Introduction

Background and Research Questions

Since the promulgation of "Teacher Education Law (TEL)" (Taiwan Ministry of Education, 1994) in 1994, Taiwan's secondary school mathematics teacher education program has changed drastically. Before 1994, the system was funded by the government with normal universities monopolizing the market of future teacher education. From the enactment of TEL, the system has since been pluralized by approving teacher education programs and post-bachelor education credit classes initiated by higher institutions other than teachers colleges and normal universities. The teacher education policy has been changed as well from one that trains teachers in a planned manner with graduates assigned to designated schools to one that selects individuals through diverse channels with some having to pay for their teacher education fees and all graduates have to apply their teaching posts through teacher recruitment tests set by each school. Since teachers have traditionally been highly regarded in Taiwanese culture, accompanied by the changing population demographics of fewer and fewer children in Taiwan, the recruitment tests are becoming more and more difficult and, it is extremely competitive now to become a teacher in Taiwan.

The new program consists of two integrated elements: university-based course (See Appendix A) and school-based practicum. The students become probationers only after passing the university-based course. In the traditional school-based practicum, teaching was done fully independently by probationers in a whole academic year without observations of any school teachers, only the university supervisors would from time to time attend a lesson and decide the final mark of the student teachers for their teaching practice. With the implementation of TEL, this traditional form of teaching practice has become a thing of the past, teacher mentoring schemes during the school-based practicum were introduced and made compulsory on a national basis, the probationary period has been reduced from a whole to half year at present. However, unlike countries such as UK and US, there is no formal education in teacher mentoring in Taiwan to select, train and support teacher mentors, all mentoring models in Taiwan are self-developed and vary from school to school.

While there is some disagreement concerning the roles and functions of teacher mentors, and effects of teacher mentoring (Hobson, Ashby, Malderez, & Tomlinson, 2009), the work of teacher mentoring is generally understood to be complex, multi-dimensional, and demanding (e.g., Ackley & Gall, 1992; Orland-Barak & Yinon, 2005). This leads to our major research question: "What are the

models of some of Taiwan's secondary school mathematics teacher mentoring?"

Guiding by this research question, we conducted 17 case studies in a three-year research project, the two cases reported in this paper are two extreme cases among them, which represent one-on-one and team mentoring respectively. In this paper, we adopt Megginson and Garvey's (2004) definition of mentoring:

Mentoring is a relationship between two people with learning and development as its purpose. (p. 4)

The two participant schools in this study are Southern Senior High School (SSHS) and Central Senior High School (CSHS). SSHS operated one-on-one mentoring while CSHS operated team mentoring with almost the whole mathematics department of the school mentored one probationer. Since they are self-developed teacher mentoring models, we wonder if they match any existing well-designed teacher mentoring models. Brooks and Sikes (1997) had identified the following four out of a proliferate of existing teacher mentoring models: the traditional apprenticeship model, the competence-based model, Anderson and Shannon's (1988) theoretical model, and Furlong and Maynard's (1995) empirical staged model of mentoring. This leads our major research question further to the sub-question: "What are the similarities and differences of the two self-developed teacher mentoring models we examine in this paper with these four models identified by Brooks and Sikes?"

Jaworski and Watson (1994) offered the concept of "co-mentoring" that develops the mentoring as part of the work of other teachers or the whole mathematics department, for example, any mentee in a school works with many of the teachers in the department (pp. 124, 133). This leads to our next sub-question: "What are similarities and differences between the team mentoring we examine in this paper and Jaworski and Watson's concept of co-mentoring?"

The purpose of this paper is to present two extremes of the existing self-developed mentoring models at the secondary school level in Taiwan and, compare them with well-designed existing mentoring models and ideas. This paper has several sections. The first section addresses background, research questions and related theoretical framework. The second section deals with methodology of the study. The third section deals with mentoring models of the two cases we studied. The fourth section focuses on comparisons between the two cases we studied and the traditional apprenticeship model, the competence-based model, Anderson and Shannon's (1988) theoretical model, Furlong and Maynard's (1995) empirical staged model of mentoring, and Jaworski and Watson's (1994) concept of co-mentoring.