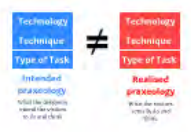


**Didactique**

Partially design and analysis of teaching-learning processes in the theory and didactics of the didactics

**Didaktik**

The study for the development of didactics in other research fields (pedagogy, psychology, etc.)





# **Museum Exhibition Research** *From a didactics perspective*

Marianne Achiam, University of Copenhagen  
I International Workshop on Museum Education  
USP - São Paulo - 12-14 December 2012



## Museum Exhibition Research From a didactics perspective

Mariamne Achiam, University of Copenhagen  
1 International Workshop on Museum Education  
USP - São Paulo - 12-14 December 2012

What are the affordances of exhibit genres?

6

What is a didactics perspective?

1

What influences the creation of exhibits?

5

How is science transformed into an exhibit?

2

How can exhibit design be optimized?

4

How is science acquired by visitors to an exhibit?

3

### RESEARCH FRAMEWORK

Museographic form



Science embodied in exhibit



Learner acquires science



1

**What is a didactics  
perspective?**

**How is science**



France

# Didactique

The study, design, and analysis of teaching-learning phenomena in relation to a well-defined (science) content



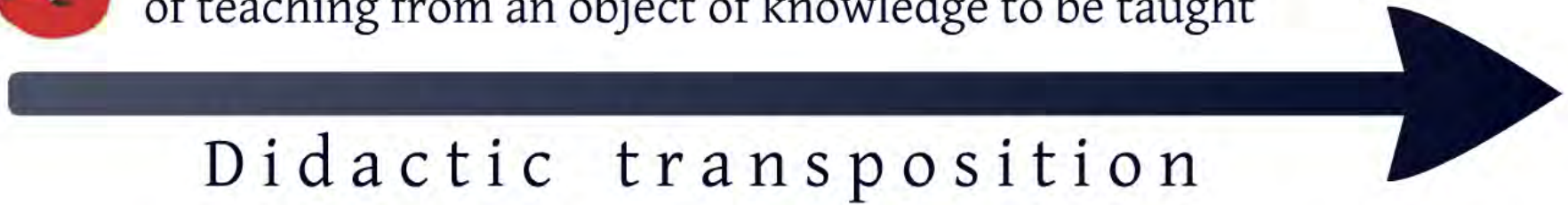
Germany

# Didaktik

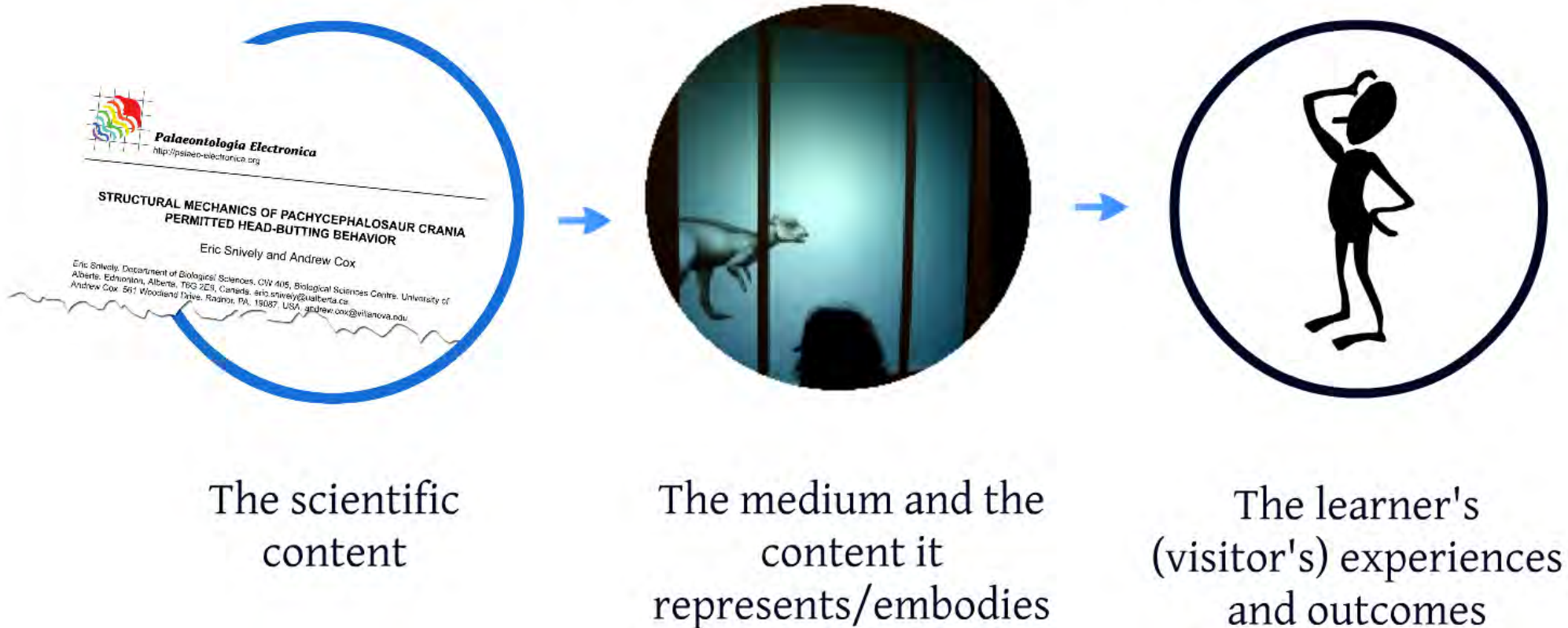
The study and development of domain- or subject-specific learning processes (in the sciences)



The minimal unit of analysis is not just how the learner learns, but must include the process that makes an object of teaching from an object of knowledge to be taught



Didactic transposition

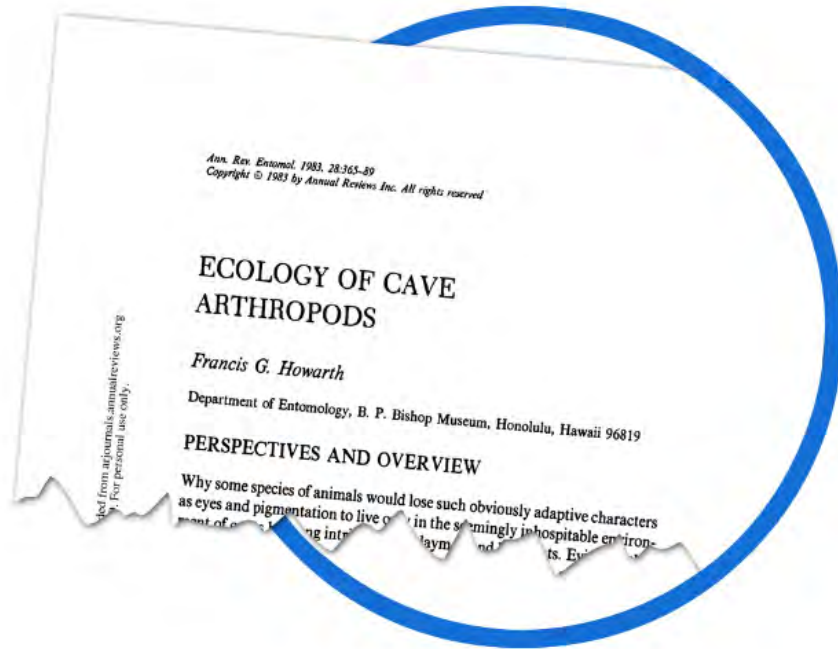




**2**

**How is science  
transformed into  
an exhibit?**

**How is science**



Science content:  
The adaptations of blind cave beetles to their habitat of permanently dark caves



Immersion exhibit:  
Science content embodied in artificial cave for visitors to experience - on their own bodies - how the cave beetle is adapted



## Biological content

### The notion of "cave"

“The cave beetle habitat is an interconnected network of spaces which range from 1 mm to 20 mm in width

(Howarth, 1983)

## Museographic form

### The notion of "cave"

“A three-dimensional scale model of an existing world, that the visitor can step into and immerse themselves in

(Belaën, 2003)

## Immersion exhibit

### The notion of "cave"

Artificial, darkened cave with clear entrance and exit, rock-like structure and curved passage-way



### **Biological content**

#### The notion of "predator"

“Cave beetles are preyed upon by other larger arthropods such as millipedes, spiders, and larger beetles.

(Solodovnikov, 2008)

### **Museographic form**

#### The notion of "predator"

“The dramatisation of the content is driven by characters and conflict

(Belaën, 2003; Damiano et al. 2005)



### **Immersion exhibit**

#### The notion of "predator"

1:1 models of tarantula spiders on the walls for visitors to find by touch



**Biological content**  
"Elongated antennae"

“Cave beetles are characterised by having very long legs and antennae, which indicate special development of the chemical and tactile senses

(Crowson, 1981)

**Museographic form**  
"Elongated antennae"

“The visitor is integrated in the world of the exhibit by being given a role to play

(Belaën, 2003)

**Immersion exhibit**  
"Elongated antennae"

Blind person's walking stick to simulate elongated limbs



**Biological content**  
The notion of "cave"

“The cave beetle habitat is an interconnected network of spaces which range from 1 mm to 20 mm in width”  
(Kroon, 1983)

**Museographic form**  
The notion of "cave"

“A three-dimensional scale model of an existing world, that the visitor can step into and immerse themselves in”  
(Mortensen, 2010)

**Immersion exhibit**  
The notion of "cave"

Artificial, darkened cave with clear entrance and exit, rock-like structure and curved passage-way



**Biological content**  
The notion of "predator"

“Cave beetles are preyed upon by other larger arthropods such as millipedes, spiders, and larger beetles.”  
(Schubert, 2004)

**Museographic form**  
The notion of "predator"

“The dramatisation of the content is driven by characters and conflict.”  
(Schubert, 2003; Damiano et al., 2005)

**Immersion exhibit**  
The notion of "predator"

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**Biological content**  
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**Museographic form**  
"Elongated antennae"

“The visitor is integrated in the world of the exhibit by being given a role to play”  
(Mortensen, 2010)

**Immersion exhibit**  
"Elongated antennae"

Blind person's walking stick to simulate elongated limbs



*Conclusion*  
The exhibit is shaped in a dialectic between science content and museographic form  
*(Mortensen 2010)*

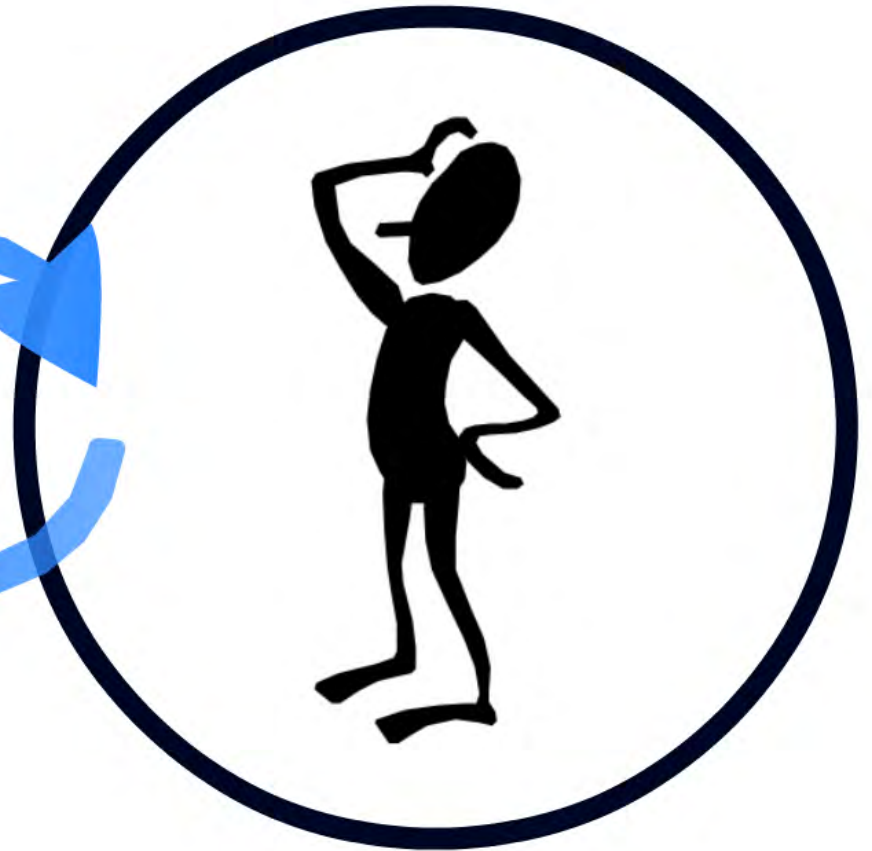
Learner  
acquires  
science

3

**How is science  
acquired by visitors  
to an exhibit?**



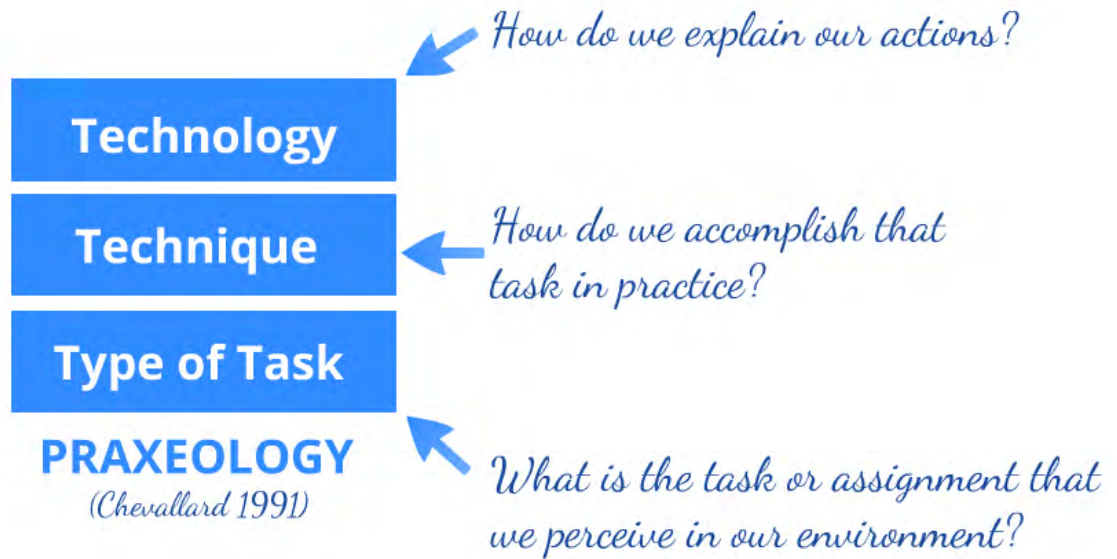
Immersion exhibit



Visitor to exhibit



3  
This is how the cave beetle navigates... by touch!



Technology

Technique

Type of Task



Technology

Technique

Type of Task

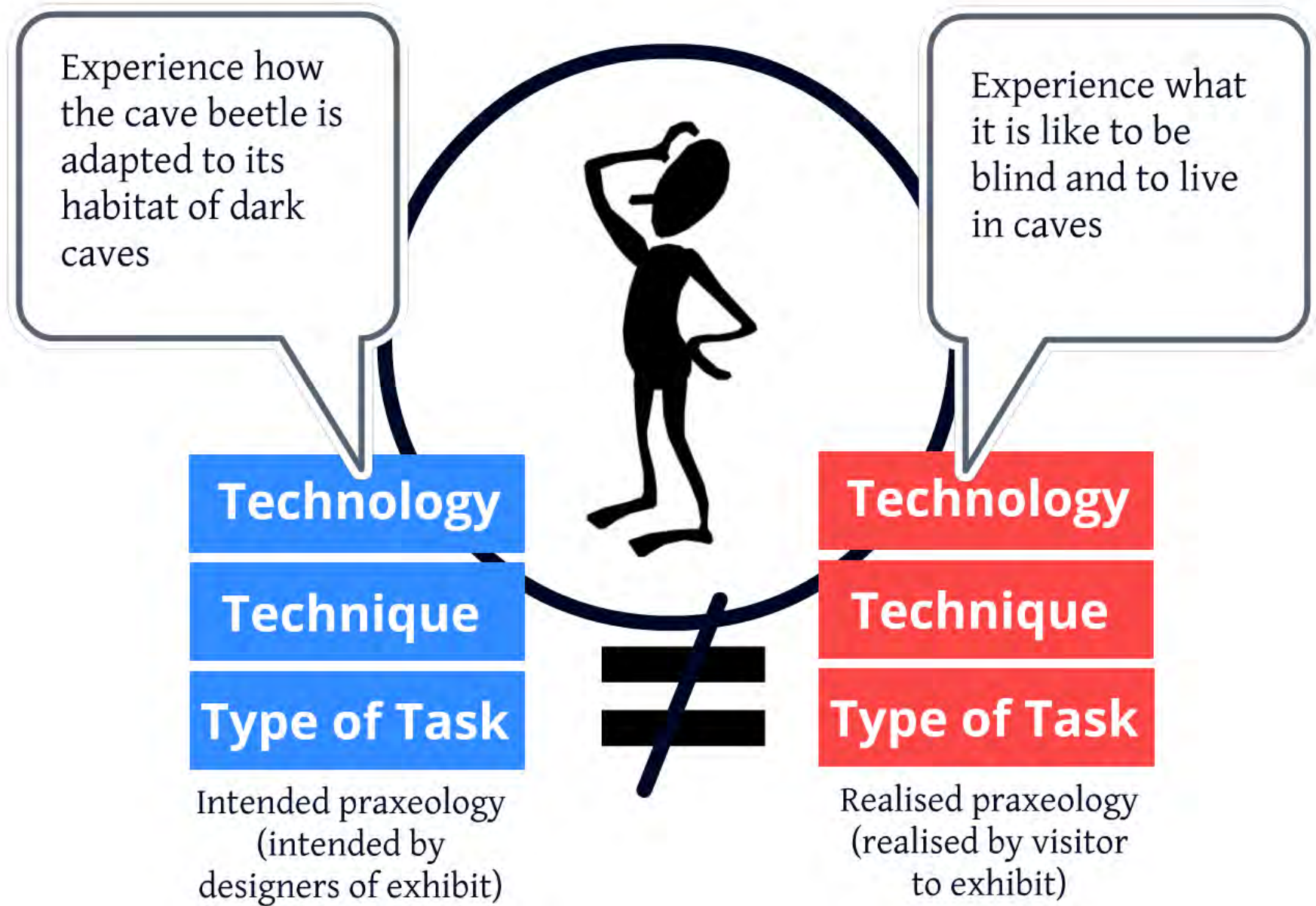
## Intended praxeology

What the designers  
intend the visitors  
to do and think

## Realised praxeology

What the visitors  
actually do and  
think







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### RESEARCH FRAMEWORK

Museographic form



Science content



Science embodied in exhibit

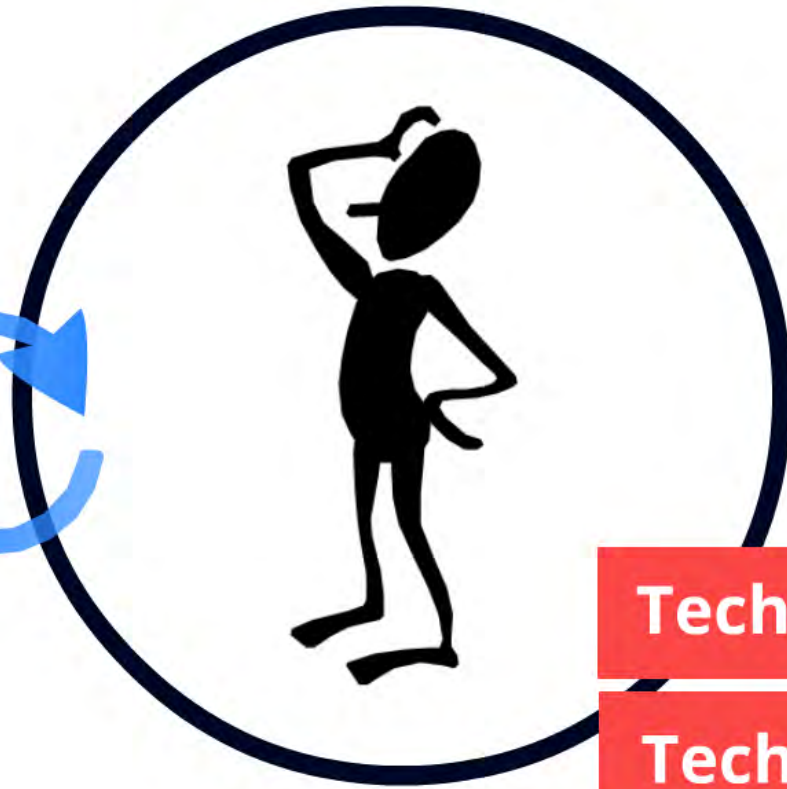


Learner acquires science

9. Civilization
8. Society
7. Museum
6. Pedagogy
5. Discipline
4. Exhibition
3. Cluster
2. Exhibit
1. Task

# How can exhibit design be optimized?

4



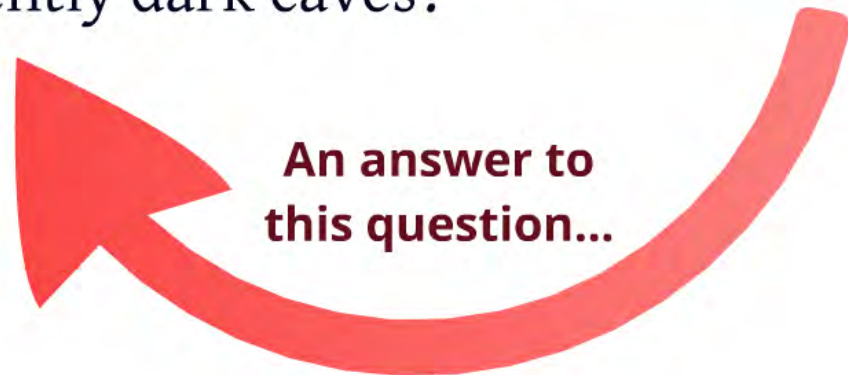
**Technology**

**Technique**

**Type of Task**

How is the blind cave beetle adapted to its habitat of permanently dark caves?

**An answer to this question...**



How is the blind cave beetle adapted to its habitat of permanently dark caves?

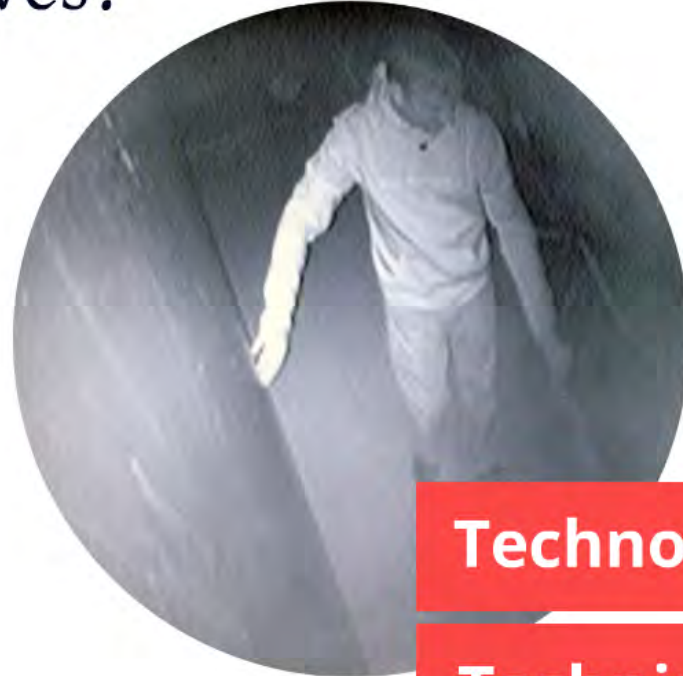


**Technology**

**Technique**

**Type of Task**

Scientist's  
praxeology



**Technology**

**Technique**

**Type of Task**

Visitor's  
praxeology

# Entomologist's praxeology

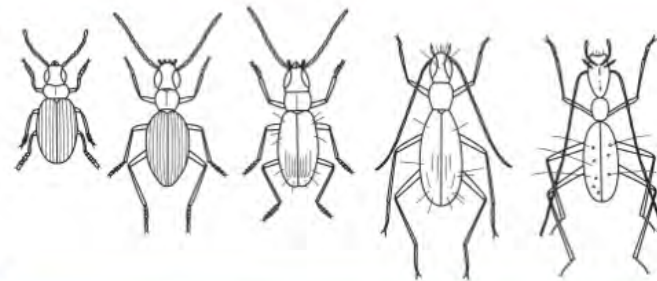


**Technology:** if near relatives from a different habitat have different characteristics, they are probably adaptive

**Technique:** compare beetle's characteristics with those of nearest relatives to exclude characteristics that come from common descent

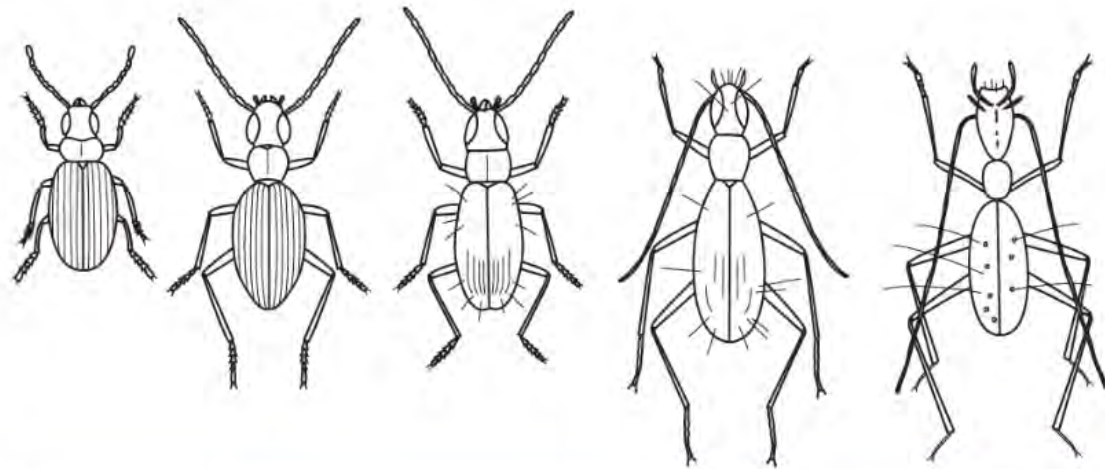
**Task:** identify the blind cave beetle's characteristics as being adaptive

How is the blind cave beetle adapted to its habitat of permanently dark caves?



Ground beetles  Cave beetles

**Task:** identify the blind cave beetle's characteristics as being adaptive



Ground beetles



Cave beetles

**What influences  
the creation  
of exhibits?**

**5**





**Biological content**  
"Elongated antennae"

“Cave beetles are characterised by having very long legs and antennae, which indicate special development of the chemical and tactile senses

(Crowson, 1981)

**Museographic form**  
"Elongated antennae"

“The visitor is integrated in the world of the exhibit by being given a role to play

(Belaën, 2003)

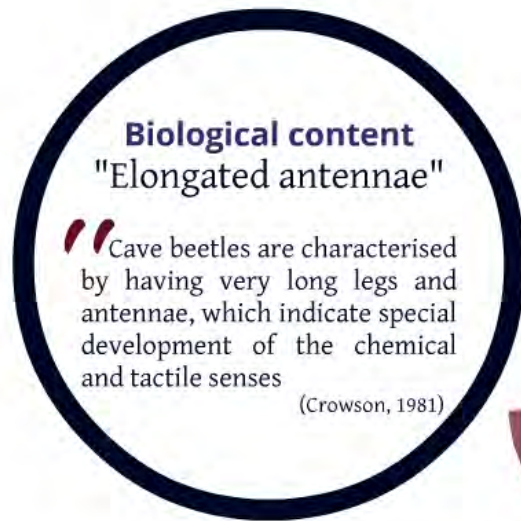
**Immersion exhibit**  
"Elongated antennae"

Blind person's walking stick to simulate elongated limbs

**Safety issue**



Not all conditions and  
on the didactic transpo  
process come from the



Not all conditions and constraints on the didactic transposition process come from the science content or the museographic form!

Some conditions come from outside the science dissemination situation at hand.

*Artigue & Winslow 2010*

*e.g. ministry of culture*



**Society**

*e.g. natural  
history museum*



**Museum**

*e.g. evolution*

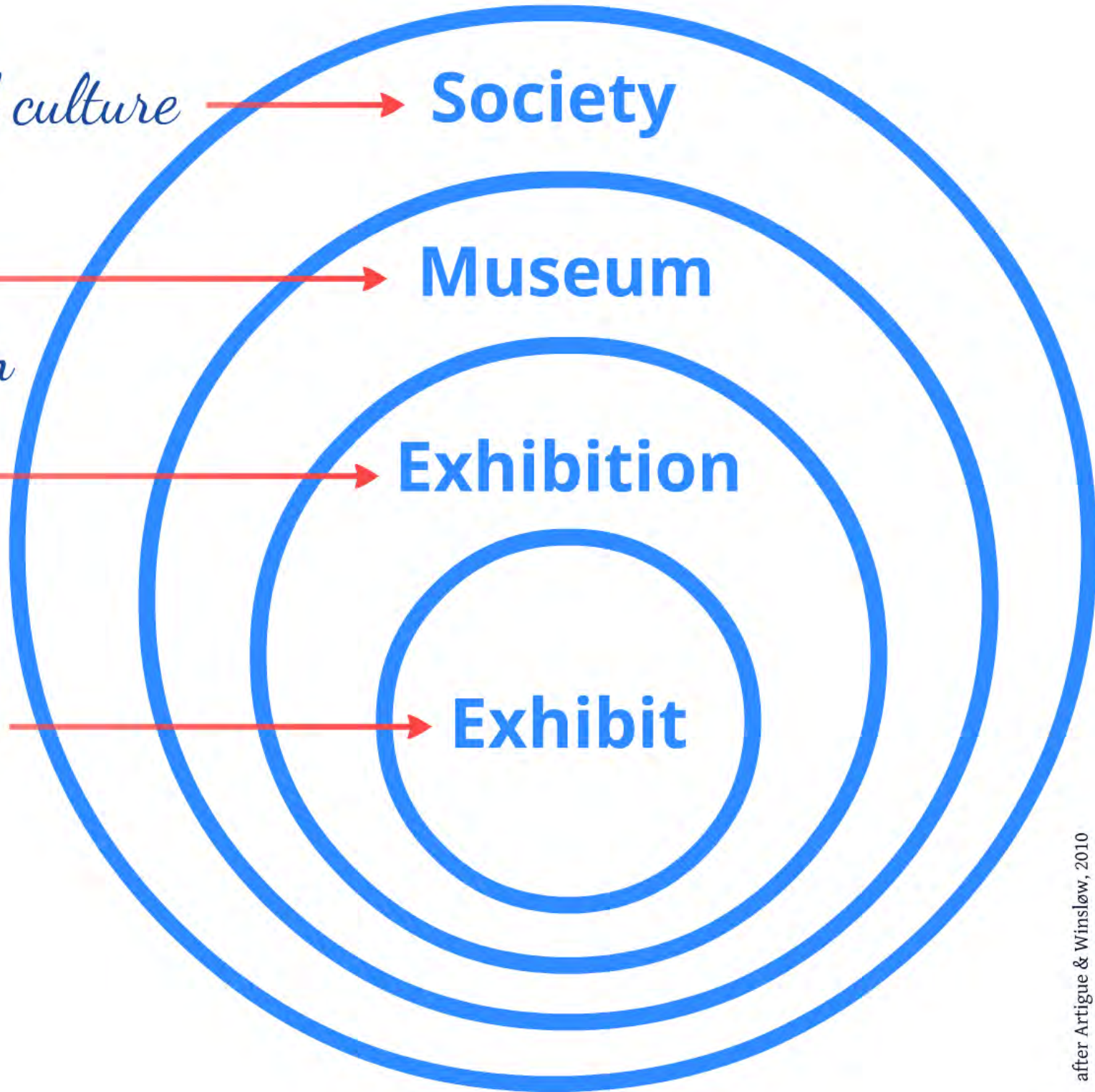


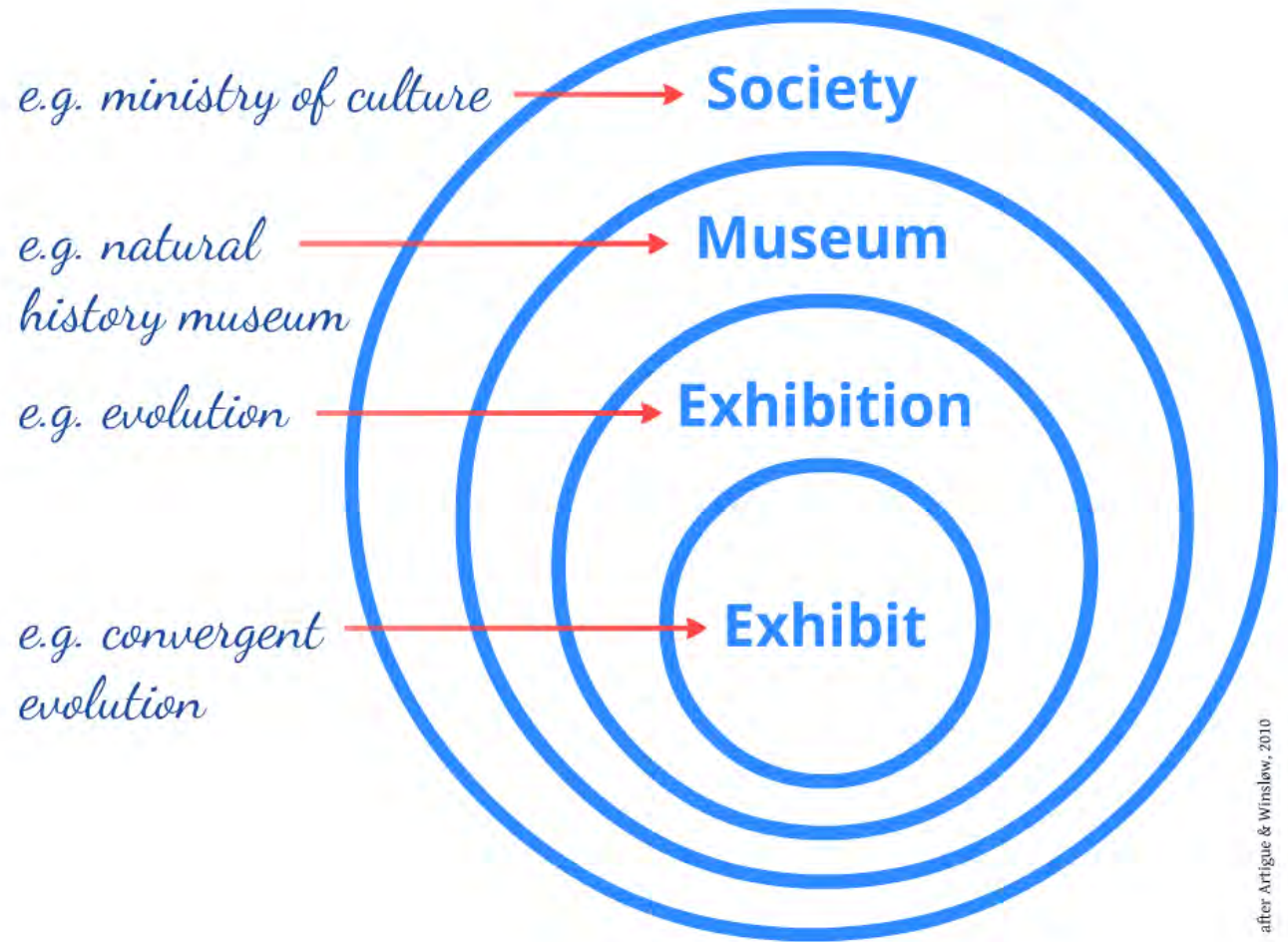
**Exhibition**

*e.g. convergent  
evolution*



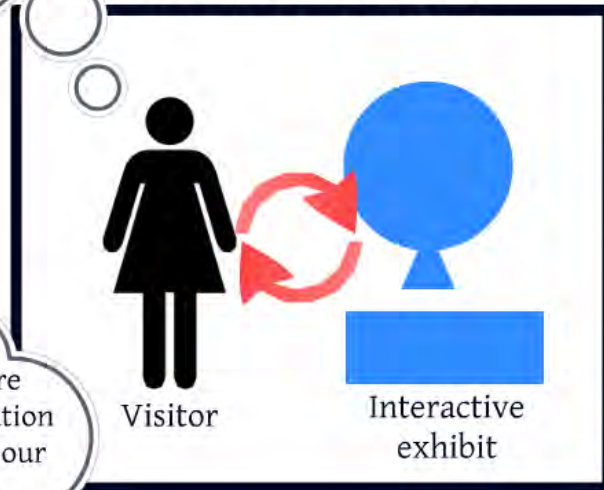
**Exhibit**



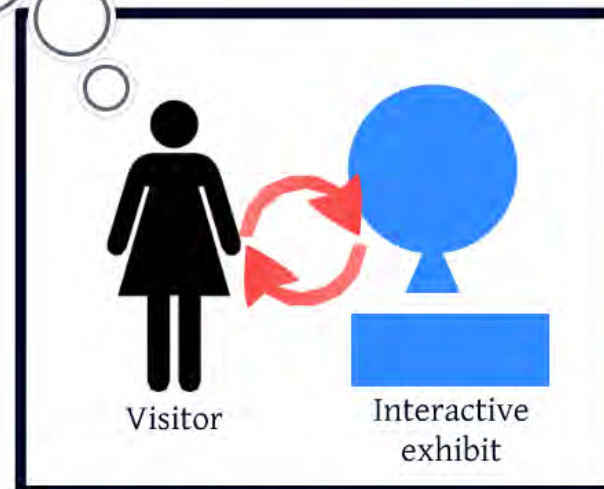


Interactive exhibits are essential for my learning!

## Science Centre



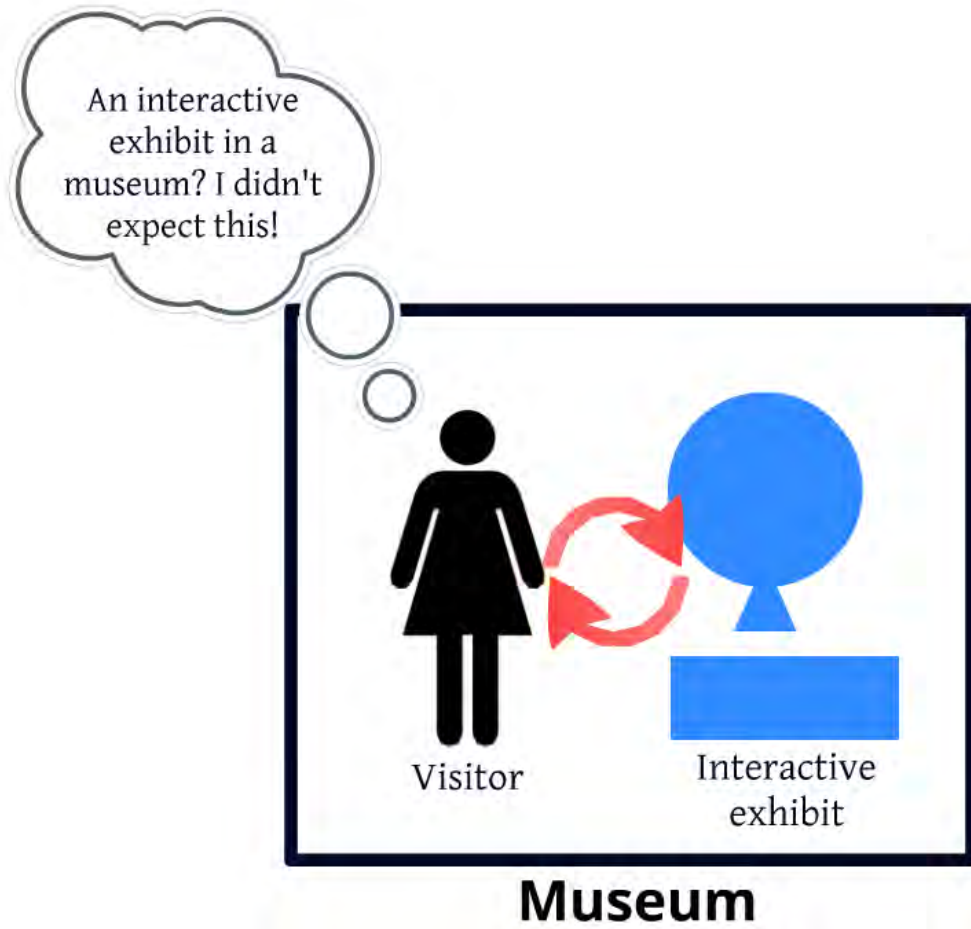
Museums are about information and old stuff, our heritage.



## Museum

There was a significant correlation between what visitors expected to be able to do at a museum or science centre, and their self-reported learning outcomes

Visitors who were expecting interactivity were more likely to report educational benefits from their interactions than visitors who were surprised by it



**What are the affordances of exhibit genres?**



Museogr  
form

Techno

Techno

Type of

# What are exhibit genres?

## Science centres

### Interactive exhibit



- The visitor's actions and the exhibit's reactions must influence and change each other
- Message is mediated through sequences of mutually influential actions

*(Dicks, Soyinko & Coffey 2006)*

### Hands-on exhibit



- Require activation by visitor
- Often show a phenomenon, the visitor otherwise would not be able to see
- Message is mediated through visitor's action

*(Ferber 1990)*

## Museums

### Immersion



- 3D environment for visitor to enter and play a role in
- Message is mediated through characters, conflict and dramatisation

*(Montpetit 1996; Belén 2003; Mortensen 2010)*

### Diorama



- 3D model that shows event or scene
- Refers to the natural world
- Requires visitor to use senses they would use in nature

*(Inslay 2008; Porcedda et al. 2006; Montpetit 1996)*





Ways of mediation  
= affordances?

# Affordances

Directly perceivable properties of objects that determine how they can be used

*Allen 2004*

Plates are for pushing. Knobs are for turning. Slots are for inserting things into... When affordances are taken advantage of, the user knows what to do just by looking: no picture, label or instruction is required.

*Norman 1988*



Interactive exhibit



Hands-on exhibit



Immersion



Diorama



Do the characteristic affordances of an exhibit genre constitute its own "didactic praxeology"?

*Artigue & Winslow 2010*

**Technology**

**Technique**

**Type of Task**

**DIDACTIC  
PRAXEOLGY**





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### RESEARCH FRAMEWORK

Museographic form



Science content



Science embodied in exhibit



Learner acquires science





achiam@ind.ku.dk  
Dissertation available as pdf at

[http://www.ind.ku.dk/publikationer/inds\\_skriftserie/2010-19-exhibit-engineering/](http://www.ind.ku.dk/publikationer/inds_skriftserie/2010-19-exhibit-engineering/)