

**Factors that Affect Mathematics Teachers' Planning,  
Implementation and Reflection**

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Ph.D. Thesis

Submitted to the Senate of Bar-Ilan University

Ramat-Gan, Israel

April 2014

## Abstract

The present research focus on factors that affect the elementary mathematics teachers' planning, implementation, and reflection, based on their perceptions. Because annual teaching planning is preliminary, it is important and necessary that every teacher will adapt the preliminary planning by further planning during the academic year. This research relates to the factors and processes of the teaching complex: (1) pre-teaching process that include planning process and the factors that affect it; (2) teaching process; (3) post-teaching process.

This study is based on the teacher decision making models by Westerman (1991), on the curriculum analysis model by Goodlad, Klein and Tye (1979), and on the curriculum mapping model by TIMSS (Mullis, Martin, Ruddock, O'Sullivan, & Preuschoff, 2009). This research proposes to insert one more additional aspect in these models – *planned curriculum*. This is the link between the intended curriculum and the implemented curriculum. The *planned curriculum* is the teacher design curriculum in the pre-teaching process to which he brings his personal world and both school and system factors. In other words, in the pre-teaching process different factors affect the teacher' planning.

The main purpose of the study is to examine the contribution of system, school and personal factors to the planning process of a math unit by teachers, according to their perceptions. Another purpose of the study is to identify the components of teaching plan and lesson and also identify pattern of teaching different plans and check their contribution to the students' achievements. In addition, this study examines the circumstances during the teaching process where the teacher needs to make changes to his original teaching plan. The teaching methods that were chosen for this research are customary teaching methods in the elementary school, like: "ASHBAHA", "HASHBON 10", "SHVILIM", etc.

The following research questions were posed:

1. Do relationships exist among affecting factors, planning process, teaching process, and post-teaching process?
2. Do differences exist in *planning process* between teachers according to the teaching methods, after controlling for the effect of the factors?

3. Do differences exist in *teaching process* between teachers according to the teaching methods, after controlling for the effect of the factors?
4. Do differences exist in *post-teaching process* between teachers according to the teaching methods, after controlling for the effect of the factors?
5. Do differences exist in achievement level between students according to the teaching methods, after controlling for the effect of the factors?
6. What are the circumstances during the teaching process where the teacher needs to make changes to his original teaching plan?
7. What are the *teaching plan components* according to *different* teaching method?
8. What are the *patterns* of different teaching plans in the *same* teaching method?

#### Methodology:

This research uses a mixed-methodology design – quantitative and qualitative methodology (Creswell, 1994). Participants in the study included 106 teachers and 224 students. Out of the 106, 55 teachers use a meta-cognitive method ("ASHBAHA"). 129 students were exposed to a meta-cognitive method and the others were exposed to other elementary school methods.

The research instruments include an extensive questionnaire, an interview with the teachers, observations in math classes, documents, and students test.

All teacher participants of both groups completed the questionnaire independently, and were assured that the questionnaire was anonymous and would be used for research purposes only. In addition, pre- and post-interviews were conducted with a representative sample of 8 teachers including an observations in their math classes. Teaching plans for the observed lessons were collected from the teachers. A few days later, students of these teachers were tested. The students were assured that the test doesn't affect their final school score and would be used for research purposes only.

The quantitative data, collected by means of the questionnaire, was analyzed using the SPSS program for statistical analysis in the social sciences. In addition, the HLM program was used for multi-level analysis of both students' and their teachers' quantitative data, and AMOS program was used for path analysis in order to establish relationships among affecting factors, planning process, teaching process, and post-teaching process. The qualitative data, collected in interview, were sorted into external and internal categories using the models by Westerman (1991) and selected categories

from Fernandez and Cannon (2005) study. The qualitative data, collected in observations and documents, were sorted into categories proposed by Shimizu (2003).

Research main findings showed that:

- Relationships were found between affecting factors and planning process and teaching process, but relationship wasn't found between affecting factors and post-teaching process. Also relationship was found between planning process and teaching process, but relationship wasn't found between teaching process and post-teaching process.
- Teachers who implement a meta-cognitive method in their classroom are significantly planning more than another after controlling for the effect of school factors, but no difference between teacher groups after controlling for the effect of system and personal factors.
- Students who were exposed to a meta-cognitive method in their classroom significantly outperformed students who weren't exposed to a meta-cognitive method, and school factors have positive contribution while personal factors have negative contribution and system factors no contribution.
- Creating teaching plan reduce the amount of teacher' interactive making decisions, and that led to less change to their original teaching plan who implement a meta-cognitive method in their classroom than other teachers.
- It identified plan and lesson pattern among teachers who implement a meta-cognitive method in their classroom. In addition, was found similarly sequence in writing the teaching plans.

This research is the first, as far as it is known, to address the factors that affect the teaching complex, and principal components in teaching, from the teacher point view.