What Is Design Thinking and Why Is It Important?

Bibliographic data

The paper was written by Rim Razzouk and Valerie Shute. It goes by the name "What Is Design Thinking and Why Is It Important?" and it was published in September 2012 by AERA as the 82nd volume under the Review of Educational Research magazine.

Theme of the paper

The paper approaches the field of **design thinking** and aims to synthesize the existing research on it to allow for a better understanding of its characteristics and processes, the differences between novice and expert design thinkers and apply the findings from literature regarding its application to the educational system.

Most importantly, the goal is to discuss the importance of design thinking in promoting students' problem-solving skills in the 21st century.

Synthesis of the paper

Design has been widely considered to be the **central or distinguishing activity of engineering** and it stems from a dissatisfaction with the way things are at the moment and the determination to take some action to solve them.

Design thinking has been given increasingly more recognition as the design of products and services is a **major component of business competitiveness**. It is now an integral part of design and engineering fields and business.

The authors believe that it can also bring positive outcome if applied to 21st century education as **creative thinking** is needed to **generate solutions for problems**. As it is, "students are required to read critically, think and reason logically, and solve complex problems" and the theory is that design thinking could help **enhance their problem-solving skills** and prepare them for both college and career.

Although there has been extensive research on design thinking, quantitative studies are lacking.

Creative people can be divided in **finders**, who demonstrate their creativity through discovery, or **makers**, who are driven to synthesize what they know in new constructions, arrangements, patterns, compositions and concepts.

Design is highly synthetic and strongly concerned with real-world subject matter. However, because disciplines of design deal with communications and symbolism, design has a **symbolic component** and, because design requires analysis to perform synthesis, there is also an **analytic component**. This being said, design can be divided between two interdependent spaces, a **space of concepts** and a **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.

There is no precise definition of the profile of a design thinker but some characteristics have been identified of how they think and approach issues. Even if the line between a design thinker and a normal person is very tenuous, there are some characteristics to note: **Empathize**, 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.

The process of design thinking involves 3 main steps: preparation, assimilation and strategic control. During **preparation**, designers learn about the project's main focus and relevant points. It is during this phase that specifications and constraints of the project are identified; In the **assimilation** phase, designers analyse the proposed solution and observations coming from the design environment, gathered through experiments with prototypes; In the **strategic control** phase, designers make decisions over what solution to follow and how to do it.

After identifying this process and its phases, the authors invite us to analyse the way of thinking and solving a problem of experts vs novices.

Expertise is considered the result of deliberate and dedicated application to a specific field towards the improvement of performance in that same field. The main difference between novice and expert design thinkers resides precisely in the **amount of practice** they have had. In this line, **novice design thinkers** usually follow depth-first approaches to solve problems and expert design thinkers' strategies are mainly top-down, breadth-first approaches. This means that novice design thinkers, when faced with a problem, **focus only on the surface level** since they will try to identify and explore sub-solutions in depth and sequentially, while **expert design thinkers use explicit problem decomposing strategies**.

A technique they both share though is a bottom-up strategy. However, 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 and their solution is ultimately not the best.

If we look upon the designers in engineering, we can observe that novices use trial-and-error techniques of generating and implementing a design modification, evaluating it and then generating another evaluation through several iterations, but experienced engineers make a preliminary evaluation of their tentative design decisions before implementing them and making a final evaluation.

Another point we should consider is the impact of the relationship between visual and technical designing using qualitative analysis. Experts integrated both aspects and generally considered them in a parallel way during the design process, while novices usually forget to use the visual aspect of designing.

Taking all this into consideration, we can divide the levels of design that differentiate novices from experts, which are: the **physical** (relates to the instances that have direct relevance to the external world), **perceptual** (relating to instances that attend to visual-spatial features/relationships), **functional** (relates the perceptual level and the abstract concepts) and **conceptual** (groups all the information of the other levels to create concepts) levels.

The more experienced a designer is, the more they will use generative reasoning instead of deductive reasoning, i.e., 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**.

In relation to novice students, the premise is to get them to work with the methodology used by professionals and get them to 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.

We live in a century in which companies expect students to be prepared for solving problems and adapt to what the market requires the moment they leave college and, in order to accomplish this, the school model currently used must be updated. To prepare students for the real world, schools should not require them to memorize facts and repeat them but get them to interact with real problems/content, think about them critically and create new information/solutions.

After going through the nature of design thinking, analysing experts' behavior in design and comparing it to the novices' behavior, the conclusion is that design thinking is the 21st century way of thinking and students have to be faced with real world problems while still in schools, so that, when they get out, they have a behavior closer to that of experts to perform better in their assigned roles and be good professionals.

Questions and reflection

Q1: How to prepare students for a world that is yet to come and is therefore unpredictable and ever-changing?

Q2: Based on the characteristics of a design thinker, which ones would serve the requirements engineer the best?

Q3: In which way can we improve the 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?

After analysing this paper more in depth, we conclude that design thinking is very important when it comes to solving problems and is becoming increasingly more relevant and acknowledged worldwide in several industries.

Our main conclusion is that there is a significant need for reformation in the current education system, as we continue to follow a very traditional teaching method too concerned with rules and memorization, instead of focusing on incentivising creativity, developing critical thought and supporting an empowering environment where students feel free to question, tread their own paths and innovate. As of now, teaching methods are still predominantly based on pre established formulae and sets of rules that, most of the time, student do not even need to understand but solely memorize for the closest exam and only when they enter the work world do they truly start to learn what they should have been learning all along.

Only this way can schools better shape the way students think and design solutions, to prepare them for the challenges coming in the future so they become creative and proactive problem solvers in work and in life.

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