DEVELOPING ANALYTICAL MODELS OF PEDAGOGICAL CONTENT KNOWLEDGE: A CASE STUDY OF MATHEMATICS TEACHERS IN MACAO

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Mathematics teachers implement lessons in the ways that are different from the anticipated plans judging by simultaneous interactions among students and the teachers in classrooms. This study investigates two primary school teachers' pedagogical considerations in terms of the analysis of their pedagogical content knowledge (PCK) in the topic of geometry. A case study is conducted to compare strategies utilised in the planning and implementation of the mathematics lessons conducted by the two teachers in Macao. Findings including two models of quantifying frame of PCK maps, indicate dynamic considerations of the teachers in various aspects.

PENTAGON MODEL OF PEDAGOGICAL CONTENT KNOWLEDGE: THE PCK MAPS

Shulman (1986) initiated ideas of pedagogical content knowledge (PCK) which is a holistic consideration of content knowledge and pedagogy of teachers who embrace interests of students with learning diversity. PCK shows an importance of instruction not only indicating teachers' demonstration skills, but also ability to guide students to construct meaningful knowledge. Previous research reveals teachers' PCK is subjected to knowledge aspects and generation of guidelines (Berliner, 2001). Park and Chen (2012) purposed a model of PCK map integrating five prominent components which are orientations toward teaching science, knowledge of student understanding, knowledge of instructional strategies and representations, knowledge of science curriculum and knowledge of assessment of science learning. The pentagon model of PCK for teaching science is adopted in this study as an analytical tool for depicting PCK of the mathematics teachers in Macao. The case study involved two primary school mathematics teachers with difference teaching experiences. Teacher A is a novice teacher and Teacher B is an experience teacher. Both teachers designed each lesson related to geometry in primary levels, who attended semi-structured interviews. The perceptions of the teachers were anlaysed by the model of PCK through the interviews to construct two PCK maps according to the five domains that interaction and coherence among the components were emphasised in the maps shown below.

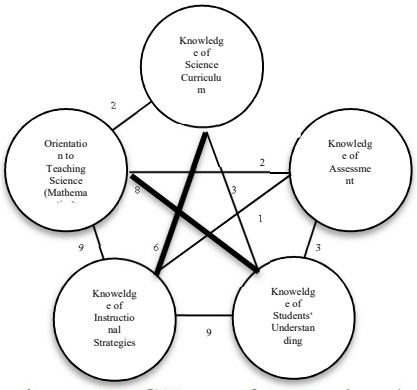

Figure 1: PCK map for Teacher A

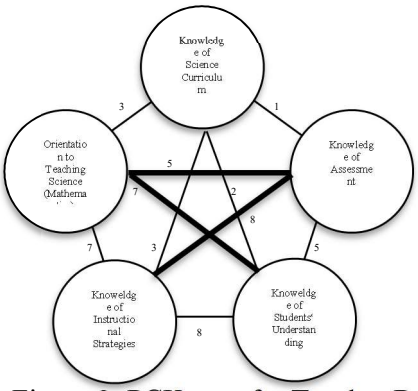

Figure 2: PCK map for Teacher B

References

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