

Une école de l'IMT

EMSE_07

Design Thinking for Product-Service System Design

Elaheh Maleki



www.digifof.org

Objective



Objective: Defining a sustainable Product-Sevice System (PSS) using Design Thinking method and tool (OMILAB)



1. Design Thinking (Basics)



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How to approach problems using Design Thinking:

A user-centered, creative, and collaborative methodology for solving problems.

https://courses.edx.org/dashboard/programs/9b729425-b524-4344-baaa-107abdee62c6/

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Design Thinking: 1. RESEARCH



- User and target market research: provides an understanding of user environments (where the end products or services are intended to be used), practical and aesthetic aspects of potential solutions, and can even predict marketplace trends
- Business research: consists of data and statistics related to the organization's interests or focus area such as a product portfolio plan, revenue/profit requirements, establishing geographic interests for product distributions, etc.
- Technology research: focuses on assessment to determine strengths, weaknesses, and availability of particular materials or what resources might be relevant for a specific problem area.



Best innovation opportunities

Design Thinking: 2. IDEATION



Ideation:

When people talk about design thinking, it's usually the activities associated with ideation that come to mind. This is the stage in which all ideas, no matter how wild, are welcome. All ideas are then assessed against the research done in the preceding stage. Some common tasks are:

- Visualization / storytelling
- Strategic mapping of solution ideas by theme, such as product categories or timelines



https://courses.edx.org/dashboard/programs/9b729425-b524-4344-baaa-107abdee62c6/ https://www.omilab.org/nodes/design-thinking.html

Design Thinking: 3. PROTOTYPING



Prototyping:

Prototypes are an opportunity to make your ideas real, or at least real in model form. Prototypes are a useful way of testing out strong ideas or products with users. Do your solutions really work like you thought they might? What do your users think of them? Prototypes can be used during any stage of the design thinking process.



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Design Thinking & Systems Thinking

Design Thinking

USER-FOCUSED: prioritizes deeply understanding the problems of a core group of users

SOLUTION-ORIENTED: culminates in a prototype for a solution that can be tested with real people

ASPIRES FOR DELIGHT and USE: works to build solutions that meet the needs of real users



BOTH!

THOUGHTFUL: both emphasize understanding problems before building solutions

NON-LINEAR: both prioritize gaining input from people and then iterating upon your ideas in a cyclical fashion

INNOVATIVE: both look for new approaches based on previously undetected needs or patterns





Systems Thinking

SYSTEM-FOCUSED: prioritizes understanding the factors and dynamics that make up a complex problem

PROBLEM-ORIENTED: focuses on developing a nuanced understanding of a problem through the creation of a systems map

ASPIRES FOR HEALTH: works to build solutions that do not create unintended consequences but instead foster healthy dynamics



Industrial PSS Case



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Industrial PSS Case





Green Energy



Manufacturing of wind turbines

High precision gear grinding process







Gear grinding process

- The method of finish grinding gear teeth
- The significant step when building high precision gearing



High precision gear grinding process



High precision gear grinding process



Produces Waste



Metal Sludge



Damage of the metal sludge



• Pollution for the field:

The sludge needs a lot of filed to be placed and will sink into the soil with the rain, change the content of the soil and even with heavy metal.

• Pollution for the atmosphere:

The placed sludge produces an exothermic reaction which makes harmful gas. It also causes dust pollution with the wind.

• Pollution for the water:

The content of CaO and MgO in these sludge will turn into corrosive strong alkaline hydroxide which will be away with water, these materials also turn the nearby water and soil with high PH value.





How to safely and efficiently dispose the grinding sludge produced during manufacturing processes?

Metal sludge: Separation of grinding oil and metal





https://www.youtube.com/watch?v=4OddInE7JSE

New "products-services" solution based on circular economy and used sales





Possible scenario



This scenario is based on a service contract between the machinist and the manufacturer. The briquetting machine is at the factory, but the machinist does not own it: the manufacturer of the bricklayer makes it available to the machinist through a service contract. The scenario is based on the assumption of a service contract including preventive maintenance, curative maintenance, and support for the treatment of mud in the event of the briquetting machine being unavailable.



3. Design Thinking for PSS (OMILAB)



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Design Thinking

for PSS (OMILAB)

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OMILAB Downloads



Download and install Scene2Model:

https://austria.omilab.org/psm/content/scene2model/download?view=download

In 2 groups create 2 scenes from the viewpoint of the machinist and the viewpoint of the intermediary (Distribution Scene).

You can use the paper-made characters inside the box. As an exmple some characters are shown in the next slide.

OMILAB Characters





- ✓ Machinist
- Briquetting machine Manufacturer
- ✓ Founder



✓ Waste water✓ Drilling fluid✓ Briquettes



✓ Explanations✓ Discussions



✓ Workers✓ Customers





✓ Stock



✓ Briquetting Machine



✓ Service

All Scenes





Scene 1: Machinist Scene







Scene 2: Intermediary (Distribution Scene)







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