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Elementary Mathematics Lesson Study: Enacting Productive Facilitation Practices through Lesson Planning

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When research identifies the need to improve classroom experiences for all students, helping teachers improve their teaching is one of the critical first steps (e.g., NCTM, 2014). In this study, we investigated how elementary school teachers enacted effective classroom practices through lesson planning and teaching in lesson study. Using qualitative research methodology, we analyzed lesson plans and research lesson video transcripts of four elementary-school lesson study groups from one school district in the United States. Using Cognitive Demand Levels and Five Practices frameworks (Stein & Smith, 1998; Stein et al., 2008), we identified how the lesson study groups used lesson tasks of different cognitive demand levels, how they planned facilitations of student discussions, and how the student discussions were actually carried out in research lessons.

Out of the four lessons analyzed, two groups taught low cognitive demand lessons (requiring students to memorize or follow procedures without making conceptual connections), and the other two taught high cognitive demand lessons (addressing procedures with conceptual connections and doing mathematics). The low demand lessons directed students to follow teacher prescribed representations and procedures, narrowly leading them to correct answers. The high demand lessons helped students generate different strategies, teachers facilitated them in whole-class discussions, and the conceptual connections with the core content topics were highlighted.

The findings suggest that lesson tasks need to be sufficiently high in cognitive demand levels in order for teachers to effectively use the five facilitation practices: (1) anticipating likely student responses to cognitively demanding tasks, (2) monitoring students' responses to the tasks while they explore solutions, (3) selecting students to share their responses, (4) sequencing responses to build upon mathematical ideas, and (5) connecting responses to one another and key mathematical ideas. When the task is low in cognitive demand, it does not allow teachers enough space to use facilitation practices. High demand lessons make it possible for teachers to specify all five practices in the lesson plans, which help the enactment of the practices in research lessons possible.

The findings of the study suggest that detailed planning of cognitively-demanding tasks and facilitation practices can make productive student discussion possible in lessons. When teachers attempt to enact new practices in lessons, lesson plans reflect their current sensemaking and how the lesson will play out. Lesson planning may generally be assumed as a part of teaching, not drawing as much attentions from teacher

educators, but it is a critical point in teachers' learning, requiring additional and specific support, to successfully integrate new practices in own teaching. Lesson planning is a critical component of lesson study cycle, and it presents an ideal context to support teacher learning as well as investigate their learning process.

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A Didactical Design of Intermolecular Forces and Geometry Molecules through Sharing and Jumping Tasks for Improvement of Learning Quality

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A means to improve the quality of learning can be started from overcoming students' learning difficulties. Students' learning outcomes at grade ten of Attached Senior High School to Universitas Pendidikan Indonesia on intermolecular forces and geometry molecules material show that they got low and uneven scores. The students' difficulties might be caused by the abstract concept of the material. Meanwhile, this material is always present in the national examination in the last five years. The results of Lesson Plan analysis show that it only contains teachers' one-way instruction, the absence of prediction of students' response and teachers' response towards students' difficulties. Furthermore, in enrichment material questions, it was found that there is no effort to use sharing and jumping tasks to create interesting learning for both low and high achiever students so that equal learning outcomes can be reached. The aim of this study is to design a didactical design of intermolecular forces and geometry molecules material based on students' learning difficulties and teacher's self reflection. Developing didactical design begins with a literature review, then, sharing and jumping tasks, and material review of intermolecular forces and geometry molecules. It is continued by designing and validating the research instruments, i.e.: response resilience test, interview guides, and observation sheets in order to identify student's learning difficulties on learning material. It will be used as guidelines in drafting didactical design. This research employs qualitative research approach with Didactical Design Research (DDR), that consists of three phases: 1) analysing of didactical situation before learning in form of Hypothetic Didactical Design, including ADP; 2) Metapedadidactical Analysis; 3) Restropective analysis between result of hypothetical didactical situation analysis with analysis result of metapedadidactical analysis. From these three phases of empirical didactical design, the results that will be obtained the possibility to continue to be refined and developed through the three phases of DDR. Didactical design as a result of this research proposal is expected to provide solution for students' learning difficulties in the classroom so that the quality of learning can be improved. The result of this study will be presented.

Keywords: Didactical Design, Intermolecular forces and geometry molecules, students' learning difficulties, Learning Quality

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Learning to Teach Writing as a Process through Lesson Study: A Case Study of a Singapore Primary School

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Teacher professional development (TPD) programmes have traditionally been delivered through a workshop-only model. The literature has raised concerns over their efficacy in helping teachers develop classroom practices that are called for by present-day educational reforms (Little, 1993). Coupling lesson study with TPD programmes as part of the post-workshop extended support offers teacher participants the platform to collectively apply their learning and invent local solutions that embody central values and principles advocated.

This presentation explores how English language (EL) teachers from a Singapore primary school after attending a four-session professional learning programme (PLP) on teaching writing used lesson study to apply their learning in their classroom practice. The aim of the PLP was to provide teachers with a deeper understanding of the process of writing, enable them to scaffold the teaching of writing and teach it with awareness of writing for purpose, audience, context and culture, and use formative assessment tools and tasks to give constructive feedback on students' writing.

Findings on how the EL teachers, organised by teaching grade level teams, used lesson study to mediate their implementation of the writing curriculum will be presented. The case study points to the kind of research classroom teachers engage in as a lesson study team and the ways in which the group inquiry into their classroom practice helped them and their students. For instance, established classroom practices and teacher beliefs were challenged, team capacities were built to implement reform through curriculum deliberation, designing tools and resources. Illustrative examples of teacher learning through lesson study would be presented, along with related questions we might pose to ask whether lesson study teams are having an impact on teacher teaching, student learning, and school improvement. The study has implications on a widened conception of practitioner research and teacher learning from the lens of lesson study inquiry.