CHOOSING AN APPROPRIATE APPROACH TO USING PATTERN LANGUAGE THEORY

Activity Kit
Activity Kit
A guide for
CHOOSING AN APPROPRIATE
APPROACH TO USING PATTERN
LANGUAGE THEORY

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Disclaimer
The recommendations provided in the Activity Kit are based on the research findings in the author’s master thesis titled “Choosing an Appropriate Approach to Using Pattern Language Theory”. The Activity Kit is true to the best of the author’s knowledge, although it is not yet fully complete. The author disclaim any liability in connection with the use of the Activity Kit.

Two caveats related to the completeness of this Activity Kit need to be stated here. First, the purpose list does not exhaustively enumerate all the purposes that can be achieved with PLT. Second, in addition to the four tools, more tools are needed to support the execution of some activities. So don’t hesitate to be creative in using the Activity Kit.

Preface
The pattern language theory (PLT) is a design methodology that can tackle complex systems. It is particularly suitable for projects that involves multiple stakeholders or disciplines.

The pattern language theory (PLT) was first proposed by Christopher Alexander initially for urban design domain in 1970s. With its broadening application in other domains, such as computer science, education, service design etc., the original PLT approach proposed by Alexander has been applied differently, with different activities and roles involved. These differences are related to project facilitators’ diverse value system and project purposes. However, practitioners new to the theory may fail to perform an appropriate approach well aligned with their values and purposes.

This Activity Kit, therefore, aims to provide guidance for practitioners and researchers to take an appropriate approach — including performing activities relevant to their purposes, involving the right people and pattern language, and making use of proper tools — to use PLT in a more effective way.

The Activity Kit is designed primarily as a resource for those who are new to PLT but should also prove useful to more experienced practitioners.
# Patterns

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### Keywords

**Pattern Language Theory (PLT)**

The methodology that utilises patterns and pattern languages to deal with complex systems.

**Pattern Language**

A network of patterns — each of which documents a problem and corresponding solution.

**Approach**

The way to use the pattern language theory.

### Further Reading

To better understand the concept of pattern language theory, the trilogy of Alexander are recommended to read:

1. *A Pattern Language*
2. *The Timeless Way of Building*
3. *The Oregon Experiment*
Chapter 0. Guide for Readers

This chapter introduces how should readers use this Activity Kit.

Chapter Overview

In Chapter 1, the concept of Pattern Language Theory is introduced.

In Chapter 2, 12 activities commonly involved in PLT projects are introduced. First, an overview of the 12 activities is presented in a table. Second, the activity icons are presented in an icon map. Finally, the details of each activity are presented.

In Chapter 3, 8 common project purposes that can be realised with PLT are presented in a table. For each purpose, the activities that should be performed are visualised with an icon map introduced in Chapter 2.

In Chapter 4, 4 tools that can assist the activities are introduced in detail.

Guidance to Use

If you are new to the concept of PLT, it is suggested to start from Chapter 1 and then scan through the overview tables at the start of Chapter 2, 3, 4. In this way, you can gain an overview of the Activity Kit.

If you have a project to work with, you can find out what activities to perform in this Activity Kit. First, consider which purpose(s) in the Chapter 3 overview table suits your project. Second, find out which activities are recommended in the icon maps. These would be the activities suggested to involve for your project purpose.

When you are carrying out the recommended activities, read the details of all activities. The tools detailed in Chapter 4 may support your process.
Chapter 1. Introduction to Pattern Language

This chapter introduces the concept of pattern language and presents an example. Ways of using or contributing to a pattern language are visualised. The benefits of Pattern Language Theory are introduced.

What is Pattern Language?

This page introduces the concept of pattern and pattern language step by step.

1. Pattern
A pattern is the invariants* in the solutions to a recurring problem.

* invariants: things that do not change or always exist in different situations

2. Formatted Pattern
A pattern can be formatted into a card consisting these elements:

3. Related Patterns
Look at the 5th element: related patterns. This element signifies the relations between individual patterns. Two common relations are:

1. A requires B
To fulfill Pattern A, Pattern B needs to be fulfilled first.

2. C complements B
Pattern C and Pattern B complement each other (in fulfilling Pattern A).

4. Pattern Language
A series of patterns that are related in such ways makes a Pattern Language. In other words, a pattern language is a network of patterns. With each pattern solving one problem, a complete pattern language can solve a series of recurring problems in a complex system S.

Here is a video introducing the concept of the pattern language theory.
An Example

For ease of understanding to people from different disciplines, I take "making chocolate chip cookies" as an example to demonstrate the concepts of pattern and pattern language.

1. A Pattern
Here is a pattern summarised from Grandma’s solutions for how much chocolate should be added:

   - recurring problem → How much chocolate to add?
   - solutions vary in different contexts → Grandma gives a different number each time.
   - but there is an invariant → Each time Grandma tries maintaining the texture of the basic dough.

2. Formatted Pattern
This pattern can be formatted as such:

   **Pattern Name:** ChocolateRatio

   **Context:** You are baking chocolate chip cookies in small batches for family and friends. You have finished the basic dough with sugar, flour, and egg, and you are ready to add chocolate to the dough.

   **Problem:** Determine the optimum ratio of chocolate chips to cookie dough.

   **Forces:** Most people consider chocolate to be the best part of the chocolate chip cookie. Also, too much chocolate may prevent the cookie from holding together, decreasing its appeal. Since you are cooking in small batches, cost is not a consideration.

   **Solution:** Therefore, use the maximum amount of chocolate while maintaining the dough texture you already achieved with SugarRatio, FlourRatio, and EggRatio.

   **Consider these patterns first:** SugarRatio, FlourRatio, EggRatio

   **Consider next:** NutRatio or CookieDough

3. Related Patterns
By the items of "Consider these patterns first" and "Consider next" in the formatted pattern, the patterns related to the ChocolateRatio pattern (highlighted) can be visualised as such:

4. Pattern Language
If all patterns related to each other are visualised, a complete pattern language for "making chocolate chip cookies" is as below:
How can you interact with a pattern language?

We can consider a pattern language as a living database storing common problems and solutions for a domain. Practitioners and researchers can both make use of and contribute to this database in a wide range of ways. In this page, several ways are visualised to inspire you. You can be creative in exerting PLT’s values with more complex interactions to achieve your own project purpose. You can also refer to Chapter 4 for more achievable purposes.

Benefits of Pattern Language

Using PLT can bring about the benefits of facilitating (1) knowledge management, (2) consistency and (3) participation. These benefits attribute to the format of individual pattern and the relations between patterns.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>knowledge externalisation</td>
<td>consistency over-time</td>
<td>understanding users’ needs</td>
</tr>
<tr>
<td>Help stakeholders externalise tacit needs, knowledge, experience.</td>
<td>Patterns as artefacts cannot be distorted throughout a process.</td>
<td>Maintain the authenticity of insights gained from users.</td>
</tr>
<tr>
<td>knowledge communication</td>
<td>consistency between projects</td>
<td></td>
</tr>
<tr>
<td>Help stakeholders exchange insights without distortion.</td>
<td>Avoid reinventing the wheel for the same problem in a domain.</td>
<td></td>
</tr>
<tr>
<td>patterns’ relations</td>
<td>new knowledge creation</td>
<td>information justice</td>
</tr>
<tr>
<td>amplifies the power of patterns by leveraging their connectedness to solve complex design problems (Kambete et al., 2015)</td>
<td>Enable spotting new relations between tangible patterns.</td>
<td>Provide an open-sourced knowledge base.</td>
</tr>
</tbody>
</table>
Chapter 2. Purposes

Through research, it was found a lot of users of PLT had taken an approach not well suited to their project purposes. Therefore, before deciding on what activities to perform, you would like to first reflect on the purposes to use PLT. This can prevent you from taking unnecessary activities and help you find a recommended combination of activities.

This chapter presents 8 common project purposes that can be achieved with PLT and a combination of recommended activities for each purpose are introduced.

Purpose List

The Purpose List is a table presenting 8 common purposes that can be achieved with PLT. For each purpose, the specific target users and the recommended activities are also presented. Here is one item of the list for an example:

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Specific User</th>
<th>Recommended Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Looking for an overview of a domain.</td>
<td>Novice to a domain</td>
<td><img src="image" alt="Activity Icons" /></td>
</tr>
</tbody>
</table>

You can read the "purpose" column to see if any item can represent your need. This column shows the target users of each purpose. This column uses "activity icon map" to present the recommended activities for each purpose.

The complete list is presented on the next page.

Activity Icon Map

To show the readers which activities are recommended at a glance, the activity icon map is used. This map provides an immediate representation of the recommended activities.
As well as providing a useful visual representation of the different activities, the map helps to define the process relationship between them. Icons on the left of the map represent tools that are generally used before ones on the right. While this is not set in stone – Aligning, for example, can be used throughout a project – it is broadly the case.

In this chapter, the icon map provides an immediate visual representation of the tools being used. The activities recommended for practitioners are highlighted in yellow. The map for Purpose 3 (to create a toolkit for participatory project), for example, shows that 5 tools (yellowed) are used:

The details of each activity are introduced in the next chapter.

### Purpose List

The Purpose List presents an overview of 8 common purposes that can be achieved with PLT. For each purpose, specific target users and the recommended activities are also presented here.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Specific User</th>
<th>Recommended Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Looking for an overview of a domain.</td>
<td>Novice to a domain</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>2 Looking for reusable solutions/measurements to diagnose or make decisions for the current situation.</td>
<td>Practitioners</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>3 To create a toolkit for participatory (design) project.</td>
<td>Facilitating a participatory project</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>4 To identify and externalise reusable solutions from past project experience.</td>
<td>Facilitating multiple projects in a same domain</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>To understand needs or externalise knowledge of stakeholders (and retain the authenticity of these insights throughout the project).</td>
<td>Researchers</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>To elicit visions from stakeholders (and retain the authenticity of these visions throughout the project).</td>
<td>Researchers</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>To identify future research priorities.</td>
<td>Researchers</td>
<td>![Icons for activities]</td>
</tr>
<tr>
<td>To build an ever-growing knowledge database for a domain.</td>
<td>Stakeholders that facilitate multiple projects in a same domain</td>
<td>![Icons for activities]</td>
</tr>
</tbody>
</table>
Chapter 3. Activities

This chapter introduces 12 activities worth performing in individual projects. An activity icon map is introduced here. Each activity is elaborated in detail.

Activity Overview

A table presents an overview of the 12 common activities needed for supporting PLT application. They are organised into 4 categories: Aligning, Framing, Gathering Intelligence, and Iterating. This overview includes a brief description of each activity and what tools can support each activity. Details of the tools will be introduced in the next chapter.

Category 1: Aligning

The value system of involved practitioners is an essential element of using PLT. To help practitioners elicit their and their stakeholders’ concealed values, an exclusive aligning activity is needed.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Supporting Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aligning</td>
<td>Stakeholders reflect on and communicate about their underlying values.</td>
<td>Navigation Panel Approach Axes</td>
</tr>
</tbody>
</table>

Category 2: Framing

Three activities are involved to help practitioners in framing and scoping.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Supporting Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choosing Approach</td>
<td>1. Project facilitators understand and choose the suitable approach to use PLT in a near, mid and/or long term. 2. Project facilitators reflect whether the current approach aligns with underlying purposes and values.</td>
<td>Navigation Panel Approach Axes Approach Detail Tables</td>
</tr>
<tr>
<td>Finding PL</td>
<td>Project facilitators find related pattern languages that can be directly used or adapted for the project or a new domain.</td>
<td></td>
</tr>
<tr>
<td>Selecting Patterns</td>
<td>Project facilitators select patterns from a domain-PL to formulate a project-PL. This process helps define the project scope.</td>
<td></td>
</tr>
</tbody>
</table>
Category 3: Developing PL
Two stages are involved in the development of a pattern language, namely Gathering and Synthesising. In the Gathering stage, four activities are involved. In the Synthesising stage, two activities are involved.

Category 4: Using PL
The Diagnosing with PL and Designing with PL in Chapter 3 are combined into the Iteration group. Although the functions of Artefact (patterns or pattern languages) are different in the two activities, these two are both activities for Using a pattern language.

### Developing Pattern Language

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Supporting Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview/Focus Group</td>
<td>Getting insights from stakeholders</td>
<td>Pattern Format</td>
</tr>
<tr>
<td>Problem Sharing</td>
<td>Inexperienced practitioners externalise the problems they meet.</td>
<td>Pattern Format</td>
</tr>
<tr>
<td>Experience Sharing</td>
<td>Experienced practitioners externalise good solutions from experiences</td>
<td>Pattern Format</td>
</tr>
<tr>
<td>Brainstorm/Prototyping</td>
<td>Eliciting visions and dreams from stakeholders.</td>
<td>Pattern Format</td>
</tr>
<tr>
<td>Writing Patterns</td>
<td>Concretising insights from other activities into patterns.</td>
<td>Pattern Format</td>
</tr>
<tr>
<td>Curating Patterns</td>
<td>Reconfiguring new patterns and making connections in between</td>
<td>Pattern Format</td>
</tr>
</tbody>
</table>

### Using the PL

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Supporting Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosing with PL</td>
<td>Diagnose or evaluate the situation according to the solutions provided by related patterns.</td>
<td>Pattern Format</td>
</tr>
<tr>
<td>Designing with PL</td>
<td>Develop and detail project solutions based on related patterns.</td>
<td>Pattern Format</td>
</tr>
</tbody>
</table>
Activity Details

The detailed information of each activity are introduced with a card. You can find how to perform an activity in the cards.

### Aligning Stakeholders

**Aim**
- To elicit stakeholders’ underlying value.
- To facilitate communication.
- To seek alignment in a long term.

**Participants**
Any stakeholder. (Whether end-users are involved also reflect stakeholders' value.)

**Timing**
Usually at the beginning of a project. Also could be used throughout the process to check the project progress.

**Tool**
Navigation Panel
Approach Iceberg

**Use After**
Aligning Stakeholders

**Move on to**
Choosing Approach

**Basic Procedure**
1. Participants read the Navigation Panel and Approach Iceberg individually.
2. Participants consider which values and approaches are ideal for them.
3. Participants share their ideas and discuss.

**Expected Outcome**
Ideally, stakeholders might align on their values. Another possibility is although an ultimate value consensus is achieved, stakeholders have to acknowledge that their current (short-term) values are divided.

However, even if no consensus was reached, this activity provides a chance for stakeholders to reflect on and articulate their values more explicitly, rather than remaining tacit.

### Choosing Approach

**Aim**
To understand the differences between approaches to applying PLT.
To consider/decide/reflect on a short-, mid- and/or long-term approach.

**Participants**
Project facilitators

**Timing**
Usually at the beginning of a project. Also could be used throughout the process to check the project progress.

**Tool**
Navigation Panel
Approach Iceberg
Approach Detail Table

**Use After**
Aligning Stakeholders

**Move on to**
Aligning Stakeholders

**Basic Procedure**
1. Supported by Aligning Stakeholder, participants discuss their values and choose the ideal approach accordingly.
2. Participants discuss whether this ideal approach is viable in the current situation. If not, consider which approach is immediately applicable (short-term), and which can act as the transitional approach (mid-term).
3. Draw the route connecting short-, mid- and/or long-term approaches.
4. Participants read the Approach Iceberg and Approach Detail Table to understand what are the main components of the chosen approach. For a in-progress project, participants can reflect on the current approach and consider what changes are needed.

**Expected Outcome**
This activity helps project facilitators choose the suitable approach to using PLT in a short, mid- and/or long-term.

### Framing Finding PL

**Aim**
To find existing intelligence and avoid inventing the wheel twice.
To adapt related knowledge to a new domain.

**Participants**
Project facilitators

**Timing**
Before considering developing a new pattern language, it is suggested to find existing or relevant pattern languages first.

**Tool**
- New tool is required.

**Use After**
Aligning Stakeholders

**Move on to**
Selecting Patterns
Gathering Intelligence Activities

**Basic Procedure**
1. Search for a pattern language for your domain.
2. Consider more general searching terms or other relevant domains.
3. Consider using solution databases or other synonyms to replace "pattern language".

**Expected Outcome**
This activity helps project facilitators find reusable or adaptable pattern languages, and avoid reinventing the wheel.

### Framing Selecting Patterns

**Aim**
To select patterns relevant to the project scope and help redefine the project scope.
To prepare for writing and curating new patterns.

**Participants**
Project facilitators

**Timing**
After a broader or relevant pattern language is found.

**Tool**
- New tool is required.

**Use After**
Finding PL

**Move on to**
Gathering Intelligence Activities
Iterating Activities

**Basic Procedure**
1. Define or refine your project scope.
2. Scan through the pattern language from the patterns at a larger scale. Look for the pattern best describing the overall project scope. This would be the starting pattern for the project.
3. Read the starting pattern and find the patterns that are connected with your starting pattern. Among these patterns, include the ones at a smaller scale than your starting pattern. (Only include the patterns that are at a larger scale than your starting pattern when you also plan or hope to help improve them. Also do not include the patterns that are confusing or doubtful for you.)
4. Then move on to the second largest pattern and include its smaller related. Repeat this step until all patterns have been scanned through.
5. Take note of any missing patterns or the patterns that need adaptation according to your need.

**Expected Outcome**
A project-pattern language ready for use or adaption is filtered out.
**Interview/Focus Group**

**Aim**
To learn about stakeholders’ knowledge or experience.
To learn about stakeholders' needs.

**Participants**
Any stakeholder. (Depending on the approach decided in Choosing Approach.)

**Timing**
Usually used as a research activity at an early stage of a project. Also could be used throughout a project as needed.

**Tool**
5 Whys (for understanding real needs) Pattern format (to remain the authenticity of insights in future activities)

**Basic Procedure**
1. Before interviewing, align on who to interview (experts or end-users), what to look for (knowledge or needs etc.).
2. Normal interview/focus group procedure.
3. After the interview, try documenting insights in the format of a pattern. Consider having interviewees to verify or review the half-finished patterns generated from their insights.

**Expected Outcome**
Interview or focus group insights documented in a pattern format.

**Use After...**
Pattern Writing, Pattern Curating, or Iterating Activities

**Move on to...** Pattern Writing, Pattern Curating, or Iterating Activities

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**Experience Sharing**

**Aim**
To assist experienced practitioners externalise the tacit solutions they have.

**Participants**
Stakeholders who facilitate the development of domain-pattern language, experienced practitioners, the inexperienced practitioners who have input the involved problems

**Timing**
After the problem part of a pattern has been documented

**Tool**
Pattern format (to remain the authenticity of insights in future activities)
New tool is required.

**Expected Outcome**
The solution part of a pattern.

**Use After...**
Problem Sharing

**Move on to...** Pattern Writing, Pattern Curating, or Iterating Activities

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**Problem Sharing**

**Aim**
To make stakeholders aware of the importance of inexperienced practitioners in pattern language To assist inexperienced practitioners to externalise the problems they meet.

**Participants**
Stakeholders who facilitate the development of domain-pattern language, inexperienced practitioners

**Timing**
At any stage of a project.

**Tool**
Pattern format (to remain the authenticity of insights in future activities)
New tool is required.

**Basic Procedure**
1. Introduce the importance for inexperienced practitioners to share the difficulties they meet.
2. Participants individually reflect what difficulties they have met or what knowledge is needed.
3. Have participants share the problems they thought of.
4. After the session, consider letting participants document their insights into the problem part of a pattern by themselves or having participants to verify or review the half-finished patterns generated from their insights.

**Expected Outcome**
Recruiting problems requiring solutions are documented in a pattern format.

**Use After...**
... ...

**Move on to...** Pattern Writing, Pattern Curating, or Iterating Activities

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**Brainstorm/Prototyping**

**Aim**
To learn about stakeholders’ visions. To learn about stakeholders’ needs.

**Participants**
Any stakeholder. (Depending on the approach decided in Choosing Approach.)

**Timing**
Usually used as a research activity at an early stage, or an inspiration/co-creation activity at a later stage of a project. Also could be used throughout a project as needed.

**Tool**
Prototyping (for concretising tacit ideas) Pattern format (to remain the authenticity of insights in future activities)

**Basic Procedure**
1. Before the workshop, align on who to involve (experts or end-users) and what to look for (knowledge or needs etc.).
3. After the workshop, try documenting insights in the format of a pattern. Consider having participants to verify or review the half-finished patterns generated from their insights.

**Expected Outcome**
Brainstorming or prototyping insights documented in a pattern format.

**Use After...**
... ...

**Move on to...** Pattern Writing, Pattern Curating or Iterating Activities
Gathering Intelligence

**Brainstorm/Prototyping**

**Aim**
To learn about stakeholders’ visions.
To learn about stakeholders’ needs.

**Participants**
Any stakeholder. (Depending on the approach decided in Choosing Approach.)

**Timing**
Usually used as a research activity at an early stage, or an inspiration/co-creation activity at a later stage of a project. Also could be used throughout a project as needed.

**Tool**
Prototyping (for conceptualising task ideas)
Pattern format (to remain the authenticity of insights in future activities)

**Basic Procedure**
1. Before the workshop, align on who to involve (experts or end-users) and what to look for (knowledge or needs etc.).
3. After the workshop, try documenting insights in the format of a pattern. Consider having participants to verify or review the half-finished patterns generated from their insights.

**Expected Outcome**
Brainstorming or prototyping insights documented in a pattern format.

**Use After**
Pattern Writing, Pattern Curating or Iterating Activities

**Move on to**
Designing for the Situation

---

Gathering Intelligence

**Pattern Curating**

**Aim**
To write up gained insights or half-finished patterns into a complete pattern using a shared pattern template.

**Participants**
Depending on the approach decided in Choosing Approach.

**Timing**
After Pattern Writing

**Tool**
Pattern format
- Writer’s workshop (Atkinson, 2000)
- Iterating Activities

**Basic Procedure**
1. Check for redundancy between patterns and make sure that the different patterns align with the shared values and visions of the group.
2. Review written patterns through moderated discussions among participants.
3. Make connections between patterns to develop a structure.
4. Arrange the categories and patterns into a graphic mind map. Make connections with existing pattern languages if needed.
5. Editing and iteration.

**Expected Outcome**
Patterns with a structure, or combined with existing pattern languages.

**Use After**
Pattern Writing

**Move on to**
Designing for the Situation

---

**Iteration**

**Diagnosing the Situation**

**Aim**
To find the gap between the current state and a desired state.
To evaluate the current situation using pattern as a yardstick.

**Participants**
Depending on the approach decided in Choosing Approach.

**Timing**
After the project-pattern language is formulated in Selecting Patterns. Usually used as a research activity at an early stage of a project. Also could be used throughout a project as needed.

**Tool**
New tool is required.

**Use After**
Aligning, Framing Activities

**Move on to**
Designing for the Situation

---

**Iteration**

**Designing for the Situation**

**Aim**
To fix the gap defined in Diagnosing the Situation.

**Participants**
Depending on the approach decided in Choosing Approach.

**Timing**
After Diagnosing the Situation.

**Tool**

**Use After**
Aligning, Framing Activities

**Move on to**
Diagnosing the Situation
Chapter 4. Tools

This chapter presents 4 tools that can facilitate relevant activities. These are Approach Axes, Navigation Panel, Approach Detail Table, and Pattern Template.

**Approach Axes**

An approach to using PLT in a project can be measured in two ways. First, actions can either be implemented by a top person (top-down) or by grass-roots (bottom-up). This division is described with an **Axis of Change-making Direction**. Second, the aim can either be reusing extant solutions (decision-making) or promoting industry revolution (vision-making). This division is describe with an **Axis of Innovation**.

This tool can be used to support two activities:

- **Aligning Stakeholders**
  Promoting understanding the differences between approaches.

- **Choosing Approach**
  Helping position the near, mid, and/or long term approach to using PLT.
This table presents the details of the four PLT approaches.

**Navigation Panel**
This Navigation Panel combines the Axis of Innovation and the Axis of Change-making Direction. A complete plane hence is divided into four areas, each representing an approach to using PLT.

For example, four cases are mapped in the Navigation Panel:

1. Palmieri et al., 2021
2. Köppe et al., 2017
3. Alexander, 1975
4. Athavankar et al., 2014

These cases are chosen as references for their consistency between internal values (de jure), and external characteristics (de facto). The details of the four cases can be found in the Appendix.
Pattern Template

The template helps practitioners develop patterns in a structured way. It also allows practitioners to modify it as needed.

1. Helping externalise knowledge, experience, problems, and needs into tangible texts, which can remain authenticity and originality throughout a project.
2. Helping externalise tacit insights into explicit patterns.
3. Helping standardise the form of new patterns.

This tool can be used to support the activities in Developing PL category:

1. context: In what situation is this pattern applicable
2. problem: What is the detailed problem in this context, and what are the forces that produce the problem
3. solution: What are the invariants of working solutions, and what are the consequences of using this pattern
4. related patterns: Are there other patterns that should be considered earlier, or that can be considered later
5. references: Are there known examples of this pattern

A visual can also be included to improve readability.

Tool Overview

An overview of these tools is presented in this table.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach Axes</td>
<td>The Axis of Innovation and the Axis of Change-making Direction for differentiating PLT approaches.</td>
<td>1. Helping choose the suitable approach according to underlying values or purposes. 2. Helping backcast and reflect on the underlying values or purposes according to approach.</td>
</tr>
<tr>
<td>Navigation Panel</td>
<td>A two-dimensional plane for mapping different approaches to using PLT.</td>
<td>1. Providing a discourse system for stakeholders to express their underlying values that are relevant to PLT approaches. 2. Helping position the near, mid, and/or long term approach to using PLT.</td>
</tr>
<tr>
<td>Approach Detail Tables</td>
<td>An overview of the four PLT approaches.</td>
<td>1. Helping choose the suitable approach. 2. Introducing the details of each approach. 3. Providing example cases for reference.</td>
</tr>
<tr>
<td>Pattern Format</td>
<td>A template for the patterns in a pattern language. Defined by the stakeholders who facilitate the development of domain-pattern language</td>
<td>1. Helping stakeholders to externalise tacit knowledge or experience. 2. Helping remain the authenticity and original taste of the insights gained from stakeholders.</td>
</tr>
</tbody>
</table>
Chapter 5. Conclusion

The Pattern Language Theory shows the wisdom of circulating human intelligence within a domain. With the connections between individual patterns, a pattern language offers a domain framework plus a living knowledge base. This knowledge base constantly takes in new knowledge and in turn inform relevant projects.

This Activity Kit assist practitioners and researchers in choosing effective activities to make better use of pattern language theory in their projects or contribute to the pattern language.

Yet as acknowledged, the Activity Kit is not fully finished yet. Users may find other more useful combinations of the activities to support fulfilling their own purposes. More tools await being developed to support the activities.
In Chapter 4, four cases are presented when introducing the Navigation Panel. These cases are chosen as references for their consistency between internal values (de jure), and external characteristics (de facto). In other words, the four cases present an honest application of pattern language, with the actions well aligned with the purpose. The details of the four cases can be found in this table.

### Appendix

#### Case α

**Palmieri et al., 2021**

- **Approach Type**: Bottom-up & vision making
- **Internal values**
  - 1. **Social justice**: Emphasizing the envisioning of the future
  - 2. **Mastery of future**: De-politicizing the envisioning of the future
  - 3. **Transformation**: Challenge the dominant, rather than confirming it
- **External characteristics**
  - 1. **Co-producing**: Researchers and residents using patterns to present existing living patterns and flow for dreams and properties
  - 2. **Curating**: Researchers curate results using an open-ended dialogue
- **Detailed process**
  - 1. Value-based workshops: Identify the core individual values of the hybrid participant group; establish a collective value framework
  - 2. Vision-driven workshop: Activate the collective values in individual visions; transform these into a collective position or manifest that guides the development of design patterns

#### Case β

**Köppe et al., 2017**

- **Approach Type**: Top-down & vision making
- **Internal values**
  - 1. **Transformation**: Presents an alternative way of designing for higher education
  - 2. **Mastery of future**: Presents an alternative way of designing for higher education
- **External characteristics**
  - 1. **Expert knowledge**: Each individual pattern is formatted in a manner that makes it possible for others to evaluate and possibly modify it without losing the essence of it
  - 2. **Consistency**: “Without losing the essence of it”
- **Detailed process**
  - 1. **Value-based workshops**: Identify the core individual values of the hybrid participant group; establish a collective value framework
  - 2. **Vision-driven workshop**: Activate the collective values in individual visions; transform these into a collective position or manifest that guides the development of design patterns

#### Case γ

**Alexander, 1975**

- **Internal values**
  - 1. Mastery of immediate problem: To create service systems that lead to a delightful customer experience
  - 2. Tradition: Documenting the underlying principles in good design practices
- **External characteristics**
  - 1. **Expert knowledge**: Patterns are employed as a way of framing expertise; capture the knowledge of participants from different disciplines and integrate it
  - 2. **Consistency**: A shared vocabulary for creative exchange
- **Detailed process**
  - 1. **Value-based workshops**: Identify the core individual values of the hybrid participant group; establish a collective value framework
  - 2. **Vision-driven workshop**: Activate the collective values in individual visions; transform these into a collective position or manifest that guides the development of design patterns

#### Case δ

**Athavankar et al., 2014**

- **Internal values**
  - 1. **Expert knowledge**: Patterns are employed as a way of framing expertise; capture the knowledge of participants from different disciplines and integrate it
  - 2. **Consistency**: A shared vocabulary for creative exchange
- **External characteristics**
  - 1. **Expert knowledge**: Patterns are employed as a way of framing expertise; capture the knowledge of participants from different disciplines and integrate it
  - 2. **Consistency**: A shared vocabulary for creative exchange
CHOOSING AN APPROPRIATE APPROACH TO USING PATTERN LANGUAGE THEORY