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Learning to Teach by Pre-service Teachers in a Learning Study Course in Hong Kong

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Learning Study has been employed in pre-service teacher training in Hong Kong since 2007. This presentation by pre-service teachers introduces their use of Variation Theory in and learning from three Learning Study projects in Hong Kong.s

Project 1 focuses on the teaching map reading skills for understanding Hong Kong landscapes in General Studies of primary four. Two lessons were designed and taught collaboratively by a group of six pre-service teachers in 2016. In order to reach the object of learning, i.e., the ability of reading a map, four critical features were confirmed according to the pre-test: the names of the three map symbols (CF1), the functions of the map symbols (CF2), the names of the eight directions in Chinese (CF3) and understanding the questions about directions (CF4). Throughout the two lessons, Variation Theory was the main method to highlight the critical features for students. The pedagogical design of Lesson 2 was revised after the post-lesson reflection based on the post- test and observation of Lesson 1. It was confirmed by the pre- test and post- test results that, improvement of students' ability in map reading was bigger in Lesson 2 than Lesson 1.

Project 2 focuses on teaching the use of adjectives to primary two students. After a pre-test was conducted, the critical features identified were 1) function of nouns, 2) function of adjectives, 3) the positioning of adjectives and 4) the practical application of adjectives. A total of two lessons were deliberately designed and co-taught by a team of pre-service teachers. It was found that Lesson 2 achieved better improvement in the post-test than in the pre-test, compared to Lesson 1. The key factors producing such differences included blackboard management, activity formats and reiteration of concepts. The results suggest the need to consolidate variation theory and its relevant facilitating factors in order to achieve the most suitable pedagogical design wherein students learn the object of learning best.

Project 3 focuses on helping primary three students learning how to describe a picture in a short English passage. Elements of Variation Theory, like comparing two examples written about the same topic and focusing on one critical feature at a time, were applied in teaching to help the students to improve their picture descriptions with richer content and great organization. The Learning Study was carried out in two cycles among students in two classes in the same level. Through lesson observation of cycle 1, teachers of cycle 2 developed better understanding of student needs and carried out improvements in some activities. It was found that the improved version of the posters enabled the students to see more clearly the different features of contents and how to categorize sentences.

Learning Study enabled all members on the team to share their pedagogical knowledge and work together to find more effective teaching approaches, which is important in enhancing student learning. The

presentation concludes with implications for effective use of Variation Theory and the application of Learning Study for pre-service teacher learning.

Writing Texts Containing Multiple Sources and Conclusions in Upper Secondary School

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In spring of 2016 we, together with a third colleague, performed a learning study. We were one of many learning study projects at our school and our study took place in the subject of the Swedish language (our pupils' mother tongue). Swedish is a subject in which we practice speaking, writing and reading and in this study we focused on the writing process.

The object of learning was: Writing a text containing multiple sources and conclusions, in which the conclusions are based on the sources and the content of the written text. The reason why we chose this object of learning was because we noticed that our pupils had difficulties writing a coherent text. Our pre-test revealed that several texts lacked correct references and stringency. It also showed that a lot of our pupils had difficulties understanding what a text requires to be apprehensible, for example linking words, sufficient explanations and reasonable conclusions.

The purpose of our study was to visualize different aspects in a text that are necessary to make a text coherent. To enable this we used the method of learning study and based our study on the theory of variation (Marton, 2015). By using the results from the pre-test we found a number of critical aspect from which the lessons in the study were designed. The theory of variation contains: contrast, generalization and fusion. We focused on contrast by which the pupils for instance examined one text with and one text without linking words. Thereby the pupils experienced the purpose of linking words in texts. Our lessons were divided in three parts; part one was about references and their function in texts, part 2 was about linking words and their meaning in the text and part 3 about drawing conclusions from the content.

Our conclusions from the lessons and the post-test was that the pupils gained better understanding of the purpose with references and why it is important that the text is explicit according to who says what. They also deepened their understanding concerning linking words and how they affect the texts' stringency and readability. Drawing reasonable conclusions from the content appeared to be more difficult. Both for us, who struggled with the contrast and producing clear examples, and for the pupils who sometimes had difficulties understanding our examples and what we really wanted them to see. An explanation could be that texts are influenced by the writer and their experiences and therefore it is difficult for us to draw a clear line between what is reasonable to write and what is not.

Since writing is something pupils practice in all school subjects this object of learning is relevant for all teachers. This study in general and part 3 in particular were an eye opener for us. It showed us that to be able to give our pupils powerful tools for them to use in the writing process we need to understand their way of thinking and how it affect their writing.

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Teaching Mathematics through Problem Solving in Singapore Classrooms

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Designing mathematics lessons where teachers play a facilitative role and students are empowered to take charge of their own learning by building mathematical ideas collaboratively with their classmates requires a paradigm shift in teachers' conceptions of teaching and learning. At the core of mathematics learning is problem solving. Teachers are often challenged by what they believe to be effective teaching and learning of problem solving when designing such lessons. This is especially true in the context of a packed curriculum and high-stakes assessments in Singapore.

A group of Math teachers from two primary schools in Singapore worked together in planning a live research lesson involving problem solving using open-ended tasks. With guidance from knowledgeable others, the collaborative learning process was framed by the key features of Lesson Study and undergirded by the Teaching for Robust Understanding of Mathematics (TRU) framework. The research lesson focused on introducing 'Average' to Primary 5 students by adopting a structured problem solving approach where students were posed an open-ended task that enabled them to think mathematically about the purpose and usefulness of average in comparing two sets of data. By doing so, they can further appreciate the use of this concept in real world settings, beyond the boundaries of textbooks and the classroom.

This paper seeks to describe how the team addressed the challenges they faced in effecting a paradigm shift in both the conceptual design of the unit plan and research lesson and its subsequent implementation. From the design of an appropriate task with multiple entry points for students, to the process of anticipating possible student responses to the task and eventually orchestrating discussions during the lesson that affords students opportunities to construct meaning for themselves and to learn from one another, the team will share its experiences in designing the research lesson. Besides highlighting key points of discussion that occurred during the pre and post lesson discussions, the paper will include reflections from the two teachers who conducted the live lessons on how the knowledge and expertise that they have built through the entire lesson study experience have reshaped their beliefs in effecting instructional changes in the classroom that facilitates students to be independent learners.