Paper Title A Four-Year Longitudinal Study of the Development of Student Teachers' Pedagogical Knowledge and Skills in Teaching

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A four-year longitudinal study of the development of student teachers' pedagogical knowledge and skills in teaching in Singapore

Abstract: This study followed a cohort of student teachers from the beginning of their teacher education program to the end of the third year of teaching, looking at their perceived changes in pedagogical knowledge and skills in teaching in Singapore. The PKST survey comprising 37 items with six factors were used to collect data. In the cohort of over 1300 student teachers, 353 participated in all five survey data collections. The results showed that the participants' overall pedagogical knowledge and skills in teaching increased significantly. The largest increases were found in knowledge in lesson planning and skills in classroom management. The skills in showing care and concern did not show significant increases until the end of third year of teaching.

Introduction

The purpose of this study is to investigate the development of pedagogical knowledge and skills from the beginning of their teacher education program as student teachers to the end of their third year of teaching as beginning teachers. In this four-year longitudinal study, data was collected from the participants at the beginning of their one-year post graduate diploma in education program (T1), at the end of the program (T2), at the end of their first (T3), second (T4), and third year (T5) of teaching.

Teacher education programs are expected to provide adequate knowledge and skills to the student teachers in order to prepare them for teaching all children in the future (Cochran-Smith, 2006). A review of literature has recommended some knowledge and skills that are essential for all teachers to teach their students effectively. Teachers need to be able to deliver the curriculum with their students' characteristics in mind and also understand their students' thoughts and behaviors (Darling-Hammond, 1999). Scannell (1999) reviewed the literature on quality teacher education and suggested some of the core characteristics that teacher education programs should have included: a concept of good teaching in coursework and field experiences; and a good connection between theory and practice.

However, Feiman-Nemser (2001) suggests that no matter how good teacher education programs could be, there are knowledge and skills that can only be learned when the beginning teachers step into their own classrooms. As a result, teacher education programs should prepare the student teachers before they learned different knowledge and skills, such as planning curriculum, teaching and managing diverse learners and adapting to school culture, through direct interactions with their students as they take on the full teaching responsibilities in schools.

As beginning teachers, studies have suggested that they should be equipped with the pedagogical principles that will enable them to teach, the content knowledge in different subject areas, and the skills to provide instruction and motivate students in class (Reynolds, 1995). Teacher education programs begin to prepare the student teachers with adequate knowledge and skills before they step into their own classrooms. Then, in the beginning years of teaching, the teachers continue to develop their knowledge and skills in teaching through professional development courses and gaining experiences in their classrooms. Kane, Rockoff, & Staiger (2006) found that the greatest changes in teacher performance were found during the first three years of teaching. This suggested that the first three years of teaching is a significant period for investigating teachers' development. As a result, the purpose of this longitudinal study is to investigate the changes of the beginning teachers' pedagogical knowledge and skills in teaching from their entry into teacher education program to the end of their third year of teaching.

Methodology

The Pedagogical Knowledge and Skills in Teaching (PKST) survey was used to collect data for this paper (Chong, Wong, Choy, Wong, & Goh, 2010). The survey comprised 37 items, with two 5-point Likert rating scales to measure the student/beginning teachers' perceptions of their pedagogical knowledge and skills in teaching. Confirmatory factor analysis showed a model fit with six factors: Student Learning, Lesson Planning, Instructional Support, Accommodating Diversity, Classroom Management and Care and Concern (TLI = 0.92, CFI = 0.93, RMSEA = 0.05). There were four to seven items in each factor. The Cronbach alpha for the instrument was 0.97, which indicated it is fairly reliable.

The participants were enrolled in the Postgraduate Diploma in Education (PGDE) program in 2005. There were 1044 out of 1325 student teachers who completed the survey at the beginning of the program. At the end of the data collection, 353 participants completed the survey at all five data collection points from 2005 to 2009. The student teachers in this cohort had already completed their Bachelor's degree from recognized universities before embarking on the PGDE program and their ages ranged from 21 to 45 years, with over 60% of them within 21-25 years of age.

Data Analysis and Results

Multiple analyses of variance (MANOVA) for repeated measures were used to analyze the changes in the data for pedagogical knowledge and skills in teaching. For the changes in pedagogical knowledge, the results showed that there were significant increases in all six factors from the beginning of the teacher education program (T1) to the end of the third year of teaching (T5). The overall means for pedagogical knowledge in teaching increased from 3.38 at T1 to 3.89 at T5. The changes in the overall means were significant (Wilks' Lambda = 101.95, p-value < 0.01) (see Table 1). In all the six factors, the results showed significant increases from T1 to T5. The largest increase was in Lesson Planning, from 3.29 to 3.89 (Wilks' Lambda = 103.27, p-value < 0.01). Further pairwise t-test comparisons showed that there were significant increases in most factors between beginning and end of teacher education program (T1 to T2); and end of second and third year of teaching (T4 to T5).

Table 1. MANOVA for repeated measures for T1 – T5 Pedagogical knowledge:

Pedagogical Knowledge	**T1**	**T2**	**T3**	**T4**	**T5**	**Wilks' Lambda**
Student Learning	3.30 (.63)	3.73 (.50)	3.68 (.46)	3.73 (.49)	3.82 (.45)	58.73**
Lesson Planning	3.29 (.56)	3.77 (.37)	3.77 (.35)	3.83 (.38)	3.89 (.30)	103.27**
Instructional Support	3.49 (.53)	3.86 (.39)	3.87 (.37)	3.93 (.39)	3.99 (.34)	76.42**
Accommodating Diversity	3.37 (.53)	3.72 (.40)	3.72 (.41)	3.76 (.40)	3.85 (.36)	68.69**
Classroom Management	3.15 (.65)	3.61 (.53)	3.67 (.49)	3.72 (.48)	3.83 (.40)	97.70**
Care and Concern	3.68 (.49)	3.75 (.45)	3.82 (.45)	3.87 (.44)	3.96 (.42)	26.21**
Overall	3.38 (.48)	3.74 (.37)	3.75 (.35)	3.80 (.37)	3.89 (.33)	101.95**

**p-value < 0.01

For the development in skills, MANOVA showed similar results in the participants' development of skills from the beginning of teacher education (T1) to the end of the third year of teaching (T5). There were significant increases in all six factors. The overall means of skills increased from 3.39 at T1 to 3.82 at T5 (Wilks' Lambda = 73.64, p-value < 0.01) (see Table 2). The largest increases in skills was in Classroom Management, from 3.14 to 3.74 (Wilks' Lambda = 82.76, p-value < 0.01). Pairwise t-test comparisons showed that there

were significant increases in most factors between beginning and end of teacher education program (T1 to T2); and end of first and second year (T3 to T4); and end of second and third year of teaching (T4 to T5).

Table 2. MANOVA for repeated measures for T1 – T5 Skills:

Skills	**T1**	**T2**	**T3**	**T4**	**T5**	**Wilks' Lambda**
Student Learning	3.29 (.62)	3.51 (.52)	3.54 (.51)	3.61 (.55)	3.72 (.51)	37.17**
Lesson Planning	3.32 (.58)	3.58 (.43)	3.67 (.40)	3.75 (.44)	3.84 (.36)	74.56**
Instructional Support	3.51 (.51)	3.75 (.41)	3.79 (.41)	3.86 (.41)	3.94 (.39)	61.09**
Accommodating Diversity	3.39 (.52)	3.58 (.42)	3.63 (.45)	3.67 (.46)	3.78 (.40)	44.97**
Classroom Management	3.14 (.68)	3.31 (.57)	3.53 (.57)	3.61 (.56)	3.74 (.45)	82.76**
Care and Concern	3.67 (.52)	3.68 (.47)	3.74 (.50)	3.77 (.49)	3.87 (.43)	15.73**
Overall	3.39 (.48)	3.57 (.39)	3.65 (.40)	3.71 (.42)	3.82 (.36)	73.64**

**p-value < 0.01

Discussions and Conclusion

The overall pattern of the development in pedagogical knowledge and skills in teaching showed that at the beginning of the study, there were significant increases in both pedagogical knowledge and skills between the beginning and the end of teacher education program, except for the factor, Care and Concern. This could be because the student teachers only have minimal exposure to their students during the teacher education program. They only have one field experience which lasted for ten weeks at the end of the program. In addition, they planned lessons, taught and managed the classes under close supervision of their cooperating teachers and university supervisors. As a result, they may not have sufficient opportunities to learn and demonstrate how to show care and concern to their students. This result echoed the findings from previous studies, which suggested that there are some knowledge and skills that can only be learned when the beginning teachers step into their own classrooms (Feiman-Nemser, 2001).

There were no significant changes in most of the factors from the end of the program to the end of the first year of teaching in both pedagogical knowledge and skills. This could be because most of the beginning teachers were at the "survival stage" during their first year of teaching (Gilles, Cramer, & Hwang, 2001). They may be struggling with the change of roles from studying as student teachers to becoming teachers with full responsibilities. The common challenges during the first year of teaching include ineffective classroom management, adapting to school culture and getting peer acceptance. As a result, they may not have perceived that there was much change in their pedagogical knowledge and skills in teaching.

During their first year and second year of teaching, the results are mixed. Between the end of first and second year, there were four factors in knowledge and two factors in skills which increased significantly. Then, when comparing between end of second year and third year, all the factors in pedagogical knowledge and skills increased significantly. The results suggested that the beginning teachers perceived that they were more knowledgeable and skilful in teaching in all factors only by the end of their third year of teaching.

It is interesting to see that the participants showed little changes in their pedagogical knowledge and skills in Care and Concern. This factor only increased significantly in

pedagogical knowledge between end of program and end of first year of teaching (T2 to T3); and end of second and third year of teaching (T4 to T5). There were no significant increases in their skills in Care and Concern from beginning of teacher education program till the end of second year of teaching. There was only significant increase from end of second year of teaching to end of third year of teaching (T4 to T5). This result may have suggested that the beginning teachers needed more time to gain experience in classrooms of up to three years in order to perceive that they are knowledgeable and skilful in showing care and concern to their students.

The purpose of this study is to monitor the changes of the student/beginning teachers' pedagogical knowledge and skills in teaching in the first four years of their career, including their teacher preparation period. The results showed that overall, the student teachers transformed into beginning teachers with significant increases in their pedagogical knowledge and skills. Their biggest increases were found in knowledge in lesson planning and classroom management skills. However, changes were minimal between end of program and end of first year of teaching (T2 to T3). The development in showing care and concern to students was much slower than other factors. Further discussion about the changes in participants' pedagogical knowledge and skills will be deliberated during the presentation.

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