How and why does Lesson Study influence teachers’ learning?

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Lesson Study Conferentie NL 2018, Utrecht, 8 May 2018

Faculty of Education
Theoretical foundations

Teacher	Learning

Dialogue	Lesson	Study
Current models of teacher learning

- Increase of teacher quality:
  - Knowledge
  - Skills
  - Attitude

- Change in teaching behaviour

- Improvements of student results

School organizational conditions

Important criticism on these models

They are *black box* models

The *processes* of teacher learning and student learning are missing links in these models

They may indicate *that* a PD programme does or does not work, but they cannot explain *how* or *why* it works or does not work

Black box models

Learning environment  Learning processes  Learning outcomes

Teacher layer
- Features of the intervention
- ?
- Increase of teacher quality

Student layer
- Change in teaching behaviour
- ?
- Improvements of student results

School organizational conditions
Dialogue
Language as a mechanism for learning

- Grounded in Vygotskian theories for strong link between speaking & thinking

- Professional groups: Language being used for constructing knowledge, sharing understanding, tackling problems and making plans collaboratively.

- Evidence of varying quality of talk in professional groups

- ‘Ground rules for talk’ for positive conditions for interaction

Lesson Study

- Model of collaborative teacher professional development
- Originated in Japan in the 1870s → Rapid worldwide growth
- Collaborative planning & reflection
- *Research lessons* (inquiry)
- Focus on *case pupils*
Central research question

What is the influence of Lesson Study on the learning processes of mathematics teachers in the context of the introduction of a new National Curriculum?

Or, in other words:

How and why does Lesson Study influence teachers’ learning?
The Camden Lesson Study
research and development project

1 January 2014 – 30 June 2016
59 primary and secondary schools participated

University of Cambridge research team:
Maria Vrika, Paul Warwick, Neil Mercer & Jan Vermunt

London Borough of Camden School Improvement Service:
Pete Dudley, Jean Lang & Annamari Ylonen

Funded by the London Schools Excellence Fund

Context: Introduction of a new Mathematics curriculum ⇒ Focus on mathematical fluency, reasoning and problem solving

Teachers formed LS groups and conducted a 3-cycle LS per term
The Lesson Study model in this project

Public research lesson in Japan

https://lsip.files.wordpress.com/2007/07/img_0920.jpg
Project timeline

Year 1
- **LS1**: Sep-Dec 2013
- **LS2**: Jan-Apr 2014
- **LS3**: May-Jul 2014
- **LS4**: Sep-Dec 2014

Year 2
- **LS5**: Jan-Apr 2015
- **LS6**: May-Jul 2015

- **Survey 1**
- **Survey 2**
- **Survey 3**

- **Videorecordings**

- **Cohort 1**
- **Cohort 2**
VIDEO DATA
Lesson Study meetings videorecorded by teachers
Cycle of coding and analysis of video data

## Collection of relevant features

<table>
<thead>
<tr>
<th>LEARNING PROCESSES</th>
<th>LEARNING OUTCOMES</th>
<th>LEARNING POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DISCOURSE-RELATED FEATURES</strong></td>
<td><strong>CONTENT-RELATED FEATURES</strong></td>
<td><strong>LEARNING POINTS</strong></td>
</tr>
<tr>
<td>1. Having an extended contribution</td>
<td>1. Sharing ideas about potential methods of teaching</td>
<td>1. Better understanding of purpose/importance of lesson objectives</td>
</tr>
<tr>
<td>2. Taking equitable turns</td>
<td>2. Showing explicit examples (especially related to specific visuals/resources, e.g. Ipads)</td>
<td>2. More appropriate-specific success criteria (what needs to be emphasised)</td>
</tr>
<tr>
<td>4. Showing support (incl. nodding, using minimal responses)</td>
<td>4. Specifying success criteria in maths (defining expectations)</td>
<td>4. Changes in mathematical knowledge/beliefs</td>
</tr>
<tr>
<td>5. …</td>
<td>5. …</td>
<td></td>
</tr>
</tbody>
</table>

21 categories | 22 categories | 11 categories
## Coding scheme for the videos
*Final reliable version*

<table>
<thead>
<tr>
<th>DIALOGIC MOVES</th>
<th>SCOPE OF DISCUSSION</th>
<th>LEARNING PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[DM1]</strong> Requesting information, opinion or clarification</td>
<td><strong>[S1]</strong> Groups of pupils</td>
<td><strong>[DLP]</strong> Descriptive processes</td>
</tr>
<tr>
<td><strong>[DM2]</strong> Building on ideas</td>
<td><strong>[S2]</strong> Particular pupils</td>
<td><strong>[ILP]</strong> Interpretative processes</td>
</tr>
<tr>
<td><strong>[DM3]</strong> Providing evidence or reasoning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Learning Processes

<table>
<thead>
<tr>
<th>Descriptive Processes</th>
<th>Interpretative Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes in which teachers describe experiences, observations and/or knowledge.</td>
<td>Processes that go beyond the level of description and reveal interpretative thinking.</td>
</tr>
<tr>
<td>- Describing lesson plans/activities</td>
<td>- Explaining the effectiveness of activities/methods</td>
</tr>
<tr>
<td>- Rehearsing teaching</td>
<td>- Evaluating teaching</td>
</tr>
<tr>
<td>- Describing expectations</td>
<td>- Making connections, e.g. relating, comparing, linking</td>
</tr>
<tr>
<td>- Describing observations of pupil behaviour/progress</td>
<td>- Diagnosing student errors/misconceptions/problems</td>
</tr>
<tr>
<td>- Describing observations of teaching</td>
<td>- Analyzing student reasoning</td>
</tr>
</tbody>
</table>

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Descriptive vs Interpretative Processes

**DESCRIPTIVE PROCESSES**

So you give them 4 pieces of an orange and say ‘I’ve got 4 oranges and I want to share between 3 people. Each orange has 7 segments.’ [from planning session]

**INTERPRETATIVE PROCESSES**

I think that’s why it’s good. Because it’s sticking with the same type of thing isn’t it? And it’s giving them the chance to feel like they’ve got better and use the resources that they created. [from reflection session]

Frequencies of codes

Final coding of 120 episodes

Max planning = 175
Max reflection = 184

- **DM1**: Requesting information, opinion or clarification
- **DM2**: Building on ideas
- **DM3**: Providing evidence or reasoning
- **S1**: Group of students
- **S2**: Specific students
- **DLP**: Descriptive learning processes
- **ILP**: Interpretative learning processes
SURVEY DATA
<table>
<thead>
<tr>
<th>Cohort</th>
<th>N Survey 1 (response rate)</th>
<th>N Survey 2 (response rate)</th>
<th>N Survey 3 (response rate)</th>
<th>N participating teachers in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td>27 (54%)</td>
<td>22 (44%)</td>
<td>26 (31%)</td>
<td>58</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>134 (95%)</td>
<td>80 (57%)</td>
<td>47 (35%)</td>
<td>156</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>102</td>
<td>73</td>
<td>214</td>
</tr>
</tbody>
</table>

## Contents of instrument at each time point

<table>
<thead>
<tr>
<th>Time 1 and 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inventory of Teacher Learning (ILP)</strong></td>
<td>1) Meaning oriented learning</td>
</tr>
<tr>
<td></td>
<td>2) Application oriented learning</td>
</tr>
<tr>
<td></td>
<td>3) Problematic learning</td>
</tr>
<tr>
<td><strong>Perceptions of Lesson Study</strong></td>
<td>4) Teacher learning outcomes</td>
</tr>
<tr>
<td></td>
<td>5) Value of Lesson Study as PD</td>
</tr>
<tr>
<td></td>
<td>6) Perceived student learning outcomes</td>
</tr>
<tr>
<td></td>
<td>7) Quality of dialogue</td>
</tr>
<tr>
<td></td>
<td>8) School support</td>
</tr>
<tr>
<td><strong>Teacher professional identity</strong></td>
<td>9) Student development expert</td>
</tr>
<tr>
<td></td>
<td>10) Teaching expert</td>
</tr>
<tr>
<td></td>
<td>11) Subject expert</td>
</tr>
</tbody>
</table>
Development in teacher learning patterns over time

Quality of Teacher Learning

- Meaning Oriented Learning
- Application Oriented Learning
- Problematic Learning

Time Points
The development of perceptions of LS over time
Development of meaning oriented learning for teachers with different levels of teaching experience

Years of Teaching Experience
- 0-9 years
- 10-29 years

Time Points
Conclusions and implications

• Lesson Study has a **beneficial impact on teacher learning**: positive effect on Meaning oriented learning and negative effect on Problematic learning.

• The change in meaning-oriented learning during participation in LS is **different for teachers with different levels of teaching experience**.

• Initially the perceived value of LS is high, then it decreases, and towards the end of the programme the perceived value increases again.
Conclusions and implications (cont.)

• Participating in a group impacts teachers’ individual learning processes
• Descriptive vs Interpretative learning processes: Both are necessary and important
• Descriptive processes occur more often during planning meetings, interpretative processes more often during reflection meetings.
• No correlation between DLP - ILP → Two separate processes
• Enhancing the quality of talk can raise the quality of teachers’ learning in professional development like LS.
‘How’ and ‘why’ does Lesson study have an impact on teacher learning?

Two important mechanisms in the black box between LS as a professional development model and a range of benefits reported in the literature:

→ ‘The quality of teacher learning’, or, more specifically, the learning patterns that teachers adopt while they engage in LS.

→ The ‘quality of dialogue’, or, the degree of ‘exploratory talk’ that teachers use while they engage in LS.
Further questions for practice

• Which adaptations are beneficial or necessary to fit new cultural or local groups / circumstances?
  • E.g. cultural differences in how people generally talk to one another, for example the British and Dutch talk quite differently

• How and where to infuse ‘theoretical, research-based knowledge’ into the LS cycle?

• What is the effect of adding ‘facilitators’ to the model on teachers’ ownership and agency?

• How can LS be applied to teaching and learning in higher education?
Questions, comments, ...

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