

Problem-Based Learning in Teaching of Psychology

Traditional and Distributed Approaches

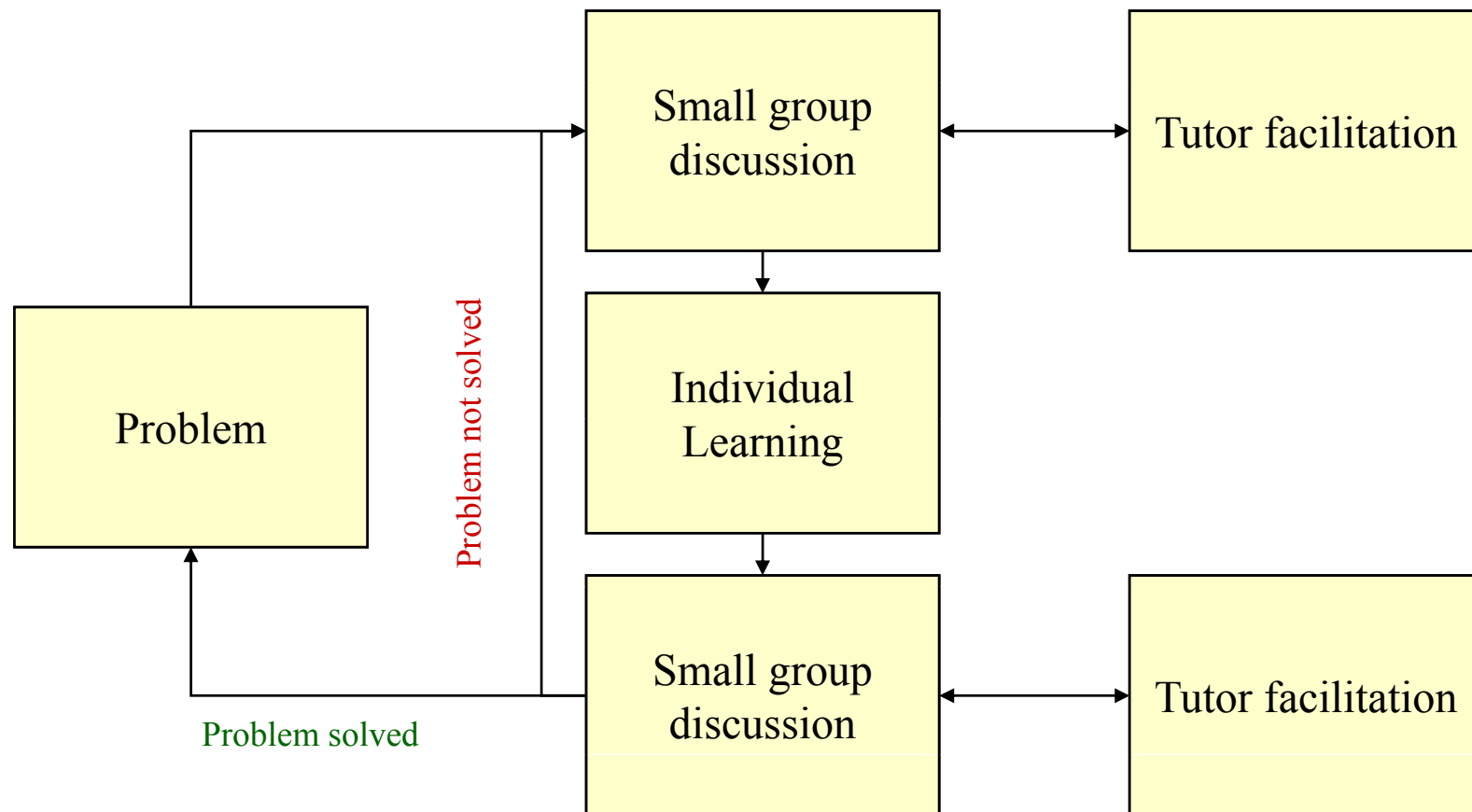
Joerg Zumbach



Overview

- Background: Problem-Based Learning (PBL) and distributed Problem-Based Learning (dPBL)
- Role of tutors in PBL
- Study 1:
The role of expert and novice tutors in distributed and traditional problem-based learning
- Study 2:
The role of *learners' expertise* in traditional problem-based learning

Background: (Distributed) Problem-Based Learning (dPBL)?



Campus Player

Datei ?

Campus Lehr- und Lernsystem

erliche Untersuchung

Auskultation
Auskultation Lunge dorsal
 Lunge auskultatorisch unauffällig mit Bronchialatmung bei seitengleicher Belüftung.

Science Education & Teacher Training

Small group learning

- Support and facilitation of social processes
- Support and facilitation of cognitive processes
- Influences of:
 - Stable vs. less stable groups
 - Group size
- Successful task-oriented groups (McGrath, 1984):
 - Production-function
 - Group well-being
 - Member support

Individual Learning

- Working on own objectives
- Resources:
 - Study books
 - Journals
 - Experts
 - Accompanying lectures and seminars

Tutors' facilitation

- Small group support as „didactic leader“
- Improving cooperative behavior
- Stimulating questions
- Not directive
- Learner centered
- Heterogeneous research outcomes regarding the tutors' role:
 - Expert tutor or
 - Non-expert tutor, peer or staff

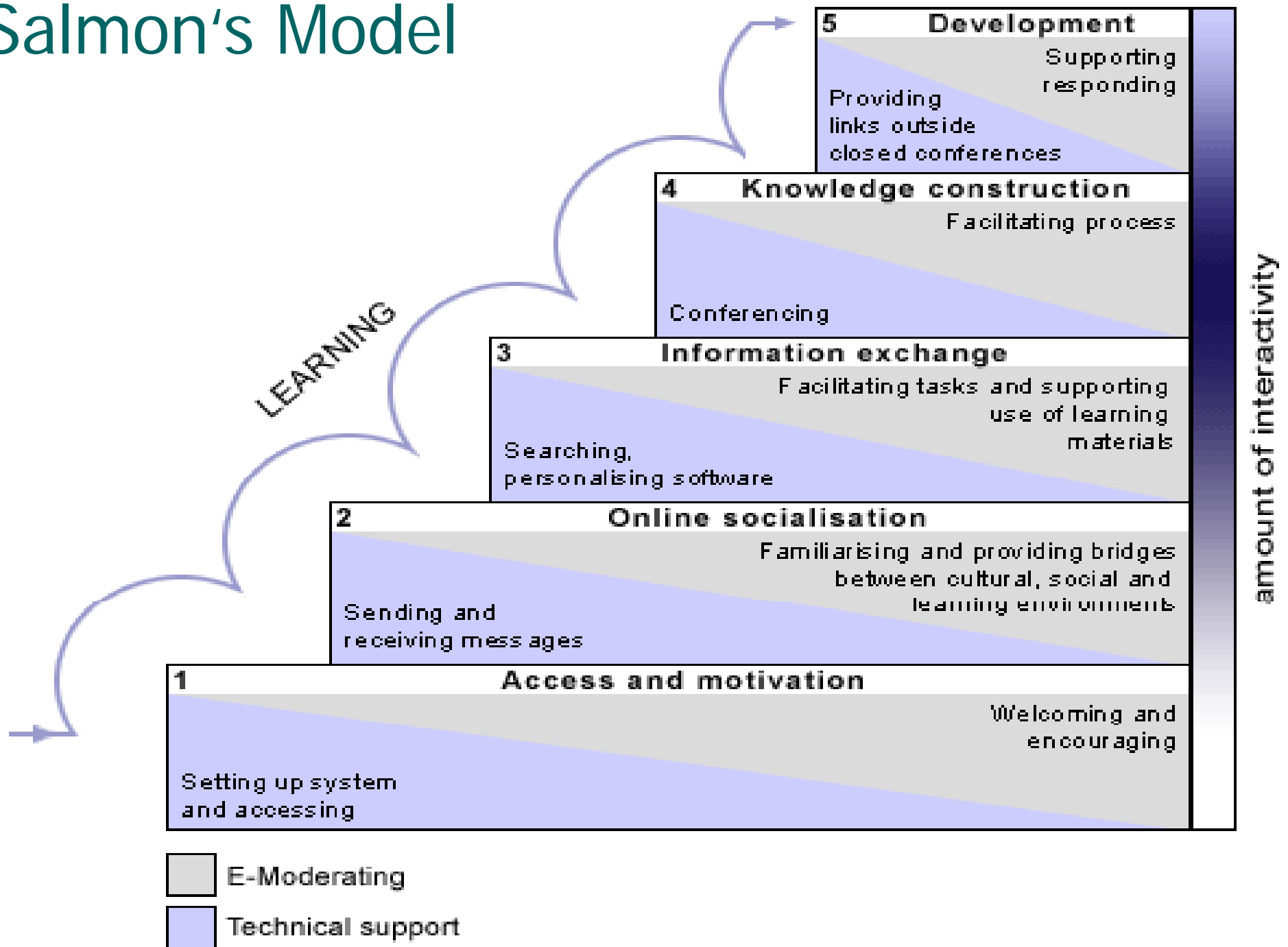
Research review: Comparative research

- Lecture-Based Learning (LBL) vs PBL
- Mainly: Medical Education
 - Basic Sciences: $LBL \geq PBL$
 - Clinical Sciences: $PBL \geq LBL$
 - Problem-Solving: $PBL > LBL$
 - Self-directed learning: $PBL > LBL$
- Problems of comparative research :
 - Heterogeneous approaches
 - Low effect sizes
 - Testing methods not appropriate (e.g., MC-tests)

Moving from PBL toward dPBL

- Media integration has a long tradition in PBL, e.g. by means of images or video
- Advantages of dPBL
 - Equally distributed participation of students (Cameron et al., 1999)
 - Chance to respond facilitator
 - Automatic storage of a group's discourse
- Disadvantages
 - Human-Computer Interface
 - Higher drop-out rates (Thomas, 2000)
 - Technical problems (e.g. Björck, 2001)
 - Insufficient group facilitation
- **One focus in our research: What kind of influence does a change in (communication) media have on tutors' facilitation?**

Salmon's Model

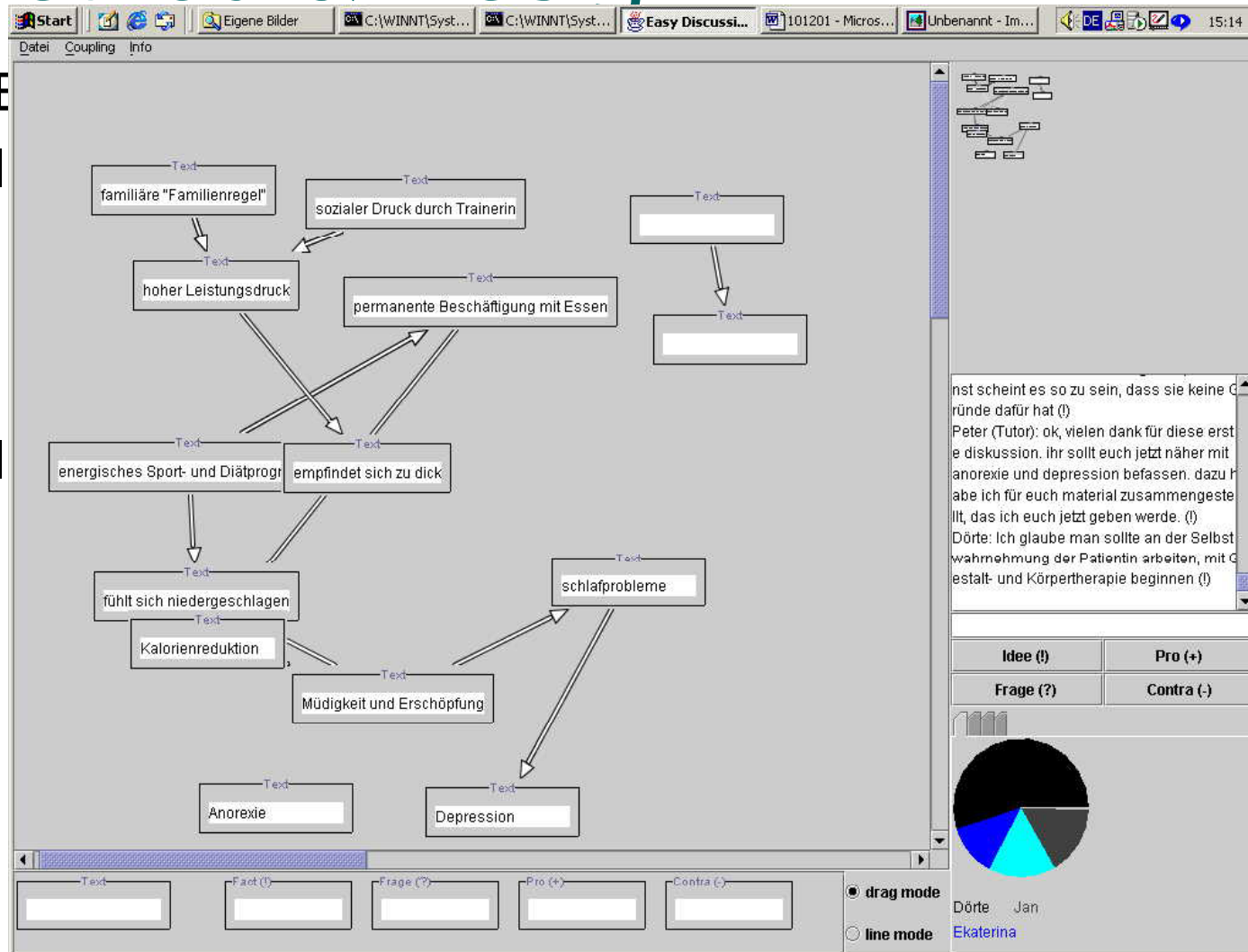


Study 1: The role of expert and novice tutors in distributed and traditional problem-based learning in novice learners

- Influence of tutor behavior on learners during PBL and dPBL?
 - Expert tutors versus
 - Moderating non-expert tutors
- Role of communication media?
 - Face-to-face versus
 - Synchronous computer-mediated communication
- Interaction effects?
- Material: A case description of a woman with a co-morbid disorder (Anorexia Nervosa and Depression) & Learning Material online (text book chapters)

Method & Design

- E
- I
- I

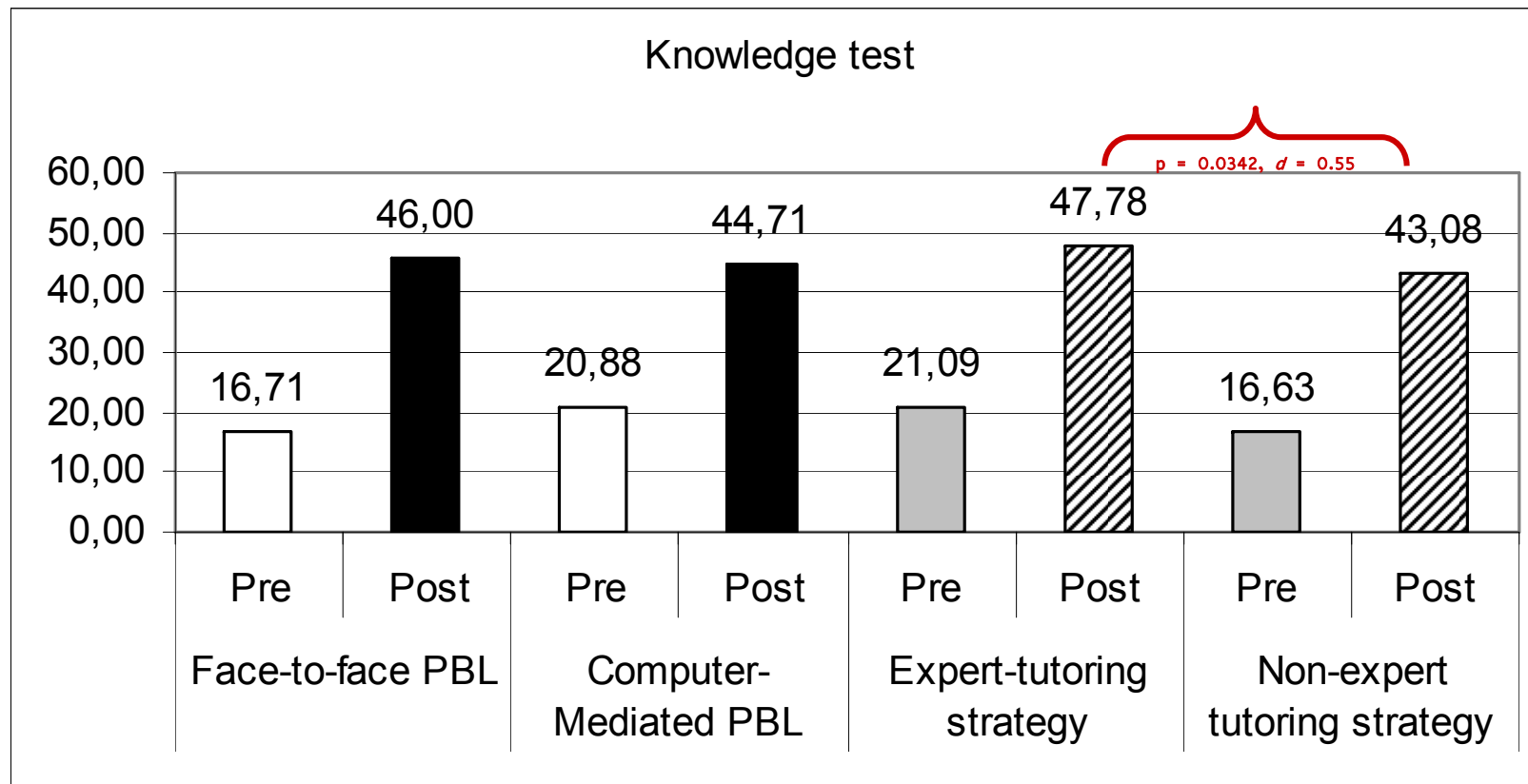


of

Dependent variables

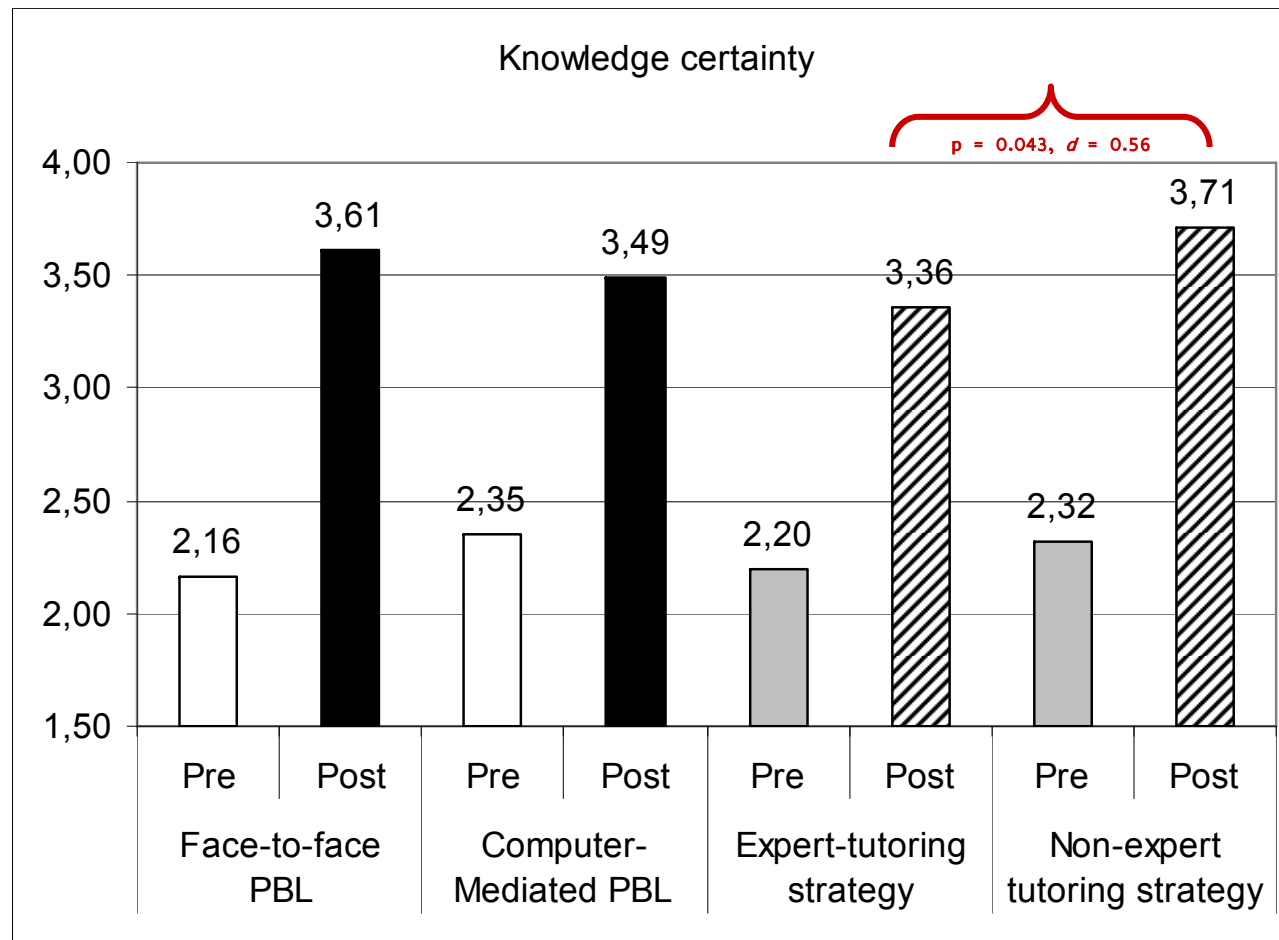
- Cognitive: Knowledge tests (Concept Mapping & MC)
- Meta cognitive: Certainty about own knowledge
- Motivation
- Emotional attribution: Satisfaction and course evaluation

Results: Knowledge

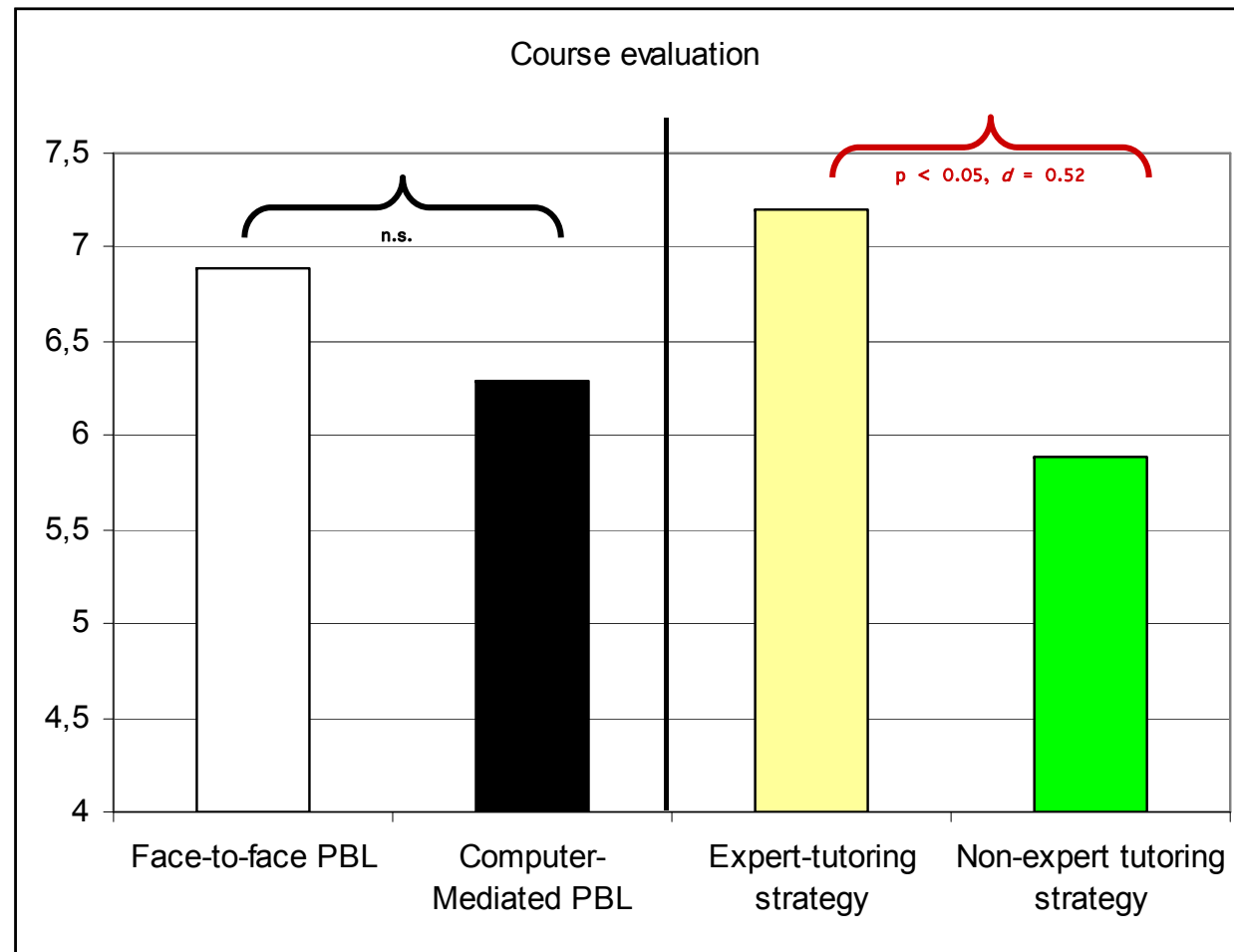


All groups performed better in the post-test than in the pre-test
 (Wilcoxon Matched Pairs Test: $Z = 6.03$, $p < 0.001$, $d = 1.64$)

Results: Certainty



Course evaluation



Study 2: The role of learners' expertise

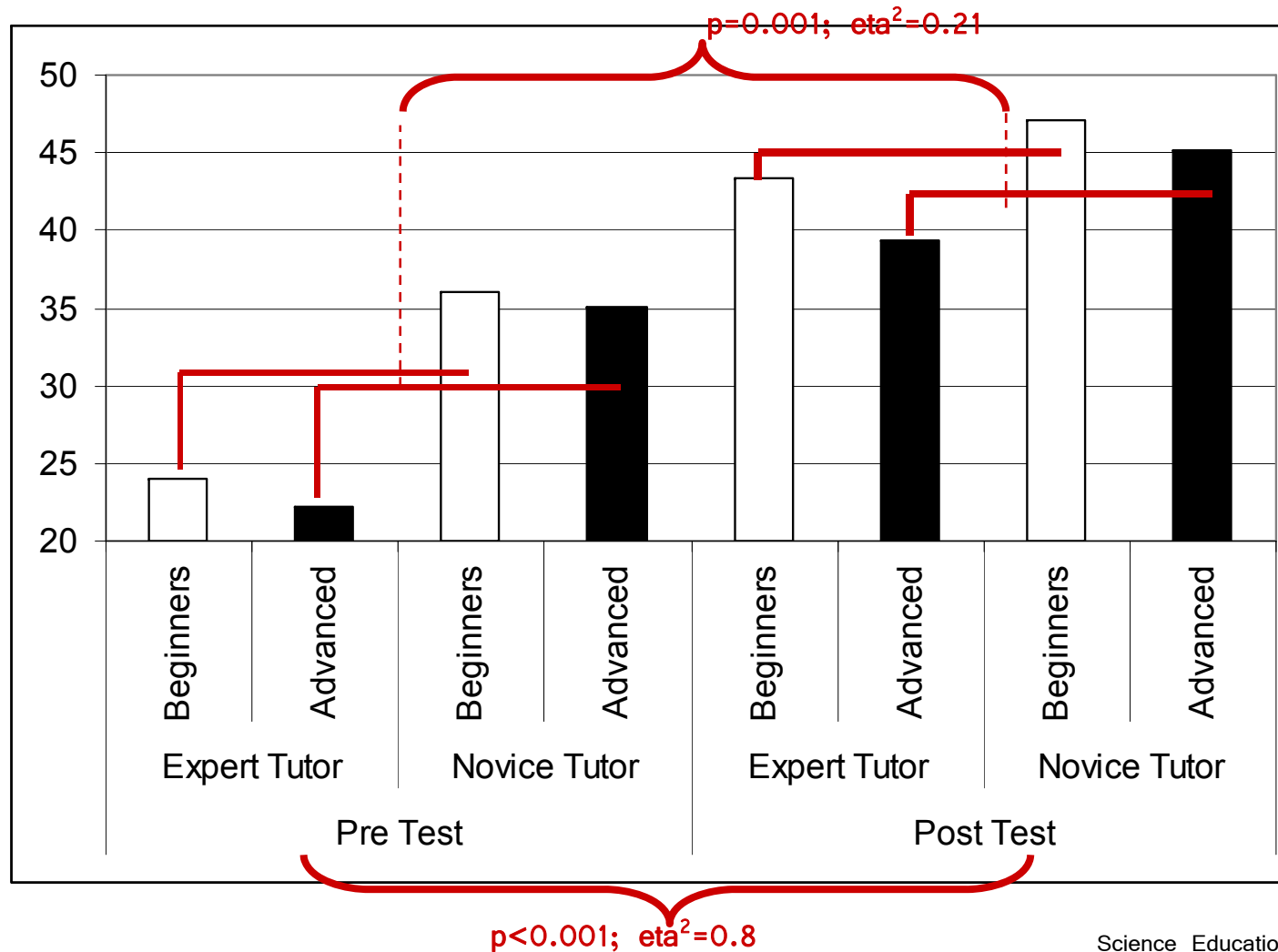
- Quasi-experimental
- Independent variable: Tutor behavior
 - Expert tutor: Completion of information & correction of wrong statements
 - Moderation
- Independent variable: Learners' expertise (practitioners vs. students)

	Expert tutor	Moderating tutor
Beginners	N = 12	N = 12
Advanced	N = 12	N = 12

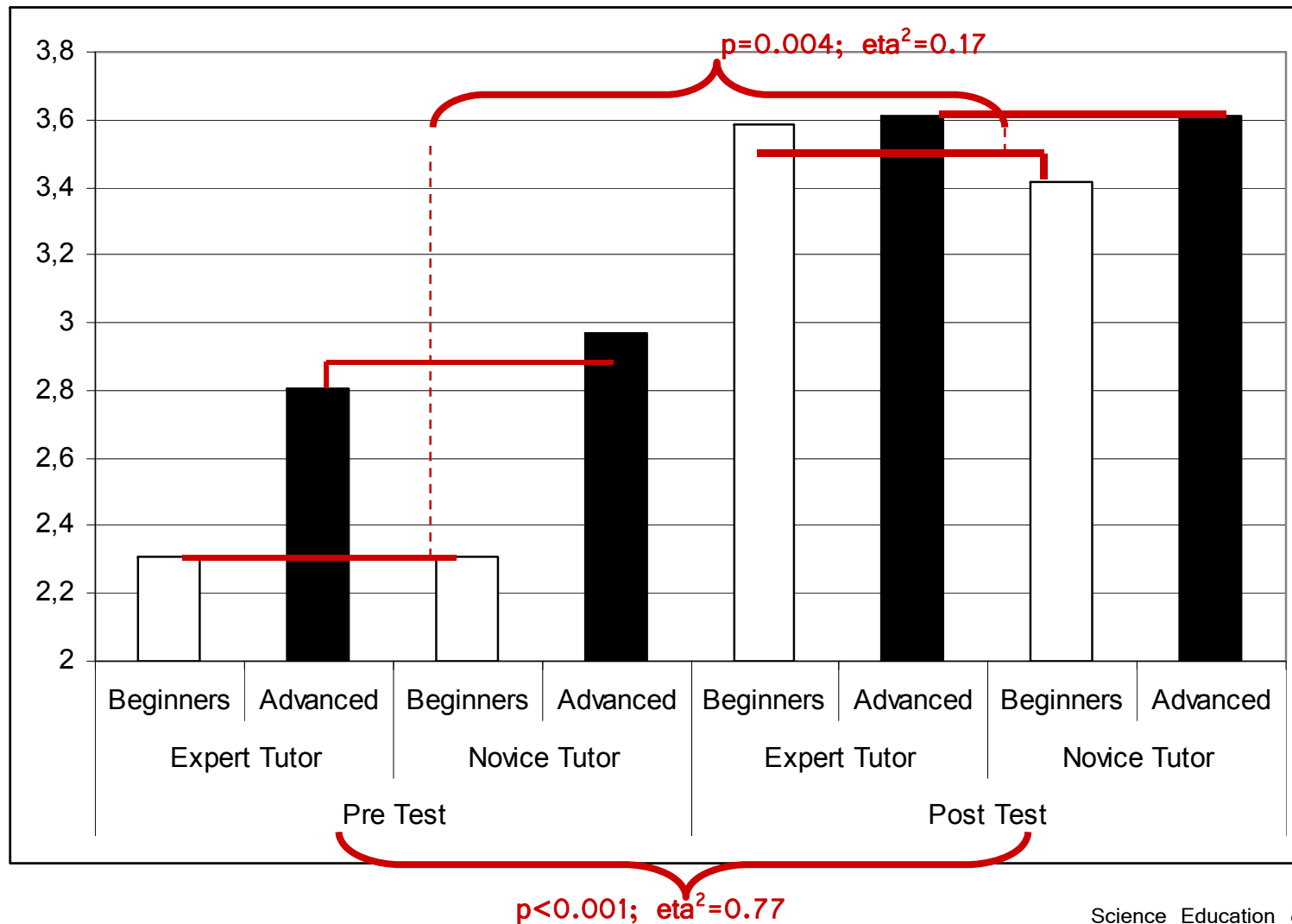
Dependent variables

- Cognitive: Knowledge tests (Concept Mapping & MC)
- Meta cognitive: Certainty about own knowledge
- Motivation
- Emotional attribution: Satisfaction and course evaluation
- Material (same as in Study 1)

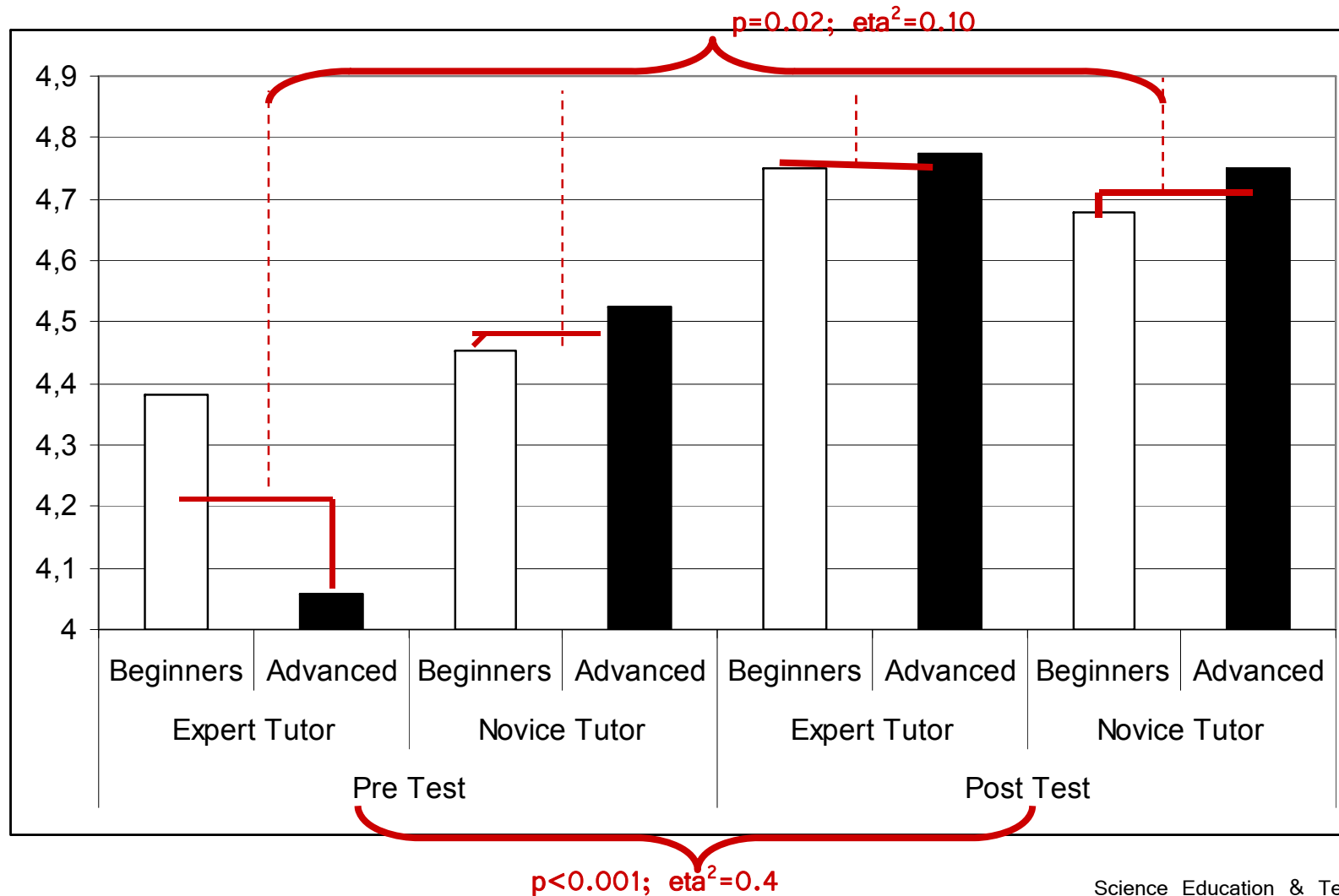
Results: Knowledge Acquisition



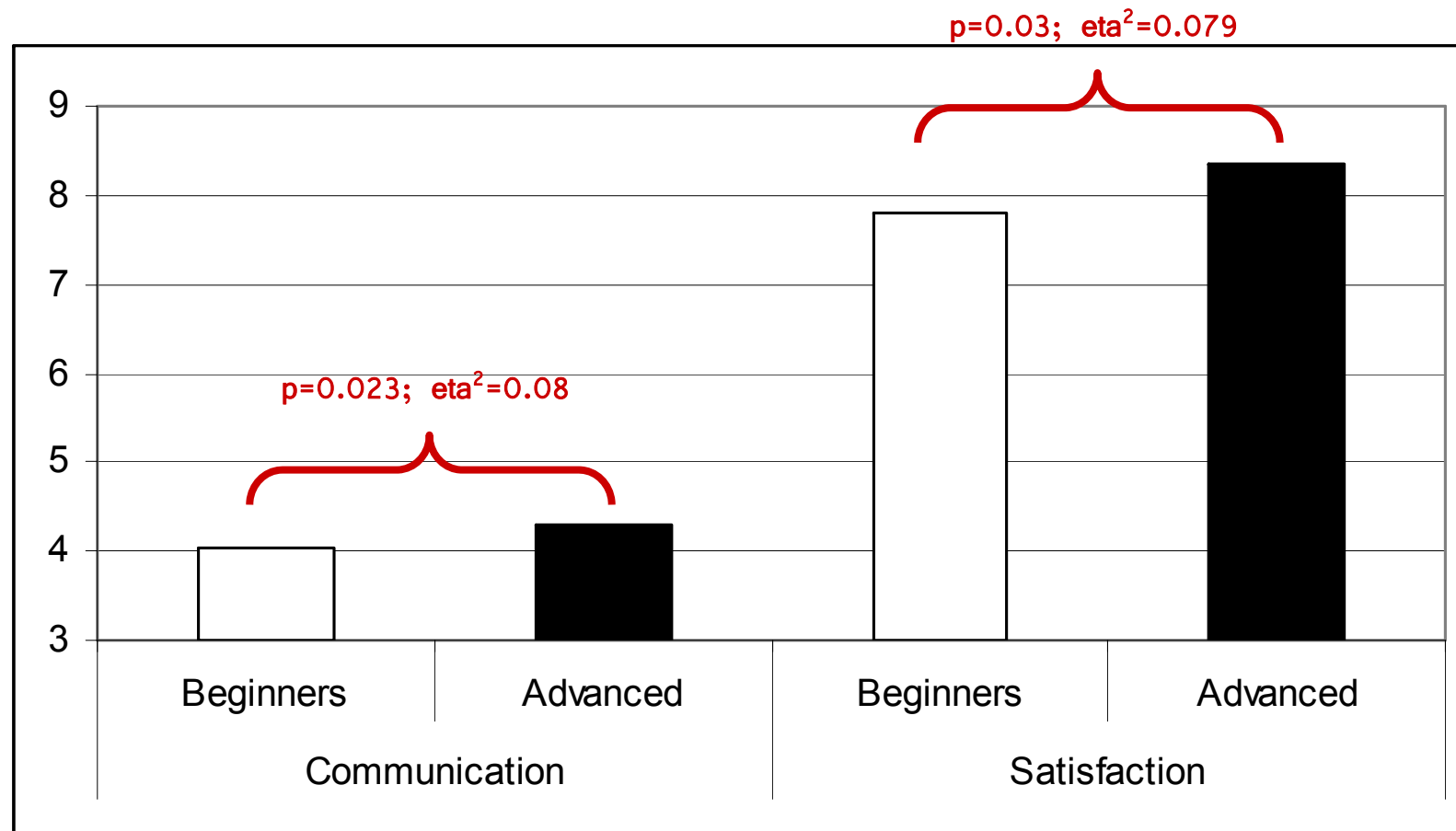
Results: Certainty in Knowledge Acquisition



Results: Motivation



Results: Communication & Satisfaction



Summary & Discussion

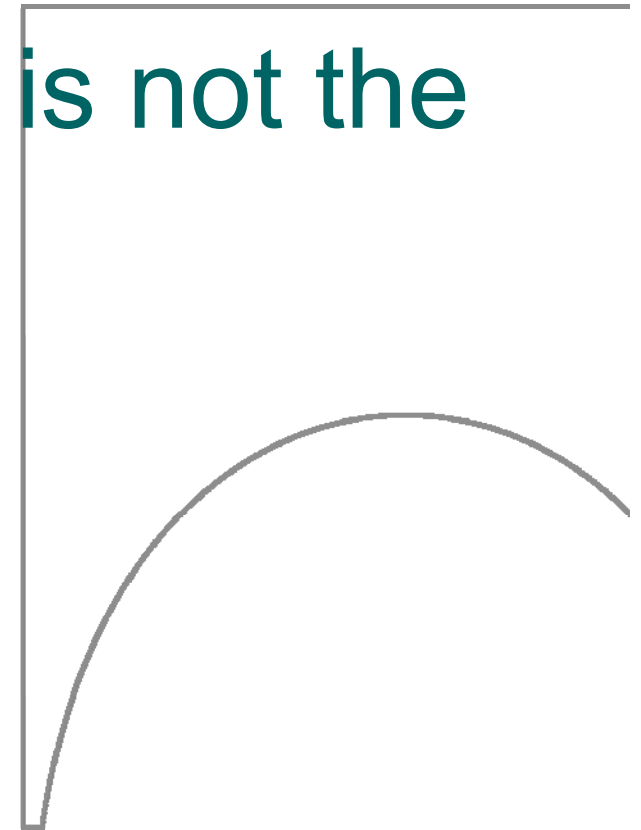
- Study 1:
 - In „*expert tutor condition*“ participants learn quantitatively more and are more satisfied with the learning environment
 - In „*moderator conditions*“ participants have a higher certainty about their knowledge, perhaps an “illusion of knowledge”
 - In „*dPBL condition*“ facilitation of the group is regarded as more important; satisfaction with the small group work is smaller
 - **Note:** All participant were beginners in PBL and in the content of the lesson
 - This stands in line with prior PBL field research: Beginners need a higher level of guidance/instruction

Summary & Discussion

- Study 2:
 - Novice Learners are highly “vulnerable” for intervention (here: knowledge acquisition and motivation)
 - In „*moderator condition*“ (i.e., with a non-expert tutor) participants still have a higher certainty about their knowledge, again an “illusion of knowledge”?
 - Novice learners seem to need more guidance while expert learners seem to benefit from self-directed PBL
 - This stands - again - in line with prior PBL field research: Beginners need a higher level of guidance/instruction

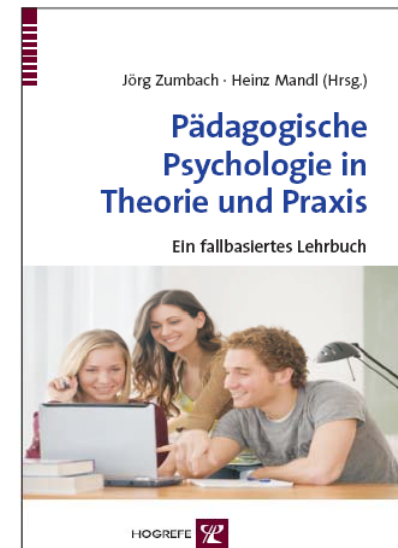
Study 3: When the case is not the problem...

...but the class size ;-(

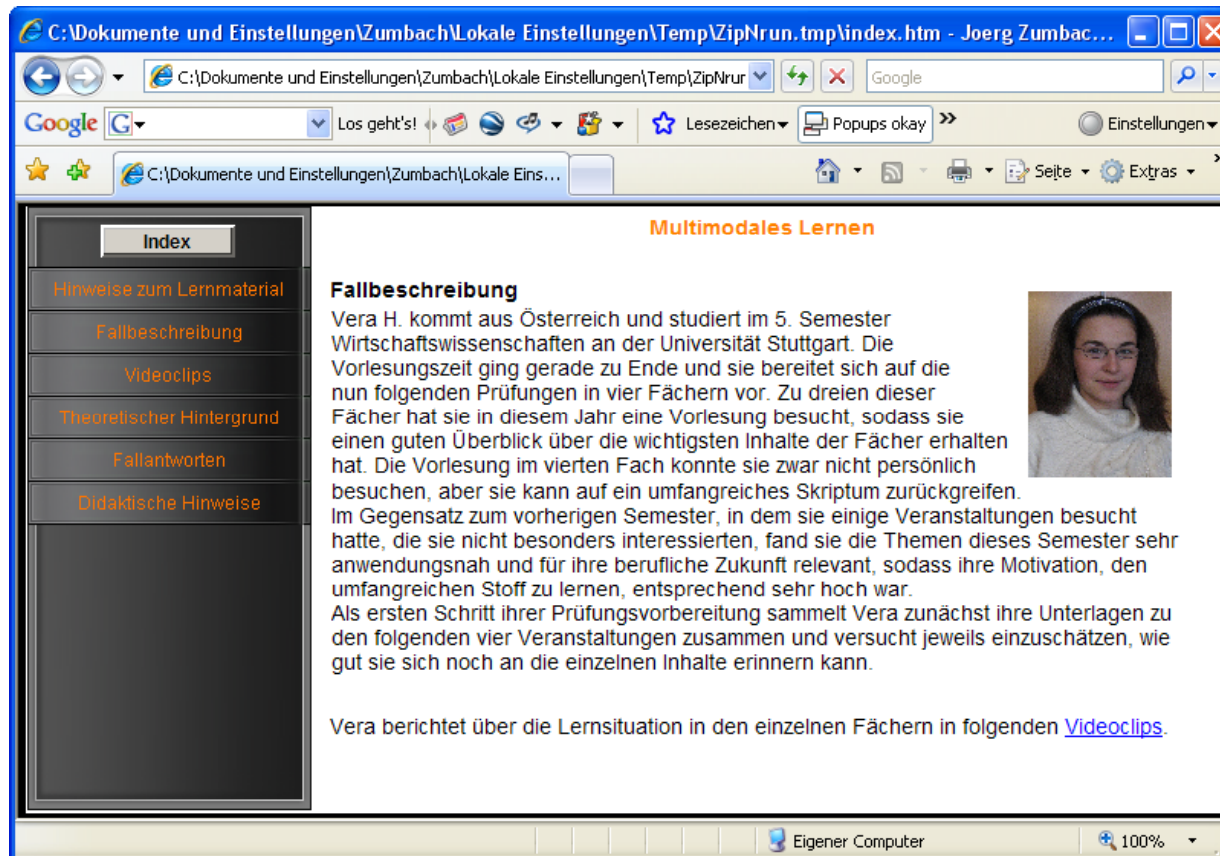


Case-based Teaching in Large Lectures

- Text from a case-based study book
 - Cases
 - Questions to approach the case
 - Theoretical background
 - Relation theory - case
 - Answers to the questions
- Implementation in a digital learning environment
- Dual use: In lecture and as self-regulated LE



Video-based Format



Index

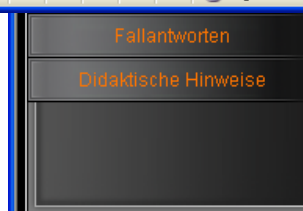
- Hinweise zum Lernmaterial
- Fallbeschreibung
- Videoclips
- Theoretischer Hintergrund
- Fallantworten
- Didaktische Hinweise

Multimodales Lernen

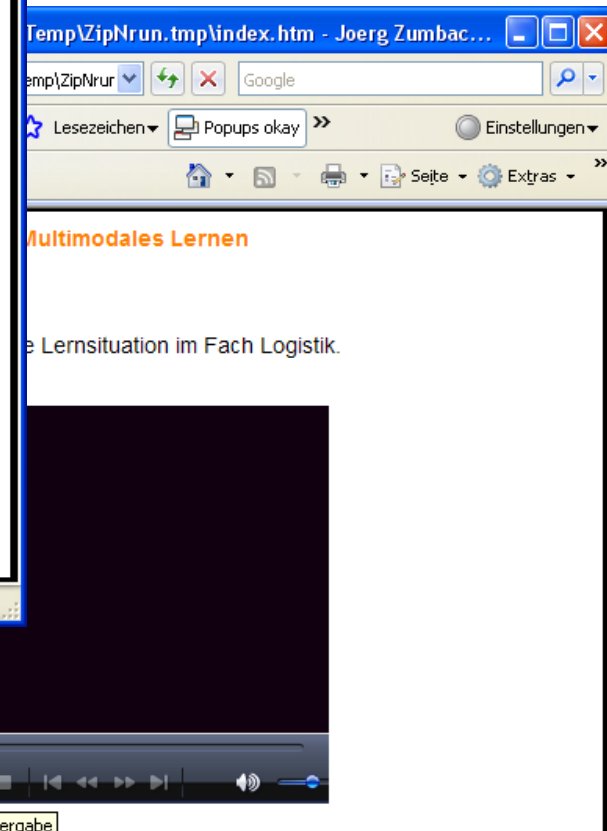
Fallbeschreibung

Vera H. kommt aus Österreich und studiert im 5. Semester Wirtschaftswissenschaften an der Universität Stuttgart. Die Vorlesungszeit ging gerade zu Ende und sie bereitet sich auf die nun folgenden Prüfungen in vier Fächern vor. Zu dreien dieser Fächer hat sie in diesem Jahr eine Vorlesung besucht, sodass sie einen guten Überblick über die wichtigsten Inhalte der Fächer erhalten hat. Die Vorlesung im vierten Fach konnte sie zwar nicht persönlich besuchen, aber sie kann auf ein umfangreiches Skriptum zurückgreifen. Im Gegensatz zum vorherigen Semester, in dem sie einige Veranstaltungen besucht hatte, die sie nicht besonders interessierten, fand sie die Themen dieses Semester sehr anwendungsnah und für ihre berufliche Zukunft relevant, sodass ihre Motivation, den umfangreichen Stoff zu lernen, entsprechend sehr hoch war. Als ersten Schritt ihrer Prüfungsvorbereitung sammelt Vera zunächst ihre Unterlagen zu den folgenden vier Veranstaltungen zusammen und versucht jeweils einzuschätzen, wie gut sie sich noch an die einzelnen Inhalte erinnern kann.

Vera berichtet über die Lernsituation in den einzelnen Fächern in folgenden [Videoclips](#).



- Fallantworten
- Didaktische Hinweise

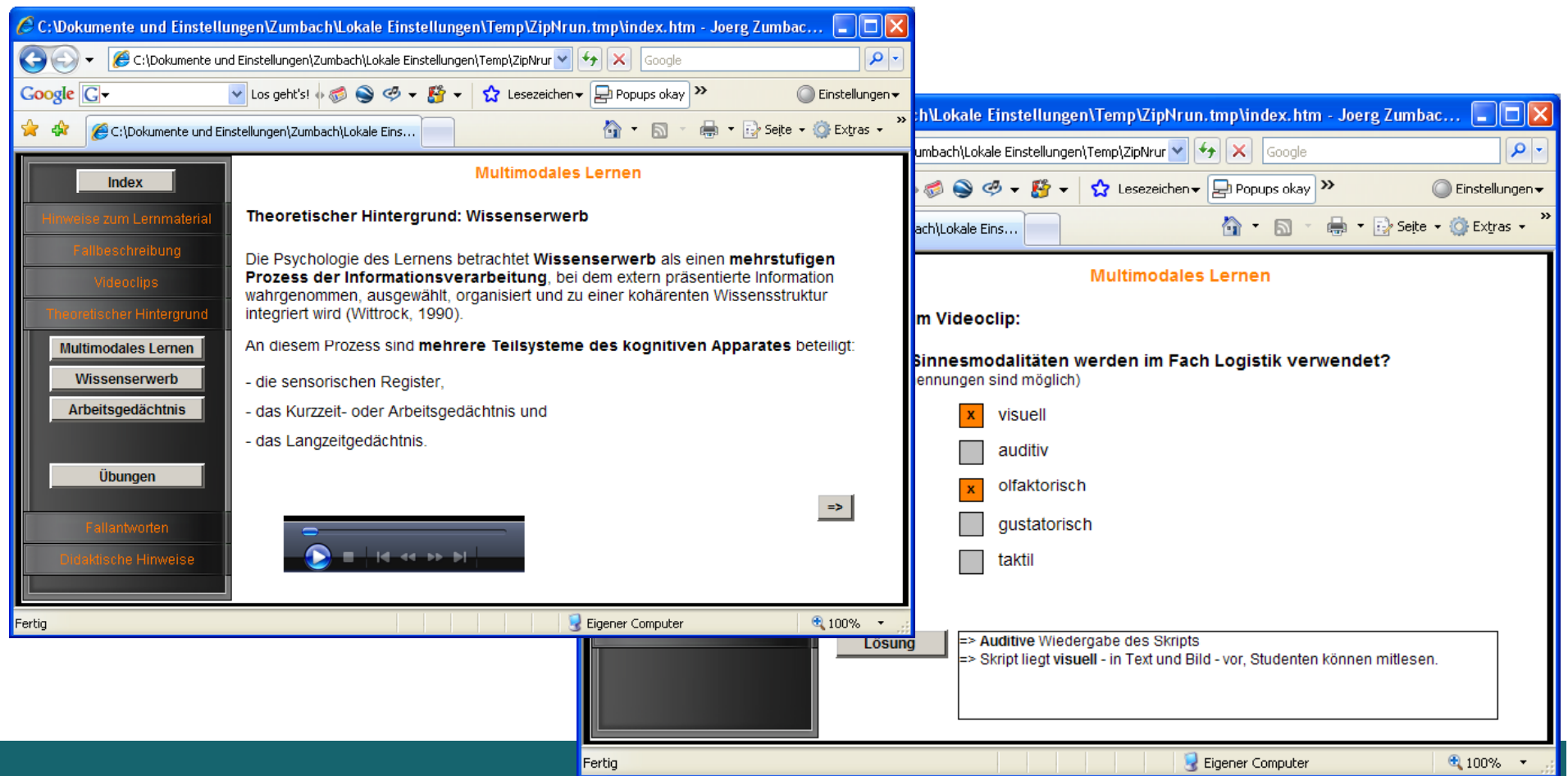


Multimodales Lernen

...e Lernsituation im Fach Logistik.

Wiedergabe

Theoretical background and solutions



The screenshot shows a web browser window with the following content:

Multimodales Lernen

Theoretischer Hintergrund: Wissenserwerb

Die Psychologie des Lernens betrachtet **Wissenserwerb** als einen **mehrstufigen Prozess der Informationsverarbeitung**, bei dem extern präsentierte Information wahrgenommen, ausgewählt, organisiert und zu einer kohärenten Wissensstruktur integriert wird (Wittrock, 1990).

An diesem Prozess sind **mehrere Teilsysteme des kognitiven Apparates** beteiligt:

- die sensorischen Register,
- das Kurzzeit- oder Arbeitsgedächtnis und
- das Langzeitgedächtnis.

in Videoclip:

Sinnesmodalitäten werden im Fach Logistik verwendet?
(Mehrfachnennungen sind möglich)

- visuell
- auditiv
- olfaktorisch
- gustatorisch
- taktil

Lösung

=> **Auditive** Wiedergabe des Skripts
=> Skript liegt **visuell** - in Text und Bild - vor, Studenten können mitlesen.

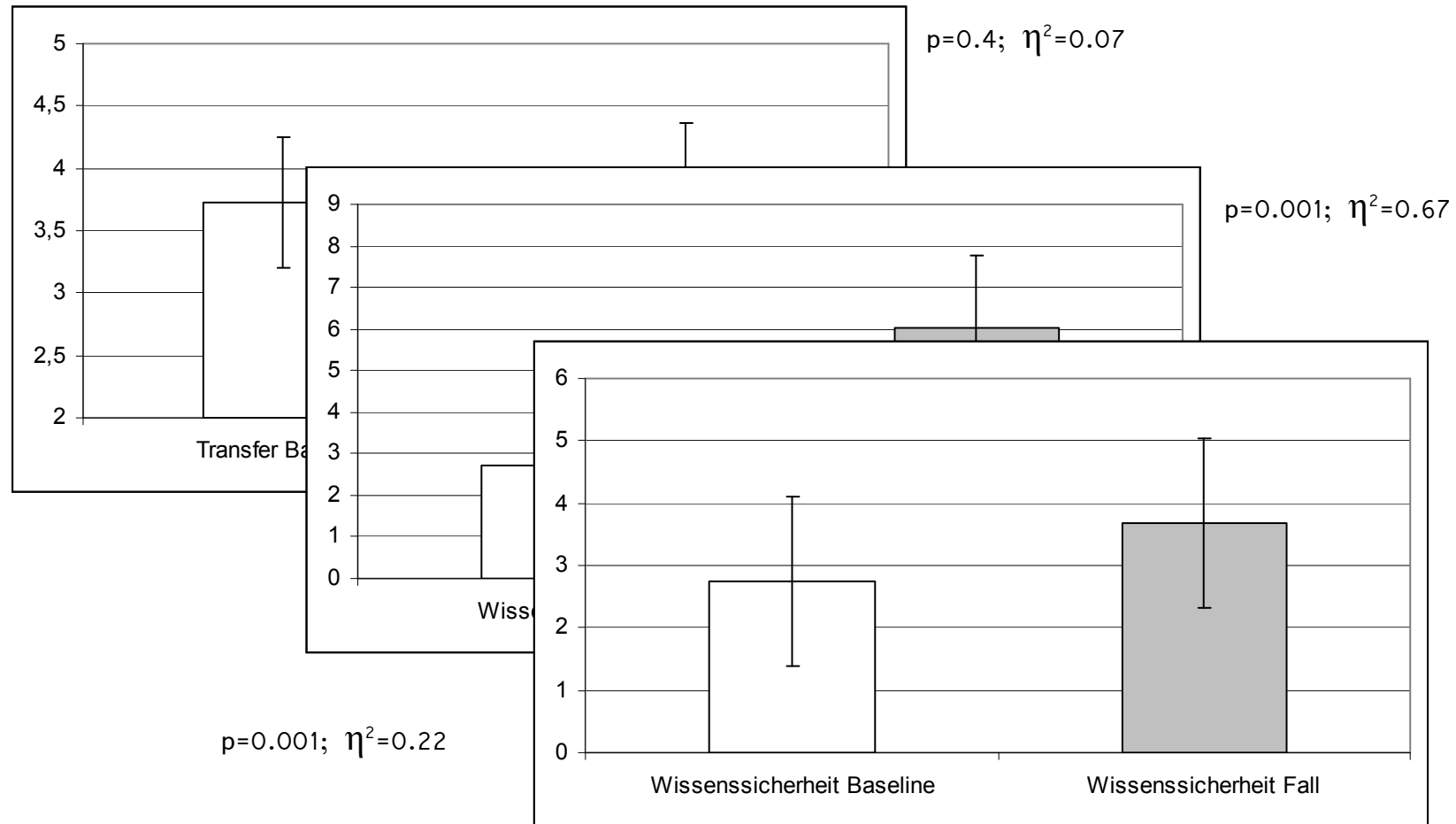
Comparison with a common lecture

- Skales:
 - Teaching quality (13 Items; Cronbach's Alpha = 0.82)
 - Probability of transfer (5 Items; CA = 0.69)
 - Motivation (7 Items; CA = 0.89)
 - Knowledge acquisition
 - Subjective certainty in knowledge acquisition
 - Overall judgment
- Baseline and case-based lecture (complete data N = 43)

Results

- No significant differences in :
 - Quality of teaching
 - Motivation
 - Overall judgment
- Significant increase from baseline to case-based teaching:
 - Transfer
 - Knowledge acquisition
 - Subjective certainty in knowledge acquisition

Results



Summary and discussion

- Learning with cases/problems in large lectures
 - Does not necessarily motivate students more
 - Does not change the prerequisites of large lectures and students' overall judgments
- But:
 - Strengthens the subjective practical relevance and probability of transfer
 - Is an effective instructional approach
 - Fosters students self competence
- Might be a pragmatic and intermediate approach to PBL



Österreich ist ein mehrsprachiges Land...
...außer Hochdeutsch

www.zumbach.info