Useful Tools from Design Thinking

System thinking and design thinking often follows an alternating divergence-convergence method. Although this idea has been around in some form since at least 1996, it was restated and popularized as the 'Double Diamond' approach in 2005 by the UK Design Council. This framework for systematically ideating and innovating has been used to devise forward-thinking solutions to wicked problems in supply chain management, climate change, healthcare, and a variety of other domains.

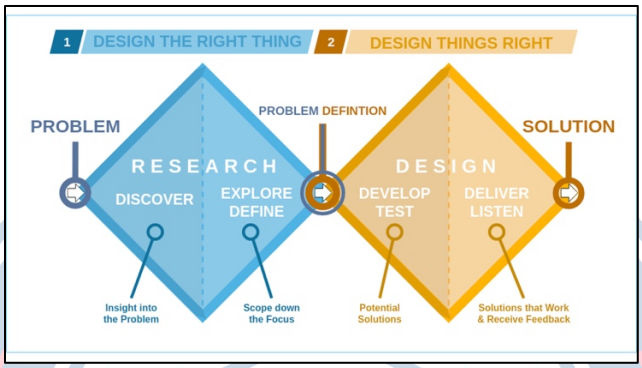

Figure 1: Double Diamond method. Used courtesy of https://commons.wikimedia.org/wiki/File:Double_diamond.png

As formulated, the process is composed of two main phases: **research**, and **design**.

In the **research** phase, participants comprehensively **study** the problem from a wide range of perspectives, trying to understand the root causes of the issue and potential ramifications of different approaches. They then **synthesize** this information into a single workable, open-ended problem statement that can be used for ideation.

In the **design** phase, participants first **suggest** a range of ideas to approach the problem, using any number of techniques meant to foster creativity. Then, they screen through all of the solutions and finally **select** the one that seems most promising.

A third diamond, not shown in this model, describes the implementation phase – first, teams build prototypes or tests for several facets of their proposed solutions, then, they gradually combine their successful approaches for a rollout of the finished product or policy.

The following is a non-exhaustive list of useful tools and techniques.

1. **Day-One Hypothesis:** Participants note their initial thoughts, without much research or investigation. This is useful for identifying assumptions and heuristics, and for tracking their first impressions about the key issues.
2. **Problem Definition (Research Phase):** Participants take the time to identify the **context**, **constraints, criteria for success, stakeholders,** and **sources** of useful information.
    a. This is often done in collaboration with other stakeholders, or after interviews with key people.
    b. Then, the information is condensed into a single workable statement.
    c. This tames a wicked or overwhelming set of facts to something more manageable.

3. **Design Sprint (Design Phase):** This structured process for rapidly generating and evaluating new ideas begins with brainstorming and ends with a workable solution.
    a. First, participants generate as many ideas as possible. Emphasis is placed on quantity, not quality. Sometimes, participants are given extra criteria to spur creativity.
    b. Participants may also be asked to generate intentionally bad ideas, and explain what makes them unsuitable. This helps to clarify the key features of any design.
    c. Later, participants share ideas, and screen for whether the proposed solutions are viable, desirable, and / or feasible. Ideas may also be combined.
    d. Finally, participants define key criteria for success (often determined during the problem definition phase), and screen and score the top ideas against these criteria to select a solution.

Theoretical Models of Decision-Making

1. There are **two systems** of information processing. **System 1** is intuitive, fast, and nonconscious, while **System 2** is more analytical, slow, and effortful.
2. Decision-making in a crisis is often explained using the **recognition-primed decision (RPD)** model, in which decision-makers will iteratively generate an option, evaluate it using a mental model to predict whether it will succeed or fail, and adopt the first option they come up with that is not rejected. RPD is most useful when decision-makers already have a strong intuition for likely outcomes.
3. The RPD model may lead to **satisficing**, where decision-makers choose a suboptimal decision because it is the first one to meet the stated criteria. This often leads to worse downstream consequences.
4. People generally rely on pre-learned mental models to predict the results of each decision. These models incorporate several **heuristics** – learned rules of thumb that are fast and correct a lot of the time, but may impose systemic biases or lead to incorrect results.
5. Because people solve problems using their pre-learned mental models, and may rely on different heuristics, working with a diverse team of people with different skills and backgrounds improves performance on a novel challenge.

Common Biases and Heuristics

The following list is non-exhaustive.

1. **Availability**: Decisions are based on information that is easiest to remember.
2. **Anchoring**: People start with an initial guess and adjust from there as new information comes in.
3. **Overconfidence**: It is hard to effectively gauge how much is known / how confident we can be in our predictions.
4. **Confirmation bias**: It is easier to focus on data that favors a certain outcome or hypothesis and discount evidence against it.
5. **Automation bias**: People can tend to overvalue computerized recommendations; alternatively, some people undervalue computerized recommendations.
6. **Framing and risk avoidance**: People tend to prioritize options that minimize loss, rather than maximize potential gain.