

Design Thinking – teaching the Engineering Skills of the 4th Industrial Revolution

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Keywords – Design Thinking, 4th Industrial Revolution, thinking skills, cognitive flexibility, creativity

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ABSTRACT

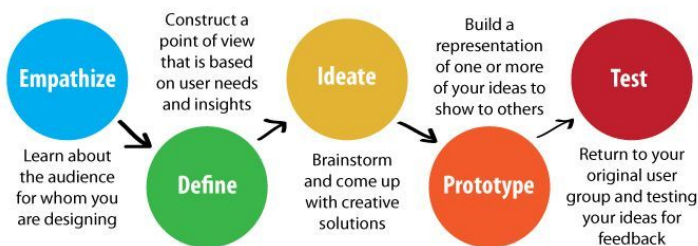
Background: According to the World Economic Forum (WEF) (<https://www.weforum.org/>) we are now facing the 4th Industrial Revolution. New technology will change the world in many ways that we can't see the full extent of at this point. Two thirds of the jobs of the future don't even exist yet. How do we prepare our students for that future when we don't know what those jobs are? WEF has made a list of the top 10 skills of the future (<http://bit.ly/1qyDkb6>):

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with others
6. Emotional intelligence
7. Judgment and decision making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

I believe that students can train most or all of these skills through participation in Design Thinking projects. I am preparing to do a research project which aims to document this. For now I would like to focus on Cognitive Flexibility which is a core component of creativity (Ritter *et al* p 961).

Explanation: Design Thinking (DT) is a Human-Centered Innovation approach which is taught in The Hasso Plattner Institute of Design (D:School) at Stanford University (<http://dschool.stanford.edu>).

The DT process has a number of phases and activities which requires participants to be able to shift quickly between different modes of thinking. I would argue that this requires Cognitive Flexibility



because these modes are so different in character and entails everything from empathetic listening to analysis/synthesis. Another type of shift required from the students is a “Mindshift”. A Mindshift is a “re-synthesis and reorientation of their worldviews” (Goldman *et al*, 2012). Four different Mindshifts have been identified in DT: “Human

Centred”, “Collaborative”, “Metacognition”, and “Experimental”. (Goldman *et al* 2012). I would argue that Cognitive Flexibility plays an important role there too. In my presentation I will further expand on my view of Design Thinking and the benefits of using this approach in Engineering Education.

Set-up: I'm planning an Action Research project for the Autumn (2017) and next Spring (2018) aiming to gain a more precise understanding about which skills students learn during DT projects.

Expected outcomes: I expect to gain a much deeper knowledge about what the students learn, and how DT can provide Engineering students with the skills they need for the 4th Industrial Revolution.

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The Hasso Plattner Institute of Design (D:School) at Stanford University:
<http://dschool.stanford.edu>