



Concept Selection

MEC 3002 Methods in Early Product Development

© Katja Hölttä-Otto 2020

1

Reminders

Find your teams for the Wind of Change 10 minutes read/video assignment for next week.

Keep keeping your journal – better your on-going journal, easier the final journal assignment.

Today is the last live session.



© Katja Hölttä-Otto 2020

2

Agenda

Homework feedback

Reflection Journal Assignment

Concept selection

3

Great work

I am halfway grading.

So far great effort by all.

Biggest issue is self criticism – you stand in the way of your own good ideas.

Many well reflected how team ideation would have been better. I agree. Do so in your ALL future projects, but do combine individual and team ideation, that has the benefits of both!

4

Agenda

Homework feedback

Reflection Journal Assignment

Concept selection

5

Journal – Reflection Assignment

A reflection essay at the end of your journal.

This assignment builds on the journal you have been keeping all period long. If you have good notes from the past weeks, this assignment will be quick to do. The key here is to reflect back on what you have done and learned, how you have grown as a product developer. The reflection should cover the entire course from Lesson 1 to the 10 minutes reads/videos.

Grading criteria:

Depth of insights. More specifically I will look at how meaningful and in-depth your insights are, how well you show your understanding of product development and its phases and the reasons why we use particular methods, you will have clear examples to demonstrate your points and you show you have internalized your learnings.

Due date:

Monday 19.10, 9am.

6

Journal assignment – cont'd

At the end of your journal, write a 2-4 page (typed, longer if hand written) reflection piece on what you have learned. Length is not graded, but under 2 pages is not likely to contain enough of reflection and over 4 pages may mean you have not thought critically enough on what you have learned. The reflection piece can be done from many viewpoints including but not limited to: what surprised you, what you would do differently if you would do it/a project again, interesting links you see between the course topics and what you applied in a real project with interesting results. What you should *not* do is list all topics covered and how important those are and how you learned a lot without any further detail. Also, do not summarize what the topics are (I am familiar with the class content). Rather focus on learning, details and personal experiences. Perhaps you did the user needs assignment one way, but realized how it really should have been done; or perhaps you re-did the requirements in your PDP project based on the lecture; or perhaps you thought something before the class and now think differently. Also disagreeing with a topic with valid justifications is possible in a reflection piece. Be sure to cover most topics in class, but there is no need to cover them all. We had 10 sessions before the seminars – you should cover 5-7 of these depending on how deeply you dive into any one of them + your thoughts on the 10 minute read/video based on viewing or reading at least a few of them. Deeper they are, less topics you need to cover. An ideal reflection piece consists more likely of 5 in-depth topics than 7 superficial write-ups. Submit the entire journal as a whole (=journal+reflection essay).

7

Agenda

Homework feedback

Reflection Journal Assignment

Concept selection

8

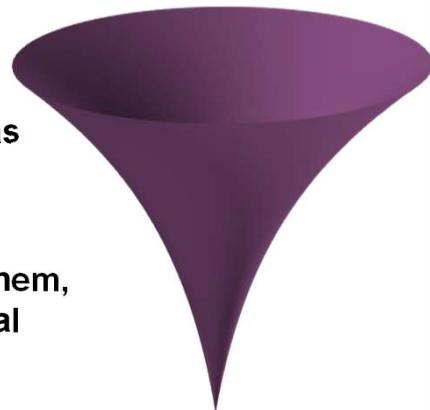
Learning Objectives:

Learn to screen concepts before concept selection
Learn how to use Pugh Chart – one particular method in concept selection

9

Goals

Find the best concept by
...narrowing down to most promising ideas
...evaluating those against our criteria
...improving the concepts
...working more of the concepts, testing them,
getting more data in order to make the final selection



[This Photo by Unknown Author is licensed under CC BY-SA](#)

10

Concept Selection

- **Many methods:**
 - External decision
 - Multivoting
 - 2x2 Screening Matrix (C-box)
 - Challenging ideas for further development
 - Intuition
 - Pros and Cons
 - Prototype and test
 - Decision matrices (such as Pugh Chart, Convergence guide
(<https://drive.google.com/file/d/oB9pbmPGtf5MhU2ZrUDFiS2NLToo/view?usp=sharing>))
- **While all useful in decision making, a structured method at certain times can make the process more effective (e.g. consider relevant criteria with many stakeholders at once)**

11

Concept Selection

- **Many methods:**
 - External decision
 - Multivoting
 - 2x2 Screening Matrix (C-box)
 - Challenging ideas for further development
 - Intuition
 - Pros and Cons
 - Prototype and test
 - Decision matrices (such as Pugh Chart, Convergence guide
(<https://drive.google.com/file/d/oB9pbmPGtf5MhU2ZrUDFiS2NLToo/view?usp=sharing>))
- **While all useful in decision making, a structured method at certain times can make the process more effective (e.g. consider relevant criteria with many stakeholders at once)**

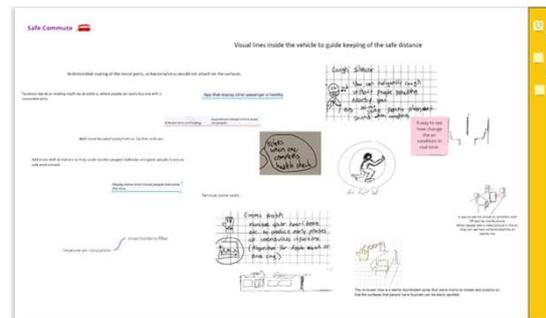
12



Aalto University
School of Engineering

Let's do a quick screening in Miro

<https://miro.com/app/board/o9Jktflo2k=/>



7.10.2020

13

© Katja Hölttä-Otto 2020

13

Concept Selection

- **Many methods:**
 - External decision
 - Multivoting
 - 2x2 Screening Matrix (C-box)
 - Challenging ideas for further development
 - Intuition
 - Pros and Cons
 - Prototype and test
 - **Decision matrices** (such as **Pugh Chart**, Convergence guide
(<https://drive.google.com/file/d/oB9pbmPGtf5MhU2ZrUDFiS2NLToo/view?usp=sharing>))
- **While all useful in decision making, a structured method at certain times can make the process more effective (e.g. consider relevant criteria with many stakeholders at once)**



Aalto University
School of Engineering

7.10.2020

14

© Katja Hölttä-Otto 2020

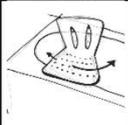
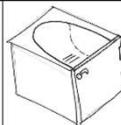
14

Concept Selection – Pugh Chart

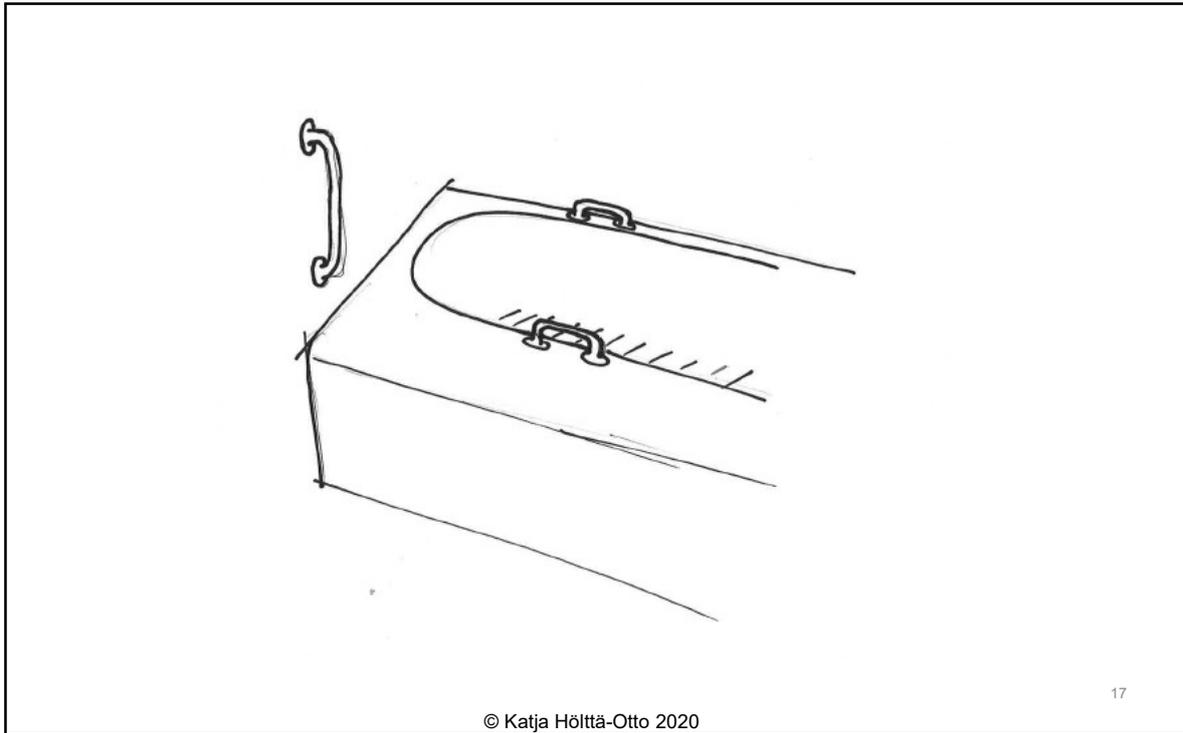
- **Developed by Stuart Pugh**
- **Criteria to use:**
 - Requirements
 - Internal criteria such as schedule, risk, feasibility or ease of manufacture
 - Wow factor
- **Choosing a Datum (or choosing not to use one)**
- **Iterative process – focus on discussion and challenging the concepts to improve**

15

Pugh Matrix: Example

	DATUM	OPTION 1	OPTION2	OPTION 3	OPTION 4
	Swivel Chair w/ Hinge Leg	Hydraulic Swivel Chair	Pivoting Tub	Shower Grips	Tub Door
Sketches					
CRITERIA	DATUM				
Aesthetics		0	-	+	+
Cost (low preferred)		-	-	+	0
Ease of installation		0	-	+	-
Safety in use		0	-	-	+
Ease of getting in and out of tub		+	0	-	0
Intuitive use		0	-	+	0
Ease of maintenance		-	-	+	0
Bathing comfort (ability to relax and lay in bath)		0	+	+	0
Noise		-	-	0	0
Space required		0	-	+	+
Universal		0	-	+	0
Total +	0	1	1	8	3
Total 0	0	7	1	1	7
Total -	0	3	9	2	1
TOTAL	0	-2	-8	6	2

16



© Katja Hölttä-Otto 2020

17

17

Pugh Matrix: *Improved* concept Example

		Swivel Chair w/ Hinge Leg	Shower Grips	Tub Door	Seating ledge	
Sketches						
CRITERIA						
		DATUM	+	+	+	
			+	0	+	
			+	-	+	
			-	+	0	
			-	0	0	
			+	0	+	
			+	0	+	
			+	0	+	
			0	0	0	
			+	+	0	
			+	0	+	
	Total +		0	8	3	7
	Total 0		0	1	7	4
	Total -		0	2	1	0
	TOTAL	0	6	2	7	

© Katja Hölttä-Otto 2020

18

18

		App that displays health/risk level of areas	Visible antimicrob. Coating on every other seat
Selected criteria from needs or specifications	Enables hygienic commute	+	+
	Enables feeling of safety	+	+
	Encourages distancing	+	+
Internal criteria	...		
	Incr passengers	0	+
	Level of risk	0	+
To avoid a compromise	Wow-factor	0	+
	Plusses	3	6
	Minuses	0	0
	Total	3	6

23

Repeating the assessment with weights and values

What we did was concept *screening* with only +/- rating

Later when bit more information on a few concepts

- e.g. user feedback, cost assessment, model results, benchmark data etc.

Repeat with values from e.g. 1-5 and use weights (*scoring*)

- Weights from needs prioritization or requirements setting

Can use even more precise values, once more information is available

Do NOT use “precise” numbers when comparing very early concepts, that is fake precision, you do not have that much information yet.

24

Concept Selection – Pugh Chart

- **Key features of the Pugh chart**
 - Enables comparison to customer needs/requirements
 - Enables joint agreement on all selection criteria
 - Enables team discussion
 - Enables concept improvement
 - Records the process and decision
- **As for all methods covered in this class – the reason the method exists is more important than any one particular method, but never underestimate use of a method – they have been tried and tested numerous times in the real world as well!**

25

Learning Objectives:

Learn to screen concepts before concept selection
Learn how to use Pugh Chart – one particular method in concept selection

26