

## EXPLORING SUSTAINABILITY OF TEACHER KNOWLEDGE IN DIVERSE EDUCATION CONTEXT

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### ABSTRACT

*In the recent years, numerous studies on the link between teacher's knowledge and students' achievement have been carried out. During the certification course in teacher training, teachers are exposed to these knowledge forms. However research findings prove that teachers' certification status is not a direct measure of teacher's knowledge. This could be attributed to many factors. Questions were designed to measure teacher's knowledge and were administered to teachers teaching English. Initial findings indicated certain demographic variables influencing teacher's knowledge. The findings has implications for teacher training programmers and the types of professional development courses offered to in-service teachers.*

**Keywords:** *Teacher knowledge, multicultural, teacher education, factor analysis.*

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## 1.0 INTRODUCTION

Teachers are an important component of any education system (Aaronson, Barrow & Sander, 2007). The knowledge that they carry has the potential to influence their instructional decisions and their success with students learning experiences. Teachers with in-depth knowledge are capable to determine which concepts should be taught, mastered and even eliminated from a curriculum with regards to their children (Kolis & Dunlap, 2004; Valencia, Place, Martin, & Grossman, 2006). The importance of teacher's knowledge is clearly spelt out by Lipson and Wixson (1997) who wrote that '*perhaps no single factor influences the instructional setting more than a teacher's knowledge... about teaching and learning*' (p.128).

Demonstration of teachers' knowledge is also a reflection on the status of teacher quality. Although having a good knowledge is not an assurance of high quality teacher, it can be considered as one of the defining characteristics of quality (Darling-Hammond & Bransford, 2005). Studies have also shown that when teachers have an in-depth knowledge, they significantly contribute to students' growth in learning (Mosenthal, Lipson, Torncello, Russ, & Mekkelsen, 2004)

Teachers receive their first knowledge of teaching during their certification course. Scholars researching teacher knowledge have indicated that teachers who are certified have better knowledge and so perform better and this impacts students' achievements (Betts, Ruebea, & Danenberg, 2000; Darling-Hammond, 2000). However once these certified teachers enter an educational context, multiple variables within the context of teaching intersect and emerge as domains of teacher knowledge, representing the different types of context knowledge which teachers need to know. Wallace (1988) classify such contexts as the immediate classroom context, the school context and the wider community context. Such knowledge is not reflected in teacher training programmes which are generic in nature. In this study the researchers explore the kinds of knowledge needed by teachers to succeed in practical educational contexts. In doing so the researchers use Shulman's teacher knowledge categories as their base.

## 2.0 REVIEW OF TEACHER KNOWLEDGE BASES

The framework of teacher knowledge categories base in this paper is based on the teacher knowledge domains proposed by Shulman (1986, 1987). Shulman defined a professional knowledge base for teaching that included seven specific categories of teacher knowledge. In this professional knowledge base Shulman distinguished between pedagogical knowledge

and pedagogical content knowledge. While general pedagogical knowledge is described as broad and unattached to specific knowledge, pedagogical content knowledge represented an effort to capture the "instruction strategies" teachers use when they teach specific subject matter content.

Shulman posited that all seven categories were essential elements of teacher knowledge, but at the same time pedagogical knowledge was seen as a "special province of knowledge for teachers ...that exemplified the most essential elements of teacher knowledge". Table 1 below describes the seven categories of teacher knowledge bases by Shulman.

The knowledge base of a teacher is a significant focus in education and policy and would provide some direction to teacher education programmes. However studies in multicultural context of teaching and learning have shown that a teacher knowledge base requires changes with current settings they are in. This mismatch could pose a problem in the teaching and learning process in a classroom and teachers' understanding of her learners (Montecinos & Rios, 1999). Therefore teacher educators must ensure that the pre-service teachers have a good practical knowledge of the setting in which they teach and understanding to teach in a multicultural society or school.

In this paper the case is argued for ELS teaching in a Malaysian multicultural context where there is a need for teachers to have a wide base of knowledge of their learners, teaching context and the evolving policy in education. While Shulman's framework of teacher knowledge addresses these context, the current paper argues that the framework does not emphasise the diversity of multicultural context of teaching and learning in Malaysia. As such there is a call more research to be done in this area. This paper is an attempt to examine if the kinds of teacher knowledge received by teachers during their teacher training programme are able to support their practice in their practical educational context. The above issue is explored through the research questions below.

### **3.0 RESEARCH OBJECTIVES**

This study explores and discusses the kinds of knowledge that teachers require in a multicultural ESL context in Malaysia. Specially the research answers the following questions:

- i. Do teacher training programmes provide teachers with a well defined practical theory of teacher knowledge to support teaching practices in diverse, multicultural ESL context?
- ii. What kinds of demographic factors affect teacher's knowledge when teaching in multicultural ESL context?

### 3.1 *Research Design*

The paper employs a quantitative research design. A survey questionnaire which included 21 items was used to explore teacher knowledge to examine if teachers were equipped with the kind of knowledge needed to teach in a multicultural context. The section below provides details of how the survey instrument was administered.

#### 3.1.1 *Instrument*

To measure teacher knowledge a questionnaire based Shulman's (1986b, 1987) conceptualization of the seven categories of teachers knowledge (refer to Table 1) was designed. Items on the questionnaire were based on Shulman's (1986b, 1987) conceptualization of the seven teachers' knowledge items as in Table 1. A set of 30 multiple choice items were developed to represent the seven categories in Shulman's framework. All 30 items then underwent a series of revision by the research team members. They were scrutinized in terms of formatting, style, quality and function of distracters, as well as an overall evaluation of discreteness and distribution of items. To establish content validity, a panel of expert persons, the panel included three teacher educators was used (Cooper & Schindler, 2003; Gay & Airasian, 2003). The items were shown to three teacher educators. Of the 30 items, 21 were chosen for this study and these items were then attached to the existing categories in Shulman's framework. These are shown in Table 2 below.

The questionnaire was administered, during a professional development course conducted by a Teacher Training Institute.

#### 3.1.2 *Participants*

The participants for this study were 86 in-service trained ESL teachers teaching in Malaysian primary government schools. The participants for this study were 86 in-service trained ESL teachers teaching in Malaysian primary government schools. No consent was asked as the study was anonymous thus giving the researchers no idea which response belonged to which teacher. The individual identities of the teachers were not required in order to complete this study

The selection of only primary school teachers eliminated biases and increased the reliability of this study, especially with teacher's knowledge depending on the subject and level they taught. All participants had undergone teacher education program, in which they were exposed to the theoretical principles of pedagogy and methodology of teaching.

Tables 3-6 present the demographic data for the teachers selected. Of the total participants, 32 teachers were in the age range of 30 and below, followed by another 41 teachers falling in the age range of 31-40. Only 2 of the teachers were over the age range of 50.

The location divide showed that more teachers were from the urban schools (55) as compared to rural (31). 60 of the participants had more than 4 years of teaching experience.

### 3.1.3 Data analysis

Data gathered was analyzed and interpreted using a series of statistical analyses to answer the first research question. A combination of descriptive, inferential, and correlation statistical analyses were used. First, descriptive statistics followed by inferential statistics were used to analyze the sample in terms of each item of the participant's knowledge.

The categories of teacher knowledge were analysed using factor analysis. For the purpose of the interpretation, each factor was composed of variables that loaded at 0.4 or higher (Malhotra, 2010). Prior to the factor analysis, the data were screened for normality of distribution. Bartlett's Test of Sphericity ( $X^2$  test) and Kaiser-Meyer-Olkin measure of sampling adequacy was performed. Two ways were used to determine the number of factors. They were an eigenvalue greater than 1 and the results of the screen test. Each factor consisted of items with loadings greater than 0.40. As this was an exploratory study, an alpha level of 0.05 was used as the margin of statistical significance (Malhotra, 2010). A common factor analysis method known as the Varimax Rotation (Neal, 2010) was employed to extract teacher's knowledge.

To explore the second research question non-parametric methods were used to investigate the role of demographic variables. This method is preferred because it is able to provide estimation in quantifying the trends of within and between groups, minus the peril of misspecification danger (Dacuycuy, 2006); and assumptions required for parametric test, such as normality of data, are not necessarily fulfilled (Alvo & Park, 2002; Mumby, 2002).

## 4.0 RESULTS

The results of the analyses are discussed based on the two research questions.

The overall objective of the first research question was to examine if teacher training programmes provided teachers with adequate knowledge to support teaching practices in diverse, multicultural ESL context.

Two statistical measures were used to help assess teacher knowledge factor ability of the data: Bartlett's Test of Sphericity ( $X^2$  test) and Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO). In this study, the null hypothesis, that the population matrix is an identity test, is rejected by Bartlett's Test of Sphericity. The approximate chi-square was significant at 0.05 level, allowing for factor analysis. The value of KMO statistics was 0.525, is above the required level i.e 0.5, confirmed this.

Through factor analysis, (refer Table 7) three factors emerged and were labelled as 'Knowledge of Learner Characteristics', 'Knowledge of Policy' and 'Pedagogical Knowledge' (see Table 8). These factors were composed of variables that loaded 0.40 or higher on the factor. Three items were used for factor 1 and 2, while only 2 items were for factor 3.

The total variance explained statistics displayed the initial eigenvalues, extraction sums of squared loadings, varimax rotation sums of squared loadings. In all, the three factors explained 33.43% of the total variance (See Table 9).

Research question 2 aimed to examine the demographic knowledge that affect teachers when teaching in multicultural teaching context. Four demographics factors emerged from the analysis which were gender, age, school location and school type. Gender and age were significant to factor 1, location to factor 2 and school type to factor 3 (see Table 10). Table 10 shows the results.

#### *4.1 Discussion*

The three factors of teacher knowledge in Table 8 are factors which emerged showing a lack of training provided in these areas to meet the demands of teacher knowledge when teaching in multicultural context. Factor 1 is significantly linked to gender and age, indicating that gender and age play an important role in the kind of knowledge the teacher has. Different gender may approach learners and the learning context in a different manner. And this can have an influential impact on student's overall motivation to learn. Studies show that female teachers adopt a more direct teaching style where they prefer to immediately address the content being taught to achieve the required performance of students. An implication of this is a conventional and passive mode of teaching in the classroom where teacher imparts knowledge and students are expected to learn and reproduce knowledge.

On the other hand, teachers of the male gender prefer exploration of content knowledge of the topic being taught. There is more emphasis on knowledge development and knowledge reproduction. The reason for this could be the wider reading base of male teachers on current issues compared to female teachers.

Teachers who are older have a broader knowledge of the system due to the years of teaching. These teachers are able to better handle the constant changes within their teaching environment and make the right decision and facilitate the positive learning among the pupils or learners. Such teachers easily adapt their teaching to meet the current characteristics of their students as compared to younger teachers who are still in the process of developing their knowledge of the different requirements in diverse teaching context.

Factor 2 is related to location. This means that teachers from rural location seldom receive current information on changes and status of policy in education. This causes them to be unable to significant input during their teaching. Most of the time their teaching approaches are backdated as they may not be informed of changes in curriculum and pedagogy. For example, many teachers in the rural location were unable to explain the principles of KSSR. The KSSR is the new curriculum document to teaching English currently implanted by the Ministry of Education (MOE). The document comes with changes in approaching the teaching of the four skills of Listening, Speaking, Reading and Writing using a modular approach and an added element of Language Arts. A lack of knowledge in the KSSR implied that teachers were still approaching the teaching of English Language based on the earlier curriculum document which proposed and integrated approach to teaching.

Factor 3 is related to school type. In the Malaysian educational settings, there are three types of primary school in existence. They include the national schools and the national type Chinese and Tamil Schools. All these schools use the same curriculum for non-language subjects with mother tongue being the medium of instruction. For language subjects (i.e National Language and English) there is a degree of difference in difficulty level of the curriculum standards. . Most of the participants in this study did not undergo training on how to adapt their pedagogical knowledge of the generic curriculum they were exposed during their teaching training to the specific needs of the curriculum of being used in the different school type in Malaysia.

A common criticism levied against teacher education is pre-service teacher education has not done an adequate job in preparing teachers to teach (Carreker, Joshi & Boulware-Gooden, 2010; Lee & Herner-Patnode, 2010). To bridge this gap, some modification to teacher education in Malaysia is undertaken. Unlike before, the current trend of teacher education is specialised, catering to the needs of specific subjects. Previously teacher education was generic in nature. This allowed teachers to be versatile when posted to schools. They were able to teach any subject given to them.

However the demand on the style of teaching has increased. In the ESL context where the study is conducted (Malaysian schools) such demands include an understanding of diverse learners and learning contexts. There has also recently been changes in policy and curriculum that affect subjects being taught. As the context of teaching in this study is English, this change is ever more evident with the change in the curriculum currently taking place. There has to be adaptation to teacher's knowledge made based on the change taking place in the study context.



Different subjects also require different set of pedagogical skills and knowledge. When instruction is proximate to a subject, students learn better (Brady & Moats, 1997). Te'llez (2007) sees a difference between academic content knowledge and pedagogy content knowledge. The relationship between the academic qualifications of the teacher with what constitutes a good teacher is still debated. Often teachers with high academic qualification are unable to teach because having the knowledge and teaching requires different set of skills. With the current changes taking place in the ESL syllabus in Malaysia it has become very important for new pedagogical and methodological skills to be incorporated in teacher training in Malaysia.

## **5.0 CONCLUDING REMARKS**

In this study the first factor identified was the need for teachers to develop knowledge of their students' learning characteristics. Educators know that individual learner characteristics play a huge role in how fast and how well overall learning occurs. Characteristics such as capabilities, interest, plural literacy of the multicultural learner and needs, for instance, differ from one learner to the other and one place to the other and should be the emphases in all teacher education programmes especially in the multicultural contexts where the learner is a diverse learner. A generic set of learner characteristics will not be effective in various contexts in Malaysia. What we then need is a multicultural syllabi for teacher training programmes. Work done by Gorski (2009) on a multicultural coursework syllabus in teacher education programs is a point for inclusion.

Among the demographic variables, gender was significant for the first factor. There is a need to attract more male teachers to join the teaching profession. Currently female teachers outnumber male teachers (see Figure 1). Monetary incentives, which were common in the olden days, could be used to attract more males to join. However careful consideration must be taken before toying with such ideas, for there are other implications to think about too.

The current policy requiring teacher educators in Teacher Training College (TTC) in Malaysia to have a minimum of 10 years of teaching echoes and conforms to this factor. Compounded with academic qualification, TTC lecturers would be able to pass on their wealth of knowledge and experience. Another suggestion would be to have school authorities encouraging new teachers to be placed under the wings of senior teachers.

Factor 2 related to the development of the knowledge in the policy of the day. In order for teachers to keep abreast with the latest development in education, MOE has enforced teachers to undergo at least 7 days of professional development courses where experts from outside



are invited. MOE hopes during such courses, teachers would be aware of the happenings and would adopt the knowledge they acquired during these professional development courses. Another recommendation would be to ensure in-service teachers undergo continuous professional courses every 3 years in order to update them on the changes in policy.

Factor 3 reflects on the knowledge needed by teachers to manage teaching and learning in different types of classroom. Darling-Hammond and Baratz-Snowden (2005) refer this to teacher's pedagogical knowledge. Teachers who are able to use their pedagogical knowledge effectively for different types of classroom in diverse settings will create optimal learning experiences.

The findings of this study hold significance to both pre and in-service teacher education programmes. Pre-service teachers need to be equipped with knowledge of skills and strategies to be able to adapt to diverse teaching and learning situations to optimise student learning. This knowledge must be made a major part of pre-service teacher education programme. In-service teachers need effective exposure to changes in policy methodology and approaches so as to enable them to play a more significant role and adapt a positive attitude to change. To do that, we need to move away from the current practice of disseminating information using a cascading approach which may not be able to transfer information to the teachers on the ground.

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Table 1

## Teachers' Professional Knowledge Base Categories (Shulman, 1987)

Category	Definition	Description
Subject matter content Knowledge	<i>Academic related knowledge</i>	Subject matter knowledge includes information or data and the structures, rules, and conventions for organizing and using information or data.
Pedagogical Content Knowledge	<i>The combination of content and pedagogy</i>	Information or data that helps lead learners to an understanding would classify as pedagogical content knowledge. This includes any way of representing a subject that makes it comprehensible to others.
Curriculum Knowledge	<i>Materials and programs that serve as "tools of the trade" for teachers</i>	Knowledge of the curriculum can be considered vertical (within a discipline area across grades), or horizontal (within grade and across disciplines).
General Pedagogical Knowledge	<i>Principles of classroom management and organization unrelated to subject matter</i>	General pedagogical knowledge is unrelated to a specific subject matter and can therefore be implemented in a vast array of classroom settings.
Knowledge of Learners	<i>Specific understanding of the learners' characteristics</i>	These characteristics can be used to specialize and adjust instruction.
Knowledge of Educational Contexts	<i>An understanding of the classroom, the governance and financing of school districts, the character of school communities.</i>	Knowledge of the big picture surrounding the classroom helps to inform teachers about how the community may perceive their educational actions. This knowledge of educational contexts may also inform teachers about how to proceed in the classroom in relation to school, community, and state conventions, laws, and rules.
Knowledge of Educational Ends	<i>The purposes and values of education as well as their philosophical and historical grounds</i>	An understanding of the purposes and values of education will help teachers motivate learners.

Table 2

## Items for Knowledge

Category	Item No	Statement
Subject matter content	1	Standard Malaysian English is also known as Manglish.
	2	Phonology is the study of how sounds are organized and used in natural languages.
Knowledge Pedagogical Content Knowledge	3	English taught in school should adhere to UK standards.
	4	Though disciplinary actions are often necessary to correct students' misbehaviour the emphasis in any classroom should be on rewarding positive behaviour.
	5	When designing a lesson, it is good to review previously learned materials, before introducing new ones.
Curriculum Knowledge	6	When a child does not respond to question by his teacher, it means the child does not know the answer.
	7	From 2011, all primary school students will be taught using the Kurikulum Standard Sekolah Rendah (KSSR) syllabus.
	8	In KSSR, the foundation of the English language syllabus is formed based on the principles of 'Communicative Language Teaching'.
General Pedagogical Knowledge	9	In KSSR, teachers are given the freedom to determine the syllabus.
	10	Using the song 'Head, shoulder, knees and toes', Ms. Tan an English teacher, wants to teach parts of a body. The teaching approach used by Ms. Tan is an example of intelligence-focused lesson using musical-rhythmic and bodily-kinaesthetic intelligences.
	11	There are 3 thinking skills in Bloom's Taxonomy.
	12	According to Multiple Intelligence Theory, by Gardner, learning styles depends on the age of the student.
Knowledge of Learners	13	To enhance competency of any learning experience it is important that we improve learner's intrinsic motivation.
	14	Personality trait will impact on the way a learner interacts with the learning environment.
	15	Teachers should vary their teaching techniques only when their students have short attention span.
Knowledge of Educational Contexts	16	The Ministry of Education Malaysia is responsible from pre-school up to secondary stage of education including tertiary education in 2004.
	17	Teachers need to make educated decisions about their teaching environment before undertaking an approach.
	18	UPSR examination is under the purview of Malaysian Examinations Council
Knowledge of Educational Ends	19	The main legislation governing education in Malaysia is the Education Act of 1996.
	20	Moral education, introduced in Malaysian schools, was an effort to address the education reform in 1993.
	21	Geography is a compulsory subject in SPM.

Table 3  
Age and Sex of Teachers

Age	Sex		Total
	Male	Female	
30 and below	12	20	32
31 – 40	10	31	41
41 – 50	1	10	11
51-58		2	2
Total	23	63	86

Table 4  
School Location and Sex of Teachers

School Location	Sex		Total
	Male	Female	
Urban	15	40	55
Rural	8	23	31
Total	23	63	86

Table 5  
Academic Qualification and Sex of Teachers

Academic Qualification	Sex		Total
	Male	Female	
Diploma	13	34	47
Degree	10	29	39
Total	23	63	86

Table 6  
Teaching Experience and Sex of Teachers

Teaching Experience	Sex		Total
	Male	Female	
Less than a year	1	7	8
1 – 3 years	5	13	18
4-10 years	9	16	25
11 – 20 years	7	18	25
More than 20 years	1	9	10
Total	23	63	86

Table 7  
Rotated Component Matrix

Item	Rescaled Factor		
	1	2	3
Item1	-.257	-.053	.142
Item 2	.027	.352	.140
Item3	.182	.022	.309
Item4	.398	-.267	-.168
Item 5	-.212	.299	.353
Item 6	.030	-.098	.618
Item 7	.019	-.267	.385
Item 8	.000	.652	-.006
Item 9	.172	.204	.487
Item 10	.326	.242	.198
Item 11	-.040	-.293	.232
Item 12	.018	-.224	.075
Item 13	.683	.103	.094
Item 14	-.721	.011	-.114
Item 15	.311	-.186	.212
Item 16	.124	.559	-.109
Item 17	.533	.261	-.102
Item 18	.013	-.206	.199
Item19	.017	.185	-.005
Item 20	.347	.640	-.138
Item 21	.014	-.084	.103

Table 8  
Labelling of factors

Factor	Item	Description	Label
1	13	To enhance competency of any learning experience it is important that we improve learner's intrinsic motivation.	Knowledge of Learner Characteristics
	14	Personality trait will impact on the way a learner interacts with the learning environment.	
	17	Teachers need to make educated decisions about their teaching environment before undertaking an approach.	
2	8	In KSSR, the foundation of the English language syllabus is formed based on the principles of 'Communicative Language Teaching'.	Knowledge of policy
	16	The Kementerian Pelajaran Malaysia is responsible from pre-school up to secondary stage of education including tertiary education in 2004.	



	20	Moral education, introduced in Malaysian schools, was an effort to address the education reform in 1993	
	6	When a child does not respond to question by his teacher, it means the child does not know the answer.	Pedagogical Knowledge
3	9	In KSSR, teachers are given the freedom to determine the syllabus.	

Table 9  
Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.02	14.38	14.38	3.02	14.38	14.38	2.50	11.92	11.92
2	2.30	10.96	25.34	2.30	10.96	25.34	2.49	11.84	23.76
3	1.70	8.09	33.43	1.70	8.09	33.43	2.03	9.67	33.43
4	1.55	7.38	40.81						
5	1.31	6.24	47.05						
6	1.23	5.85	52.90						
7	1.19	5.68	58.57						
8	1.11	5.28	63.86						
9	1.02	4.84	68.69						
10	0.93	4.43	73.12						

Table 10  
Comparisons of demographics difference and Teacher's Knowledge

Factor	Demographic Variable							
	Gender <sup>^</sup>		School Location <sup>^</sup>		School Type <sup>^</sup>		Age <sup>+</sup>	
	Z-Value	P-Value	Z-Value	P-Value	Z-Value	P-Value	X <sup>2</sup>	P-Value
1	-6.13	0.03*	-1.12	0.26	-1.94	0.05	9.09	0.03*
2	-0.62	0.54	-5.32	0.01*	-0.75	0.45	3.25	0.35
3	-0.63	0.53	-1.73	0.08	-4.50	0.04*	3.33	0.34

<sup>^</sup> Mann-Whitney U Test

<sup>+</sup> Kruskal-Wallis Test

\* Significant at 0.05%

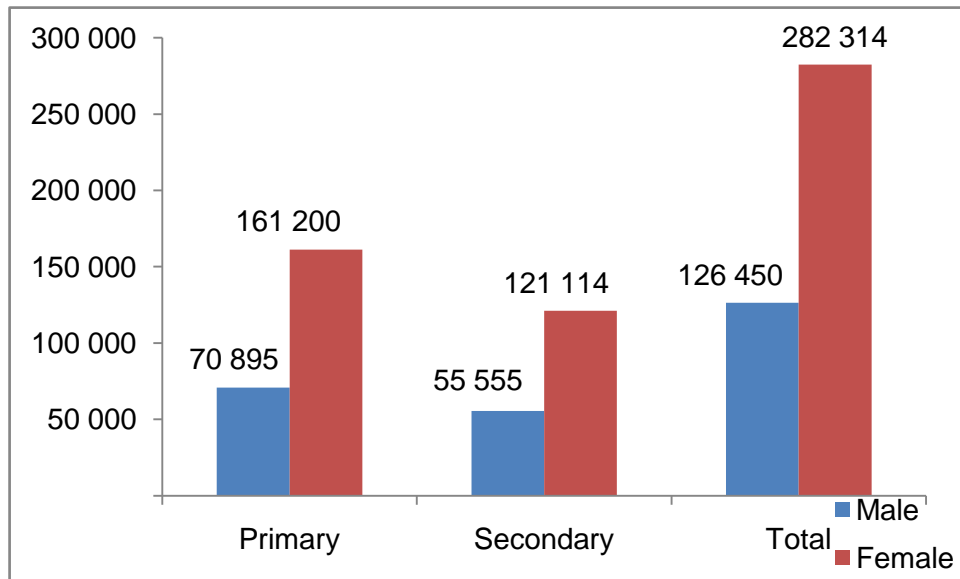


Figure 1: Number of teachers by gender (as of 10 July 2011)  
Source: MOE, 2011