seen)
 - Rationale (principles, evidence from literature etc to back up pattern)
 - Links and references (supporting the above)
- Verification (problem scenarios which this pattern has been used to solve)
- Author
- Licensing (default Creative Commons attribution-non-commercial-share-and-share-alike)

This was found to be too complex for the initial consideration of cases to candidate patterns, so a separate candidate pattern template was implemented. This comprises a subset of the full pattern and includes: name, icon, illustration, summary, confidence, group, problem, context, solution, diagram, source and other supporting cases, links and references, author, licensing, with an additional "wants" field for input of information still required to promote this to a pattern. Candidate patterns can be easily promoted to patterns in the wiki when sufficient cases (normally at least three) have been registered to warrant it being considered a full pattern.

The implementation of the pattern structures is more variable. The experimental structures that have been evaluated are available only as paper-based mapping activities. Digital versions of these are problematic due to the rapidly changing nature of the pattern collection. Instead a tagging framework has been proposed within the wiki to enable users to find patterns and cases based on tags. At present, this framework reflects a number of key categories. For example,

- Technologies: blog, wiki, social network, GoogleGroups, Second Life etc.
- Pedagogies: active learning, problem based learning etc
- Assessment: formative, summative, negotiated etc.
- Subject: computing, language learning etc
- Activities: collaborative work, communication, group work etc.
- Issues: digital identity, privacy

Such a scheme allows users to explore cases, candidate patterns and patterns along a single dimension at present. A more complex search is being added to allow for multiple dimensions to be explored. This will allow us to begin to dynamically represent the structures proposed.

4.3.3 Pattern and organising structure outputs

The project has produced in excess of 100 cases of successful practice, which have led to around 75 patterns being proposed. These vary in the level of development from proposals through candidate patterns (which still require corroborating evidence) to full patterns. Appendix B presents a summary of these. Full details of all of them are available on the Planet wiki.

In addition the project has contributed a number of proposals for organising structures (see, for example, Appendix A and Hensman, 2009) and a number of discussion papers. All of these can be seen at <http://www.patternlanguagenetwork.org/pattern-maps>. Tagging with associated tag clouds has been implemented on the wiki and a tag framework has been proposed.

4.4 Planet wiki platform

4.4.1 Development methodology

The Planet software development methodology was based on the original *User and Innovation Development Model* (Fowler & Scott, 2007). This involves an iterative process with three stages, all of which involve user engagement. These stages are

1. User requirements capture and participatory design of ideas
2. Implementation of tools
3. Testing, deployment and evaluation of tools in context

The Planet platform was designed to support the project's overall methodology for engaging groups of practitioners in the collaborative endeavour of developing a pattern language. This methodology was based on that of the Learning Patterns project (Learning Patterns Project) and therefore it was intended to use the platform developed by that project as a starting point. The project plan identified the need for a web-based system for collaborative authoring of case studies, design patterns, scenarios and domain maps. This called for a system that would support basic functionalities for our initial engagement with users and would evolve in tandem with the *Participatory Pattern Workshop* methodology.

The system needed to support the following core functionality:

- Index pages of case studies, patterns, scenarios and domain maps
- Template-based on-line editors for case studies, patterns, scenarios and domain maps
- Discussion mechanism for case studies, patterns, scenarios and domain maps.

The system was required to support the following data formats for interoperability:

Name of standard or specification	Version	Notes
PLML	2.0	Pattern Language Markup Language
XML, XSLT, CSS	1.1, 1.0, 2.1	Various Document/web standards
REST	n/a	Web services
W3C WAI WCAG	2.0	Accessibility
PDF	n/a	Documentation

To achieve this, we defined a phased approach to development:

- An initial release of the Planet wiki was developed and deployed, based on an adaptation of the Learning Patterns project platform, to meet immediate requirements collected from Planet team members.
- This system was seeded with content by team members through a pilot workshop activity and presented to core user groups for feedback.
- The core Planet wiki platform was developed and extended iteratively, based on user feedback, allowing others to engage in an open source process.

- In parallel enhancements to improve the system's usability and interoperability (e.g. visualisation, tagging and API development) were developed through student development project work and deployed as they became available.
- The system was documented for users and future developers.

The interdependence of the platform and the pattern identification process was reflected in the internal data structures used to store information provided by users. A set of functional, interface and design specifications (<http://purl.org/planet/Specs/>) was created and used to guide the software development process. Building the software followed a highly agile approach and reflected the iterative process of build, test, evaluate (through the user group workshops) and modify. Issues identified by the user groups were reviewed and used to enhance the platform.

4.4.2 Implementation of Planet platform

The Learning Patterns project code was built on top of the Alpha Complex CMS developed by the Kaleidoscope Network of Excellence (Kaleidoscope Network of Excellence). At the time of Planet's inception, this CMS was to be released as an open source product with continued support. However, soon after the project's initiation, it emerged that neither the release date of the Alpha Complex CMS nor its support plan were reliable. This was identified as a major risk to Planet and the implementation plan was reassessed in order to mitigate it. It was therefore decided to evaluate alternative platforms. Eventually XWiki was identified as a suitable candidate for the following reasons:

- XWiki is an open-source highly-configurable wiki platform, written in Java.
- It is backed by a commercial body (XWiki.com), as well as a vibrant user and developer community.
- It supports many of the features we needed out of the box, or through minimal scripting.

The need to move away from the original plan of using the Learning Patterns codebase also highlighted the volatility of academic hosting. Academic institutions tend to be somewhat slow to adapt to changes in technological requirements. It was assessed that approving the installation of an XWiki server and exposing it through the firewall might pose a risk in terms of on-time delivery of the required functionality. In order to pre-empt this risk, we chose to host the project platform during its development on the free MyXwiki server farm.

In order to support a streamlined, effective and quality-controlled development process, a project development space was established on Google Code. This space provides issue tracking, version control, release management and a development wiki.

We opted not to use the Google Code wiki function, choosing to host the specifications on the Xwiki system itself. Version control and release management were not significant issues during development: the code we developed was versioned on the system itself, and, since we did not entertain external installations, a periodic local backup was satisfactory. As we moved towards the end of the project, and to ensure sustainable outcomes, we contacted XWiki.com for stable hosting, and deposited a version of the code along with an installable product on Google Code.

During development by far the most useful facility on Google Code was the issue tracker. This was used to manage and coordinate all coding practice. It afforded an efficient, effective and transparent development process. For the convenience of non-technical users, the issue tracker was embedded in a local page on the Xwiki platform. Complex requirements and enhancements were discussed with the project team at face-to-face and online meetings, as well as via the team mailing list. A laptop was used for local test & development, enabling us to respond to issues as they emerged even during on-site workshops.

Based on the initial requirements, as well as the needs as they emerged from the user workshops, we developed content areas for cases, patterns (later in the project separated into candidate patterns and patterns) and scenarios. Domain maps and trails, which played a significant role in the Learning Patterns methodology, were less critical to the *Participatory Pattern Workshop* methodology, and were therefore left underdeveloped (although basic functionality exists).

In the course of the project, we recognised the need to provide thematic groups with their own workspace, so we created a Groups section. The actual group space functionality was provided using the base XWiki features.

As the project progressed and content accumulated, several features were identified as high-priority requirements and additional development effort was allocated to them. Most notably, these included the API, the tagging mechanism and the candidate/pattern differentiation, described in section 4.4.3.

Using the MyXwiki environment released us from institutional constraints and system maintenance, but it did raise issues of stability and control. While the service was generally robust, it came with no guarantees, and occasionally the server would be down at the least convenient moment. Platform software upgrades were performed per XWiki's testing schedule, and on some occasions caused unexpected incompatibilities and feature degradations. Limited access rights on the MyXWiki server meant that some required Planet features were hard or impossible to implement. The free service contract came with no support obligation. XWiki staff and community were very helpful, but acted out of good will and within the limits imposed by their commercial commitments.

During the active life of the project, the advantages of having a low-cost, powerful and flexible platform outweighed the price of working "in the wild". In terms of sustainability, we decided we needed to stabilise the system and to ensure that it will remain stable without constant monitoring. To that end, we have agreed on a paid hosting and support plan with XWiki.com, the commercial company that backs xwiki.org. This will ensure the platform is reliably available for at least three years.

4.4.3 Platform outputs

The platform-related deliverables from the project include:

1. A collaborative software platform for capturing and storing case studies, patterns and scenarios in various levels of refinement
2. A software application program interface (API) for the patterns stored within the software platform
3. Entry into the JISC Innovation base for the Planet project identifying the types of services needed to support patterns

These are described in more detail.

4.4.3.1 Collaborative authoring system

The Planet wiki supports the creation and collaborative editing of four content types: case stories, candidate patterns, patterns and scenarios. Each one of these has a dedicated space in the system, where all items of this type are displayed in a searchable and sortable index. The index page is also the entry point for creating new items. Upon creation, authors are presented with a form-based editor, which scaffolds them through the editing process. They can save and return to this editor as many times as needed. The owner of an item can also specify additional contributors who will be granted editorial rights. Other users can comment on the item but not edit it.

The form of the different types was refined through the iterative participatory process. The case type is intended for contributors to describe the details of a problem they personally encountered and resolved. The case template offers a simple structure which guides authors but leave ample room for a personal narrative. The template prompts authors to specify the situation in which the case is embedded, the task or problem to be solved, the actions taken, their results and finally any reflections. Patterns abstract the salient features of context and problem across cases, and the common core of a possible solution. The pattern template is much more detailed, prompting authors to specify the context, problem and solution along with supporting evidence and related patterns. Special attention has been devoted to the visual aspects of pattern: the pattern template has fields for icon, illustration, diagram and a text editor for a defining a sequence diagram. The candidate pattern template is a reduced version of the pattern, and includes a flag to promote the candidate to full pattern status. Scenarios are similar to cases, except that they describe problems that need to be solved and prompt authors to explore which patterns could be applied in the resolution.

Tutorials on using the system are available via the wiki and more immediate help was provided in the form of tooltips.

Tagging is enabled for cases, patterns and scenarios. Authenticated users can apply tags to any item in these classes, and can then search, filter or navigate using these tags. Although tagging can be used freely, a tag framework has been collated to help guide consistent tagging and to facilitate searching against the organisational structures that have been proposed.

4.4.3.2 Interoperability and the e-Framework

The Planet wiki supports interoperability by offering two APIs for accessing cases, patterns, and scenarios, which were inspired by the discussions with the Pattern Exchange Forum, a group of developers of pattern tools and repositories across Europe. Both APIs are based on REST model with only GET method enabled at this stage. In effect this means that client applications can read the content in our system, but cannot edit, delete or add new items. A generic API allows programmatic navigation through the class and object structure. Clients can retrieve the list of classes (datatypes), the structure of each class, and then list objects from any class or ask for specific fields of specific objects. A simple API allows clients to retrieve cases or patterns, specifying search criteria and output format. Output formats include PLML, XML, RSS and CSV. As part of the Connection benefits realisation project, investigation of using the API to interface the Planet platform to other systems, such as the Cloudworks system developed by the Open University, was carried out, and provided valuable feedback that helped refine the API implementation.

In addition, the project has made an entry into the Innovation Base as a contribution to the e-Framework.

4.4.3.3 Code and executable release

All code developed by the project is available for browsing or sub-version access under an open source licence from: <http://code.google.com/p/patternlanguagenetwork/source/checkout>. The installable package is available for download from:

<http://code.google.com/p/patternlanguagenetwork/downloads/list>. This package is an XAR file which can be imported directly into any XWiki installation. XWiki can be downloaded from:

<http://www.xwiki.org/xwiki/bin/view/Main/Download>. Note that the installable package includes all the source files, which are released under a Creative Commons non-commercial share-and-share-alike licence.

5 Project evaluation

Two members of the Planet team have had primary responsibility for evaluation of the project throughout its operation. A draft interim evaluation report was issued in July 2008 and a final evaluation report is being produced for the end of the project in March 2009. Both of these are available at <http://www.patternlanguagenetwork.org/reports>. This section therefore provides only a summary of the approach to project evaluation and the outcomes.

5.1 Approach to evaluation

The Planet project plan contains eight evaluation questions, two focusing on user engagement and the remaining six on the patterns elicitation process. They are:

User engagement:

1. What user engagement activities has the project used in each cycle of the Planet development model and how have they been used?
2. Which user engagement activities worked well and which did not?

Patterns development

3. What process was used to identify patterns?
4. How well did the pattern identification process work?
5. What functions does the support platform offer users?

6. Which functions work well, which do not?
7. What representations of the pattern language have been used?
8. Which pattern language representations worked well and which did not?

These have been addressed through a range of evaluation activities including

- Surveying project documentation
- Analysing contributions to project wiki and blog throughout project
- Observation and reflection on workshop activities throughout project
- Questionnaire to workshop participants in the last 3 months of the project

The interim evaluation report in July 2008 contributed formatively to ongoing project development.

5.2 Summary of evaluation results

Continuous observation of, and reflection on, the behaviour of users in workshops and in their contributions to the Planet wiki and blog, have been fundamental to developing the *Participatory Pattern Workshop* methodology and the software to support it.

The reflective and iterative approach to developing the pattern identification process has produced a three workshop process that works well, but relies on the facilitation of workshop leaders at key points, in particular to develop patterns from candidate patterns. The process is not capable of standing on its own.

Observation of user behaviour has been particularly important in developing understanding of how the patterns might be organised to facilitate their discovery and use, and led to adoption of simple two-dimensional frameworks rather than more complicated systems, and of user-initiated tagging.

The workshop process has significantly increased stakeholder understanding of the potential use of patterns as a way of representing practice, and has generated considerable interest among other projects in using this representation.

While users participated enthusiastically in workshops, they have not, in general, contributed actively to the process between workshops, and have not formed a sustainable pattern community around the Planet platform. Separate user groups have, however, used the platform extensively to perform specific tasks.

The project set clear criteria and guidance for what constituted a pattern; particularly important was the “rule of 3” that required any pattern to be supported by at least three case studies. The criteria were crucial in enabling realisation and subsequent articulation of the distinction between “candidate patterns” and “patterns”. This distinction then informs understanding of the pattern identification process and changes to the wiki platform to support it.

Despite this, there is evidence of a lack of consistent understanding among participants of the nature of patterns, with some patterns looking like sequential generic learning designs while others looking like principles derived from practice. Further consideration is needed as to how to address this. One possibility is to use a simplified form based on patterns, such as bundles (Fincher et al., 2001). Another is to recognise and allow for the need for an editorial role in pattern development.

The Planet platform has been developed considerably, in particular to support realisation of the distinction between candidate patterns and patterns, but development has been constrained by being hosted on the XWiki farm and not having control over the server, and also by lack of staff time devoted to code writing, and some requirements, for example for enhanced discussion facilities, were never met. The original decision to go for XWiki hosting was a result of institutional constraints on servers and raises a more general issue for the JISC of how experimental development work might best be supported. For example, JISC could establish a server farm for projects to experiment with technologies.

6 Project management

Clear activities relating to the various objectives in the project were identified and these were articulated as individual work packages with individual responsibilities allocated at the start of the project. An early schedule of face-to-face meetings at three monthly intervals was also agreed very early in the project. However it quickly became clear that face-to-face meetings were particularly effective in keeping the project moving forward and so such meetings were held more frequently after the first quarter.

The distributed nature of this collaborative project meant that communication of information and sharing of documents, calendars etc. were crucial to its success. Initially a range of tools were identified as supporting a variety of different communication needs e.g. email, Google docs, Google calendar, Google code, Google groups, a Wordpress blog and the Xwiki site. What quickly became evident was that with such a range of tools there was confusion over which tool to use for what purpose and it was agreed to reduce these to the blog for posting comments and work updates, Google groups for email discussions, the wiki for hosting the software platform (case stories and patterns) and storing administrative documents such as reports, and Google code for storing the project software code, platform issues and specifications.

Managing a geographically distributed collaborative project has particular difficulties in that the individual team members have their respective local responsibilities to meet and each institution may also impose its own constraints on staff. Getting staff together proved difficult on several occasions and a number of scheduled face-to-face meetings had contributors attending electronically using both Elluminate and Skype. A related issue here is the fact that no individual team member was allocated to work on this project on a full time basis, each team member was allocated to the project for some fractional part of their professional activities and hence there were always competing demands on their time and energies.

As well as interacting extensively with our user community, we drew on the expertise of specialists outside the project to support our activities. This included the patterns expert group, for assistance with evaluation and discussion of the organising structures, the Web2Rights (Web2Rights) team for assistance with IPR and licensing issues, and the Xwiki team for dealing with some platform issues. This proved to be beneficial in all cases.

As well as the formal JISC reports (available at <http://www.patternlanguagenetwork.org/reports>) the project has informally documented much of its discussions and activity in the project blog: www.patternlanguagenetwork.org.

7 Outcomes

7.1 Achievements against aims and objectives

The original aim of the project was to demonstrate an effective community-based mechanism for sharing successful practice in order to encourage greater transfer of practice across different contexts. This has been achieved through meeting the following objectives. The project's achievements against each of the objectives are summarized in italics.

1. To develop a **pattern language** for the domain of learning through Web 2.0 technologies. This domain is chosen as a new area within learning where the pattern language initiative will have most impact on the future use of technologies and development of emerging practices.

The project has developed a collection of approximately 75 patterns and candidate patterns. It has engaged with a range of user groups with broader interest than web 2.0 although this is the recurrent theme in many patterns. The pattern collection is continually expanding and a number of organizing structures have been developed to give more coherence as a language or collection of languages. In addition to the pattern language, in excess of 100 case stories of successful practice have been collected. Initially these were seen as a means to capturing patterns, but they also have value in themselves as representations of specific practice. This is discussed in more detail in section 4.3.

2. To develop a **collaborative software platform** to facilitate community based pattern creation and use, together with **supporting methodologies** for these activities.

A wiki platform has been developed to support the collection, review and editing of case stories, candidate patterns and patterns. This is discussed further in section 4.4. A workshop-based methodology for capturing and using patterns has been developed and documented as a series of patterns. This is discussed in more detail in section 4.2 of this report.

3. To support and engage a **community of practice** to sustain the pattern activity in the longer term.

We have worked with over 200 users from more than 50 Higher Education Institutions and other organisations over the course of the project. These have engaged actively in the workshop process but have been less active in interacting electronically via the wiki. However we have a number of user groups and projects who have committed to continuing to use the Planet approach in the future. These include: CETL Active Learning in Computing, led by University of Durham, Leeds Metropolitan University's Personalising Curriculum Creation through Coaching (PC3) project (JISC Curriculum Design programme), University of Kent's Share Project (NTFS) and Coventry University's Building Research and Innovation Networks (BRAIN) project (JISC Information Environment and e-Research VRE 3 programme). These user groups will help sustain the pattern activity beyond the end of the Planet project.

4. To evaluate the **pattern language approach** in terms of its appropriateness, ease of use and impact on the development of learning experiences.

We have collected feedback from participants and have invited experts to critique our processes. The workshop process for capturing and reflecting on practice has been very successful with overwhelmingly positive feedback. The pattern outputs themselves have, if anything, been less important to participants than the process. A full evaluation report is available at <http://www.patternlanguagenetwork.org/reports> and summarised in section 5.

5. To contribute to the e-framework semantic wiki, by indicating the types of services needed to support the patterns and relationships expressed in the language, for example through developing **use cases**.

The project has contributed an entry to the JISC Innovation Base indicating the services needed to support patterns. We have also implemented an API to allow other systems using a service-oriented approach to interface with the Planet platform.

6. To disseminate successful practice in Web 2.0, and in pattern creation and use, both through Planet itself and through **workshops** and **conference presentations**.

The Participatory Pattern Workshop methodology has been represented as patterns in keeping with the spirit of the project. The project and its methodology have been presented at a number of workshops and conferences, nationally and internationally.

The main outputs of the project (including those already discussed in detail) are given in Appendix C.

7.2 Impact on stakeholders

The project has had a significant impact on the teaching and learning community in higher education in the UK and more widely. Participants from at least 50 UK and international HEIs have participated in our workshops and engaged with the process of sharing their practice. The methodology and platform are available for continued use and are being taken up by at least four funded UK projects including one CETL. Elements of the methodology (sharing practice through reflective story telling) have also been used successfully as standalone activities, which could be very valuable in a wider context. The specific benefits that have or could be gained from the project by different stakeholder groups are outlined below.

- **Teaching and learning practitioners (academic and learning technologists):** There is a set of case stories and patterns capturing successful practice in a range of areas of Web 2.0 and education, including assessment, group work, digital identity, social and communication technology, and project management. A number of pattern maps have been created, which reflect the process of teaching and learning decision-making, and which can be used to identify relevant

patterns. This increases practitioner awareness of good practices applicable in teaching and learning activities.

- **Pattern workshop facilitators/contributors:** There are clearly specified and documented processes and a software platform to allow others to continue the process of identifying and refining patterns. This allows groups outside of the Planet team to use the approach in their own context.
- **Pedagogical patterns/learning representations community:** The project has contributed to a better understanding of effective pattern identification and the design of organising structures. The development process and the thinking behind it are documented in the project blog and our working papers. The availability of an API for the Planet wiki allows other groups to make use of our outputs. The project has also organised events that have raised the profile of patterns in education and given new impetus to research in the area. For example, one participant described the CAL09 symposium organised by Planet team members as “an important milestone to disseminate and establish the pattern approach in the community of educators”.
- **Higher/Further Education Institutions:** The patterns are representations of successful practice, which can be applied in their context. The methodology and its components are available for staff development activities. The open and interoperable platform supports interchange of good practice between institutions with differing contexts. All of these have been developed with input from a wide range of institutions. This helps institutions address the need to support sharing of good practice.
- **JISC community:** The methodology and platform developed by the project can be used by other projects to capture their own good practice. This has been done by CETL ALiC and by the eFormative Assessment project. Other projects (for example JISC funded PC3 project) are also planning to use the approach.

8 Conclusions

Patterns have been demonstrated to be promising as an accessible, effective and efficient way to share good practice between educational practitioners. Practitioners can in general quickly understand the pattern and the design advice it represents and apply it to their own context. Using structured story telling to elicit examples of good practice is extremely effective and can be used in a range of contexts to encourage sharing of practice. The abstraction process from specific examples to more generic patterns has proved to be more difficult and requires facilitation and scaffolding, which the project has gone some way to provide, although there is still work that can be done in this area. Where user inputs are required it is helpful to offer examples of the scale and focus of such inputs to help users provide relevant information at appropriate levels. The effective use of patterns is dependent on practitioners being able to find an appropriate pattern, at the pertinent time in their learning design process. This requires the patterns to be organised in a way that highlights their relationships both to the learning design process and to each other. Planet has made some proposals for organising structures to achieve this but more work is needed to evaluate fully and to see how they scale to larger numbers of patterns. It is clear from our experience, that seeking to create a sophisticated tool that can dynamically present users with relevant subsets of patterns to help them take decisions about designing and implementing learning experiences is a more complex problem than we originally thought, though a very interesting and relevant one.

The face-to-face facilitated workshop-based methodology was extremely effective and universally valued by participants. It is important to recognise that, even though we have the means to conduct most business electronically and to network remotely through social technologies, face-to-face interaction is still most productive for some activities. We did conduct some online workshops but on the whole these were not so engaging for participants, nor could they explore practice in such depth. Sharing practice effectively is more than simply listening to a presentation or reading a description: it involves mutual reflection, comparison, exploration and, ultimately, abstraction. Thematic and disciplinary sharing of practice have been particularly effective on this project. Such activities require, and should be afforded, time and focus and are most successful face-to-face, supported in between by social technologies where needed.

Our management of a multi-site collaborative project was facilitated through the use of social and communication technologies, although, as with the workshops, some discussions, particularly of

theoretical issues, were much more effective when held face-to-face. Communication tools need to be kept as simple as possible, but should be appropriate to their use, particularly where the activities generate a range of different outcomes e.g. public documents, software, case studies, collection of artefacts, internal reports. For example, tools such as Google Docs are useful for sharing documents and initial collaborative editing. However, they do not scale well to larger documents with complex or specific formatting. Our use of these tools became more effective when we agreed a protocol for their use within the project.

9 Implications

Our experience on the Planet project suggests that mechanisms to support successful sharing of practice are both required by and lacking in the higher education community. The *Participatory Pattern Workshop* methodology offers a solution to this problem that can be adopted, adapted and used by others in the community.

Although the methodology is offered as a complete process, the different elements of it can be used alone to support sharing of practice, or to support other representation paradigms. It is recognised that different groups have different needs and may already be using a non-pattern based approach to representing practice. This flexibility derives from the multiple workshop approach (one can be used without the others) and from the specific activities that comprise workshops, which again can be used independently.

With regard to future work, there is a need for further investigation of the organisation of patterns and mechanisms for supporting identification of the right one at the right time. One approach, similar to that used in the Learning Patterns project, which influenced our thinking, would be to begin the pattern elicitation activity not with stories but with consideration of process or domain concepts, using these to then guide the selection of stories and, ultimately, the patterns produced. This would have the advantage of a tighter, more focused pattern collection, built around a concept map, but would potentially lose the benefit of allowing practitioners to choose the good practice they wish to share.

There is also work that can be done trialling the methodology with other, more simple, forms of representation, for example, bundles (Fincher et al., 2001). There is no doubt that the part of the process that participants found most difficult was abstracting from concrete examples of practice to the level of abstraction required for an effective pattern. Using a simpler, less abstract approach might be beneficial.

The Planet wiki could be developed further, particularly to provide dynamic visualisations of the relationships between patterns and organising structures. These concepts have been demonstrated through our use of simulations and paper based mapping tools (for example see Hensman, 2009) but resource did not allow integration of such tools in the wiki.

The pattern platform can accommodate existing pedagogical patterns collections. It could also accommodate collections of good practice emerging from other JISC projects. It therefore provides a potential basis for a repository of design guidance for the educational community on a range of areas. In particular, the workshop methodology could be used to elicit such guidance, however it was eventually represented and stored.

Exploration of the role of social networking tools to promote the practice of sharing and make wider use of the outputs was outside the scope of the project. However, team members were active in a number of social networking environments, including Twitter, Facebook and a number of blogs. This informal promotion proved effective for project outputs and could be examined more systematically as a way of encouraging sharing and ownership of patterns by groups of practitioners. One example of this would be the creation of a patterns blog in which contributors would be encouraged to operate in a pattern of the week series in which both the original context and a variety of implementations would be presented for comment to the wider community. This would promote both ownership and transparency of the emerging patterns; it would also help those wishing to use particular patterns to

engage with those who have used them. Further work exploring such measures to support community sharing would be welcome.

The project blog and wiki will be available for at least three years. A number of funded projects have committed to using some or all of the project outputs. These include : CETL Active Learning in Computing, led by University of Durham, Leeds Metropolitan University's Personalising Curriculum Creation through Coaching (PC3) project (JISC Curriculum Design programme), University of Kent's Share Project (NTFS) and Coventry University's Building Research and Innovation Networks (BRAIN) project (JISC Information Environment and e-Research VRE 3 programme).

In addition, several groups have enquired about using the methodology and the tools, including:

- InQbate: The Centre for Excellence in Teaching and Learning in Creativity.
- OLnet.org Open Learning network
- Canberra Primary School, Singapore and the FutureSchools@Singapore programme

These projects and groups offer the opportunity to test the processes in new contexts and may provide opportunities for further development and refinement of the platform and the methodology.

10 Recommendations

A number of specific recommendations arise from this project:

1. Sharing practice is an important but time-intensive activity. Thematic and disciplinary sharing of practice has been particularly effective on this project but by definition usually requires cross-institutional interaction, which has associated resource implications. Institutions need to consider how they can facilitate and support this within staff development programmes.
2. Technical support departments in academic institutions rightly see their first priority as supporting informational and learning support systems and are ill-equipped for responding to the needs of experimental web 2.0 projects. This leads to reliance on external hosting services, a practice fraught with inefficiencies. JISC should consider establishing a centralised research and development resource farm, which would supply projects (at cost) with development process tools (source control, document management, release management, etc.) along with high-specification application hosting.
3. Several of the facilitation activities developed through Planet have broad application in any activity where the focus is encouraging sharing and reflecting on experience. JISC should consider repurposing these for wider distribution, for example, as part of an Infokit on workshop facilitation.

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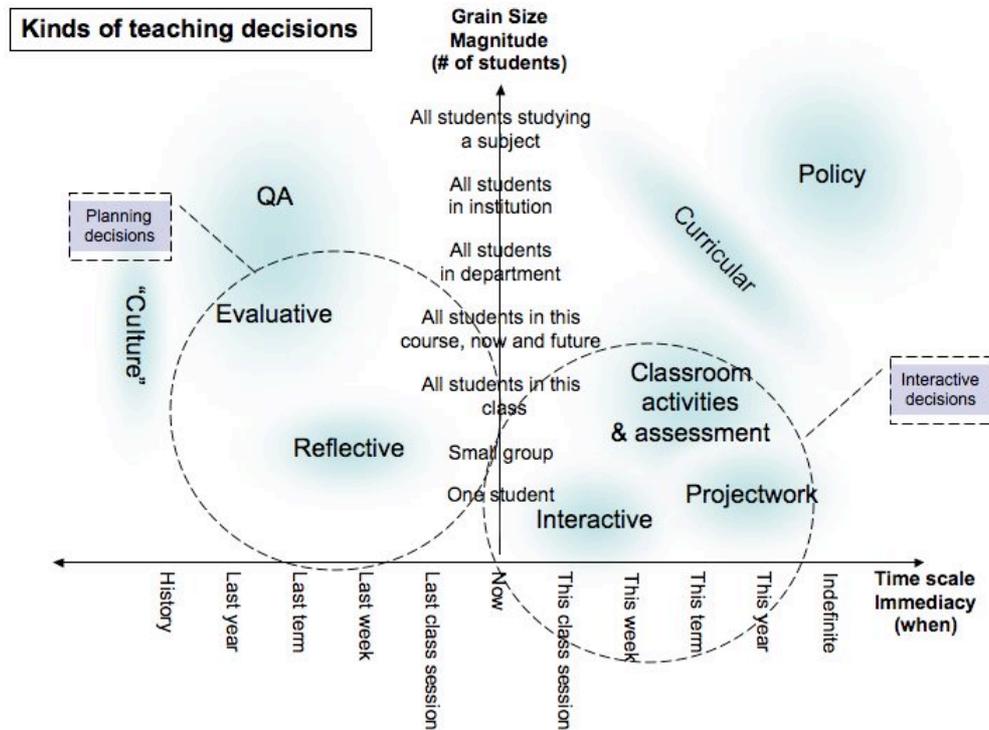
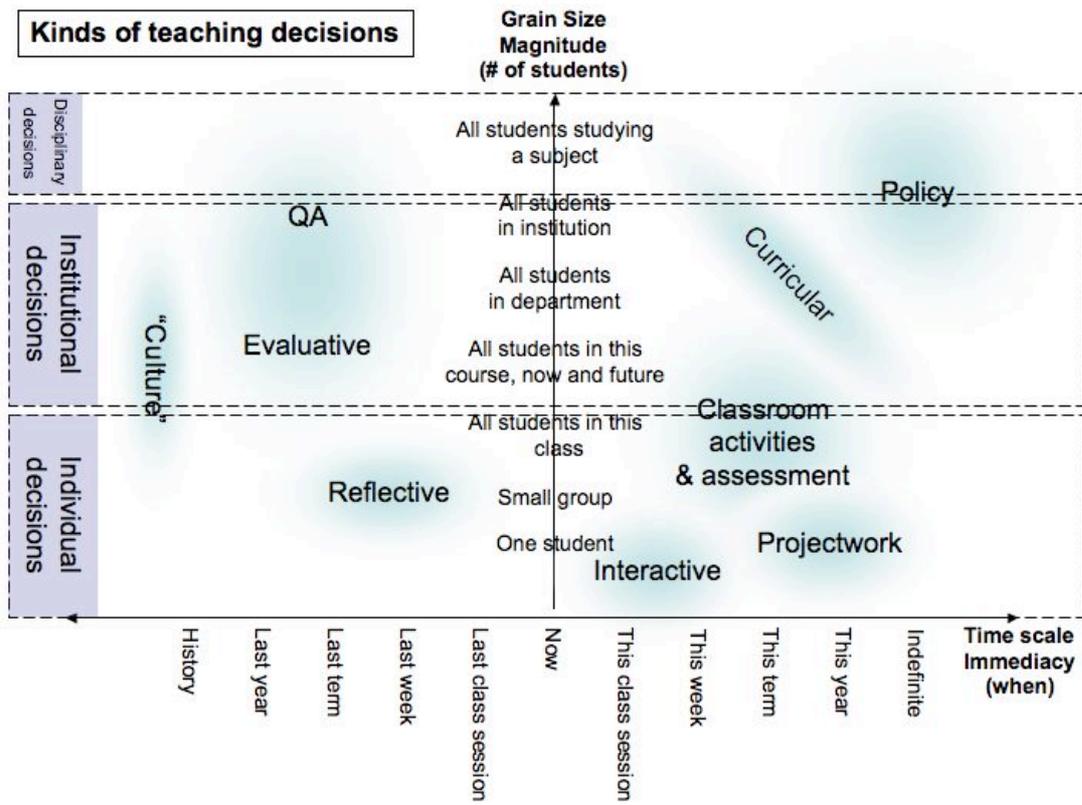
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12 Appendixes

Appendix A: An organising structure for learning patterns

This structure was proposed by Sally Fincher and has been evaluated through the Planet workshop process.



Appendix B: Table of patterns, candidate patterns and proposals

Name	Level	Summary
WHAT'S MY NAME?	Proposal	<i>None</i>
WEAR YOUR SKILLS ON YOUR SHIRT	Candidate	Your appearance reflects your abilities
VISUAL NARRATIVE	Proposal	Tell a story in pictures
USE NATIVE TECHNOLOGIES	Candidate	When a project is using a particular technology, be wary of using the same technology for project management. This might only be the case if the task being discussed is native to the technology as well as the project overall.
USE MY STUFF	Candidate	Use learner supplied artefacts as raw materials for new learning activities.
TRY ONCE REFINE ONCE	Pattern	A two-step question-answering system which encourages students to consider their initial answers to skills-based questions very carefully, and, on receiving feedback on their errors, to give as much thought to the refinement process.
TRUSTED AUDIENCE	Candidate	<i>None</i>
TRUST INNOVATION	Proposal	Looking at aspects of supporting trust generation within students.
THREE HATS	Candidate	I tell a story, you write it down, and she will present it.
THIS REMINDS ME OF...	Proposal	Provoke collaborative reflection on a case story or scenario by asking peers to suggest similar stories.
TABLE TOP CONCEPT MAPPING	Candidate	Establish a shared vocabulary by negotiating a concept map of the domain.
SUITABLE DATA COLLECTION PROCEDURES	Proposal	<i>None</i>
STATUS INDICATOR	Candidate	Important to be able to see people's online status.
START WITH INTRODUCTIONS	Proposal	<i>None</i>
STAND STILL	Proposal	When facilitating a discussion, or any participatory learning activity, sometimes the hardest challenge is to not do.

SPACE FOR LURKING	Candidate	Lurking is important when engaging with new social platforms/services, especially when deciding what is a legitimate projection/use of identity. It allows new users to assess the social codes in place before diving in. The same type of platform can support different social codes (eg some blogs are factual and some are fictional) and some platforms eg Second Life have shifting social codes because they have not been culturally normalised.
SOMETHING TO TALK ABOUT	Proposal	Social constructivism has endowed us with the notion that we learn by talking about things. That may be true, but we should always remember that for meaning to emerge, there need to be meaningful things to talk about. Conversation needs to be grounded in significant experiences.
SOFT SCAFFOLDING	Candidate	Scaffolding is a term commonly used in educational design to describe structure that directs the learner's experience along an effective path of learning. Technology should be designed to scaffold learners' progress, but an interface that is too rigid impedes individual expression, exploration and innovation.
SHOW-CASE LEARNING	Candidate	This pattern is about publically celebrating student work, either digitally or physically.
SETTING THE AGENDA	Candidate	Allowing students to set the lesson agenda has obvious motivational benefits, but it also gives the teacher an excellent window on prior knowledge.
ROUND AND DEEP	Pattern	<i>None</i>
ROLE PLAYING	Proposal	<i>None</i>
RAPID FEEDBACK	Pattern	Timely feedback is essential for successful learning. Designing learning activities where feedback is integrated can mitigate delays in giving feedback to students.
QUASI REAL-WORLD CUSTOMER	Proposal	<i>None</i>

PURPOSEFUL DELAY	Candidate	Add a purposeful delay before sending potentially disruptive or emotionally laden messages when working in a professional situation.
PRIVATE PUBLIC SPACES	Candidate	How do you decide what is public and what is private.
PRESENTATION PATTERN	Proposal	The use of PRESENTATION for formative assessment by peers and tutor to promote reflective learning.
POWER LAW OF PARTICIPATION	Proposal	<i>None</i>
PERMISSIONED AGGREGATION OF PERSONAL INFORMATION	Proposal	<i>None</i>
PATTERN MINING WORKSHOP	Candidate	From case stories to design patterns
PARTICIPATORY PATTERN WORKSHOP	Pattern	The Participatory Methodology for Practical Design Patterns is a process by which communities of practitioners can collaboratively reflect on the challenges they face and the methods for addressing them. The outcome of the process is a set of case stories, design patterns and future scenarios situated in a particular domain of practice.
PAPER 2.0	Pattern	Paper is a wonderful technology, but web2.0 has some nice features. Why not combine the best of both?
OTHERS FIRST	Candidate	Managing the tensions between identity and responsibility to others, where identity is enmeshed with others.
OBJECTS TO TALK WITH	Pattern	When we talk we point at objects. When we talk on-line we should be able to do so too.
NEUTRALLY LED FOCUS GROUP	Candidate	When it is difficult to receive rich feedback from students, arrange focus groups lead by a neutral facilitator.
NEGOTIATING EXPECTATIONS	Proposal	While teachers highlight high-level meta-skills at the process level, students are often focused on tangible measurable products. This tension needs to be acknowledged and negotiated in the open.
NARRATIVE SPACES	Pattern	Constructing narrative is a fundamental mechanism for making sense of events and observations. To leverage it, we must give learners opportunities to express themselves in narrative form.

MILESTONE MANAGEMENT MEDIA PRODUCTION TEAM	Proposal Proposal	<i>None</i> Applicable when a teacher wants to facilitate learning through authentic, self directed, collaborative and communicative process
MATCHING PERSONA TO CONTEXT MAKING IT EASY TO GIVE FEEDBACK	Proposal Proposal	<i>None</i> Technology can make it easy to give immediate and natural feedback (e.g. in ALPS). Provides feedback in a way that encourages reflection.
LEADING TO FORMAL SETTING KEEP IT SIMPLE	Proposal Pattern	<i>None</i> Using a wide range of Web 2.0 services and tools can lead to confusion and loss of inertia. Define the services you want first and then choose appropriate tools.
ISPY GUESS MY X (GMX)	Proposal Candidate	<i>None</i> Sustaining a mathematical discussion is vital to the establishment of socio-mathematical norms (Yackel & Cobb, 1995) and to the collaborative construction of knowledge in the community. This goal is especially difficult to achieve in geographically distributed communities. This pattern addresses this by a challenge exchange game of build this puzzles.
GROUP FORMATION THROUGH SPEED DATING	Pattern	Multidisciplinary team building is supported by short, rapidly changing interactions in an icebreaker activity.
GIVE ME A QUEST	Proposal	We need open environments to support open-ended learning of complex meta-skills, but that creates an initial disorientation. Give participants an initial toy task with a clear goal.
FUTURE SCENARIOS WORKSHOP	Candidate	Put patterns to the test by applying them to novel real problems in real contexts.
FRONT GARDEN	Proposal	A space that projects a clear group / personal ownership, and a sense of protection for the owner, even if it is publicly visible.

FREQUENT LOGGED INTERACTIONS	Proposal	Formative assessment requires frequent teacher-student interactions. Supporting software should unintrusively keep a record of these interactions, such that the teacher can revisit and reflect on.
FINDING A VOICE	Proposal	How do you understand the language games needed to communicate effectively in certain online tools?
FEEDBACK ON FEEDBACK	Pattern	Feedback given to learners should provide opportunities to improve the learning experience. It should comprise constructive feedback to improve learning as well as socio-emotive feedback. Tutors in large courses often resort to grading devoid of effective feedback. To support them in improving their feedback, then need effective feedback on the feedback they give.
FACILITATED TEAM MEETINGS	Proposal	Often in group work, teachers find that some students will take on an unfair burden while other become "Freeloaders". Some students also fail to learn certain skills essential to survival to today's society. Failure to resolve this situation will result in frustration and group members disengaging themselves from the task.
EYE ON STUDENT COSMOLOGY	Candidate	Students come with their own image of the world. Ignoring it disempowers and alienates them. The teacher should begin each interaction by giving the student a space to express her conception of the issue at hand.
DOG FOOD PRINCIPLE	Proposal	If it's good enough for your clients, it should be good enough for you.
DIGITAL IDENTITY PANIC	Pattern	<i>None</i>
DELAY COMMITMENT/INCUBATION	Proposal	Users new to web 2.0 may be cautious about committing contributions to the public domain. Providing an initial private space may help.
CONTENT BEFORE STRUCTURE	Proposal	Imposing structures based on specific technologies can inhibit people offering content. Allowing people to express ideas in a familiar form might be necessary.

CONCEPTUALISATION	Proposal	<i>None</i>
COMPETITION BREEDS COLLABORATION	Proposal	A competitive element gives people a focus and incentive for working more tightly as a group.
COMMUNITY OF TEACHER DEVELOPERS	Proposal	<i>None</i>
COLLABORATIVE REFLECTION WORKSHOP	Pattern	Elicit design knowledge by sharing, analysing and scrutinising personal experiences.
COLLABORATION IS AN OPTION	Proposal	In any activity, some participants may prefer to work alone - for various reasons. If collaboration is not intrinsic to the task or the nature of knowledge, participants should have the option of working in a "team of one"
COLLABORATION FOLLOWS IDENTITY	Proposal	People are reluctant to collaborate before establishing the identity of themselves and their peers.
CLASSROOM DISPLAY	Pattern	Share your work with a trusted audience
CIRCLES OF ENGAGEMENT	Proposal	Most communities are composed of several concentric circles of members, where the closest to the core are the most active and committed. The communication requirements of each circle are different. Failing to address this diversity will result in frustration and disengagement.
CASE STORY WORKSHOP	Pattern	Engender collaborative reflection among practitioners by a structured process of sharing stories.
BASELINING SKILLS	Candidate	Any activity assumes some skills as a prerequisite. When asking learners to partake in an online activity, we need a way to identify the required skills and establish the learners' proficiency.
PIGGY BACKING	Pattern	When it is difficult to get a new network or community together, arrange your meeting to coincide with a larger more established meeting or conference that potential participants will be attending.
ONE MAIL ONE MESSAGE	Proposal	Make a single point in a single message.
LEAVING TRAILS	Candidate	Leave trails as you move communication/conversation from one channel to another.

DRAW AND TELL

Candidate In a conversational activity, start off by a structured task in which participants represent a personal reflection in drawing and present it to the group.

The subject of the task should be related to the theme of discussion at an abstract level so it inspires the ensuing conversation.

Appendix C: Planet Deliverables

Form	Deliverable
Software	Collaborative platform for capturing, storing, browsing, searching and presenting case studies, patterns and scenarios. This site also acts as a repository for the project downloads, reports and project management documentation. http://purl.org/planet/Main/WebHome
	Blog site recording project developments, discussions and contributions http://patternlanguagenetwork.org/
	There is an API to the Collaborative Platform – details available at: http://purl.org/planet/api/
Specifications	A set of specifications outlining the design and functionality of the platform, the structure of the case studies and patterns, and the API are given here: http://purl.org/planet/Cases/DeverlopingthePlanetPlatform
Processes	An iterative and interactive four workshop process identifying a successful approach for capturing, storing and refining examples of successful pedagogic practice as case studies. These case studies are refined during the workshops and evolve into candidate patterns which are subjected to validation and review and may then be presented as patterns. These have been captured as a set of patterns: Participatory Pattern Workshops: http://purl.org/planet/Patterns/ParticipatoryPatternWorkshops Collaborative Reflection Workshop: http://purl.org/planet/Patterns/CollaborativeReflectionWorkshop Case Story Workshop: http://purl.org/planet/Patterns/casestoryworkshop Pattern Mining Workshop: http://purl.org/planet/Patterns/patternminingworkshop
Pattern Language	This is implicit in the design of the collaborative platform. A description of this is given here: http://purl.org/planet/Cases/DeverlopingthePlanetPlatform
Reports	High quality brochure and video package describing the Planet Methodology and its applications – planned for late Spring 2009.
	Pattern Language and Framework: Jim Hensman, May 2008 http://purl.org/planet/Outcomes/Internal_Reports

Form	Deliverable
	PatternFramework.pdf: Jim Hensman, Nov 2008 – http://purl.org/planet/Outcomes/Internal_Reports
	Mapping patterns to the Decision Based organisational structure: John Gray Nov 2008 – http://purl.org/planet/Outcomes/Internal_Reports
	Maps are for going somewhere – Yishay Mor Jan 2009 – http://patternlanguagenetwork.org/2009/01/22/maps-are-for-going-somewhere/
	Jim's document on the framework – Jan 13 th 2009 post
Video	EXTEND project video – http://patternlanguagenetwork.org/2009/02/25/the-planet-video/
	Methodology video
Case Studies	The cases are accessed from here: http://purl.org/planet/Cases/
Patterns	The patterns are accessed from here: http://purl.org/planet/Patterns/
Scenarios	The scenarios are accessed from here: http://purl.org/planet/Scenarios/
Pattern frameworks	Organising Structures – Sept 17 th 2008 posting http://patternlanguagenetwork.org/2008/09/17/organising-structures/ Pattern formats and structures – Sept 23 rd 2008 posting http://patternlanguagenetwork.org/2008/09/23/pattern-formats-and-structures/
Innovation Base entry	
User Guides	How to create a new case study – http://purl.org/planet/Help/CreateCaseStudy How to write a case study – http://purl.org/planet/Help/CaseStudyHelp
Workshops	The project has delivered in excess of 20 workshops primarily face to face but there were also several run as online sessions. (For details see below)
Online conferences	The project presented and contributed to a number of EMERGE online conferences as well as several face to face JISC events .
Evaluation	There are 2 Evaluation Reports, May 2008 and April 2009: http://purl.org/planet/mgmt/Draft++Evaluation+Report http://purl.org/planet/mgmt/EvaluationReportApr09

Appendix D: Planet Workshops

Date	Title	User Groups
May 2009	Expert Group on Patterns reconvened – Leeds Met.	Expert Group.
Mar 25 th 2009	Applying patterns to new problem scenarios	CETL ALiC

Date	Title	User Groups
Mar 24 th 2009	Symposium at CAL 09	
Mar 17 th 2009	Design Patterns for Civic Empowerment	Social Action
Mar 16 th 2009	Telling Stories of Good Practice	Leeds Met Teacher Fellows
Mar 5 th 2009	E-Learning Patterns Workshop, Tuebingen	
Mar 2 nd 2009	Digital Identities: EDID9 – workshop 2 – from case stories to patterns	Digital Identities
Feb 22 nd 2009	EXTEND online workshop	http://patternlanguagenetwork.org/2009/02/26/our-extendplanet-discussion/
Jan 27 th 2009	Successful Practice – workshop 4	CETL ALiC
Jan 8 th 2009	Digital Identities: from patterns to scenarios	Digital Identities
Dec 11 th 2008	Successful Practice – workshop 3	CETL ALiC
Dec 4 th 2008	Mapping patterns and concepts	JISC e-formative assessment
Nov 13 th 2008	Approaches to using technology to support learning in computer science and information systems subjects.	Computer Science staff
Nov 4 th 2008	Successful Practice – Workshop 2	CETL ALiC
Nov 3 rd 2008	Sharing TEL Practice	Staff at Leeds Met
Nov 3 rd 2008	From Expert stories to shareable design knowledge	JISC e-formative assessment
Oct 28 - 29 th 2008	The Reflective Practitioner – bringing together Planet team and external experts in the creation and use of patterns	Expert Group
Oct 2 nd 2008	Refining case studies	JISC e-formative assessment
Aug 8 th 2008	IDA workshop in Singapore	
Jul 24 th 2008	Successful Practice – workshop 1	CETL ALiC
Jul 7 th 2008	Making stuff together	
Jul 3 rd 2008	Capturing case stories	JISC e-formative assessment
Jun 23 rd 2008	JISC EMERGE online session – Sustaining Learning Communities	
May 20 th 2008	Pilot workshop reviewing current processes	Planet Team