



PLE Reference Model Project

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PLE Theme

Technology is changing, and the host of new projects, initiatives, emerging user behaviours and discursive disagreements around 'Personal Learning Environments' present a problem for the effective coordination of longer-term strategic planning in e-learning and institutional organisation.

We need to take stock of the trends and technologies and crystallise the fundamental processes in a model which we can use to guide us through this territory.

This will provide foresight for threats to current practice, direction for future development, and a focus for constructive discourse.

Why do we need a PLE Reference Model?

- Current Activity – (there's a lot of it!)
 - ELGG, LMOS, Boddington PLE, Chandler, Yahoo360, Google Desktop/ig, EyeOS, etc
 - And not to forget Web2.0, Myspace, FOAF, Flickr, 43 things, messaging, Syndication, etc, etc
- Accounting for the transformation of online behaviour.
 - Rise of online activity in teenagers (blogging, MSN, music, etc), demise of (non-interactive) TV
 - Convergence of many communities of practice around a single environment – this includes many instances of 'informal learning'.
- Need for Coordination of future projects
- The need to identify issues that pertain to the future organisation of institutional IT provision.

Basis of the Reference Model

- No model exists that we can build on...
- .. but a lot is written about the 'PLE-ness' of various projects (with different interpretations of what this means)
- We must therefore:
 - Analyse current and emerging practice and technologies
 - Identify patterns of usage
 - Analyse trends in technological development and user behaviour in the light of **categories** identified through...
 - Analysis of underlying trends in the general use of technology
 - Philosophical investigation of tool usage
 - Identification of categories for understanding technology



Foundations of Reference Model

■ Categories

- What is the essence of the relationship between humans and technology?
- Ways of envisaging human organisation with technology

■ Patterns

- What are people doing now?
- What are they likely to want to do?

■ Themes

- What does it all mean?
- Who is affected and how?

PLE Categories 1

■ Service and Instrument

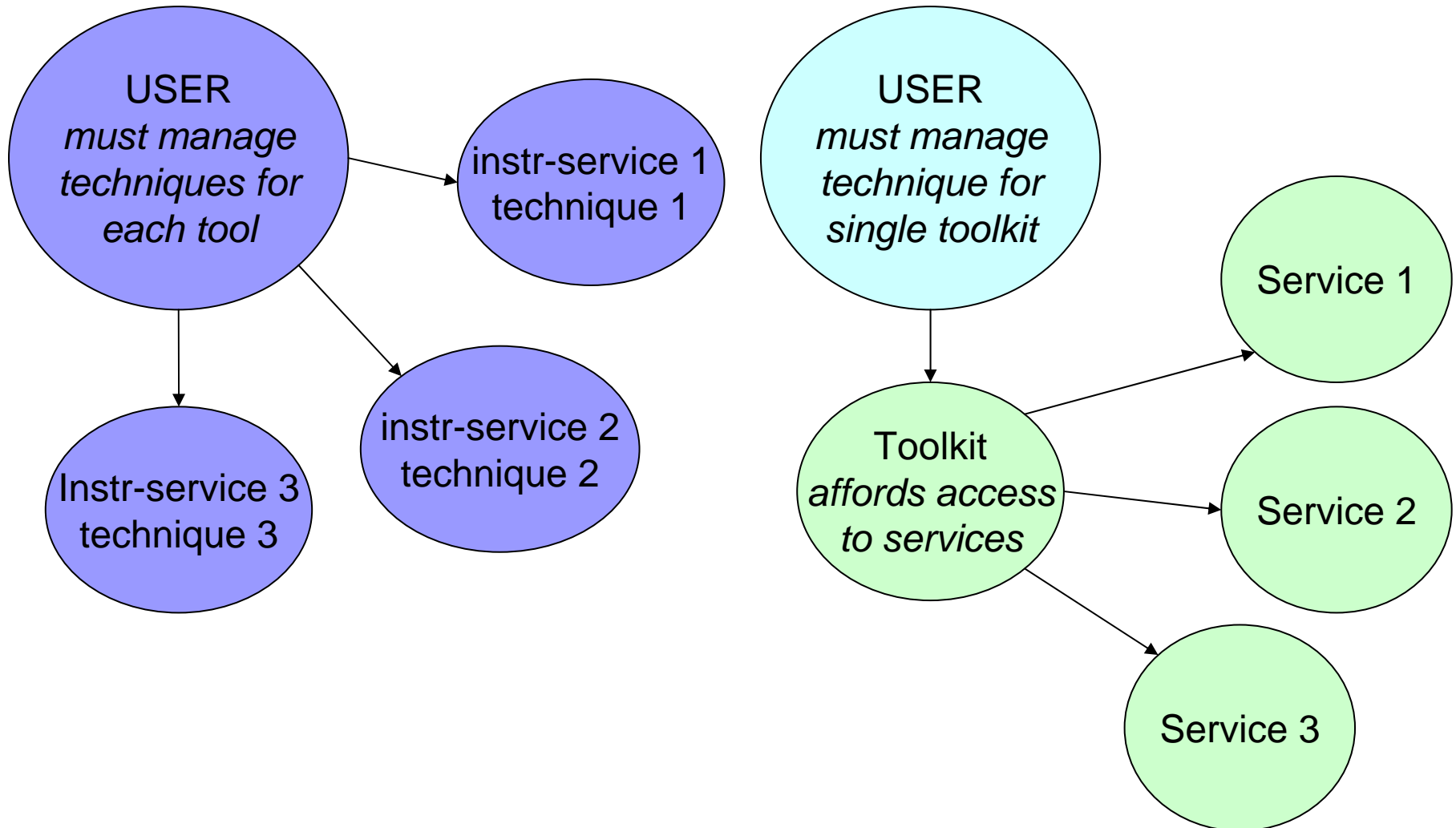
- A tool is characterised as an extension to human power realised through human interaction with its interface (or the *instrument*)
- With most (non-e) tools, the service that the tool provides (its function) is tightly-coupled with the instrument (its physical form)
 - Hammer, spade, etc
- It is a feature of SOA that a division of service from the instrument is possible.
 - Imagine the 'robotic JCB' that exposes its functionality as an API which can be realised in whichever way the user chooses...
 - This has cognitive benefits in the **management of technical skill...**

PLE Categories 2

- The management of technical skill
 - When using a tool, we must learn how to relate to its interface
 - This entails a process of biological conditioning to acquire the necessary cognitive and motor skills.
 - A large number of different tools necessitates the learning and management of a large number of dispositions.
 - This may be characterised as a ‘cognitive burden’

The Management of Technical Skill

- Two Views:



PLE Categories 3

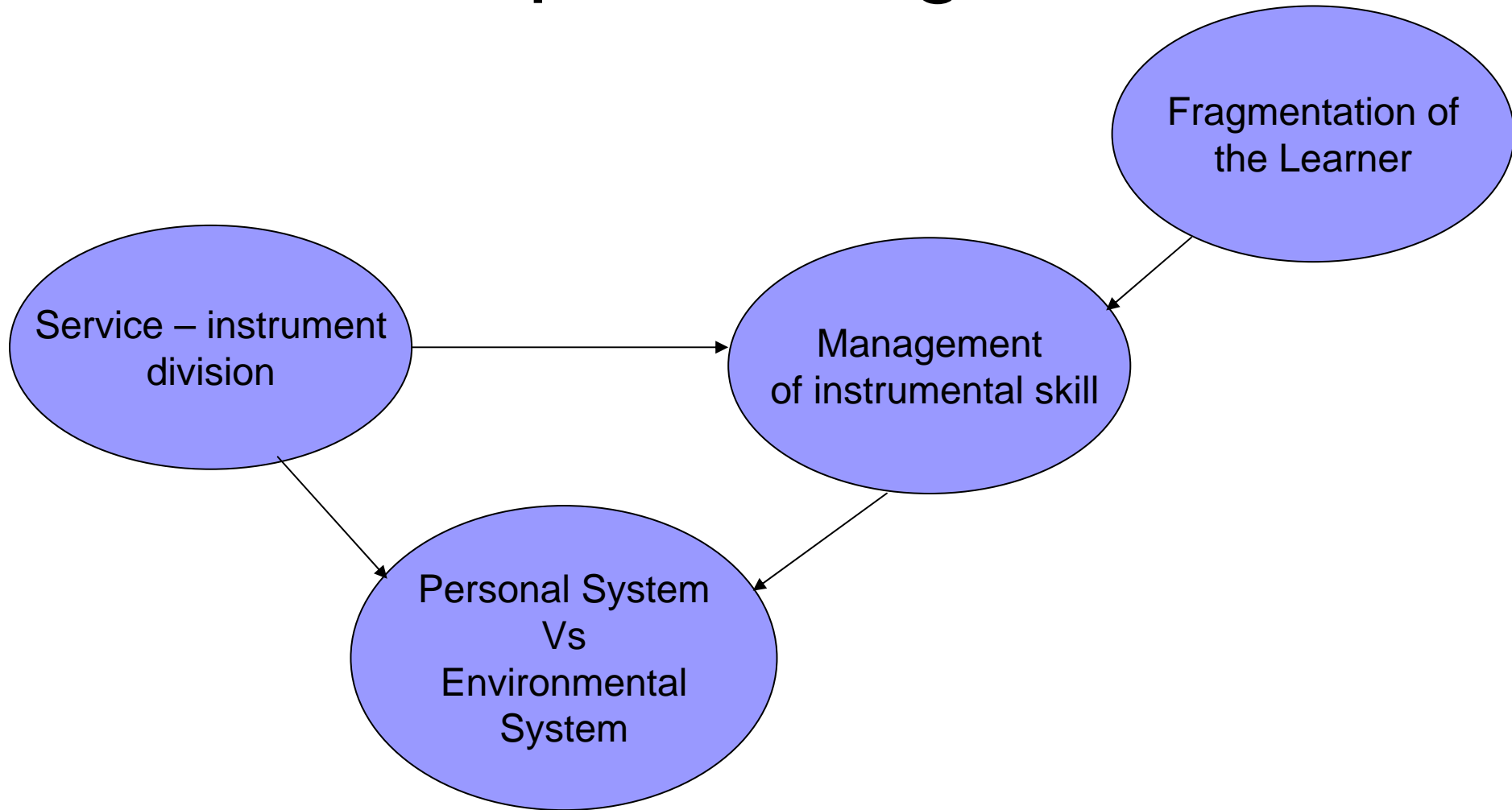
- Personal System, Environmental System
 - An environmental system is a system that gives access to tools (usually tightly-coupled as service and instrument)
 - Eg. Operating Systems, Web browser
 - A personal system is a system that gives access to services but gives control of instrumentation to the user
 - A personal system is accessed through an environmental system.

PLE Categories 4

■ Fragmentation of the Learner

- The 'whole learner' is never on a course
 - What we have instead is a fragment of the learner
 - This fragment is one of many, most of which have nothing to do with a course of study, but all of which can impact on the learning.
 - Eg. Family, finance, work, hobbies, health
 - All these fragments must be managed, and the 'whole person' is a coordination of the combined management of fragments.
 - This entails a large variety of tools and services that must be engaged with.

Relationship of Categories



Patterns of Technological Usage relevant to learning

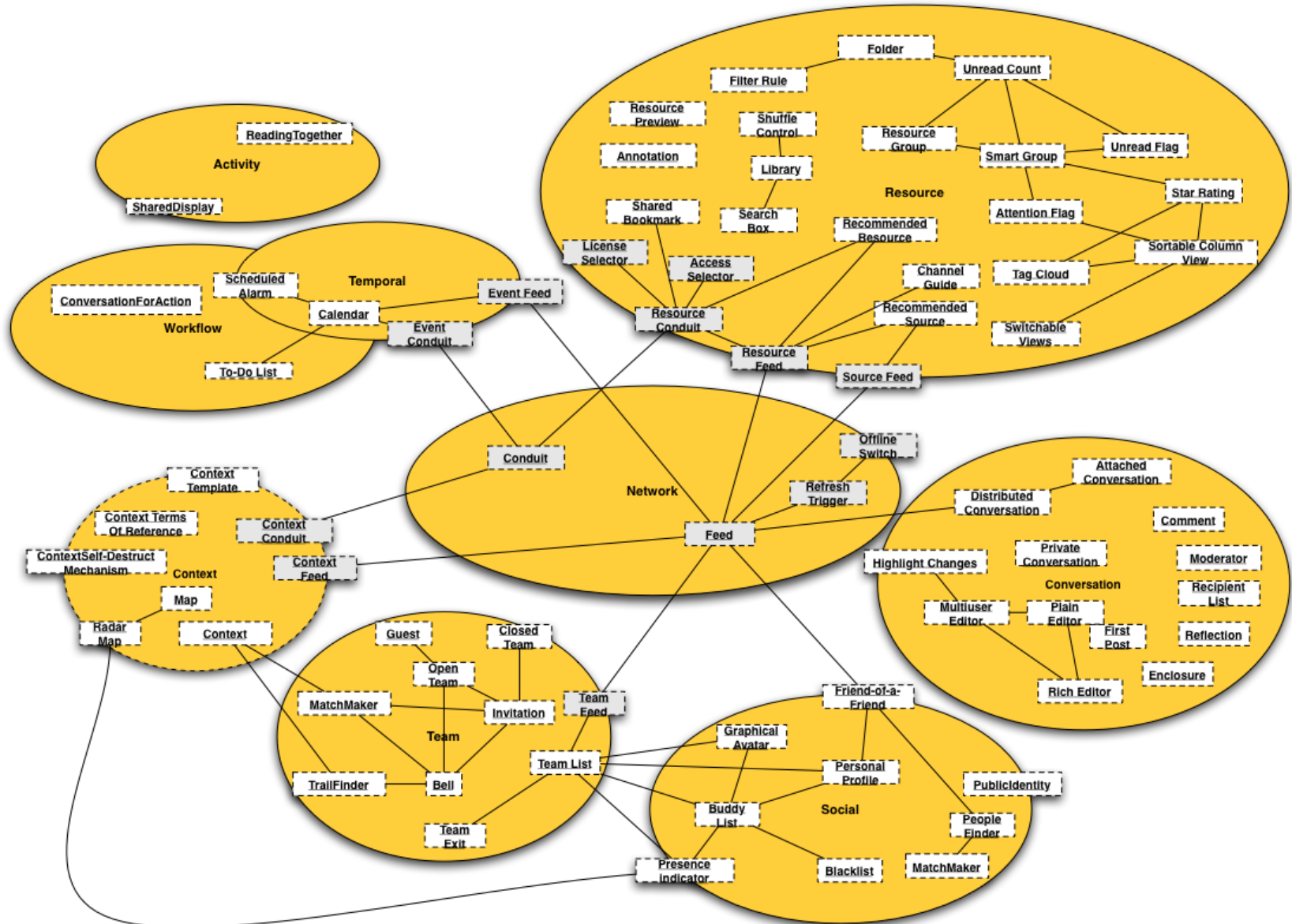
- Using a Pattern-discovery methodology with a number of different current tools and software, we have identified the following patterns:
 - Context Patterns
 - Conversation Patterns
 - Network Patterns
 - Resource Patterns
 - Social Patterns
 - Team Patterns
 - Temporal Patterns
 - Workflow Patterns
 - Activity Patterns

These patterns relate to a number of different **agents**, not just Learners, but also teachers and administrators..

Tools and Software analysed for Pattern identification

- Email and PIM (*Outlook, Chandler*)
- Chat and Messaging (*iChat, msn*)
- Calendaring and Scheduling (*iCal, BaseCamp*)
- News Aggregation (*NetNewsWire, Shrook*)
- Weblogging, Pers. Publishing (*Flock, WordPress*)
- Social Software (*Flickr, 43Things, del.icio.us*)
- Authoring and Collab. Working tools (*Writely*)
- Integration Tools (*Netvibes, SuprGlu*)

PLE Pattern Map



PLE Themes 1

■ The locus of control

- The transition to PLE is a transition from tightly coupled tools to separated service-instrument provision.
- Instruments are in the control of the user
- This permits more effective **management of technical skill:**
 - **Management of technical skill** at a single point
 - Services accessed straddle many **learner fragments**

PLE Themes 2

■ Institutional Issues

- change in role from provision of technology to support for services
 - Why duplicate technologies and services (ie. Move away from institution as ISP, etc)?
- Focus on those services which pertain to the core business of the institution
 - focus on design of effective learning services
 - Less delivery-focussed
- institutions stop owning students
 - seeing themselves as part of the learning journey, providing services to support the student self-organisation

PLE Themes 3

■ Pedagogical Issues

- Learner takes control of a single learning space that straddles their communities of practice
 - encourages student to see learning as inter-related
- support development of skills in managing learning, recognising goals and progress, communication and teamwork skills
- The management/organisation of technology becomes embedded in the management of learning

The Model: View 1

•Categories

•Main feature is separation of **Toolkit** and **Service**. This typifies the **personal system**. The toolkit represents a single set of **dispositions** for managing a wide range of services.

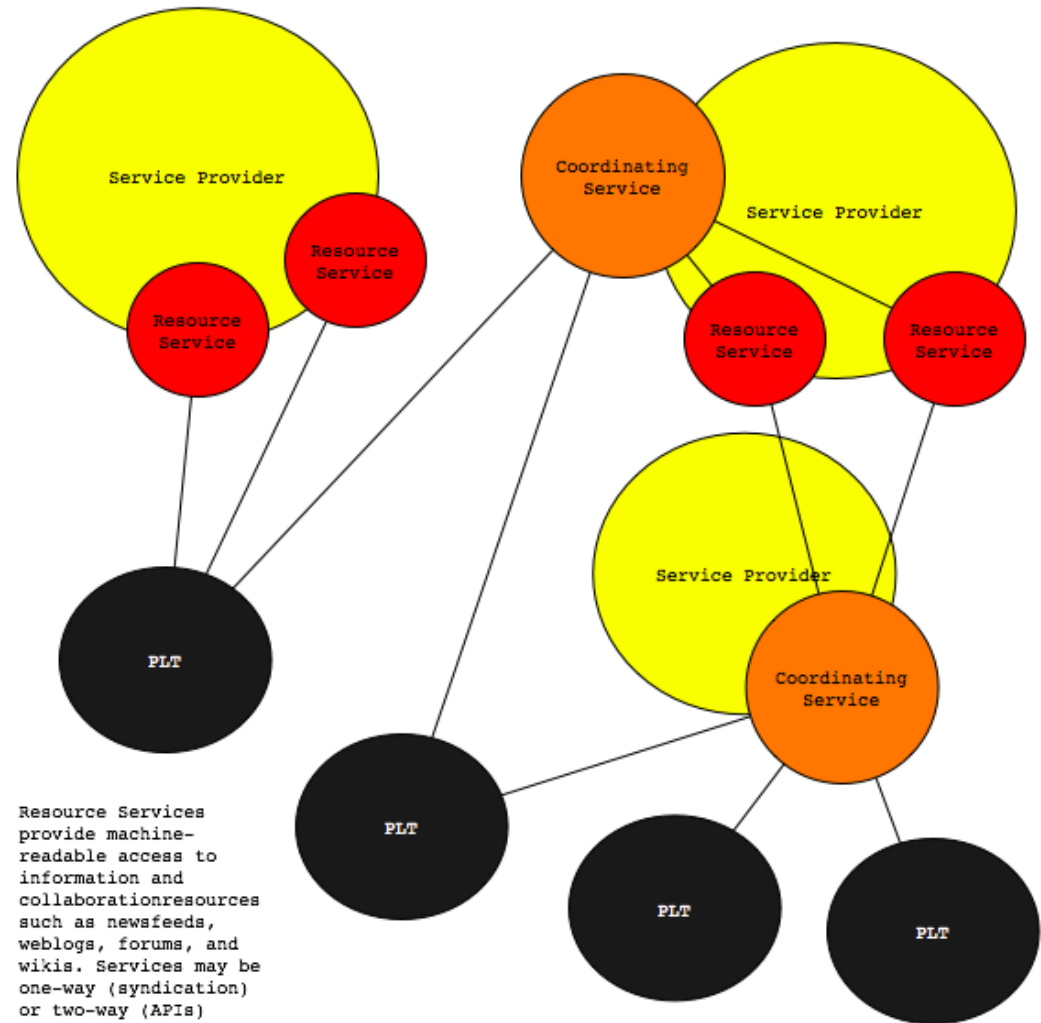
•Patterns

•**Network patterns** (feeds and conduits) are embodied in the service-toolkit links

•**Social and team patterns** embodied in relationships between coordinating services

•Themes

•**Locus of control** is clearly the learner-PLT. **Institutions** provide services.



Resource Services provide machine-readable access to information and collaboration resources such as newsfeeds, weblogs, forums, and wikis. Services may be one-way (syndication) or two-way (APIs)

Coordinating Services provide contextualization of sets of resource services, and enabling the sharing of personas (personal information profiles) amongst participants

Service providers can be institutional, commercial, or personal hosting services. For example, the shared bookmarking service [del.icio.us](#), the blog hosting service [edublogs](#), and the institutional system Sakai are all examples of service providers in this context

A PLE may connect directly to resource services (for example, a newsreader), use only coordinating services, or a combination of both approaches.

Services of the model

- The following services are specified in our model (The list is not exhaustive. The services are based on patterns which are *tensed*, and we should expect new technologies to transform patterns of behaviour)
 - Activity Management
 - Workflow
 - Syndication and Posting
 - Group
 - Rating, Annotating, and Recommending
 - Presence
 - Personal Profile
 - Exploration and Trails
 - ... and ones which are generic

The Model: View 2 (with services)

•Categories

•Services support patterns of behaviour that reflect **Learner Fragmentation**. Also, single point of management of **dispositions** very clearly shown here.

•Patterns

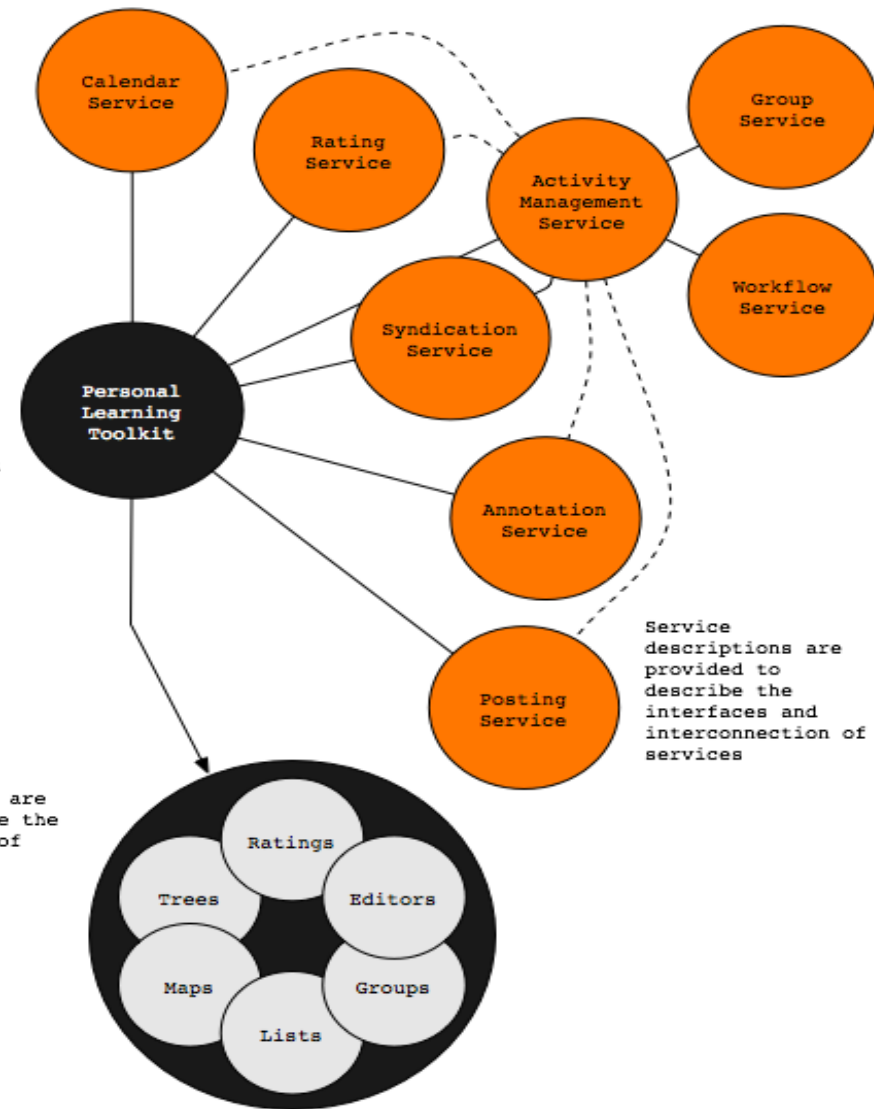
•**Context, Workflow and Resource patterns** are enabled through workflow and activity management services. **Temporal Patterns** enabled through Calendaring, **Social patterns** through group services.

•Themes

•**Pedagogical themes** are particularly emphasised here, as is the **Locus of Control**.

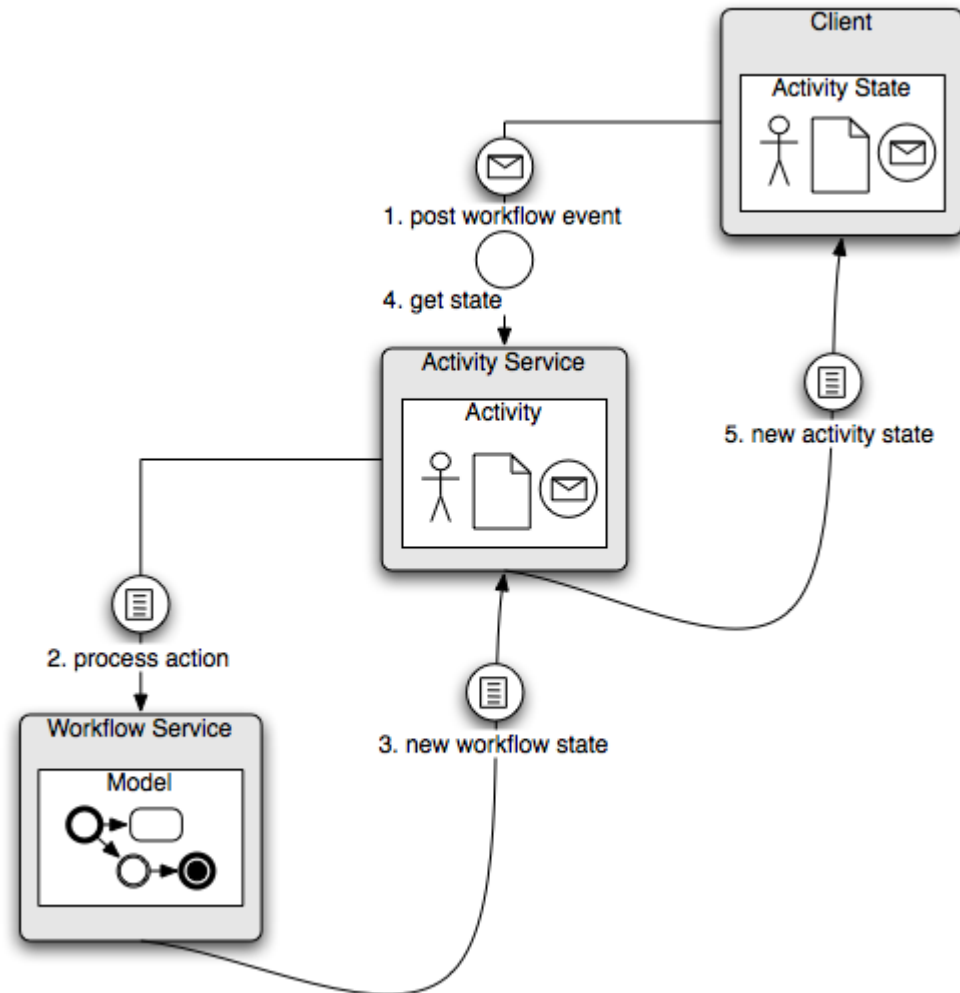
Prototypes are provided to demonstrate the use of a personal learning tool to interact with services and support self-organisation

Design Patterns are used to describe the implementation of instruments



Example Service Specification

- Activity Management Service
 - allows a PLE user to
 - publish activities,
 - join activities others have created,
 - contribute resources for activities
 - access resources for activities.
 - Broker for Workflow service
- Helps to demarcate the boundary between **Workflow** and **Activity Management**.



PLE Learner Use-case scenarios

Heibert's diagram shows **Learner** use-case scenarios and the integrating possibilities of the PLE.

The **Learner** is one of a number of **Agents** that need to be considered within the model. Others include **Teacher** and **Administrator**.



The Reference Model as a tool for reviewing current technologies

- Review of LMOS, ELGG, PLEX
 - LMOS concentrates on a framework for services
 - This effectively maps a lightweight toolkit onto a 'heavy' body of services
 - Advantages in interoperability and the exposure of new aggregating/coordinating services.
- ELGG is a web-based implementation
 - Relatively heavy toolkit (web tools)
 - Uses established services (FOAF, etc)
 - Advantage in single point of access to all toolkit functionality
- PLEX
 - Heavy toolkit (Rich client based)
 - Lightweight services (FOAF, XCRI, 43 things, etc)
 - Advantages in speed and affordance of Rich client.

The Reference Model as a guide for design and coordination

- Focus on the **Patterns** of the model can guide design in the implementation of services.
- The pattern map in its relationship to the service map can help coordination, as can the agreement of standards (ATOM, FOAF, XCRI, etc)
- New patterns will emerge which can be identified with reference to **PLE categories** and pattern methodology.
- **PLEX** has been a testbed of the implementability of the model. It is, however, not the only way of doing it.
 - A design may be *toolkit-oriented (PLEX)*, or *service-oriented (LMOS)*. Both approaches are consistent with the model.
- Further coordination possible through the recursive exposure of services by existing Personal Learning Tools.

The Reference Model as a focus for discourse.

- “the PLE (or LMS) is not necessary... The Operating System with internet provision is all that is required...”
 - The categories of the model can address this:
 - Environmental System vs Personal System
 - Service-instrument boundary
 - Management of Technical Skill

The prototypes

- The purpose of the prototypes is to embody the principles of the reference model
- PLEX
 - Rich-client solution
 - Supports some (as yet not all) patterns as discussed
- PLEX/w
 - Web-based solution



What's left to do...

- Finish Writing
- Consultation
 - Investigate interface with other RMs
 - Investigate pedagogical implications
- Dissemination and Evaluation
 - Workshop in June @ Bolton