

Models as Forms, Models as Concepts

Part 2

Øyvind Eide

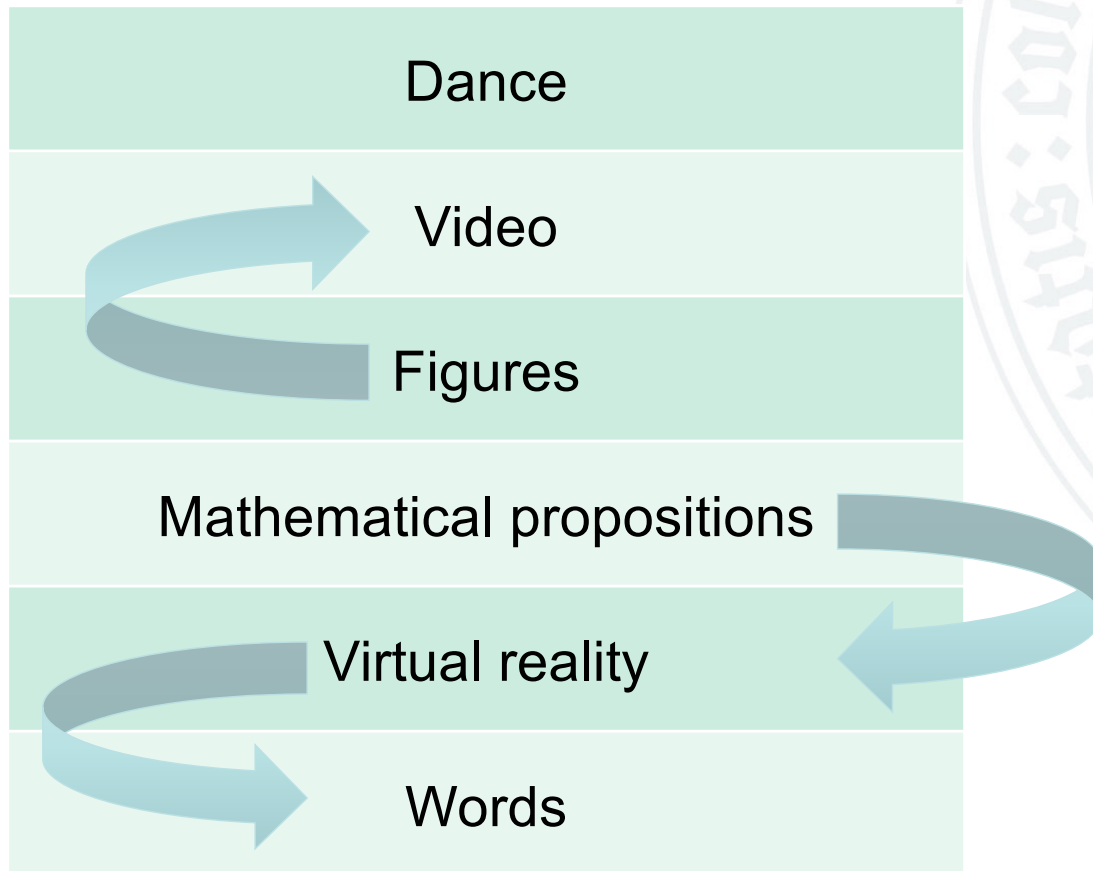
@oeide

oeide@uni-koeln.de

www.oeide.no



What is a model?



There is no general hierarchy

no “more” or “better” type of model at the top

There may still be relationships

a model based on another abstraction/operationalisation of



E28 Conceptual Object

This class comprises non-material products of our minds and other human produced data that have become objects of a discourse about their identity, circumstances of creation or historical implication. The production of such information may have been supported by the use of technical devices such as cameras or computers.

Characteristically, instances of this class are created, invented or thought by someone, and then may be documented or communicated between persons. Instances of E28 Conceptual Object have the ability to exist on more than one particular carrier at the same time, such as paper, electronic signals, marks, audio media, paintings, photos, human memories, etc.

They cannot be destroyed. They exist as long as they can be found on at least one carrier or in at least one human memory. Their existence ends when the last carrier and the last memory are lost. (*CIDOC CRM 6.2.3: 2018*)

Shared conceptualisations

- Meaning can only be negotiated in the human mind
- Must link conceptual objects to shared objects
 - For human to human communication, but also
 - For a meaningful semantic web
- Based on agreed upon meaning between humans
 - With formal ontologies this enables meaningful automatic reasoning



Knowledge

Model

Theoretical model
model for

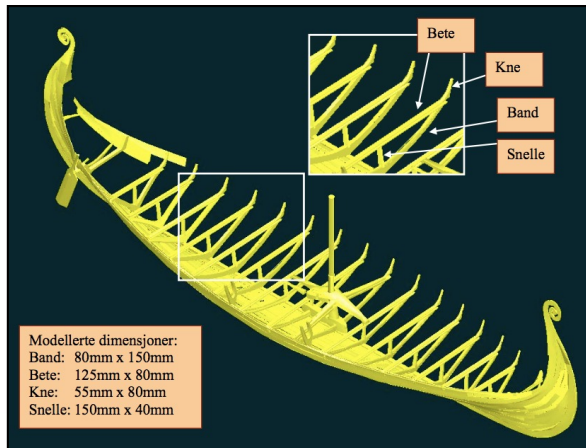
Empirical model
model of

*comparison
calibration
verification*



Generating
knowledge

*comparison
evaluation*



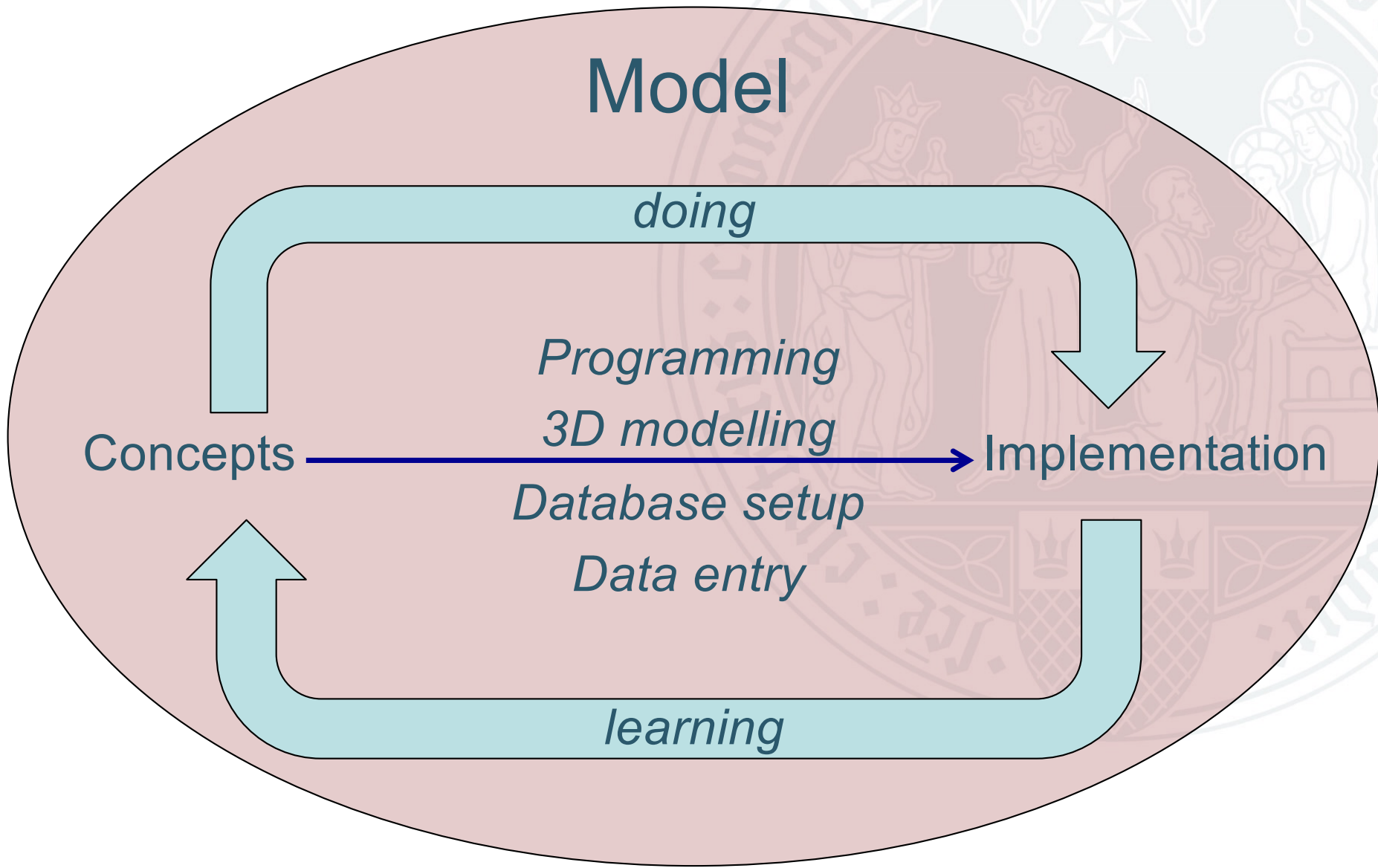
created object



modelled object

The creative tension between
concepts and implementation
happens also *within* the
modelling process

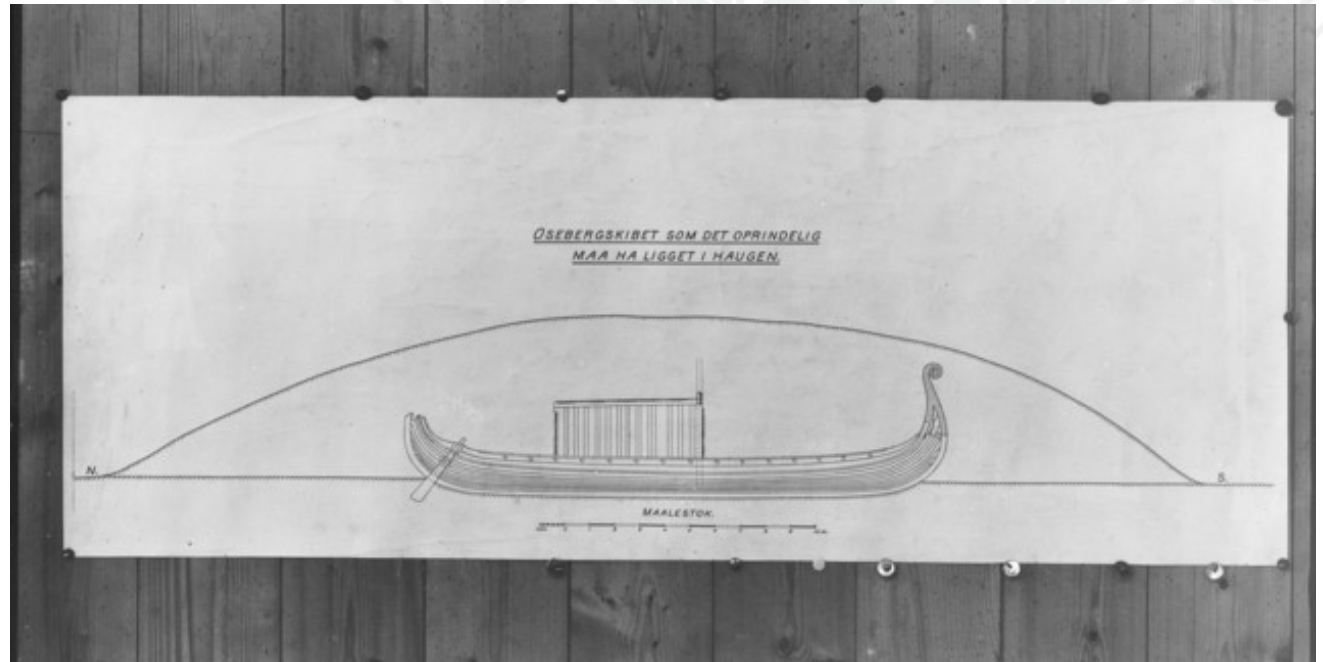




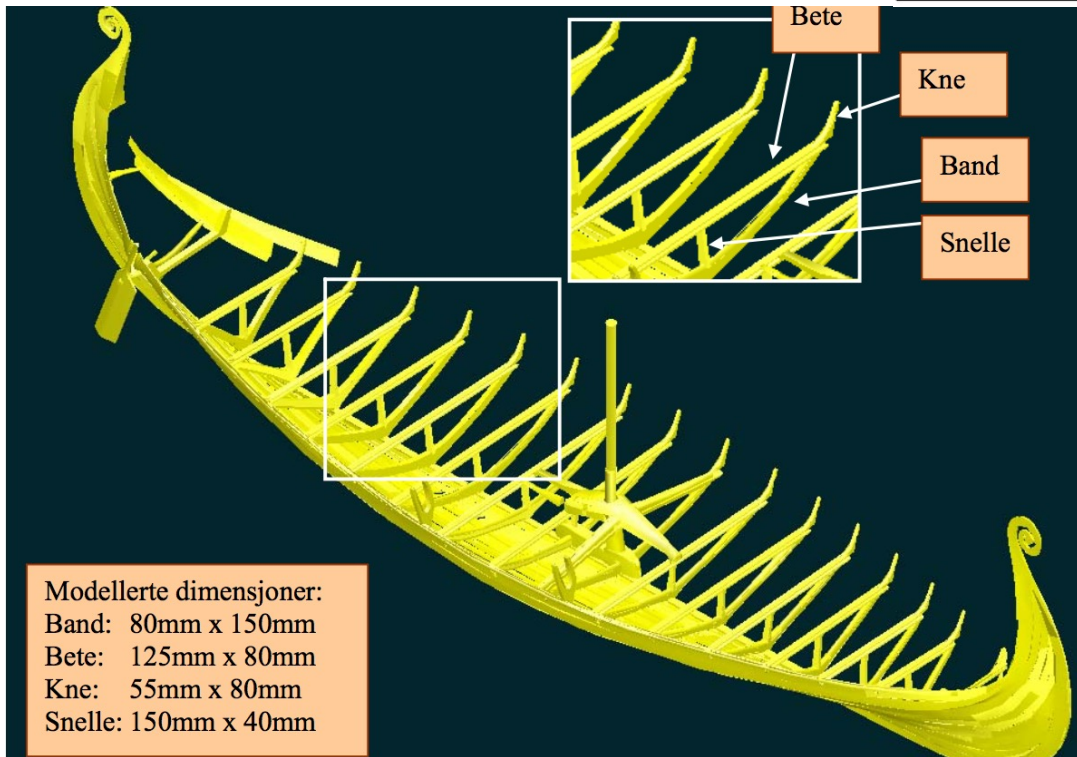
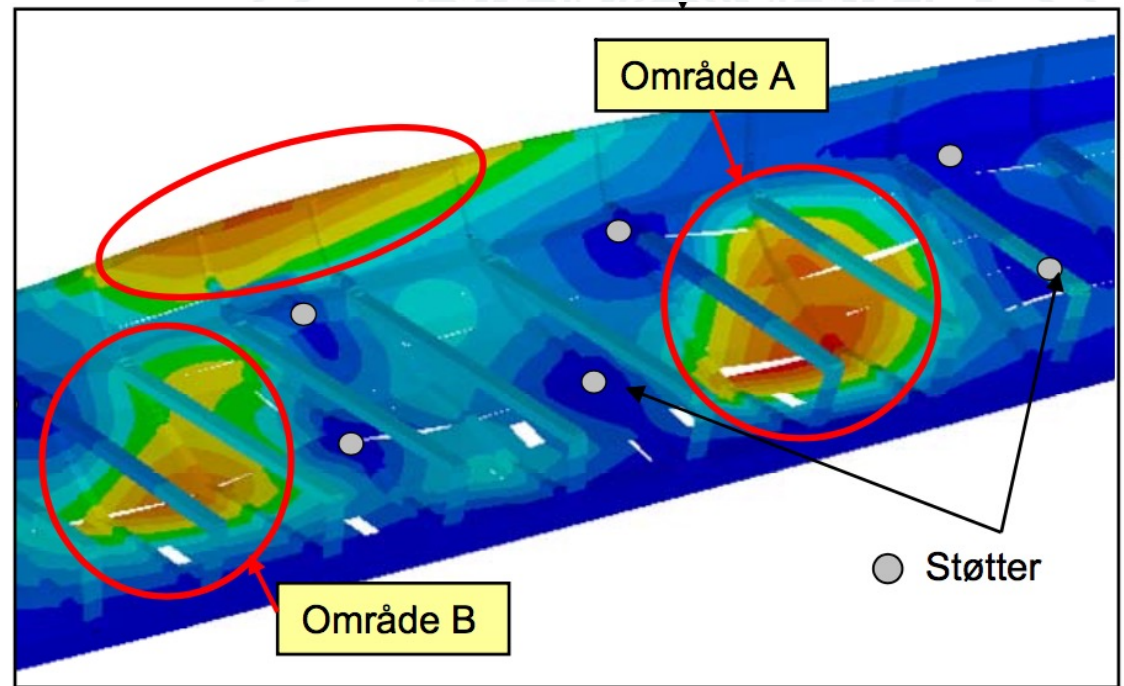
The creative tension between
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Oseberg



Oseberg



$$h(x, y, z) = |I_0|^2 + 2|I_1|^2 + |I_2|^2$$

$$I_0(x, y, z) = \int_0^\alpha B_0(\theta, x, y, z) \left(t_s^{(1)} t_s^{(2)} + t_p^{(1)} t_p^{(2)} \frac{1}{n_s} \sqrt{n_s^2 - n_i^2 \sin^2 \theta} \right) d\theta$$

$$I_1(x, y, z) = \int_0^\alpha B_1(\theta, x, y, z) \left(t_p^{(1)} t_p^{(2)} \frac{n_i}{n_s} \sin \theta \right) d\theta$$

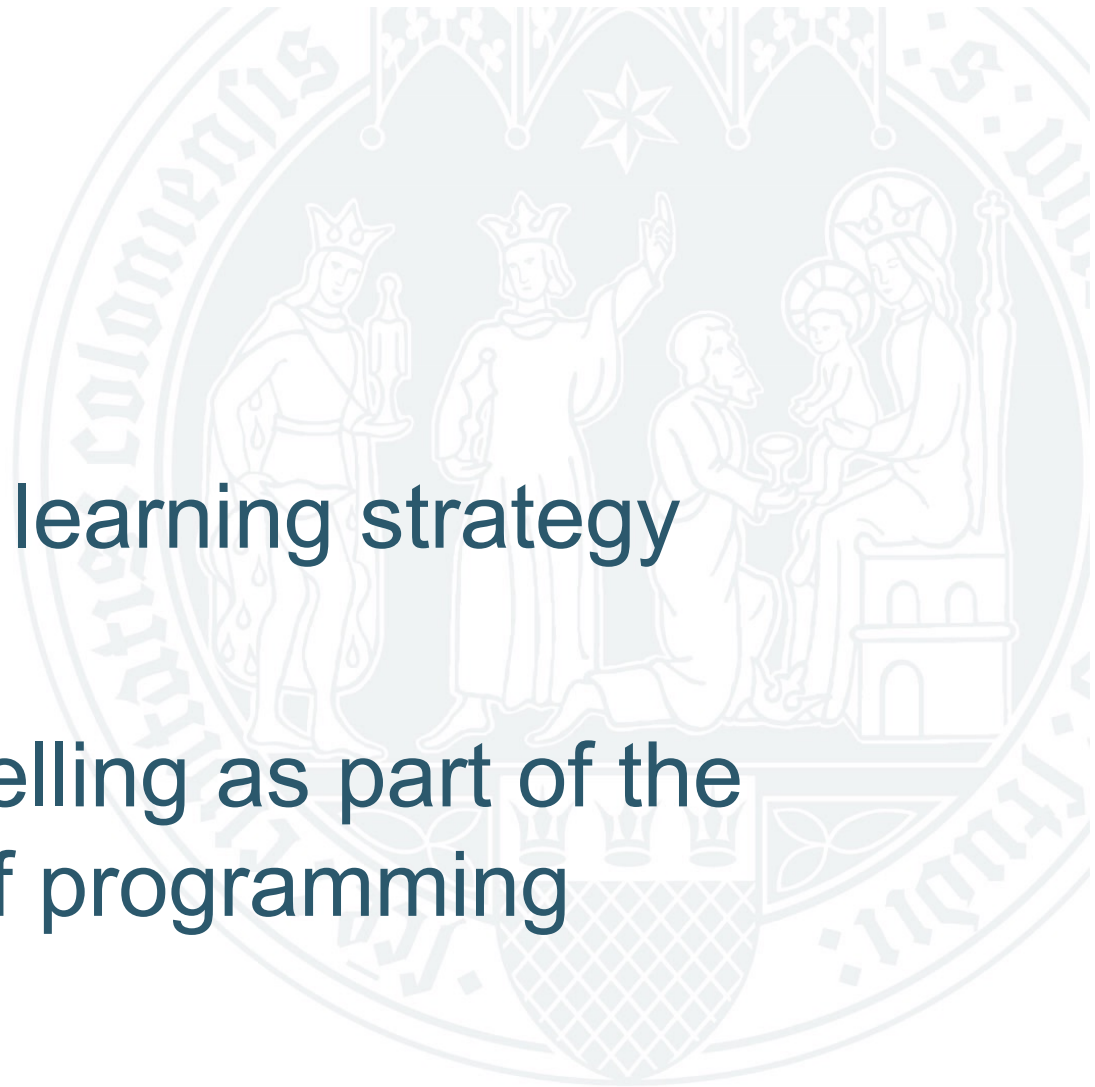
$$I_2(x, y, z) = \int_0^\alpha B_2(\theta, x, y, z) \left(t_s^{(1)} t_s^{(2)} + t_p^{(1)} t_p^{(2)} \frac{1}{n_s} \sqrt{n_s^2 - n_i^2 \sin^2 \theta} \right) d\theta$$

$$B_m(\theta, x, y, z) = \sqrt{\cos \theta} \sin \theta J_m(k \sqrt{x^2 + y^2} n_i \sin \theta) e^{jW(\theta)}$$

$$W(\theta) = k \left\{ t_s \sqrt{n_s^2 - n_i^2 \sin^2 \theta} + t_i \sqrt{n_i^2 - n_i^2 \sin^2 \theta} - t_i^* \sqrt{n_i^{*2} - n_i^2 \sin^2 \theta} + \right. \\ \left. + t_g \sqrt{n_g^2 - n_i^2 \sin^2 \theta} - t_g^* \sqrt{n_g^{*2} - n_i^2 \sin^2 \theta} \right\}$$

This is also a learning strategy

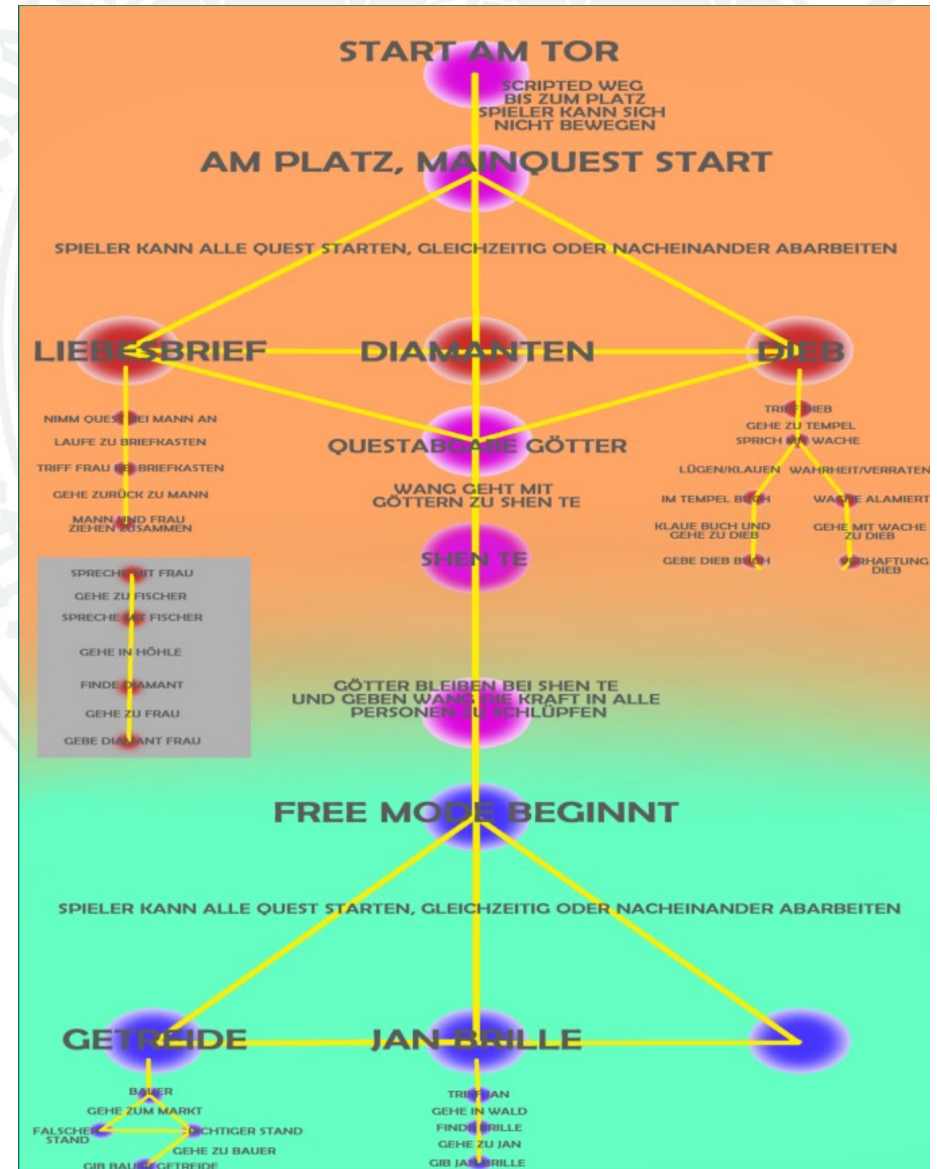
We teach modelling as part of the
teaching of programming



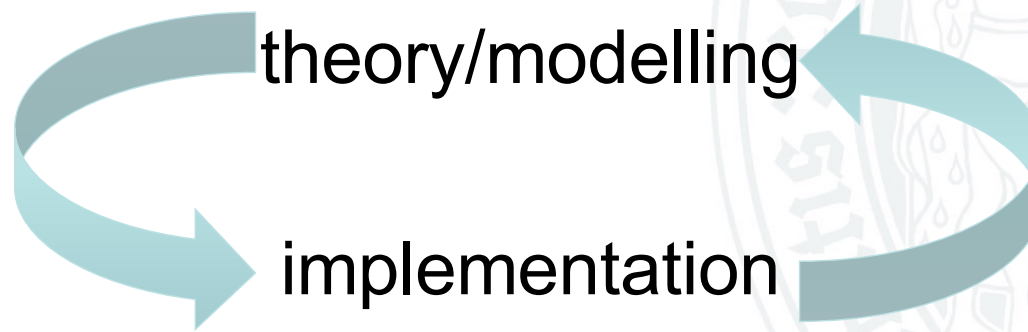
Theater as VR



Made by: Benedikt Mildenberger,
Niclas Schwarzbach, Kai Niebes,
Thomas Schiffer, Jason Steinkühler



Fusing theory with practice



= practice based theory
= theory based practice
→ the role of modelling



The Cologne model

(established late 1990s, still going strong)

- Currently 400+ BA and 50+ MA students
- We train humanities candidates who are also developers
 - basis: Java or C++
 - then in projects: C#, javascript, python, prolog, ...
- This means, for instance:
 - students making VR systems do so in the context of media theory
 - tool use is based on knowing tool development
 - not programmer + humanities, as two distinct parties meeting

For us it is about the merging of two sets of competences/practices in one person

Research, practice, and theory

- Research based teaching
 - learning from researchers
- Practice based teaching
 - learning by doing
- The role of theory
 - what theory?
 - “The theory of the humanities” does not exist



Conclusions? Or questions?

- A model is a way to
 - make the abstract concrete
 - manipulate this concretisation (also during creation)
- Beneficial when the meaning and the tools are understood by the same person
 - works differently in computer scientist – humanist collaboration, but differently
 - still some people needs to understand both
 - understanding for practical tasks (such as programming) is mastering practical work
- Digital + humanities is
 - practice + theory
 - operationalisation + abstraction

Digital humanities ≠ computer science + humanities

Thanks (but no responsibility):

- VW colleagues
 - Arianna Ciula, Cristina Marras, Patrick Sahle
- Students
 - from BA to PhD
- Manfred Thaller
- Other colleagues in Cologne & around the world
- Manfred Thaller
- All those who keep on asking questions
 - don't worry too much about answers
we can usually find them later

