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HPM and In-service Mathematics Teachers' Professional Development in China

Abstract

Conceptualization of professional development have moved from "deficit" and "workshop or training" models, to models of "professional growth" where teachers engage actively in collaborative inquiry into their own practice to enhance their knowledge of pedagogy, and students (Widjaja et al. 2017). However, through researching papers from Proceedings of HPM Satellite Meeting, ESU, CERME, ICME, in books and journals in the 21st century, we find that the studies on HPM and mathematics teachers' change or professional development mainly happen in universities, are mainly for pre-service teachers and the direct approach in this context is to give graduate courses (Barbin and Tzanakis, 2014).

In Mainland China, the situation is somewhat different, as a teaching research system has been practiced nationally since the 1950s (Wang, 2009). We have combined the teaching research system - mainly Lesson Study (LS) - with HPM, which we call HPM Lesson Development (HPMLD). In the course of lesson study, the teacher who conducts the LS should follow a procedure as shown in Fig.1 (Wang, Qi and Wang, 2017) with support from professional learning community (PLC), which is made up of a school-based group, an HPM research group, and a teaching expert group. Each group in the community has its own expertise, which is the reason why they get together, and without collaboration, it may be impossible to develop a sufficiently good HPM Lesson. Through HPMLD, the teachers' knowledge, beliefs, attitude, and even instructional competencies would improve (Wang, 2013; Yue and Wang, 2016).

However, the influence of HPM has to be expanded. So we publish the developed lessons, and make them accessible to all teachers. Some teachers interested in HPM would adopt the instructional designs of the developed lessons in their own teaching, which is called HPM Lesson Sharing (HPMLS). On the other hand, we would use developed HPM Lessons to teach Pre- and In-service Mathematics Teachers, which is called HPM Lesson-based Teaching (HPMLbT), as one way of spreading the conception of HPM. What is the procedure of HPMLD, HPMLS and HPMLbT? What are the effects of HPMLD?

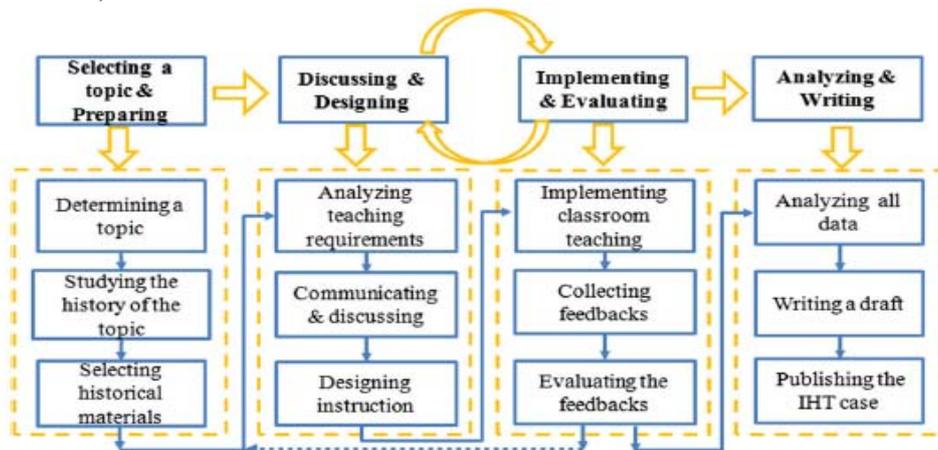


Figure1. The procedure of the HPMLD (Wang, Qi &Wang,2017)

- Topic:**
- Part 1**
- (1) Analysis of Student, textbook and teaching method
 - (2) Instructional objectives
 - (3) Important Points and Different Points
- Part2 Process of Teaching**
- (1) Introduction to new knowledge
 - (2) Learning new concept
 - (3) Exercise and Consolidation
 - (4) Summary
 - (5) Extended Practice(not necessary)

Figure 2

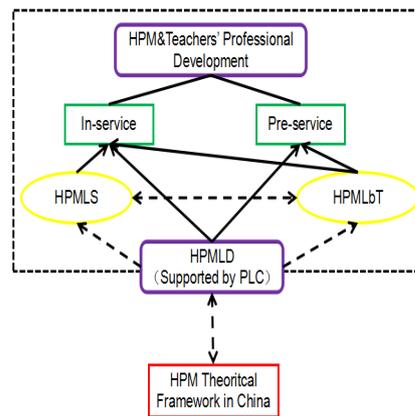


Figure 3

In this workshop, we will organize an LS according to Fig. 1. We firstly provide text from a textbook and demand of the curriculum in China, the link with learned knowledge and knowledge learned later, historical resource about related topics. Under the guidance of a member of the workshop organizers, participants in small groups design a lesson based on the above resource, the cognition of the students they would teach, and format of design in China (Fig.2). Secondly each group presents its design. Then we present a video of an exemplary lesson, and participants watch and assess the lesson based on our assessment worksheet. Thirdly, we conduct post-lesson debriefing, and participants revise their design. Lastly, we use a case study to introduce teachers' professional development during the HPMLD and the procedure of HPMLS and HPMLBT, and construct a preliminary framework of HPM and mathematics teachers' professional development (shown as Fig.3).

References

- Gu, L. Y., & Wang, J. (2006). School-based research and professional learning: An innovative model to promote teacher professional development in China. *Teaching Education, 17*(1), 59–73.
- Wang, J. (2009). *Mathematics education in China: Tradition and reality*. Jiangshu: Jiangshu.