

instructional strategies of questionable efficacy, i.e., interventions that have little to no empirical basis. In Singapore, the training for special needs therapists (SNTs) involves diagnosing learning and/or behavioural challenges, dialoguing with the client and his family to establish a clear understanding of his challenges, and didacticizing (coined by Oerbaek, 2009) so that the client can learn to manage or cope with his learning and/or behavioural challenges. This systematic approach is known as the Triple-D Model in special education covering diagnosis, dialogics and didactics. Within this framework, the Lesson Study is adapted and implemented to help the SNTs to develop deep understanding of and skills in educational therapy – a form of therapy that deals with processing of information as well as academics and it offers a wide range of intensive interventions designed to treat individuals with learning and/or behavioural challenges. This paper presents a case study of how a team of SNTs – working with children with autism at a private learning clinic in Singapore – uses the Lesson Study to continuously engage in learning more about best or effective practices in educational therapy in order to improve the student learning and behavioural outcomes.

**D31-PP TR704 Deepening student learning – finding a powerful object of learning that opens up possibilities for students in Special Needs schools**

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Teachers sometimes limit the opportunities for students to learn because they perceive that their students have limited ability or potential for learning. In this paper, through a case study, we show how teachers taking part in a learning study learnt to cater for students' individual differences and at the same time, opened up opportunities for students to reach their potential. The learning study took place in special school settings in Hong Kong. Instead of following their former practice which was considered to be tailoring the curriculum to the students' perceived ability, the group of teachers tried to find a powerful object of learning, such that further learning can be built, leading to a level of learning that they had never dared to try to reach before. The outcome was encouraging and had great impact on the teachers involved.

**D32-PP TR704 To discern a learning object teacher's development during a Learning Study in Swedish school age educare settings**

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This study focuses upon teacher's development during a Learning Study among children in Swedish school age educare. The aim is to explore and describe in what way Learning Study could affect teachers approach to the learning object and thereby develop their teaching. The study is performed in school age educare settings which is an after-school activity for students in need of childcare during the afternoon. School age educare is a part of the Swedish educational system, regulated by the government, and led by school age educare teachers specially trained for teaching in this setting. A learning study among children in the age group of nine to eleven years, and what influences as learning object was carried out. Two teachers participated in the Learning Study and their conceptions of influences were documented. Data consist of audio recorded interviews and dialogues between researcher and teachers. The study is based on variation theory and the concepts of discernment, simultaneity and variation (Marton & Booth, 1997; Marton & Pang, 2006). While learning it is important for the learners to discern critical aspects of the learning object, discern different aspects simultaneously and variation and contrast in representation forms. Within variations theory learning is defined as gaining knowledge about the world and an assumption is that different people experience things in different ways (Marton & Booth, 1997). That means that an aspect could be critical for one individual but not for another who has already experienced this aspect. A critical aspect is thus critical just as long it is not discerned by the learner. Once the learner has

understood the aspect it is no longer critical and a new critical aspect could occur. The result shows that the teachers' participation in a learning study enabled them to discern the learning object in a different and more complex way. Some critical aspects were illuminated and teachers' awareness increased and changed to a different way of discerning the terms. The result also shows a new awareness among the teachers when describing their work to their children.

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### **Learning Study in Mathematics education - opportunities and challenges**

The Swedish National Agency of Education was commissioned by the government (U2009/914/G) to allocate project funding to school authorities in order to support local development projects in mathematics. The types of schools which benefited from this investment were primary schools, compulsory schools, special needs schools and Sami schools. Between 2009 and 2011, over 200 000 students and 12 000 teachers participated in the mathematics initiative pursued by the National Agency. Several projects received funding to work with learning study as a model for developing the teaching of mathematics. This article will present ways in which the learning study model is used as an activity in mathematics education. The impact of the projects is also reported in this presentation. The results are based on the analysis of eight case studies. The material consists of interviews with teachers, students, school principal and project manager, video-recorded lessons, students' tests and notes from the minutes which were taken at various mathematics project meetings. The analyses of the collected data were based on theoretical concepts from activity theory. It is evident that the teachers' participation in the process of implementation of the learning study has, amongst many teachers, created a process which facilitated both their ongoing professional growth and improved the culture of their schools. The results show that the supervisor's competence, dedicated time in the schedule for teachers' cooperation, the connection to learning theory and the teacher's ability to choose content to be covered in the lesson are key success factors in mathematics teaching.

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### **Networked learning to sustain transformative practices in Mathematics through Lesson Study**

This paper reports the progressive effort of the Mathematics Master Teachers from the Academy of Singapore Teachers in building networked learning communities among teacher participants of their lesson study workshops. Besides "face-to-face" networked meetings, the paper also explores the possibilities and potential of harnessing online platform to enhance collaborative professionalism. Through the professional networked learning, the Master Teachers aspire to build a repository of lesson study experiences and encourage the pervasive sharing of effective practices amongst mathematics teachers in the fraternity. Traditionally, professional development for teachers is namely, a one-time, in-service workshops or courses provided by an external expert with limited opportunities for participants to engage in a generative dialogue to further deepen their understanding. For successful professional learning to take place, Borko and Putnam (1995) asserted that efforts in professional development must help teachers build a deep subject matter knowledge base as well as develop new ways of thinking about learners and learning. Such proficiency would enable and empower the teachers to reach out to students in more impactful and meaningful ways. Schoenfeld and Kilpatrick (2008) noted that building a deep and broad knowledge base is a critical factor for proficiency in the teaching of Mathematics and cited the examples of Japanese teachers who engaged in lesson study. To encourage the professional learning amongst Maths teachers