Consecutive cycles of “whole class” Lesson Study
A format for development of shared teacher knowledge in preservice teacher education
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Consecutive cycles of “whole class” Lesson Study - A format for development of shared teacher knowledge in preservice teacher education

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Abstract

An analysis of three lesson study cycles of the same research lesson carried out by 16 pre-service lower secondary teachers. The process of lesson planning and revision is displayed and it is shown how the pre-service teachers develop knowledge about critical details of the lesson, its contents and pupils’ learning.

Research Questions

1. How is knowledge gained from each research lesson - and post-lesson reflection incorporated in subsequent re-teaching?
2. What are the benefits and drawbacks of large group sizes in pre-service teacher lesson study?

Context, method and theory

In 2015, a group of 16 students attending a Danish teacher education in which Lesson Study in small groups is common, were asked to plan one research lesson collectively. The development over three cycles of a lesson plan (for a grade 8, 2X45 minutes) were subjected to document analyses. The lesson and reflections were observed by the author (note-taking and video recording). All material was indexed using NVivo10 and subjected to praxeological analysis in the sense of the anthropological theory of the didactic (Chevallard & Sensevy, 2014).

Knowledge development

Initial task type (T1) put to the pupils, anticipated techniques (T)

T1: Who in the class is most likely to be selected to pick up milk.
T2: Investigate who of three pupils are most likely to be the one pick up milk, if they use two coins.
T3: Make a combinatorial argument to answer T1.
T4: Peer/class discussion based on previous experiences.
T5: Performance physical simulation, take count.
T6: Perform large number of simulation using padlet (mobile phone).
T7: Draw a schematic of sample space.

After first revision

T1: Who in the class is most likely to be selected to pick up milk.
T2: Investigate who of three pupils are most likely to be the one pick up milk, if they use two coins.
T3: Make a combinatorial argument to answer T1.
T4: Peer/class discussion based on previous experiences.
T5: Performance physical simulation, take count.
T6: Perform large number of simulation using ICT (Excel spreadsheet).
T7: Draw a schematic of sample space.

After second revision

T1: Given one crooked die, who should do the dishes? What rules to make a fair game?
T2: What happens if two or more crooked dice are used? What rules to make fair game in this situation.
T3: Make combinatorial arguments to answer T1.
T4: Peer/class discussion based on “intuition” about how an irregular die will perform.
T5: Perform physical simulation, sample frequency as group probability.
T6: Perform physical simulation with two dice.
T7: Draw sample space (with unequal probabilities).

Reasons (θ) for tasks and techniques.

θ1: Pupils should become of subjective beliefs about probability.
θ2: Pupils become aware of statistic probability.
θ3: Pupils that statistic probability variation decreases.
θ4: Pupils become aware of combinatorial probability.

Associated didactic techniques (τ)

τ1: Use of familiar context engages the pupils.
τ2: Watch video instruction about how to do simulation.
τ3: Provide table in which to record results of physical simulation.
τ4: Step by step video and written instruction about how to do simulation.
τ5: Use of crooked dice generates a true need for statistic probability.

Reorganizing (Accommodation)

No new θ

Reasons (θ) for tasks and techniques.

θ1: Pupils should be able to make subjective inferences about probability on basis of prior experience.
θ2: Pupils realise the value of statistic probability to determine probability.
θ3: Investigate a more complex situation using statistics.
θ4: Make a connection to combinatorial probability.

Associated didactic techniques (τ)

τ1: Use of crooked dice to make lesson more oriented towards problem solving.
τ2: Draw a schematic of sample space.
τ3: Performance physical simulation.
τ4: Peer/class discussion based on “intuition” about how an irregular die will perform.
τ5: Use of crooked dice generates a true need for statistic probability.

Conclusions from post-lesson reflection:

Tasks are unclear to the pupils. (Lack of “raison d’etre”)
ICT simulation difficult, unclear if pupils realise what they are doing.

Conclusions from post-lesson reflection:

Lesson work very well until second die is introduced. Every pupil should have two dice of the same “crookedness” so posing results of physical simulation would get better frequency stability. ICT should not be used at all.

Benefit: Greater sense of unity. Knowledge shared and common to all participants. A greater variety of aspects can be considered in advance. Lower “cost” of educator time.

Drawback: The lesson study were initially undertaken by the whole class, but as schools and executive students were chosen, others lost engagement with the process.

Background

Lesson study is usually done in small teams up to around five teachers. This is reasonable in an in-service perspective, but might be impractical (and costly) in ordinary pre-service education where one teacher educator has to manage 15 students or more. Lesson study collectively performed by greater group sizes is largely unexplored. Another issue is that literature reporting on consecutive re-teaching of a refined lesson plan is scarce, although some exist (Robinson & Leikin, 2012). The mechanism for improving instructional performance and teacher knowledge has been suggested to be rooted in the reflective practice inherent to lesson study (Warwick, Vriki, Vermunt, Mercer, & van Halem, 2016) However, as most studies end with the first reflection session, it is difficult to gauge how the reflections impact on subsequent practice.

Concluding Remarks

Knowledge that the lesson does not work optimally are first sought remedied with minor didactic changes, before major changes are attempted.
A “knowledgeable other” is crucial to overcome reluctance to make major changes.
The semi-autonomous process of lesson study need another scaffolding to engage a whole class and thus produce didactic knowledge common to all pre-service teacher students.

References


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References