Software Architecture and Design Thinking

116U01C701

Module 4

Module 4 (06)

4 Introduction to Design Thinking

4.1 The Power of Design Thinking

Stages of thinking: The design process: Define, Research, Ideate, Prototype, Select, Implement, Learn, Example project

4.2 Research: Identifying drivers, Information gathering, Target groups, Samples and feedback

4.3 Idea generation: Basic design directions, Themes of thinking, Inspiration and references, Brainstorming, Value, Inclusion, Sketching, Presenting ideas

Stages of thinking

- Design is a process that turns a brief or requirement into a finished product or design solution.
- The design process can be said to comprise seven stages:

- define,
- research,
- ideate,
- prototype,
- select,
- implement and
- learn.

- Each of these requires design thinking.

Design Process

- The design process engages a high degree of creativity but in a way that is controlled and directed by the process so that it is channeled towards producing a viable, practical solution to the design problem, meeting or excelling the stated aims of the brief.
- While creativity in design is important, design is an activity that serves economic as well as creative goals.

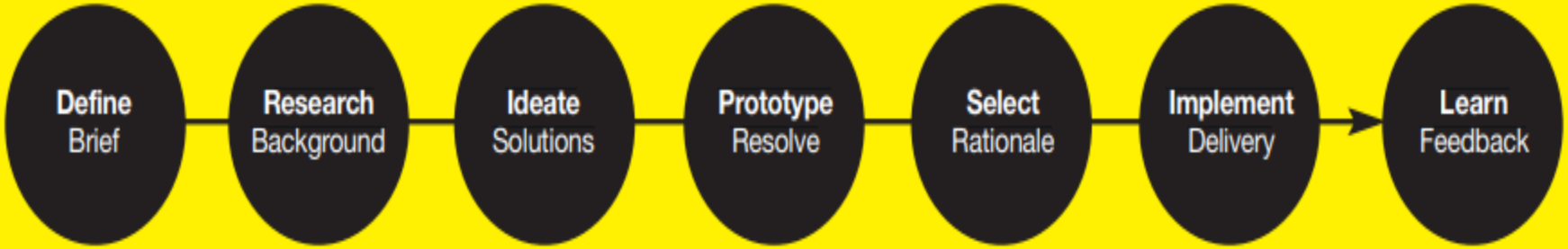
The Design Process

Within the design process, seven steps can be identified:

- Define
- Research
- Ideate
- Prototype
- Select
- Implement
- And learn

- First, the design problem and the target audience needs to be defined.
- The research stage reviews information such as the history of the design problem, end-user research and opinion-led interviews, and identifies potential obstacles.
- Ideate is the stage where end-user motivations and needs are identified and ideas are generated to meet these, perhaps through brainstorming.
- Prototyping sees the resolve or working-up of these ideas, which are presented for user-group and stakeholder review, prior to being presented to the client.
- Selection sees the proposed solutions reviewed against the design brief objective. Some solutions might be practical but may not be the best ones.
- Implementation sees design development and its final delivery to the client.
- Learning helps designers improve their performance and, for this reason, designers should seek client and target audience feedback and determine if the solution met the goals of the brief.

The seven stages of design



Stage 1 – Define

- Objectives
- Objectives are simply what the client hopes to achieve through commissioning a design job, and it is important that these are fully understood and ‘mapped’ to your design thinking.

- 1 Who is the client and target audience? (size, nature, characteristics)
- 2 What design solution is the client thinking of? (print, web, video)
- 3 When will the design be needed and for how long? (project timescales)
- 4 Where will the design be used? (media, location, country)
- 5 Why does the client think a design solution is required?

Stage 2 – Research

- Collecting background information.
- This research can be either quantitative, with hard statistical numbers about the size and composition of target user groups, or qualitative, with information about what that user group buys or consumes and what their lifestyle is like.

- Primary research
- A primary source of research is the feedback generated during the learning phase of projects previously undertaken with the same or similar clients.

- Secondary research
- Secondary research is the information obtained from general secondary sources such as consumer market research reports. These provide the demographic breakdown and historic performance of given markets and market segments, and provide a clear view of how a market is structured.

Stage 3 – Ideate

- Creating potential solutions.
- During the ideate stage, the design team draws on the research gathered and the constraints established during the define stage.
- This information is used to create ideas with which to tackle the design brief.
- Ideation methods include brainstorming, sketching ideas, adapting a tried-and-tested design that already exists, taking a top-down analytical approach that focuses on the product, service or company or a bottom-up approach that focuses on the customer or user

Stage 4 – Prototype

- Resolving solutions.
- The ideate stage generates a variety of potential solutions to the design brief.
- Prior to selection, it may be necessary to further work up the most promising of these solutions. This will allow particular aspects to be tested and will provide a better basis for comparison at the selection stage. In such cases a prototype can be created.
- A prototype can be used to test the technical feasibility of a design idea to see if it works as a physical object.
- A prototype gives the design team and client the ability to visualise and handle a design concept, to get an idea of its physical presence and tactile qualities.

Stage 5 – Select

- Making choices.
- The select stage is the point at which one of the proposed design solutions is chosen for development.
- The key decision criterion is fitness for purpose: does the design meet the needs and goals of the brief, and will it effectively communicate to the target audience to achieve those aims?
- Other factors, such as cost and time, are relevant in the selection process
- At the end of the selection process, the client will sign off the choice, thus initiating the next stage in the design process

Stage 6 – Implement

- Delivering the solution to the design brief.

- During this stage, the designer passes the design artwork and format specifications to those who will be supplying the final product. This might be a printer, web builder or fabricator.

- The design team typically provides project management during this stage, in order to ensure that the end results meet design expectations, and to keep the project on budget and on time.

Stage 7 – Learn

- Obtaining feedback.
- The final stage in the process involves learning from what has happened throughout the design process.
- This is a feedback stage during which the client and design agency might seek to identify what worked well and where there is room for improvement.
- The feedback generated at the end of the process becomes a learning opportunity for future projects. It forms one of the sources of information for the define and research stages.

Module 4

4.2 Research:

- Identifying drivers
- Information gathering
- Target groups
- Samples
- Feedback

Research

- Once a brief has been defined and agreed, the research stage can begin. The research stage is when the design team investigates the subject matter of the brief in order to accumulate relevant information that will be used to inform design decisions.
- Various data gathering methods exist to generate quantitative and qualitative information

Identifying drivers

- The research stage aims to identify the drivers that stimulate the target group to act on a design and the barriers that could impede the success of a design.

Drivers

- Drivers are the knowledge and conditions that initiate and support activities for which the design was created.
- Knowledge and conditions can include such terms of reference as market forces, fashions and musical trends of the day.
- By identifying these drivers, the design team will have an appreciation of the stimuli that people are receptive to.

Barriers

- Barriers need to be identified during the research stage in order to prevent work from being undertaken in a direction that has little chance of being implemented for technical, legal or market reasons
- Barriers can be rules and laws about what product packaging can and cannot show
- Technical barriers might include systems of standards that exist in different countries.
- Market barriers include the purchasing and distribution power of key competitors, is something that might restrict access to outlets.

Information gathering

- When conducting research, information can be classified into two categories: quantitative and qualitative.
- These help define the size of a target market and its characteristics.
- Quantitative information is numerical or statistical information that enables a design team to put physical dimensions to a target market. Ex- Total market sales value, annual sales volume and the number of consumers in the 25–30-year-old
- Qualitative information allows the design team to understand why things are as they are; the reasons that people respond to certain stimuli or not. Ex- via a group discussion or focus group, or an in-depth interview

Diagram techniques

- Diagrams can provide an excellent means of organising the relationships between different pieces of information and ideas.
- By creating diagrams, a design team can quickly obtain an understanding of how a target group is structured and what some of the key relationships within that group may be.
- Diagrams also provide a means to help communicate the results of the research stage.

Target groups

- The research stage identifies and provides rudimentary classification to the different groups of consumers or users in a sector and their characteristics.
- Once target groups have been identified, they can be further researched to acquire a greater level of detail about their composition and habits, providing both qualitative and quantitative information.
- For example, the sex, education and income level profile (quantitative information) and the motivations, likes, dislikes and aspirations (qualitative information) of the groups

Character profiles

- A character profile is a tool developed during the research stage, containing written and graphic information about a particular group of people.
- It is used in the design process to stimulate idea formation and help with decision making.
- Like keywords or visual clues

Secondary research

- Secondary research sees the collection and use of existing published information about customers, competitors and relevant trends of interest such as social and economic trends.
- Secondary research can be used to feed general information about the target group, the market and underlying trends into the design process.
- Various secondary data resources are available at public reference libraries and online.
- Secondary data sources include newspapers and trade periodicals, blogs, conference papers, market research reports, trade association and official statistics, commercial business reports (KeyNote, Euromonitor, Mintel, Datamonitor and EIU), university research papers and think tanks.

Samples and feedback

- Understanding the motivations, behaviors and aspirations of a target group often involves detailed study of that group.
- As it is not possible to quiz every member of the target population, a sample group is typically defined

Samples

- A sample group is typically a collection of five to ten people who share the characteristics of the target group and who can be used for one-to-one interviews, questionnaires and focus groups

Feedback

- Design is an iterative process, during which internal and external feedback is sought and received at all stages.
- The main learning opportunity comes at the end of the process when feedback about the performance, acceptance and success of a design is sought and fed back into the design process

Cluster and vote, deciding which ideas to develop

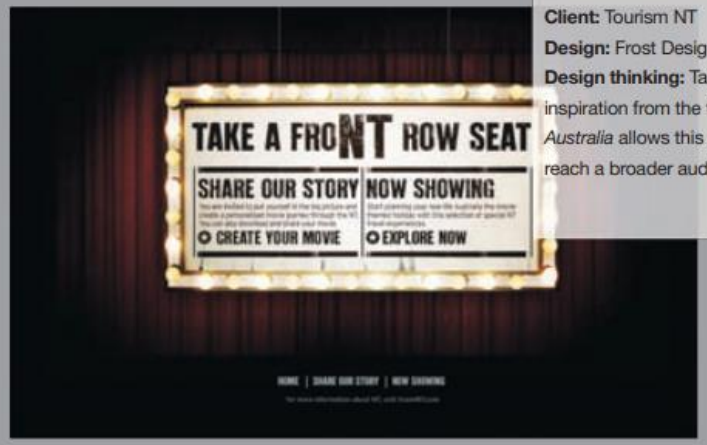
- This is a method used to identify patterns in a problem area or in a series of ideas to help the design team select appropriate solutions.
- This system uses agreed assessment criteria that can take into account the concerns of multiple stakeholders.
- These criteria are brainstormed, refined, agreed and structured to encourage participants to consider the perspectives of other stakeholders

Scoring methods

- All design ideas are to be scored against the individual selection criteria and then these will be totalled to produce a final score for each idea

Idea generation

- Once a design brief has been defined and researched, the idea generation or ideate stage gives concepts that may solve the problem.
- This is the part of the design process where creativity is unleashed.
- Ideation seeks to generate concepts that will be worked up and resolved in subsequent process stages.



Client: Tourism NT
Design: Frost Design
Design thinking: Taking inspiration from the film *Australia* allows this website to reach a broader audience

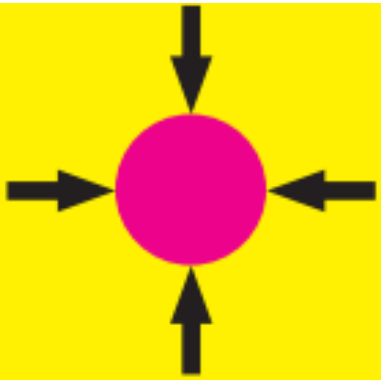
Basic design directions

- Starting from a given point designers can think in specific ‘directions’ in order to generate new ideas from existing designs.

- Divergence
- Divergence is the expansion or spreading out of something from a central point or theme. Divergence occurs as both an instigator and a response to divergence in society at large as designers respond to changing demographics, and the increasingly diverse market segmentations of their clients.
- Convergence
- Convergence is the contraction of something towards a central, more generalised point. In design, although the overriding tendency is towards divergence, convergence can still be found in areas such as generic branding.
- Transformation
- Transformation involves a substantial qualitative change, such as the redesign of a visual identity, or a repackage in order to facilitate a new distribution method

Divergence

Moving away in different directions from a common point. Also called branching out.



Convergence

The coming together of two or more entities towards a central point or common ground.

Transformation

A qualitative change in appearance or character.

how this will relate to the design direction of competing products, brands and organisations?

- Point of difference or unique selling point (USP)
- The point of difference or unique selling point (USP) is the combination of values and attributes that differentiates a company or product from all other similar companies or products.
- Clustering
- Clustering can be found in any town. For example, the presence of many restaurants in one area draws people to that area to eat, although they may not know which restaurant they'll be eating at until they get there. Designs can be created to blend in (converge) with the visual image presented by others in the peer group or can be created to stand out (diverge) from them.
- Inclusive design
- Inclusive design aims to increase social equality and ensure that products, services and environments are accessible to all people. Given the estimations of some research that by 2020 half the UK adult population will be aged over 50, while 20 per cent of Americans and 25 per cent of Japanese will be over 65, this is becoming an increasingly important factor for consideration.

Themes of thinking

- Designers often have to face the challenge of fitting large quantities of information into formats with limited space.

- KISS
- Keep It Short and Simple, or Keep It Simple Stupid (KISS) is a modern acronym
- Focus
- Select only the key message elements as the focus for the design. A company may have many products or projects but the design should focus on the most important ones.
- Top down and bottom up
- An analytical approach appropriated from information technology development, this looks at a design problem from the system perspective and then ‘drills’ down to add detail in specific areas (top down), or focuses on the basic elements first and works upwards to link these together as part of a system (bottom up)

- Python philosophy
- Derived from ideas presented by Tim Peters in The Zen of Python, these tenets include: beautiful is better than ugly; simple is better than complex; sparse is better than dense; readability counts; practicality beats purity; and refuse the temptation to guess.
- White space
- Some believe that white space allows key design elements to breathe and be easily seen. It also helps the viewer to focus attention on them, giving them greater impact.
- Text minimisation
- This tenet suggests that text should be kept to a minimum, with sentences pared back to short, sharp phrases that have a meaningful impact.
- Graphic impact
- According to many designers, graphics should create a visual impact that grabs the attention and reinforces text communication. However, graphics that go overboard and are too large, complicated or numerous are distracting.

- Scale
- Designers need to think about scale, an easily forgotten aspect when designing on screen. Design proofing needs to include an actual scale proof for small- or large-scale items such as stamps or posters to ensure that text and graphics are of sufficient scale to be comfortably read
- User-centred design (UCD)
- User-centred design (UCD) places the needs, desires and limitations of the user at the centre of every stage of the design process and requires designers to foresee how they are likely to use the resulting product.
- Ergonomics
- Ergonomics is the practice of designing in accordance with physical human needs, to optimise performance and minimise discomfort. Ergonomics focuses on safety, efficiency, productivity and health in work settings to ensure that products, services and environments are compatible with the human form. and
- finally… TIMTOWTDI (pronounced Tim Toady)
- This means simply that ‘there is more than one way to do it’ and follows the belief that a problem may have several different, but equally valid, solutions

Inspiration and references

- Inspiration is essential in any creative activity and design is no exception. Inspiration is key to the generation of exciting design ideas and design professionals draw inspiration from innumerable sources
- work of other people in the field, past and contemporary
- ideas book
- latest trends and styles are easily observable on the street, in films, on TV, in magazines and in the shops
- visual arts provide a wide and varied palette of historical and contemporary styles
- rich vocabulary of art and design knowledge

Brainstorming

- Brainstorming is a creative group approach to developing ideas and originating solutions during the ideate stage.

Brainstorming rules

- Do not criticise: this is the most important rule. Criticism prevents people from making suggestions and voicing options. Any idea is valid in brainstorming.
- Keep the process manager-free: the presence of line managers may inhibit the flow of ideas.
- Avoid resolve: do not start working up or resolving an idea that looks like a possible leader during the session. Instead, carry on generating ideas during the allotted time. Ideas can be resolved following the evaluation stage.
- Work to a target: a numerical target helps idea generation as participants move away from standard thinking on the subject in order to achieve it. Focus on quantity not quality.
- Clock watch: set a time by which the session should end. This helps to keep the pressure on, forcing more ideas to be generated.
- Let go: participants must not be afraid of offering odd, wacky or wild ideas, although this does not mean participants should not take the session seriously.
- Be inclusive: the session chairperson should prevent any group members from dominating the session and should encourage all members to contribute

Additional brainstorming methods

- Visualisation
- Groups and voting
- Scribble, say, slap
- Assessment criteria

Value

- Value is a term often used in design. A designer ‘adds value’ to a brand through the creation of a visual identity, for instance, but what exactly does value mean in the design thinking context?

Inclusion

- Throughout the design process it is important to remember who the target audience is and to consider how design ideas might resonate with this audience. Design must be focused on who it is communicating to and not just the tastes of the designers who create it

Sketching

- Most designers sketch in order to quickly put ideas down on paper. As sketching can convey a visual idea for a design or design element very rapidly, it can be used in many parts of the design process, and indeed, throughout it

Presenting ideas

- Potential design solutions have to be presented to the client, who will then choose one for implementation. Presenting ideas well is crucial; a good idea presented badly can fall at the first hurdle