

# Foundation Certificate in Design Thinking



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# Contents

Introduction	3
Assessment Examination	3
Syllabus	4
1. Introduction to Design Thinking (10%)	4
2. Fundamental Design Thinking Practices (15%)	4
3. Design Thinking Approaches (20%)	4
4. Design Thinking Techniques (40%)	5
5. Implementing Design Thinking (15%)	5
Question weighting for each syllabus section	7
Design Thinking Concepts, Approaches and Techniques	8
Syllabus section 2: Fundamental Design Thinking Practices	8
Syllabus section 3: Design Thinking Approaches	9
Syllabus section 4: Design Thinking techniques	11
Syllabus section 5: Implementing Design Thinking	14
References	16

## Introduction

This syllabus presents the learning objectives to be assessed for the A4Q Foundation Certificate in Design Thinking. The Foundation Certificate in Design Thinking assesses a candidate's ability to demonstrate an understanding of Design Thinking principles, approaches and techniques.

## Assessment Examination

The examination leading to the Foundation Certificate in Design Thinking is based upon this syllabus and the A4Q Design Thinking course materials. Candidates' knowledge and understanding of Design Thinking is assessed in line with the learning objectives specified in this syllabus.

The examination leading to the Foundation Certificate in Design Thinking:

- Consists of 40 multiple choice questions, each of which has a value of one mark. Candidates must gain 26 marks out of the available 40 marks (65%) in order to pass the examination and be awarded the certification.
- Has a duration of 60 minutes. If a candidate's native language is not the examination language, the candidate is allowed an additional 25% (15 minutes) of examination time.
- Is a closed book examination and no reference materials may be used while sitting the examination.
- Assesses competence at levels 1,2 and 3 of Bloom's Taxonomy of Cognitive Domains. These levels assess competence as follows:
  - K1: remember
  - K2: understand
  - K3: apply

# Syllabus

## 1. Introduction to Design Thinking (10%)

### Learning objectives for Introduction to Design Thinking

- 1.1. Define the nature and characteristics of Design Thinking
- 1.2. Demonstrate an understanding of the rationale for Design Thinking
- 1.3. Identify the core elements of the Design Thinking mindset:
  - 1.3.1. Collaboration
  - 1.3.2. Customer centricity
  - 1.3.3. Outcome focus
  - 1.3.4. Creativity
  - 1.3.5. Experimentation

## 2. Fundamental Design Thinking Practices (15%)

### Learning objectives for Fundamental Design Thinking Practices

- 2.1. Describe the following Design Thinking practices:
  - 2.1.1. Empathy and perspective analysis
  - 2.1.2. Research and investigation
  - 2.1.3. Divergent and convergent thinking
  - 2.1.4. Experimentation and prototyping
  - 2.1.5. Visualisation
  - 2.1.6. Validation
  - 2.1.7. Assumption identification and testing
  - 2.1.8. Iteration and continuous learning

## 3. Design Thinking Approaches (20%)

### Learning objectives for Design Thinking Process

- 3.1. Demonstrate understanding of the Design Council approach
  - 3.1.1. The Design Council 3 H approach
    - 3.1.1.1. Head: Problem solving
    - 3.1.1.2. Heart: Humanity centred
    - 3.1.1.3. Hand: Practical skills
  - 3.1.2. The structure and stages of the Double Diamond
    - 3.1.2.1. Discover
    - 3.1.2.2. Define

3.1.2.3. Develop

3.1.2.4. Deliver

### 3.2. Demonstrate understanding of the d.School 5 stage approach (Stanford)

#### 3.2.1. The stages of the d.School 5 stage approach

3.2.1.1. Empathise

3.2.1.2. Define

3.2.1.3. Ideate

3.2.1.4. Prototype

3.2.1.5. Test

### 3.3 The design thinking macro and micro processes

#### 3.3.1 Problem space

3.3.1.1 Macro process: Empathise, Define

3.3.1.2 Micro process: Investigate, Model, Evaluate

#### 3.3.2 Solution space

3.3.2.1 Macro process: Ideate, Prototype, Test

3.3.2.2 Micro process: Ideate, Make, Check

## 4. Design Thinking Techniques (40%)

### Learning objectives for Design Thinking Techniques

4.1. Describe the structure and application of the following Design Thinking techniques

4.2. Explain the rationale for using each of the following Design Thinking techniques within the stated Double Diamond stage

#### 4.2.1. Discover

4.2.1.1. Service safari

4.2.1.2. Empathy map

#### 4.2.2. Define

4.2.2.1. Customer journey map

4.2.2.2. Problem framing

#### 4.2.3. Develop

4.2.3.1. Service blueprint

4.2.3.2. Assumption reversal

#### 4.2.4. Deliver

4.2.4.1. High and low fidelity prototyping

4.2.4.2. Feedback capture grid

4.2.4.3. A/B testing

4.3. Describe and distinguish between the following generic Design Thinking techniques

4.3.1. Brainstorming and brainwriting

4.3.2. Focus groups

4.3.3. User role and persona analysis

4.3.4. Storyboarding

## **5. Implementing Design Thinking (15%)**

### **Learning objectives for Implementing Design Thinking**

- 5.1. Describe the relationship between organisational culture and the application of Design Thinking
- 5.2. Distinguish between the elements of organisational culture using the Culture Pyramid
- 5.3. Define cultural aspects that may inhibit or enable the use of Design Thinking
- 5.4. Define the POPIT™ elements needed to support the implementation of Design Thinking

## Question weighting for each syllabus section

Syllabus area	Percentage weighting	Target number of questions
1. Introduction to Design Thinking	10%	4
2. Fundamental Concepts for Design Thinking	15%	6
3. Design Thinking Process	20%	8
4. Design Thinking Techniques	40%	16
5. Implementing Design Thinking	15%	6
Totals	100%	40

## Design Thinking Concepts, Approaches and Techniques

This section of the syllabus defines the key concepts, approaches and techniques within the learning objectives in this syllabus.

### Syllabus section 1: Introduction to Design Thinking

#### LO 1.1 Definition of Design Thinking

“Design thinking is a human-centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.”

*Tim Brown, Executive Chair of IDEO*

#### LO 1.2 The Rationale for Design Thinking

- To apply the design mindset and principles to challenges facing organisations
- To provide a basis for creative problem-solving within organisations
- To ensure that the solutions developed are customer-centric and are focused on meeting the needs of all stakeholders

#### LO 1.3 The Design Thinking Mindset

Five fundamental aspects of the design thinking mindset are defined in Table 1.

<b>Collaboration</b>	Working within a team that values listening, sharing, trust and respect for others.  Team members compensate for each other’s strengths and weaknesses and can provide outcomes that are greater than the sum of the available parts (e.g. 2+2 =6).
<b>Customer centricity</b>	Applying a primary focus on understanding and empathising with the different types of customers, including consumers, of products or services. Being aware of and understanding the thoughts, feelings and experiences of customers and other stakeholders.
<b>Outcome focus</b>	Applying a primary focus on achieving the desired results from activities or solutions. This includes the objective assessment of feedback in order to learn and realise desired benefits.
<b>Creativity</b>	Applying skills and techniques to generate new ideas and solutions.
<b>Experimentation</b>	Testing a hypothesis or option in order to build understanding of results and gain insights into possible solutions.

**Table 1: Aspects of the Design Thinking mindset**

### Syllabus section 2: Fundamental Design Thinking Practices

#### LO 2.1 The Design Thinking practices

Eight key design thinking principles are defined in Table 2.

<b>Empathy and perspective analysis</b>	Engaging with people and understanding their deeply held beliefs, values, priorities and motivations.
<b>Research and investigation</b>	Apply a range of techniques to uncover the issues and challenges pertaining to a situation and the people involved with the situation.
<b>Divergent and convergent thinking</b>	Thinking broadly and expansively about possible problems and options (divergent thinking); evaluating options and deciding ways forward (convergent thinking).
<b>Experimentation and prototyping</b>	Building models (at relevant levels of functionality and fidelity), utilising prototypes to try out ideas, accepting the need to take risks, and learning from feedback.
<b>Visualisation</b>	Using illustrations to express ideas and options.
<b>Validation</b>	Understanding the desirability, viability and feasibility criteria to be applied when evaluating options.
<b>Assumption identification and testing</b>	Probing information and beliefs to uncover those that are open to challenge and checking where alternatives are viable.
<b>Iteration and continuous learning</b>	Enabling the evolutionary development of solutions through continuing feature addition and adaptation.

**Table 2: Definition of key Design Thinking practices**

## Syllabus section 3: Design Thinking Approaches

### LO 3.1 The Design Council approach

The Design Council 3 H approach is described in Table 3.

Head: Problem solving	<i>"The ability to visualise and conceptualise the intangible."</i>
Heart: Humanity centred	<i>"The passion and curiosity to design solutions that are right for people and planet."</i>
Hand: Practical skills	<i>"The technical abilities to enable the end goal to be reached."</i>

**Table 3: the 3H approach**

The structure and stages of the Design Council Double Diamond are described in Table 4.

<b>Discover</b>	The first quarter of the double diamond model. The 'Discover' quadrant is concerned with the beginning of a new initiative when research is carried out into customer problems and requirements, ideas and possibilities for new ways forward are generated, and insights are gathered and considered. Design thinkers begin to think about what might be new to consumers that might generate interest and engagement.
<b>Define</b>	The second quarter of the double diamond model. The 'Define' quadrant focuses on making sense of the information elicited during discovery. The nature of the issues identified is analysed leading to the definition of the problem or challenge to be addressed.

<b>Develop</b>	The third quarter of the double diamond model. The 'Develop' quadrant is the stage when potential solutions are identified, prototyped and tested. This process is carried out iteratively with feedback used by design thinkers to refine ideas and improve designs.
<b>Deliver</b>	The fourth quarter of the double diamond model. The Deliver quadrant is where the product or service is launched into operation, additional feedback is sought and this is used to evaluate and improve the product or service.

**Table 4: the stages of the Double Diamond**

### **LO 3.2 The d.School 5 stage approach**

The stages of the d.School approach are defined in Table 5.

<b>Empathise</b>	The Empathise stage is concerned with understanding the people who will use the delivered product or service. The aim is to build empathy with customers through engaging with them, observing their behaviour, uncovering their values and beliefs, and recognising their experiences and views.
<b>Define</b>	The Define stage is concerned with clarifying the needs of the customers and framing the problem or challenge to be addressed. The aim is to develop a clear problem statement that sets the foundation for the generation of ideas and development of possible solutions.
<b>Ideate</b>	The Ideate stage is concerned with the generation of ideas and options for a new or improved product or service. The aim is to propose a high volume and wide variety of suggestions that may form the basis for developing prototypes during the next stage.
<b>Prototype</b>	The Prototype stage is concerned with developing models and samples of proposed ideas. Initially, the prototypes may be low fidelity in order to explore possibilities at pace and with low costs. The aim is to learn from customer experiences and feedback.
<b>Test</b>	The Test stage is where prototypes are used to gather feedback and refine solutions. This is done iteratively. The aim is to learn about the customers and their views regarding the proposed solution and where improvements might be made.

**Table 5: The five stages of the d.School approach**

### **LO 3.3 The design thinking macro and micro processes**

Macro process	Micro process
The double diamond problem space: <ul style="list-style-type: none"> <li>● Use divergent thinking to empathise with the situation;</li> <li>● Use convergent thinking to define the problem</li> </ul>	Iterate the micro process: <ul style="list-style-type: none"> <li>● Ideate: Investigate the situation</li> <li>● Prototype: Analyse and model the information</li> <li>● Evaluate: Review and validate the findings</li> </ul>
The double diamond solution space: <ul style="list-style-type: none"> <li>● Use divergent thinking to ideate about the problem</li> </ul>	Iterate the micro process: <ul style="list-style-type: none"> <li>● Ideate: Generate ideas</li> </ul>

<ul style="list-style-type: none"> <li>● Use prototypes to envision possible solutions</li> <li>● Use convergent thinking to test the possible solution</li> </ul>	<ul style="list-style-type: none"> <li>● Make: Build possible solutions</li> <li>● Check: Review the results</li> </ul>
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## Syllabus section 4: Design Thinking techniques

### LOs 4.1 and 4.2 Structure, application and rationale for the Design Thinking techniques

The Discover stage techniques are described in Table 6.

Discover stage technique	Rationale	Content
Service safari	<p>A technique used to gain understanding about services. Design thinkers experience a service personally in order to uncover the exact nature and characteristics of a service.</p> <p>A Service Safari may be used to experience a particular service (such as attending a training course offered by a particular provider) or a type of service (such as attending any online training course).</p>	<ol style="list-style-type: none"> <li>1. Identify service that is relevant to the design thinking process</li> <li>2. Engage in the service in order to gain direct personal experience</li> <li>3. Keep a record of the service experience using a variety of media and through engaging with the service, the staff delivering the service, other participants and the service environment.</li> </ol>
Empathy map	<p>A technique used to explore and document customers perspectives, responses and feelings. The technique helps to better understand the customers and identify where their problems lie and potential benefits may be achieved.</p>	<p>A matrix that sets out four areas:</p> <ol style="list-style-type: none"> <li>1) What the customer sees</li> <li>2) What the customer hears</li> <li>3) What the customer says</li> <li>4) What the customer does</li> </ol> <p>The analyst observes and listens to customers. The analyst then reflects on what has been observed or heard and interprets what the customer thinks and feels.</p>

**Table 6: Discover stage techniques**

The Define stage techniques are described in Table 7.

Define stage technique	Rationale	Content
Customer journey map	<p>A technique that takes the perspective of a user role/persona and is used to identify which interactions (or touchpoints) for a service work for the customer (magic moments) and which are</p>	<p>A visual or diagrammatic representation of a customer's journey through the delivery of a service. The representation should show the user role/persona, the interactions encountered</p>

	opportunities for improvement (pain points).	during delivery of the service, the emotions experienced by the customer at each touchpoint.
Problem framing	A technique focused on providing problem clarity through iterative discussion, investigation and evaluation of problematic situations and their associated frames.	<p>'A <b>problem</b> is 'a situation, person, or thing that needs attention and needs to be dealt with or solved.' (Cambridge Dictionary)</p> <p>'A <b>frame</b> is a set of principles, or rules, or an organizational pattern that we use to delimit, identify, and make sense of a situation.' (<i>Mieke van der Bijl-Brouwer, Tongji University</i>)</p> <p>The application of the technique involves the discussion, investigation and evaluation of both problem situations and their associated frames.</p> <p>Frames which are challenged can include:</p> <ul style="list-style-type: none"> <li>● Problem definition and impact</li> <li>● Problem context</li> <li>● Assumptions</li> <li>● Root causes</li> <li>● Rules (Boundaries / constraints)</li> <li>● Data</li> <li>● Principles and values</li> <li>● Perspectives</li> </ul>

**Table 7: Define stage techniques**

The Develop stage techniques are described in Table 8.

Develop stage technique	Rationale	Content
Service blueprint	A technique used to define the stages and resources used in the delivery of a service. It enables those involved in delivering a service to understand their role and the resources they need to use.	<p>A detailed visual representation of a complete service, showing the entire customer journey, including the stages, touchpoints and 'back office' elements required to deliver a service.</p> <p>The customer-facing service elements are known as the</p>

		'front stage'. A service blueprint models the touchpoints and the corresponding 'back stage' processes, showing the interactions and connections between the front and back stage activities and resources.
Assumption reversal	<p>A technique whereby assumptions are identified about a particular product or service, and are then reversed. These reversals cause design thinkers to question the assumptions and gain insights and ideas for alternative ways of working.</p> <p>Useful in support of divergent thinking and in the exploration of creative and innovative ideas.</p>	<ol style="list-style-type: none"> <li>1) List assumptions regarding a specific topic, issue or problem</li> <li>2) Select an assumption and reverse this (e.g. 'individuals like swimming in warm weather' to 'individuals like swimming in cold weather')</li> <li>3) Explore the potential of the assumption reversal</li> <li>4) Review and repeat steps 2 and 3 if appropriate</li> </ol>

**Table 8: Develop stage techniques**

The Deliver stage techniques are described in Table 9.

<b>Deliver stage technique</b>	<b>Rationale</b>	<b>Content</b>
High and low fidelity prototyping	<p>A technique whereby models, representations or 'mock ups' of products or services are used to test assumptions, obtain feedback and evolve and validate understanding of potential solutions.</p> <p>A prototype is characterised in five fidelity dimensions: Visual, Interaction, Data, Functional Width, and Functional Depth.</p>	<ol style="list-style-type: none"> <li>1) Agree scope and nature of prototype</li> <li>2) Develop prototype</li> <li>3) Demonstrate prototype</li> <li>4) Obtain feedback</li> <li>5) Review feedback and agree next steps</li> </ol>
Feedback capture grid	<p>A technique that consists of a four box grid that is used to structure the comments, observations and feedback from customers regarding a specific product or service.</p> <p>Aids with enhancing understanding of customer perspectives.</p>	<ol style="list-style-type: none"> <li>1) Request customer feedback in the four areas on the grid: <ul style="list-style-type: none"> <li>● Positive feedback</li> <li>● Constructive criticism</li> <li>● Questions customer wish to ask as a result of their experiences</li> <li>● New ideas that customers wish to suggest.</li> </ul> </li> </ol>

		2) Evaluate feedback and identify ideas for improvement
A/B testing	A technique used to compare the outcomes from using two or more variants of a product or service, in particular customer preferences. It may also help to test assumptions that underlie the product or service offer.	<ol style="list-style-type: none"> <li>1) Determine variable (or variables) to be tested</li> <li>2) Create variants using A and B variables</li> <li>3) Allocate actors randomly to use/test each variant</li> <li>4) Collect quantitative and/or qualitative data</li> <li>5) Review results</li> </ol>

**Table 9: Deliver stage techniques**

**LO 4.3 Describe and distinguish between the following generic Design Thinking techniques: Brainstorming and brainwriting; Focus groups; User role and persona analysis; Storyboarding.**

The generic design thinking techniques are described in Table 10.

Generic design thinking technique	Rationale	Content
Brainstorming and brainwriting	<p>Brainstorming is a facilitated group idea generation technique that involves participants sharing their ideas and perspectives verbally. The technique can be particularly useful for individuals that are keen to engage in active verbal discussion and sharing of ideas.</p> <p>Characteristics of brainstorming:</p> <ul style="list-style-type: none"> <li>• Conversational.</li> <li>• May be chaotic.</li> <li>• Thinking may be blocked.</li> <li>• May be dominated by a few.</li> </ul> <p>Brainwriting is a facilitated group idea generation technique which involves participants sharing their ideas in writing. The technique can be particularly useful for individuals who prefer to reflect on situations or issues before offering suggestions or comments.</p> <p>Characteristics of brainwriting:</p> <ul style="list-style-type: none"> <li>• Silent.</li> <li>• Structured.</li> <li>• Uninterrupted thinking.</li> <li>• Level playing field.</li> </ul>	<ol style="list-style-type: none"> <li>1) Provide a description of the specific product, service or issue</li> <li>2) Conduct the brainstorm or brainwriting exercise – the aim is to create as many ideas and opportunities as possible.</li> <li>3) Evaluate and organise outputs</li> <li>4) Agree actions, summary and close</li> </ol>

	<p>General rules of brainstorming (A.F. Osborn, 1948)</p> <ol style="list-style-type: none"> <li>1. Focus on quantity.</li> <li>2. Withhold criticism.</li> <li>3. Encourage wild ideas.</li> <li>4. Combine and improve ideas.</li> </ol>	
Focus groups	<p>A means of gathering ideas and feedback about a specific product, service or issue, in an interactive group environment.</p> <p>It enables sharing of perspectives from a range of participants.</p>	<p>A typical focus group structure will include:</p> <ol style="list-style-type: none"> <li>1) Introduction and background</li> <li>2) Description of specific product, service or issue to be discussed</li> <li>3) Idea generation, perspective sharing</li> <li>4) Summary and close</li> </ol>
User role and persona analysis	<p>A user role is a collection of job holders or actors that share common tasks or functions. The technique aids with building common understanding of specific users or actors in relation to a business or technology solution.</p> <p>A persona is a representation of a user role, aggregating users with common characteristics, behaviour, attitudes and needs. If it is based on real user data (i.e. the result of user research) it is a <b>(validated) persona</b>. However, if the persona is the result of a brainstorming session (i.e. invented by the Design Thinking team), it is called a <b>proto-persona (or ad hoc persona)</b> to distinguish it from the validated persona. The technique provides a basis from which to build a shared understanding (e.g. empathy for the user group in question) and helps to evaluate ideas and potential solutions in relation to the users represented by the persona.</p>	<p>Areas to analyse are as follows.</p> <p>User role:</p> <ul style="list-style-type: none"> <li>- Frequency of use</li> <li>- Level of experience in the domain</li> <li>- Technology proficiency,</li> <li>- Goal in using the solution</li> </ul> <p>Persona</p> <ul style="list-style-type: none"> <li>- Name</li> <li>- Occupation</li> <li>- Age</li> <li>- Character description</li> <li>- Motivation and goals</li> <li>- Content preference(s)</li> </ul>
Storyboarding	<p>A graphical representation of the steps within a particular service blueprint or customer journey.</p>	<ol style="list-style-type: none"> <li>1. Select a service or customer journey to storyboard</li> </ol>

	<p>The technique is used to build understanding and to design the steps within a service or customer journey. It is often applied to information technology solutions (such as a websites or mobile applications) and leads to the creation of a low-fidelity prototype. The technique can also be used applied to non- technology based business systems.</p>	<ol style="list-style-type: none"> <li>2. Create the visual representation of the steps within the service or customer journey</li> <li>3. Explore scenarios and develop the storyboard iteratively based upon the scenarios</li> <li>4. Review</li> <li>5. Agree next steps</li> </ol>
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**Table 10: Generic design thinking techniques**

## Syllabus section 5: Implementing Design Thinking

### ***LO 5.1 The relationship between organisational culture and the application of Design Thinking***

The relationship between an organisational culture and the application of Design Thinking can be understood by asking the following questions:

- Does the organisational culture enable the application of a Design Thinking mindset?
- What is the organisation’s attitude to ‘failure’?
- Is there a blame culture within the organisation?
- Does the organisational culture promote feedback and learning?

### ***LO 5.2 The elements of the Culture Pyramid***

The elements of the Culture Pyramid are described in Table 10.

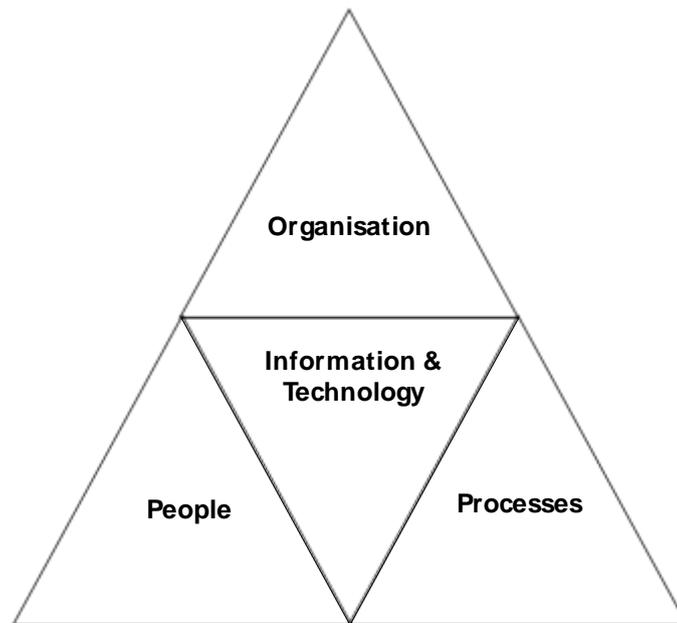
<b>The world view</b>	This drives the organisational culture and is based upon the leaders’ values, beliefs and priorities regarding the organisation that underpins why it exists.
<b>Formal dimension</b>	The structures, policies and systems that are established within the organisation as a result of the world view and govern the way the organisation operates.
<b>Informal dimension</b>	The customary ways of doing things within the organisation, the anecdotes told that reflect behaviours and the symbols used to represent the organisation.

**Table 11: Elements of the Culture Pyramid**

### ***LO 5.3 Cultural aspects that may inhibit or enable the use of Design Thinking***

- Inhibit: blame culture; aversion to feedback; focus on right answer; hierarchical control
- Enable: openness and transparency; trust; empowerment; experimentation

### ***LO 5.4 The POPIT™ elements needed to support the implementation of Design Thinking***



**Figure 1: The POPIT™ model** (© Assist Knowledge Development Ltd)

The elements of the POPIT model are described in Table 11.

<b>People</b>	The skills, motivation, commitment and attitudes of the staff working within the organisation.
<b>Organisation</b>	The culture, management structures, governance approach, capabilities and roles within the organisation.
<b>Processes</b>	The value streams and processes used to conduct the work of the organisation.
<b>Information</b>	The data and information collected, recorded, stored and used within the organisation.
<b>Technology</b>	The technical architecture of the organisation.

**Table 12: Elements of the POPIT™ model**

Consideration of these elements helps when implementing a design thinking approach within an organisation. Aspects to consider are described in Table 12:

<b>People</b>	The staff working within the organisation need to have design thinking skills and need to have the motivation, commitment and attitudes that enable design thinking.
<b>Organisation</b>	The culture of the organisation and the corresponding formal structures and governance need to support the implementation of design thinking. Also, the organisation needs to possess the capabilities that enable design thinking.
<b>Processes</b>	The value streams and processes used to apply design thinking should be defined and communicated within the organisation.
<b>Information</b>	Any data and information required to support design thinking should be available.
<b>Technology</b>	The technical infrastructure required to support design thinking should be in place.

**Table 13: Using the POPIT™ model to implement design thinking**

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