



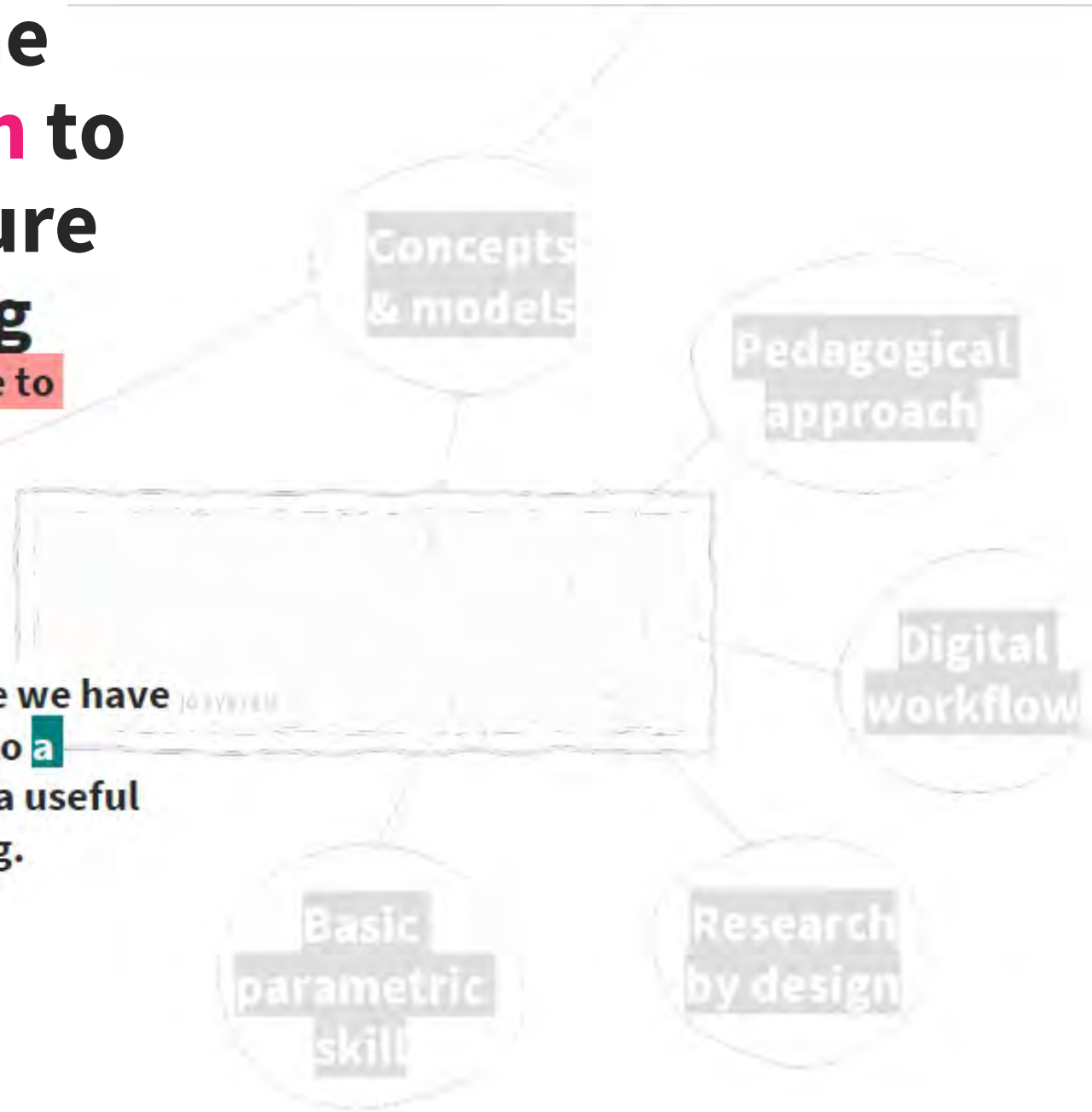
# Hover over the comment icon to view the lecture note.

**Presenter**

This view will be populated with documents. Your assignment is to read the references, compile this together, and then explain it here in this slides as well as possible, but also please read the references (I will upload them as supporting material). Please be proactive on this learning process, as this is your own learning curve. I am here to facilitate, but as I said at the beginning of the module, you are in charge of your own learning. Some information might have been repeated. I also hope that during your assessment planning, you will look back at these slides 📄

**Rationale:**  
 Bringing together knowledge we have gathered in previous weeks to a **univocal view**, which will be a useful for your assessment planning.

ng  
ble to



# Just a heads up..

- 1. No engagement task this week, start to work on your assessments (submit group list and Stage 1.1).** Check deadlines.
- 2. Deadlines are progressive and strict,** there will be no time adjustments. No second chance for any plagiarism issues.
- 3. Install Rhino 6 for next week.** If you can't install it, please inform me. In understand it is an expensive software.
- 4. Any group problems, find me asap.** If you don't have any groups, also find me asap. I will reorganise groups if needs be.

# Plagiarism

## LINK TO THE DOCUMENT:

<https://miatedjosaputro.com/2021/02/27/week-1/>

*password: nbu*

### FUNDAMENTALS OF ACADEMIC WRITING: PARAPHRASING, CITING, AND BALANCE BETWEEN AUTHORS' WRITER'S VOICE

25 May 2020

By: Matt Wallwork

feedback studio      Contessa Ruiz | The Goliath of the Sea      75 /100      < 18 of 28 >

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## The Goliath of the Sea

The majestic blue whale, the goliath of the sea, certainly stands alone within the animal kingdom for its adaptations beyond its massive size.

<sup>1</sup> At 30 metres (98 ft) in length and 190 tonnes (210 short tons) or more in weight, it is the largest existing animal and the heaviest that has ever existed. Despite their incomparable mass, aggressive hunting in the 1900s by whalers seeking whale oil drove them to the brink of extinction. But there are other reasons for why they are now so endangered.

### Match Overview

43%

3 matches

1	<a href="https://en.wikipedia.org" style="color: #e00; font-weight: bold;">en.wikipedia.org</a> <small>Internet Source</small>	17%
2	<a href="https://animals.nationalgeogr..." style="color: #e00; font-weight: bold;">animals.nationalgeogr...</a> <small>Internet Source</small>	14%
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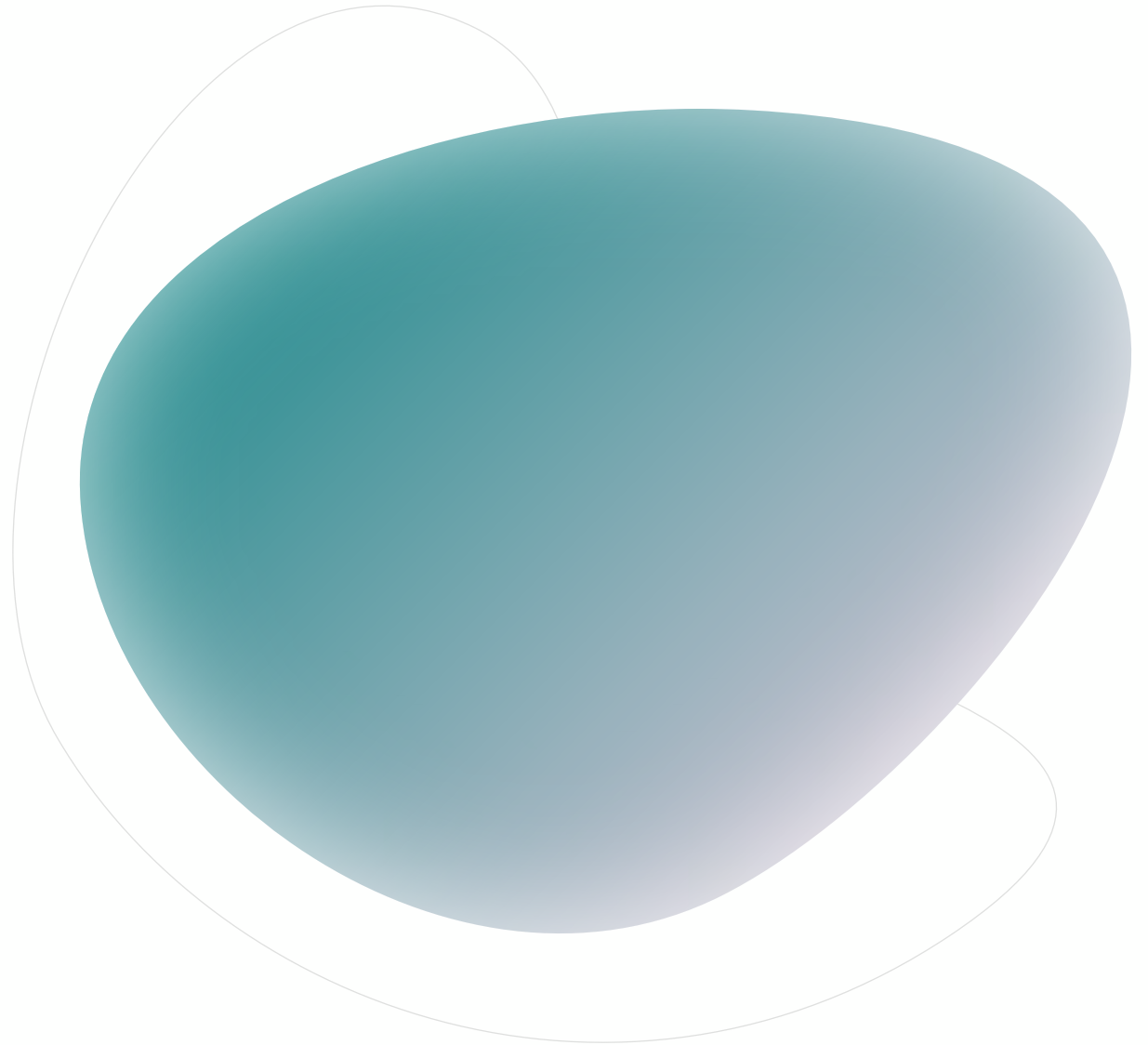


# Week 7

## Digital design cognition and research



This week we will be exploring digital design thinking, cognition and research. This week's slides serve as an introduction of your assessments, aiming to give a clear context of **what will be assessed** and **rationale** behind your grading rubric. Assessment documents will be released before Week 8.





# Outline

## 01

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### Introduction of design cognition

Evolution of important paradigms in design thinking will be enumerated, serving as a point of departure.

## 02

---

### Parametric design thinking and research

Different parametric design thinking lenses will be elaborated: concepts and models, pedagogical approach, digital workflow and design by research.

## 03

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### Summary of concepts

This set of concepts are to be illustrated, documented and communicated for the assessment.



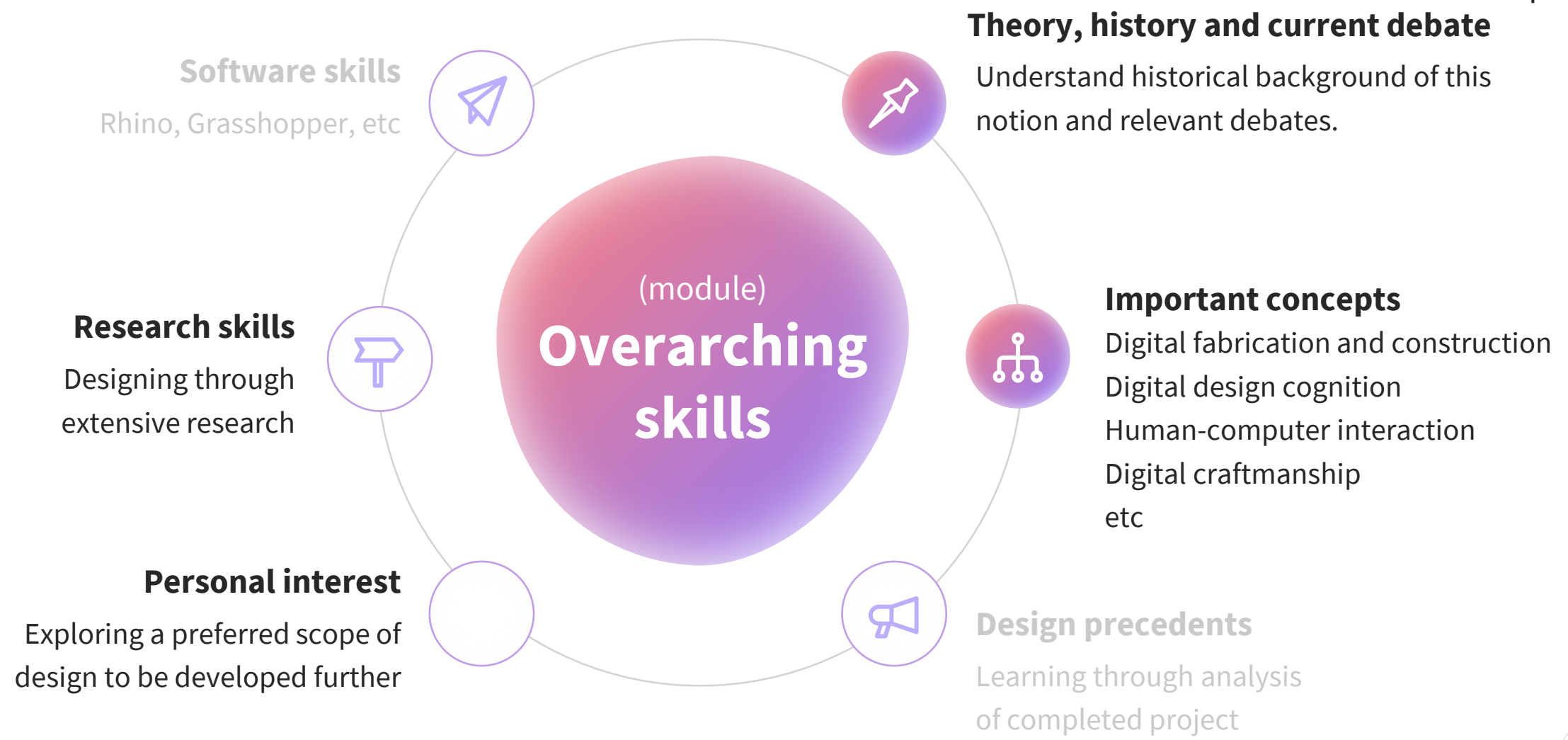
# Aims and objectives

- To elicit **evolution of paradigm in design thinking**, starting from pen-and-paper based thinking up to the parametric design thinking.
- To demonstrate **changes** in terms of studying design behaviour and changes in design behaviour itself.
- To provide **contextualisation** of the upcoming assessments.

# Learning outcomes

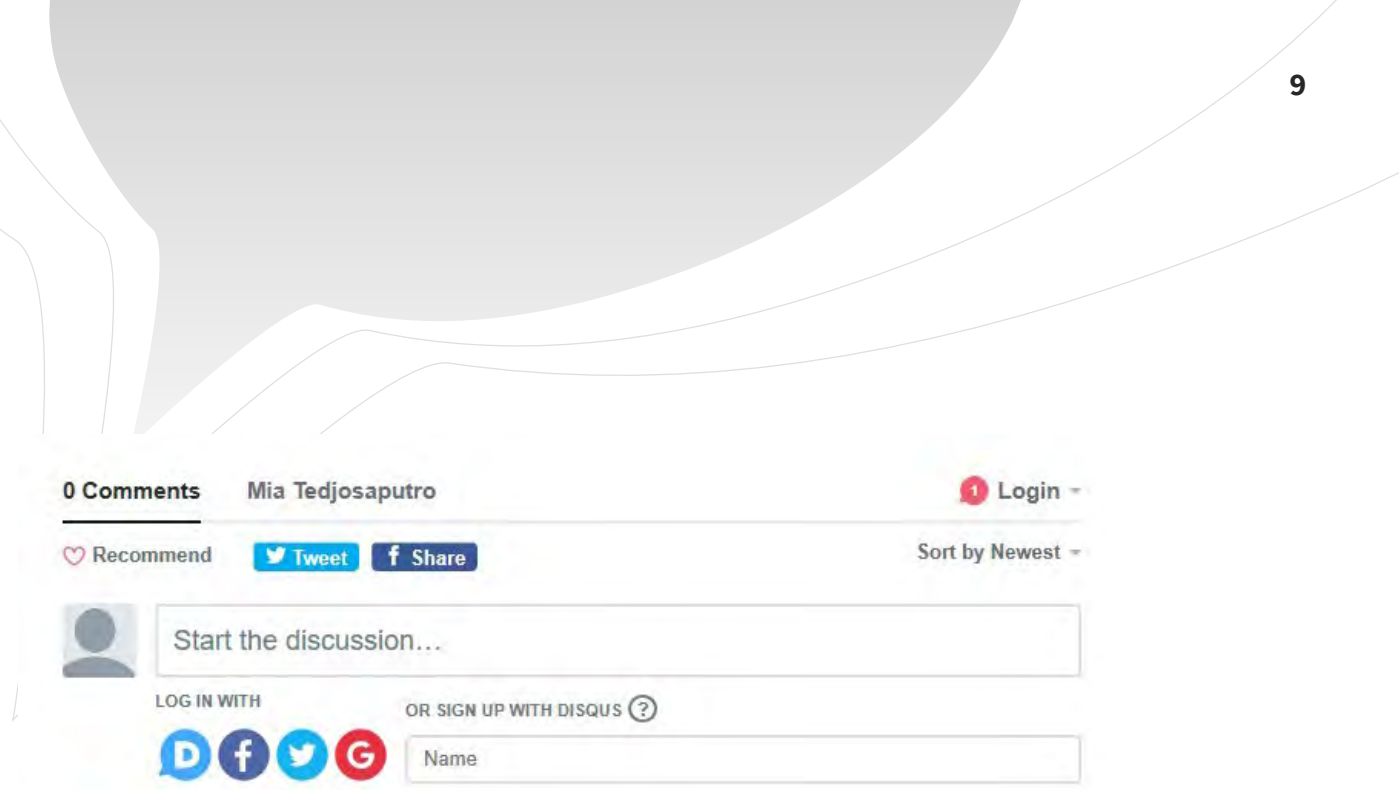
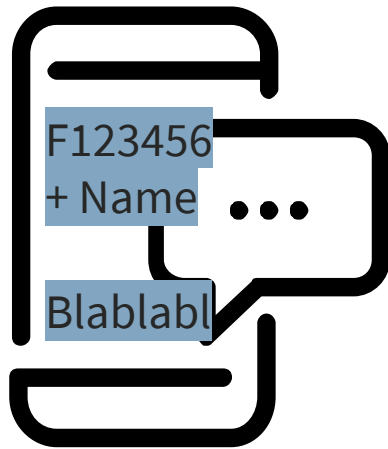
*Students will be able to..*

- 01** Summarise **important paradigms** in design thinking.
- 02** Synthesise **different aspects** of parametric design thinking and research.
- 03** Draw **comparison** of traditional design thinking and recent design thinking.
- 04** **Hypothesise** concepts into their early assessment planning.





# Discussion



- There is no engagement task this week, but you need to work on your Assessment 1:
1. Submit **group names** via Disqus, deadline: 14 April 2021 (Wednesday 11:45pm)
  2. Submit **Stage 1.1** by the end of next class on 19 April (11:45pm the latest).

<https://miatedjosaputro.com/2021/04/12/dg-week-7/>



# Design cognition



# Design cognition is: Study of human information processing in design

Eastman, C. (2001). Chapter 8 - New Directions in Design Cognition: Studies of Representation and Recall. *In*: Eastman, C. M., McCracken, W. M. & Newstetter, W. C. (eds.) *Design Knowing and Learning: Cognition in Design Education*. Oxford: Elsevier Science.



In other words..  
**Design cognition** is:  
**Study of design  
behaviour**



**My previous research:**  
**Study of design  
 behaviour, utilisation of  
 sketches and mental  
 imagery.**

Mia A. Tedjosaputro  
<http://miatedjosaputro.com/>

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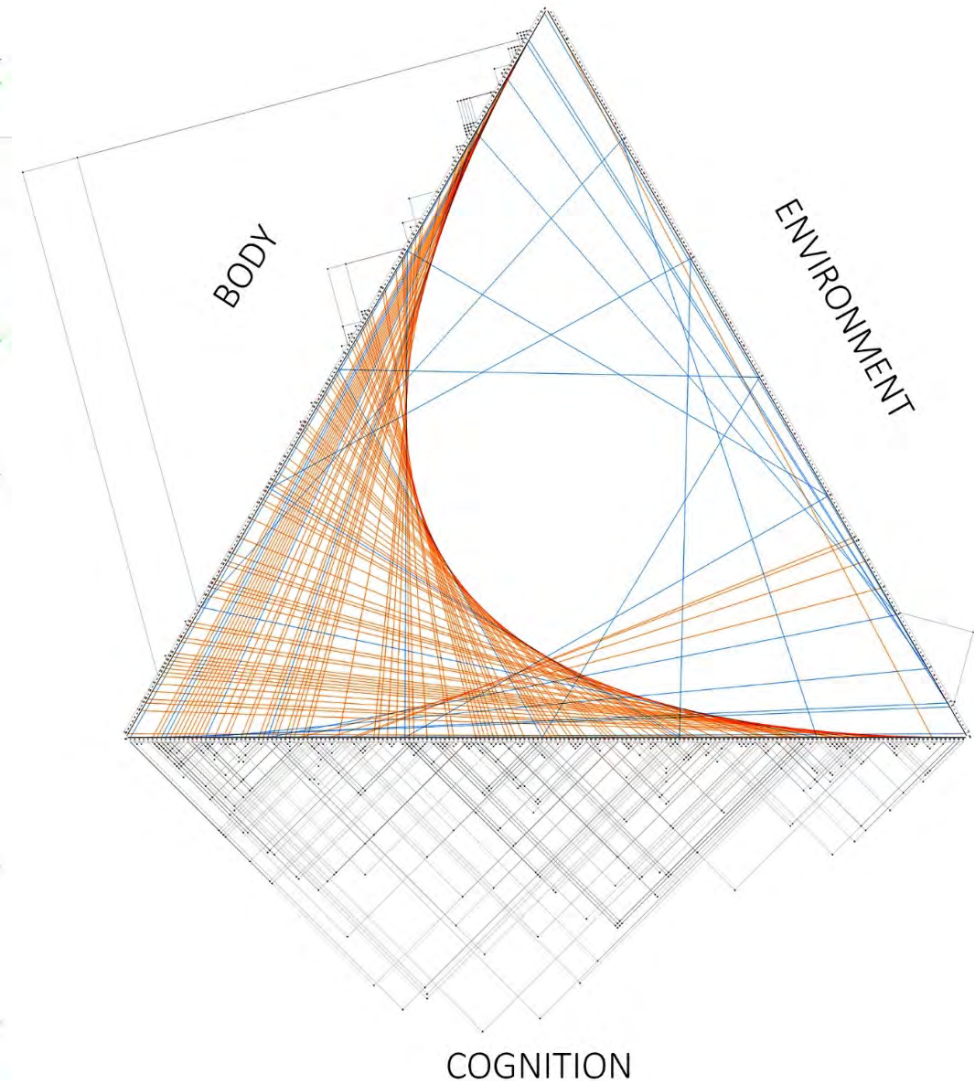
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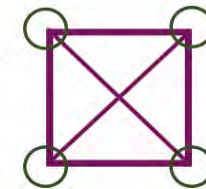


### 1 transcript:

- #133 Roll element that you hang actually climb up the stuff (gesture) from the loft that you build yourself.
- #181 Just the small housing in US, similar.
- #274 (long pause) Okay.. One meter, two meter, three meter. One meter, two meter.

1 what participants SAID

2 what participants REPORTED



3 direct observation by researcher

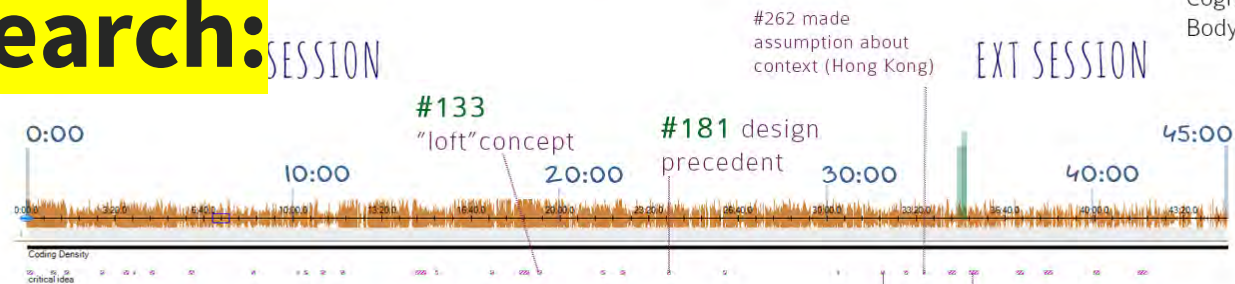
4 what participants DID

3 field notes

- 40. Ceiling height
- 41. Mention something she did previously
- 42. I assume it's safe (making assumption)
- 43. So I have loft.. #133
- 44. Assume 4m ceiling height
- 45. More layers for the room
- 46. What should be the size of the loft
- 47. 1m, 2 meters

3 and coded utterances  
Cognition code: C-as  
Cognition link: #132  
Body code: M-hg

## My previous research:



design summary with selected critical ideas: #133, #181, #274



These critical ideas were triangulated from what EG1 said, reported, did and also from direct observations.

### 2 prompted questions:

Q1: What kind of design precedent did you use?  
Yeah, I use the one-- the American kind of small house I have be to in US. #181

Q2: How did you get the idea from?  
Um, because it is a small family unit, so I- I also get the reference from IKEA. They have their flexible use of furniture and the space. And also the idea of house I have been to in St Louis, they have a kind of loft- they put the bedroom and storage above their kitchen. So they can use more space. #133

#248 illustrated a section with gesture



#274 started with plan

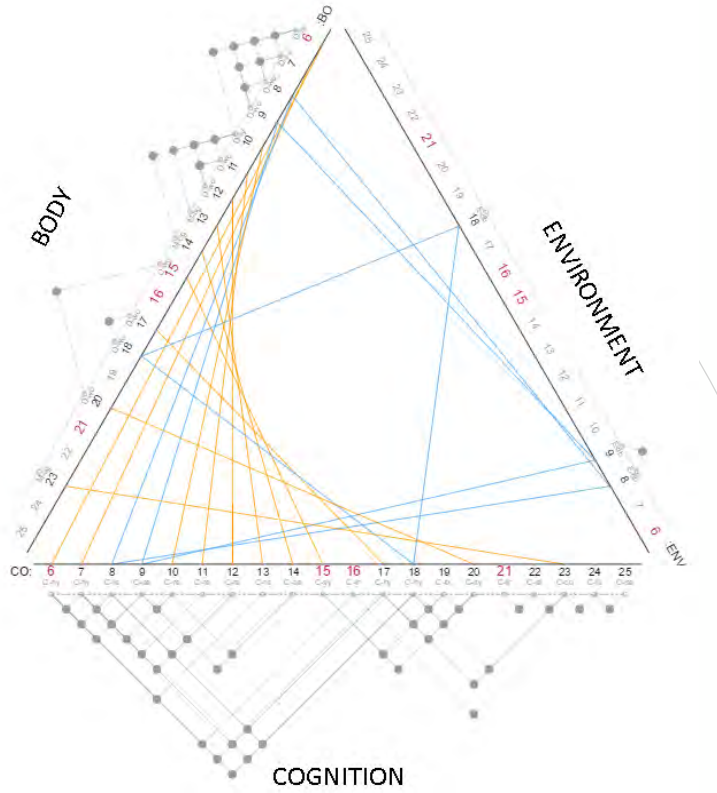


4 design marks, for example artefacts (plan drawing). or body gesture she produced.



No	Time	Transcript	Critical Ideas	Cog code	Links (Cog)	Bo code	Links (Bo)	Env code	Links (Env)
6	0:57.6 - 1:09.1	Let's say that if, firstly I need to have the client analysis and what do they really want, I think.	Cl	C-hy		D-sy			
7	1:08.4 - 1:19.7	What they really want? Please read..		C-hy	6	D-sy	6		
8	1:19.0 - 1:38.6	And also this like, dining set up. A place to eat and-- and entertain.. Entertainment. And what else?		C-re	6,7	D-wo	6,7	E-db	
9	1:37.6 - 1:50.9	Learning space. Ok, I think it's normally the same with the adults, like. What's for the children?		C-as	6,7	D-wo	6,7,8	E-db	8
10	1:49.8 - 2:05.9	(long pause) What a child need, for you? Play around..		C-re	9,7	D-sy	6		
11	2:04.9 - 2:12.7	What else, read? Yes..		C-re	7	D-wo	10		
12	2:12.0 - 2:18.0	For study? Dining is for eating right, of course..		C-re	9,8,7	D-wo	11,10,11		
13	2:18.0 - 2:33.6	What else, is there any special one? (long pause) nothing spec		C-re	6	M-hg	10		
14	2:32.4 - 2:42.8	Play around. before. And							
15	2:41.8 - 3:01.9	Mixed use.. (place of wha							
16	3:01.9 - 3:05.9	What if I sep that..							
17	3:04.4 - 3:15.4	One part is for say, if we lea for children							
18	3:15.4 - 3:24.6	And another the adult? Ac							
19	3:24.6 - 3:36.8	Adults.. Or m have the sar							
20	3:36.8 - 3:42.7	They don't h they can play at the same space.			19				
21	3:41.7 - 3:53.1	If I imagine the furniture as space or (inaudible mumble). What it could be?	Cl	C-tr	5				
22	3:52.6 - 4:07.7	Let's say, it's quite like um, a sofa or something like that (long pause).		C-at	21	D-c			
23	4:07.0 - 4:17.7	What if the sofa have--um, two sides? (long pause)		C-co	22,17,18	M-og	22		
24	4:16.4 - 4:44.6	If we put the sofa into-- select-- dividing into two part, and then one is for adult one is for children. How to make it interesting? (long pause)		C-fu	16,23				
25	4:44.0 - 4:51.6	But this is too close-- too close. Is not-- what it should be?		C-se	24				

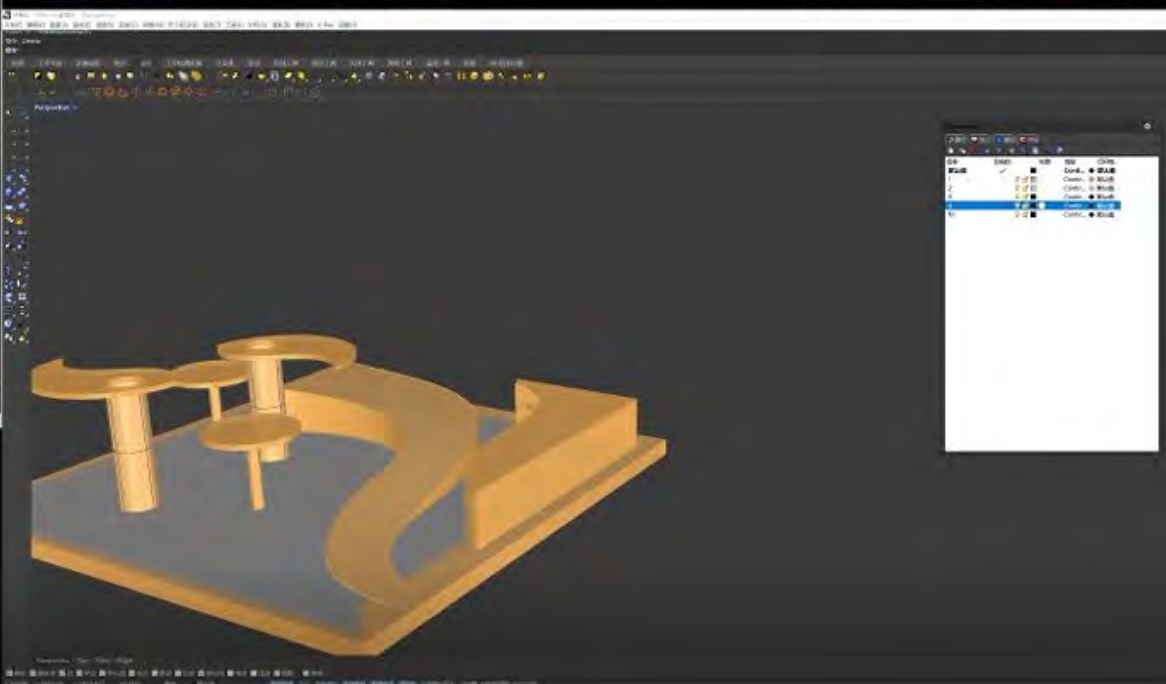
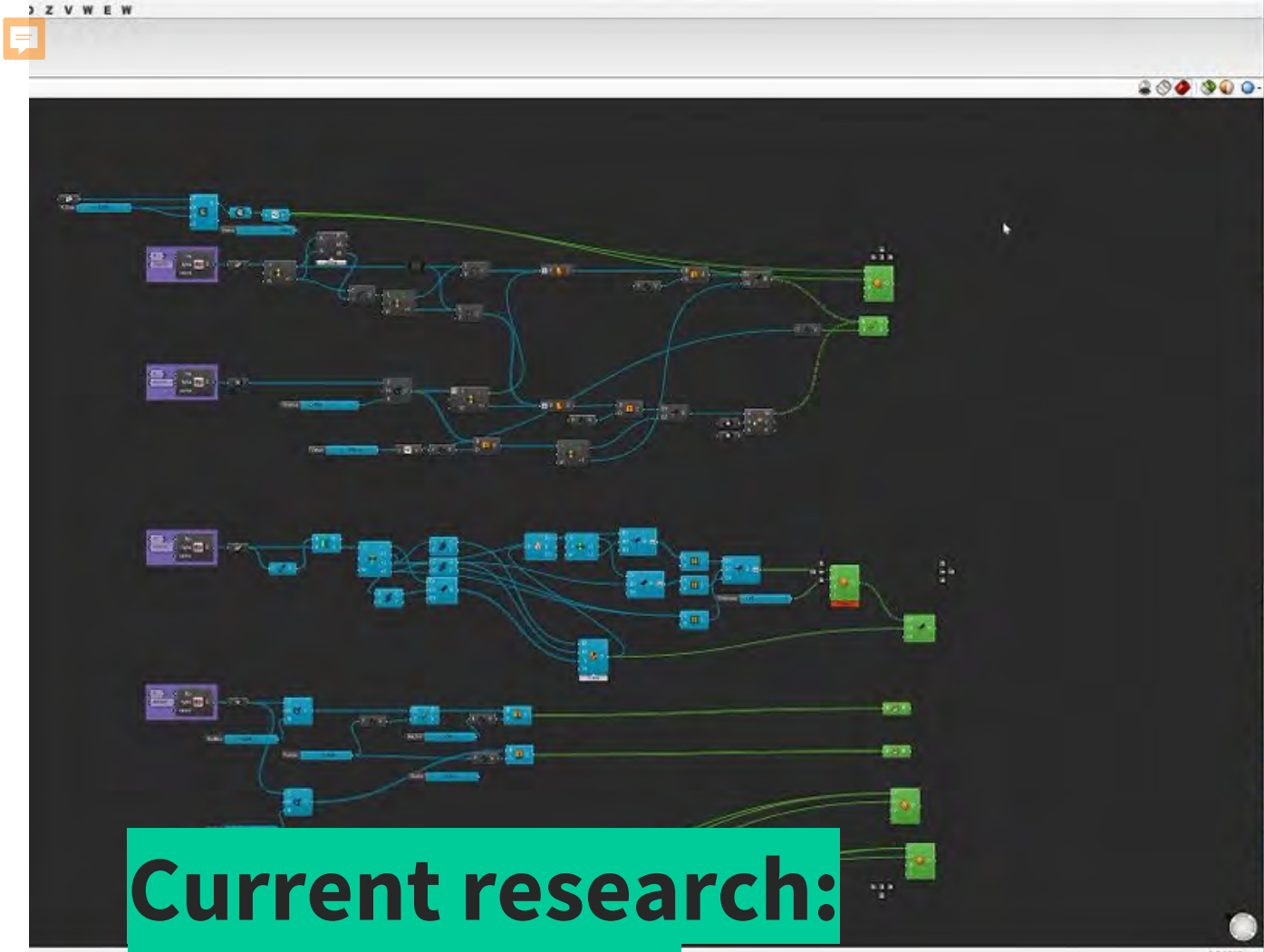
# My previous research: Each design move was visualised and analysed



1- PROTOCOL DATA WAS GENERATED IN FORM OF VERBATIM TRANSCRIPTIONS, EACH DESIGN MOVE WAS PARSED AND ANALYSED.

2- PROTOCOL ANALYSIS, SHOWING AN EXAMPLE, AN EXCERPT OF MOVE #6-#25

3- LINKOGRAPHY OF DESIGN MOVES (MOVE #6-#25). VISUALISATION WAS GENERATED USING SCRIPT

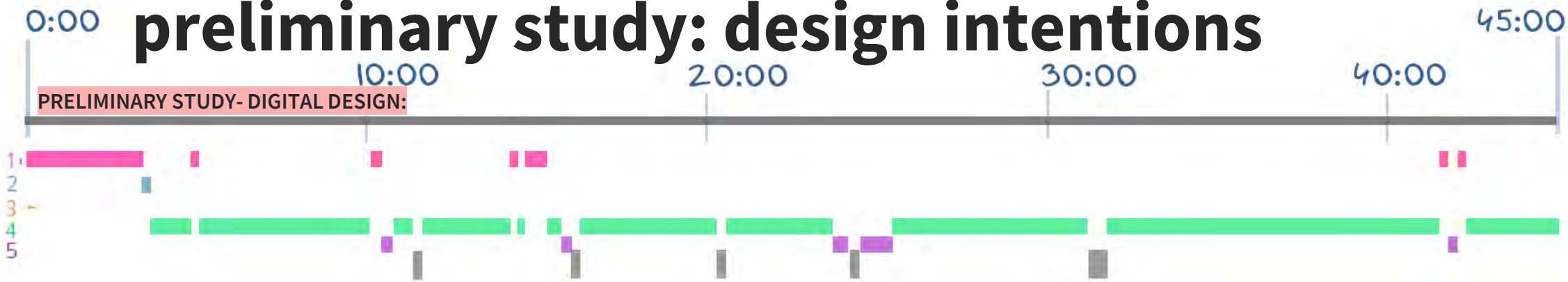


**Current research:  
Digital design  
Preliminary study using  
the same design brief**



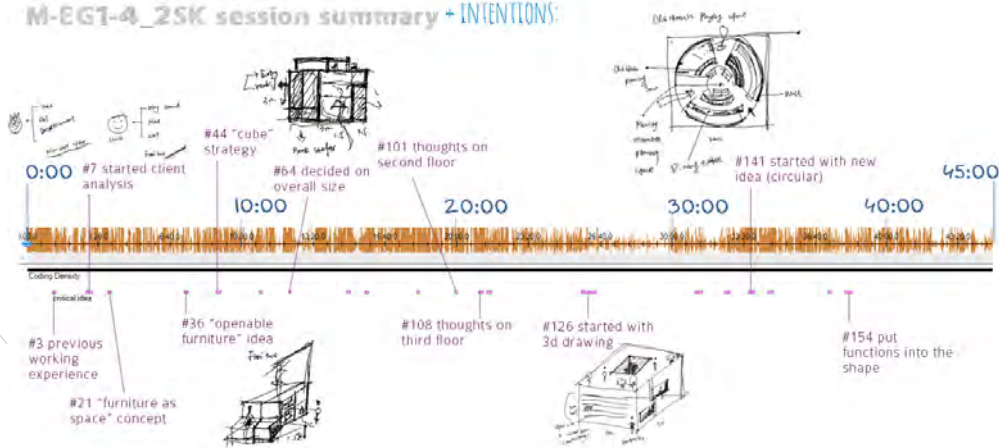
# Digital design

## preliminary study: design intentions



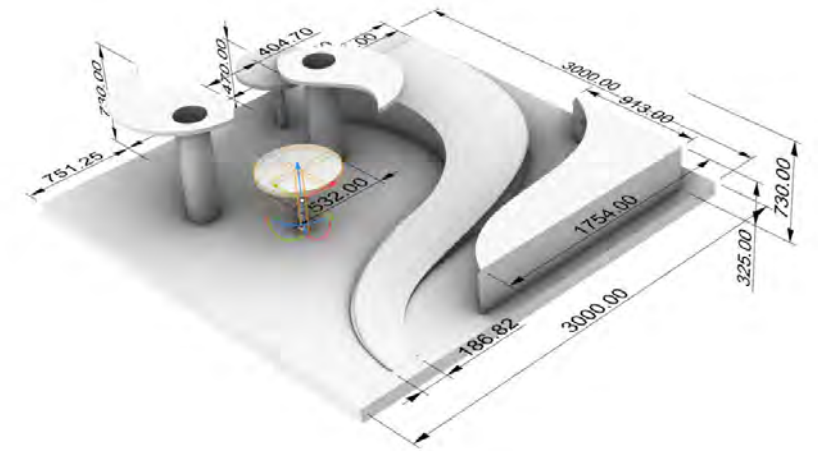
1: SITUATION 2: PROBLEM 3: PATTERN 4: SOLUTION 5: DOMAIN- RELATED INTENTIONS

### M-EG1-4\_2SK session summary + INTENTIONS:

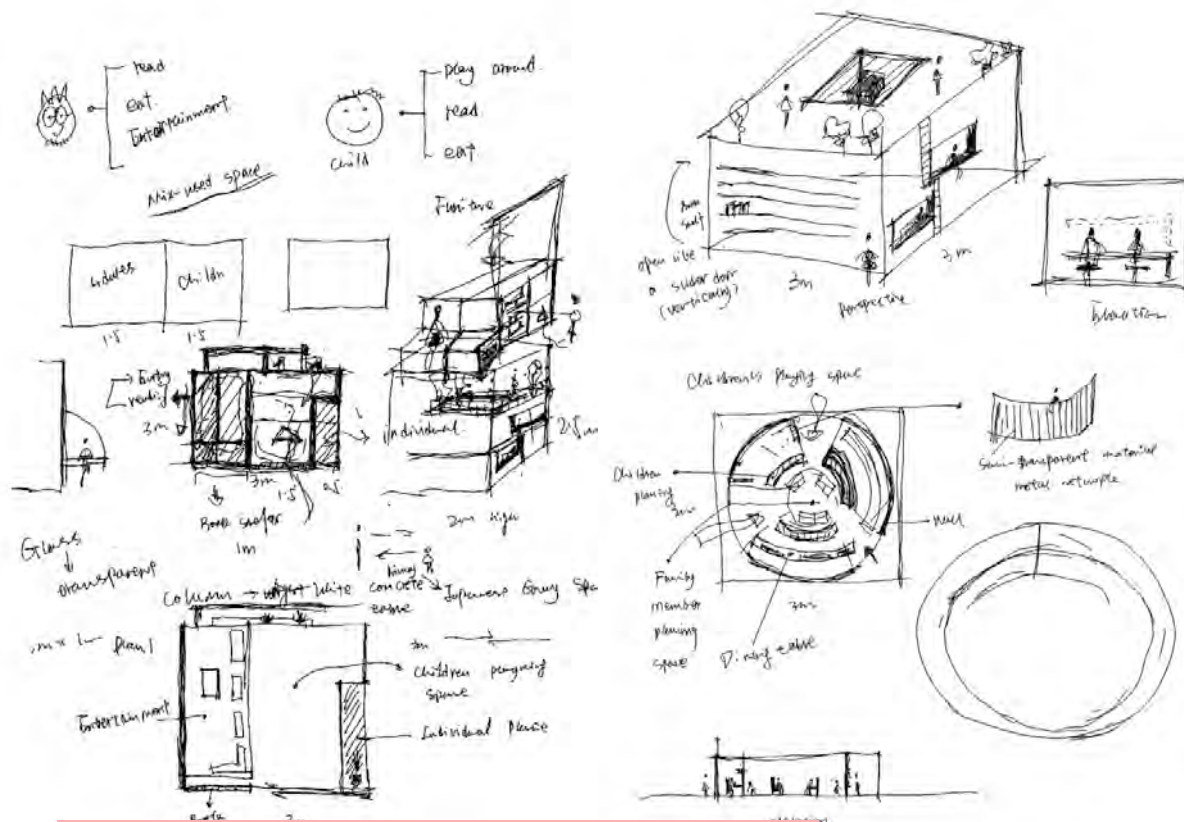


### PHD STUDY- SKETCHING SESSION (SAME BRIEF)

# Digital design preliminary study: output



PRELIMINARY STUDY- DIGITAL DESIGN

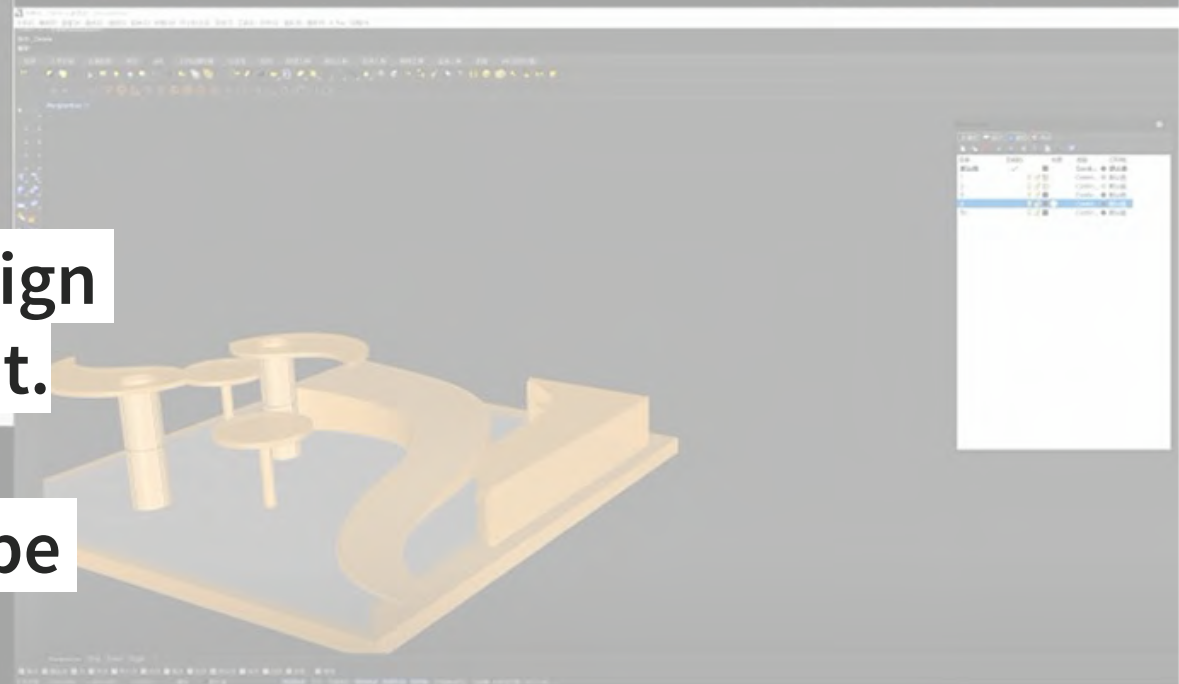


PHD STUDY- SKETCHING SESSION (SAME BRIEF)

**DG: observed potentials in a controlled experiment**

Designers mapped out their design strategies in form of visual script.

Transcription does not need to be verbatim.





# Design thinking paradigms

Adapted from: Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.



01

**EARLY MODELS OF DESIGN THINKING**

02

**DESIGN THINKING IN EARLY  
COMPUTER-AIDED DESIGN MODELS**

03

**KNOWLEDGE-BASED COMPUTATIONAL  
MODELS OF DESIGN**

04

**ADVANCED COMPUTATIONAL DESIGN,  
ALGORITHMIC THINKING AND SCRIPTING**

05

**PARAMETRIC DESIGN THINKING**





01

# Early models of design thinking

## “Designerly ways of knowing”

*Cross, N. (2006). Designerly ways of knowing : with 15 figures / Nigel Cross, Springer.*

**How the designer works through the complex iterative cognitive processes of conceptualisation, modification and refinement in solution space.**

**Sketch modification as refinement process.**

# 01 Early models of design thinking

## “Reflection-in-action”

Schon, D. A. (1991). *The reflective practitioner : how professionals think in action* / Donald A. Schòn, Ashgate.

Schon, D. A. & Wiggins, G. (1992). Kinds of seeing and their functions in designing. *Design Studies*, 13, 135-156.

**Radical proposal after the rational problem solving process. It perceives design tasks are unique and designing as a reflective dialogue which base on the interaction of designing and discovering, seeing-moving-seeing.**

# 01 Early models of design thinking

	<b>Rational problem solving</b>	<b>Reflection-in-Action</b>	<b>Co-evolution</b>
<b>Designer:</b>	Information processor (in an objective reality)	Person constructing his/her reality	Person developing and refining reality
<b>Design problem:</b>	Ill defined, unstructured	Essentially unique	Clarifiable
<b>Design process:</b>	A rational search process	A reflective conversation	An interaction between problem and solution space

02

## Design thinking in early computer-aided design models

Early CAD system tries to **mimic pen-and-paper based thinking.**

Early CAD system exploit the ability to explore **one-off design.**

Media technological developments.

Continuous mapping of early cognitive model.



## 03 Knowledge-based computational model of design

**Early research and development on Artificial Intelligence (AI) and Knowledge-based Design (KBD).**

**Begin to provide perspectives related to: *cognitive structures, algorithmic systems, computational mechanisms* in design creativity and innovation.**



04

# Advanced Computational Design, Algorithmic Thinking and Scripting

**Integrated processes of simulation, evaluation and fabrication.**

**Relevant principles from domains of science and philosophy, mathematics and computer science have introduced way of new thinking and morphogenetic processes.**





# Advanced Computational Design, Algorithmic Thinking and Scripting

Pen on pen-and-paper based design thinking has now been replaced by computer's **algorithmic mode of thinking.**

‘Software is a tool for mind’.

Being *reflective* means designer's ability to **control** computational and scripting tools.

# Advanced Computational Design, Algorithmic Thinking and Scripting

Designers are no longer making choices of a single object, but creating “a matrix encompassing entire population of **possible designs**’.

Algorithmic code is related to structure of visual representation.

# Parametric Design Thinking

PDT is seen as **an advance form of computational design.**

Based on the conception that: exploration and re-editing happen in **geometrical solution space**, through process of **associative relationship.**



# Parametric Design Thinking



Previously in week five..

# Week 5 Outline

**01**

Introduction to  
Parametric Design

**02**

Brief historical account

**03**

Parametricism

**04**

Parametric Design Thinking

**05**

Characteristics of  
Parametric Design System

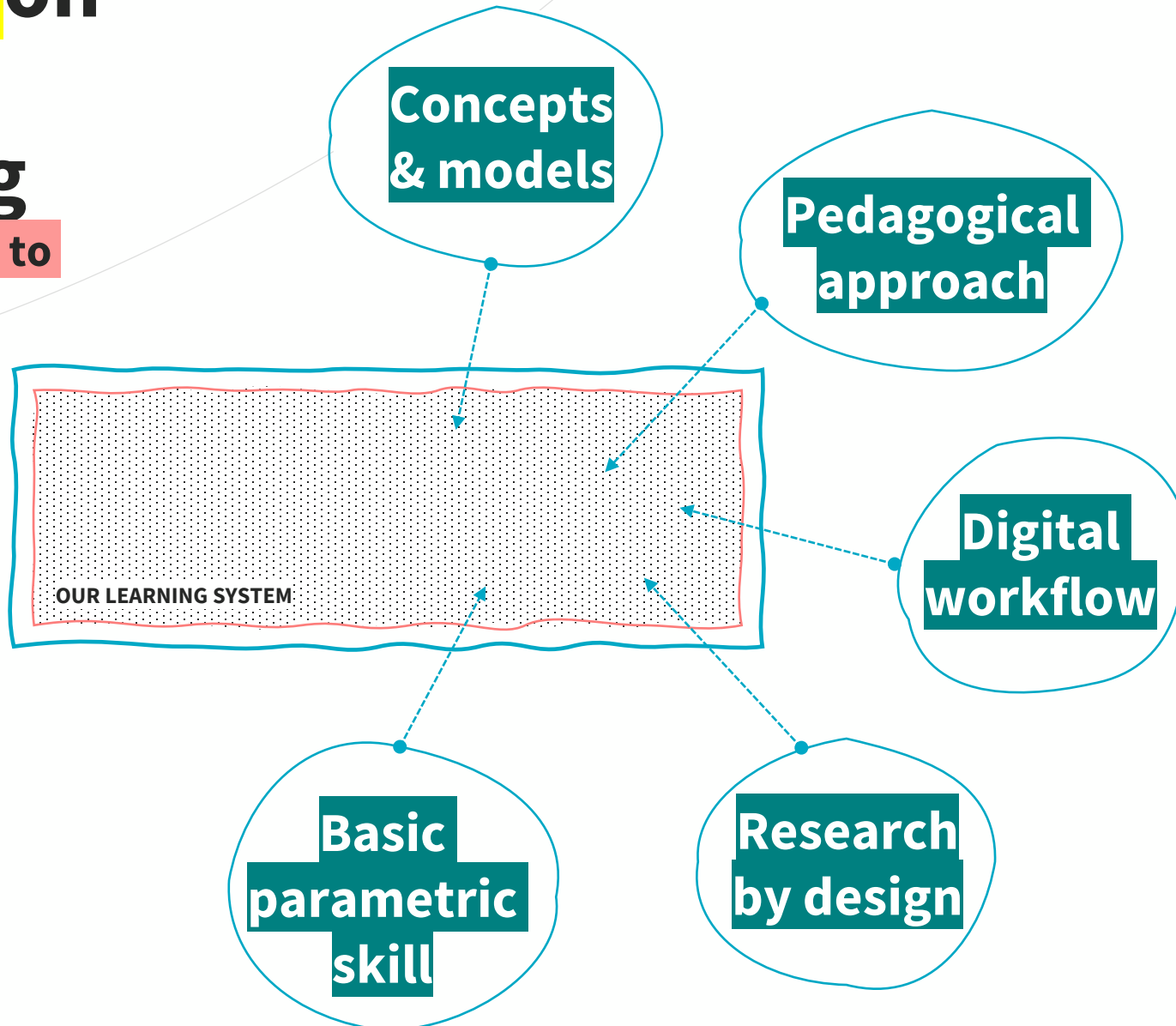
**06**

How Designers Use Parameter



# A broader view on Parametric Design Thinking

For the purpose of being able to express parametric design

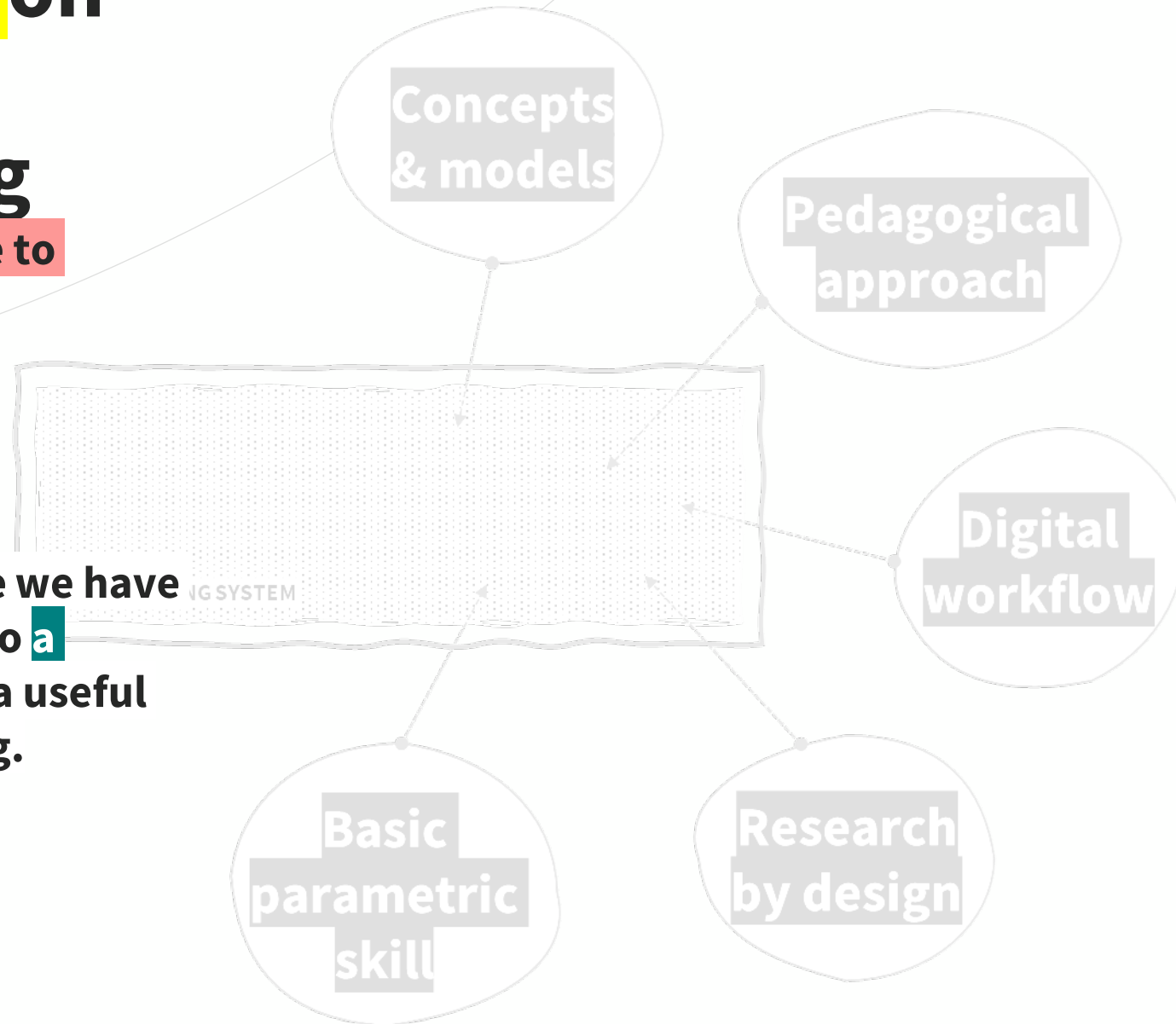


# A broader view on Parametric Design Thinking

For the purpose of being able to express parametric design

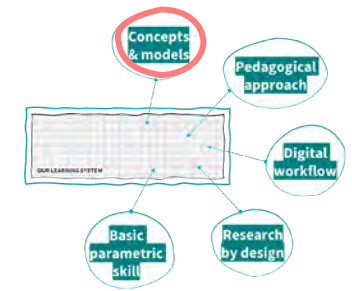
## Rationale:

Bringing together knowledge we have gathered in previous weeks to a univocal view, which will be a useful for your assessment planning.



# 1: Concepts and models

Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.



**1.1: PDT (Parametric Design Thinking) as intersection between seminal parametric design concepts.**

**1.2: Typological to topological thinking in creative design.**

**1.3: Differentiation as key strategy.**

**1.4: New symbolic role of imagery, requires different thinking.**



# 1: Concepts and models

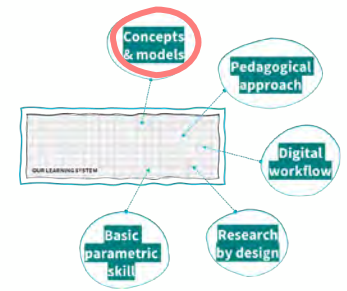
Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.

1.2: **Typological** to **topological** thinking in creative design.

The evolution is:  
From *typological thinking* to *topological thinking*.

**Typological thinking:** design by sub-types

**Topological thinking:** design of versioning types, by changing values of their associative relationships.



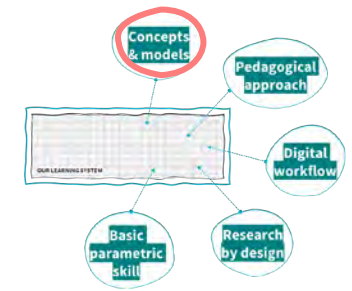
# 1: Concepts and models

Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.

## 1.3: Differentiation as key strategy.

Read lecture notes

Differentiation is a term in the field of calculus, and **continuous differentiation** can be considered as the *‘geometrical transcoding of parametric variations into differential geometries driven by iterative versioning processes of parametric design in a continuous rhythm’ (Jabi, 2013).*





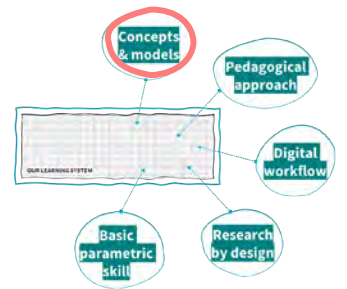
# 1: Concepts and models

Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.

## 1.3: Differentiation as key strategy.

Example of differentiation in different context (1)

<http://degroot.co.il/lyen56.asp?gj=com&hl=en&shop=nike+air+max+by+year&xi=3&xc=11&pl=0&pr=75.99&you=0>





# 1: Concepts and models

Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.

## 1.3: Differentiation as key strategy.

Example of differentiation in different context (2)

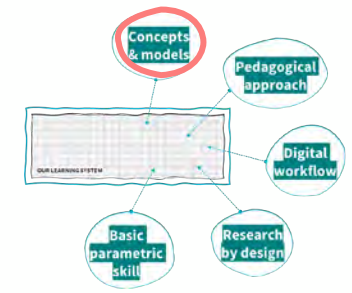


fig. 5 A family of Scottish doors.



# 1: Concepts and models

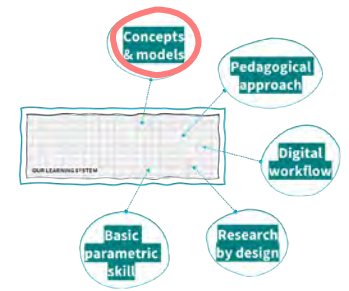
Oxman, R. (2017). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4-39.

1.4: New symbolic role of imagery, requires different thinking.

**Design modification.**

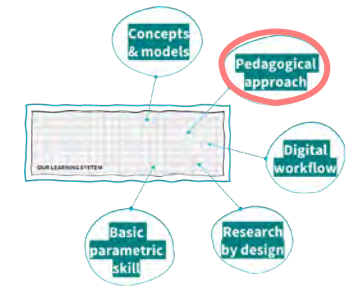
In traditional ways of thinking → usually achieved by visual operation of re-drawing and re-modelling object of design.

In parametric design → Re-editing refers to design process represented by a set of algorithmic rules defined by the designer.



# 2: Pedagogical approach

Aish, R. & Hanna, S. (2017). Comparative evaluation of parametric design systems for teaching design computation. *Design Studies*, 52, 144-172.



## 2.1: *Cognitive dimensions*

## 2.2: Cognitive challenges

## 2.3: *Learning curves of parametric design systems (in this case, software)*

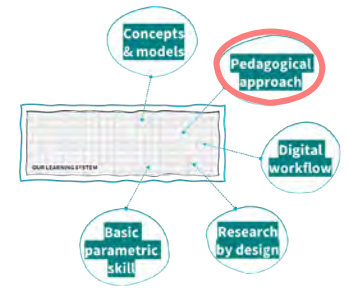
## 2: Pedagogical approach

Aish, R. & Hanna, S. (2017). Comparative evaluation of parametric design systems for teaching design computation. *Design Studies*, 52, 144-172.

### 2.1: Cognitive dimensions

**Cognitive dimensions, developed by Green and Blackwell (1998) are discussion tool to evaluate usability of information-based artefacts. It focuses on the process of interaction.**

**Aish and Hannah (2017) adapted 9 dimensions from Green and Blackwell (1998). They analysed 3 parametric design system using the dimensions.**





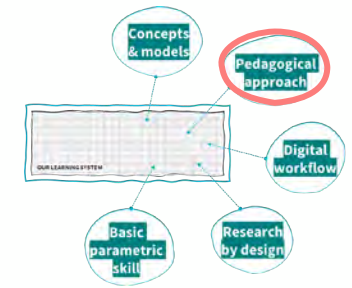
## 2: Pedagogical approach

Aish, R. & Hanna, S. (2017). Comparative evaluation of parametric design systems for teaching design computation. *Design Studies*, 52, 144-172.

### 2.1: Cognitive dimensions

The dimensions are:

1. Abstraction barrier
2. Semantic interference
3. Consistency between representations
4. Discoverability
5. Flexibility
6. Side effects
7. Work around
8. Convoluted workflow
9. Liveness





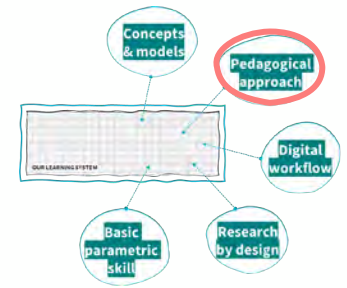
## 2: Pedagogical approach

Aish, R. & Hanna, S. (2017). Comparative evaluation of parametric design systems for teaching design computation. *Design Studies*, 52, 144-172.

### 2.2: Cognitive challenges

**Cognitive challenges might occur during modelling, or can be at the earlier and later phases.**

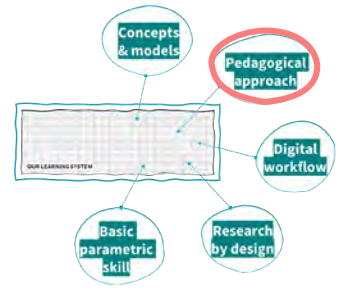
**Cognitive challenges over the duration of learning process are illustrated in the *learning curves* (2.3), in form of the vertical lines.**





# 2: Pedagogical approach

Aish, R. & Hanna, S. (2017). Comparative evaluation of parametric design systems for teaching design computation. *Design Studies*, 52, 144-172.



## 2.3: Learning curves

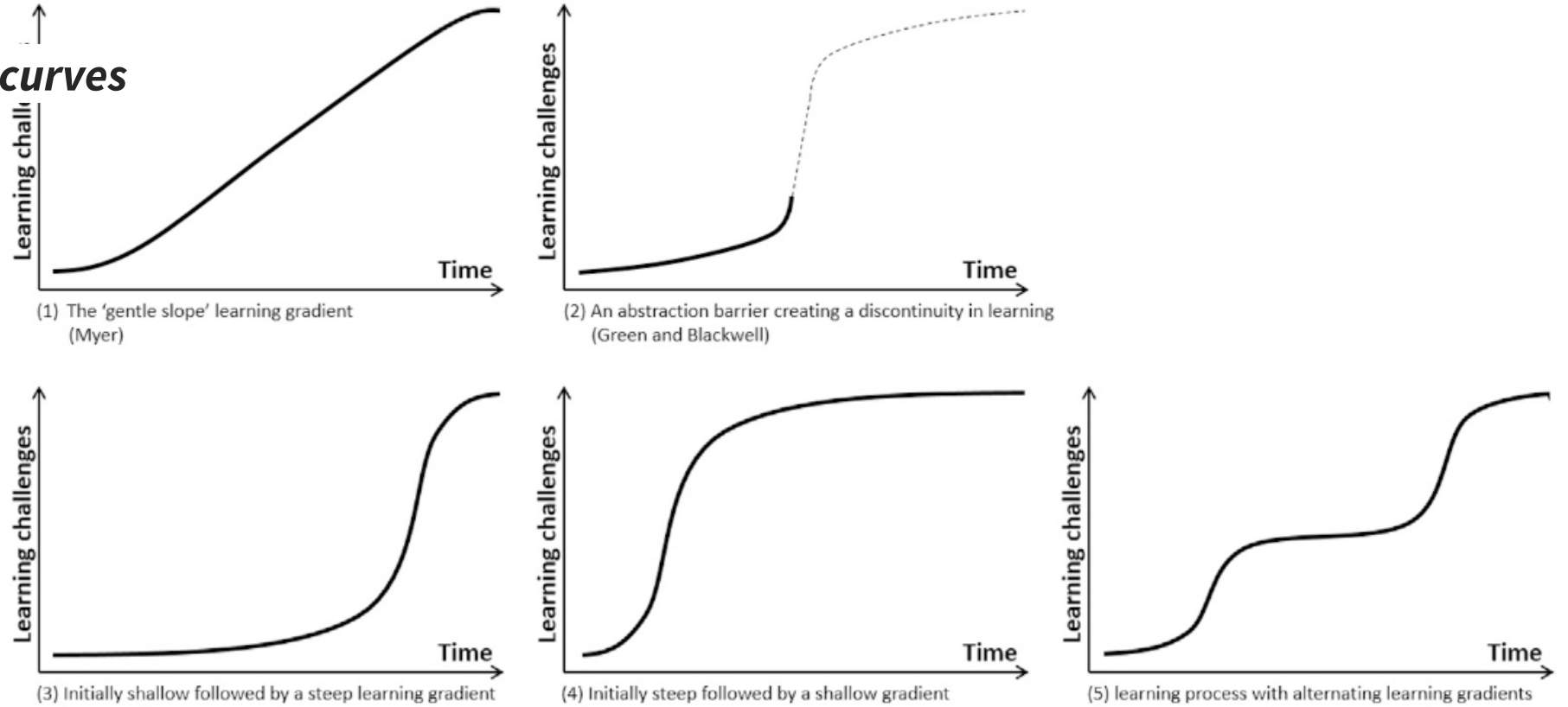
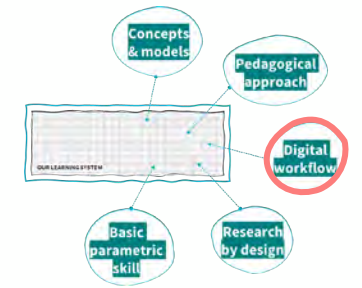


Figure 1 Five possible learning curves

# 3: Digital workflow

Wortmann, T. & Tunçer, B. (2017). Differentiating parametric design: Digital workflows in contemporary architecture and construction. *Design Studies*, 52, 173-197.



**3.1: Great level of detail and differentiation** *(similar with item 1.3)*

**3.2: Master Model** shared between architects, consultants and contractors.

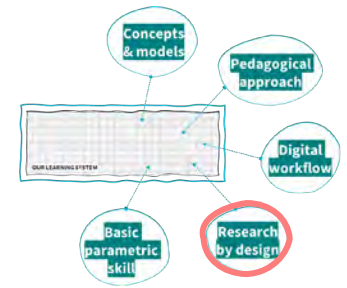
**3.3: Strength of PD (Parametric Design) is not only generating design variants, but realising highly specific, differentiated, rule-based designs.**

# 4: Research by design

Bhooshan, S. (2017). Parametric design thinking: A case-study of practice-embedded architectural research. *Design Studies*, 52, 115-143.

Definition of Parametric design thinking (PDT) according to Bhooshan (2017):

**Computationally augmented form of design thinking**



## Three components of PDT derived from practice:

### 4.1: PDT Cognitive Model

The iterative process finding optimal solutions requires balance between **exploratory** and **exploitative** phases.

### 4.2: Design Method

### 4.3: Information Processing Model

## Bhooshan (2017)

Bhooshan, S. (2017). Parametric design thinking: A case-study of practice-embedded architectural research. *Design Studies*, 52, 115-143.

He also highlights the need for architectural design and practice to follow a **research programme**, instead of ad-hoc solutions to design tasks.

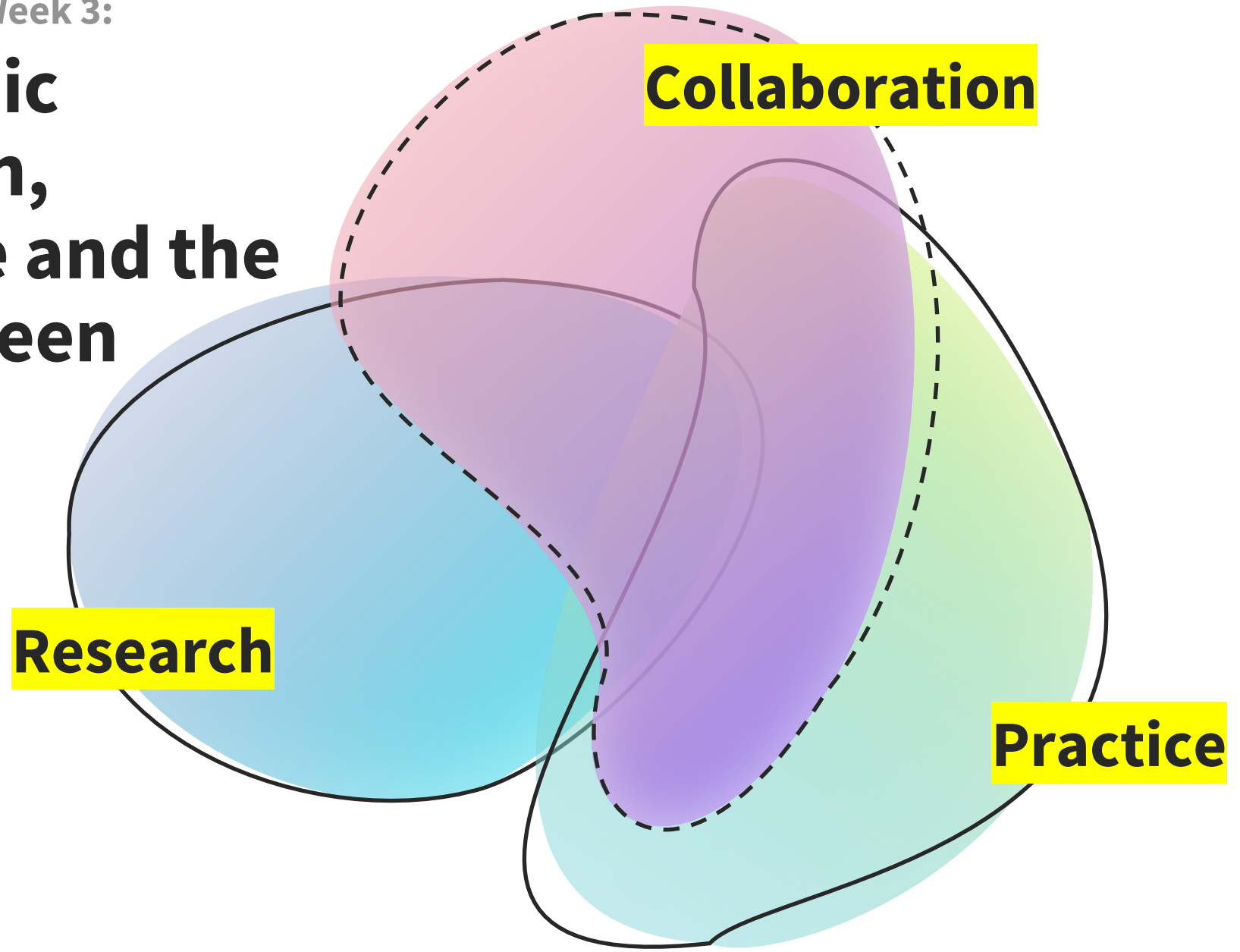
**Cumulative research** enabling network involving *academic institutions, professional firms and embedded research groups* to effectively realise architectural projects.





Previously in Week 3:

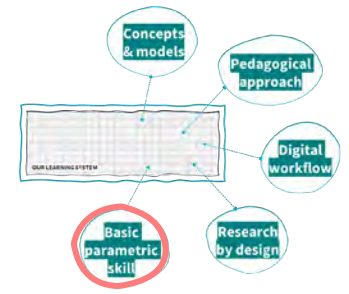
# Academic research, practice and the in-between





# 5: Basic parametric skill

Woodbury, R. (2010). Elements of parametric design.



## 5.1: The shift between conventional and parametric

## 5.2: New skills

## 5.3: New strategies



# How designers use parameters

Woodbury, R. (2010). Elements of parametric design.

1. **The shift between conventional and parametric**
2. New skills
3. New strategies

Parametric modelling relies on **establishing relationships.**

The cost is it depends on **designers' ability to redefine relationships**, and willingness to consider relationship-definition phase as **integral design process.**

“Relationship creation”

Previously in Week 5..

# How designers use parameters

Woodbury, R. (2010). Elements of parametric design.

1. The shift between conventional and parametric
2. **New skills:**
3. New strategies

1. CONCEIVING DATA FLOW
2. DIVIDING TO CONQUER
3. NAMING
4. THINKING WITH ABSTRACTION
5. THINKING MATHEMATICALLY
6. THINKING ALGORITHMICALLY

THESE ARE **BASIC SKILLS** OF PARAMETRIC CRAFT.

# How designers use parameters

Woodbury, R. (2010). Elements of parametric design.

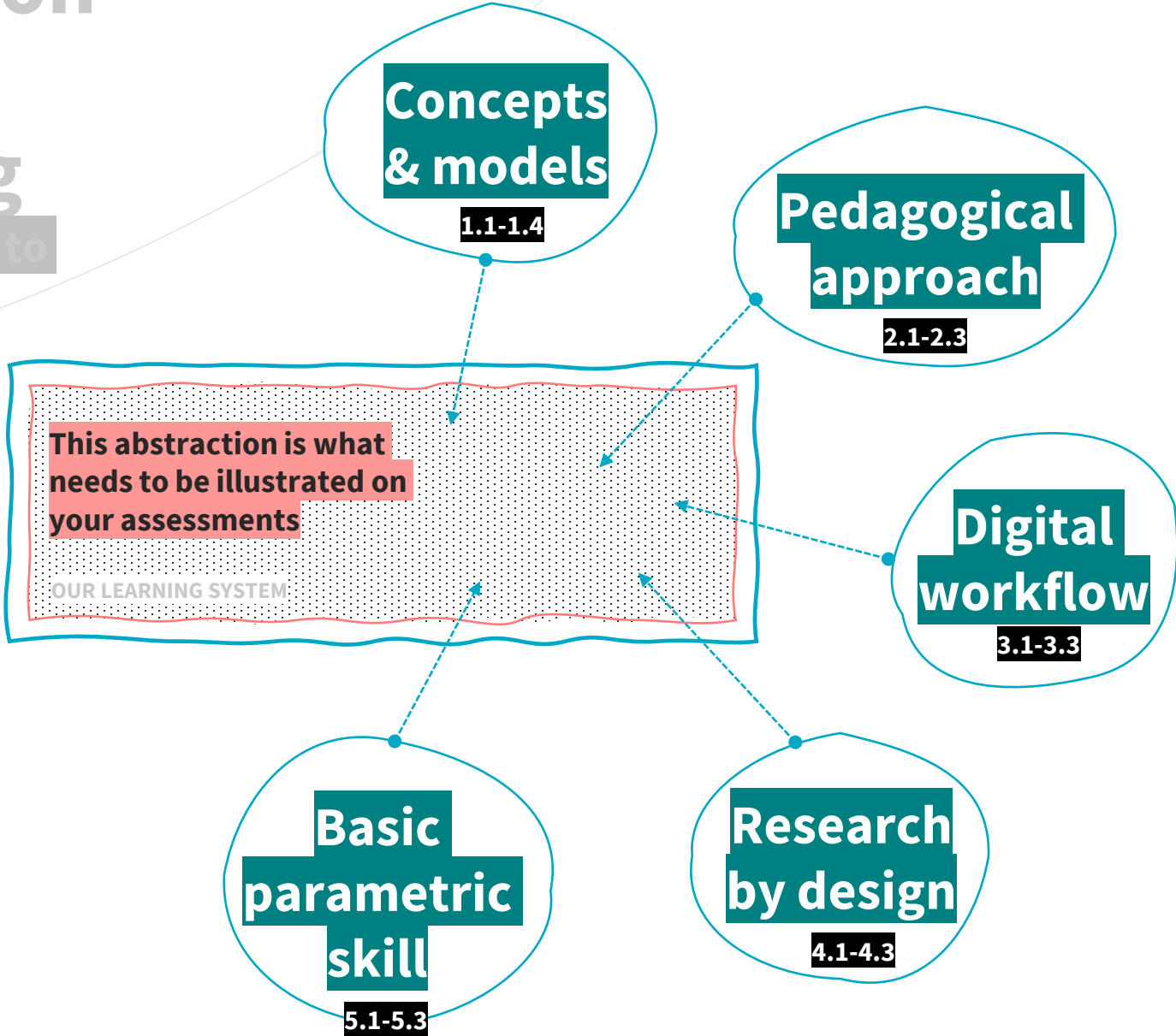
1. The shift between conventional and parametric
2. New skills
3. **New strategies:**

1. SKETCHING
2. THROW CODE AWAY
3. COPY AND MODIFY
4. SEARCH FOR FORM
5. USE MATHEMATICS AND COMPUTATION TO UNDERSTAND DESIGN
6. DEFER DECISIONS
7. MAKE MODULES
8. HELP OTHERS
9. DEVELOP YOUR TOOLBOX



# A broader view on Parametric Design Thinking

For the purpose of being able to express parametric design



This abstraction is what needs to be illustrated on your assessments

OUR LEARNING SYSTEM

Note: to be read in conjunction with assessment documents (brief, grading rubric, etc)



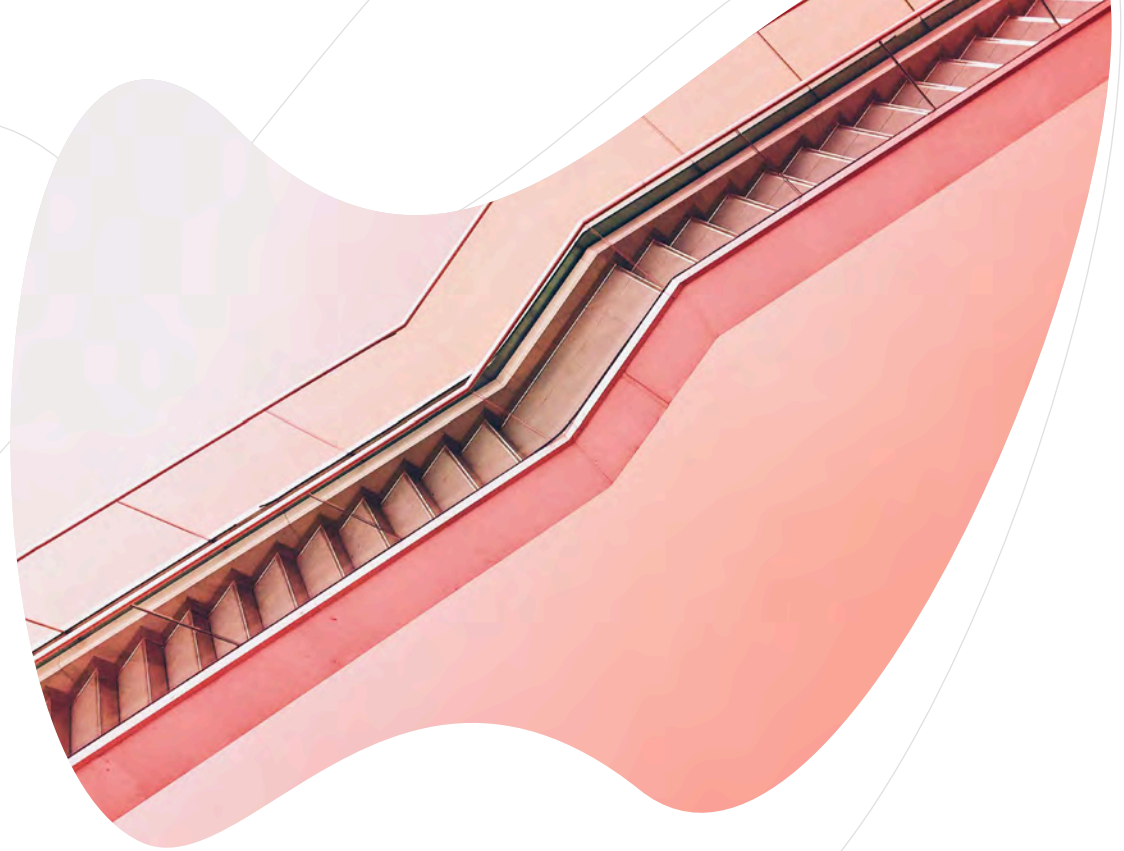


# Summary of concepts



# Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. Emergence
4. Reflection
5. Modification
6. Adaptation
7. Media:
  - Media used
  - Algorithmic design
  - Scripting language





# Summary: concepts of design thinking

## 1. Search of solution space

2. Exploration

3. Emergence

4. Reflection

5. Modification

6. Adaptation

7. Media:

Media used

Algorithmic design

Scripting language

**A solution space is an abstract space where designers go through complex cognitive processes to develop and deliver solution. Usually it involves the processes mentioned on item 2-6.**

**Also it is highly related with problem space.**





# Summary: concepts of design thinking

1. Search of solution space
2. **Exploration**
3. Emergence
4. Reflection
5. Modification
6. Adaptation
7. Media:  
Media used  
Algorithmic design  
Scripting language

**The process of developing solutions by generating and analysing them.**







# Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. **Emergence**
4. Reflection
5. Modification
6. Adaptation
7. Media:  
Media used  
Algorithmic design  
Scripting language

**Recognition of visual entities in design enables emergence, supporting the ability ‘to think with an image’.**





# Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. Emergence
4. **Reflection**
5. Modification
6. Adaptation
7. Media:
  - Media used
  - Algorithmic design
  - Scripting language

**Framing and re-framing design problems and solutions.**





# Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. Emergence
4. Reflection
5. **Modification**
6. Adaptation
7. Media:  
Media used  
Algorithmic design  
Scripting language

**Modification or refinement**  
refer to the process of  
transformation from schematic  
state to specific state.

Oxman, R. E. & Oxman, R. M. (1992). Refinement and adaptation in design cognition. *Design Studies*, 13, 117-134.





# Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. Emergence
4. Reflection
5. Modification
6. **Adaptation**
7. Media:  
Media used  
Algorithmic design  
Scripting language

**Adaptation refers to the transformation process of modifying existing design.**

Oxman, R. E. & Oxman, R. M. (1992). Refinement and adaptation in design cognition. *Design Studies*, 13, 117-134.





# Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. Emergence
4. Reflection
5. Modification
6. Adaptation
7. **Media:**

Media used  
Algorithmic design  
Scripting language

**What are designing mediums  
you use? How do they affect  
your design thinking?**





# Link to assessment documents

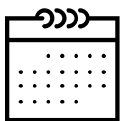
[DG 2021: Live Assessments  
Documents – Mia  
Tedjosaputro](#)



# Week 8 (next week): Install Rhinoceros 3D

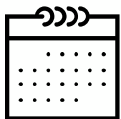
Developed by:  
**Robert McNeel & Associates**

<https://wiki.mcneel.com/rhino/rhinohistory>



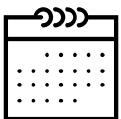
## 1998

RHINO 1.0 RELEASED



## 2018

RHINO 6.0 FOR WINDOWS

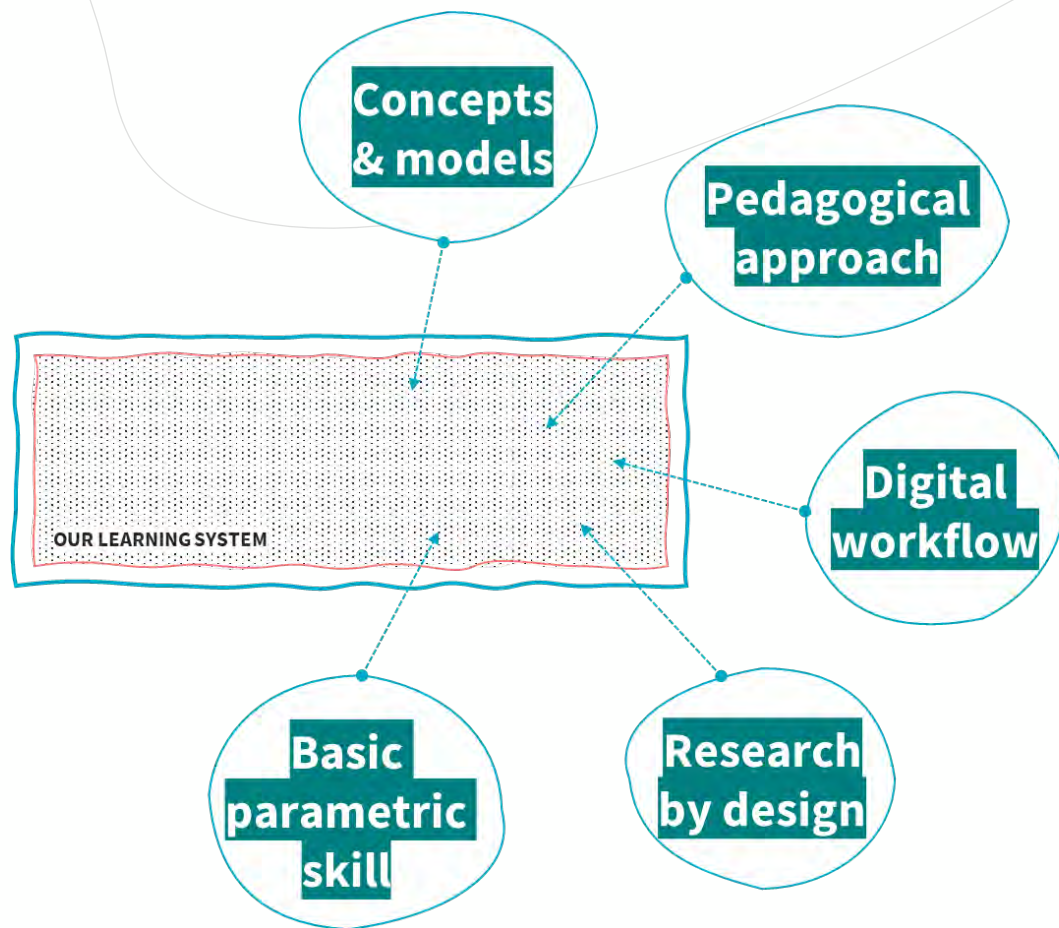


## 2021

RHINO 7.0 FOR WINDOWS



# To sum up, for your assessments



+

## Summary: concepts of design thinking

1. Search of solution space
2. Exploration
3. Emergence
4. Reflection
5. Modification
6. Adaptation
7. Media:
  - Media used
  - Algorithmic design
  - Scripting language

# Re-iterating aims and objectives

- To elicit **evolution of paradigm in design thinking**, starting from pen-and-paper based thinking up to the parametric design thinking.
- To demonstrate **changes** in terms of studying design behaviour and changes in design behaviour itself.
- To provide **contextualisation** of the upcoming assessments.