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# Ready and Willing? How Subject Culture and Perceived Demands Affect Implementation of HPS in Science Teaching

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# Implementing Innovations

**Step One – Choose Strategy:** A. *bottom-up* B. *top-down* C. *symbiotic*

**Step Two – Choose Style:** ✓ Programmed - Procedural      ✓ Adaptive - Evolutionary

**Step Three -  
Prepare for:**

**Selective  
Implementation**

- **assimilation** to *subjective or general principles* of “good teaching”
- **application** of *promising* knowledge in practice
- **localisation** of knowledge to *specific situations* & interests
- **redefinition** of knowledge and procedures in terms of *existing cultural practice*

# From Selective Implementation to Cultural Practice

*“...the subject defines the texture of teaching down to the finest grain.”*  
(Baumert '06)

## Classroom activities as cultural practice:

- **classroom semiotics** (Presmeq '97, Jaipal '09)
- **teaching styles** (Mosston '86, Siedentop '91)
- **lesson scripts / typologies** (Knierim e.a. '04, PISA 2006)
- **sociological power structures** (Morais & Neves '91)
- **habitualization, fields and games** (Willems '07)

significant  
inter-subject  
differences



*subject cultures*

# Readiness to Act – Teachers’ Professional Skills

**Professional Teaching - A heuristic model:**

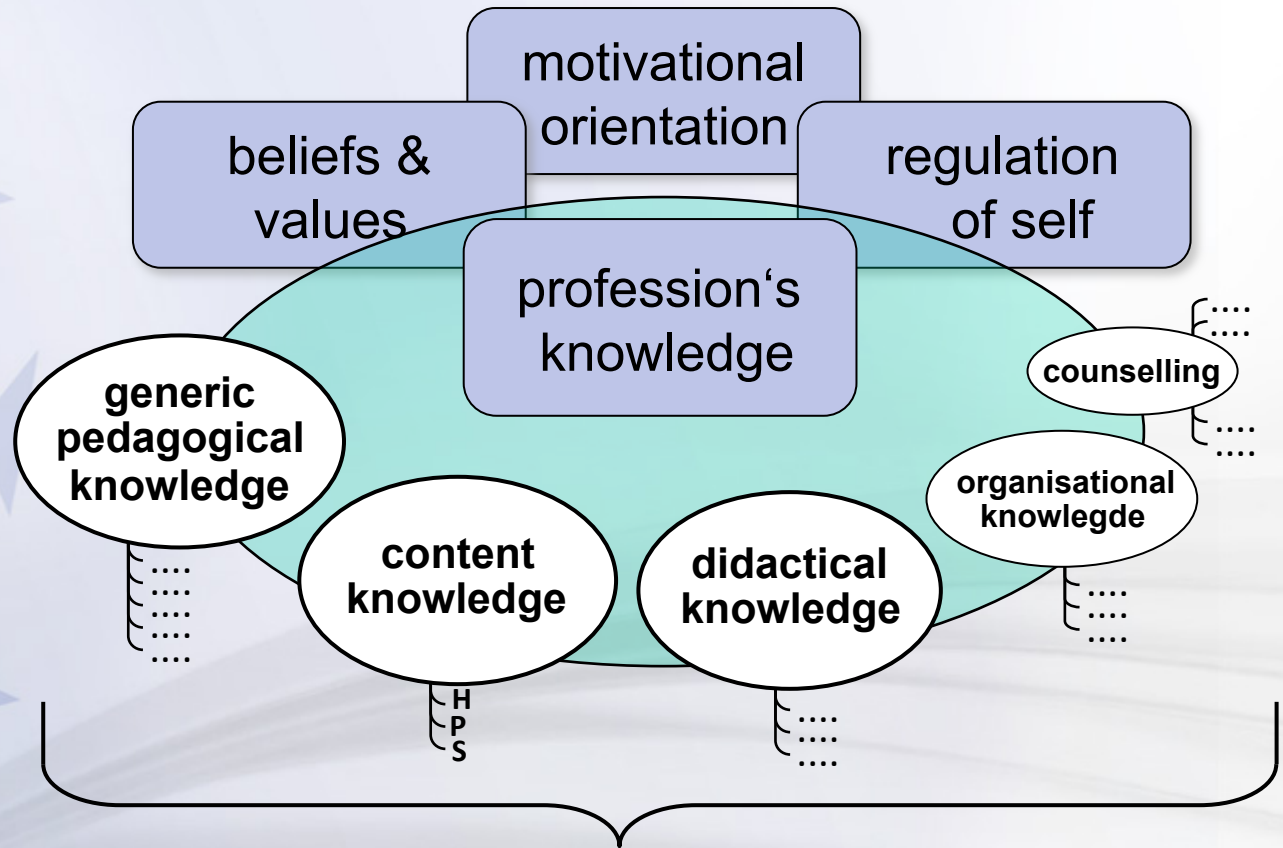
## Knowledge Characteristics:

- organized into episodes & scripts by a restricted set of events
- automated, but flexible to a limited extent
- mostly domain specific

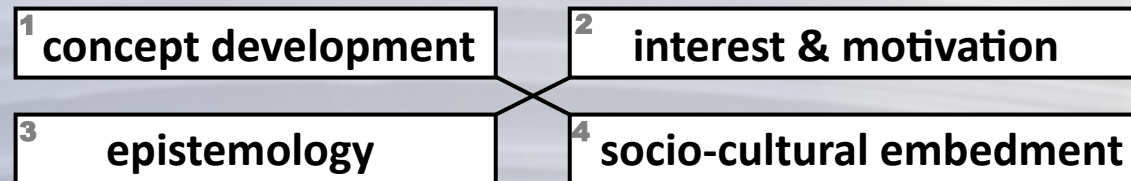
(Hatano e.a. '86, Palmer e.a. '05)

## Knowledge in action for HPS in ST teaching:

(Seker '07, Neuweg '05)



### AREAS OF APPLICATION



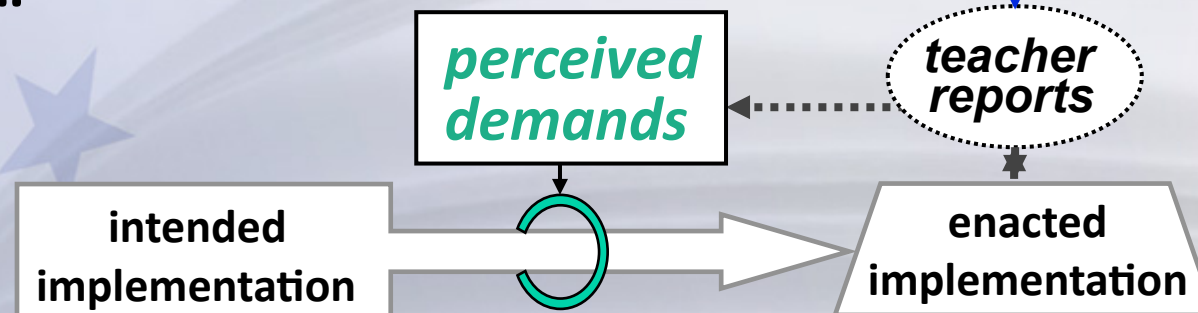
# Willingness to Act – Volitional Considerations

(Bandura '97; Wigfield/Eccles, Deci/Ryan, Krapp; 2000)

The perceived demands of an innovation will not coincide with the teachers' beliefs about their competencies related to teaching events.

## Participants' Traits

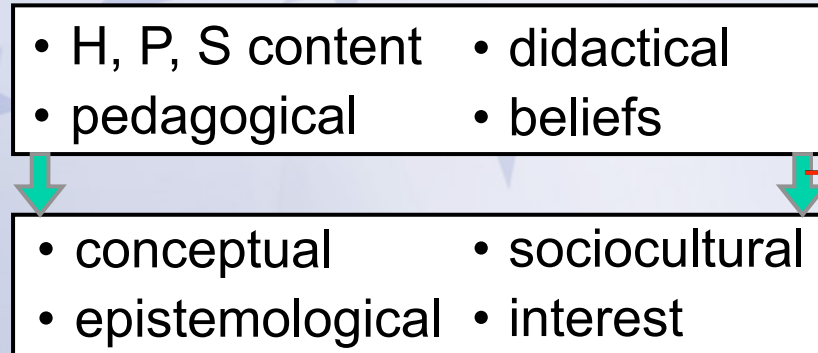
- perceived control vs. support
- self efficacy
- motivational orientation
- behavioral beliefs
- ...





# Perceived Demands

## Framework for interpretation



*subject  
cultures*

**perceived  
demands**

*selective  
implementation*

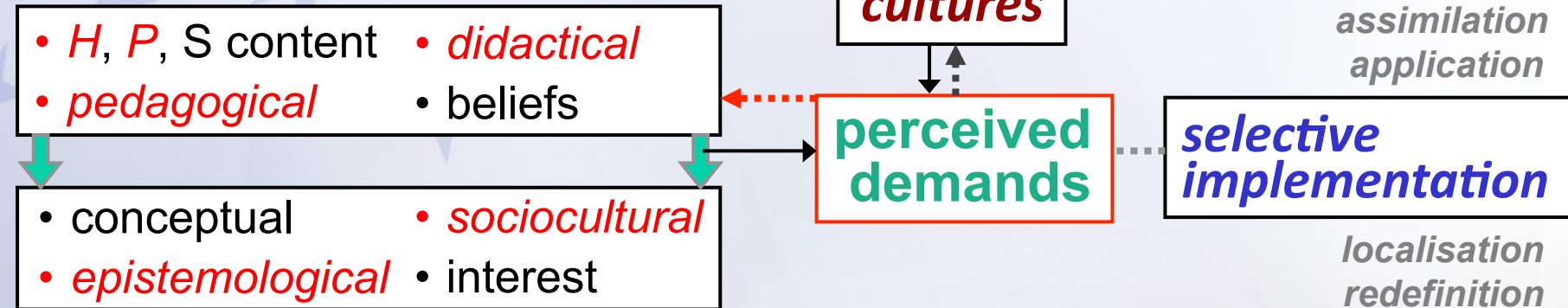
*assimilation  
application*

*localisation  
redefinition*

Demands - Theme A:  
**„scaffolding explicit reflection“**

# Perceived Demands

## Framework for interpretation



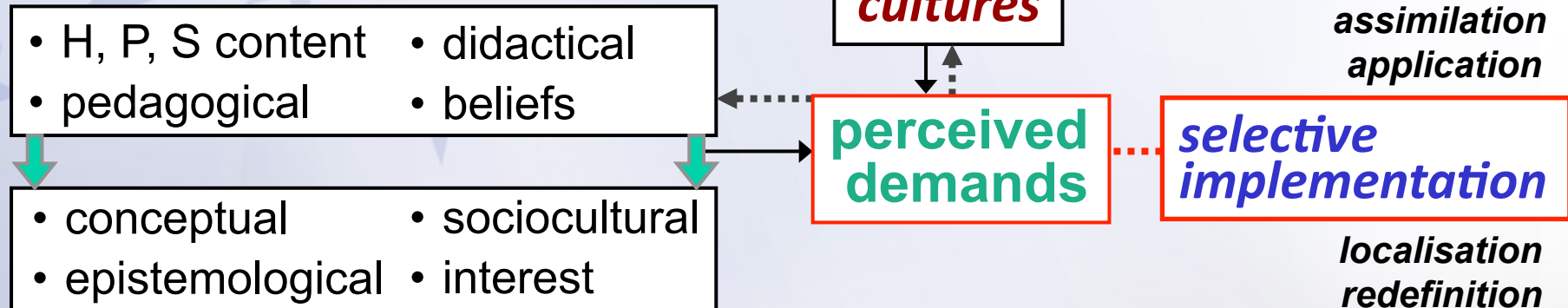
### Demands - Theme A:

### „scaffolding explicit reflection“

- » after 10 sessions I will know **students' first ideas** and how to deal with them «
- » I need to give the **right assistance** at the right moments to support students' thinking «
- » in plenary discussion I have to **react instantly** to students' ideas «
- » It was hard to categorize students' ideas, like – **science, about science, science methods** «
- » in the end, I **didn't learn to involve all students in reflection** «
- » In the end it was clear, **first info – then science – then about science.** «

# Perceived Demands

## Framework for interpretation



## Demands - Theme B:

„align historical context, students‘ attributes & instructional methods“

- » *Low ability students may present things from the researchers youth, that’s easier – better students have to present his research methods* «
- » *HPS forces me to put everything under a central question – that’s a good thing* «
- » *I have less flexibility to freely choose themes and experiments* «
- » *I need more and special methods for every phase of the lesson which can keep the question or person alive in students‘ minds* «
- » *the general structure of the lessons stays more or less the same* «



# Thank you very much for your attention...

We'd like to thank our collaborating teachers:

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