

THE ROLE OF TEACHERS' MATHEMATICAL KNOWLEDGE IN PRIMARY TEACHER EDUCATION CURRICULUM IN IRAN

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Introduction

The nature of a teacher's knowledge is one of the controversial debates in field of teacher education curriculum. For a long time, researchers in the field of education focused only on general pedagogical knowledge as teachers' knowledge, but now subject-specific knowledge can not be ignored. Much of the focus on teachers' subject-specific knowledge rooted in Shulman's conceptualization. He (1986, 1987) introduced a combined knowledge of both content knowledge and pedagogical knowledge into a unique category of subject-specific teacher knowledge, named pedagogical content knowledge. His work motivated others to consider subject-specific knowledge in teacher education curriculum.

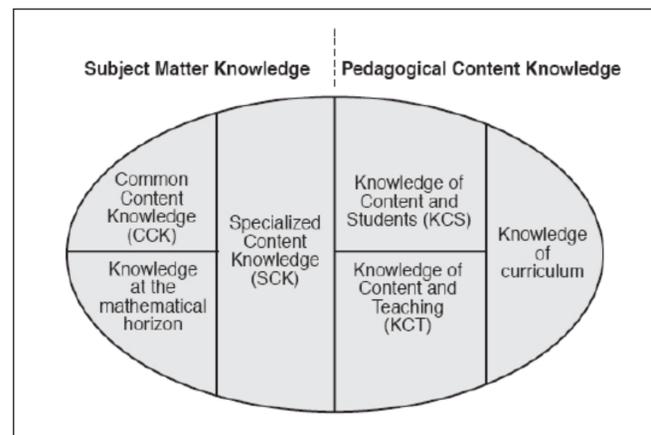
Nevertheless, most of the works in field of teachers' subject-specific knowledge have been developed in the subject-specialist context of secondary education rather than in primary education (e.g. Krauss et al, 2008, Baumert et al, 2010, Kleickmann et al, 2013). This happened because primary teachers work across an extended range of curriculum subjects simultaneously, not a specific one (Pop, 2019).

Working as a teacher not in a specific subject area might cause the curriculum developers to neglect from subject-specific knowledge of teachers. In other words, primary teacher education curriculum might focus on pedagogical knowledge and this might resulted in little knowledge of teachers in subjects. On the other hand, we cannot ignore the role of mathematics as a subject in primary school mathematics curriculum. It would seem that a student teacher with limited understanding of the mathematical topic such as area would not be effective in developing children's understanding (Murphy, 2009). Therefore, conceptualization of teachers' mathematical knowledge in primary school is an important topic.

This study would analyze the placement of teachers' mathematical knowledge in primary teacher education curriculum in Iran.

Theoretical Background

Ball, Thames and Phelps developed a practice-based theory of content knowledge for teaching built on Shulman's (1986) notion of pedagogical content knowledge which named mathematical knowledge for teaching (MKT).



Through this model we could understand that the nature of mathematical knowledge for teaching is complicated and we need to develop a specific curriculum to cover that. This causes a question about primary teacher education curriculum which trains teachers who would teach multi subjects area that: what is the role of mathematical teaching knowledge in a primary teacher education curriculum?

Research Method

Research method of this study is based on qualitative study in three phases:

1- Analysing content of formal curriculum. Since Iranian teacher education curriculum is centralized, in the first phase of this study, we analysed its content through qualitative content analysis to find courses and opportunities which may develop each components of MKT model.

2- Analysing curriculum based on teacher educators ideas. In the second phase we gathered data from interviews with five mathematics teacher educators to analyse their attitudes through the placement of each components of MKT model in teacher education curriculum. They all were selected among experienced mathematics teacher educators.

3- Analysing curriculum based on student-teachers ideas. In the last phase, we gathered data through interview with 20 student-teachers to analyse their attitudes through the placement of each components of MKT model in teacher education curriculum. The students all selected among the best ones and all of them were at final year of their studies.

To analyse data, we used coding and making themes as the main method of analysing qualitative data.

Analysis of Iranian Primary Teacher Education Curriculum

Primary teacher education curriculum in Iran has changed recently in 2013 after developing National Curriculum and Fundamental Reform Document of Education (FRDoE) approval in 2011. In the new curriculum Farhangian University is responsible for teacher education, both primary and secondary, in Iran.

In this university's curriculum, student teachers are chosen among graduated high school students who have a diploma in mathematics and physics, science and humanities (three main majors in Iranian high schools) based on the result of entrance exam named Konkur which is a comprehensive and central entrance exam for universities in Iran. Konkur evaluates knowledge of different subject matters in high school. Each person who is accepted in this exam should pass an interview which is mostly based on the religious, psychological and social aspects.

After acceptance in teacher education university, as a student teacher, he/she is supposed to pass 150 units courses in four years consists of 34 units general education courses, 8 units in Islamic education courses, 15 units in pedagogy and 92 units in specialized education courses. Therefore, it seems that in specialized courses, we might expect to see a trace of mathematical knowledge.

With reviewing these courses we could understand that there are only two courses named "basics of mathematics education" and "mathematics education" which mainly focused on mathematics in this curriculum. Furthermore, by analysis of curriculum content of these courses, we could understand that main topics are not directly talking about SMK, but they are focused on PCK.

Data analysis from mathematics teacher educators and student teachers also confirmed the findings from the first phase.

As a result, we could expect that mathematical knowledge of future primary school teachers in Iran is under a critical condition.

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