
Title	A comparison of perceptions of knowledge and skills held by primary and secondary teachers: From the entry to exit of their preservice programme
Author(s)	Angela F. Wong, Sylvia Chong, Doris Choy, Isabella Y. Wong and Kim C. Goh
Source	<i>Australian Journal of Teacher Education</i> , 33(3), 77-93
Published by	Edith Cowan University

This document may be used for private study or research purpose only. This document or any part of it may not be duplicated and/or distributed without permission of the copyright owner.

The Singapore Copyright Act applies to the use of this document.

2008

A Comparison of Perceptions of Knowledge and Skills Held by Primary and Secondary Teachers: From the Entry to Exit of Their Preservice Programme

Angela F. Wong

National Institute of Education, Singapore

Sylvia Chong

National Institute of Education, Singapore

Doris Choy

National Institute of Education, Singapore

Isabella Y. Wong

National Institute of Education, Singapore

Kim C. Goh

National Institute of Education, Singapore

Recommended Citation

Wong, Angela F.; Chong, Sylvia; Choy, Doris; Wong, Isabella Y.; and Goh, Kim C. (2008) "A Comparison of Perceptions of Knowledge and Skills Held by Primary and Secondary Teachers: From the Entry to Exit of Their Preservice Programme," *Australian Journal of Teacher Education*: Vol. 33: Iss. 3, Article 6.

Available at: <http://ro.ecu.edu.au/ajte/vol33/iss3/6>

This Journal Article is posted at Research Online.

<http://ro.ecu.edu.au/ajte/vol33/iss3/6>

A Comparison of Perceptions of Knowledge and Skills Held by Primary and Secondary Teachers: From the Entry to Exit of Their Preservice Programme

Angela F. L. Wong
Sylvia Chong
Doris Choy
Isabella Y-F Wong
Kim Chuan Goh
National Institute of Education
Singapore

Abstract: The purpose of this study was to investigate if there were differences in the levels of pedagogical knowledge and skills as perceived by the student teachers who were enrolled in the Primary and the Secondary Post Graduate Diploma in Education programme at the National Institute of Education in Singapore. 170 Primary and 426 Secondary student teachers participated in the study. The results showed that there were no significant differences at the beginning of the programme between the two cohorts. However, there were significant differences between the two groups at the end of programme, with the Primary student teachers tending to perceive themselves as gaining more pedagogical knowledge and skills by the end of their initial teacher preparation programme than the Secondary student teachers.

Introduction

Beginning teachers are expected to acquire a range of knowledge and skills before taking their first teaching posts. The preparation of new teachers is imperative to educational improvement (Cobb, Darling-Hammond, & Murangi, 1995). What constitutes quality preservice of teachers is in itself an issue that is at the centre of much educational debate. There seems to be an expectation from employers, schools, and beginning teachers that preservice teacher preparation will equip teachers with a set of beginning knowledge and skills; ensure they have adequate content knowledge across curriculum areas; and have a repertoire of teaching strategies that will assist students with the aim of increasing student achievement. Beginning teachers are expected to be able to understand and use pedagogy that has three dimensions: intellectual quality; quality of learning environment; and significance (Kervin & Turbill, 2003).

Studies reviewed by Davies and Ferugson (1997) stressed the importance of teacher preparation and quality teaching. They stated that a knowledgeable and skilful teacher makes the greatest impact on the learning process of the students. When a graduate becomes a beginning teacher, his/her practice is in a unique physical, social and

temporal environment which represents the intersection of multiple, interacting, interdependent contexts and s/he must call upon multiple ways of knowing to begin enacting the roles of his/her profession (McLeod, 2001). It is undeniable that teachers need to know many things, including subject matter, learning, students, curriculum, and pedagogy. An important part of learning to teach involves transforming different kinds of knowledge into a flexible, evolving set of commitments, understandings, and skills (Feiman-Nemser, 2001).

Models of teacher preparation aim for some basic parameters to be attained by the time a pre-service teacher graduates from a course. In this regard, Reynolds (1992) provided four characteristics beginning teachers should have:

- knowledge of subject matter
- disposition to find out about students and schools and the skills to do so
- knowledge of strategies, techniques and tools to create and sustain a learning environment/community, and the ability to employ the above
- knowledge of content specific pedagogy

While the first three would set a standard for pre-service teacher programmes to aim for, the last can also be developed through experience and professional development. It is evident that subject matter knowledge, knowledge of pedagogy and awareness of the new learning environment, and hence instructional strategies, feature strongly in the above.

This paper compares the perceptions of knowledge and skills held by Primary and Secondary student teachers of the Postgraduate Diploma in education (PGDE) programme in the National Institute of Education, Singapore. Eggen and Kauchak (2001) gave a cognitive dimension of perception; they see perception as the process by which people attach meaning to experiences. Perception may be influenced by both the present and past experiences, individual attitude at a particular moment, the physical state of the sense organ, the interest of the person, the level of attention, and the interpretation given to the perception. It has been established that there is high correlation between what teachers perceived they know and what they teach (Wilson et al., 2001). Thus, the ability to teach effectively depends on the teachers' perceptions of knowledge and skill, and knowledge and skill occurs in a variety of forms. Studies of pre-service and beginning teachers' perceptions on their knowledge and skills have been conducted, in primary and secondary levels (Boulton-Lewis *et al.*, 2001; Waeytens *et al.*, 2002; Bolhuis & Voeten, 2004). However, little has been done to compare the perceptions of these two levels of teachers. It is possible that the literature on the perception of Primary and Secondary school teachers' knowledge and skills is not cross-referenced extensively because of the differences expected between the two groups.

Postgraduate Diploma in Education (Primary Track and Secondary Track)

Currently NIE offers three separate teacher preparation programmes for three different types of student teachers based on their entry qualifications. These are:

- a. Diploma in Education (Dip Ed) - for high school graduates and Polytechnic Diploma holders. This is a 2-year course, and almost all student teachers in this group are prepared to teach in the primary schools.
- b. Bachelor of Arts (Education) and Bachelor of Science (Education) – for high

school graduates and Polytechnic Diploma holders who meet the university entry requirements. These are 4-year courses with direct honours based on excellent overall performance. Student teachers are trained to teach at either the primary or secondary level.

- c. Postgraduate Diploma in Education (Primary) and Postgraduate Diploma in Education (Secondary) (PGDE) – for graduates with a baccalaureate degree from local or recognized foreign universities. This is a one year course.

The PGDE programmes (Primary and Secondary) have had a long history. Prior to 1991 the Singapore Teachers' Training College which later became the Institute of Education offered a 2-year Certificate in Education and a 1-year Diploma in Education programme. In 1991 with the upgrading of the Institute of Education to a university college, the National Institute of Education, as part of the Nanyang Technological University, these were renamed the Diploma in Education (Dip Ed) and Post-Graduate Diploma in Education (PGDE) respectively. At the same time, a concurrent initial teacher preparation programme at the degree level was introduced. The PGDE programme, except for the physical education specialisation which is a 2 year full time programme, is a one- year full time programme with separate tracks for preparing teachers for the primary or secondary school system.

The PGDE programme is designed to prepare student teachers to:

- a. have the knowledge and skills to teach in primary or secondary schools;
- b. be aware of and sensitive to the needs, abilities, interests and aptitudes of students in schools;
- c. be able to teach students of different abilities, interests and backgrounds effectively and creatively;
- d. be committed to the nurturing and development of the students in their charge; and
- e. be committed to self-initiated and sustained professional development.

(National Institute of Education, 2004)

The PGDE primary and secondary tracks share similar programme structures. The programme comprises four main components of study:

- a. Education Studies (with an education studies elective module)
- b. Curriculum Studies
- c. Practicum
- d. Language Enhancement and Academic Discourse Skills (LEADS)

The education studies component provides a balanced approach of the key foundations for learning and teaching. The student teachers learn about understanding their learners and the process of learning, as well as about themselves as teachers and professionals in relation to professional and social contexts. Areas such as teaching thinking, classroom management, and socio-emotional learning are captured within and across the various courses. Central to these concepts are: educational psychology, social context of education, and how technologies (ICT) can enhance the social, cognitive, and emotive dimensions of teaching and learning for the individual student or learner.

With the exception of specialised subjects such as mother tongue languages (that is, Mandarin, Malay and Tamil) and physical education, all Primary school teachers are expected to teach at English Language and Mathematics as well as a third subject from

the following: Science, Art, Music and Social Studies. Secondary school teachers are expected to teach 2 curriculum subjects in school. Curriculum studies courses are designed to provide student teachers the pedagogical skills in teaching specific subjects in Singapore schools

The LEADS component is designed to improve the ability of the student teacher to be more effective communicators in the classroom. There is only one LEADS course in the PGDE programme – the Use of English in Teaching. This course has a practice orientation, and focuses on how the appropriate management of voice and language can contribute towards more effective teaching and professional communication.

The Practicum occupies a crucial position in the teacher preparation programmes at NIE. A pass in practicum is a prerequisite for certification of student teachers at the end of the programme. Its principal function is to provide student teachers with opportunity to use knowledge and skills acquired in the programme and attempt to integrate theory and practice. The practicum serves to develop teaching competencies, through close developmental mentoring and supervision. Student teachers are mentored by cooperating teachers about the schooling process, and the various roles and responsibilities of a teaching professional.

To ensure that standards are maintained, NIE has an International Advisory panel to review NIE's role and functions as well as its strategic thrusts, and included in these, is the quality of its teacher preparation programmes. At the programme level, external examiners evaluate each of the programmes. At the curriculum studies level, external examiners/assessors are appointed for each discipline. These examiners/ assessors come from reputable universities and have much experience in these subject areas.

Objectives

This paper reports part of the results from a longitudinal study conducted to collect baseline information from student teachers about the initial teacher preparation programmes at the National Institute of Education. The longitudinal study investigated why the student teachers wanted to join the teaching profession, their attitudes, and perceived knowledge and skill levels towards teaching at the beginning and at the end of the teacher preparation programme. Upon completion of the teacher preparation programme, the study continues to follow the student teachers into their first year of teaching.

The purpose of this paper is to examine if there were differences in the way the PGDE (Primary) and PGDE (Secondary) programme student teachers perceived the pedagogical knowledge and skills that they possessed at the beginning and end of their initial teacher preparation (ITP). Hence the objectives are to:

1. compare the Primary and Secondary student teachers' perceptions of the level of their pedagogical knowledge and skills in teaching at the entry point of their ITP programme; and
2. compare the Primary and Secondary student teachers' perceptions of the level of their pedagogical knowledge and skills in teaching at the exit point of their ITP programme.

Based on the objectives of this paper, only part of the data and findings from the longitudinal study will be reported and discussed in the following sections. More specifically, this paper focused on how the Primary and the Secondary student teachers perceived their knowledge and skills. The questionnaires collected at the beginning and end of the teacher preparation programme were used as the main source of data to answer the research questions.

Methodology

Sample

The participants for this study were student teachers who were enrolled in the primary and secondary tracks of the PGDE initial teacher preparation programme. They were invited to participate in the study at the entry point (beginning) and the exit point (end) of their programme. Out of the total of 284 students enrolled in the PGDE (Primary) and 750 students enrolled in the PGDE (Secondary) programmes, 170 from the primary and 426 from the secondary programme participated in both data collections. The overall response rates for the primary and secondary tracks were 60% and 57% respectively. The age range of the participants in both tracks was between 22 – 43 years.

Instrument

The survey instrument comprised 34 questions. Each question had two 5-point Likert rating scales, one to measure participants' perceptions of their level of knowledge in teaching and the second to measure their perceptions of the level of their current skills in teaching. The Likert scale used to assess the self-perceived level of knowledge and skills is given in Table 1.

Perceptions of Knowledge Level	Perceptions of Skills Level
5. Highly knowledgeable	5. Extremely confident
4. Knowledgeable	4. Confident
3. Uncertain	3. Uncertain
2. Not so knowledgeable	2. Not so certain
1. No knowledge at all	1. No confidence at all

Table 1: The five-point Likert Scale of the self-perceived level of knowledge and skills in teaching

Data Analysis and Results

There were two different sets of data collected at the entry and the exit points of the Primary and Secondary PGDE programmes. One set was for the participants' perceptions of their level of knowledge in teaching and the second was for their perceptions of the level of their current skills in teaching. The statistics used, the reasons for using them and the findings of this study are discussed in the subsections that follow.

Factorial Analysis

Factor analysis using principal components extraction with varimax rotation was used to extract factors from the 34 items related to pedagogical knowledge and skills. As this paper compares the differences between student teachers' perceptions in the PGDE Primary and Secondary programmes in teaching, we looked at the data separately at the beginning of the data analysis process. Factor analyses were conducted on both sets of data using SPSS 15.0 in an attempt to identify common factors that fit well with the Primary as well as the Secondary programme data. Initial factor analysis showed six factors extracted from the Primary programme and five factors from the Secondary programme. The eigenvalues ranged from 11.94 to 1.01 for Primary and from 11.53 to 1.12 for Secondary programmes. After analyzing the Primary data, we decided to eliminate the sixth factor ($\lambda = 1.01$) as the eigenvalue was low, the percentage of variance explained by this factor was less than three percent and the component matrix results from SPSS showed that there were only three items that carried loadings that were higher than 0.30 in this factor. As a result, further factor analysis for the Primary programme was done to set the extraction of eigenvalue at over 1.10 before comparing the results between the factors from the two programmes.

The rotated component matrixes from the Primary and the Secondary programmes were then compared carefully to identify common factors and common items in each factor. The five factors extracted from both sets of data are: Factor One: Facilitation; Factor Two: Assessment; Factor Three: Management; Factor Four: Preparation; and Factor Five: Care and concern. Each factor consisted of five to six items from the survey. Six out of the 34 items were eliminated from the data as they did not fit well with both the Primary and the Secondary programme data.

Cronbach alpha was then used to estimate the reliability of each factor extracted from the factor analyses. The results showed that all factors were fairly reliable, the Cronbach alphas ranged from 0.77 to 0.89. The descriptors of the factors, selected items in each factor as well as their Cronbach alphas are shown in Table 2.

Factor	Factor description	Sample items	Cronbach Alpha
Factor 1: Facilitation	Facilitating students' thinking and learning	<ul style="list-style-type: none"> • Infusing critical thinking appropriately into the lessons • Facilitating and stimulating thinking among students 	0.89
Factor 2: Assessment	Assessing students' learning formally and informally	<ul style="list-style-type: none"> • Using evaluative feedback to assist students in their progress • Interpreting students' performance from test scores 	0.82
Factor 3: Management	Managing student behaviours and discipline	<ul style="list-style-type: none"> • Managing students with behavioural and learning problems • Managing student learning-groups effectively 	0.84
Factor 4: Preparation	Planning lessons and preparing appropriate resources	<ul style="list-style-type: none"> • Choosing appropriate teaching strategies for teaching particular topics • Planning lessons that take into consideration the different abilities of students 	0.83
Factor 5: Care and concern	Providing care and helping students with problems	<ul style="list-style-type: none"> • Showing concern for the holistic development of students • Motivating students to work hard 	0.77

Table 2: Sample items of factors and their reliabilities

Comparisons of the Student Teachers' Perceptions of the Levels of Their Pedagogical Knowledge and Skills

As the purpose of this paper was to investigate the differences in perceptions of the level of pedagogical knowledge and skills between the student teachers in the Primary and Secondary tracks at the entry and the exit points of their ITP programme, it was necessary to find out if their perception levels have changed significantly from the entry to the exit point of the programme as a whole cohort, before conducting any further analysis. Next, t-tests were used to compare the overall means of their levels of perceptions of knowledge and skills in the five extracted factors. The results showed that there were significant increases in their perceived knowledge level in all five factors. There were also significant increases in their perceived skills level in four out of the five factors. The only factor in the skills level that did not increase significantly is Factor Five, Care and concern. The average of their perceived knowledge and skills level ranged from 3.2 to 3.6 at the entry point of the programme and their means increased to a range from 3.4 to 3.7 at the exit point of the programme (See Table 3).

Extracted Factors	Means (entry)	Means (exit)	t	p-value	Effect Size
Factor 1: Facilitation					
Perceptions of pedagogical knowledge	3.34	3.67	-9.53	< .01*	-0.5
Perceptions of pedagogical skills	3.35	3.47	-3.79	< .01*	-0.2
Factor 2: Assessment					
Perceptions of pedagogical knowledge	3.34	3.62	-9.90	< .01*	-0.5
Perceptions of pedagogical skills	3.37	3.54	-5.368	< .01*	-0.3
Factor 3: Management					
Perceptions of pedagogical knowledge	3.20	3.53	-10.62	< .01*	-0.6
Perceptions of pedagogical skills	3.24	3.41	-5.54	< .01*	-0.3
Factor 4: Preparation					
Perceptions of pedagogical knowledge	3.37	3.76	-15.80	< .01*	-0.8
Perceptions of pedagogical skills	3.44	3.67	-9.00	< .01*	-0.5
Factor 5: Care and concern					
Perceptions of pedagogical knowledge	3.65	3.74	-2.95	< .01*	-0.3
Perceptions of pedagogical skills	3.64	3.68	-1.15	.25	-0.1

Table 3: Paired sample t-test comparisons of means of the five extracted factors between the entry and the exit of the programme (*statistically significant at p < 0.01 level)

The results of the t-tests showed that there were significant increases in almost all of the factors in student teachers' perceptions of their level of pedagogical knowledge and skills at the exit point of the ITP. Based on this result, further investigations will be conducted to find out if there are significant differences in perceptions of the level of pedagogical knowledge and skills between the Primary and the Secondary student teachers.

Comparisons of Descriptive Statistics Based on the Extracted Factors

Based on the results from the factor analyses, both Primary and Secondary programme data were organized according to the factors before further comparisons.

The descriptive statistics showed that there were some differences between the Primary and Secondary student teachers' perceptions of their pedagogical knowledge level in all five factors at entry and exit points of the programme. At the entry point of the programme, the overall averages were different for student teachers from different programmes (see Table 4). The Primary student teachers' perceptions of their pedagogical knowledge level (3.30) were slightly lower than that for the Secondary student teachers (3.38). At the exit point of the programme, there were also some differences in their overall perception level. The Primary student teachers' overall perception levels (3.70) were slightly higher than that of the Secondary student teachers (3.63). These differences are illustrated in Figure 1. Further analysis using MANCOVA will be discussed to find out if the differences are a result of differences in the teacher preparation programmes.

	Primary		Secondary	
	Entry	Exit	Entry	Exit
1. Facilitation	3.21	3.70	3.33	3.55
2. Assessment	3.29	3.59	3.36	3.65
3. Management	3.17	3.60	3.18	3.47
4. Preparation	3.19	3.76	3.30	3.69
5. Care and concern	3.63	3.85	3.69	3.80
Overall Average	3.30	3.70	3.38	3.63

Table 4: Means of student teachers’ perceptions of their level of pedagogical knowledge at entry and exit points of the programme

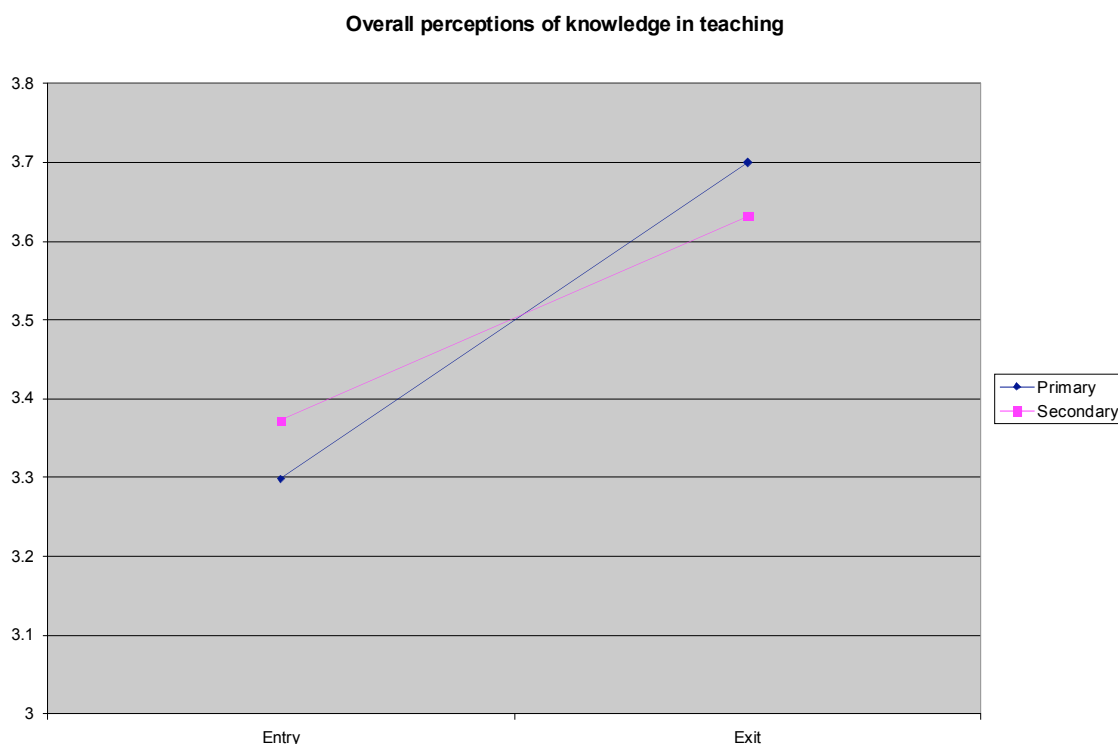


Figure 1: Overall averages of Primary vs. Secondary perceptions of level of pedagogical knowledge

In contrast to their perceptions of their level of pedagogical knowledge, the student teachers’ perceptions of their level of pedagogical skills were about the same at the entry point of the programme. The overall average of Primary student teachers was 3.39 and of Secondary student teachers was 3.38 (see Table 5). However, there were some differences between their perceptions of their level of pedagogical skills at the exit point of the programme, where Primary student teachers’ overall average (3.59) was higher than the Secondary average (3.51). Figure 2 illustrates these differences.

	Primary		Secondary	
	Entry	Exit	Entry	Exit
1. Facilitation	3.31	3.56	3.32	3.39
2. Assessment	3.35	3.48	3.39	3.56

3. Management	3.28	3.47	3.19	3.34
4. Preparation	3.33	3.65	3.36	3.59
5. Care and concern	3.67	3.75	3.64	3.67
Overall average	3.39	3.59	3.38	3.51

Table 5: Means of student teachers’ perceptions of their levels of pedagogical skills at entry and exit points of the programme

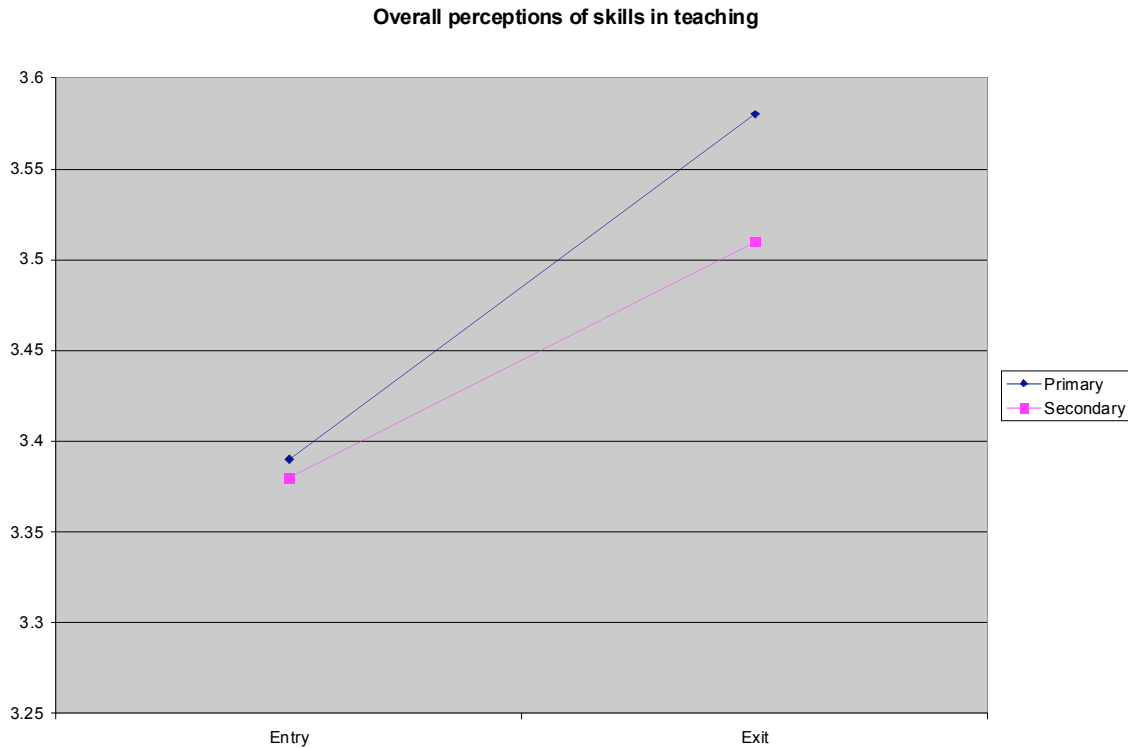


Figure 2: Overall averages of Primary vs. Secondary perceptions of level of pedagogical skills

Comparison of Effect Sizes between Primary and Secondary Programmes

The effect sizes in Primary and Secondary programmes showed that there were differences in effect sizes between the two programmes. When looking at effect size, Cohen (1988) suggested that effect sizes is small when *d* is less than 0.2; medium between 0.3 to 0.7, and large when *d* is larger than 0.7.

In general, the Primary programme showed a larger effect size (0.3 – 1.1) in all four factors than the Secondary programme (0.1 – 0.7) in the student teachers’ perceptions of pedagogical knowledge level. The largest difference was from Factor One: Facilitation, where the effect size of Primary student teachers’ perception of their pedagogical knowledge level was -0.9 and Secondary student teachers’ was -0.3. The effect sizes of Primary student teachers’ perceptions of pedagogical knowledge level in Factor Three: Management; Factor Four: Preparation; and Factor Five: Care and concern were all larger than the Secondary student teachers’. However, the effect size indexes for Factor Two are the same for both programmes.

When comparing the effect size of their perceptions of their pedagogical skills level, the Primary student teachers' effect size was slightly larger than the Secondary programme in Factors One and Four (see Table 6). The effect size indices in the pedagogical skills level for Factors Two, Three and Five are the same for both programmes.

Overall, the results suggested that the participants in the Primary programme perceived themselves as gaining more pedagogical knowledge in most of the factors and a slightly higher level of pedagogical skills in facilitation and preparation from the teacher preparation programme than the Secondary student teachers. Further analysis using MANOVA to compare the differences in student teachers' perceptions of their levels of pedagogical knowledge and skills will be discussed.

Extracted Factors	Primary Programme Effect size (d)	Secondary Programme Effect size (d)
1. Facilitation		
Perceptions of pedagogical knowledge	-0.9	-0.3
Perceptions of pedagogical skills	-0.4	-0.1
2. Assessment		
Perceptions of pedagogical knowledge	-0.5	-0.5
Perceptions of pedagogical skills	-0.3	-0.3
3. Management		
Perceptions of pedagogical knowledge	-0.8	-0.5
Perceptions of pedagogical skills	-0.3	-0.3
4. Preparation		
Perceptions of pedagogical knowledge	-1.1	-0.7
Perceptions of pedagogical skills	-0.6	-0.4
5. Care and concern		
Perceptions of pedagogical knowledge	-0.3	-0.1
Perceptions of pedagogical skills	-0.1	-0.1

Table 6: Comparison of effect size indices between Primary and Secondary programmes

Multiple Analysis of Variance (MANOVA) of Primary and Secondary Student Teachers' Entry Perceptions of Their Levels of Pedagogical Knowledge and Skills

Preliminary comparisons of means showed that there were some differences between the Primary and Secondary student teachers' perceptions of their levels of pedagogical knowledge and skills. In order to avoid Type I Error, where the statistical analysis concludes that there are significant differences between the two groups when in fact there are no differences between the groups, a Multiple Analysis of Variance (MANOVA) was used instead of t-tests to compare if there were any significant differences between the two groups of student teachers at the entry point of the ITP programme.

MANOVA was used on the five extracted factors of the data collected from the entry point of the programme with programmes (Primary vs. Secondary) as the independent variable. As the sample sizes of Primary and Secondary programme were different, Box's test was used to test the equality of covariance matrices of the two groups. The Box's test yielded no significant values ($F=0.86$, $p=0.60$), and the result showed that the two programmes were similar in their covariance matrices. The

MANOVA of their perceptions of their pedagogical knowledge level was not significant [Wilk's Lamda = 0.98, $F(1, 594) = 2.01$, $p = 0.08$] between the Primary and the Secondary student teachers. The MANOVA of their perceptions of their pedagogical skills level yielded similar results [Wilk's Lamda = 0.98, $F(1, 594) = 2.19$, $p = 0.06$]. The results of MANOVA showed that there were no significant differences in their perceptions of both levels of pedagogical knowledge and skills at the entry point of the programme.

Multiple Analysis of Covariance (MANCOVA) of Primary and Secondary Student Teachers' Exit Perceptions of Their Levels of Pedagogical Knowledge and Skills

Multivariate analysis of covariance (MANCOVA) and a series of analysis of covariance (ANCOVA) procedures were conducted to examine if there are significant differences in perceptions between the Primary and the Secondary student teachers at the exit point of the teacher preparation programme. The five extracted factors were used as the independent variable and the data collected from the entry point of the programme as covariates. As multiple statistical analyses were conducted to answer different research questions in this study, it is very possible to run into Type I Error when conducting multiple t-tests repeatedly. Hence a MANCOVA was selected for use in this case.

The MANCOVA indicated that there was significant difference (Wilk's Lamda = 0.95, $F(1, 594) = 6.62$, $p < 0.01$) between the Primary and the Secondary student teachers in their perceptions of their pedagogical knowledge level on the five extracted factors at the exit point of the teacher preparation programme. As a result, a follow-up an analysis of covariance (ANCOVA) was used to determine which of the five factors were responsible for the significance. Table 7 shows the summary of the ANCOVA comparing student teachers' perceptions of their pedagogical knowledge level at the exit point of the programme.

Factors (Knowledge)	F	P
1. Facilitation	13.31	<0.01**
2. Assessment	0.82	0.36
3. Management	8.82	<0.01**
4. Preparation	4.97	0.02*
5. Care and concern	3.73	0.05*

Table 7: Summary of ANCOVA comparing the student teachers' perceptions of their pedagogical knowledge level at the exit point of the teacher preparation programme (significant at $p < 0.01$, * significant at $p < 0.05$)**

The ANCOVA showed that there were significant differences in four out of the five factors. The perceptions of pedagogical knowledge level of Primary and Secondary student teachers' were significantly different in Factor One: Facilitation; Factor Three: Management; Factor Four: Preparation; and Factor Five: Care and Concern. The only factor that was not statistically significant was Factor Two: Assessment.

Similar to the perceptions of pedagogical knowledge level, MANCOVA showed significant differences in the perceptions of pedagogical skills level between the Primary and the Secondary student teachers [Wilk's Lamda = 0.94, $F(1, 594) = 6.68$, $p < 0.01$]. Univariate ANCOVA showed quite different results when compared to that for perceptions of pedagogical knowledge level. There were only two out of five factors that were significantly different when comparing between the Primary and the Secondary

student teachers (see Table 8). The perceptions of pedagogical skills level were only significant in Factor One: Facilitation and Factor Three: Management.

Factors (Skills)	F	P
1. Facilitation	10.33	< 0.01**
2. Assessment	2.18	0.14
3. Management	4.78	0.03*
4. Preparation	1.78	0.18
5. Care and concern	1.98	0.16

Table 8: Summary of ANCOVA comparing the student teachers' perceptions of their pedagogical skills level at the exit point of the teacher preparation programme (significant at $p < 0.01$, * significant at $p < 0.05$)**

Discussions

The purpose of this study attempted to compare the level of perceptions of pedagogical knowledge and skills held by Primary and Secondary student teachers from the Post-graduate Diploma in Education programme at the entry and exit points of their initial teacher preparation (ITP).

Findings from the study indicated that upon entering the teacher education programmes, student teachers already viewed themselves to have some pre-requisite pedagogical knowledge and skills in facilitation, assessment, management, preparation and showing care and concern for students. This perception could stem from the fact that they have already undergone some 18 years of education as pupils in schools, and therefore feel that they know what teaching is about. Lortie (1975) refers to this as “apprentice of observation.” He had noted that because of these long exposure to teacher models, student teachers enter their training programmes with models of teacher behaviour internalized and that “... to a considerable extent future teacher behaviour is rooted in experiences which predate formal training” (Lortie, 1973, p. 487). The results here provide some support for Lortie’s contention. However, there were no significant differences between the Primary and Secondary student teachers’ perceptions of their levels of pedagogical knowledge and skills at the entry point of their ITP programme.

On the other hand, at the exit point of their ITP, both Primary and Secondary student teachers perceived a significantly higher level of pedagogical knowledge and skills. However, the increase in the levels of pedagogical knowledge and skills perceived by Primary student teachers were significantly greater than that shown by the Secondary student teachers. In the area of pedagogical knowledge, the Primary group perceived a significantly higher level of the following factors: facilitation, preparation, management, and care and concern. For pedagogical skills, the significant differences were found in the facilitation and management factors.

Let us first look at the possible reasons for the difference in levels of increase of the pedagogical knowledge base in facilitation, preparation, management and care and concern as perceived by the two groups of student teachers. At the time when the exit data was collected, all the student teachers would have already completed all their course work as well as a 9-week block practicum in school. As a result, this pattern of significant differences could be attributed to the different content and delivery of the teacher education curriculum and the characteristics of the student teachers themselves. This

corresponded with the findings of a study (Marston et al, 2005) that examined the motivations of three groups of teachers: two elementary and one high school, for remaining in teaching. The researchers found that there were differences between high school and elementary school teachers. One clear difference was that many of the high school teachers responded to the interview questions in terms of a particular subject (for example biology, music, math) while elementary school teachers often made reference to their students and referred to subjects as “curriculum” rather than individual subjects.

In addition, from their practicum experiences, the participants may have gained a more realistic understanding of the demands of primary or secondary school teaching, the context of their workplace and the characteristics of the students they teach. For example, in the Singapore secondary schools, students are formally streamed by academic abilities and inclinations into either the Special/Express (higher ability) or the Normal (Academic) (average ability) or Normal (Technical) (lower ability) courses, whereas in the Primary classroom, there is less delineation of students by abilities by class. Secondary students who are in their teenage years already exhibit more challenging behaviours. With streaming, students with more demanding behaviours are concentrated in a class. Secondary student teachers may thus perceive themselves to be less adequately prepared in preparing and facilitating the learning and managing the behaviours of their adolescent students, especially those in the Normal courses. Hence, it was not surprising to find that the secondary student teachers perceived a smaller increase in the level pedagogical knowledge in facilitation, preparation and management as compared to their Primary counterparts.

The roles of Primary and Secondary teachers are also different. This affects the ways that they relate to their students. Hargreaves (2000) found differences in the “emotional geographies” of Primary and Secondary teachers. The teacher-student relationship in primary schools shows more “physical and professional closeness which creates greater emotional intensity” while secondary teachers show greater “professional and physical distance”. The primary/elementary school teacher finds more delight working with the children than the high school teacher (Marston et al, 2005). This may thus explain why the Primary student teachers perceived a larger increase in the level of their pedagogical skill in care and concern as compared to their secondary counterparts.

Next let us examine the possible reasons why the increase in pedagogical skills perceived was greater for the Primary group as compared to the Secondary group in the areas of facilitation and management. In both the Primary and the Secondary teacher preparation programmes, student teachers were exposed to knowledge on generic classroom teaching skills. From the findings, it would seem that Primary level student teachers perceived that the generic skills that they learnt had immediate application to their classrooms. However, as there is streaming in secondary schools, Secondary student teachers may perceive that they cannot use the generic skills and that they would require more specialized skills to teach, especially students in the Normal courses. Therefore, this could explain why secondary student teachers perceived that it is more difficult to apply their generic teaching skills to their teaching as compared to the Primary student teachers. This could thus result in a lower level of increase of perceived facilitation and management skills by the Secondary group as compared to the Primary group.

The difference in levels of increase of the pedagogical knowledge base in facilitation, preparation, management and care and concern as perceived by the two

groups of student teachers may also be explained by beginning teachers' levels of concerns. According to the study by San (1999), Japanese beginning primary teachers are concerned with more education-related items such as class management, student guidance, understanding students, school management and relationships with home and community issues. Secondary school teachers, on the other hand, tend to be more concerned with subject related items such as subject knowledge, basic teaching techniques and the study and use of teaching aids. The beginning teachers' need to overcome their focused concerns and challenges may explain the difference in their perceptions of skill acquisition.

With regards to the remaining Assessment factor in pedagogical knowledge and three factors in pedagogical skills (Preparation, Assessment and Care and concern), the change in the level of perceptions between the Primary and the Secondary programmes was not significantly different from each other. Hence both groups perceived a similarly higher level of these factors at the exit point of their teacher preparation programme.

This paper examined if there were differences in the Primary and Secondary student teachers' perceptions of the level of their pedagogical knowledge and skills at the entry and exit points of their initial teacher preparation. The results showed that there were significant differences in the increase of some factors in perceived pedagogical knowledge and skills levels between the Primary and the Secondary student teachers. More specifically, the increases in these factors for the Primary student teachers were significantly higher than that for the Secondary student teachers. These results seemed to suggest that there may be a need for a greater differentiation in certain areas of the teacher preparation curriculum for Primary and Secondary teachers. Currently, the structures of the NIE initial teacher preparation programmes for preparing Primary and Secondary student teachers are relatively similar. As the student teachers will be facing very different sets of expectations, demands from schools and different target audiences, initial teacher preparation for different programmes may need to differentiate further.

Recommendations and Conclusion

From the results of this study, it would seem that the NIE initial teacher preparation programme is providing both the Primary and Secondary student teachers adequate pedagogical knowledge skills to get them started in their teaching career. However, there seems to be some differences in the levels of perceived adequacy between the two groups of student teachers, with the Primary group perceiving a higher level than the Secondary group. This differential effect of initial training on the levels of perceptions of knowledge and skills of the Primary and Secondary student teachers has important implications for teacher educators. They must take cognizance of the fact that methods instructors in teacher education programmes should be aware of the different teaching approaches required for Primary and Secondary levels. This would imply that teacher education programmes that prepare student teachers for teaching at different levels may have to differ in the nature and quality of the curricula. In addition, more careful consideration of course work and greater differentiation in delivery of programme for the different levels of student teachers may be required.

Teacher education programmes would expect all student teachers to graduate with a sophisticated range of knowledge and skills that would facilitate their students to learn at high levels. Hence, a more deliberate set of strategies for ensuring that their teachers gain access to adequate and appropriate pedagogical knowledge and skills will be needed. The development of practice-oriented teacher preparation curricula should offer teachers the opportunities to adapt to the students. Components of teachers' pre-service education that influence effectiveness should be reviewed. Such components include programme structure, level and subject-specific teaching preparation, field experiences, preparation to work with learners, and preparation for diversity.

The results of this study suggested that there are differences in Primary and Secondary student teachers' perceptions of pedagogical skills. Future studies should try to look into their perceptions of knowledge and skills in different subject areas. Subsequently, professional development that focuses on understanding and implementing specialized teaching skills for both primary and secondary schools should be provided to beginning teachers. Profiles of professional competencies could be developed in collaboration with schools so that preparation and induction into the Primary or Secondary teaching becomes a more coherent process of professional development. Schools and teacher preparation institutions should work closely to raise the standards of teaching and learning in the classrooms.

As this paper reported part of the results from a longitudinal study, future research will continue to follow these Primary and Secondary PGDE beginning teachers into their first year of teaching. Data from questionnaires, in-depth information from interviews and focus groups could be used to examine the changes of the self-perceived level of pedagogical knowledge and skills after one year of teaching as a full-time teacher.

Teacher preparation is a continuous journey. The initial teacher preparation programmes provide foundational knowledge and skills to the student teachers. The programme would need to inspire student teachers to be innovative leaders, who are capable of reflecting on their actions, practice and thoughts. In the long term, professional development plays an integral part in the growth of teachers and their teaching skills. Studies support "pre" and "in" service teacher development as a continuum (Bernier & McClelland, 1989; Delannoy, 2000; Feiman-Nemser, 2001). This has led to a shift away from a fragmented vision of discrete "pre" and "in" service training to one of teacher learning over time. Learning to be the best teacher is a lifelong endeavour.

References

- Bernier, R., & McClelland, A. F. (1989). Contexts of professional development. In M. L. Holly, & C. McLoughlin (Eds.), *Perspectives on teacher professional developments*. London: Falmer Press.
- Bolhuis, S., & Voeten, M. J. M. (2004). Teachers' conceptions of student learning and own learning, *Teachers and Teaching: Theory and practice*, 10, 77–98.
- Boulton-Lewis, G. M., Smith, D. J. H., McCrindle, A. R., Burnett, P. C., & Campbell, K. J. (2001). Secondary teachers' conceptions of teaching and learning, *Learning and Instruction*, 11, 35–51.
- Cobb, V. L., Darling-Hammond, L., & Murangi, K. (1995), Teacher preparation and

- professional development in APEC members: An overview of policy and practice. In L. Darling-Hammond & V. L. Cobb (Eds), *Teacher preparation and professional development in APEC members: A comparative study* (Washington, DC, US Department of Education (Eric Document No. ED 383 683), pp. 1–16.
- Davies, R., & Ferugson, J. (1997). Teachers' views of the role of initial teacher education in developing their professionalism. *Journal of Education for Teaching: International Research and Pedagogy*, 23(1), 39-56.
- Delannoy, F. (2000). Teacher training or lifelong professional development? Worldwide trends and challenges. *TechKnowLogia*, 10-14.
- Eggen P., & Kauchak D. (2001). *Educational psychology: Windows on classrooms*. New Jersey: Prentice Hall, Inc.
- Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 103(6), 1013-1055.
- Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education*, 16(8), 811-826.
- Kervin, L.K., & Turbill, J. (2003). Teaching as a craft: Making links between preservice training and professional practice. *English Teaching: Practice and Critique*, 2(3), 22-34.
- Lortie, D. (1973). Observations on teaching as work. In R. Travers (Ed.), *Second handbook of research on teaching* (pp. 474-498). Chicago: Rand McNally.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. London: University of Chicago Press.
- Marston, S. H., Brunetti, G. J., & Courtney, V. B. (2005). Elementary and high school teachers: Birds of a feather? (similarities and differences). *Education*, 125(3), 469.
- McLeod, J.C.H. (2001). Getting out, getting on: Becoming a teacher. In J. Allen (Ed.), *Sociology of Education. Possibilities and Practices* (2nd ed.). Social Science Press: Katoomba.
- National Institute of Education (2004). *Postgraduate Diploma in Education, 2004 -2005* ISSN 0218-3196.
- Reynolds, A. (1992) What is a competent beginning teacher? A review of the literature. *Review of Educational Research*, 62(1), 1-35.
- San, M.M. (1999). Japanese beginning teachers' perceptions of their preparation and professional development. *Journal of Education for Teaching*, 25(1), 17-29.
- Vonk, H. (1991). Some trends in the development of curricula for the professional preparation of primary and secondary school teachers in Europe: A comparative study. *British Journal of Educational Studies*, 34(2), 117-137.
- Waeytens, K., Lens, W. & Vandenberghe, R. (2002) Learning to learn: teachers' conceptions of their supporting role, *Learning and Instruction*, 12, 305–322.
- Wilson, S.M., Floden, R.E., & Ferrini-Mundy, J. (2001). *Teacher preparation research: Current knowledge, gaps, and recommendations*. A research report prepared for the U.S. Department of Education by the Center for the Study of Teaching and Policy in collaboration with Michigan State University.