Design Thinking

Design thinking is generally defined as an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback, and redesign. Several characteristics (e.g., visualization, creativity) that a good design thinker should possess have been identified in the literature. The primary purpose of this article is to summarize and synthesize the research on design thinking to

- better understand its characteristics and processes, as well as the differences between novice and expert design thinkers.
- apply the findings from the literature regarding the application of design thinking to our educational system.

The authors' overarching goal is to identify the features and characteristics of design thinking and discuss its importance in promoting students' problem-solving. Being successful in today's highly technological and globally competitive world requires a person to develop and use a different set of skills than were needed before (Shute & Becker, 2010). One of these skills is called design thinking.

Design thinking is a user-centric, solutions-based approach to problem-solving that can be described in four stages:

- Clarify: This phase involves observing a situation without bias. It leans into design thinking's user-centric element and requires empathizing with those affected by a problem, asking them questions about their pain points, and identifying what they solved. You can then use what you learn to create a problem statement or question that drives the rest of the design thinking process.
- Ideate: Begin brainstorming potential solutions. Take your problem statement or question and ideate based on patterns or observations collected in the clarify phase. This is the time to let your imagination and creativity run wild.
- Develop: Develop potential solutions using the ideas you generate, then test, experiment with, and reiterate to determine which are successful and which aren't. Be ready to return to the ideation or clarification stage based on your

results. Stepping back in the process is common—and encouraged— in design thinking.
- Implement: Finally, implement the solution you've developed. Again, it's likely you'll have to take a few steps back and reiterate your final solution, but that's a central part of this phase. After several tests and edits, you'll have a solution that can yield positive results.

Design thinking is an undeniably powerful tool for companies, but what does it look like in practice? How have organizations applied it and how does it work? How has design thinking been applied to different industries, challenges, and business sectors?

1. **PillPack**

This case study describes how PillPack started as a startup-in-residence at IDEO Cambridge. Working with designers and using a human-centered approach, PillPack refined their brand vision, strategy, and identity across channels. PillPack was called one of the best inventions of 2014 by Time Magazine and Amazon bought PillPack for $1 Billion in 2018. I think you could safely say that their design thinking approach was successful.

2. **Airbnb**

Another household name, Airbnb, started by only making around $200 a week. After some observation, its founders recognized that the advertising pictures hosts were posting online weren't of a high enough quality, which often deterred customers from renting rooms.

To empathize with customers, the founders spent time traveling to each location, imagining what users look for in a temporary place to stay. Their solution? Invest in a high-quality camera and take pictures of what customers want to see, based on their travel observations. For example, showing every room rather than a select few, listing special features like a hot tub or pool in the description, and highlighting the neighborhood or areas in close proximity to the residence. The result? A week later, Airbnb's revenue doubled.

3. Netflix

Although many companies have successfully used design thinking, Netflix has repeatedly leveraged it to become an industry giant. During the company's inception, its main competitor, Blockbuster, required customers to drive to brick-and-mortar stores to rent DVDs. The process was the same for returns, which was a major pain point for many. Netflix eliminated that inconvenience by delivering DVDs directly to customers' homes with a subscription model. While this revolutionized the movie industry, Netflix's real success has been in its innovation over the years. For example, when the company realized DVDs were becoming outdated, it created an on-demand streaming service to stay ahead of the curve. This also inadvertently eliminated the inconvenience of having to wait for DVDs.

Subsequently, in 2011, Netflix took its design thinking one step further and responded to customers' need for original, provocative content that wasn't airing on traditional networks. Later, in 2016, it improved its user experience by adding short trailers to its interface. Each of Netflix's major updates was in response to customers' needs and driven by an effective design thinking process.

User-Centered Design

User-centered design (UCD) is an iterative design process in which designers focus on the users and their needs in each phase of the design process. In UCD, design teams involve users throughout the design process via a variety of research and design techniques, to create highly usable and accessible products for them.

UCD is an Iterative Process

In user-centered design, designers use a mixture of investigative methods and tools (e.g., surveys and interviews) and generative ones (e.g., brainstorming) to develop an understanding of user needs. The term was coined in the 1970s. Later, cognitive science and usability engineering expert Don Norman adopted the term in his extensive work on improving what people experience in their use of items. And

the term rose in prominence thanks to works such as *User-Centered System Design: New Perspectives on Human-Computer Interaction* (which Norman co-authored with Stephen W. Draper) and *Norman's The Design of Everyday Things* (originally titled The Psychology of Everyday Things).

Generally, each iteration of the UCD approach involves four distinct phases. First, as designers working in teams, we try to understand the context in which users may use a system. Then, we identify and specify the users' requirements. A design phase follows, in which the design team develops solutions. The team then proceeds to an evaluation phase. Here, you assess the outcomes of the evaluation against the users' context and requirements, to check how well a design is performing. More specifically, you see how close it is to a level that matches the users' specific context and satisfies all of their relevant needs. From here, your team makes further iterations of these four phases, and you continue until the evaluation results are satisfactory. User-centered design is an iterative process that focuses on an understanding of the users and their context in all stages of design and development. UCD Considers the Whole User Experience
In UCD, you base your projects upon an explicit understanding of the users, tasks, and environments. The aim of the process is to capture and address the whole user experience. Therefore, your design team should include professionals from across multiple disciplines (e.g., ethnographers, psychologists, software and hardware engineers), as well as domain experts, stakeholders, and the users themselves.

Experts may carry out evaluations of the produced designs, using design guidelines and criteria. However, you should bear two crucial points in mind. First, to span the entire user experience, you must involve the users for evaluation. Second, you'll need to ensure long-term monitoring of use.

The User-Centered Design Process
The user-centered design process prides itself on being a research-focused practice. There are six stages that designers go through when developing a product. These stages include:

1. Specify the Context of Use

Before beginning to develop a product, the designer must research the ideal user and their needs. By observing their lives, the designers are able to get a broad picture of some of the challenges these users face. Many of these observations are done in the form of interviews. These interviews give the designer insight into what specific goals users intend to meet and how they would like to achieve them. From here, the designers can then understand the use cases of their product and begin designing.

2. Indicate Business Requirements

After interviewing users, the designers have a better sense of what is most desirable to them. During this phase, designers begin to research financially feasible solutions for the user. Once a solid design idea has been formed and tested, the designers consider the business requirements that must be upheld. Since the primary goal of most products is to produce user loyalty and increase long-term revenue, the business requirements should be addressed over time. Before implementing the product, the designers may ask a few questions to help them modify the design. Some of the questions may include:

- What partnerships need to be made?
- What resources do we need to help develop this project?
- What is our revenue stream like?

3. Design Solutions For Concepts and Finished Designs

This stage of the UCD process involves generating ideas, testing, and refining solutions based on user requirements and input. When working through this stage, it is important to keep users involved so that the product can be continuously changed to meet their needs.

Testing out ideas on users helps designers discover which feasible ideas help the user and which do

not. Since the user's needs change over time it is important to keep testing ideas to ensure that they are still relevant solutions.

This phase will continue until the designers and users are happy with the result.

4. Evaluate the Design

At this point in the UCD process, designers conduct usability testing with actual users of their product. This stage gives the designers insight into how the users

would actually interact with the product and understand how to tweak it to better suit them.

5. Implementation

The implementation phase allows designers to finally bring their solution to the market. Within this phase designers focus on a few key steps:

- Building partnerships
- Altering their business model
- Piloting their idea
- Receiving a reliable solution

The best way to do this is by researching the user and launching a prototype within their natural setting. This step will look very different depending on the type of product that is being designed.

For example, the implementation phase for a product that is designed for a younger user may involve user interviews, and observing the user in their personal life and community settings.

By observing the user, the designer is able to put themselves in their shoes. Once this stage is implemented, the design is likely to change to best fit the user's needs and meet business goals.

6. Deployment

The final stage of designing, before releasing a product, aims to understand if the product will have the desired impact on the user. Assessing this factor will differ depending on the goal of the product.

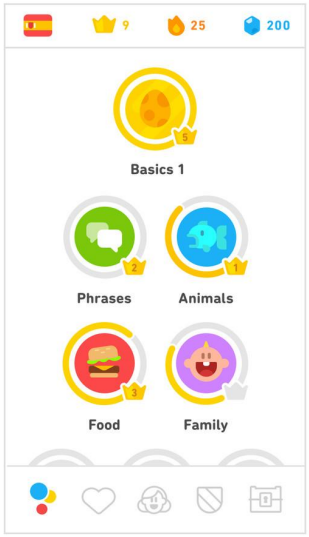
If the product is meant to alter user behavior, factors such as user feedback will greatly help the designer understand the outcome of their work. Alternatively, the assessment may be as simple as understanding whether or not the product generated revenue.

Ultimately, the designers will compare these assessments with their business goals and alter them before deploying the product. This stage will not be considered complete until the product is as accessible as possible for the intended users.

Below are a variety of examples that have demonstrated a great use of the key principles of UCD.

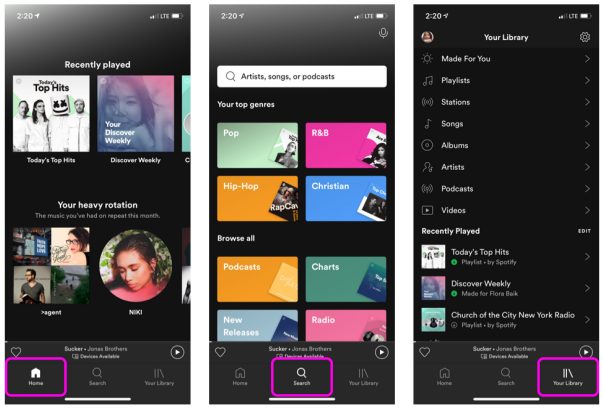
1. **Duolingo**

This language learning app takes simplification to a new level. Its simplistic interface allows users to learn a language easily through the process of completing tasks. Duolingo turns language learning into a game by letting users advance to new categories after completing a section.



2. **Spotify**

Spotify is a leading example of turning the needs and desires of users into a highly valuable product. Before their service was available, users usually purchased their music on a song-per-song basis.
For most, purchasing music in this way was not financially feasible.



Spotify created its service to address this issue and provide users with an easier way to access music. Since its development, users can now access music in one place for a standard monthly fee.

3. Apple

The design process of a website and mobile app should be focused on making information quickly accessible. There is no better example of this principle than Apple's web pages.

Apple designs each of its web pages to provide information in a visible manner. Users can better understand factors, such as product types, features, and speculations, due to their sleek and organized display.

Accessibility should always be a top priority as it greatly impacts user experience and can change how users view your brand.

Resources:

- Valerie J. Shute, September 2012, What Is Design Thinking and Why Is It Important?
- Esther Han, 22 February 2022, 5 EXAMPLES OF DESIGN THINKING IN BUSINESS
- Interaction Design Foundation, User-Centered Design.
- Seth Viebrock, User-Centered Design: Principles, Process, Examples