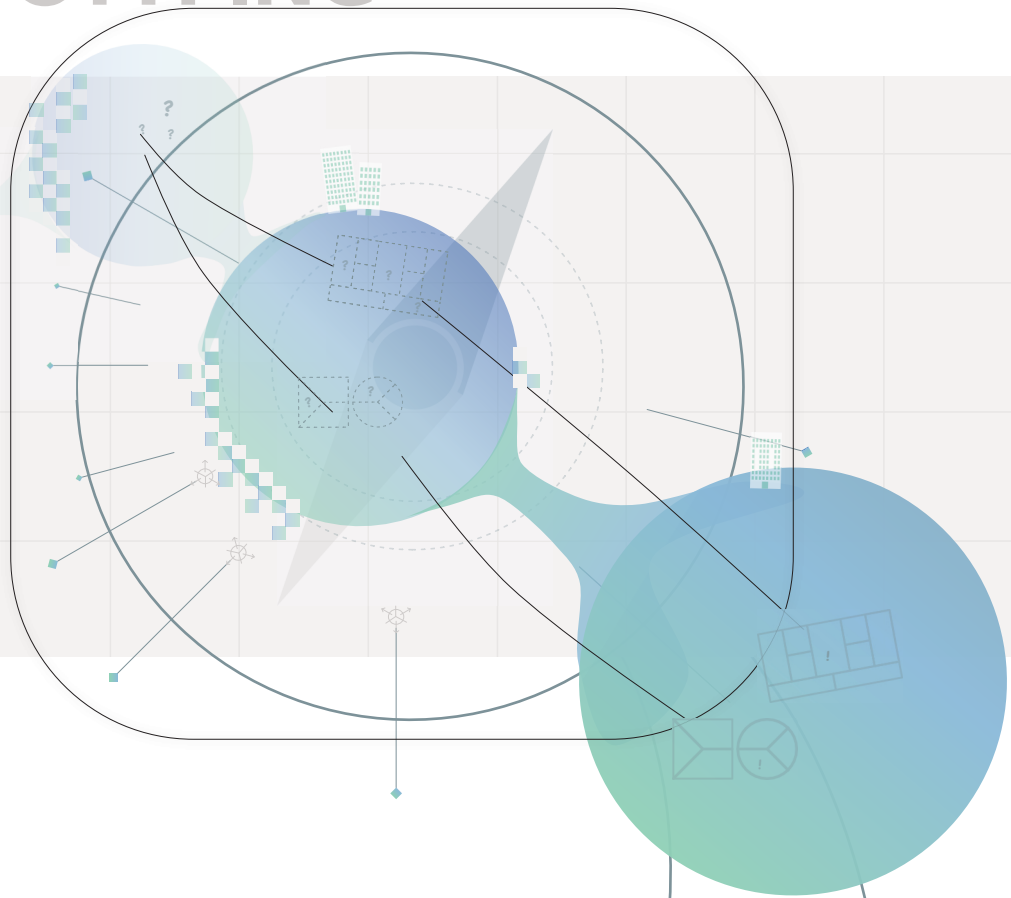# APPENDIX

DEALING WITH UNCERTAINTY THROUGH PROTOTYPING

GRADUATION PROJECT

J.J.L.A. in 't Veld
Student Strategic Product Design

APPENDIX 1

Generative interviews

To develop a deeper understanding about the stakeholders, paper profiles were created that served as objects that the facilitators could adjust. These profiles were based on the work from Kelley (2005) and personal observation during meetings.

To dig a bit deeper in current expertise the frame of the prototyping mountain was created with upfront formulated level. These levels were defined using the work from Diefenbach and colleagues (2019)

Set up

[Session in Dutch] - [30 min] [n=5]

Hi thanks for making time for this interactive session. The aim to develop understanding of who your 'clients' are and create a profile of a BMI facilitator. Also we will explore current expertise levels from a prototyping perspective. If it's okay with you I will record this session to possibly use some quotes, it should be stated the recordings will be anonymized and only locally stored at my computer.

Different levels of expertise could be defined when it comes to prototyping, I use here the analogy of a mountain.

Guiding questions

- First we will take a look at the profiles, if you take the teams into consideration you facilitated this year and last year, which profiles represent some of those teammates?
- Why not these?
- How would you adjust those to make them more truth worthy? (write on it use post its)

Guiding questions

- Could you create your own mountain as how you see the mountain based on your experience. (Meaning how steep to level up, distance between the levels. Talk me through what you are thinking!)
- Where on this mountains starts the journey for the 'validation teams'? Where does it ends?
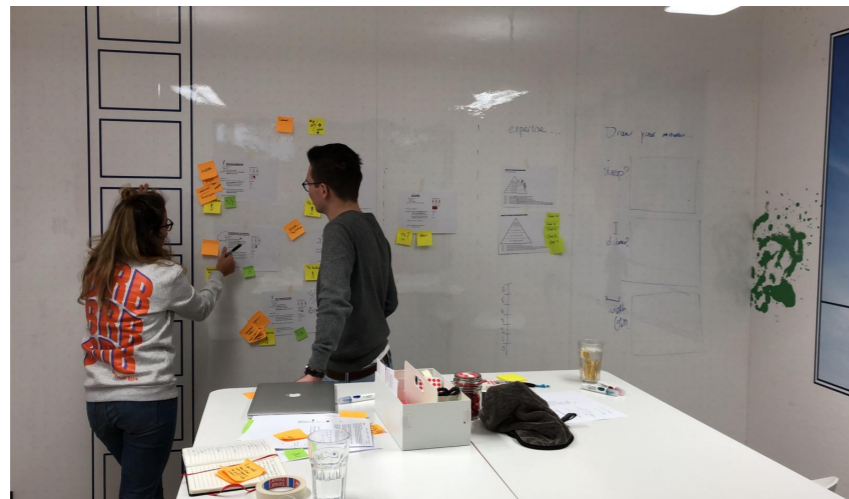- Where on this mountain are the business designers? Where should they go (level?)

Figure A snapshot of the generative sessions

Profiles used as trigger objects

THE COLLABORATOR
Name: Mitchel
Age: 38
Job: Account manager
Ambition: Help solve the issues my **business relations** encounter......

Team role: _____

Description: He is the necessary bridge for the team to **connect** the customers' **interest** with the solutions his colleagues come up with......

Dislikes: When the product team doesn't take into consideration what the **customers wants** & .....

Mantra: Customer is king!

Prototyping level
Prior Achieved Ambition

Favorite BMC space

Beverage
Espresso

EXPERIENCE ARCHITECT
Name: Myrthe
Age: 32
Job: Marketing communication
Ambition: Achieve a higher NPS by making the customer journey as smooth as possible by deeply linking everything we do with the customers' needs...

Team Role: _____

Description: For her it's all about the looking at the needs from the customer and create real value. The product is just a mean to an end. All technical details are not relevant for her.

Dislikes: ....

Mantra: "Keep it simple, always"

Prototyping level
Prior Achieved Ambition

Favorite BMC space

Beverage
Espresso

Notes:

THE BUILDER
Name: Mick
Age: 28
Job: Product Engineer
Ambition: Making elegant robust solutions that work efficiently.....

Team role: _____

Description: Mick always wants to build the thing right and thus best possible way. Efficient is key for him.

Dislikes: Vague and abstract design criteria.

Mantra: "There's a solution for every problem"

Prototyping level
Prior Achieved Ambition

Favorite BMC space

Beverage
Cappuccino

Notes:

THE TRANSFORMER
Name: Eveline
Age: 49
Job: Business developer
Ambition: **Transition** the current organization to remain **competitive** through innovation.

Team role: _____

Description: Eveline is aware of the **threats** the firm faces and dedicated her role as business developer to turn these threats into **opportunities.**

Dislikes: 'That will never work' comments

Mantra: "If everything seems under control, then you're not going fast enough"

Prototyping level
Prior Achieved Ambition

Favorite BMC space

Beverage
Coffee + sugar

Notes:

THE HURDLER
Name: Renée
Age: 45
Job: Product Manager
Ambition: Bring new **product** to the market using the latest **technologies** that's extremely **valuable** for the customer

Team role: _____

Description: **Lack** of resources is not a hurdle for Renée, he actively tries to come up with ways to enable his team to **get things done real quickly.** ......

Dislikes: Team members who **don't** show **commitment** and give their very best .....

Mantra: There's always a way, if you're committed

Prototyping level
Prior Achieved Ambition

Favorite BMC space

Beverage
Black Coffee

Notes
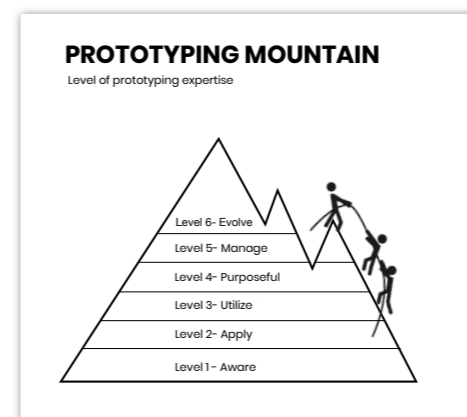
THE GUIDE
Name: Sophie
Age: 29
Job: Designer
Ambition: Create a positive impact!

Team role: Facilitator

Description: Sophie is a **real creative** but likes to keep things **practical.** She knows everything about business models and see them as a means to **create** real **value** and impact!

Dislikes: Ivory tower consultants

Mantra: "Innovation is anything but business as usual."

Prototyping level
Prior Achieved Ambition

Favorite BMC space

Beverage
Coffee

Notes:

PROTOTYPING MOUNTAIN

Level of prototyping expertise

Level 6- Evolve
Level 5- Manage
Level 4- Purposeful
Level 3- Utilize
Level 2- Apply
Level 1- Aware

Level 0 the person is not aware how prototypes can be used and applied
Level 1 the person is aware where prototypes can used for
Level 2 the person is able to apply a prototyping method when instructed
Level 3 the person is able to utilize different prototyping methods with some help
Level 4 the person is able to independently chose and apply a prototyping method to achieve a goal
Level 5 the person has a clear overview of prototyping methods and is aware how & when to use to generate intentional learnings
Level 6 the person is able to evolve the prototyping practice and is able to iterate and improve methods or develop new methods

Based on the work from Diefenbach and colleagues (2019)

Data

Profile	Quotes
The Collaborator (Account manager)	He knows the customer well" "Often in a sales position, but often not in direct contact with the clients, [friction] with the rest of the organizations than think, what is it you actual do then?"
	"the account manager, wants to meet the need of the current customers, often not for new customer or (unmet/new) needs" "often comes with anecdotal prove, the customer didn't told me that"
	"Close to the customer [..] he knows the customer well but is often not able to make articulate it in job-to-be-done way. They often talk about wants rather than what they need, they are very solution minded"
Experience Architect (marketing communication)	"This is a customer experience expert [..] and thinks in user journeys, [..] is knowledgeable about the customer
	"Marketing communication talks about what it means for the customer rather than how cool the features are, they have a role in storytelling, but one that doesn't results in a new marketing campaign"
	"Currently not in my team, however it would be beneficial. Since the team should create value for the customer rather than consider technical details at the beginning"
	"[describes role as] service design, with customer journeys"
Builder (Engineer)	"Builds [prototypes] often too big, with many features [..] needs clear instructions"
	"Technical orientation, this can however be difficult, they need to switch from to getting the right learnings rather than a finished product" [..]
	"The builders understand the mindset of prototyping, when they understand they don't have to be right, that is perfect because they can actual build things"
	"You want those people in your team, the do'ers. I have someone in my team who is able to directly change the website" [..] It is phase depended however, clear design criteria are often difficult in the beginning of the process [..] [usefull when] you are building clear prototypes […]
The transformer (business developer)	" [..] wants to grow the business in a broad sense [..] is quite pragmatic and has a clear overview of the business [..] looks at a strategic level, at the bigger picture.
	"a corporate entrepreneur, a real change agent. [..] is able to 'talk' to the board and understands the corporate world"
	"She possesses a lot of knowledge to drive change, the business develops has the right information to do so [..] Revenue is a trigger to think about a competitive solution"
	"I believe there are two types of business developers [..] those who want to sharper their current value propositions or those who seek for new value for current customers [..] they need most often sponsorship from their business [..] normally they are the project manager of such projects [..]"
The hurdler (product manager)	"Business orientated and customer representative [..] customer is king, is the entrepreneurial persona of the team"
	"Is some you see quite often, ideal for in the team, often in a team lead role"
	"I am puzzling between the product manager vs innovation manager [..] I can imagine the product manager is involved with the value direction. He is able to think along"
The guide (business designer)	" I am a real creative [..] I like to go from 0 to 1 [..] 'Uber search, I am definitely not an executor [..] personal ambition is to make the world a bit better. "
	" For me it is about not zooming in on one thing, but rather look at the bigger picture [...] for me it is also important to meet the customer where they are, this could result in a less revolutionary business model, but in specific and practical business outcome [..] it is a combination of creativity yet practical and small to get to work"
	" Drive change is our role, [..] I am the bus driver who knows how to ride the route and I want to enable them to ride the route themselves, from bus driver I become the co-driver, eventually a passenger who then gets off the bus. :
	"My ambition is going forward, progression, I don't find myself a creative more business savvy. We do have real creatives but I am more a hussler, an innovator."

Cumulative prototyping mountain

- Steepness represent the difficulty
- The length represent the time it takes to 'level up'
- The dots represents the learning curve team members go through
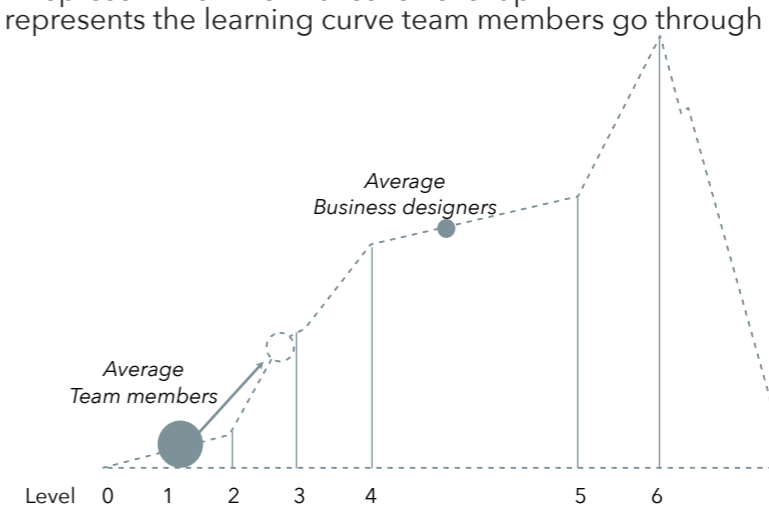
Themes	Quotes
Challenges	" I didn't know enough; how can you formulate the right hypothesis and create the right prototype? [..] it is quite hard"
	" People understand how they could approach it, but actually doing it is sometimes difficult, especially in a corporate environment, the learning only comes when you really do it"
	"Teams find it difficult to keep it small, [..] are solution minded and want to make things complex and make things to big, rather than think what the assumptions we want to test, .. while keeping it too vague"
Skills	"Where teams start depends on the client [..] Often they are familiar with it so start at level 1, we are able to get them to level 3, [..] but when they need to pivot they still need help"
	"Customer [talking about the teams] sometimes drop out at validation because they have no clue [..]
	"Customers [the team] do not exceed skills past level 2, [..] able to establish something in a structural manner is not something they are good at"

References

Diefenbach, S., Christoforakos, L., Maisch, B., & Kohler, K. (2019, July). The state of prototyping practice in the industrial setting: Potential, challenges and implications. *In Proceedings of the Design Society: International Conference on Engineering Design* (Vol. 1, No. 1, pp. 1703-1712). Cambridge University Press.

Kelley, T. (2005). *The ten faces of innovation: IDEO's strategies for beating the devil's advocate & driving creativity throughout your organization*. Crown Business.
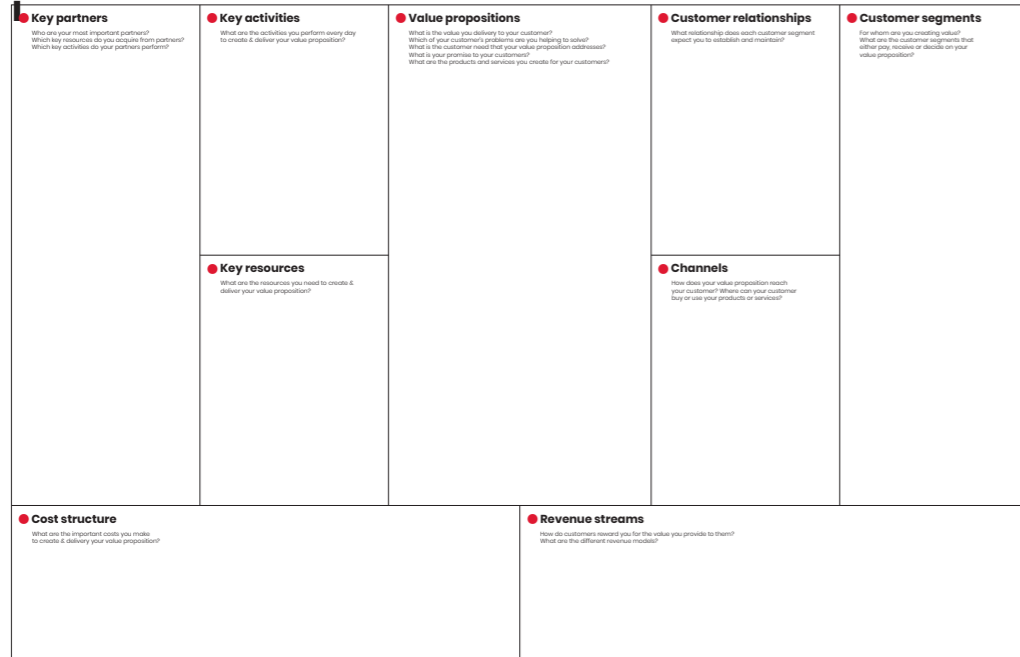
APPENDIX 2

Overview tools

This section showcase tools that are utilized during the 'validation phase'. These tools can be regarded as boundary objects.

Business model canvas

Value proposition canvas
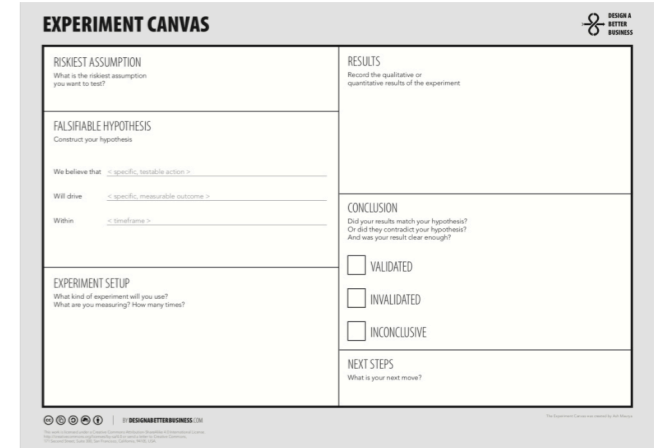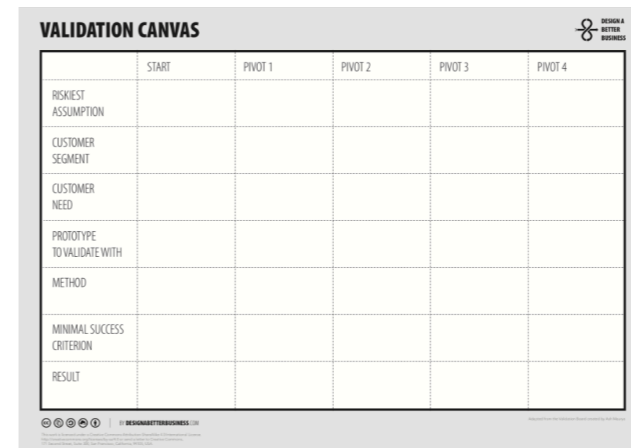

Riskiest assumptions finder
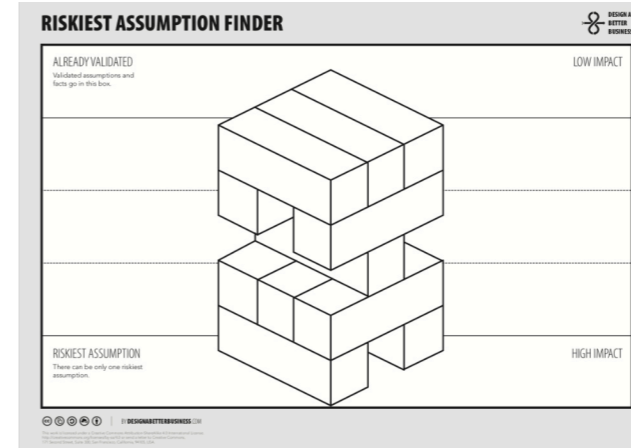
A tool used to brainstorm and make assumptions explicit to find the riskiest assumption by mapping these.
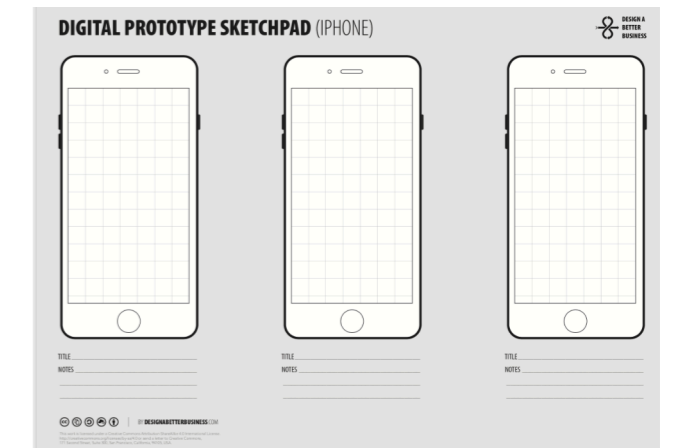
The experiment canvas

Used to set up and design an experiment (activity) to test the riskiest assumption

Validation canvas

Tool to keep track of multiple validation sprints and pivots

Digital prototyping

Wireframe tool to quickly design and communicate ideas before building the prototype

APPENDIX 3
Confidential information was erased from the images

Overview created prototypes

1

As BMI uses several canvases as a boundary object within sessions they also currently make use of an experiment canvas. As argued in chapter 2, to set up a suitable experiment different elements should be considered. However, many constructs are not considered when designing the experiment. This then could lead to questionable results since validation teams are best described as novice designers.
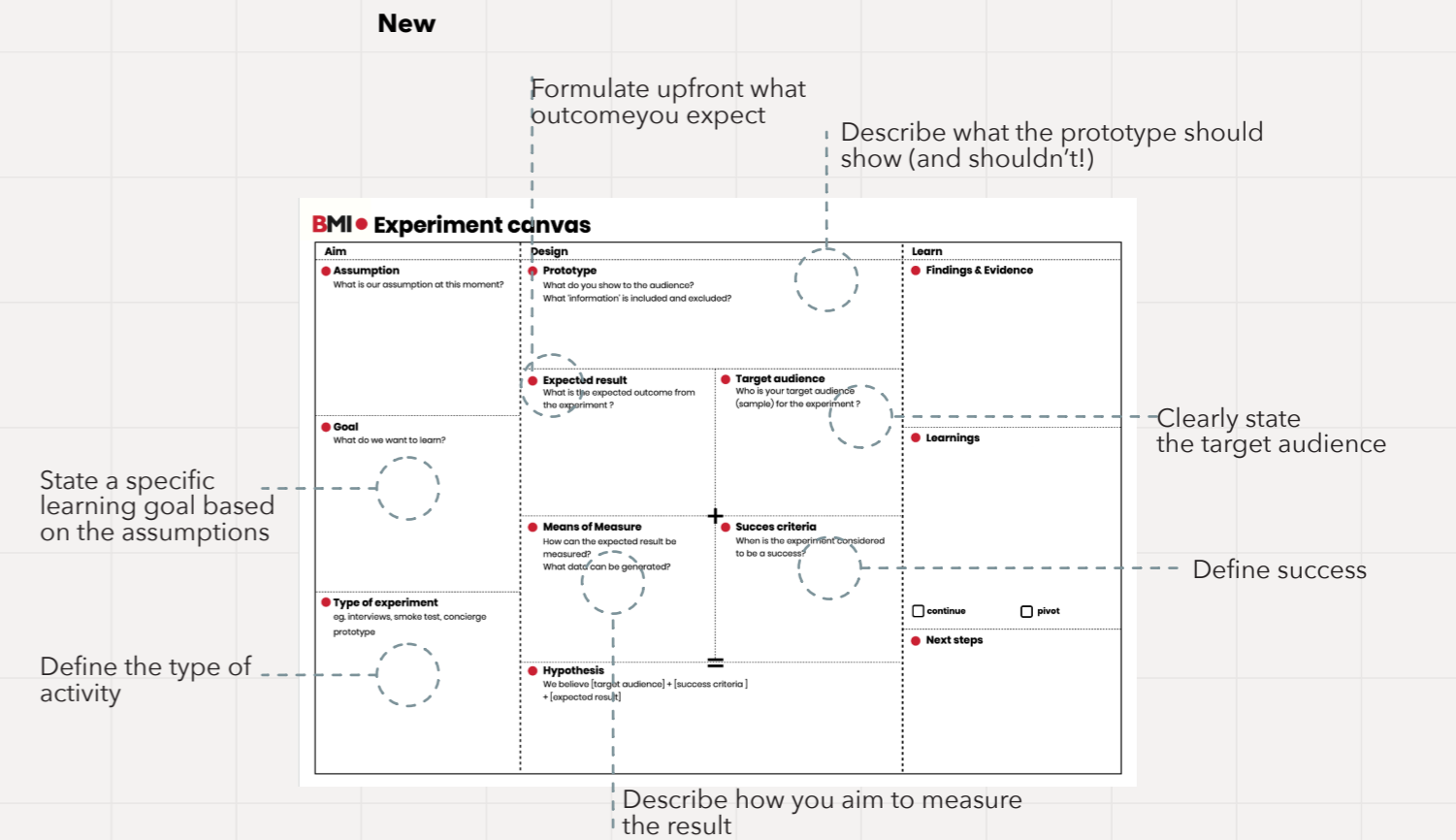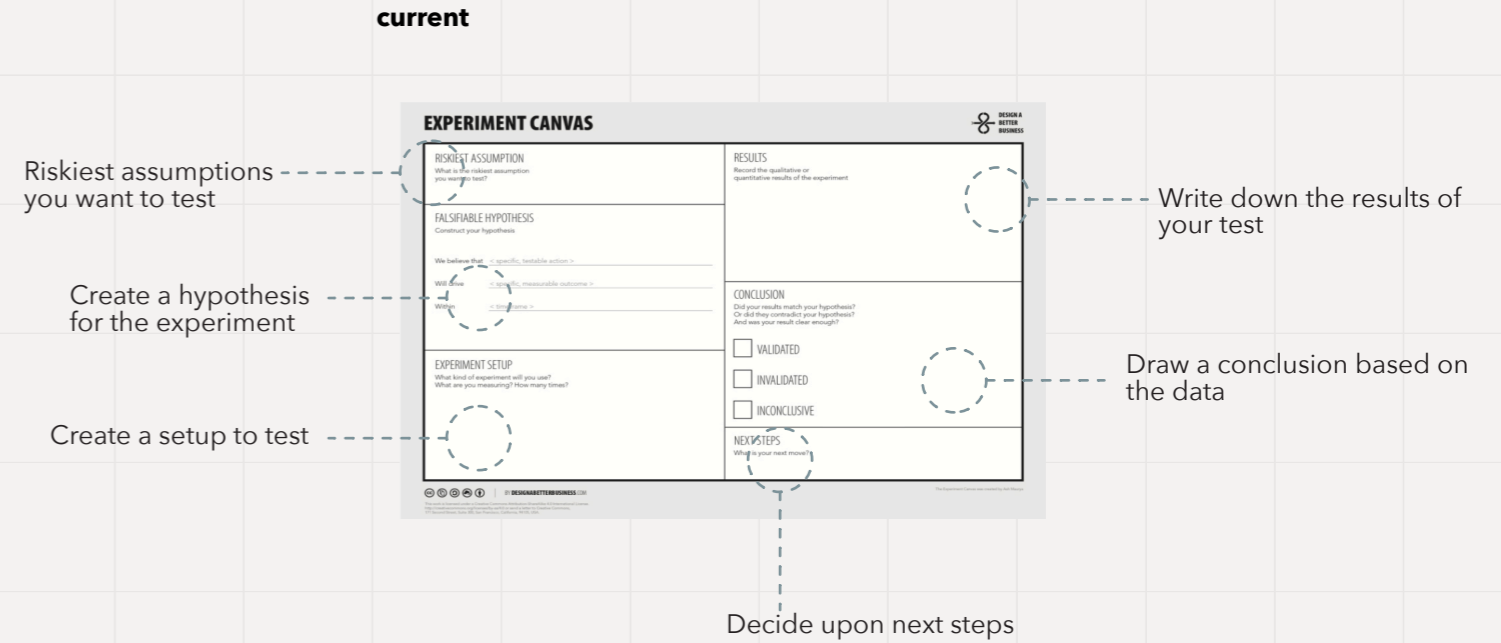
Results

The experiment was set up by using the digital version in virtual mural application. Filling in the canvas enables to design and discuss the 'experiment' around the already created artifact.

Moreover, using the 'canvas' not only resulted in an initial set up, simultaneously other experiment ideas were created that could be of use for follow up experiments. By especially making explicit how the idea is filtered (what is included in the prototype and exclude) the mind is triggered to consider what if the excluded aspects should be test as well.

Uncertainty
Expected confirming: this tool mostly helps to design a set up to test a specific assumption. Since assumptions are often used as a starting point. As such, the teams search for an expected outcome.
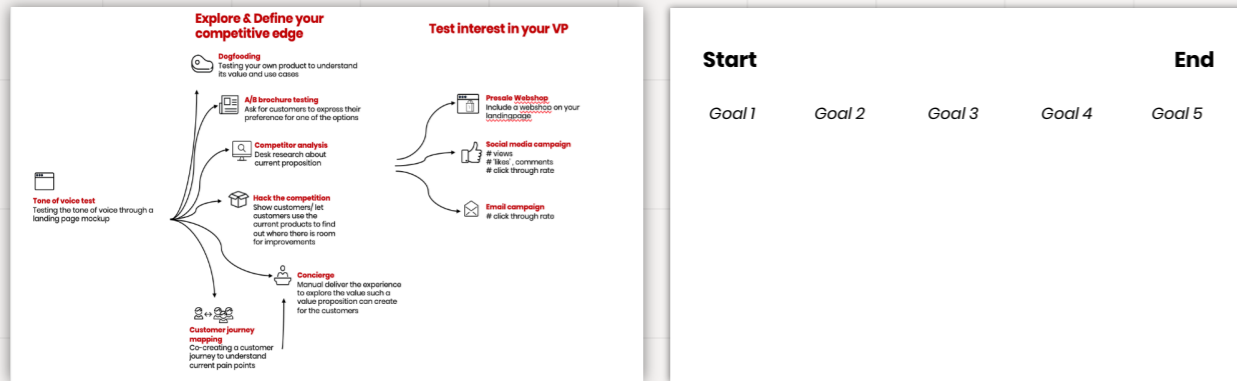
Scope	Purpose	Uncertainty	Observation
Design	Co-creating a clear experiment set up by considering multiple important construct such as stakeholders (audience), purpose, expected result, prototype and ways to capture data.	Expected confirming	- helped to state assumptions such as "We expect X views [such] an integrated approach as beneficial "
Dimension			
Process			- setup enables to only co-created on very specific elements such as audience
Prototype			
Digital experiment canvas			- Considering all elements is experienced as difficult and complex
Stakeholders			
Validation teams,			- stating what the prototype include and shouldn't works as stimuli to identify 'uncertainty' to some extent

current

Riskiest assumptions you want to test

Create a hypothesis for the experiment

Create a setup to test

Write down the results of your test

Draw a conclusion based on the data

Decide upon next steps

New

Formulate upfront what outcome you expect

Describe what the prototype should show (and shouldn't!)

State a specific learning goal based on the assumptions

Clearly state the target audience

Define success

Define the type of activity

Describe how you aim to measure the result

2

Sequence design can be described as a timeline of prototype activities to generate learnings. The idea is when prototyping, teams should at least know how to go through the fuzziness step-by-step. Likewise with a design process, designers could make use of the diverging and converging

principles and therefore combine generative and evaluative purposes in relative short cycles.. Rather than assumptions driven teams become 'activity driving' which means the approach is rather 'what can we learn from this' instead of 'how can we learn x'.

3

To enable teams to make better sense of their generated data and prevent anecdotical cherry picking based on the experiment a learn template was created to analyze the results.

The aim was to enable the team to explicitly derive underlying assumptions from the data. And use this input for further experiments.

NEXT PAGE

Example of an used visual to trigger + template to create a sequence

Results

Creating such a sequence helps to look at the 'bigger' picture. It enables to look beyond the idea and look at the process to develop an approach how an output could be achieved (e.g. A launched product or designed value proposition).

Uncertainty
Such an approach does not help to test current assumptions but can help to generate new questions that challenges the current overall idea. In an way this approach enables to list things we don't know.

Results

The digital template was iterated upon use, for example, initially the design aimed to divide the value map and customer profile separately. It turned out it was hard to divide the learnings based on these categories. (As many were linked together).

Clustering helped to see the pattern and move beyond anecdotical learnings.

Uncertainty
Based on the clustering and the derived learnings. The overall findings confirmed initial assumptions while at the same time new underlying assumptions were revealed (unexpected). These were mostly still in line with the current idea.

Moreover, overall mapping the unexpected findings led to the believe in the team that these were more 'valuable'. Interestingly, when the number of unexpected findings was low, the question emerged if the setup of the activity was flawed. This way of working can thus also serve as trigger to reflect.

Scope	Purpose	Uncertainty	Observation
Aim	Create a sequence of activities (experiments) to iterate upon the initial idea (Value Proposition)	Unexpected disconfirming	- questioning a current Value Proposition as stimuli. "Is our Value Proposition unique?"
Dimension			
Process			- sequence created to work towards a specific goal (output)
Prototype			
Visuals			- 'Activities' (experiments) selected on the basis what the team could do and are willing to do
Stakeholders			
Validation teams			

Scope	Purpose	Uncertainty	Observation
Aim, Learn	Reflecting on the gathered data by plotting the information in a structure and deciding on next steps	Expected confirming,	- unexpected learnings are viewed as most valuable
Dimension			
Process		Unexpected confirming	-clustering the findings helped to make unexpected learnings explicit.
Prototype			
Digital template with dimensions of: expected and unexpected results			- Unexpected findings lead to increase awareness of current knowledge gaps; "how would this look like"
Stakeholders			
Validation teams			- When the output of an activity resulted in only a few unexpected findings the team questioned why this happened: "Did we fail to explore due to our setup?"

the Lab

Facilitator All changes saved

1

SHARE EXPORT

Pre-sprint session
30 minutes

1) Wrap up the previous sprint and discuss insights
2) Decide on what next step to take

Findings

A   B   C   D

1
2
3
4
5

Proces beschrijven:
> Zoek naar belangrijke quotes
> Groepeer quotes tot inzichten
> Plot inzichten hieronder

Proces beschrijven:
> oranje post-its moeten begrijpelijk zijn zonder quotes
> expected findings not considered to 'interesting'
>

<grid to easily refer to the data>

Learn

Before   After

Validated assumptions
What findings confirm your current Value Map/ Customer segment assumptions?

Expected Findings

Expected Identified Findings

[...] assumptions
What findings are surprising and challenge your current Value Map/ Customer segment assumptions?

Unnamed area

Unexpected identified Findings

Uncertainty
What uncertainty do you feel need to be addressed? Based on the insights, what is still uncertain and need further testing?

Uncertainties

What iteration do we make on our Value Proposition? What do we want to learn in the next experiment(s)?

Next Steps - this sprint

Next Steps - next sprint

Next experiment

Value map

Customer profile

Next Steps

Next steps

Assumptions grid
Update your assumption grid based on your findings

important

evidence   no evidence

not important

desirability feasibility visibility

Next experiments
Pick assumptions you want to test this sprint and decide what type of experiment would be suited to test these

Upcoming expriment

Assumptions   Experiment type

Experiment after

Assumptions   Experiment type

Zoom setting

Plot findings and derive learnings by clustering

Formulate the unexpected findings as assumptions

Divide the learnings in expected and unexpected findings.

Plot the formulated assumptions in an assumption map.

Define next steps by selecting an assumption to test

4

Initially a 'clickable prototype' was designed to enable business designers browse through a library of content that could help improve their prototyping sessions. The prototype changed since the clickable prototype did not enable to create the 'right flow' for data gathering.

Therefore a new prototype was created; the chatbot prototype. This prototype provided the audience a interface to interact with navigate through we content while data was gathered continuously.

SNAPSHOT
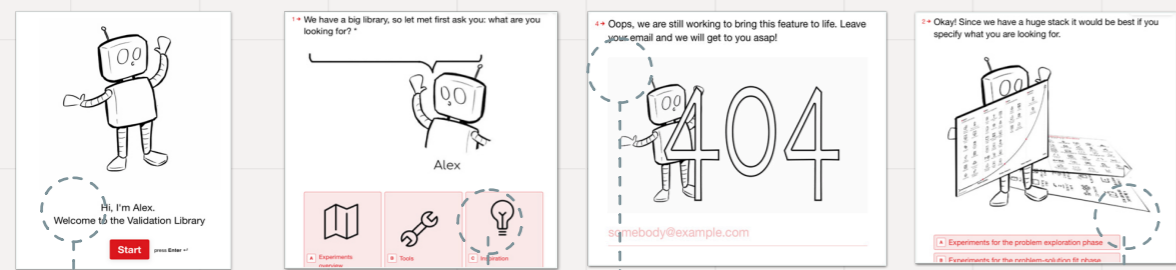
A bot called Alex guides the business designer through the items

The business designer can select category

'Fake doors' are included to test interest before building the content

The user is referred to the content (their path is captured)

Results

The tested prototype
flow: (answers in Yellow)

Start View:

- Surprise me
  - I am feeling lucky
  - I am looking for wisdom
  - I have no idea why I am here
  - I am just bored
- Validation Commandments
- Tools
- Inspiration
  - Murall wall
  - Examples
  - Quotes
- Experiment cards
- Experiment cards

Validation commandments

Share your wisdom:
1. Question everything
2. Engage all stakeholders
3. Doing beat thinking

5

responses
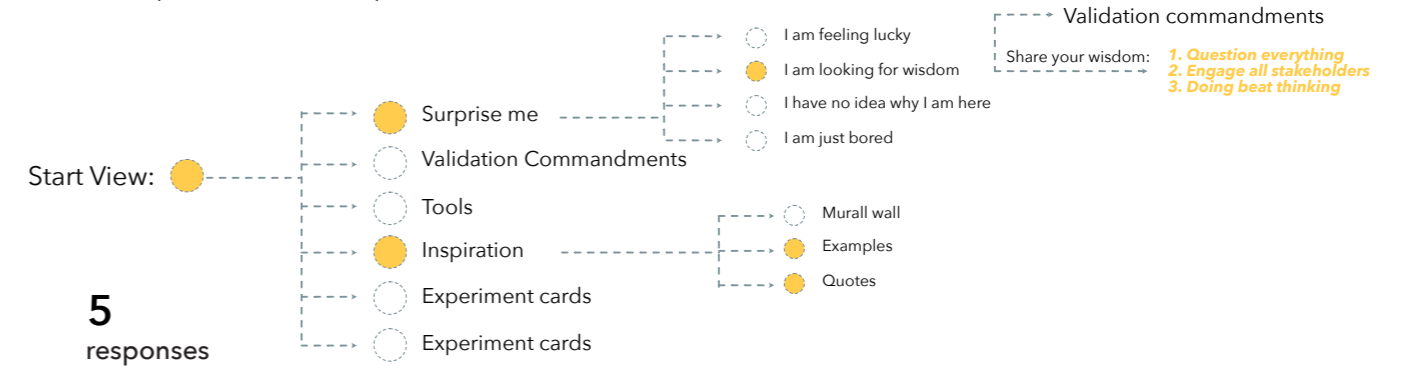
As the prototypes shows, the sessions were mostly used to get inspiration. The business designers didn't looked for specific content.

Uncertainty
As the prototype didn't influence the context of the validation teams ; the addressed uncertainty could be defined as none

Scope	Purpose	Uncertainty	Observation
All	Explore what content is needed to enable business designers to improve their sessions, and find out if existing content is relevant to do so.	None [prototype didn't influence the process of the validation teams]	- chatbot mostly used to browse for inspirational purposes
Dimension			
Process			- not explicit ask for content by business designers
Prototype			
Chatbot prototypes			
Stakeholders			
Validation teams			

5

The way of working needed to rapidly shift to a digital way due to the Corona Virus. A so called digital warroom was developed to continue te practice of co-creating the prototyping activities during sessions and beyond (as the rooms were always accessible).
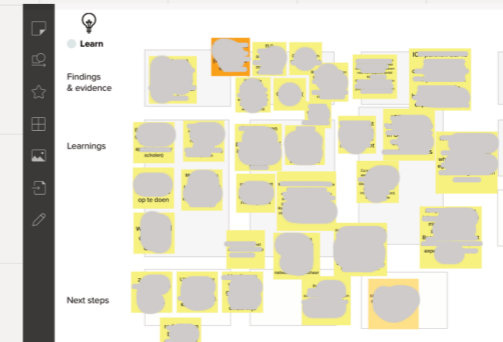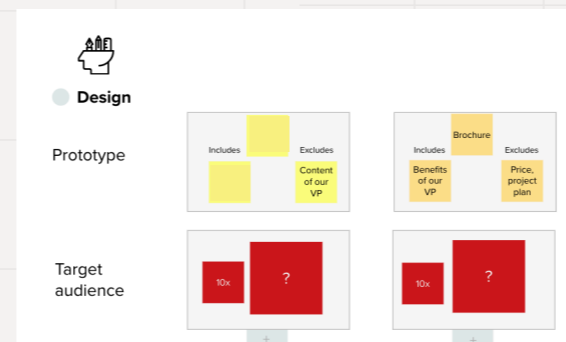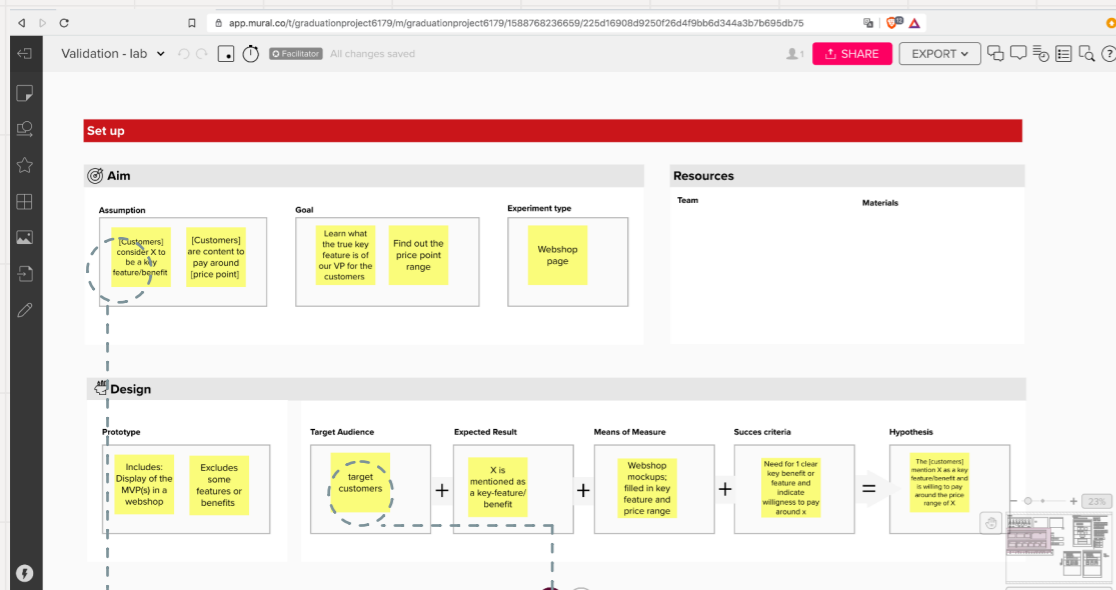
The use of digital post-it to create a quick setup

Leaving specific parts undefined to further define during meetings

Overall setup was rarely adjusted overtime

Massive amount of 'learnings' plotted.
Hard to interpret due to the lack of structure and selective placing
(data scrapped due to confidential output)

Results
The warroom was utilized over de course of 3 months. Above snapshot of 'relevant' parts. The collaborative environment served as a boundary object for the team during the process. The setup of breaking it down to smaller parts helps to leave parts undefined to later get back to in order to discuss it.

The overall designed setup was rarely adjusted overtime, even though the post-its make the barrier low. In the light that initial set up might be flawed it would be necessary to make adjustments.

As also turned out, the virtual warroom is often used just as a wall to put unlimited post its on. The findings illustrate using the prototype in such a way could make it hard to pin point the main findings while the displayed findings are quite random.

Uncertainty
The warroom mostly enables the teams to either verify or falsify the hypothesis they created. Mostly helps therefore to either confirm or disconfirm the hypothesis.

Scope	Purpose	Uncertainty	Observation
All	Align team members continuously in the process to work towards a clear goal in a digital way by providing	Expected confirming	- shared digital warroom grants overview
Dimension			- authors (who is responsible) of the content are unclear which makes it still rather static, unexpected hiccups are thus seldom addressed
Process			
Prototype			
Digital warroom			
Stakeholders			
Validation teams			

6

A brochure mockup is method to visualize a Value Proposition to enable customers to react and give feedback. Initially the creation of the mockup is used to align the team by making the Value proposition tangible. This method could be moreover used as a way to evoke discussion about the value proposition.
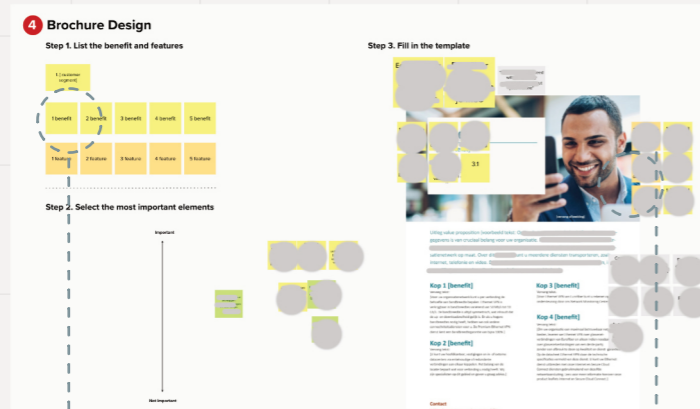
Initial setup to narrow to rank/cluster the benefits to include in the brochure

Use of post its to quickly create an outline

Results

While at first teams hesitated to make a , It would be useless because we don't know what would be in this [mockup]" mockup due to the missing information when they started they saw the value such an activity could brings. As it helped them to further specify and scope their idea further. This approach

helped to create a mockup to at first narrow down their idea and make it more specific. It also helped teams to challenge 'each other' indirectly by pointing things out through the mockup.

Uncertainty
This approach helped to make the idea of the team tangible and thus represent simply the current idea. To a certain extent, the team could challenge each other through the mockup, through this critical thinking

unexpected disconfirming information could emerge. The team members for most parts do not challenge the idea, and agree upon the current idea (expected confirming).

Scope	Purpose	Uncertainty	Observation
Design	Enable teams to create a mockup to evoke team discussion	Expected confirming, Unexpected confirming	- mockup served as a straw man to enable teammates to challenge each other; *"Customer do not know what x and y means"*, this helped the team to further detail the idea
Dimension			
Activity			- [1/2]teams rather avoid making a mockup with 'insufficient' information, "It would be useless because we don't know what would be in this [mockup]"
Prototype			
Mockup setup, explanation cards			- [2/2]After creating the mockup the team viewed this approach helped them to make the idea more concrete and thus streamline their thoughts
Stakeholders			
Validation teams			

7

The explainer video is a method used to explain the value proposition in a compelling way without building the 'product' and actual delivering the 'value'. The dropbox explainer video is famous example.

To gather insights an initial setup was created to use an already existing video to gather insides. .
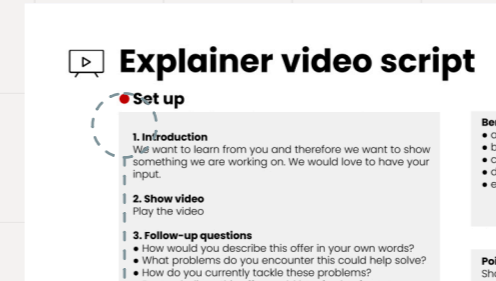
Using the explainer video as a trigger object in a qualitative set up to gather insights.

Results

By using the explainer video as trigger object the team was able to gather input from customers/experts and as derived from this elicit concrete customer needs. This open-ended setup enabled the team to gather a large amount of both expected and unexpected findings. Moreover, the

qualitative setup also enabled the team to gather data if the prototype was understandable and suitable, based on these findings the video was eventual iterated upon.

Uncertainty
Through this setup (10) confirming expected findings were found while a large amount of unexpected findings were found. These mostly consisted of findings that confirmed the initial direction.

Scope	Purpose	Uncertainty	Observation
Build & Run	Creating an experiment outline to trigger customers through artifacts to gather user needs	Expected confirming, Unexpected confirming	- evoking through artifacts helped the team to gather unexpected input and identify key issues and elicit concrete customer needs; (total of 10 expected findings and 15 unexpected findings)
Dimension			
Activity			
Prototype			
Script, explainer video, visuals, experiment set up			- By engaging with customers team realized their artifact (explainer video) was unclear on many parts, therefore the video was iterated upon.
Stakeholders			
Validation teams,(customers)			

8

To explore latent needs and co-create a future desired situation with customers an initial very rough paper prototype enabled to gather ideas within the team to create a setup for the session and timeline.

Lofi initial prototype to gather ideas and fill in the 'ingredients' blocks.

Simple powerpoint format

Results

Based on these activity an initial outline for 'the ingredients' to build the timeline was decided upon. The activity of 'brainstorming' these elements helped specify certain element and enable to identify new design questions such as "what is the role or [stakeholder]?

Uncertainty

The activity helped to trigger the team to generate new relevant (design) questions and thus revealed assumptions. The addressed uncertainty is thus framed as unexpected confirming.

Scope	Purpose	Uncertainty	Observation
Design	Design a co-creation session to create an ideal timeline together with customers	Unexpected confirming	- creating the 'ingredients' helped to further shape the idea in unexpected since it enabled to identify new (design) questions such as: "what is the role of [stakeholder] ?"
Dimension			
Activity			
Prototype			
Facilitation script, digital timeline builder			
Stakeholders			
Validation teams			

9

Prototypes that are used to generate learnings should at least be understandable for the audience to give feedback [paragraph]. If the audience is not able to understand the prototype there is the danger of 'false positives' with the possibility teams might not be even aware they 'oversell' their concept. When creating a prototype it is always wise to include what I call a smoke signal test. The test

simply helps to verify if the audience understands the prototype. To show the importance of this I created an experience prototype: a simple assignment shows how confusing mockups can be. This example helped to trigger the teams to incorporate 'smoke signal test'/comprehension test during their activities (e.g. Explainer video)
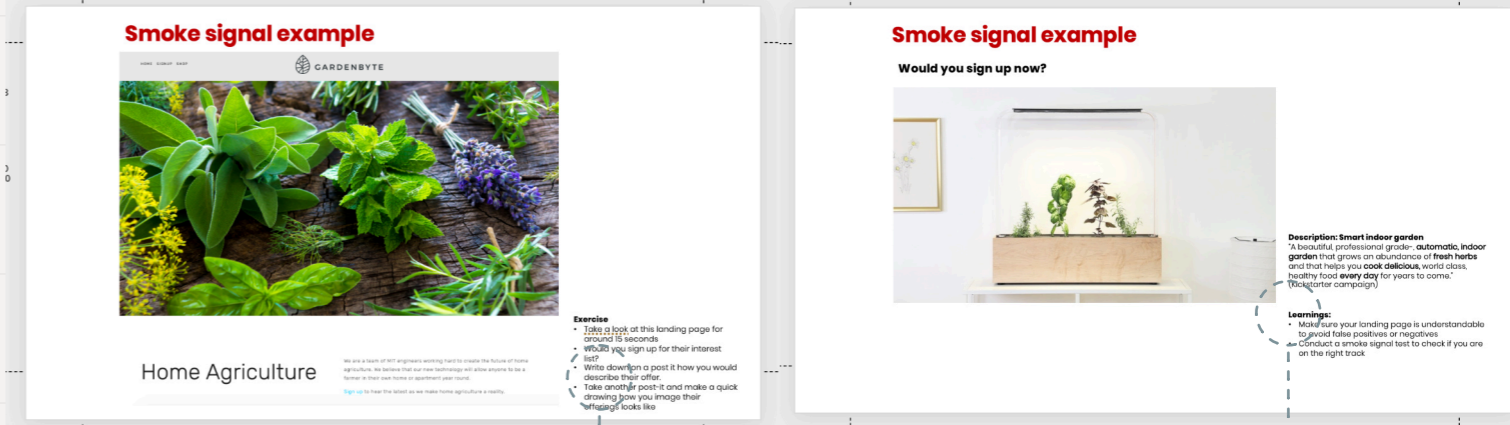
Example exercise to let team realize the importance to create the right prototypes (mockups etc.)

Results

Based on the exercise and some guidance teams made use of such a test to verify if they created the right prototype (= understandable)

Uncertainty

Interestingly, this test helped to address a different type of uncertainty: the uncertainty of the approach and if the prototype would be suitable. The test resulted in the realizations, the prototype was not suitable in unexpected ways. E.g. The test was used in the context of the explainer video were a specific video take let the customers believe this would be an exclusive and expensive service. This was not intended. However, as this occurred the team reveled an exclusive service was not desirable for these customers.

Scope	Purpose	Uncertainty	Observation
Design & Build & Run	Help teams create understanding how people perceive their prototype	Unexpected disconfirming	- utilized to test alternative 'mockup'
Dimension			- lacking knowledge of audience mental models makes it hard to upfront create the right prototype, e.g. do people understand these technical details.
Prototype			
Prototype			- Teams were able to gather data by asking the participants to describe the artifact in their own words through this approach they realized that the artifact was inappropriate
simulation exercise, explanation cards			
Stakeholders			
Validation teams, customers			

10

A brochure mockup is type of prototype that visualizes the Value Proposition to enable customers to react and give feedback. The mockup can be used as an artifact during an interview.

11

To co-create a timeline together with customers an digital prototype was created. This prototypes enables to create a timeline in a quick manner by providing a structure and elements.

Mockup of a Value Proposition which enables to leave the 'product/service' design left out

Brochure powerpoint template to let the team easily create a mockup

General setup outline to use the brochure during a qualitative interview

Drag and drop elements to construct the timeline

Specify your goal

Use in a digital environment

Results

Creating a mockup that is just right can be considered difficult. Eventual the brochure is helpful to gather feedback from customers. A team found through this practice customers' were not interested in the offer, according to the team this doesn't disprove the assumptions such a value proposition is

relevant for customers but leaned towards the explanation they target the 'wrong' audience (customers). Based on these learnings the was enable to further specify the 'right' customer and further specify the target audience.

Uncertainty
The mockup helped the team to further specify what the customer should 'look like' in order to find the offering of interest. The efforts thus helped to reveal certain not explicit assumptions: (unexpected disconfirming)

Results

The co-creation session helped to create a concrete tangible timeline while enabling to explore small details more in depth considered to a simple visual. But moreover, the customer feel taken seriously and get in a 'creation mode', rather than telling 'what's

wrong' concrete adjustments are made; "This is really old school, I would prefer X".

Uncertainty
Based on initial assumptions, to a certain extent the sessions show expected confirming results, their desired future situation is simply in line with the idea. Besides, also ideas evolved of what could be of value (unexpected findings).

Scope	Purpose	Uncertainty	Observation
Build & Run	Enable teams to present their idea through a mockup to gather customer feedback	Unexpected disconfirming	- prototypes often created from authors own 'thought world' and as such not through the lens of customers, e.g. listing the features instead of explaining what these features mean for the customers
Dimension			
Prototype			
Prototype			- Lack of customer knowledge makes it hard to imagine why this could be useful for the customers
Brochure template			
Stakeholders			- Eventual lack of 'interest' let the team question if they targeted the right customer/audience. This was adjusted
Validation teams			

| Scope	Purpose	Uncertainty	Observation
Build & Run	Co-create an ideal situation/ timeline together with customers or experts	Expected confirming, Unexpected confirming	- Pilot session helped to identify issues with prototype, for example starting without inspirational content starting from blank is hard, the customers should be inspired
Dimension			
Prototype			
Prototype			- The prototype to imagine a future situation which helps to emerge current issues: "X is of importance, but I question if that actual happens"
digital timeline builder			
Stakeholders			- Upfront defined ingredients could be reframed in such a context; e.g. "This is really old school, I would prefer x"
Validation teams, customers			

12

The card sorting activity and mockup aimed to define what customers consider to be most valuable. While also evoking to share what benefits are not relevant for them.

Benefits as plotted on a Value Proposition translated to simple 'cards' (total of 10)
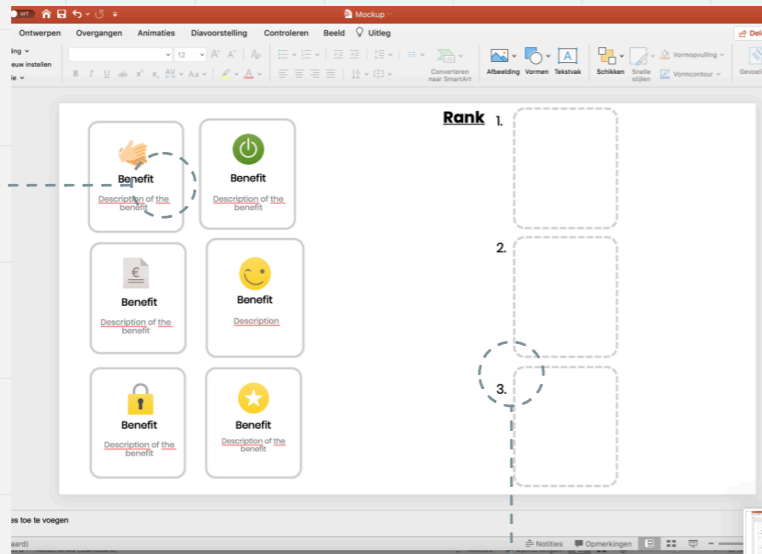
Cards used select 'most important' benefits according to the customers

Cards used to provoke customers to think critical and select the not so important benefits
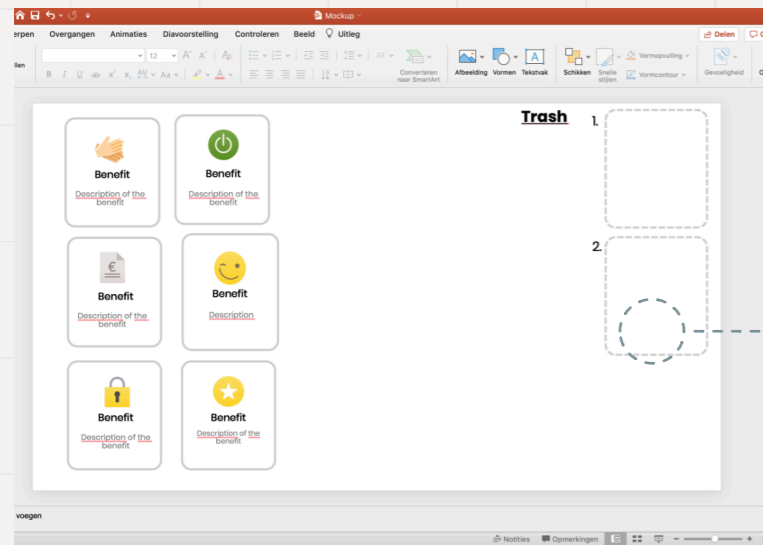
Results

The cards enabled to have interesting conversations and let a concrete results (ranking) and 'trash'. During the conversation 'whys' were ask constantly to get a better understanding. These helped to identify clear signals why some parts were not considered relevant, for example the promise of low(est) price was viewed as not relevant since the aim was quality.

Through the conversation valuable learnings emerged about topic not considered. For example while defined initially as customers, the audience turned out be users. Most of the time for them, another party 'bought' the service.

Uncertainty
The activity highlighted the importance of specific benefits and are therefore in line with the idea. Most striking is the insight the defined customers are in some cases the users. Not upfront considered as such this insights can be considered as unexpected disconfirming.

Scope	Purpose	Uncertainty	Observation
Build & Run	Let teams create 'cards' to gather feedback on the importance of specific features and intended benefit	Expected confirming,	- Initially the benefits were defined in quite abstract terms such as "great customer service", "security", these were adjusted to fit the audience (e.g. "We answer all your questions")
Dimension		Unexpected disconfirming	
Prototype			
Prototype			- The cards helped to trigger the customers to talk about their preferences which let to a wall of expected (e.g. We want someone to answer our questions) and unexpected insights for the team (e.g. Some of their defined customers turned out to be only users, the product is 'bought' by another party
Digital card template			
Stakeholders			
Validation teams, customers			

APPENDIX 4

Warroom design

[Next page]

**Welcome!
To your war room**

The mission
Briefing

Meet the validation team

Captain
Celine

At mission control the aim is to keep track of the progress and adjust the mission if necessary

Captain
Celine

The captain is leads the mission and makes sure the team operates to the best of their ability

Team responsibilities
- Targets – Dave
- Radar – Celine
- Strategy – Celine
- Set up – Bob
- Capture – Peet
- Prototype – Eva

The targets

John

Eva

Our generated insights

Our generated insights

The Radar

Neutralized

The Strategy

1 2 3 4 5

Inverted Strategy

1b 2b 3b 4b 5b

? ? ? ? ?

To make the mission multiple tactics will be deployed to address the uncertainty by generating learnings

x
Name

x
Name

The setup

1a

1b

Capture

Design a script

Place final script design

Expected Results

The prototype

Place a picture, drawing etc. to show the prototype

Positive feedback team

Critical feedback team

Information is key to make the mission a success.

Analyst
Name

Insights

Confirming

Important

Not important

Disconfirming

Warnings

APPENDIX 5

Initial Project Brief

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

⚠ **USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT**
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME
Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 ! ⚠

family name	in 't Veld
initials	J.J.L.A. given name Jan-Maarten
student number	4444795
street & no.	
zipcode & city	
country	
phone	
email	

Your master programme (only select the options that apply to you):

IDE master(s): ( ) IPD   ( ) DfI   (★) SPD

2nd non-IDE master: _____

individual programme: ____ - ____ (give date of approval)

honours programme: ( ) Honours Programme Master

specialisation / annotation: ( ) Medisign

( ) Tech. in Sustainable Design

( ) Entrepeneurship

SUPERVISORY TEAM **
Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	Peter Lloyd	dept. / section: DOS
** mentor	Niya Stoimenova	dept. / section: DOS
2nd mentor	Daan de Geus	
	organisation:	Business Models Inc.
	city: Amsterdam	country: the Netherlands

comments (optional)

There's no conflict of interest. The project is related to Niya's Phd thesis, while Peter Lloyd can give the necessary guidance within the design methodology domain to make the project a succes.

⚠ Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

⚠ Second mentor only applies in case the assignment is hosted by an external organisation.

⚠ Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

Procedural Checks - IDE Master Graduation

APPROVAL PROJECT BRIEF
To be filled in by the chair of the supervisory team.

chair Peter Lloyd   date 26 - 2 - 2020   signature _____

CHECK STUDY PROGRESS
To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: _____ EC

Of which, taking the conditional requirements
into account, can be part of the exam programme _____ EC

(YES)   all 1st year master courses passed

(NO)   missing 1st year master courses are:

List of electives obtained before the third
semester without approval of the BoE

name _____   date ___ - ___ - _____   signature _____

FORMAL APPROVAL GRADUATION PROJECT
To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **.
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of
  the student (taking into account, if described, the
  activities done next to the obligatory MSc specific
  courses)?
- Is the level of the project challenging enough for a
  MSc IDE graduating student?
- Is the project expected to be doable within 100
  working days/20 weeks ?
- Does the composition of the supervisory team
  comply with the regulations and fit the assignment ?

Content: (APPROVED)   (NOT APPROVED)

Procedure: (APPROVED)   (NOT APPROVED)

comments

name _____   date ___ - ___ - _____   signature _____

Initials & Name J.J.L.A. in 't Veld   Student number 4444795

Title of Project Using process prototyping to enable corporates to generate innovations

introduction (continued): space for images
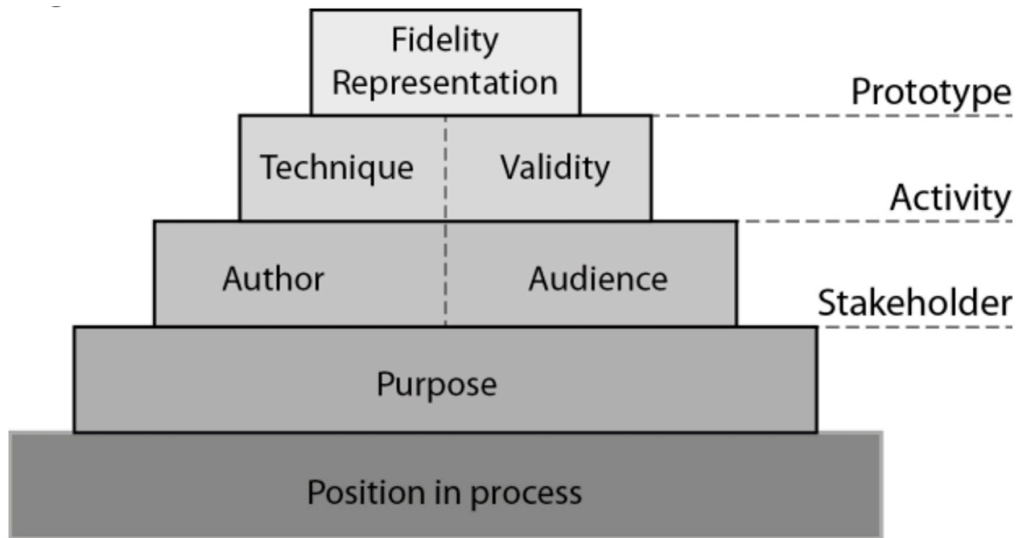
image / figure 1:   Prototyping dimensions (Blomkvist & Holmlid, 2011)

image / figure 2:

In today's competitive environments adaption has to be a more continuous process, which implies a direct feedback loop to customers in order to learn what they truly need. Experimenting with new business models and value propositions that directly involve users and/or customers is therefore of the essence. Prototyping is an important element of the experimentation process as it enables a business model validation team to generate validated learnings from users/customers.

As stated in the introduction (page 4), little research exists that describes how to successfully embed and utilize 'process' prototyping, which aim to facilitate 'learning' during the innovation process. It should be noted, process prototyping is broader than current classical industrial design approaches such as product prototyping (eg. usability testing). Process prototyping can be used for example to communicate, explore, generate and evaluate ideas by making them tangible. Within the context of Business Model Inc. and their clients, the aim is to deepen our understandings of the use of generative and evaluative prototyping. More specifically we want to understand what a validation team needs in terms of process and artifacts to successfully conduct experiments that generate validated learnings on an ongoing basis to fi a so called problem-solution fit, As prototyping here is seen as a process, the scope of this project is not merely the artifacts (prototypes) but also includes the activity of making the prototype, the stakeholder involvement and the purpose of the prototype (eg. communication, evaluation, generation) (see figure 1).

The project thus aims to answer the following questions by conducting a research through design approach:

The objective of the project is to enhance the understandings of the prototyping process during the problem-solution fit phase within the context of business design at Business Model Inc., a research through design approach is taken to 'explore, propose and test' the use of prototyping.

To achieve this goal, first research will be conducted to explore the current prototyping process, leading to a framework of characteristics for the prototyping process which then can be used as input to redesign the current process. After the initial research, the design goal is to propose a redesign of the prototyping process ('prototyping prototyping'), with the aim to accelerate the process and enhance the potential creation of necessary learnings. The designed proposals will be tested with clients of BMI to 'generate learnings' to further improve the 'design' of the prototyping practice.

Thus, the expected outcomes for the project are:
- A 'framework' of the prototyping process to illustrate dimensions and characteristics of prototyping with a focus on generating learnings.
- Several 'process prototypes' that are based on the framework and thus include changes on different layers (eg. purpose, activity, artifact)
- Insights into key challenges and success factors for validation teams (around prototyping)
- A collection of prototype examples and how they've been used to generate validated learnings.
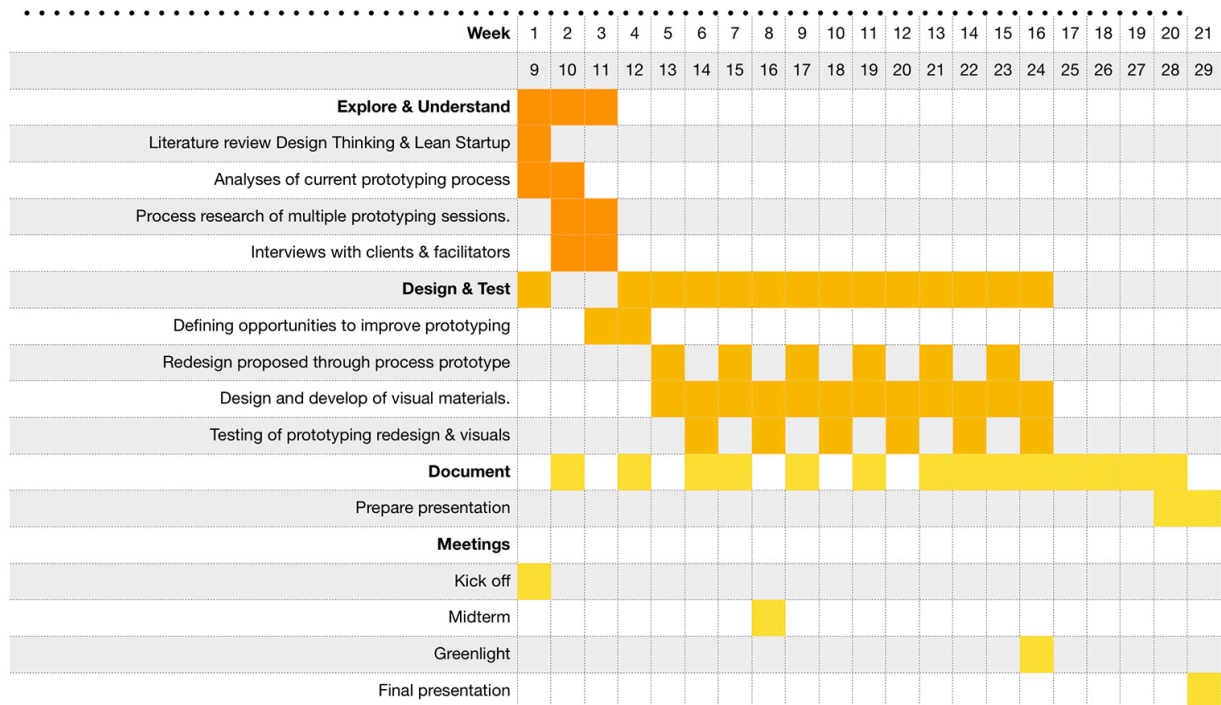- A portfolio of experiments/prototypes linked to riskiest assumptions to be tested within a BM/VP

Initials & Name ___J.J.L.A.___ ___in 't Veld___   Student number __4444795__

Title of Project ___Using process prototyping to enable corporates to generate innovations___

start date   25 - 2 - 2020   14 - 7 - 2020   end date

PLANNING

*21 weeks instead of 20 weeks due to the national holidays (eg. Easter, kingsday)

To answer the previous formulated questions, the following activities were determined:
//Explore & Understand:
+ Literature review on Lean Startup and Design Thinking
+ Understanding the current context of Business Model Inc and their innovation process
+ Literature review on different dimensions of prototyping (Purpose, Stakeholders, Activity, Prototype)
+ Analyses of current prototyping process, based on input and interviews with Strategic Designer(s) at the company and data from previous projects
+ Interviews with clients who participated in a prototyping session.
+ Analyzing possible prototype cases/examples considered as 'good'

//Design & Test:
+ Redesign of current prototyping process (addressing multiple dimensions)
+ Design of supporting visual material for the validation lab
+ Generating learnings by testing the proposed redesign(s) in a prototyping session(s).
+ Further iterative improvement based on generated learnings. (>5 iterations)
+ Note taking and observations during prototyping activities, analyses of created prototypes, analyses of learnings

//Document: Writing the thesis/ making visuals/ preparing documents for meetings

As Design Thinking (DT) is becoming rather popular, DT is put to use beyond classical design (engineering) projects. It is my believe to be successful in the new realms, further development of expertise in Design is needed. It's a necessity to further develop our core competences. As from a pragmatic world view, I see prototyping as a core process of design. Through prototyping we make ideas tangible and are able to explore those in not just an office but in the real world. However, at this point I'm missing key knowledge to use prototyping in a thoughtful manner especially in early stages of innovation projects. My personal main goal for this thesis is to: become an 'expert' in prototyping so that I am always able to use this as mean to innovate.

Moreover, I also see this graduation project to emerge from a 'design student' to a professional. Therefore, my personal goals are to learn to prioritize activities and develop the ability to work in a fast-paced manner. This is important because projects always have a specific time constraint and there's always more to do. Moreover, in today's dynamic fast changing world speed is of importance and the luxury of going slow but steady belongs to the past for most industries. Meaning, working in rapid manner (including rapid prototyping) is an important skill to have in the future.

To sum things up: I have the following personal goals:
- Become a 'prototyping' expert
- Learn to (better) prioritize activities
- Work in a fast paced manner to learn fast(er)
- Able to deal with time constraints and thus finish work within the given time

References are listed in a seperate document

Graduation project is a result/follow up on the research project I did in the third semester with Niya (paper title: Enhancing the absorptive capacity through design: A prototyping perspective)