

COMPLETION REPORT

Influence of Japanese lesson Study on Mongolian teachers' knowledge possession

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This research aims to identify impacts of the Japanese *Lesson Study* (LS) on Mongolian teachers' *Mathematical Knowledge for Teaching* (MKT) (Ball, 2008) focusing on secondary mathematics topics. Teachers' MKT is comprised 2 types of knowledge, namely content knowledge and pedagogical content knowledge (Ball, 2008). In this research, the impact is operationally defined as a quantitative relationship between the LS and teachers' MKT. In order to approach the aim, the researcher investigated responses of three questions on (1) what are characteristics of Japanese lesson study in Mongolia, (2) what extent secondary school teachers have possessed the MKT, and (3) what are impacts of the lesson study on teachers' MKT. The research has conducted in 10 secondary schools in urban (Ulaanbaatar) and rural area (Khovd aimag) of Mongolia. In total, 57 secondary mathematics teachers are sampled. Most (78.9%) teachers are female, and 65% of them are aged more than 35 years old. Most of them (60.7%) have been teaching mathematics to secondary school students more than 11 years. The research developed 3 instruments - document analysis, questionnaire and interview. Document analysis and interviews are used to identify characteristics of the LS, while a questionnaire is utilized to reveal teachers' MKT. In order to dig into teachers' responses to the questionnaire, informal interview is carried. Impacts of the LS on teachers' MKT are investigated using *Canonical Correlation Analysis* (CCA) in quantitative research method. Research data was collected during September to October 2014. Firstly, the collected data on the LS and teachers' MKT are analyzed in descriptive manner. The lesson study in Mongolia secondary schools is characterised as it focuses on the teaching and curriculum. In the LS, teachers always emphasize how to teach mathematics topics along with the what is intended in the secondary mathematics curriculum. However, it does not pay attention on student learning of content which can be considered one of the weaknesses of LS development in Mongolia. Meantime, second, teachers' MKT is characterized by their knowledge of content teaching, and knowledge of content curriculum those bring knowing about teaching and knowing about mathematics curriculum. They lack of knowledge related to students' learning of mathematics and deeper mathematical knowledge. Third, in CCA, data on the LS and MKT are examined with the goal of understanding the multivariate relational patterns between these two sets as more parsimoniously operationalized by the canonical correlation. CCA extracted two sequential correlations and those are called canonical correlation coefficients. At first extraction, correlation coefficient is estimated as $R_{c1}=.624$, at second extraction, $R_{c2}=.501$. These two correlations are both statistically significant ($p>.003$). These correlation coefficients indicate that there is a positive relationship between the LS and teachers' MKT. It means that what is emphasized in the LS can be a reflection and prediction of what teachers know in MKT. In other word, teachers' MKT can be predicted what they discuss in the LS. Based on the above results, it can be concluded that the Japanese lesson study really gives significant impact on Mongolian teachers' MKT in context of secondary schools. If they focus more on how students learn mathematics in the lesson study, their MKT can be drastically improved specifically for students' effective learning. At the end, the research strongly recommends that the lesson study development in Mongolia needs to focus on students' aspects of learning in order to enhance teachers' MKT which is the essential resource for improving student learning in school mathematics education of Mongolia.

Publication of the Results of Research Project:

Verbal Presentation (Date, Venue, Name of Conference, Title of Presentation, Presenter, etc.)

1. 23 August 2014, Mongolian State University, Conference on Teacher Education Reform in Mongolia, Mongolian mathematics teachers' mathematical knowledge for teaching, Oyunaa Purevdorj.

Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)

1. Educational Study, National Institute of Educational Research, Mongolia, 2015, Impacts of the Japanese lesson study on Mongolian secondary school teachers' mathematical knowledge for teaching, Oyunaa Purevdorj

Book (Publisher and Date of the Book, Title and Author of the Book, etc.)