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Enhancing Student Learning with Variation Theory in Learning Study

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Learning Study has been adopted as a main collaborative action research approach for teacher professional development in Hong Kong since 2000 and in Sweden since 2003. Learning Study is a special type of Lesson Study. Its uniqueness lies in the adoption of Variation Theory as its guiding principle. Variation Theory argues that learning is always directed to a certain object of learning. Each object of learning bears many various aspects. Some of the aspects are more critical than the others and should be the very focus of teaching. In order to discern the critical aspects, a person needs to experience variation corresponding to these aspects.

Paper 1 introduces the teaching approach guided by Variation Theory with Johann Herbart's five-component framework of a teaching approach, including theoretical framework, objectives of teaching, teaching process, teaching strategies and assessment. Examples from a number of Learning Study projects will be used to illustrate each component in detail. The presentation concludes with implications for applying Variation Theory to achieve effective learning and teaching.

Paper 2 illustrates how Variation Theory was put in practice to improve primary three students learning of the positional numeral system in a Swedish school. To understand the positional numeral system, the students have to understand how the numbers are grouped. The standardized tests indicated that the primary three students in the school viewed 10 as a numerical digit and not as a number. In our continuously and collaboratively work on developing teaching for students learning we use Variation Theory principles. After teaching a lesson, the didactic teams met to discuss, analyze and draw conclusions from the new data that were gathered. The most critical aspect found was that the students did not understand how the decimal system (10-base) was structured. By contrasting that system with a quinary system (5-base) the students were shown the principles of grouping numbers together. The groupings stayed constant while the numbers varied. During the lesson the teacher used the students own answers, as examples to contrast the wrong and the right answers. The teams then shaped new lessons based on those discussions. When analyzing the posttests we could see that teaching with Variation Theory principles had a positive outcome on the students' learning of the positional numeral system.

Paper 3 presents a Learning Study applying Variation Theory to teach how to write non-fictional texts to primary two children in a Swedish school. The standardized tests indicated that the target students in the school had difficulties with the parts regarding non-fiction texts. We therefore saw a need to further investigate how to improve the students' learning to write non-fictional texts. The most critical aspect that was found was that the students needed to difference between fact and opinion. By contrasting a

non-fictional text and a song lyric, while the topic of Space was kept constant, the students were made aware of the distinctions between the two different types of texts. The analysis of the posttests showed that our students learning had improved. The standardized tests that were performed the next semester also showed the same result.