

# What is Design Thinking and Why Is It Important?

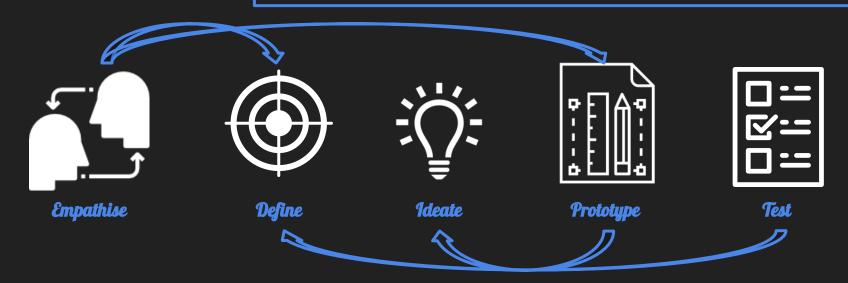
Paper Analysis and Discussion

Engenharia de Requisitos de Sistemas de Software

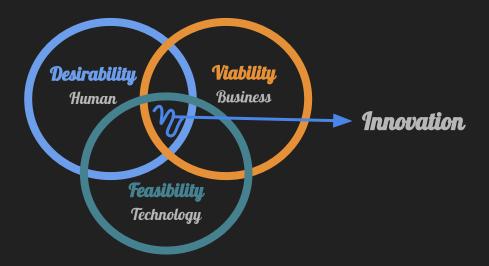
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#### What is Design Thinking?

Non-linear, iterative process which seeks to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. Most useful when you want to tackle problems that are ill-defined or unknown



#### What is the context behind Design Thinking?



#### **Problem:**

Increasingly more interconnected and complex world.



Problems that are ill-defined or unknown

+

Rapidly changing requirements

#### Solution:

Develop and refine skills which allow us to understand and act on rapid changes in our environment and behavior.

Design thinking offers a means to grapple with all this change in a more human-centric manner.

# Paper Analysis

**Bibliographic Data** 



Rim Razzouk Valerie Shute

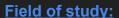
#### Name:

What is Design Thinking and Why Is It Important?

#### **Publication:**

September 2012 by AERA 82<sup>nd</sup> volume under <u>Review of Educational Research</u> magazine.

### Theme of the paper



Design Thinking

#### Goal:

- Synthesize existing research on design thinking as to allow for a better understanding of...
  - its characteristics and processes;
  - the differences between novice and expert design thinkers;
  - apply the findings from literature regarding its application to the educational system.
- Discuss the importance of design thinking in promoting students' problem-solving skills in the 21<sup>st</sup> century.



- Nature and in depth overview of the design thinking process;
- Experts behavior in design;
- Experts vs novice designers;
- Design thinking applied to the education system.



#### What is Design?

- Central or distinguishing activity of engineering;
- Stems from a dissatisfaction with the way things are at the moment and the determination to take some action to solve them.

Design Thinking...

- ... Major component of business competitiveness;
- ... Integral part of design and engineering fields and business.





Makers

#### **Finders**

#### **Motivation:**

Discover.

Understand and find explanations for not well understood phenomena.

#### Makers

#### **Motivation:**

Synthesize what they know in new constructions, arrangements, patterns, compositions and concepts.



#### **Design has:**

#### Symbolic component



Analytic component

Deals with communications and symbolism

Requires analysis to perform synthesis

#### And can therefore be divided in:

- space of concepts
- space of knowledge

So design thinking is an **iterative and interactive process** where designers see the concepts/ideas of a problem, draw relations between those ideas to solve it and view what has been drawn as a means of information for further design efforts.

#### **Design thinker's common characteristics:**

#### Empathy

 Facilitating the way a designer sees how what is being created will attend the human needs.

#### Vision

 To understand the problem, representing it visually and keep its big picture in mind while considering multiple solutions that better solve it.

#### Systemic Vision

 Treating problems as system problems with opportunities for systemic solutions involving different procedures and concepts to create a holistic solution.

#### Resourcefulness

To better describe more detailed aspects not so obvious visually.

#### Teamwork

 To work with different people from different disciplines towards a better overall solution.

#### **Design thinking process:**

#### Preparation

- Designers learn about the project's main focus and relevant points;
- Specifications and constraints of the project are identified.

#### Assimilation

Designers analyse the proposed solution and observations coming from the design environment, gathered through experiments with prototypes.

#### Strategic control

 Designers make decisions over what solution to follow and how to do it.

#### **Levels of design that differentiate novices from experts:**

- Physical
  - Instances that have direct relevance to the external world;
- Perceptual
  - Instances that attend to visual-spatial features/relationships;
- Functional
  - Perceptual level and the abstract concepts;
- Conceptual
  - Groups all the information of the other levels to create concepts.

#### **Expertise:**

Result of deliberate and dedicated application to a specific field towards the improvement of performance in that same field.

#### Expert vs Novice:

Main difference resides precisely in the **amount of practice** they have had.

#### **Experts**

#### Approach:

Top-down
Breadth-first

Use explicit problem decomposing strategies.

#### **Novices**

#### Approach:

Depth-first

Identify and explore sub-solutions in depth and sequentially.

Surface level focus only



Bottom-up

#### **Experts**

Preliminary evaluation of tentative design decisions before implementing them and making a final evaluation.

#### **Qualitative analysis:**

Integration of visual and technical designing so much so they are considered in a parallel way during the design process.

#### **Novices**

Trial-and-error

Generate and implement a design modification, evaluate it and then generate another evaluation through several iterations.

#### **Qualitative analysis:**

Forget visual aspect.

#### **Experts vs Novice summary:**

Across different experiments, the rule seems to be that:

- Less experienced design thinkers spend more time gathering information and defining the problem instead of progressing to solution generation;
  - Ultimately solution is not the best.
- The more experienced a designer is, the more they will use generative reasoning instead of deductive reasoning.
  - They will make more use of their experience by approaching the design task with solution assumptions instead of problem analysis. The idea behind this is that a solution encountered before for a similar problem may be applicable to the problem in question.

"students are required to read critically, think and reason logically, and solve complex problems"

Synthesis of the paper



Companies expect students to be prepared for solving problems and adapt to what the market requires the moment they leave college, but school model currently used does not work to fulfill this purpose.

#### **Application of findings:**

Design thinking could help enhance their problem-solving skills and prepare them for both college and career.

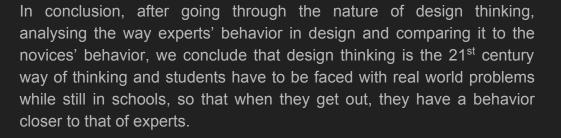
Schools should not require students to memorize facts and repeat them but get them to interact with problems/content, think about it critically and create new information/solutions

The premise is to get novice students to:

- Work with the methodology used by professionals;
- See design thinking not as a skill but rather as a way of thinking and being.

Transforming the way they approach the problems that arise for them.

Conclusion



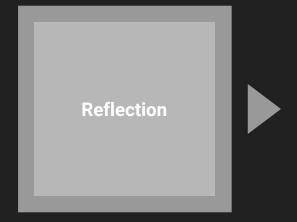
## Discussion

#### Questions

- How to prepare students for a world that is yet to come and is therefore unpredictable and ever-changing?
- Based on the characteristics of a design thinker, which ones would serve the requirements engineer the best?
- In which way can we improve the existing teaching methods in order to transform nowadays' students into expert design thinkers before they hit work life?
  - Can the existing teaching methods even be improved or does the education system need an entire reformation?
- How do we feel as students when confronted with this information? Are we being taught to be leaders of innovation or merely followers?
  - o Do we agree that there must be an impending change?
  - Do we feel prepared for the world of work? If not, why and what do we think could be done to change that?
- It is mentioned in the paper that "students are required to read critically, think and reason logically, and solve complex problems". Do you think that is true?
  - We are taught to read critically but are we allowed to express ourselves when we disagree?
  - We are taught to solve complex problems but is it teaching if all we are given is formulas to follow instead of allowing us to create our own solutions?

Tim Brown, president and CEO of IDEO, on how the real potential of design thinking isn't being fully explored.

Design thinkers increasingly thinking smaller. Their focus is on superficial matters instead of urgent matters such as humanitarian and environmental issues where they have the most to contribute to.



Reinforces the idea that design thinking should not be something only designers do but something that everyone can take into their own hands so that there can be real impact.

#### <u>Tim Brown urges designers to think big:</u>



### THANK YOU