Processes and strategies of student and teacher learning

Prof. Jan Vermunt

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Outline of this talk

1. Introduction
2. Current models of teacher professional development
3. A multi-layer model of teacher learning and student learning
4. Processes and patterns of student learning
5. Processes and patterns of teacher learning
6. Some conclusions and implications

1. Introduction

Central issues:

1. Why does research on learning and instruction often have so little impact on teachers and teaching?
2. Why does research on teaching and teacher education often have so little impact on student learning?
2. Current models of teacher professional development

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


3. A multi-layer model of teacher learning and student learning

A multi-layer model of teacher educator learning, teacher learning and student learning
4. Processes and patterns of student learning

Learning pattern

A coordinating concept in which the interrelationships between students’ learning activities, regulation of learning, conceptions of learning and learning motivations are united.

Recent research on student learning

Published in 2014 by Routledge – 304 pages

Learning Patterns in Higher Education brings together a cutting edge international team of contributors to critically review our current understanding of how students and adults learn, how differences and changes in the way students learn can be measured in a valid and reliable way, and how the quality of student learning may be enhanced.

Areas covered include:

- Cultural influences on learning patterns
- Predicting learning outcomes
- Student centred learning environments and self-directed learning
- Mathematics learning

Qualitative different patterns in the way students learn:

- Reproduction-directed learning
- Meaning-directed learning
- Application-directed learning
- Undirected learning


### A growth and development perspective

- Moving from secondary to higher education, and from higher education to lifelong workplace learning
- Increasing tendency of students to choose Master studies which are very different from their Bachelor studies, both in discipline and pedagogical practices
- International student mobility demands students to adapt to sometimes very different educational and learning cultures in foreign countries
- Second career switches may demand from experienced teachers to develop the expertise and identity of a researcher (and the other way around)

### A simultaneous perspective

Moving back and forth between different learning environments or identities on an almost daily basis

For example:

- Combining theory and practice in professional learning
- Combining research and teaching as a university lecturer
- Combining the study of majors and minors of a very different disciplinary nature.

### Development in student learning patterns

Some examples of research on student learning within a growth and development perspective

- The puzzling phenomenon that groups of learners did not seem to develop much in their way of learning or even showed regression effects, despite often intense intervention measures, can now better be understood through individual growth modelling.
- Studies using this technique have revealed that students (and teachers) show different pathways in their development, pathways that may neutralise group effects.
- Linear growth models
- Quadratic growth models
Some examples of research on student learning within a simultaneous perspective

• Active vs passive regulation
• Prospective vs retrospective regulation

Active regulation dominated in practice schools, passive regulation dominated at university

Multiple Correspondence Analysis (MCA)

Combined theory and practice in professional learning

Research methodologies

Suitable research methodologies may differ for the two perspectives

- Growth and development perspective: different variants of growth modelling
- Simultaneous perspective: different variants of combining multiple online measurements

An example: Research project on teacher learning in professional practice

- NWO Interrelated Research Project – 3 PhD-students and 1 postdoc
- 94 secondary teachers were followed for a year in their learning experiences
- Among others through digital learning logs (6 a year)
- In the context of the introduction of active and self-regulated learning in the classroom


Teachers’ learning activities

- Experimenting
- Considering own practice
- Getting ideas from others
- Experiencing friction
- Struggling not to revert to old ways
- Avoiding learning

Teachers’ learning activities: f en %

<table>
<thead>
<tr>
<th>Learning activities</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimenting</td>
<td>234</td>
<td>31.8</td>
</tr>
<tr>
<td>Considering own practice</td>
<td>244</td>
<td>33.2</td>
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<tr>
<td>Getting ideas from others</td>
<td>110</td>
<td>15.0</td>
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<tr>
<td>Experiencing friction</td>
<td>109</td>
<td>14.8</td>
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<td>Struggling not to revert to old ways</td>
<td>33</td>
<td>4.5</td>
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<tr>
<td>Avoiding learning</td>
<td>5</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>735</td>
<td>100.0</td>
</tr>
</tbody>
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Patterns in teacher learning

- Meaning-oriented learning
- Application-oriented learning
- Undirected, survival-oriented, problematic learning

A 2nd example: research on teacher professional learning in Lesson Study

Teacher Learning and Lesson Study in Mathematics Higher Order Teaching and Learning

1 January 2014 – 30 September 2015
1st year: 22 schools participated
2nd year: about 75 schools are participating

University of Cambridge research team:
Maria Vrikki, 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


The Lesson Study model in this project


Video Analysis Protocol (main categories and some examples of features)

<table>
<thead>
<tr>
<th>Learning Processes</th>
<th>Learning Outcomes</th>
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</thead>
<tbody>
<tr>
<td>Discourse-related</td>
<td>Content-related</td>
</tr>
<tr>
<td>[D1] Requesting information, opinion or clarification</td>
<td>[T1] Brainstorming, developing ideas for teaching</td>
</tr>
<tr>
<td>[D3] Expressing shared ideas and agreement</td>
<td>[P1] Setting expectations for pupils</td>
</tr>
<tr>
<td>[D5] Challenging ideas or re-focusing talk</td>
<td>[P2] Relating, linking, comparing pupils</td>
</tr>
<tr>
<td></td>
<td>[P3] Monitoring/Evaluating pupil progress</td>
</tr>
<tr>
<td></td>
<td>[S1] More appropriate/specific success criteria for pupils</td>
</tr>
<tr>
<td></td>
<td>[S3] More profound understanding of pupils’ mathematical abilities</td>
</tr>
</tbody>
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Occurrence of processes and outcomes in planning and reflective sessions

Aim: To examine the effects of LS experience on teachers

Participants:
- Experienced LS Teachers (Year 1)
- New LS Teachers (Year 2)

2 Administration points:
- Beginning of Year 2
- End of Year 2
In comparison with Teachers New to Lesson Study, Experienced Lesson Study Teachers reported engaging more in meaning-oriented learning \((p < .001)\), e.g.:

- ‘I try to understand how students learn’
- ‘I use my knowledge of individual students to tailor my teaching’

more in application-oriented learning \((p < .01)\), e.g.:

- ‘I want to know which teaching methods work’
- ‘I like to get practical hints and tips on how to improve my teaching practice’

and less in problematic learning \((p < .01)\), e.g.

- ‘I struggle with new ways of teaching’
- ‘I don’t know how I can improve my teaching’

Some theoretical implications

A new generation of learning theories will have a multi-layer character.

It will not be enough to develop sub-theories for different populations, but the interdependence and interrelatedness of the sub-theories will be the most important feature of the learning theory itself.

Some implications for research

Study the multi-layer model of student learning and teacher learning as a whole

- Cut the model into researchable pieces and bring these pieces together afterwards
- Develop longer research projects and study the whole model from beginning to end
- Cross traditional boundaries and bring together researchers on student learning and teacher learning
- Develop interconnected research projects in which both student learning and teacher learning have a place