

# Definition of design thinking



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Definition of Design Thinking Definition of Design Thinking The term ‘ design thinking’ is attributed to Herbert A. Simon’s 1969 publication *The Sciences of Application* and the 1973 publication *Experiences in Visual Thinking* by Robert McKim. Design Thinking is also regarded as a multidisciplinary, user-oriented approach towards generating ideas and solutions that ignite innovation in many ways (Almendra & Christiaans, 2012). Design thinking is usually incorporated often into the innovation process as well as organisation.

Designing thinking is a multidisciplinary process covering fields such as engineering, law, psychology, marketing and economics among others. For example, in engineering, education is geared towards the creation of engineers who can think and create designs (Pourdehnead, et. al, 2011). However, design thinking is a complex subject and one of the approaches used in teaching engineers design is the project-based learning approach (Dym, et. al, 2005). Engineering design thoughts involve a divergence-convergence thought process and a systems perspective. It encompasses several levels of interaction with system components that may be interconnected to other systems (Frisk, et. al, 2014).

Few studies have demonstrated thought processes and strategies involved in the engineering design process. One such study investigated engineering design thinking among K-12 learners (Lammi, & Becker, 2013). The research analyzed how the high school learners engaged design thinking in systems processes never before viewed or understood (Bruton, 2010). The students’ cognitive capabilities were analysed by use of an investigative triangulation mixed technique (Lammi, & Becker, 2013). Their cognitive abilities and mental processes during collaborative engineering design were studied with

the aid of a Function-Behaviour-Structure cognitive analysis mechanism (Lammi, & Becker, 2013). While other forms of data were collected, the research had to be guided by a set of two issues:

- i. One of the issue was the cognitive concerns and methods utilised by the students when tackling engineering design challenges (Lammi, & Becker, 2013).
- ii. The other issue was whether there were materialising qualitative ideas and scenarios as they associate to structure comprehension in engineering design? (Lammi, & Becker, 2013).

These questions illustrate the complexity of understanding design thinking relating to engineering.

Design thinking has also generated interest within business circles. The interest was directed towards understanding how the design thinking process impacts business in creating fads or contemporary phenomena (Hanttu, 2013). Design thinking focused on how designers thought and the tools and methods they used in their profession. Peter G. Rowe published Design Thinking in 1987 where he studied the design process and the intellectual activity of designing architects (Cross, 2011). Business publications such as the Bloomberg's Business Week and Harvard Business Review have also printed articles on design thinking. The inquiries found out that design thinking was regarded a phenomenon until it became a fad between 2008 and 2011 (Mueller & Thoring, 2012).

Key influencers of design thinking originate from convergent sources such as engineering and business. For instance, car manufacturer, Toyota pioneered lean principles in the early 1970s to optimize production and minimize wastage. Lean principles and design thinking converge on the idea of

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customer focus. The customer focused research then spurs innovation in the engineering process and ignites business. Engineering activities such as understanding, observing, point of view, ideation, prototyping and testing, can be checked against each other as the diagram below illustrates (Lammi, 2013).

Figure A: Illustration of design thinking activities correlating in engineering and business (Mueller & Thoring, 2012).

There are many illustrations of design thinking mainly in business and engineering (Lugmayr, et. al, 2013). Some elements of design thinking resulted in commercial disasters such as the 1957 Ford Edsel car launch. Few customers bought the car since it failed to meet technological and economic possibility. It resulted in losses of over \$ 250 million (\$ 1. 85 billion in today's dollars) (Morizio, 2013). Design thinking application and principles continue being relevant yet complex in today's engineering and business circles. Organisations need to leverage creative approaches with ideation to attain innovative success.

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## Appendix

Figure A: Illustration of design thinking activities correlating in engineering and business. Source: (Mueller & Thoring, 2012). International Design Management Conference.