

# Adaptive Teaching Competency

## A New Approach to Teachers' Knowledge

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## Overview

1. Aims of the research project
2. The concept of Adaptive Teaching Competency
3. Research design
4. Intervention: Content-Focused Coaching
5. Results
6. Discussion

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## 1. Aims of the project

1. Conceptualizing Adaptive Teaching Competency to capture the processes of adjusting teaching to foster student learning.
2. Analyzing and modelling Adaptive Teaching Competency and its impact on student learning.
3. Fostering Adaptive Teaching Competency through Content-Focused Coaching.
4. Examining the impact of the intervention on teaching and on student learning.

(Beck et al, 2006; Bischoff et al. 2005)

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## 2. The concept Adaptive Teaching Competency

Adaptive Teaching Competency is a teacher's ability to continually monitor their teaching orientate teaching towards students' learning processes and learning objectives according to the students' individual preconditions in order to produce favourable conditions for students' learning for understanding.

*... the use of alternative instructional strategies and resources to meet the learning needs of individual students ... (Wang 2001, 122)*

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## Four Dimensions of Adaptive Teaching Competency

In accordance with Weinert (1996) and Wang (2001) the concept of Adaptive Teaching Competency includes four dimensions:

- a) Subject Knowledge
  - b) Diagnosis of Students' Learning
  - c) Teaching Methods
  - d) Classroom Management
- pedagogical content knowledge (Shulman 1986)

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## Two modes of Adaptive Teaching Competency

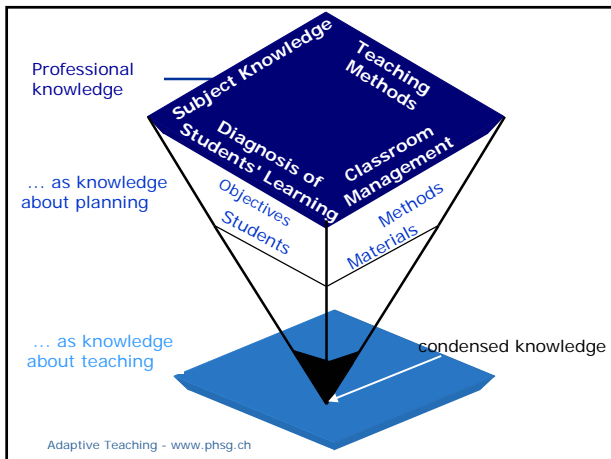
### Adaptive competency for planning

stands for the teacher's ability to adapt his or her *planning* to the individual learning processes of students.

### Adaptive competency for teaching

stands for the teacher's ability to adapt his or her *teaching* to the individual learning processes of students during lesson delivery.

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### 3. Research design

	experimental group (32 classes)	control group (18 classes)
Sept. / Oct. 03	<b>pre-tests</b> vignettes, video test questionnaires (teacher & students), science test	
Nov. 03 – April 04	<b>seminar and content-focused coaching</b>	Self-selected teacher workshops
May 04 – June 04	<b>post-tests</b> Teaching of 4 lessons of 90 minutes on a given topic with assessment of students' progress, questionnaire (teacher & students), science test, vignettes, video-test	

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### Methods of measurement

**Teachers**

- **video test** simulating teacher decisions to measure teachers' adaptive competency for teaching
- **vignettes** identifying teachers' adaptive competency for planning
- **teacher questionnaires** capturing teachers' pedagogical beliefs
- **science knowledge test** on taught topic

**Students**

- **general science knowledge tests**
- **tests measuring students' progress** in a given topic
- **questionnaires** on students' perceptions of science

**Coaches**

- **Journal** during Content-Focused Coaching

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### Methods to measure the 2 modes of Adaptive Teaching Competency

	Competency for planning	Competency for teaching	
teaching methods	vignette	video test	
diagnosis of students' learning	vignette	video test	
classroom management		video test	
focus on subject knowledge	vignette		
total score of Adaptive teaching competency	vignette	video test	Cluster analysis

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### Participants

		novice teachers		expert teachers		Total
		♀	♂	♀	♂	
<b>experimental group</b>	5 th grade	2	2	6	6	16
	7 th grade	2	4	3	7	16
<b>control group</b>	5 th grade	3	1	2	5	11
	7 th grade	1	0	0	6	7
<b>Total</b>		<b>8</b>	<b>7</b>	<b>11</b>	<b>24</b>	<b>50</b>

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### 4. Intervention: Content-Focused Coaching

Aim of the intervention:  
Developing teachers' Adaptive Teaching Competency

Intervention:

1. Two-day seminar based on recent research findings on teaching and learning
2. Content-focused coaching (West & Staub, 2003)
  - 9 coaching sessions à 3h

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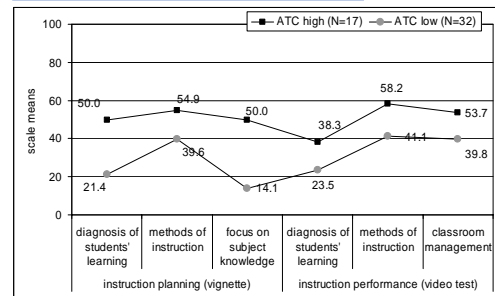
## 5. Results

- 1) Adaptive Teaching Competency and student learning outcome
- 2) Adaptive Teaching Competency and student learning outcome in heterogeneous classes
- 3) Intervention Effects on Adaptive Teaching Competency
- 4) Intervention Effects on student learning outcome

Profile of Adaptive Teaching Competency with regards to the four dimensions.

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## Adaptive Teaching Competency: Profile



High Adaptive Teaching Competencies: significantly higher scores in all dimensions.

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## Conceptualising Adaptive Teaching Competency

### Hypothesis 1

The classes taught by teachers with high Adaptive Teaching Competency have a higher student learning outcome than the classes with teachers with low Adaptive Teaching Competency.

### Statistical analysis

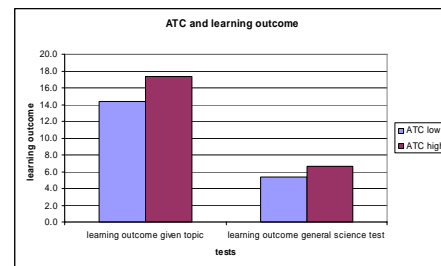
Cluster analysis, grouped according to adaptive teaching competency level (high/low)

Adaptive teaching competency: score of vignettes and video test

Learning outcome: Difference between pre-test and post-test

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## Hypothesis 1: Results



given topic: significant ( $F = .462$ ,  $df = 45$ ,  $p = .031$ ),

general science test: not significant ( $F = .716$ ,  $df = 47$ ,  $p = .171$ )

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## Conceptualising Adaptive Teaching Competency

### Hypothesis 2

In heterogeneous classes, student learning outcome is higher in those classes taught by teachers with high Adaptive Teaching Competency than in classes taught by teachers with low Adaptive Teaching Competency.

### Statistical analysis

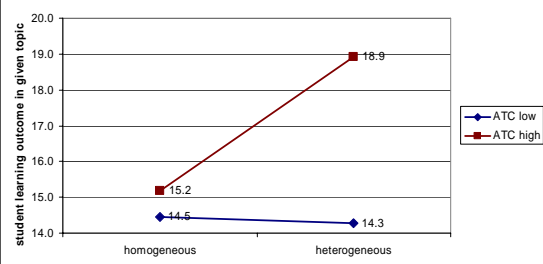
Cluster analysis, grouped according to adaptive teaching competency level (high/low)

Learning outcome: tests on given topic for a series of lessons

Heterogeneous classes: grouped according to standard deviation in pre-tests (Median split)

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## Heterogeneous classes, Adaptive Teaching Competency and learning outcome



Students in heterogeneous classes with teachers with high Adaptive Teaching Competency have higher learning outcomes in the test to the given topic than heterogeneous classes with teachers with low Adaptive Teaching Competency.

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### Effect of content-focused coaching on Adaptive Teaching Competency

#### Hypothesis 3

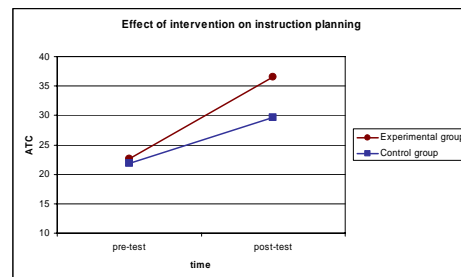
The teachers of the experimental group develop their Adaptive Teaching Competency more than the teachers of the control group.

#### Statistical analysis

Adaptive Teaching Competency for planning and teaching  
Two factorial analysis of variance with repeated measure

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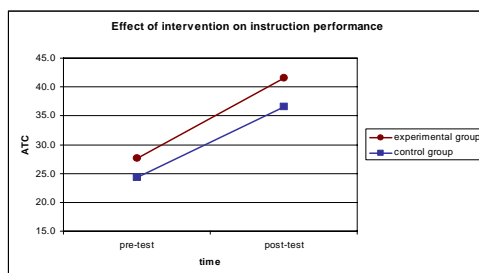
### Hypothesis 3: results for planning



significant ( $p = .042$ , 8.5% variance explained)

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### Hypothesis 3: results for teaching



not significant. ( $p = .655$ , 0.4% variance explained).

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### Intervention effects on student learning outcome

#### Hypothesis 4

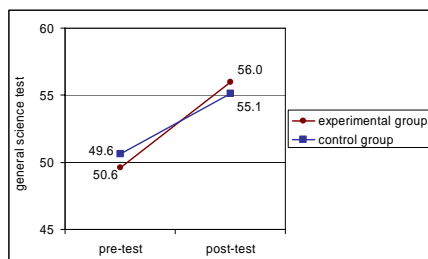
The students of the experimental group have a better learning outcome than the students of the control group.

#### Statistical analysis

Two factorial analysis of variance with repeated measure  
Learning outcome: Difference between pre-test and post-test student achievement in a general science test.

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### Hypothesis 4: results of general science test



significant ( $F = 4.19$ ,  $df = 1.47$ ,  $p < .05$ ; 8.2% variance explained)

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### Summary of results

- 1) High teacher's Adaptive Teaching Competency, high student learning outcome
- 2) In heterogeneous classes: high teacher's Adaptive Teaching Competency, high student learning outcome
- 3) Intervention effect on teachers' Adaptive Teaching Competency for planning but not for performance.
- 4) Intervention effect on students' learning outcomes in general science test

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## 6. Conclusion

### Adaptive Teaching Competency

- is linked to students learning,
- is particularly effective for classes with heterogeneous student attainment
- enables the teachers to meet more diverse students' learning needs more effectively.
- can be fostered through the intervention.

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## Further research

### Continuing the project:

- Modelling Adaptive Teaching Competency

### Avenues for further research

- interaction between teachers' knowledge and the moments of the teaching performance
- Trajectory analysis of teacher knowledge, teachers' pedagogical beliefs, planning, teaching and learning outcomes
- the possibly compensatory link between adaptive planning and adaptive performance
- the pathways to developing teachers' professional knowledge in teacher education and in-service teacher training

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## Contact

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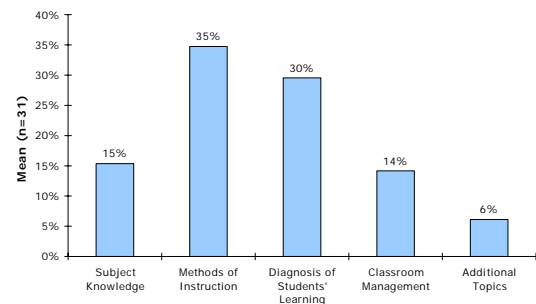
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## Addressing the four dimensions during content-focused coaching sessions

Average percentage of each dimension during content-focused coaching



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