MASTER THESIS SEMINAR

Introduction

Lecturer:
Sven Schneider

MASTER THESIS

Definition

M.Sc.

= a scientific ~~(or artistic)~~ work for completing your degree.

= a proof of your ability to independently create a scientific ~~(or artistic)~~ work

SCIENTIFIC WORK

Definition

dt.: Wissenschaft = create knowledge

MASTER THESIS AT IUDD

Goal

Creating knowledge for integrated urban development and design

THE VALUE OF SCIENCE

An example from everyday life

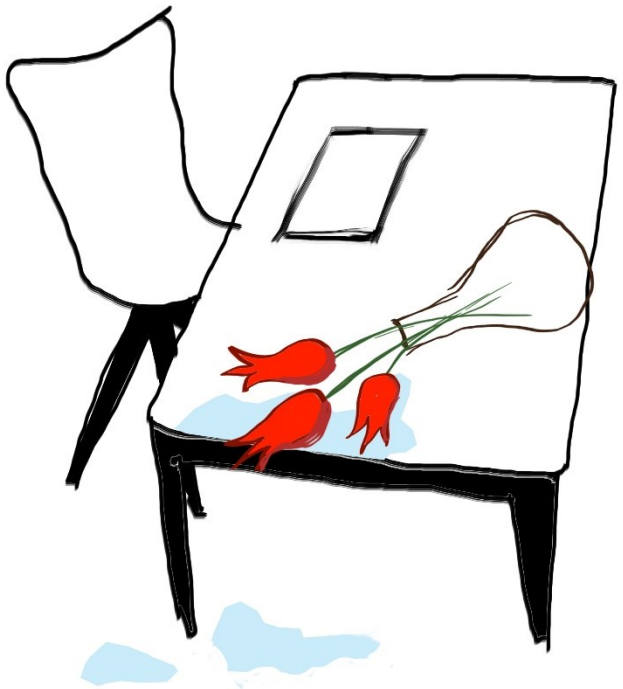
Asgedom (from Ethiopia) is working in an office together with 10 others. It‘s a Friday and his birthday. His collegues gave him a beautiful bouquet.

Idea: Asgedom Haile & Sven Schneider
Drawing: Iuliia Osintseva

Bauhaus-Universität Weimar
IUDD Integrated Urban Development and Design
bauhaus ifex

THE VALUE OF SCIENCE

An example from everyday life



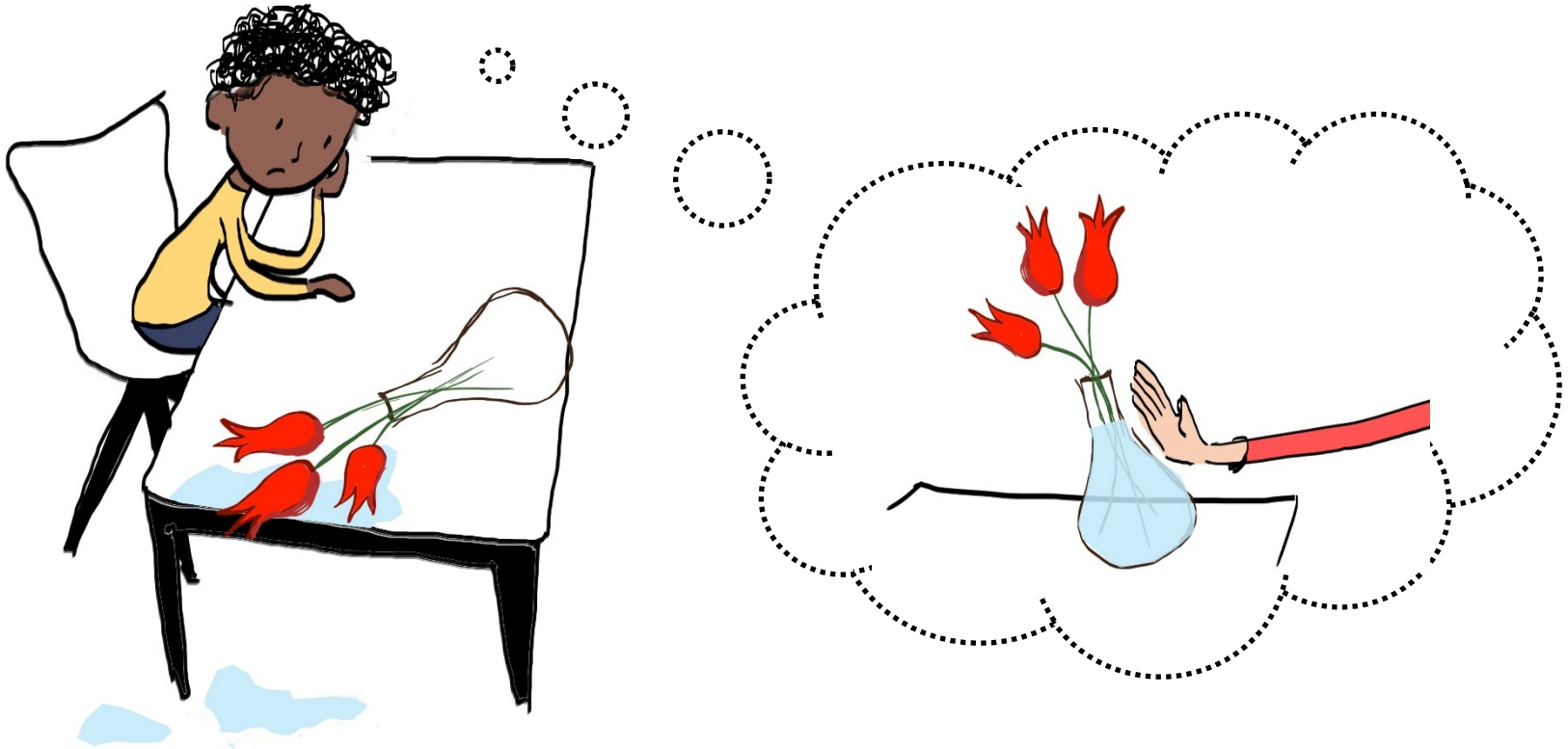
On Monday, Asgedom entered the office and saw the vase with the flowers fallen over!

Idea: Asgedom Haile & Sven Schneider
Drawing: Iuliia Osintseva

THE VALUE OF SCIENCE

An example from everyday life

Asgedom was sad and thought about how this could have happend.



Idea: Asgedom Haile & Sven Schneider
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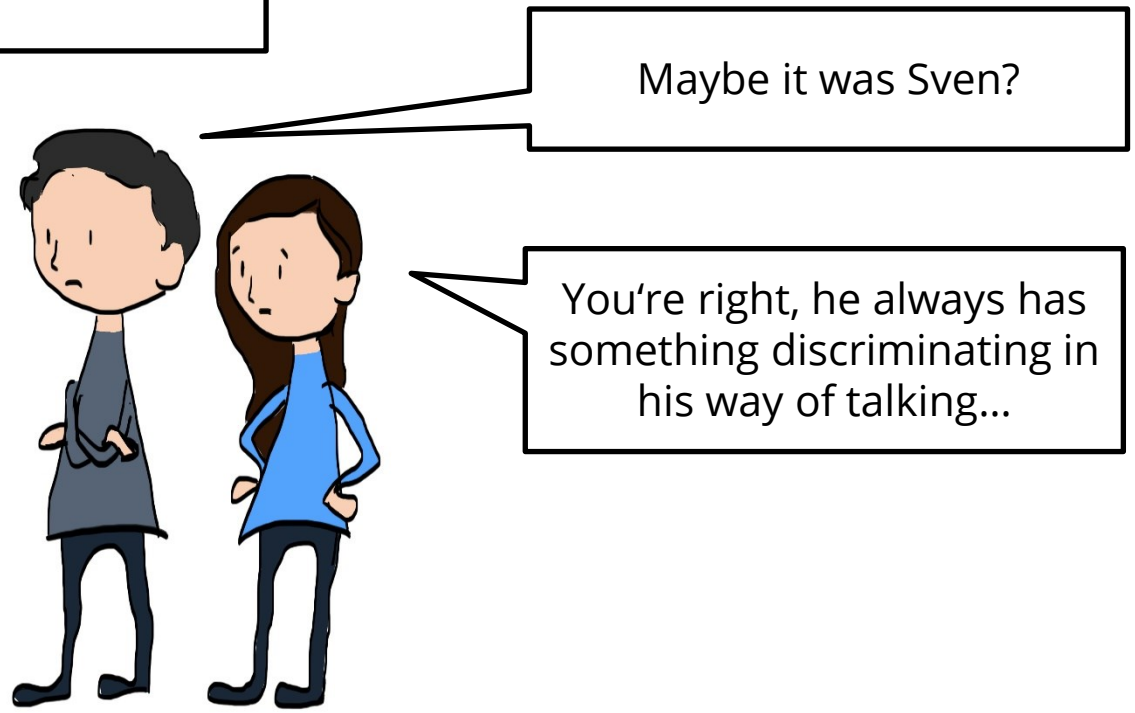
THE VALUE OF SCIENCE

An example from everyday life

Two of his collegues came by and listened to Asgedoms suspicion. Together they thought about who could be so crude...



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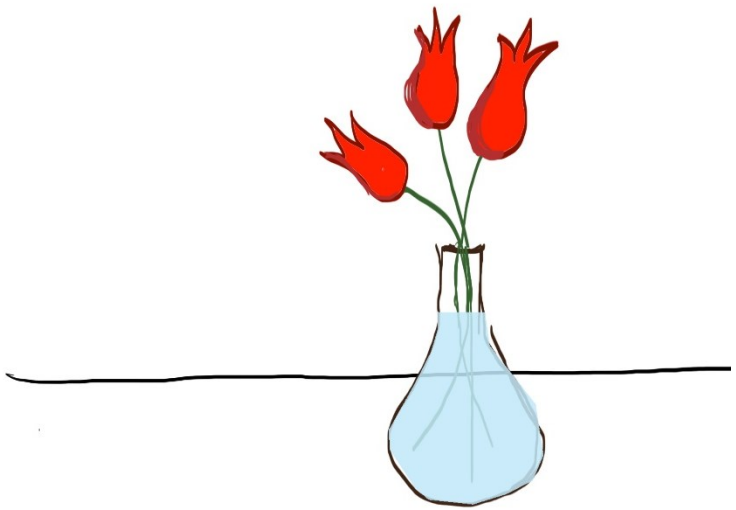
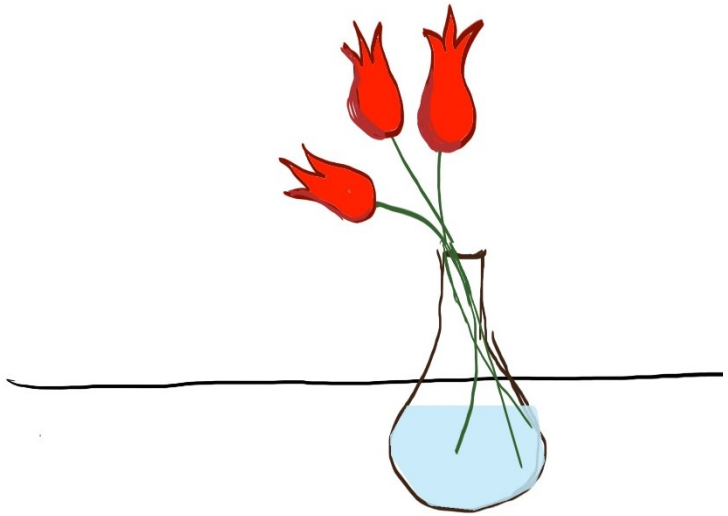
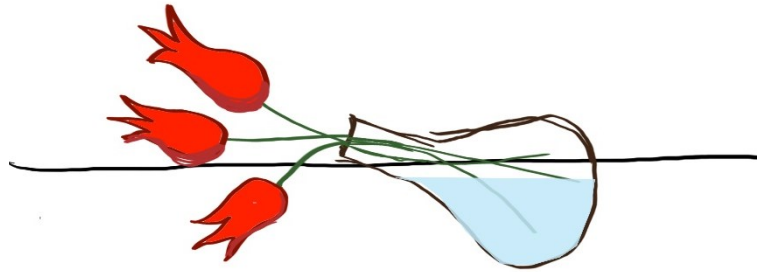
THE VALUE OF SCIENCE

An example from everyday life

What really happend…







1. Water vaporates / Flower soaks it up

2. Because of missing load in the bottom of the vase the whole thing drops

Idea: Asgedom Haile & Sven Schneider
Drawing: Iuliia Osintseva

SCIENCE

Goal: Find general principles how something works

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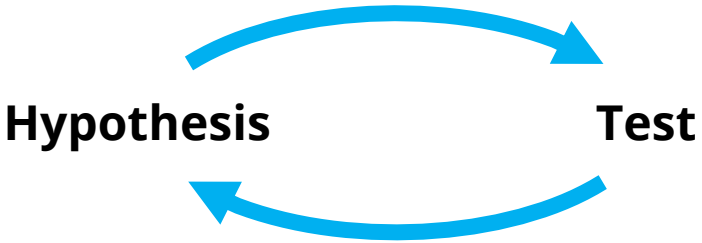

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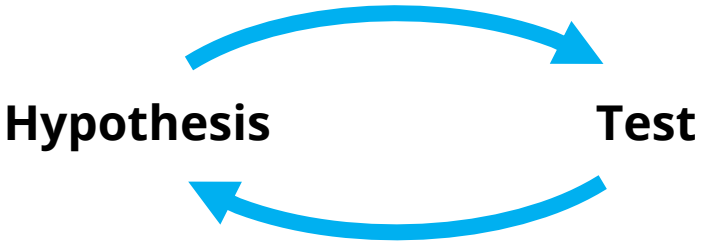
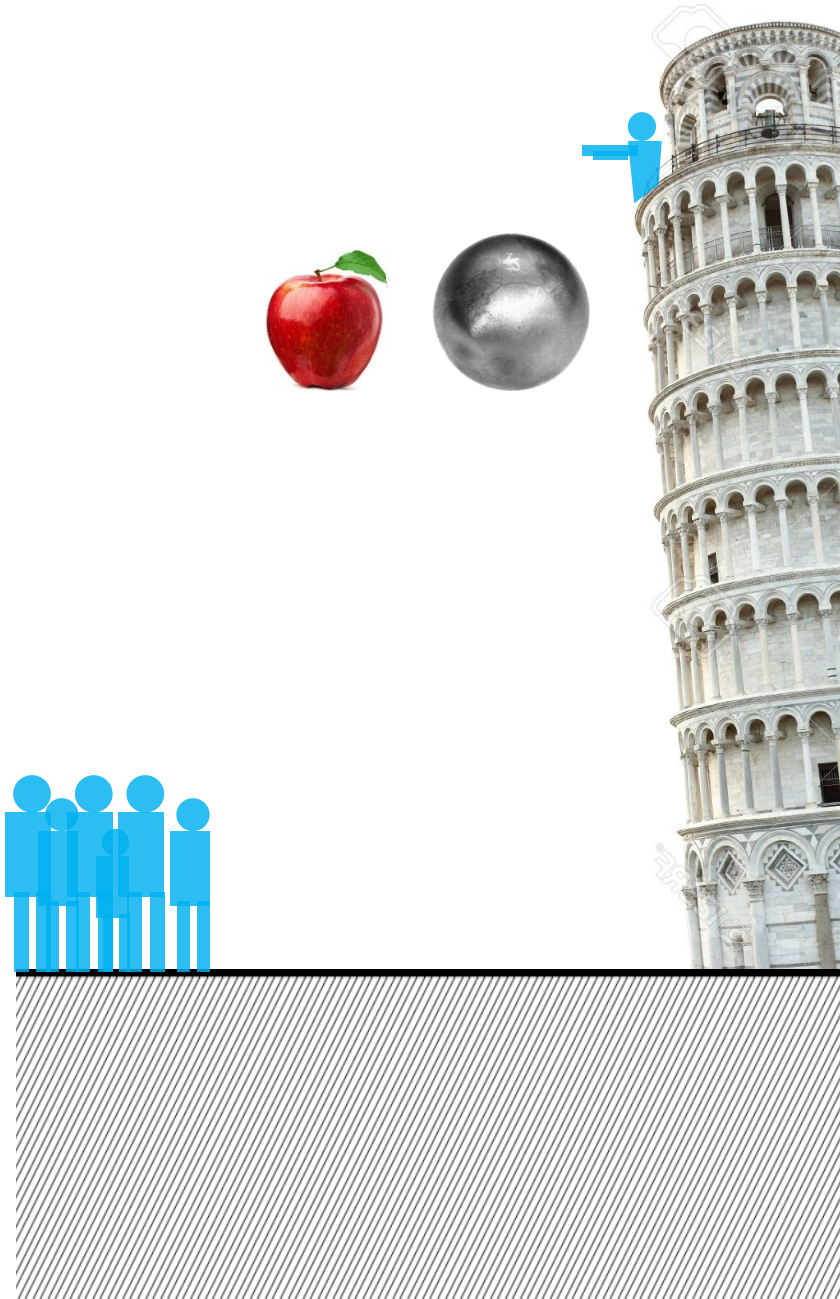
Goal: Find general principles how something works





SCIENCE

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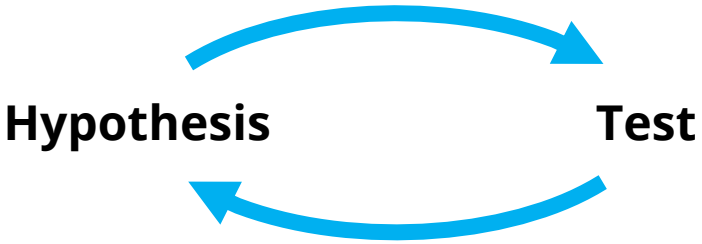
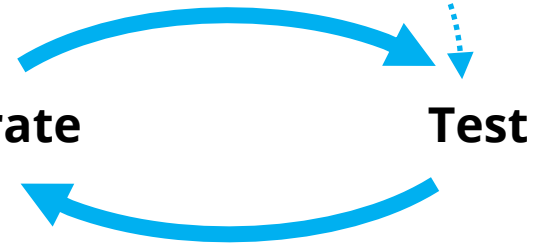


DESIGN

Goal: Find one good solution for one particular problem



can inform

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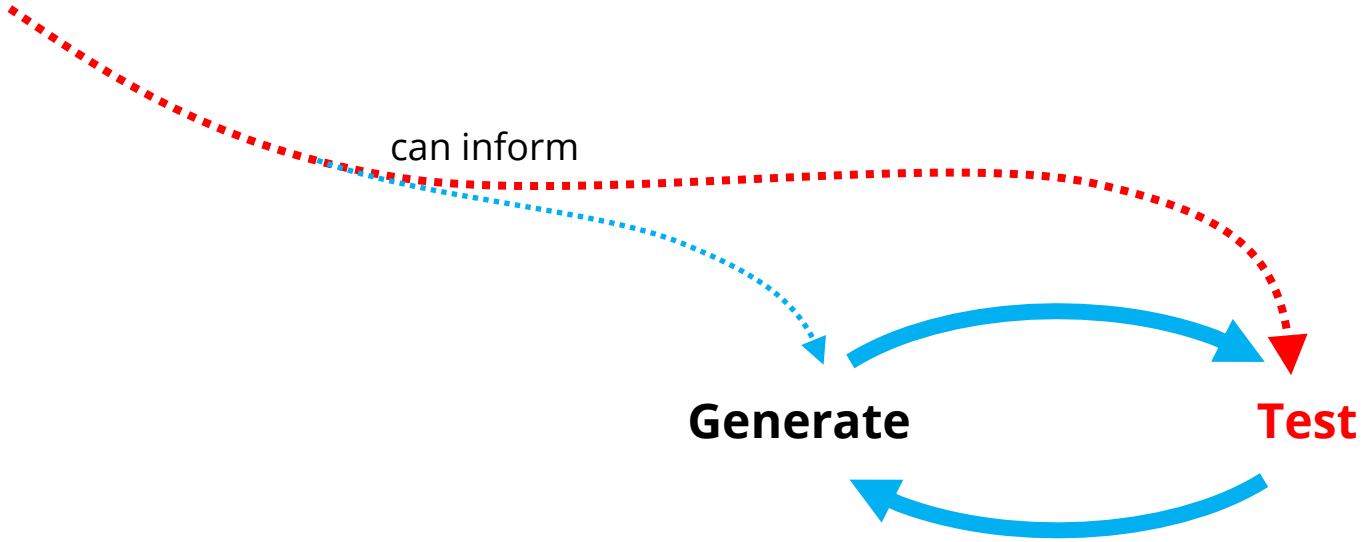
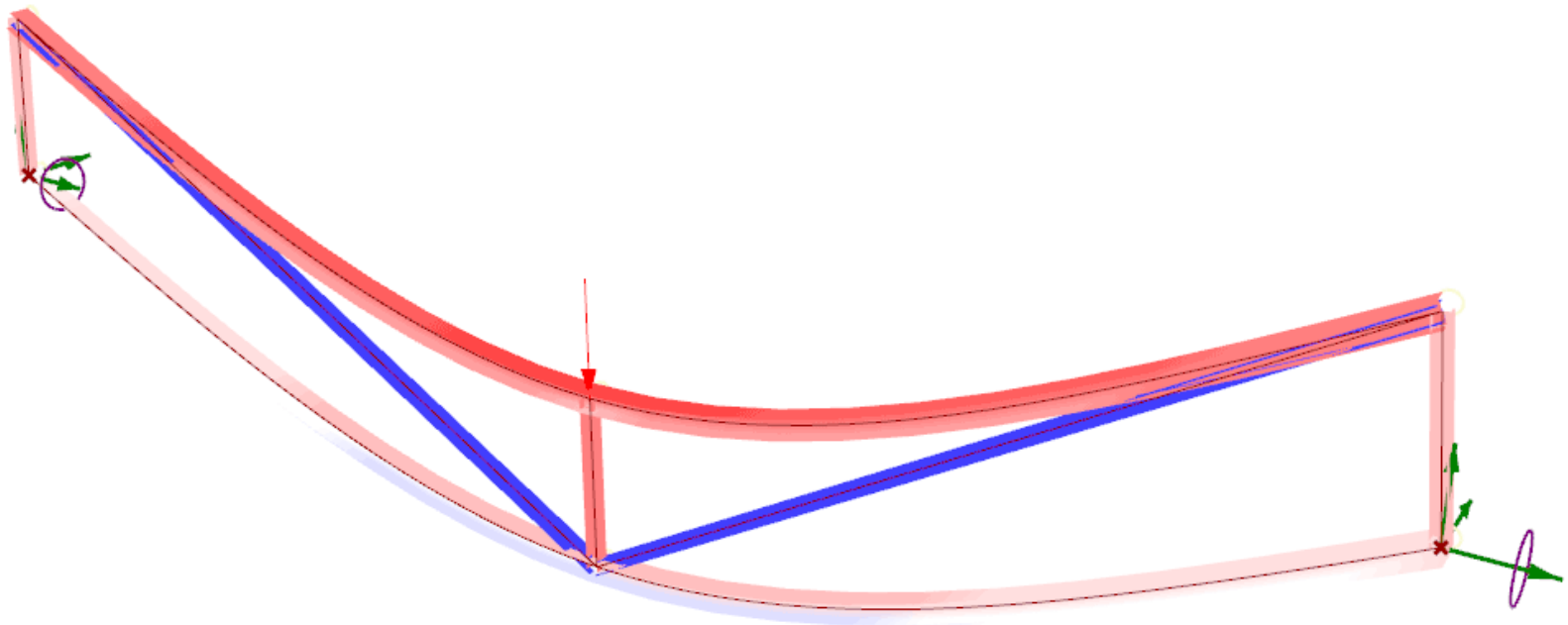


TYPICAL APPLICATION OF SCIENCE IN ARCHITECTURAL DESIGN

Testing the Stability of Structures

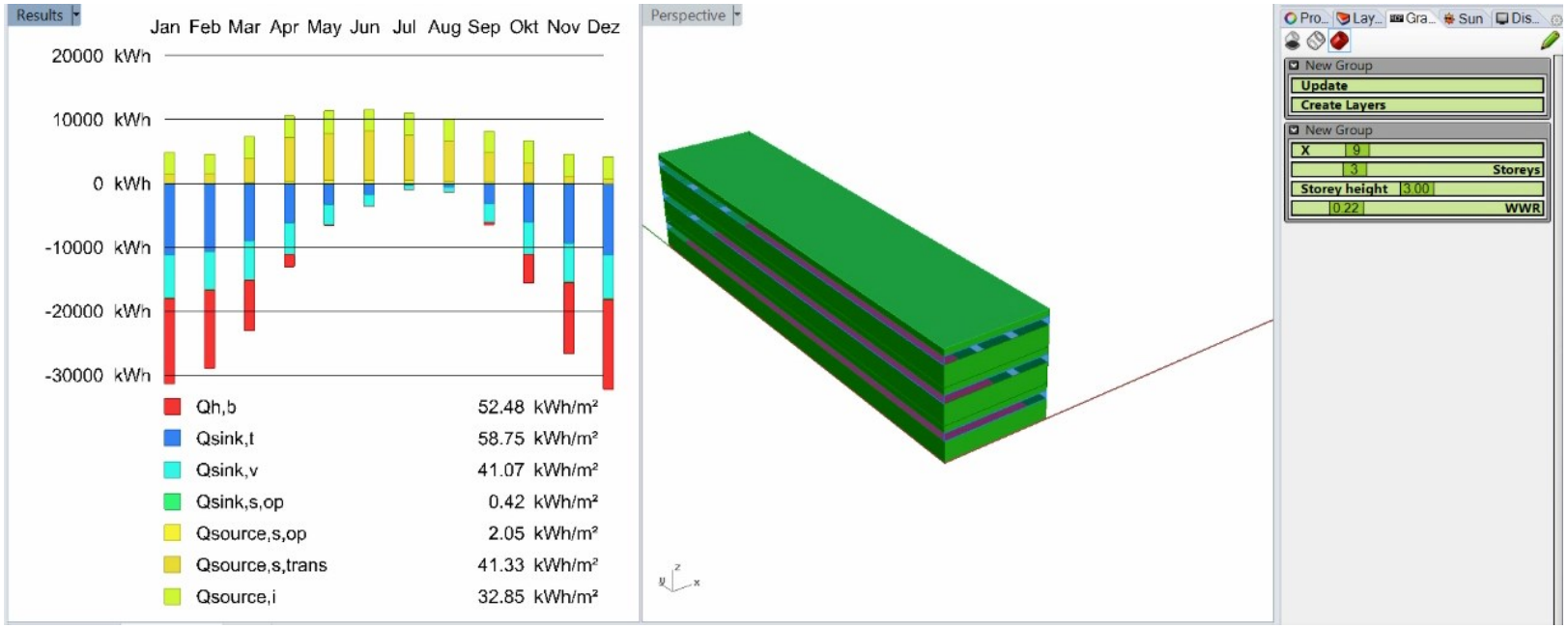


Stresses and Strains in a parametrically defined truss

http://www.karamba3d.com/examples/

TYPICAL APPLICATION OF SCIENCE IN ARCHITECTURAL DESIGN

Testing the Energy Efficiency



Parametric Energy Evaluation

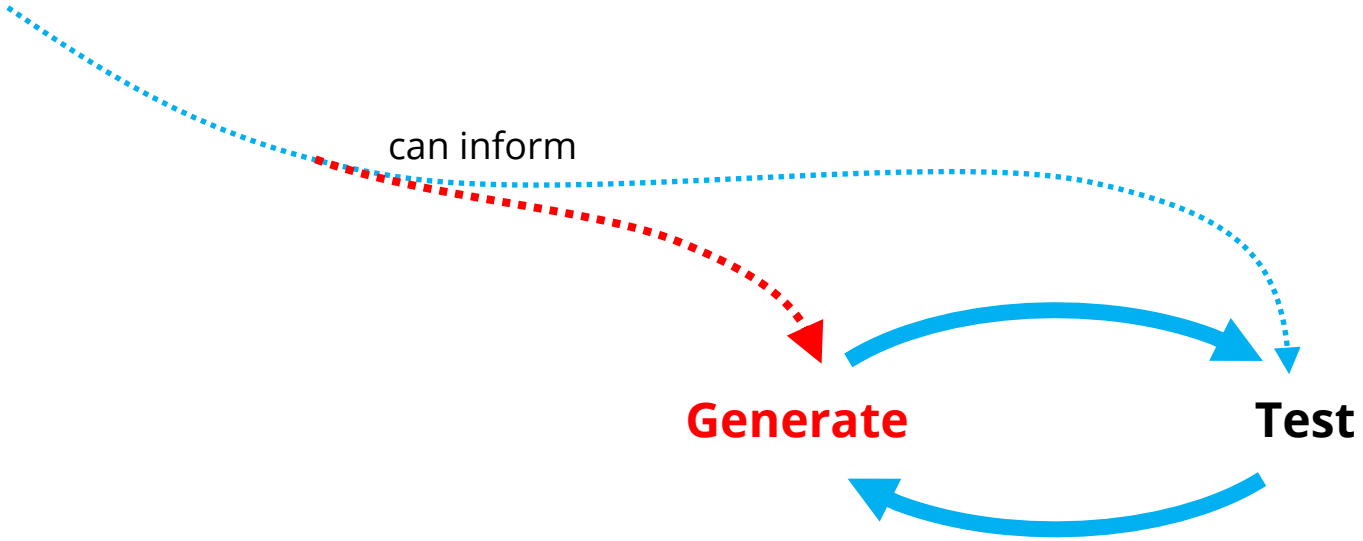
Hollberg, A. (2015)

SCIENCE

Goal: Find general principles how something works

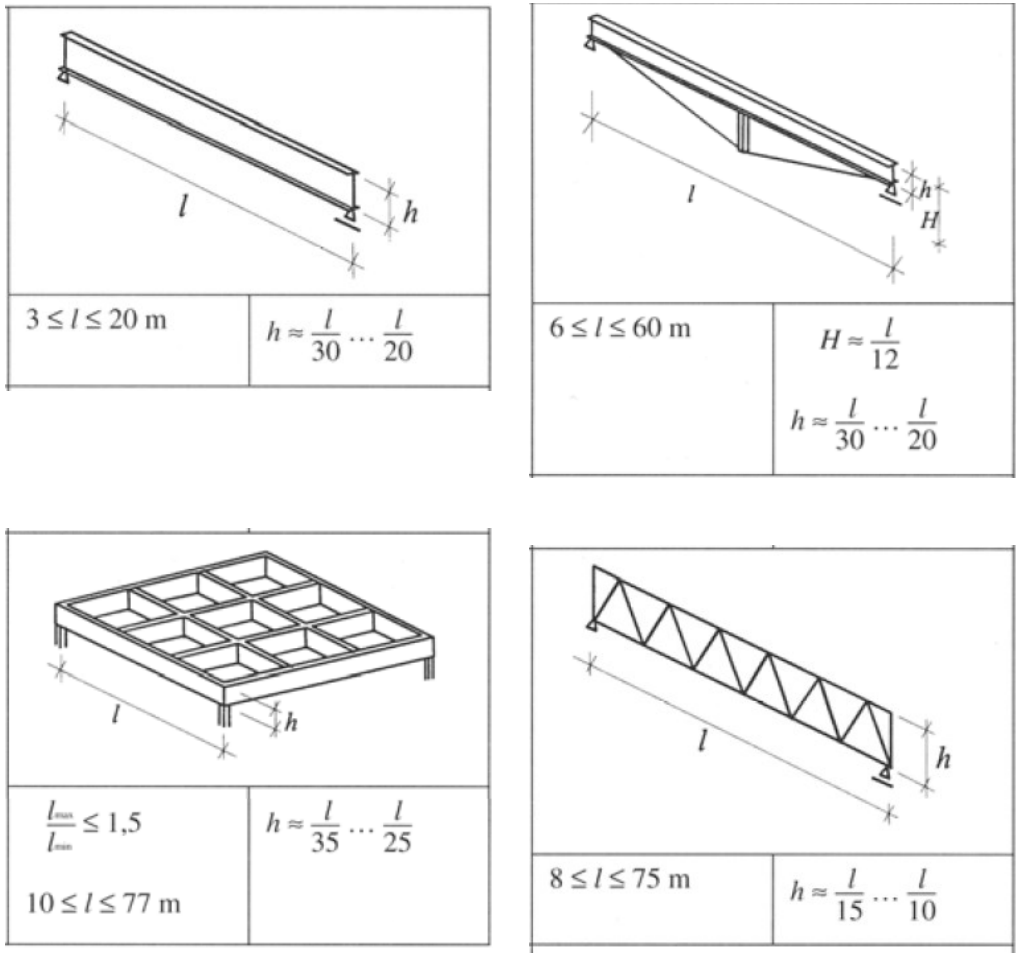
DESIGN

Goal: Find one good solution for one particular problem



TYPICAL APPLICATION OF SCIENCE IN ARCHITECTURAL DESIGN

Rules of Thumb for the generation of stable structures

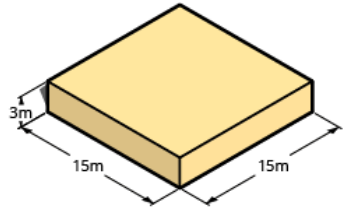


Rules for dimensioning different structures

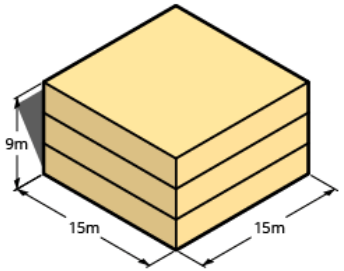
K.-J. Schneider (2012) Bautabellen für Ingenieure

TYPICAL APPLICATION OF SCIENCE IN ARCHITECTURAL DESIGN

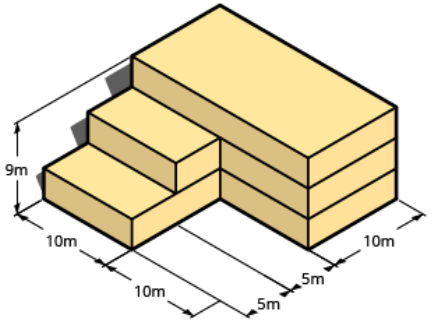
Rules of Thumb for the generation of energy efficient forms



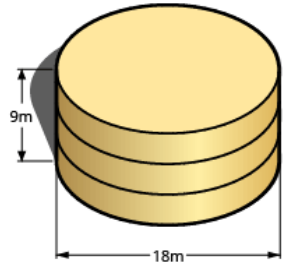
Heated Floor Area (A_{hf})*:	168.75 m²
Envelope Area (A_e):	630 m²
Volume (V):	675 m³
Heat Loss Form Factor(A_e/A_{hf}):	**3.73**
Surface to Volume Ratio(A_e/V):	**0.93 1/m**



Heated Floor Area (A_{hf})*:	506.25 m²
Envelope Area (A_e):	990 m²
Volume (V):	2,025 m³
Heat Loss Form Factor(A_e/A_{hf}):	**1.96**
Surface to Volume Ratio(A_e/V):	**0.49 1/m**



Heated Floor Area (A_{hf})*:	562.5 m²
Envelope Area (A_e):	1,230 m²
Volume (V):	2,250 m³
Heat Loss Form Factor(A_e/A_{hf}):	**2.19**
Surface to Volume Ratio(A_e/V):	**0.55 1/m**



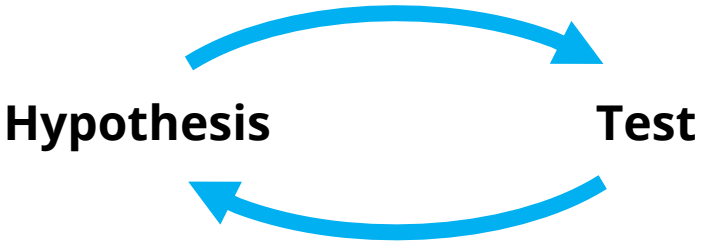
Heated Floor Area (A_{hf})*:	562.5 m²
Envelope Area (A_e):	1,004.65 m²
Volume (V):	2,250 m³
Heat Loss Form Factor(A_e/A_{hf}):	**1.79**
Surface to Volume Ratio(A_e/V):	**0.45 1/m**

The smaller the surface-to-volume ration the less heat loss

https://modelur.eu/use-form-factor-to-reduce-energy-consumption-of-buildings/

SCIENCE

Goal: Find general principles how something works



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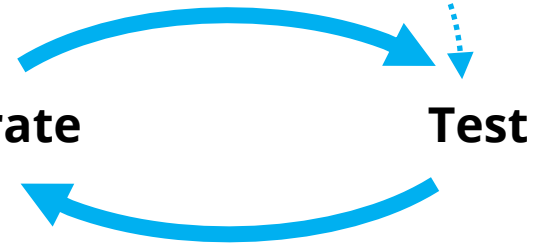

can inform

DESIGN WITHOUT SCIENCE

The story of the „Schildbürger“

The Schildbürger carry the light into the new townhall

http://www.internet-maerchen.de/maerchen/schild02.htm

DESIGN WITHOUT SCIENCE

The story of the „Schildbürger“

„If you cannot read,
you cannot write.“

The Schildbürger carry the light into the new townhall

http://www.internet-maerchen.de/maerchen/schild02.htm

SCIENTIFIC WORK

Definition

$$= \textit{create knowledge}$$

SCIENTIFIC WORK

Definition

= create knowledge

documentation = written thesis

(includes the why, how & what)

SCIENTIFIC WORK ≠ SCIENTIFIC WRITING

Definition

$= \textbf{\textit{create}}\ \textit{knowledge}$

80%

20%

documentation = written thesis

(includes the why, how & what)

MASTER THESIS AT IUDD

Three types of Master Theses

SCIENCE

Goal: Find unsiversal laws
for understanding the world

DESIGN

Goal: Find one good solution for
one particular problem

MASTER THESIS AT IUDD

Three types of Master Theses

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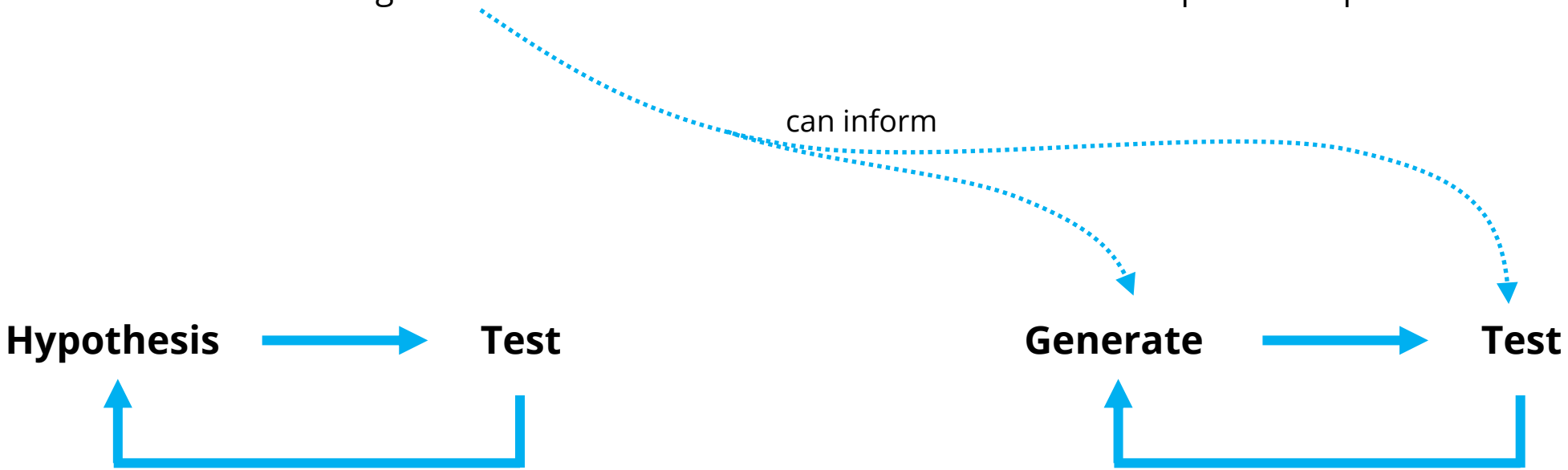
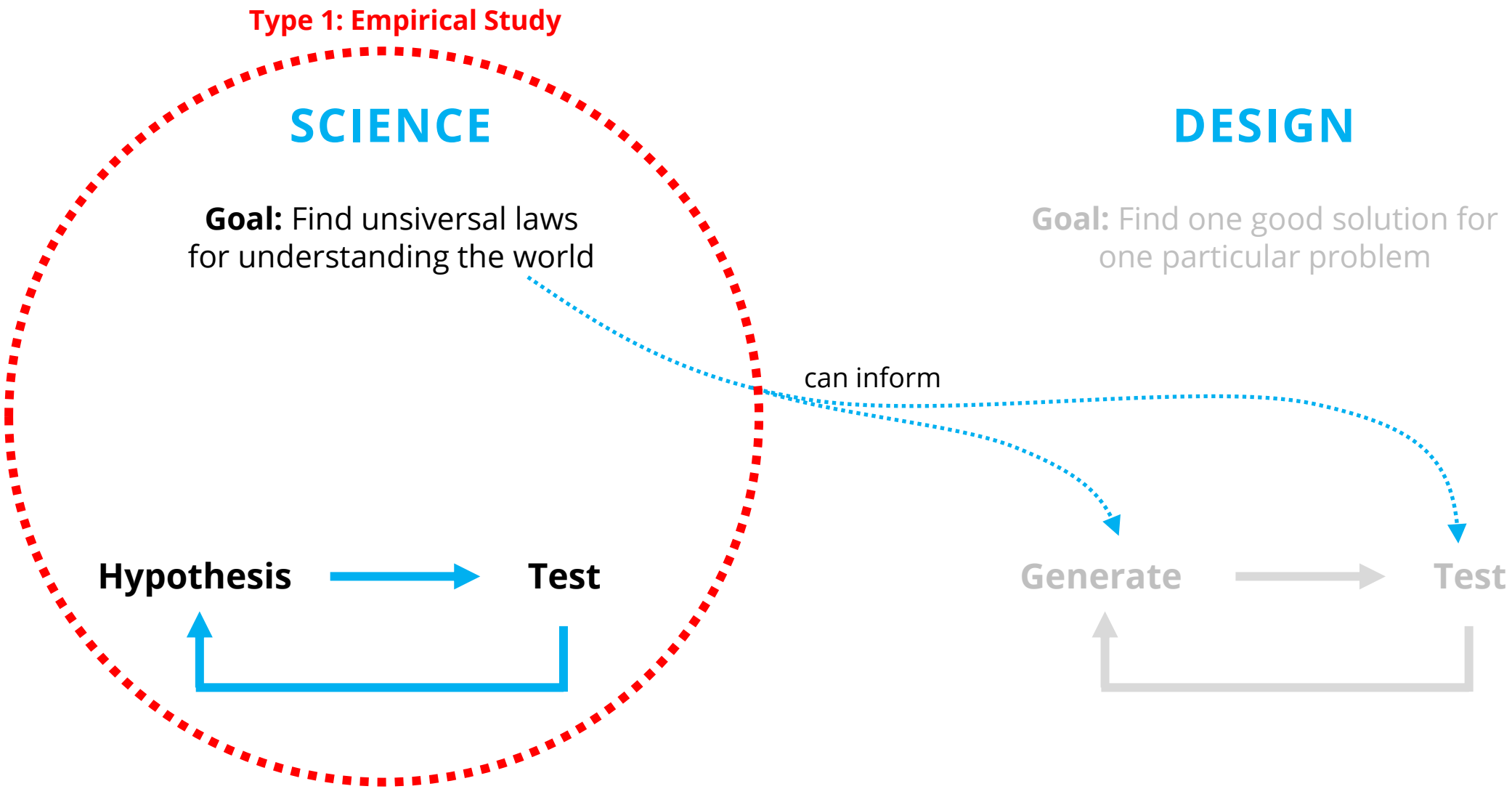


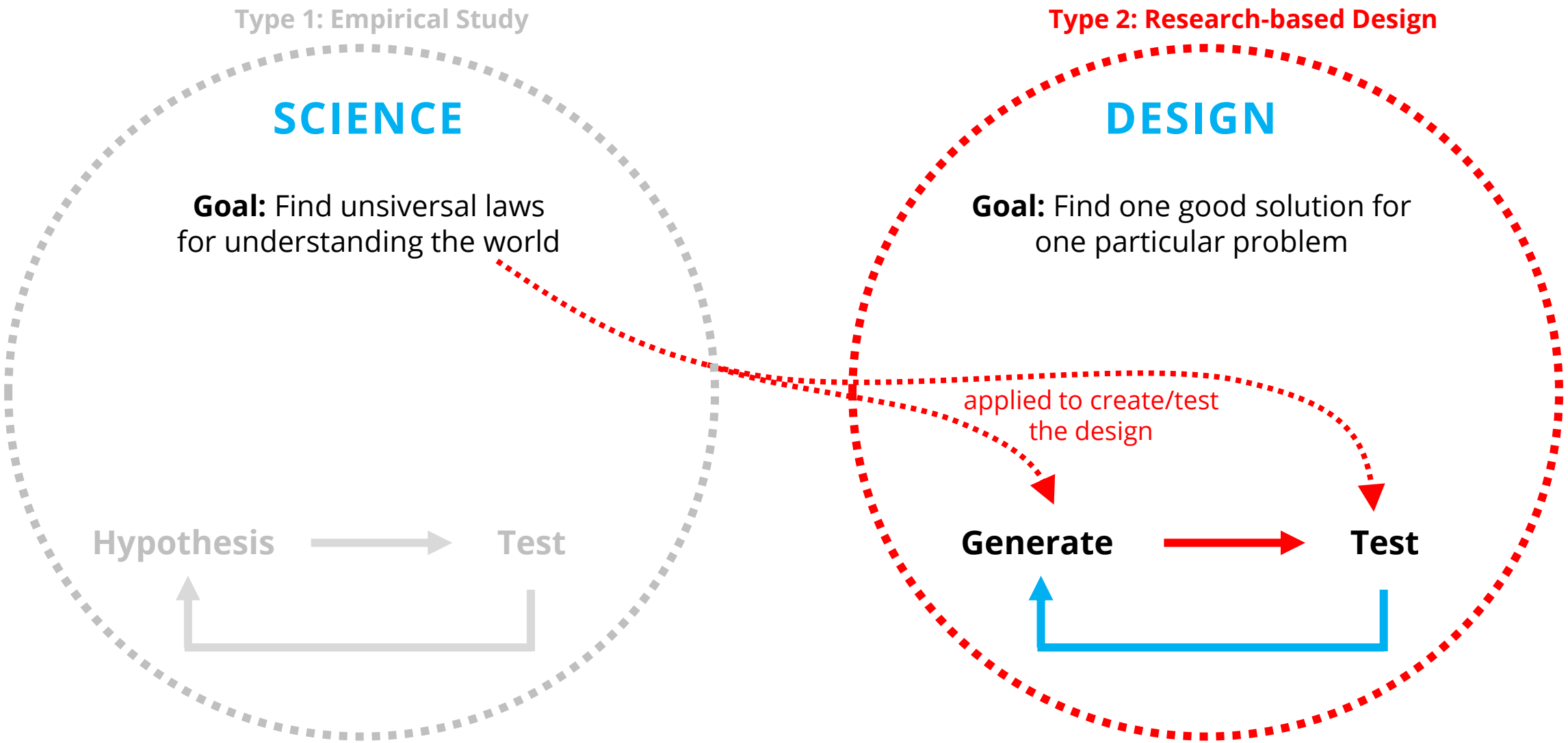
MASTER THESIS AT IUDD

Three types of Master Theses



MASTER THESIS AT IUDD

Three types of Master Theses



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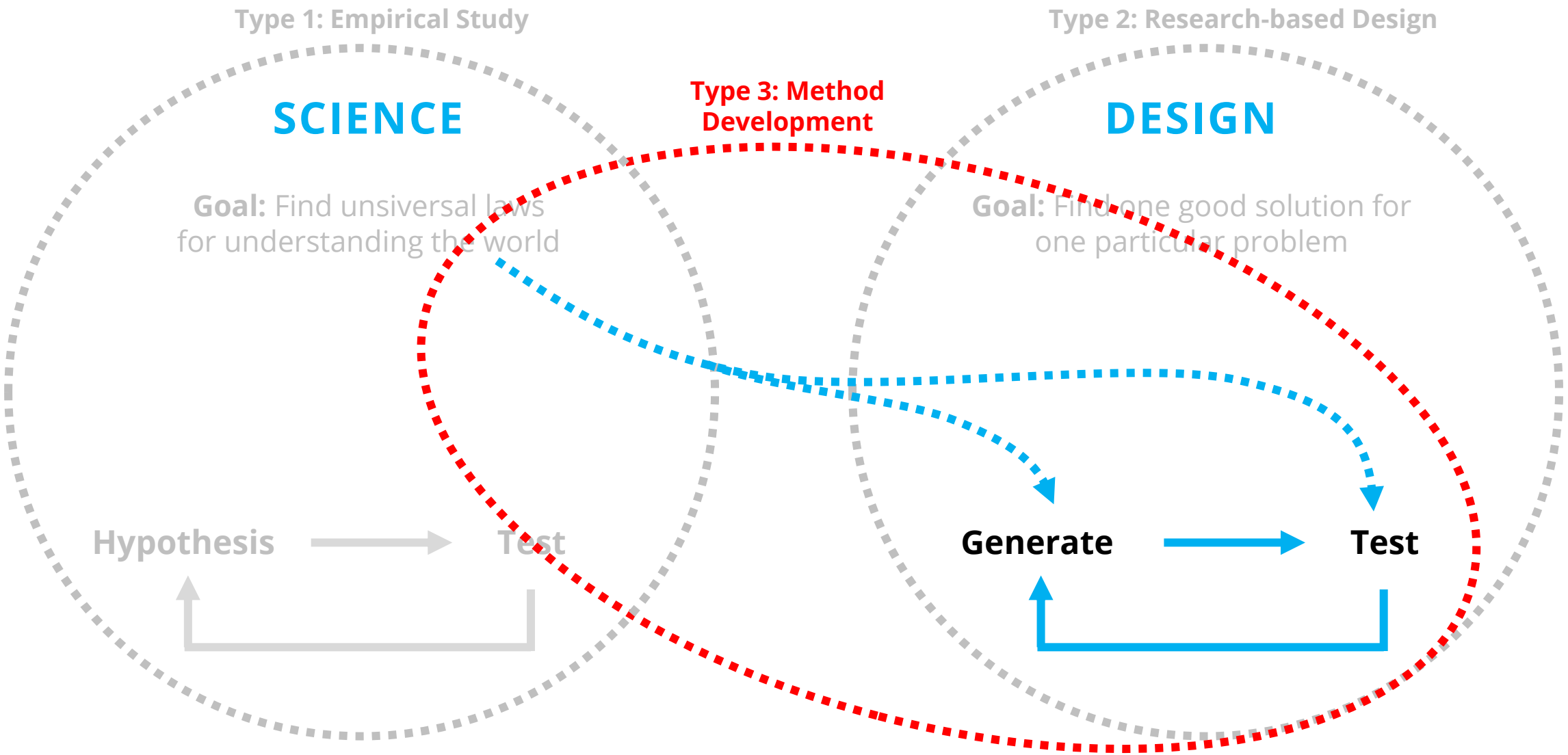
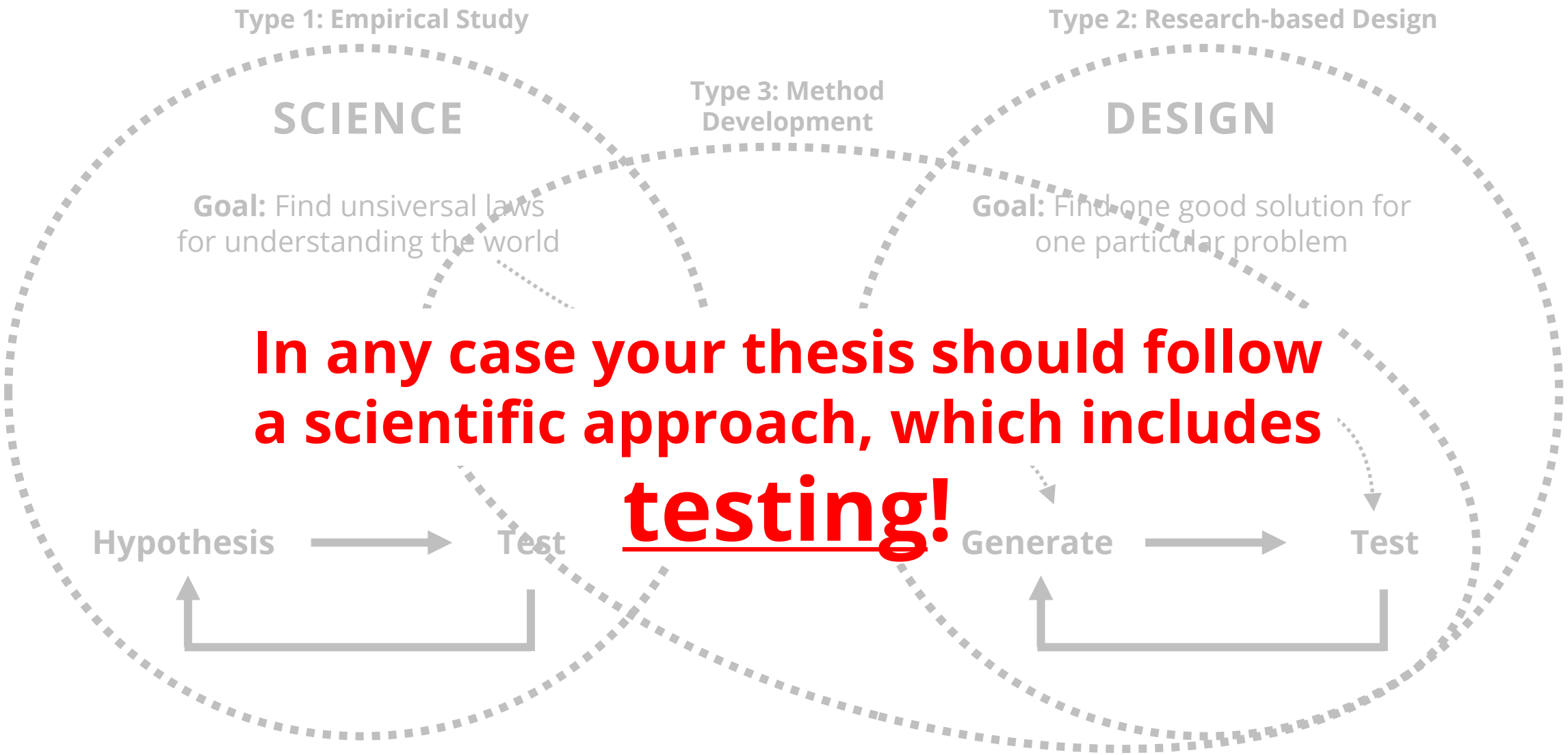
Three types of Master Theses



MASTER THESIS AT IUDD

Three types of Master Theses



In any case your thesis should follow a scientific approach, which includes testing!

QUESTION

Which type of Master Thesis would you currently prefer?

- **1. Empirical Study** → Creating new knowlege for IUDD
- **2. Research-based Design** → Application of scientific methods to IUDD
- **3. Method Development** → Creating new methods/tools for supporting IUDD

MASTER THESIS SEMINAR

Knowledge & Relevance

Lecturer:
Sven Schneider

KNOWLEDGE

Approaching a definition

„in this room there are 21 chairs and 15 tables“

= information, no knowledge

KNOWLEDGE

Approaching a definition

The maximally placeable number of chairs and tables proportionally increases with the floor area of a room by factor X.

= knowledge

useful for decision making

KNOWLEDGE

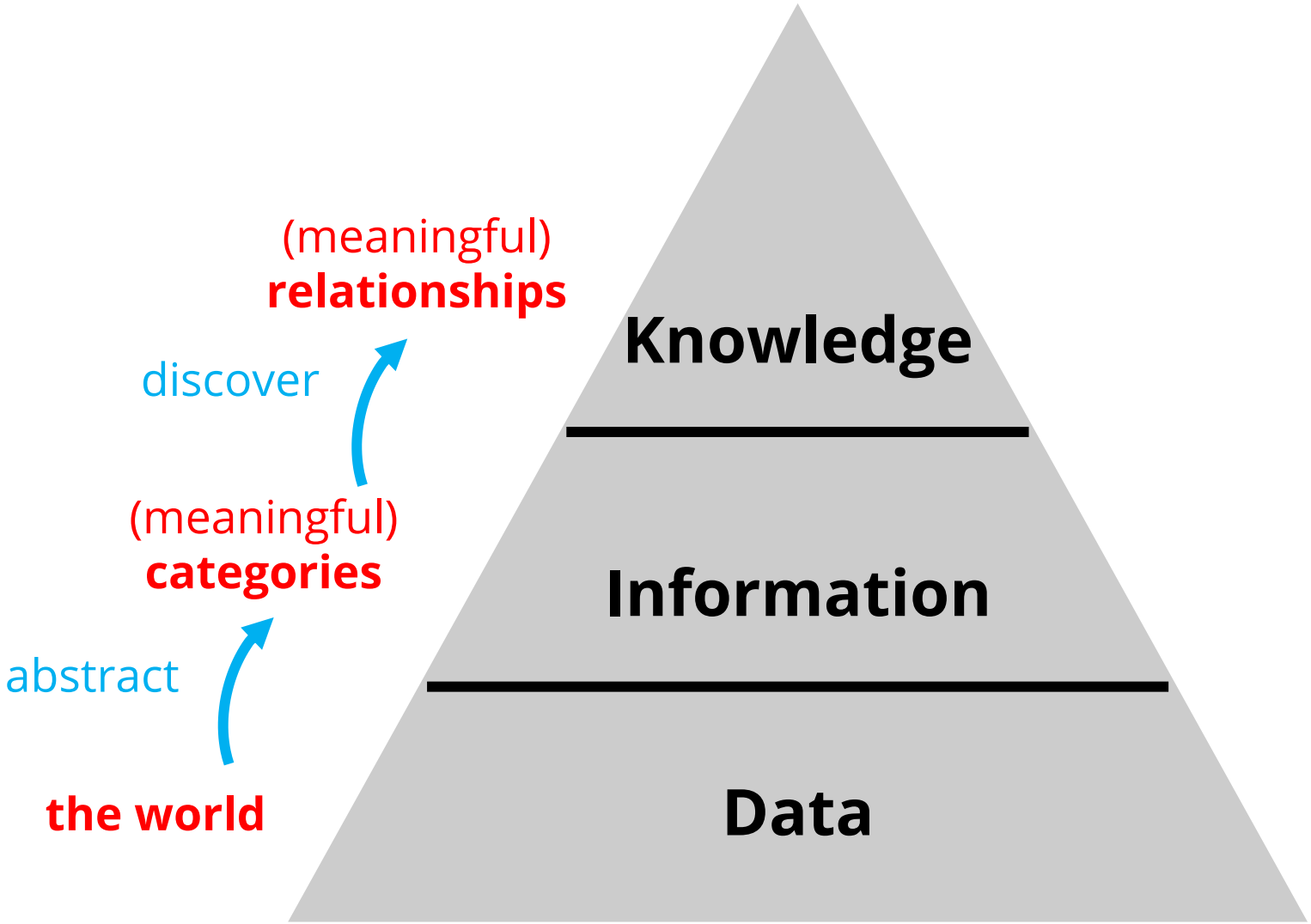
Approaching a definition

The maximally placeable number of chairs and tables proportionally increases with the floor area of a room by factor X.

Relationship

KNOWLEDGE

Approaching a definition



Are you still counting tables or are you already creating knowledge?

Discuss in groups of two,

- if the goal of the research stated in your abstract is creating knowledge and
- in how far this knowledge might advance the existing body of knowledge!

MASTER THESIS AT IUDD

Goal

Creating knowledge for integrated urban development and design

RELEVANCE

Who cares about your research?

Creating knowledge for integrated urban development and design

defines your target group

RELEVANCE

Who cares about your research?

„Investigating the relationship between the curvature of bananas on the transportation costs“

Klimapolitik » EU beschließt Begradigung von Bananen und reduziert damit CO2 Ausstoß

EU beschließt Begradigung von Bananen und reduziert damit CO2 Ausstoß

3. August 2017 von Horst Teichgut

Die EU-Kommission möchte in Zukunft, dass nur noch gerade Bananen importiert werden. Aufgrund erhöhter Packdichte könne der CO2-Ausstoß so bei den langen Flugreisen deutlich gesenkt werden. Zu diesem Zweck werden auch Fördergelder für gentechnisch optimierte Bananen bereitgestellt.

RELEVANCE

Who cares about your research?

= no urban design related parameter

„Investigating the relationship between the curvature of bananas on the transportation costs“

= relevant performance criteria

RELEVANCE

Who cares about your research?

= urban design related parameter

„Investigating the relationship between the street network and the curvature of bananas “

= not a relevant performance criteria

RELEVANCE

Who cares about your research?

= urban design related parameter

„Investigating the relationship between the street network and transportation costs“

= relevant performance criteria

TASK

Discuss in groups of two the **relevance** of the research questions of the abstracts you read!

Guiding Questions:

- For whom is the knowledge that is being created interesting?
- What can be done with this knowledge?
- In how far does it advance urban development & design?