

Science Teachers' Perceived Demands in the Context of Teaching with HPS

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Status: Weak adoption of HS based teaching approaches

Obstacles to HPS implementation (Höttecke & Silva 2011)

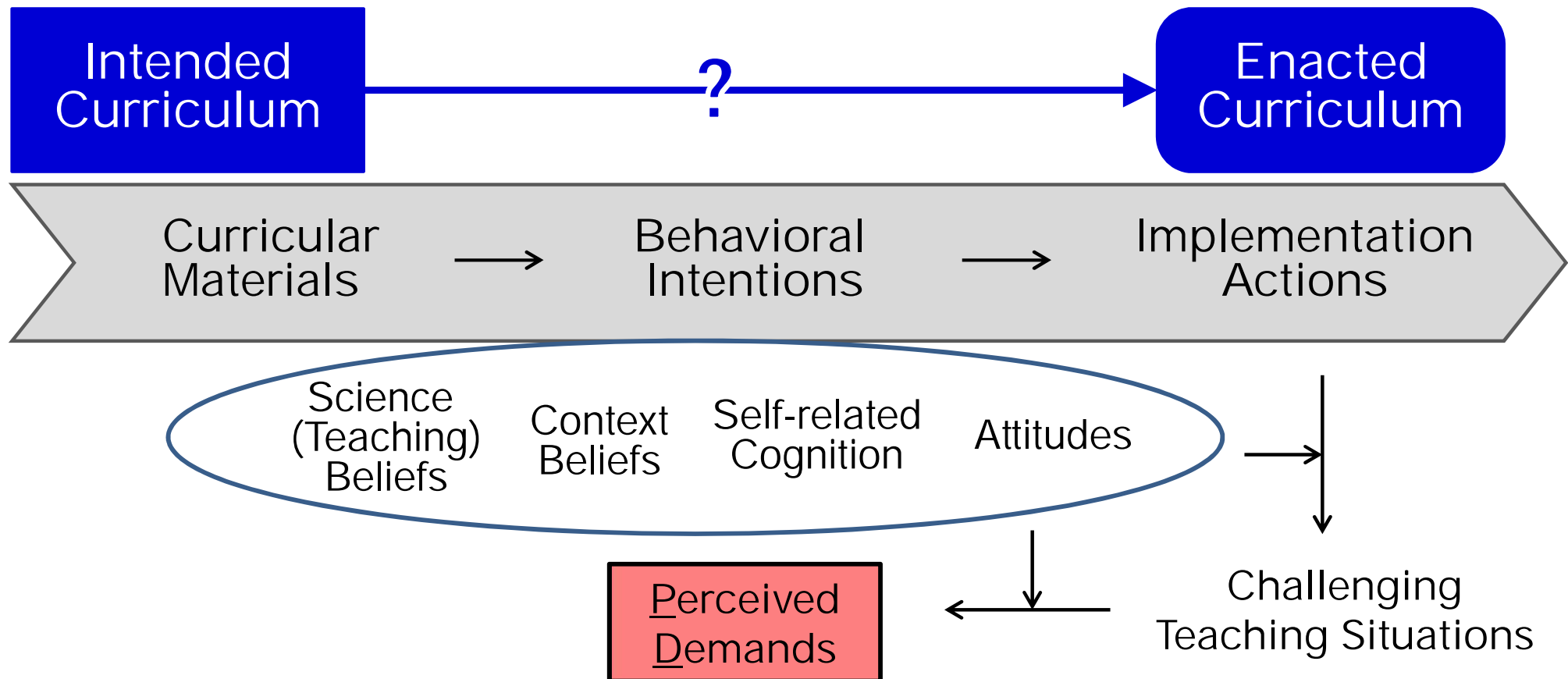
- Authoritative culture of school science teaching
- Unsupportive institutional framework
- Inadequate textbooks and curricular materials
- Incompatible science teachers' attitudes and beliefs

Assumptions hindering adoption of teaching innovations

„My educational success depends on... (Tobin & McRobbie 1996)

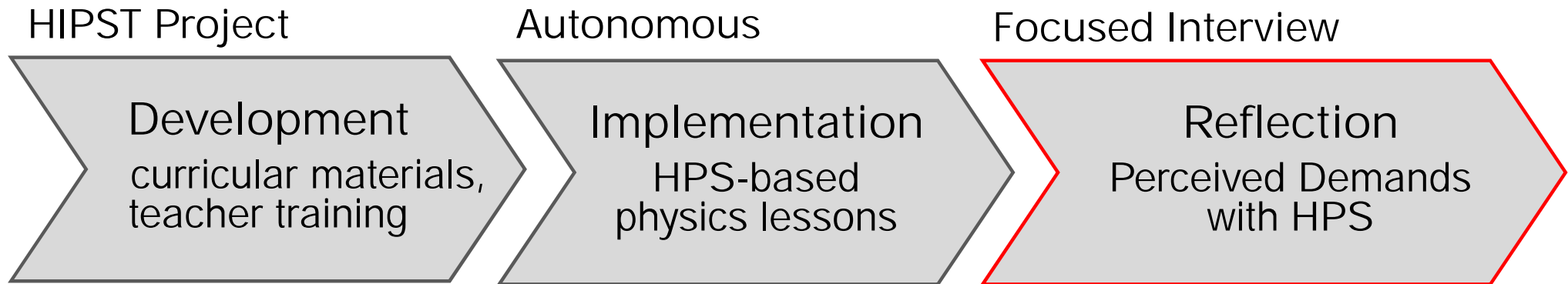


How do teachers' perspectives influence implementation of HPS?



- Subjective theories about challenges of HPS
- Influence future implementation intentions

Interview study: 8 physics teachers, early-adopters of HPS



HPS Characteristics

- Case studies with a central storyline
- Historical investigative approach
- Guided inquiry with replications
- NOS(I) explicit reflection

1. Qualitative Content Analysis

- Contexts of challenging teaching experiences

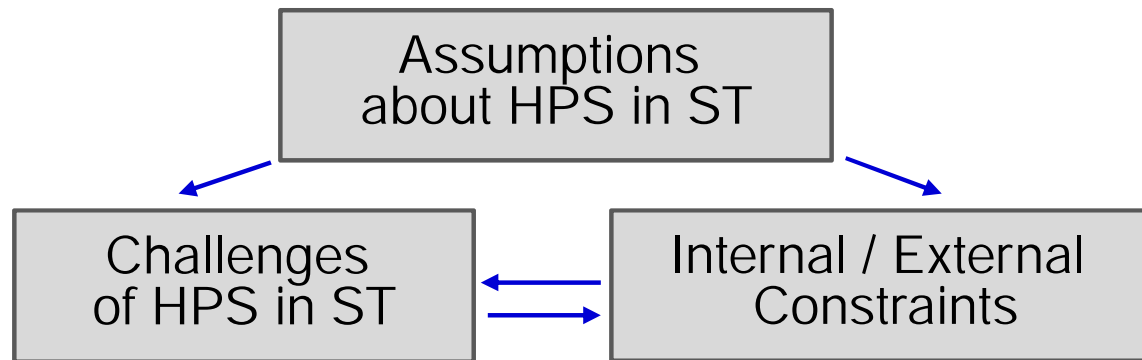


HPS Challenges

Inter-Coder Agreement:
84% ($\alpha=0.7$)

2. Reconstructing subjective theories

- Within- & cross-case comparisons



Perceived Demands

Communicative Validation



- I. Interests/Motivational Dispositions
 - Age / gender based differences
 - Preference for everyday-contexts

- II. Science Teaching Expectations
 - Content aims, simple investigations
 - Teaching methods fitting physics' subject culture

- III. Preconceptions about History
 - Making sense by everyday-analogies
 - Judging historical research from modern points of view

Perceived Demands

Lesson Orchestration	Lesson Planning/ Development
Students' Characteristics	Institutional Context

- I. Align historical concepts, students' ideas & inquiry results
 - Foster reasoning within historical conceptual frames
 - Appreciate inquiry results in conflict with modern ideas
 - Provide alternative/transitional explanations for inquiry data

- II. Coordinate storyline approach & student-centered activities
 - Storyline prescribing lesson events, reducing spontaneity
 - Students' inquiry results tied to storyline-progress

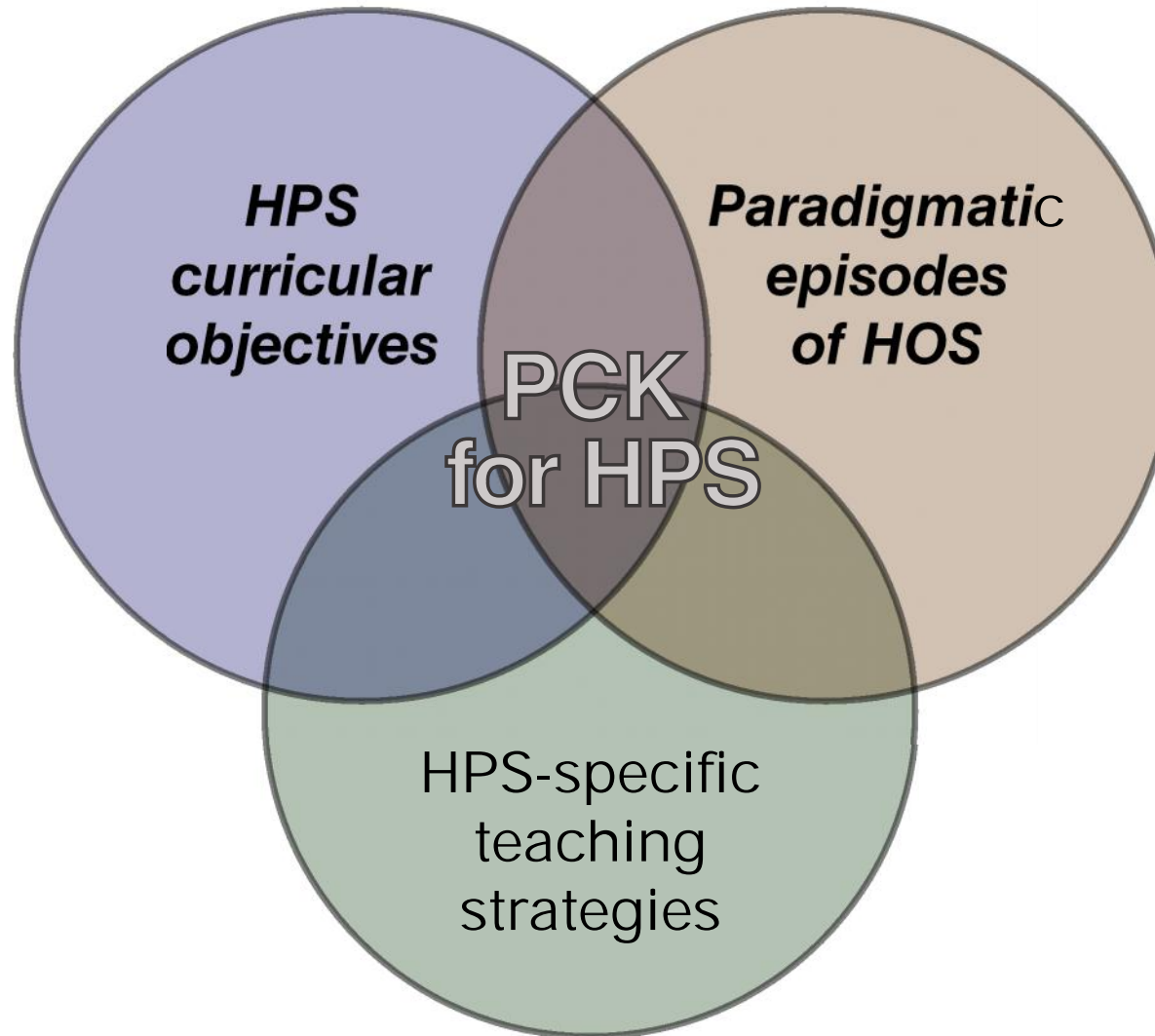
Perceived Demands

Lesson Orchestration	Lesson Planning/ Development
Students' Characteristics	Institutional Context

- I. Inadequate curricular materials
 - Insufficient curricular alignment
 - Ambitious standards for students activities
 - Text heavy preparatory materials, classroom activities
 - No suggestions for accompanying use of textbooks

- II. Novel planning decisions
 - Degree of modernizing historical apparatus
 - Degree of simplifying contextual information

The need for pedagogical content knowledge for HPS:



Perceived Demands in the context of HPS in ST

- Inside-View on HPS specific obstacles to implementation
- Tied to beliefs about teaching with HPS
- Resource for teacher training to raise HPS teaching efficacy
- Point out deficiencies of curricular materials

Further Research:

- Predictive power for implementation actions
- Role in transformation of HPS curricular materials
- Challenges of other approaches of HPS in ST
- Beliefs of HPS-inexperienced teachers

- Features of their HPS based lessons
- Challenging situations connected to:
 - conceptual learning,
 - learning about the NOS
 - HPS teaching practices and
 - HPS lesson preparation/curricular materials
- Discussion prompts:
 - Similarities and differences between HPS and non-HPS based lessons.
 - What would make you feel more secure in these situations?
 - What would be a (dis-)satisfying outcome of this lesson/situation?
 - What might cause more(less) problems for less(more) experienced teachers?
 - What might (not even) be achievable with more routine?

Curricular legitimation

- Physics-Curricula unclear about HPS
- Colleagues' expectations content-centered

Testing & Assessment

- Centralized testing without hist. contexts, NOS
- How to design HPS-based examinations