Chapter Four | A Method for Creating a Design for Pedagogy Pattern

When Alexander et al. (1977) developed their design pattern language, they created an integrated way of providing generic solutions to commonly occurring design problems. Each pattern within the pattern language served this single purpose: to provide a generic design solution to a problem - and its structure was sufficient to achieve this aim.

A design for pedagogy pattern for e-learning in contrast has different aims: its purpose is to raise the awareness of pedagogy in interface designers. It needs to pose a commonly occurring design problem for e-learning (i.e. user interface, information architecture/navigation and content layout design) and to provide solutions that incorporate a pedagogical framework. In doing this it moves e-learning away from being transactional to being pedagogically grounded. According to Goodyear (2005), a pedagogical framework should include a pedagogical philosophy, high level pedagogies, pedagogical strategies and tactics. By using Goodyear’s pedagogical framework, pedagogy should inform the learning environment, tasks, organisational forms and student learning outcomes (Figure 2-2). The current Alexandrian design pattern structure is insufficient to support both design and pedagogical solutions in the same document, as this was not its original intent.

This chapter examines the theory and practice of design patterns in order to determine how to incorporate a pedagogical framework into a pattern, and develops and trials a method for writing a design for pedagogy pattern.

4.01 Mapping Alexander to E-Learning

One way to adapt the pattern language is to modify Alexander’s notion of hierarchy. The organising principle for this mapping is performativity (Dong, 2007). From this perspective, any language of design must be comprised of coherent elements (aggregation), principles of re-contextualisation (accumulation), and principles of selection (appraisal). Coherent elements are enacted in each individual design for pedagogy pattern in the pattern structure and in the relationships and interactions between each pattern, making up the entire pattern language. Re-contextualisation is enacted in the reuse of the design for pedagogy pattern language for each design implementation. Applying a design pattern to relevant problems enacts the principles of selection.
In this case, the resources (e.g., unit of study, topic/activity, page, etc., see Figure 4-1) are the elements needed to realise any e-learning system. Principles of re-contextualisation operate when realising the elements into a new design. These principles are embodied in the connectivity and hierarchy between elements. The realisation of a resource depends on two factors: the functional characteristics and structural consequences from resources at the next level up (a vertical relation); and, the context in which the e-learning system is being developed (a horizontal relation). Each pattern must be evaluated in the context of the entire pattern language (Alexander et al., 1977). The concern with the connectivity between patterns is outlined in the pattern structure created by Alexander, seen in Figure 2-1. In his structure, the introductory paragraph and the concluding paragraph tie each individual pattern into the entire design pattern language. Consideration must be given to the links and relationships between the patterns.

This mapping (Figure 4-1) forms the foundation of a strategy for the creation of a pedagogically-based design pattern language for e-learning. A pattern structure needs to encompass and reference the larger and smaller patterns and clearly show the links between individual patterns, allowing complex and multiple relationships between them. In this way users (i.e. designers) can create their own pathways through the pattern language, enabling them to use whichever patterns suit their particular needs.
Figure 4-1 describes a top-down mapping, outlining the vertical relationships between the patterns. Although on one level some of these patterns appear to address organisational or instructional design issues, each one is nonetheless a discreet element which requires user interface, information architecture (navigation) and content layout design.

An **Internet Portal** is the front page to a university or institution’s website, through which one can access all of the resources available (The Open University, 2011; The University of Canberra, 2011; The University of Sydney, 2011; University of London, 2011; UNSW, 2011). This is a public facing page and may include links to:

- Information about the educational institution
- Information for future students, both local and international
- Access to faculties, staff and jobs
- Information about current research
- The library
- News, community activities and media contact
- Search
- Access for current students to the private areas of the website via a student/staff login.

**My area/domain or course** is also a webpage, and in the context of a course delivered entirely online, allows the student to gain access to all of the units of study they are required to undertake as part of the course. These units may be unlocked as the student progresses through the learning materials in the case of units that require a prerequisite. Accessed via a unique student login, (and therefore private) this area may indicate units completed, results, enrolment, access to community, library borrowing and information on course components. Another way of accessing this information may be via a **student profile page**.

A **unit of study** contains structured navigation or access to learning topics/activities or modules, information and assessment tasks. This access may be staged, managed or released/unlocked in a sequential order, if required. Community access (e.g. social media, online forum, messaging or chat) should be accessible at this level. Navigation requirements also include non-linear access to the learning topics/activities or modules and access back to the previous **my area** page.

A **topic/activity** or module contains lesson materials, dealing with a particular learning topic or interactive activity. These may be dealt with in one or more lessons (approximately 2-3 hours of learning activity). Each activity or module should be reusable.
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All of the above are made up of pages. A page contains ‘look and feel’, course content and layout. A page also contains:

- Design elements such as panels, text boxes, illustrations, photographs, animations, rich media elements such as video and audio
- Information architecture and navigation elements, such as buttons, links and lists

Any one of the design elements mapped in Figure 4-1 and mentioned above could be the topic of a design pattern. But a pattern language is not solely comprised of vertical relationships between patterns. Multiple patterns may exist at the same level in this hierarchy, and the context in which the pattern sits provides the horizontal relationships and linkages between patterns at the same level.

In order to integrate any individual design for pedagogy pattern into an entire pattern language, one cannot remove the linkages between patterns. So a context (connections to patterns above in the pattern language hierarchy) and a related patterns section (connections to patterns beside and below) must remain in the intra-pattern structure.

4.02 Incorporating Goodyear’s Framework into Design Patterns

4.02.01 Pattern Frameworks

The use of frameworks with design patterns is not new. Computer software programmers have been using design patterns and frameworks since the 1990s (Pree, 1995, p. 63). Object-oriented software development uses frameworks in which reusable single components are used to create complex programs. The framework determines the patterns that are included, their linkages and the sequencing. Each pattern contains code snippets or examples of code use, and the pattern language structure determines the sequencing and context for the code use. The design patterns provide a ‘roadmap’ through which to understand how a framework is implemented (Pree, 1995, p. 62).

Frameworks have also been used in pedagogical patterns. Pedagogical patterns ‘try to capture expert knowledge of the practice of teaching and learning’ (Bergin et al., 2011). They are used by educators to transmit knowledge of teaching within a community of teaching professionals. These patterns are designed to ‘help teachers teach and students learn’ (Eckstein, 2007). Pedagogical patterns when used in the context of e-learning fall into the arena of instructional design, course structure design, educational content and teaching and learning practices.

One example of a pedagogical pattern framework is presented by Yang (2008) who formulated this structure for e-learning as a result of research amalgamating Systemic
Functional Linguistics (SFL) and design patterns (Figure 4-2). The framework in this instance is also embodied in the relationships between patterns, and in the topic of each pattern. Examples of SFL patterns can be seen in sections two and predominantly in section three of Yang's diagram (Figure 4-2). For the intra-pattern structure, the original Alexandrian model was used.

The above frameworks are quite different from Goodyear's pedagogical framework. In formulating his framework, (Figure 2-2) Goodyear states the 'philosophical cap' (i.e. pedagogical philosophy) is separated from the other three layers.

(It) is a division between (a) a set of general philosophical positions which are independent of any one instance of a real world educational setting and (b) a set of commitments (high level pedagogy, strategy and tactics) specific to one instance of a real world educational setting. Second, the two upper layers can be described as 'declarative' or 'conceptual' while the two lower layers are 'procedural' or 'operational'. ... Philosophical positions and high level pedagogy can be described in ways which are not prescriptive of action. The descriptions contain statements of fact or belief - they may sketch the nature of a problem and outline the resources available for its solution. But they will not specify exactly what should be done. (Goodyear, 2005).

The pedagogical philosophy and high level pedagogies, therefore, should inform which design choices are made. The philosophy could be enacted on two levels: a philosophical statement of approach and choice of high level pedagogies which in turn inform which topic/activity is included in the courseware. One of these is an intra-pattern consideration, the other occurs with the selection of the pattern (appraisal), the pathway that the designer takes when selecting and using patterns for their project.
Goodyear’s pedagogical framework can therefore be enacted in the intra-pattern structure and within the meta-structure of the pattern language itself, embodied in the organisation and selection of the patterns.

4.02.02 Intra-Pattern Structure

Statements of general approach or philosophical statements could occur in two areas in a design pattern: in the body of the problem and the solution. The high level pedagogies and pedagogical strategies (i.e. overall approaches and specific activities) could be enacted within the problem or the solution section of the pattern. Elements of the original Alexandrian pattern structure provide a fit with Goodyear’s pedagogical framework (2004).

However, not all pedagogically-based solutions could be selected in the solution section of the pattern if one was to use a pedagogical philosophy. Only those that provided a ‘fit’ with the design principles that incorporate that philosophy could be used. So, if using constructivism and experiential learning theories as a pedagogical philosophy, the text search embodied in the method plan (see Chapter Three) could only result in solutions incorporating pedagogical strategies (i.e. topics/activities) that used this philosophy. What if the text search uncovered pedagogically-based solutions that did not fit with the pedagogical philosophy? The solution would still be pedagogically-based, and therefore useful. Provision within the pattern structure would need to be made for different types of pedagogical solutions. The realisation of the design can therefore follow other pedagogical philosophies and strategies, creating an alternate design solution. This allows the pattern to be extensible to encompass design solutions and teaching practices that do not fit constructivism and experiential learning theories. This would require changing the Alexandrian pattern structure.

The internal structure of a design pattern does differ depending on its domain. For some domains, the standard Alexandrian design pattern structure (Figure 2-1) is sufficient (e.g. Breuer et al., 2007; Van Duyne, Landay, & Hong, 2003). Other domains require modifications. For example in Applying UML and Patterns (Larman, 2002) the authors use two different pattern structures:

1. Title, Solution, Problem, Example (including diagrams), Discussion, Contraindications, Benefits, Background, Related Patterns (e.g. Larman, 2002, p. 232)
2. Title, Context/Problem, Solution, Diagram (e.g. Larman, 2002, p. 556)

The first pattern structure is used for learning general principles; the second places the pattern in the context of a more complex framework, and hence has a limited structure.

The Pedagogical Patterns Project (Bergin et al., 2011) has also slightly adjusted the Alexandrian pattern structure by including:
3. Title, Problem, Forces, Solution, Discussion, Related Patterns

In a pedagogical pattern, the diagram or picture present in the Alexandrian structure is considered optional, as in teaching and learning practice it is often not possible to include a picture that accurately illustrates complex abstract concepts, as evidenced in Goodyear (2004, p. 343).

The principal relationships in the Alexandrian pattern approach are solution, problem and context (Voigt & Swatman, 2006). The pattern’s title is also considered essential, as it places the pattern within the pattern language, enabling the principles of selection.

One would therefore expect to find in a design for pedagogy pattern incorporating Goodyear’s framework (2005):

- Elements based on the Alexandrian model
- The inclusion of a pedagogical philosophy
- Design solutions based on high level pedagogies and pedagogical strategies, relevant to the philosophy
- Solutions that fit with a different pedagogical philosophy
- Teaching practices to support the design solutions (pedagogical tactics)

The inclusion of teaching practices within the pattern satisfies the need to provide pedagogical tactics as part of Goodyear’s pedagogical framework (2005). It integrates teaching and learning practices with the features of e-learning systems (Govindasamy, 2001, p. 288), allowing designers to gain insights into how their courseware can be put into practice.

4.02.03 The Design for Pedagogy Pattern Structure

In terms of creating a pattern language for the e-learning domain, additional elements to Alexander’s basic problem/solution set could be added (Figure 4-3).
The differences and additional elements between this pattern structure and that of Alexander are:

The **picture** of the archetypal example of the pattern becomes optional, because a picture is not always possible in pedagogically-based patterns (Goodyear, 2004).

The **solution** is explained in terms of how it relates to the constructivist and experiential learning theories. It frames the design elements within the context of the two learning theories.

**Teaching strategies** outline how the solution can be helped by adopting particular teaching practices.

**Consider these other solutions** section is included so that solutions that do not map to the constructivist and experiential learning theories may also be used if applicable.
Case studies are included within the pattern as a sidebar so that novice users can see how the pattern is used in context, and experienced users can omit them (Clancy & Linn, 1999).

References are necessary so that designers and other pattern users can explore the theories and pedagogical philosophies, best practices and current media that have been referenced in the writing of the design for pedagogy pattern in more detail.

A design for pedagogy pattern for e-learning does not necessarily require the use of constructivism and experiential learning pedagogical theories. If the theories used are replaced by others that hold more currency, the resultant pattern is still a design for pedagogy pattern, if it follows the same methodology, structure and fulfils the same aims and objectives as those developed by this research. A design for pedagogy pattern requires a pedagogical framework which includes a prevailing pedagogical philosophy. This philosophy should be comprised of a pedagogical theory, irrespective of which one(s) are used. The two reviewed are those that appear to be the most relevant to e-learning courseware. The pedagogical framework informs the structure and the philosophy informs the content of the pattern.

Following the modification of the Alexander pattern structure, a pattern template was developed as a document with sections left blank for the pattern writers to fill in.

4.03 Development of the Method

This section discusses establishing a method to embed a pedagogical framework incorporating constructivism and experiential learning into design patterns. In achieving this, writers are required to extract a pattern from the solutions (e.g. an existing e-learning forum) and then write the pattern using the design for pedagogy pattern structure. This method will assist writers of the design patterns in their task. In the literature there is very little research or published methodology on how design pattern writers complete their task. Meszaros and Doble (1997), in addressing the complex nature of pattern writing, wrote a pattern language for pattern writers. They placed an emphasis on the overall structure of the pattern language, as well as elements in the individual patterns themselves. However, it was determined that the use of this pattern language for the writing of design patterns was too complex for this study, given the limited time the writers would have to complete their task and the fact that they were only to write the one pattern. There is no literature that addresses how to embed pedagogical theories or a framework into design patterns (i.e. creating the method). Nor is there literature that describes how to extract a pattern in such a way that the solution enacts/embodies pedagogy (i.e. creating the pattern). This represents a significant research
gap, as mentioned elsewhere. Extracting pedagogy and embodying it in the design patterns adds an additional level of complexity onto what is already a complex task.

The first step in this research was to develop a method for writing design for pedagogy patterns for e-learning (Chatteur, Carvalho, & Dong, 2008). The preliminary method simplified the extraction of the pedagogical and design principles and the subsequent writing of the design for pedagogy pattern into the following steps:

Step 1: Text search or identification of pattern problem

Step 2: Definition of problem

Step 3: Text search for solution, teaching strategies and optional case studies

Step 4: Write the design for pedagogy pattern in terms of constructivist and experiential learning theories (Table 4-1).

This process is drawn from the focus on design problem definition as outlined in Van Duyne et al. (2003) and attempts to locate the process within existing and current research, while taking into consideration the two learning theories – constructivism and experiential learning.

The aim here was to develop and refine the method for extracting and writing design for pedagogy patterns, not just to develop a pattern per se. Step 1 and Step 3 required attention toward empirical evidence from peer-reviewed articles on the design and use of e-learning courseware. This provided a solid empirical research core for the pattern development and ensured that the resultant patterns followed current proven ‘best practice’. This was in part to overcome the fact that the field of e-learning is a recent development and does not have the history of practice, compared to architecture, from which to draw the design for pedagogy patterns for e-learning.
Table 4-1 Pilot 1 pattern definition/solution process

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Text search or identification of pattern problem</strong></td>
<td><strong>Problem definition</strong></td>
<td><strong>Text search for solution</strong></td>
<td><strong>Write solution in terms of constructivist and experiential learning theories.</strong></td>
</tr>
<tr>
<td>Based on mapping of Alexander et al.’s structure onto e-learning (Figure 2.2) Working from larger to smaller components, and incorporating pedagogical issues (after Goodyear).</td>
<td>Definition of design problem based on research. The problem is examined in the context of peer-reviewed literature and existing e-learning examples. Problems that persist in both spheres are worthy of inclusion in pattern language.</td>
<td>In researching solution also find case-studies and teaching strategies for incorporation into design pattern. The solutions should fit with the two learning theories which form the pedagogical philosophy.</td>
<td>Writing solutions based on pedagogical philosophy, and includes elements from the pedagogical framework. Written incorporating knowledge integration of users; it tells readers how to use the pattern.</td>
</tr>
</tbody>
</table>

**Step One** involved a peer-reviewed text search to identify recurring problems in the design of e-learning courseware. By identifying problematic areas in the design and structure of e-learning the 'Problem' area of the pattern (Figure 2.5) can begin to be defined. Each problem needs to be identified with consideration given to the patterns that surround it in the pattern language structure. The writing of the problem statement should exclude issues addressed by surrounding patterns and should complement them.

**Step Two** defines the problem more thoroughly, the pattern writer examines both peer-reviewed research and existing courseware. This combination is designed to bridge a perceived gap between current theories on e-learning design and practice. The gap was highlighted during conversations with an e-learning practitioner (Lever, 2008). In this manner existing problems in e-learning practice could be compared with best practice as outlined in the peer-reviewed literature search. If the problem persists in both arenas, it is worthy of attention in a design for pedagogy pattern for e-learning, and for inclusion in the pattern language. Pattern languages must capture practice, and exemplify certain truths within that practice, capture 'the invariant property common to all [instances] which succeed in solving the problem’ or ‘the quality without a name’ or ‘aliveness’ (Fincher & Utting, 2002, p. 199).

**Step Three** the solution search focuses on but is not limited to those solutions that make use of experiential learning theory and constructivism. Solutions that provide a best fit with
alternative pedagogical theories should also be noted by the pattern writer, as the pattern structure allows space for these solutions, in the ‘Consider these other pedagogical solutions’ section. Pattern writers also note teaching practices that should accompany the design solutions, so that the pattern works on two levels: for designers who create the screen designs and information architecture, and for teachers/academics who have to use the final design. In this way the designs are used in practice in the manner that is intended.

**Step Four** the final stage in the method is to write the design pattern, which should use ‘Solutions’ and ‘Teaching strategies’ that promote experiential learning and constructivist theories. By basing the text-based research on this meta-strategy, the embedding of pedagogical theories into the design for pedagogy patterns has become operationalised.

## 4.04 My First Trials

I trialled the method prior to the first pilot pattern writing exercise, resulting in two trial patterns: THE ROLE OF TUTOR and ELICITING MODERATION. This section outlines the process of narrowing down the pattern topic and writing the pattern using the above method.

### 4.04.01 Step One: Determining the Pattern Problem

Step One of the method involved undertaking textual research in order to determine the pattern problem. This literature research resulted in a list of possible pattern topics (Appendix One). In this list, linkages were formed between the patterns to begin the process of creating a skeleton for a preliminary design for pedagogy pattern language. By creating a loose map of e-learning components in a pedagogical hierarchy, it is possible to begin to narrow down the design for pedagogy pattern topic.

Building on Figure 4-1 and the list in Appendix One, a mapping of a pedagogical hierarchy was created. (see Figure 4-4). In this pedagogical hierarchy the horizontal relationships, or learning contexts between the patterns begin to be seen.
Any one of these elements could be the subject of the design for pedagogy pattern, and together begin to make the structure of an overall design for pedagogy pattern language. The pedagogical philosophy informs the pedagogical elements shown at the bottom of the hierarchy. In addition, the activity/task section could be further broken down into commonly used e-learning activities (see Figure 4-5) otherwise known as learning objects (LOs) (Govindasamy, 2001, p. 290).

LOs are the small units or building blocks of instruction that can be taken as stand-alone units of instruction even when it is not embedded within a larger structure of content. Due to its smaller granularity and the way it is programmed, tagged, and stored, LOs have increased share-ability and reusability (Govindasamy, 2001, p. 290).
Figure 4-5 A set of possible e-learning activity types (Chatteur, 2011).

These learning objects map to the pedagogical strategies, the methods and tasks used to achieve the learning outcomes. Similarly any of the other bottom sections (activity wrappers, instruction, research and community) could be broken down into smaller patterns.

The activities in this list were not just the result of a textual search of literature. I produced many of the types of learning activities on this list with the team at BBC Specialist Factual and Learning (Open University) and BBC Worldwide Interactive Learning from 2001-2006 (Appendix 12). A preliminary list was developed there by the team in defining possible learning activities for the National College of School Leadership programme (UK). This list was recreated and added to during the course of the textual research for this study.

One feature that recurs in the preliminary list (Appendix One), in the hierarchy and learning objects is the need for collaboration and community spaces. On contemplating the possible patterns above and on examining the peer reviewed literature (Berge, 1995; Oren, Moiduser, & Nachmias, 2002; Sargeant et al., 2006) I decided to write a design for pedagogy pattern on THE ROLE OF THE TUTOR. This fulfilled the criteria that the pattern solution examines issues consistent with the pedagogical philosophy, in this case social constructivism.

4.04.02 Step Two: Creation of the Problem Statement
Following the methodology, for Step Two the following the problem statement was created:

If students are to create their own learning experience where the learner is in charge of their own learning experience through collaboration and co-operation, real world tasks and reflective practice – what is the role of the tutor?
This problem statement clearly incorporated some of the principles derived from the two learning theories as outlined in Chapter Two. It addressed the changed role of the tutor in e-learning, encapsulating the aspects of Chee's cognitive apprenticeship (Chee, 2004).

4.04.03 Step Three: Text Search for Solution
Following the method, I then conducted a text search for the solution (Step Three). This step involved not only reviewing peer-reviewed literature, but also using material from The Open University's First Class website (2005) and the National College of School Leadership's (NCSL) Talk 2 Learn website (2005) - projects which I had either produced or accessed while working for BBC Worldwide Interactive Learning in the United Kingdom (Appendix 12). The peer-reviewed literature and the website information were then used for writing the pattern’s solution (Step Four).

4.04.04 Role of Tutor Evaluation
The main problem with the first pattern, THE ROLE OF THE TUTOR (Appendix One) was that the focus had moved from the stated objective: embedding pedagogy into the user interface, information architecture and content layout design of e-learning courseware. In concentrating so heavily on the pedagogy I had created an entirely pedagogical pattern. The teaching strategies area in the template was left blank, because the pattern solution comprehensively addressed teaching practices. The solution also contains a number of examples of the pattern put into practice, thus obviating the need to include case studies. This pattern mentions design features, such as 3D learning environments, virtual avatars, 2D text bulletin boards, but these are not the main focus of the pattern solution. What is encouraging in this pattern is that these design features were able to be discussed in the context of the teaching practices, and therefore links between the pedagogy and design were established. This was encouraging, as it had been unclear prior to writing the pattern whether it was indeed possible to link the design elements with pedagogical practice.

This pattern was successful in demonstrating that design patterns could be written specifically addressing solutions that used constructivist and experiential learning theories. As a pedagogical pattern that uses the two learning theories as a philosophy, this pattern succeeds – as a design for pedagogy pattern it does not.
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4.05 The Second Trial Pattern

My second trial pattern, ELICITING MODERATION, suffered from a similar problem. This pattern’s problem statement was:

If constructivist theory claims that students construct their own knowledge by participating in student-to-student interaction as well as student-tutor interaction, how should the moderator create an atmosphere that encourages students to participate in online discussions?

This problem statement was related too tightly to teaching and learning practice. The solution’s pedagogical focus (Appendix One) also means that this pattern was a pedagogical pattern, rather than one of the stated objectives, a pattern that focuses on design while incorporating pedagogically based design principles and teaching practices. In the solution background there are references to design features such as anonymous login and the ability to use photo and rich media in postings. These requirements are more of a system design requirement (i.e. programming) rather than a user interface, information architecture or content layout of the forum, but they are linkages between design elements and pedagogy, nonetheless.

The pattern improves on the first in that a set of teaching strategies supporting the concepts in the problem statement were able to be developed, and these drew clear references to concepts encapsulated in the two learning theories. A case study was found in the literature search, and was included in the ‘case study’ sidebar. The ability to create teaching strategies, a case study and links to design (albeit system design) was a breakthrough. The main elements of the new pattern template were able to be populated, while encapsulating the learning theories. But the pattern problem statement and solution’s focus remained pedagogical. Creating a pattern addressing the design of e-learning was proving a ‘wicked’ task.

This lack of design focus led to the development of a document that gave direction to the pattern writer, which I called ‘Pattern Template Explained’. The document instructed the pattern writers how to populate the pattern document. It contained an introduction, followed by a detailed breakdown of exactly what should go into each section of the template. The final draft of this document can be found in the ‘pattern pack’ in Appendix Two.
A pattern is a generic solution to a design problem that can be used again and again while returning a different result (Alexander et al., 1977). It should be written in a style that makes knowledge assimilation easy for the end user of the design pattern. (Clancy, 1999) What this means is:

- The writing style of the pattern should be constructive, explaining how the pattern can be used in context.
- It should be written as an instruction.
- Don’t use jargon.
- Try to make the solution a generic one that encompasses various subject matters and classes that can be taught. For example it shouldn’t matter if you’re teaching Geography, English or Mathematics; the pattern should be able to be applied to all subjects.
- Think about the solution firstly in terms of:
  - 1) Content design problem
  - 2) Information design
  - 3) Interface/Navigation design (Information Architecture)

Remember, this is a design pattern and the focus needs to remain squarely in the design domain.

- Keep the teaching solutions that support the pattern for the teaching solutions section. In that way you can separate the pedagogy from the design problem.
- Always try to include a case study so that users can see how the pattern can be used in a real world example. This makes the pattern easier to use.

The introduction (Figure 4-6) discussed stylistic issues, that the pattern should contain a generic solution and the different design areas that should be discussed within the pattern solution. It also emphasised that the teaching strategies should not go in the pattern solution, but should be kept for the teaching strategies section. It also encouraged the use of a case study. Another important aspect in pattern writing is how the problem is described. The consequences of using constructive language (i.e. describing how the pattern can be used in context) are that there are more correct results by pattern users than using descriptive language - i.e. describing what the pattern does (Clancy & Linn, 1999). Use of language and how the pattern is written is critical for the usability of the pattern.

The pattern writers also needed to be equipped with background information on the two learning theories and how these theories could be enacted in e-learning courseware. The writing of the pattern needed to be focused back onto interface, layout and information architecture design, while enacting the learning principles within the design context. By
providing background information on the main tenets of the two learning theories and creating the design principles which enact these theories, in conjunction with the 'Pattern Template Explained' document, it was hoped that the lack of design focus in the patterns written to date could be addressed. The creation of documents outlining the learning theories and the pattern piloting process will be the subject of the next chapter.


