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GRÁINNE CONOLE AND CHRIS JONES

SHARING PRACTICE, PROBLEMS AND SOLUTIONS FOR INSTITUTIONAL CHANGE

Comparing different forms of representation

INTRODUCTION

This chapter critiques the roles of different forms of representation of practice as part of an institutional change process. It discusses how these representations can be used both to design and to share learning activities at the various levels of decision-making in a university. We illustrate our arguments with empirical data gathered on change processes associated with an institution-wide change programme: the introduction of a new virtual learning environment (VLE). In particular, we describe a case study of the introduction of the VLE tools in a business course. We focus on two particular forms of representations to describe the essence of the innovation: a pedagogical pattern and a visual learning design. We argue that pedagogical patterns and learning design have emerged as parallel approaches to describing practice in recent years. Despite their very different origins, both provide complementary representations, which emphasize different aspects of the practice being described. We are attempting to combine these approaches. We briefly outline the Open University Learning Design initiative, of which this work is part, and describe its key underpinning philosophies. We believe our approach provides a vehicle for enabling a better articulation of design principles and the discussion of issues concerning the re-use of educational resources and activities.

We have previously argued that there is a gap between the *potential* of technologies to support learning and the reality of how they are *actually* used. This is partly due to a lack of understanding about how technologies can be used to afford specific learning advantages and partly due to a lack of appropriate guidance at the design stage (Conole, Oliver, Falconer, Littlejohn & Harvey, 2007). The gap is also one that points to fundamental problems, suggesting an indirectness affecting the entire design process in relation to learning (Jones, 2007, Jones, Dirckinck-Holmfeld & Lindström, 2006). This chapter suggests ways to manage these issues (acknowledging the potential difficulties in relation to design for learning) and outlines the basis for a learning design methodology incorporating design patterns, which might be adapted and applied in the context of the implementation of a VLE. The initial focus of the learning design work is reported elsewhere (Conole *et al.*, 2007, Conole, 2008a; in this chapter we focus on how a

particular institutional change programme – the introduction of a new VLE – has acted as a catalyst for new curriculum design.

Representing and sharing practice is far from trivial; design, as a process, is creative, messy and iterative. This chapter describes the OU Learning Design initiative, which takes these facts as a starting point and employs a four-part strategy to researching the design process: understanding design, visualizing design, guiding design and sharing design. It goes on to focus on the visualization of designs and briefly reports on the work we have done to articulate the different forms of representation of practice and their meaning. We then use this to focus on two representations of a case study describing the use of VLE tools in a business course context, arising from the VLE change programme.

The context

The Open University (UK) is an unusual, if not a unique, institution; it combines an industrial model of course production with a deeply embedded in-house pedagogical approach – ‘supported open learning’. Recently the decision was taken at an institutional level to implement a new technological infrastructure: the Open University Virtual Learning Environment (OU VLE). The OU VLE implicitly questioned current practices for course design, both in terms of the existing divisions of labour and in terms of pedagogical approaches (Sclater, 2008; Jones, 2008). This chapter situates its arguments in relation to design in this whole-institution change in technological infrastructure.

The division of labour in the Open University follows a core and periphery model. The course team is the basic unit for the design of OU courses. It is the course teams, located centrally, who write courses, devise activities and coordinate with central services. The course team is responsible for the production of course materials. The course team also lays out an overall plan for the tasks structuring the student’s activities; this is typically specified in a ‘course guide’, which explains how the student is expected to study and provides a timetable of progress through the course activities and assessment. Students are expected to move through the materials and activities as a cohort, and the timetable is enforced through a series of continuous assessment deadlines. Associate Lecturers are employed on separate part-time contracts; it is this group that maintains day-to-day contact with students through telephone, email and asynchronous and, recently, synchronous conferencing. In addition, on some courses, there are face-to-face tutorial and residential components.

The Open University faced problems arising from the decision, at an institutional level, to introduce a new technological platform that had significant consequences for the capacity of central academics to design for it. New technologies in the OU VLE include blogs, wikis and an e-portfolio system alongside systems for content management. These innovations suggested new relationships between content provision and the existing division of labour for course design. However, OU pedagogy was still deeply rooted in the development of activities located around paper-based texts, often produced by the OU to be used as course texts, as the primary teaching material. The OU VLE prompted a shift

towards a more multi-modal form based on web services, in which the roles of content producers and content consumers are less easily defined and separated (for an earlier discussion of the OU VLE and sharing practice see Jones and Conole, 2006). The VLE programme has acted as a catalyst, highlighting the tensions inherent in the current production-based paradigm, where course production and delivery are separate. In particular, the OU VLE involves the breakdown of the previous learning infrastructure, the largely taken for granted and background set of processes through which technological platforms provided a stable environment for course production and the day-to-day teaching and learning activity of the university. Therefore there is an increasing need both for mechanisms that provide guidance to academic staff to take account of new technologies in the redesign of courses, and for better forms of representations of practice so that ideas can be shared between course teams, developers and course deliverers.

INFRASTRUCTURE LEVELS AND DESIGN

The OU VLE provides the university with a new infrastructure for teaching and learning. This is not just a set of tools and technologies, but offers the potential for new processes in design for teaching and learning. We take a perspective on infrastructure that draws on the work of Susan Leigh Star and Karen Ruhleder, who argue that infrastructure is a relational concept and ask *when* – not *what* – infrastructure is (Star and Ruhleder, 1996, p. 113). It also draws on the notion of *infrastructures for learning* (Guribye, 2005) to deal with the way in which educational design relies on the interconnectedness of artefacts with other technological, institutional and social arrangements. We are therefore taking a somewhat different approach to the micro-design level interpretation of ‘infrastructure’ found in e.g. Bielaczyc (2006) and Lakkala *et al.* (2008). Our concept of infrastructure applies more comfortably at the macro and meso levels, in which infrastructures take the form of being given in terms of local design, rather than **being** a part of the day-to-day design process (Jones *et al.*, 2006). This implies a relationship between design and learning in which infrastructures for learning are not directly designed by the academic staff who are then involved in the more detailed pedagogic design of courses and programmes.

We argue that it is useful to supplement approaches to infrastructure with a focus on design that takes place at what we call the meso level (Jones *et al.*, 2006 and Dirckinck-Holmfeld, Jones & Lindström, 2008). The meso level can be thought of as the level of interaction that is intermediate between small-scale, local interaction and large-scale policy and institutional processes. The idea of a tripartite division into macro, meso and micro levels is not new and has been developed most recently in the field of complex systems (Liljenström and Svedin 2005). The meso level can be characterized from this point of view as ‘the level in between the micro and the macro, as that is the domain where bottom-up meets top-down.’ (Liljenström and Svedin, 2005 p5). In terms of the OU VLE, the focus is not on the infrastructural change that provides the driver for change, nor on the day-to-day enactment of courses through activity guided by the Associate

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Lecturers. Instead, it is the organizational sub-units of the university, such as academic schools and faculties, which are the focus of this chapter. The smallest unit we are concerned with is the course and, in particular, the OU course team.

DESIGNING FOR LEARNING

The relationship between planning and design in tertiary education and the situated actions that teachers and students engage in has become increasingly problematic. Policy pressures have been added to technological changes to promote increasingly formal rational planning approaches to design (Jones, 2007). However, many practitioners are rarely involved in the design of the technological and institutional infrastructure they work with and in. Design in such a setting is a process of mobilizing what are, largely, given elements to create particular sequences of activities, and, at a higher level, courses and programmes, within networked learning environments. We argue that learning can never be directly designed, only designed *for* (i.e. planned in advance) (See also Jones, 2007; Beetham and Sharpe, 2007, Wenger, 1998 p225; Lave and Wenger, 1991 pp 97–98). Learning itself is only indirectly related to what we design and plan; indeed we argue that it is at least two steps removed. The tasks, spaces and organizations we design must be inhabited by others – the teachers and learners who ‘enact’ our designs. Goodyear has summarized these distinctions as an *indirect* approach to learning and educational design (Goodyear, 2000; Goodyear, Jones, Asensio, Hodgson, & Steeples, 2001). The assumption that learning can be designed relies upon a reliable, direct relationship between the design intentions embodied in design materials and artefacts and the actual learning. We believe there is a much less direct relationship. Nevertheless, we have identified six main reasons why adopting a broad learning design approach can be beneficial at all levels (Conole *et al.*, 2007). A learning design approach can:

- act as a means of eliciting representations/scenarios/designs from academics in a format that can be tested and reviewed with developers (that is, it can provide a common vocabulary and understanding of learning activities)
- provide a means by which *designs* can be abstracted for potential circulation and re-use (rather than just sharing *content*)
- provide scaffolding, guiding individual practitioners through the process of creating new learning activities
- create an auditable trail of academic design decisions
- highlight policy implications for staff development, resource allocation, quality, *etc.*
- aid learners in complex activities by guiding them through the activity sequence.

THE OU LEARNING DESIGN INITIATIVE

The OU Learning Design initiative has been funded through internal strategic funding. It focuses on how to help teachers/designers create more pedagogically informed learning activities for students that make best use of the potential affordances of new technologies. Our goal is to build on recent research on

learning design and design patterns, whilst recognizing the fundamental problems related to design for learning, in order to develop tools that provide support in the course design process, with an emphasis on the use of technology-enhanced learning. ‘Learning design’ has two distinct meanings, often distinguished by capitalizing the term when referring to the more formal technical specification of design through IMS LD (IMS, 2003) and leaving the term in lower case when referring to ‘learning design’ in a more general sense (Britain, 2004, Beetham and Sharpe, 2007). Our work focuses more at the level of designing for learning, therefore we define it as follows:

‘Learning design’ refers to the range of actions associated with creating a learning activity and crucially provides a means of describing learning activities.

The initiative has three main activities, which map to the four areas of the design process. These are:

- gathering a range of empirical evidence to try and better understand the design process – through interviews, focus groups and workshops (i.e. understanding design)
- gathering tools, resources, methods and approaches to design (i.e. visualizing and guiding design) and
- creating ~~on~~ ~~of~~ tools (i.e. visualizing, guiding and sharing design).

— In this chapter, we support our arguments with examples from the empirical data and use one of the tools we have produced, a visualization tool, CompendiumLD, to create one of the representations for the case study we discuss in depth.

Central to our approach is the fact that design is inherently a creative and messy process, dependent on a rich range of interconnected factors. No one approach is likely to meet the needs of all users (for a discussion of three approaches including design patterns see McAndrew, Goodyear, & Dalziel, 2006). Therefore part of our philosophy is to adopt a ‘pick and mix’ approach to design ~~in which~~ tools and resources need to accommodate the following characteristics, rather than impose a single ‘correct’ way of working:

- *Design processes work at different levels at different times in the design lifecycle.* For example, at one point the focus might be on the formulation of high-level learning outcomes, at another instance the focus might be on the incorporation of individual digital assets into a learning sequence. At key points there may need to be a more holistic perspective mapping the different components of the design to ensure there is pedagogical adherence.
- *Design is not focused on a single entity* – it combines different types of activity that are inter-dependent; for example, planning pedagogy, creating resources, specifying support.
- *Design is an iterative and multifaceted process;* individuals are likely to constantly switch between levels of design and focus on different elements.
- *Users will approach the design process from different perspectives;* for example, working from available resources, from assessment, or with a specific technology in mind.

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– *Design is both an individual and a group process.*

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To date the data have consists of 45 case studies of the use of VLE tools, 12 interviews with individual teachers/designers and a series of focus groups and workshops (progressively demonstrating the latest in our thinking and enabling participants to trial and give feedback on the prototype tools we have developed). In terms of tools developed, to date we have a visualization tool (CompendiumLD) and a social networking site for learning designs (Cloudworks). Cloudworks also contains tools and resources for fostering the development of a virtual community of users and promoting the uptake and sharing of designs. In this chapter we provide an example of a visual representation produced in CompendiumLD to compare and contrast with a description of the same activity as a pedagogical pattern (see the case study below). A number of papers provide more details of the background and different aspects of the overall OU LD initiative (Conole *et al.*, 2008, Conole & Weller, 2007)⁸. We have also produced a series of briefing papers (http://e4innovation.com/?page_id=13) (Conole 2007a) and Cross, Conole, Clark, Brasher, & Weller (2008) provide details on the findings from interviews. Brasher *et al.* (2008) discuss the technical rationale for the development of CompendiumLD.

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A tool for visualizing designs - CompendiumLD

We selected the software Compendium as our initial prototype for the learning design tool for a number of reasons. First, it was produced in house at the OU and we felt there was therefore more opportunity for further tool development, specifically in terms of learning design requirements. Secondly, Compendium supports the creation of a range of visual mapping techniques, including mind maps, concept maps, web maps and argumentation maps (Okada & Buckingham Shum, forthcoming), which we felt offered the potential for a range of flexible approaches to the design process. Compendium comes with a predefined set of icons (question, answer, map, list, pros, cons, reference, notes, decision, and argumentation). The creation of a map is relatively simple because users can drag these icons and build up relationships between them represented by connecting arrows. Each icon can have an associated name attached with more details contained inside the node. An asterisk appears next to the icon; if the user hovers their mouse over this, the content inside the node is revealed. Other types of electronic files can easily be incorporated into the map, such as diagrams, Word files or PowerPoint presentations. The reference node enables a direct link to be made to external websites. Icons can be meta-tagged using either a pre-defined set of key words or through user-generated terms. Maps can be exported in a variety of ways from simple diagrammatic jpeg files through to inter-linked websites.

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Figure 1 illustrates a learning design map in Compendium. Examples of some of the other designs developed from OU courses have been described elsewhere (Conole *et al.*, 2007; Conole, 2008a). The example provided here is based on an activity that was developed by Bernd Rüschoff; the Compendium map was created

in conjunction with him in just ten minutes during the Eurocall 2007 conference and so illustrates the ease with which these diagrams can be produced. The diagram represents an illustration of a learning activity that centres on language students analysing a song. Two roles are shown (tutor and student), along with the respective tasks. Tools, resources and outputs associated with each task are shown, with arrows indicating connections. Additional notes about the activity are also included, which provide contextual information, such as the type of skills the exercise aims to develop and the success factors which help to ensure it works.

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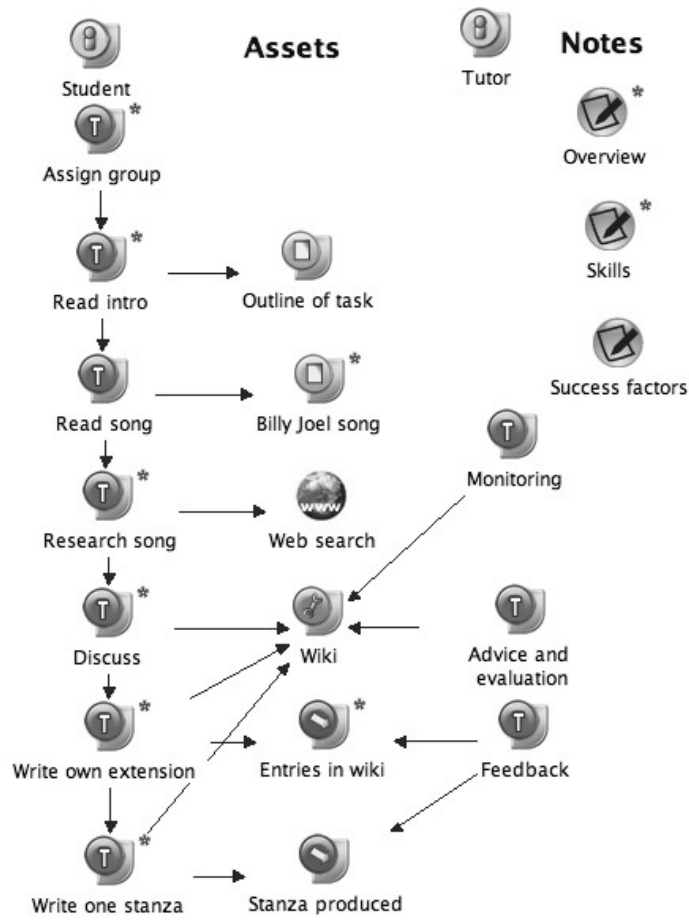
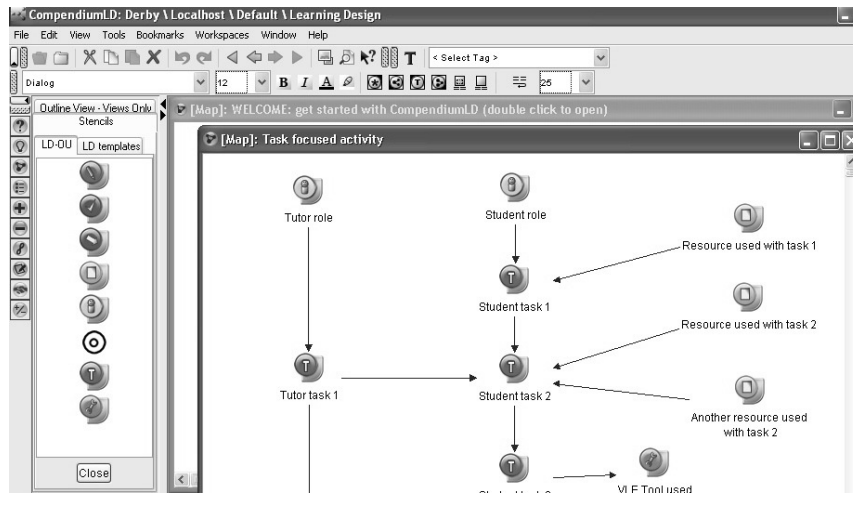


Figure 1: Visual representation of a collaborative activity using a wiki



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Figure 2: Screenshot of Compendium with the learning design stencil set of icons

As part of the core functionality of the tool, it is possible for users to create and incorporate their own ‘stencils’ of icon sets. We adapted Compendium by creating a dedicated set of learning design icons, to complement the generic set available within the tool. The new set of icons was labelled with appropriate text and given an overarching stencil name set. We chose to focus on a simplified list of icons to represent what we felt were the key aspects of the design process, namely: task, role, tool, resource, output, group, assignment, and activity. All of the icons are of the same type except for the activity icon (‘activity’ in this usage follows OU practice and identifies a set of tasks, roles and resources), which is a variant of the generic map icon. As with the core Compendium icon set, users are able to rename each of the icons to something more appropriate to their context. Once created, the stencil set is opened via the tool drop-down menu. *Figure 2* provides a screenshot of Compendium, showing the generic set of icons on the far left-hand side, along with the learning design stencil we created.

The new stencil set was used as a means of representing the learning activities being described in the case studies. We fixed on a simplified approach that consisted of a column for each role (student, tutor, *etc*) and an associated column for the ‘assets’ associated with that role (i.e. any resources, tools or outputs). We created a set of adaptable templates that users could work through and adapt to their own context. In addition to the creation of iconic stencil sets, Compendium also enables the user to create customizable templates. A template is a Compendium xml export file, which holds a set of maps/nodes that the user might use frequently. We used this template facility to create a series of learning design templates, each of which focused on a core set of different approaches to the design process:

- Simple step-by-step guidance. *Figure 3* provides a screen shot showing the LD template set on the side with the open ‘step-by-step’ template.
- Empty ‘swim line’ style diagrams showing the key components for creating a diagram.
- Mapping templates: a simple one linking learning outcomes, tasks and assessment and one linking tools, discipline problems, outcomes, assessment learning activity and topics covered.
- Two focusing on the ‘affordances’ (Conole & Dyke, 2004) that different tools and activities potentially offer.

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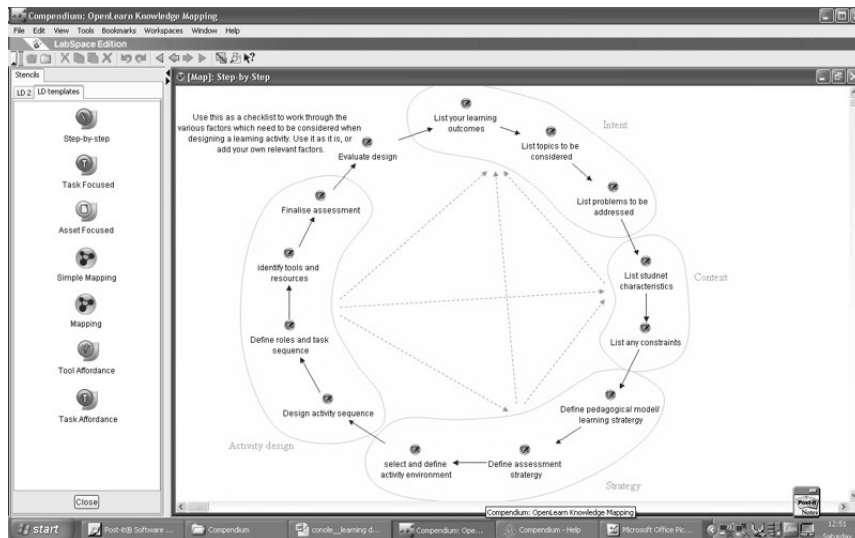


Figure 3: The seven LD templates with the step-by-step template open

Various iterations of the CompendiumLD tool have been trialled, both within the university and at a number of international conferences and workshops. Feedback from the workshops has been positive: attendees reported that they liked CompendiumLD, found it easy to use, and a useful tool both to help them think about and articulate their design process and also as a means of representing and sharing their design. However a number of issues remain:

- some users do not think in terms of design and find the concept of design alien
- some users find it difficult to think visually
- the prototype currently operates at a micro-granular level of activity and does not enable the user to switch to consider design issues at the course or programme level

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- despite the relatively easy interface, some users are likely to require more training and support than others.

In addition it is unclear yet how such a tool might be used over a longer time frame collaboratively within a course team to build up a shared and evolving design artefact. Based on these findings we are currently in a second phase of work. This consists of a number of inter-related activities:

- Continued development and adaptation of CompendiumLD. This includes integration of help and prompts to guide the user at various points in the design process.
- A series of interviews to develop a deeper understanding of teachers' views about design. This includes questions grouped into five main areas: process (how do they go about designing), support (how do they generate ideas, what kinds of support do they use), representation (how do they represent their design ideas), barriers (what are the barriers they encounter) and evaluation (how do they evaluate how 'good' a design is).
- In-depth course evaluations. Following courses in-depth to gain a detailed understanding of how design is embedded across the course development process and in what ways it manifests itself.
- Focus groups and workshops. A series of focus groups and workshops including: testing the adapted Compendium LD and the prototype social networking site for design, Cloudworks; comparison of different learning design tools and identification of their different uses; exploration of case studies and resources for learning design: a technologies 'think tank' to consider how the best in recent technological innovations and understanding might be harnessed to address the core issues of learning design.

FORMS OF REPRESENTATION

In related work, we have suggested that there are many different forms of representations or ways in which practice can be represented (Conole, 2008b; Conole & Mulholland, 2007). Each abstracts a different level of detail, emphasizing different features of the learning activity being described, and each therefore has different intended audiences and uses. Conole (2008b) terms these 'mediating artefacts' to emphasize their role in the design process:

Central to this is the fact that we want to abstract the essential and transferable properties of learning activities, i.e. we want to abstract and describe those properties that are effective but can also be applied to other contexts, those properties that are not context bound to a particular instance of activity. Learning activities can be 'codified' into a number of different *forms of representation*, which each foreground different aspects of the learning activity and which provide a means of illustrating the inherent design. These forms of representation are defined here as *mediating artefacts* because this emphasises their mediating role in terms of how they are used to mediate subsequent design activities. Course designers use a range of these

mediating artefacts (MAs) to support and guide decision making, ranging from rich contextually located examples of good practice (case studies, guidelines, *etc.*) to more abstract forms of representation which distil out the ‘essences’ of good practice (models or patterns). (Conole, 2008b: 190–191).

Conole & Mulholland (2007) classified these representations into three main types depending on their purpose:

- *Educational representations* focus on the educational aspects of the practice – giving a description of the pedagogical approach or a broad outline of the focus of activities,
- *Technical representations* provide the detailed descriptions to instantiate a learning activity into a digital run-able format.
- *Process or operational representations*, which sit between the educational and technical, give a temporal description of the activity and the connections between the different components.

Examples of educational representations include brief higher level overall descriptions of the educational approach being adopted and pedagogical patterns; whereas examples of process/operational representations include lesson plans and visual schematic representations. The difference is that, in the latter, there are more details on the *process* or enactment of the practice, and often the relationship between the different components involved. Conole and Mulholland take an inquiry-based learning educational scenario in which students are set an inquiry-based problem and choose different methods of inquiry to address the problem and work individually, and then collectively, to solve it. They illustrate this scenario in a range of different forms of representation across the three levels (educational, process and technical) and argue that seeing the same activity represented in these different ways helps to:

provide clarity about the different ways in which educational scenarios can be formally represented and provide guidance on ways in which we can provide ‘scaffolds’ to support designers/teachers in the creation of educational scenarios, as well as ‘scaffolds’ to support teachers/students in the orchestrating and running of educational scenarios. (Conole & Mulholland 2007 p11)

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Comparing two representations

The previous section argued that practice can be represented in a number of different ways. This section focuses on two forms of representation – visual LD and pedagogical patterns. The use of Compendium in terms of learning design can be compared and contrasted with the use of design patterns. The original ideas for patterns and pattern languages come from the writings of Alexander and they provide a principled but flexible resource for design that balances rigor and flexibility by offering useful design guidance without being over-prescriptive (see

Chapter One of this volume). Design patterns have the structure shown below (adapted from Goodyear *et al.*, 2004).

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- a picture (showing an archetypal example of the pattern)
- an introductory paragraph setting the **context** for the pattern (explaining how it helps to complete some larger patterns)
- problem **headline**, to give the essence of the problem in one or two sentences.
- the **body** of the problem (its empirical background, evidence for its validity, examples of different ways the pattern can be manifested)
- the **solution**, stated as an instruction, so that you know what to do to build the pattern
- a diagrammatic representation of the solution
- a paragraph linking the pattern to the smaller patterns that are needed to complete and embellish it.

For a fuller discussion of design patterns and the way they have been developed in software engineering, see McAndrew *et al.* (2006). McAndrew *et al.* claim that design patterns have a number of qualities which, in combination, give them the potential to be a useful way of sharing experience in educational design. In particular, they identify the central aspect of a design pattern as being a ‘solution to a recurrent problem in a context’ (ibid p219).

A key aspect of design patterns is that they should teach. This heuristic element allows the reader of a pattern to understand enough about a problem and solution so that they can then adapt them to meet their own particular needs. Design patterns do not do the work of design; rather, they provide a reification around which design work can be done. McAndrew *et al.* (2006) comment that:

The rationale for the pattern helps with this teaching or explanatory function. Ideally, the name of the pattern should crystallise a valued element of design experience and help relate it to other design elements such that we can create and use a pattern language. The use of patterns, then, can be seen as a way of bridging between theory, empirical evidence and experience (on the one hand) and the practical problems of design. (ibid p220)

Design patterns and Learning Design, understood in this case as the IMS formal specification signified by the capitalization, are compared by McAndrew & Goodyear (2007). They conclude that:

Both patterns and learning design encourage the representation of activities alongside content, and this is important to encourage appropriate designs for learning with technologies. Perhaps the main distinction between the two approaches is that they aim in the one case to represent a design for a computer to understand and process, and in the other for a human being to understand and work with. (McAndrew and Goodyear 2007 p101)

—In our case we are interested in design for learning and learning design outside of the formal IMS specification; the case study below compares design patterns with learning design used in this way.

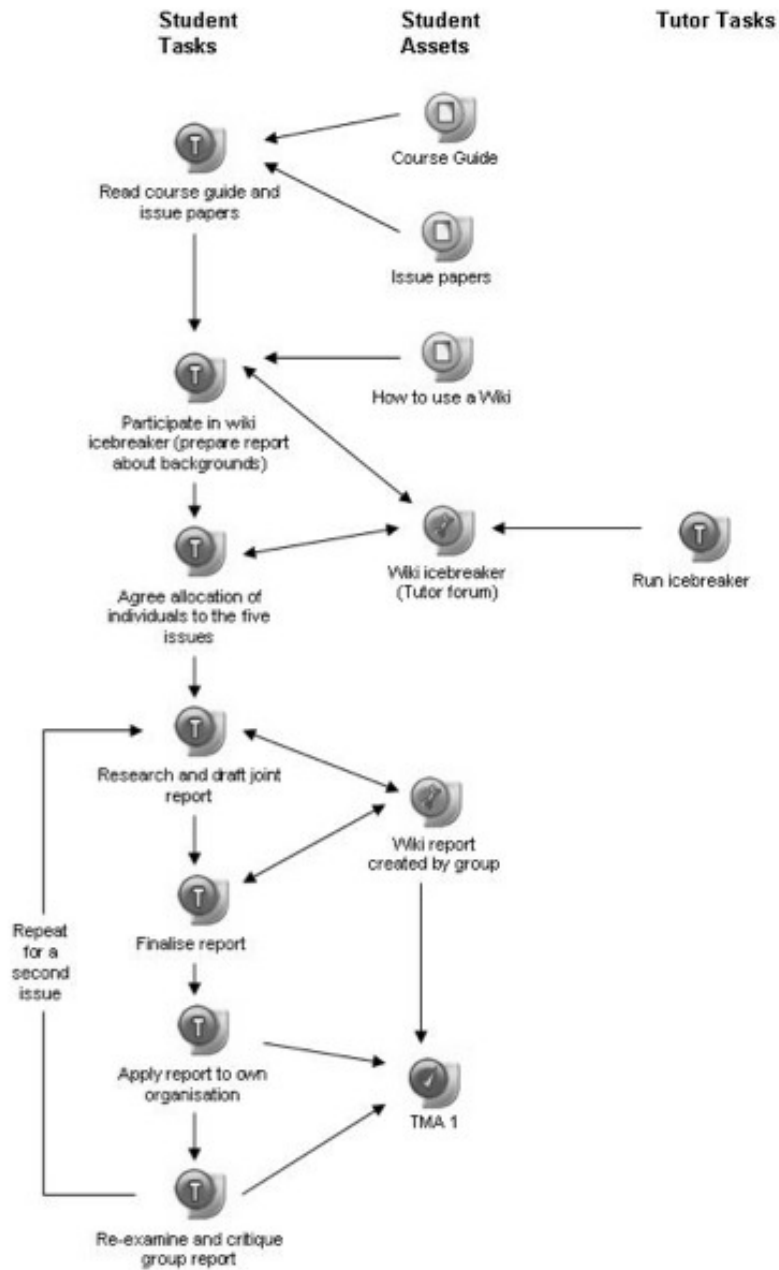
CASE STUDY: CURRENT ISSUES IN PUBLIC MANAGEMENT AND SOCIAL ENTERPRISE (B857)

The context of the case study is a course in the OU Business School on current issues in public management and social enterprise (course code B857). The case study was collected as one of 45 cases collected in 2007 as an audit to assess the impact of the VLE programme. The goal was to gain an understanding of how the VLE tools were being used across the university and of any associated barriers and enablers to the innovations being introduced (Wilson, 2007). The focus was on the pedagogies used to achieve specific learning outcomes and the use of tools (blogs, wikis, e-assessment, etc.) to support learning activities.

To collect the OU case studies, we used a template to represent the cases. Each case study was typically between 3 and 4 pages in length. The structured template used to capture the case studies and guide the interviews was derived from a previously developed learning activity taxonomy (Conole, 2007), which articulated the different components of a learning activity. The interviews were transcribed and thematically analysed. A visual representation of the learning activity being described in each case study was produced, along with a narrative account based on the structured template. These diagrams and narratives were then validated with each interviewee and collated in an internal website.

B857 – as an LD representation

Figure 4 illustrates the B857 activity as a visualization diagram drawn in CompendiumLD. It adopts a ‘swim-line’ temporal sequence, with each swimline representing different facets of the design process. In the first column the sequential tasks the students are expected to undertake are shown; parallel tutor tasks are shown in the third column. The central column lists the ‘assets’ associated with the activity – i.e. any tools and resources the student is using or any outputs produced as a result of undertaking the required tasks.



*Figure 4: B857 as a visual LD representation**B857 as a pedagogical pattern*

Table 1 shows the same learning activity represented as a pedagogical pattern. It follows the standard template for pedagogical patterns focusing on the problem to be solved.

Table 1: B857 as a pedagogical pattern

<p>Pedagogical pattern: Students collaborate to produce a joint report in a Wiki and relate this report individually to their work context</p>
<p>Context: The activity is part of a course that is composed of three cycles in which the activity takes place in the first cycle and is repeated for the second cycle. Each complete cycle takes approximately eight weeks with four weeks of group activity (50 hours). The course is called "Current Issues in Public Management and Social Enterprise"</p>
<p>Problem:</p> <ul style="list-style-type: none"> – Students need a mechanism to research, represent and share current issues in relation to public management and social enterprise – Students need to be provided with activities to enable them to explore how the issues raised in the course relate to their own organizations.
<p>Analysis:</p> <ul style="list-style-type: none"> – The solution makes use of the affordances of a Wiki to construct a joint report – It involves students researching using online resources and applying the outputs from this joint research to their own work practice.
<p>Solution:</p> <ul style="list-style-type: none"> – Engage students in a group (set) locating, scanning and organising information and data from a variety of sources – Request students within their group (set) to abstract meaning and share knowledge gained from the sources – Require students to address an issue by coordinate as a group (set) to represent their research, problem solving, and group work in a joint report using the Wiki – Require effective communication using a Wiki
<p>Example: The pattern forms part of a larger course structure in which students spend their time moving between group and individual modes working on two of five available issues. Each of the first two cycles leads to an assessment (TMA) in which 40% of the marks are allocated for the group work. The two TMAs are equally weighted and account for 50% of the total course assessment.</p>

The pattern involves students using a Wiki in a learning set to prepare a joint report on an issue and then each student working individually to see how the issue is relevant to their own organisational context. Finally students make an evaluation of the group report in light of their individual application of the group work. The activity is repeated for a second issue in a second learning set. The course concludes with a third cycle involving a different activity leading to a final assessment.

Related pedagogical approaches and patterns:

Problem-based learning,
Lifelong learning, e.g. http://www2.tisip.no/E-LEN/patterns_info.php
Resource-based learning,
Collaborative learning, e.g. http://www2.tisip.no/E-LEN/patterns_info.php
Professional inquiry

DISCUSSION AND CONCLUSIONS

This chapter has drawn on a whole institutional change process at the Open University (UK) and we have argued for the use of particular kinds of mediating artefacts to assist in providing heuristic devices around which coordination and collaboration for design purposes can take place within the institution. In particular, we have illustrated our concerns with mediating artefacts by explaining the use of a concept mapping tool CompendiumLD and comparing and contrasting the use of this software tool as a form of representation with design patterns and their largely paper-based form. It is important to note that research in this area is still highly contested. There is as yet no clear understanding or agreement on how best to a) represent educational settings in design terms, b) represent the design process, or c) provide support or scaffolding for the practice of pedagogical design.

To be used effectively, design patterns rely on collaboration through a process of drafting, critiquing and refinement. This use of design patterns suggests a link with the idea of learning design expressed through the use of CompendiumLD described above. It also suggests a link with levels of design **because both** design patterns and the use of CompendiumLD at the OU **are** related to task design and **design for** micro level interaction. A question remains about the aggregation of design patterns into a pattern language that could be useful at the level of course or programme design. Pedagogical design patterns are strongly related to an indirect notion of design for learning, stressing the heuristic use of patterns rather than direct design. Generally, design patterns exist on paper (as in a book of educational design patterns) and in this they contrast with the use of Compendium with its computer-based graphical interface. We wonder whether the classic form of design pattern could be instantiated in a CompendiumLD interface. The pedagogical pattern illustrated above is essentially an educational representation, whereas the CompendiumLD map foregrounds the process/operational aspects of the activity. We argue that each form of representation has different purposes and will be of value in different circumstances and for different stakeholders.

In the work reported here, learning design does not represent a computer readable form, rather it suggests the use of an interactive computer-based tool to represent design thinking. In this sense of learning design we think there is a degree of synergy with the classic concerns of design patterns and the idea of learning patterns. There are, however, some notable issues. While both play an educational role, and a role that relies on the heuristic use of artefacts rather than a set of prescriptions, design patterns rely centrally on the idea of being able to identify recurrent problems. At some levels of generalization this is relatively easy to do; for example, in networked learning the question of participation in group work and collaboration is a well recognized and recurrent problem, as is the backwash effect of assessment on group work. Design patterns are conceivably good ways to represent such problem areas. Where design patterns may have less use is in the preparation of emergent practices for a newly deployed technology. In some ways we do not know the problems that will arise and prove to be recurrent in the educational use of wikis, blogs and e-portfolios, because their educational use is recent and the context of use at the Open University is relatively unexplored. In this context design patterns might miss a central point, because when a new technological infrastructure is being developed the way the deployed technology becomes an infrastructure is in the *discovery* of recurrent problems and the absorption of a range of solutions as rules of thumb in local practices.

A number of key questions and issues around the concept of design remain (adapted from Conole & Mulholland, 2007):

- What are the most appropriate forms of representation to use? In what context? For what purposes?
- How can we capture and articulate the complexities of the design and narrative process?
- How will we address the known issues which have arisen in other research such as:
 - (a) issues of granularity
 - (b) context versus abstraction
 - (c) purpose (different views for different audiences – central academic, central service units (computer services, media, library)
 - (d) contextual factors (the fundamental problems of plans and situated actions e.g. Suchman, 2007)
 - (e) uptake (justification for investment in time in understanding or creating design patterns or concept maps)
 - (f) sustainability (the ongoing repurposing and reuse of designs and maps and the emergence of a user-generated community of designers).

This chapter has discussed the way the learning design team at the Open University have explored the use of CompendiumLD to provide a reification of design processes and a heuristic device for encouraging the development and learning of new or emergent practices using the new tools made available in the technological platform. We have compared and contrasted this to design patterns and suggested two developments. First, the exploration of interactive computer-based tools such as Compendium to instantiate examples of design patterns.

Secondly, we have pointed to a potential restriction on the use of design patterns in relation to emergent practice. Because design patterns rely centrally on the identification of recurrent problems, their use in an area where practice is underdeveloped is problematic and may need to be supplemented. We have also discussed how adopting a formal learning design methodology might enable better creation and reuse of educational resources and activities and the use and uptake of an institutional VLE. We have described the approach we are adopting at the Open University, including the rationale for our approach and the features of the prototype we have developed.

This is a challenging area rife with a range of issues both pedagogical and technical. Most importantly, it is unclear yet *how* such an approach might be adopted and taken up by the community and to what extent it might help with the ultimate aim of facilitating easier and more frequent use of resources and activities. However, despite this, we believe exploring this learning design methodology and how it can be related to work with design patterns is a useful approach for formalizing and hence capturing existing practice and a mechanism for identifying associated barriers and enabled to uptake and re-use.

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AFFILIATIONS

*Gráinne Conole and Chris Jones
Institute of Educational Technology,
Open University*