

PA-D25

Strand 5

Learning Study and Trainee Teachers' Content Knowledge and Pedagogical Content Knowledge: Preliminary Evidence from Economics and Business

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Previous studies support the notion that Learning Study has powerful effects on teacher learning (e.g. Holmqvist 2010). This paper reviews this conclusion by providing evidence of the effect of Learning Study on trainee teacher's Content Knowledge (CK) and Pedagogical Content Knowledge (PCK) (Shulman 1987). In doing so the study comments on the relationship between CK and PCK and the usefulness of operationalizing both in terms of phenomenography/variation theory. Six groups of postgraduate trainee Economics teachers two top rated UK Universities undertook Learning Studies on the phenomenon of price. To assess trainees' CK, all completed pre and post written tests on price determination. To assess PCK, all trainees proposed a hierarchy of student understanding of price both before and after the Learning Study. From this and evidence gathered through pre and post interviews, categories of description of trainees' understanding of

differences between student conceptions were developed and trainees classified according to their highest conception. Comparisons were made pre and post Learning Study and relationships between CK and PCK examined. The study proposes a new way of categorising conceptions of price and establishes trainee teachers' conceptions of the increasing sophistication of students' conceptions. Preliminary analysis indicates Learning Study has a positive effect on trainees' PCK. The low level of trainees' CK/PCK is striking. Findings support previous conclusions (e.g. Baumert et al. 2010) that CK is a necessary but not a sufficient condition for PCK. This study seeks to complement the small body of literature (e.g. Attorps et al. 2003) examining CK and PCK in terms of phenomenography/variation theory by looking at effects of Learning Study on teacher development. That Learning Study can have significant effects on teachers' CK and PCK adds to previous findings and supports arguments for its' inclusion in teacher development programmes. The study suggests that framing CK and PCK in phenomenographic/variation theory terms offers theoretical unity, clarity and a practical way of measuring both.

Keywords: Learning Study, Pedagogical Content Knowledge, Content Knowledge, Phenomenography

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Conceptual Learning in a Thinking Classroom

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If we are to prepare our pupils for the complexities of 21st century learning, the Thinking Classroom is the way forward in the educational landscape. It is also the driving force behind the pedagogy of inquiry in Science learning.

Students must move beyond the role of passive receiver of information and into the role of active participant in their learning. In order to "go beyond what is given," students must think critically and creatively about the topics they are studying. Going beyond the information given might mean students generating an explanation, challenging an assumption, making a comparison, or applying ideas to new contexts. Thinking critically and creatively contributes to effective learning because it helps learners develop deeper and more cognitively integrated understandings of ideas and concepts.

The lesson study seeks to explore how teachers in the Thinking classroom use concepts to integrate thinking at a deeper level. The team will explore different thinking dispositions and thinking routines to build up, to connect new ideas with existing knowledge and to extend new knowledge. The team will also seek to provide Pictures of Practice to illustrate how science classroom teachers have infused thinking into instruction in practical and creative ways. At the end of it, we want to develop a thinking classroom with a strong thinking culture which encourages students to develop good thinking dispositions, skills, and habits of mind.

Keywords: Thinking Classroom, 21st Century Skills, Pictures of Practice, thinking critically and creatively

Teacher Professional Learning through Lesson Study in Wes Java

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Lesson study has been implemented through school-university partnership in Indonesia since 2006. Teachers in collaboration with teacher educators promote student active learning through a plan-do-see cycle. In plan sessions, teachers collaboratively design a lesson based upon 'hands-on' and 'mind-on' activities with a real world, daily life approach utilizing available local materials. In do sessions, a teacher delivers a lesson while others observe the lesson focusing on student learning. See sessions are conducted soon after the lesson to share views on student learning. For committed teachers, the practice of lesson study as a form of teacher professional development has resulted in professional learning resulting, for example, from observing a colleague's lesson or through self-reflection on video recordings of one's own lessons. Mathematics teachers were able to facilitate students' engagement in collaborative learning after participating in subject based lesson studies. Another increased her sensitivity to facilitating slower learner students. A science teacher initiated and led the participation of her colleagues in school based lesson study. Another introduced and trialled a new form of lesson design, much to the appreciation of her Principal. Following successful implementation of piloting, lesson study has been expanded to other districts in West Java Province in Indonesia. Detailed evidence of teacher learning and supporting factors in West Java contexts will be shared.

Keywords: Lesson Study, subject based lesson studies, West Java Province, Indonesia

PA-C29 (Former PA-D16)**Strand 9****Critical aspects from an empirical and a theoretical perspective**

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We have been working with Learning Study and Variation Theory since 2003 when we were teachers in the first studies in Sweden. During the last years our main focus has been tutoring teachers in the use of Variation Theory in practice. Our experience is that teachers on one level quite easily can apply a theory of learning, both in planning and conducting teaching, but that some of the concepts in Variation Theory are more challenging to transfer into practice.

The concept of critical aspects is an example of this and several aspects could easily be taken for granted when using this concept for developing lessons in a Learning Study. In our presentation we will discuss and highlight the difficulties you can face in the process of transferring theoretical concepts into practice. Questions addressed in the presentation are: What could be critical when introducing the concept of critical aspects for teachers in a Learning Study? What alternative ways of seeing the concept have we found?

Keywords: Learning study, variation theory, practice, critical aspects