

# EXPERIENCED PRIMARY SCHOOL TEACHERS' THOUGHTS ON EFFECTIVE TEACHERS OF LITERACY AND NUMERACY

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## ABSTRACT

**Purpose** – This paper presents the characteristics of effective literacy and numeracy teachers within the current context of teaching in Malaysia from the viewpoints of a sample of trained and experienced primary school teachers of literacy and numeracy. The characteristics were established based on what the teachers perceived as important in guiding their pupils, to equip themselves with the necessary literacy and numeracy skills in order to cope with imminent educational demands and challenges.

**Design** – In this exploratory qualitative study, the data were collected in two phases. In Phase-1, the literacy and numeracy teachers individually responded to the Literacy Teacher Questionnaire (LTQ) and the Numeracy Teacher Questionnaire (NTQ) respectively. Both these questionnaires comprised open-ended questions. In Phase-2, focus-group discussions and reflection sessions, which focused on the teachers' experiences in the primary schools' literacy and numeracy teaching and learning processes, were carried out. The fully transcribed data from both the phases were thematically analysed.

**Findings** – The findings indicated notable skills and characteristics of effective literacy and numeracy primary school teachers from the viewpoints of the teachers in the study. These characteristics were distinctively categorized into four main themes, namely (a) structure, (b) knowledge and understanding, (c) strategies and skills, and (d) values.

**Significance** – The characteristics of effective literacy and numeracy primary school teachers that emerged from this study would serve as a frame of reference for education policy-makers and curriculum developers in determining the directions and plan of actions towards enhancing effective teaching and learning of literacy and numeracy in primary schools. The frame can also be adapted by teacher educators in aligning the training and learning activities with their literacy and numeracy trainees within their training institutions. Additionally, the findings of the study would serve as a flexible and adaptable foundation for improving the literacy and numeracy education of the Malaysian primary school pupils.

**Keywords:** Literacy, numeracy, knowledge and understanding, strategies and skills, values, effective teachers.

## INTRODUCTION

Literacy and numeracy are two essential skills in life and today's global marketplace (Northern Ireland Audit Office, 2013). The United Nations Educational Scientific and Cultural Organization (UNESCO) stated that "Literacy is the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts. Literacy involves a continuum of learning to enable an individual to achieve his or her goals, to develop his or her knowledge and potential, and to participate fully in the wider society" (2003, p. 5). The Northern Ireland Audit Office (2013) described literacy as the abilities pertaining to reading, writing and using written language in a range of contexts for different purposes and for communicating with a variety of audiences. Hence, it can be seen that the integration of reading and writing with speaking, listening, viewing and critical thinking would constitute the valued aspects of literacy in modern life.

As for numeracy, the term refers to the skills students need to recognize and understand about the role of mathematics in the world, and the dispositions and capabilities to apply mathematical knowledge and skills in their personal, social and work circumstances that are constructive and meaningful (Johnston, 2012). Askew,

Brown, Rhodes, William, and Johnson (1997) view numeracy as the ability to process, communicate, and interpret numerical information in a variety of contexts. Askew et al. also suggest that although the aforementioned definition encompasses the ability to accurately carry out arithmetical calculations, it goes beyond that to also include conceptual understanding of a number, a 'feel for number', and the ability to apply arithmetic. To the Northern Ireland Audit Office (2013), numeracy is the effective use of mathematics to meet the general demands of life at school and at home, in paid work, and for participation in the community and civic life.

It is deemed appropriate to consider literacy with numeracy simultaneously in this study since both skills are necessary for students' future living. As conjectured by the Northern Ireland Audit Office (2013), students endowed with literacy and numeracy skills are more likely to stay in full time education, and as adults, they can be more productive and earn higher wages. Additionally, improving students' literacy and numeracy can have a positive effect on their confidence, their ability to deal with everyday tasks, as well as their lifelong learning and health.

The literacy and numeracy skills could be advanced among school pupils during their primary schooling years. Hence, primary school teachers undoubtedly have significant roles and responsibility to ensure that their students are appropriately equipped with these skills. The teachers themselves also need to have the necessary skills and attitude towards literacy and numeracy. Thus, the quality of teachers, their abilities and competence with regards to literacy and numeracy skills is worthy of research. Moreover, teacher quality is an important catalyst for improvement in students' literacy and numeracy attainment levels (Northern Ireland Audit Office, 2013).

It is noteworthy that during this research process, Malaysia was beginning to introduce the new curriculum for primary schools called the Primary School Standard Curriculum (KSSR). It was partly the intention of this study to explore the teachers' readiness in supporting the new curriculum. This study explored a group of teachers' stance and knowledge of the need-to-have skills for teachers to facilitate the development of primary school pupils literacy and numeracy skills, under the KSSR curriculum.

It is well accepted that success in teaching depends on many elements incorporated by the teachers as they conduct their lessons within the classrooms. Many studies have reported significant differences among the elements, although there are some that demonstrated a certain amount of uniformity in the teachers' teaching and practice in primary schools (Medwell, Wray, Poulson & Fox, 1998; Groves, Mousley & Forgasz, 2006).

Hence, this study set out to explore trained and experienced primary school literacy and numeracy teachers' views on what it takes to be effective teachers of literacy and numeracy within the Malaysian school culture. This sample of teachers comprised teachers who were teaching English Language (the literacy teachers) and Mathematics (the numeracy teachers) in primary schools and who were using the English Language and Mathematics curricula as warranted by the Curriculum Development Division, Malaysian Ministry of Education (MOE).

## LITERATURE REVIEW

The teacher factor matters to students' learning and teacher quality is a crucial factor in promoting effective learning (Wichadee, 2010). Empirical studies have consistently shown that teacher quality is an important feature of schools that drives students' achievement (Haskins & Loeb, 2007). To be effective in their teaching, teachers need to have strong content knowledge and pedagogical skills (Shulman, 1986). In the teacher knowledge literature, the term "subject matter" sometimes includes pedagogical content knowledge. Subject matter knowledge for teaching is referred to as pedagogical content knowledge. Pedagogical content knowledge (PCK) identifies what is asserted by Shulman (1986) as the distinctive body of knowledge for teaching. PCK is concerned with how teachers represent the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners and presented for instruction (Shulman, 1986). If PCK is the effective representation of subject matter knowledge to learners, as Shulman puts it, it involves not only an understanding of the content itself, but also an understanding of the learners, their preconceptions and misconceptions, and the teaching strategies

for dealing with them, as well as the specific contexts in which the teaching takes place. Thompson (2008) states that good teachers have a combination of strong teaching skills and positive personality traits.

It is vital for educators, schools and the system to maintain and broaden a focus on literacy and numeracy education as the foundation for success in all other areas (Department of Education and Early Childhood Development, 2007). Literacy can be and has been defined very widely as a unitary process with two complementary aspects, reading and writing, that emphasizes a basic principle in developing children's skills within an integrated English language (Medwell, Wray, Poulson, & Fox, 1998). Medwell, Wray, Poulson, and Fox (1998) reported some significant findings from their research with regards to effective teachers of literacy, which include:

1. The effective teachers of literacy were more likely to have a subject background in English language and related subjects.
2. Experience of longer in-service courses and participation in long-term literacy projects had significantly affected teachers' views about literacy teaching. The most significant feature of these long-term experience appeared to be that they had provided the opportunity and impetus for the teachers to develop and clarify their own personal philosophies about literacy teaching.
3. Shorter courses were also seen as useful in professional development, but largely in terms of meeting a personal need or keeping in touch with recent development.
4. The role of the English coordinator was very significant to the effective teachers. It was a focus for in-service provision of a certain type, and had also generated substantial commitment to the area of teaching. Simply being English coordinators meant that these teachers had experience which involved them: (a) being perceived as experts by their colleagues, (b) being given the status of expert practitioner in teaching literacy in their schools, (c) being offered more extensive in-service course experience in literacy, (d) having the chance to observe other teachers teach literacy, with a view to offering advice and support, and (e) often being involved in delivering in-service courses to their colleagues, with the consequent need to think through actively the materials they were presenting.

As for numeracy, Askew, Brown, Rhodes, William and Johnson (1998) suggested a broad definition of numeracy, which is the ability to process, communicate and interpret numerical information in a variety of contexts. Effective teachers of numeracy help pupils acquire knowledge of numbers, number relations, and number operations and assist them with building an integrated network of understanding, techniques, strategies and application skills (Askew, 2005). Some research findings (e.g. Askew, Brown, Rhodes, Johnson, & Wiliam, 1997; Groves, Mousley & Forgasz, 2006; Jones, Tanner & Treadaway 2000; Clarke & Clarke, 2002; Saunders, 2004) identified a few characteristics among effective teachers of numeracy, which include: focus; taught conceptual understanding of important mathematical ideas; used various teaching approaches that included relating different areas of mathematics and mathematical experiences; encouraged meaningful discussion by using probing questions and encouraged pupils to explain their understanding and mathematical thinking, and awareness, confidence and competence in mathematics content knowledge.

## METHODOLOGY

The participants in the study comprised 67 trained and experienced teachers, of whom 32 were literacy teachers and 35 were numeracy teachers, from one education district in a northern state of Malaysia. These teachers were purposely selected and their experience in teaching Mathematics or English language ranged from 15-25 years. Nevertheless, the selection of one education district, out of the 13 education districts within the state, was done using the simple random sampling procedure.

In this exploratory qualitative study, the data were gathered in two phases, namely Phase-1 and Phase-2. In Phase-1, the literacy teachers individually responded to the Literacy Teacher Questionnaire (LTQ) which comprised of five open-ended items, and similarly the numeracy teachers answered the Numeracy Teacher Questionnaire (NTQ) which also consisted of five open-ended items. An example of the items in the questionnaire was: 'In your view, what are the characteristics of a good literacy / numeracy teacher?'

The researchers named Phase-2 as the focus-group reflection and discussion phase. During this phase, the focus of discussion and

reflection was on the teachers sharing and informing their personal experiences in the teaching and learning of literacy or numeracy at the primary school level. The teachers were divided into two groups – one group comprised 32 primary English language teachers (representing the literacy teachers) and the other comprised 35 primary mathematics teachers (representing the numeracy teachers). The discussion focused on two main aspects, namely (a) highlighting and discussing the teachers' varied responses in Phase-1, and (b) sharing and discussing their experiences in teaching and learning of primary school literacy and numeracy, with other group members. Their views were shared and debated within the focus-group and reflection sessions.

In Phase-2, six focus groups were formed for the literacy group and the numeracy group respectively. Each focus group was given the liberty to appoint a moderator. After the discussion and reflection sessions within each focus group had ended, a representative from each focus group presented their outcomes to the whole group. During the presentation sessions, one researcher was appointed as the moderator for the literacy group and another one for the numeracy group. The literacy and the numeracy group presentations sessions within Phase-2 were videotaped and were later transcribed and thematically analyzed.

In this paper, the findings are highlighted according to the themes that were constructed based on the participants' responses (see Table 1). We named these four themes as structure, knowledge and understanding, strategies and skills, and values. The description of each theme is presented in Table 1.

Table 1

*The Constructed Themes Based on Participants' Responses*

Theme	Description
Structure	This theme indicates participant's responses in the interviews that relate to the English language or Mathematics curriculum. The participant described or talked about the structure within the curriculum (e.g. aims of the subjects; the syllabuses, the learning outcomes, the lesson plans, the objectives, the lesson content).

(continued)

Theme	Description
Knowledge and Understanding	This theme indicates participant's responses that relate to what the English language or Mathematics teachers need to know and understand about teaching and learning languages or mathematics as a result of his or her initial teacher training and/or in-service teacher education.
Strategies and Skills	This theme indicates participants' responses that relate to the literacy and numeracy teachers' knowledge and skills about teaching strategies or techniques which they can employ in teaching and learning situations as teaching professionals, as a result of their initial teacher training and in-service teacher education. It also includes the literacy and the numeracy teachers pedagogical content knowledge.
Values	This theme indicates participants' responses that relate to the values that literacy and numeracy teachers should uphold when delivering their lessons in the classrooms, and which also refer to their thoughts about their relationships and social responsibilities when teaching their pupils.

The findings would therefore suggest a repertoire of viewpoints or thoughts of a sample of teachers on essential quality and skills that literacy and numeracy teachers ought to have and could serve as reference for defining the characteristics of effective literacy and numeracy teachers. Further, they could serve as reference for existing teacher education programmes and as a guideline for the training and development of literacy and numeracy teachers.

## RESULTS

In this paper, the responses from five numeracy participants (NT1, NT2, NT3, NT4 and NT5) and five literacy participants, (LT1, LT2, LT3, LT4 and LT5) responses to the open-ended questionnaire are presented. The gender and the teaching experience of these ten participants are shown in Table 2.

### Findings from Phase-1

The findings from Phase-1 are presented and discussed according to the themes shown in Table 1.



Table 2

*The Participants' Profile*

No.	Participant	Gender	Teaching Experience (Years)
1.	NT1	Female	16
2.	NT2	Male	15
3.	NT3	Male	17
4.	NT4	Female	15
5.	NT5	Female	17
6.	LT1	Male	18
7.	LT2	Female	21
8.	LT3	Female	20
9.	LT4	Male	22
10.	LT5	Female	25

\*e.g. NT1 refers to Numeracy Teacher 1

LT3 refers to Literacy Teacher 3

*The numeracy participants' viewpoints*

The participants mentioned managing interactions in classrooms as skill that effective numeracy teachers should possess. For instance, numeracy participant, NT1 (Numeracy Teacher 1), felt that what “*should be counted as effective numeracy teachers are those teachers who constantly focus on ensuring appropriate interactions in the classrooms*. NT1 further voiced out that “*the maths teachers must be able to carry out lessons with appropriate interactions, for example, teacher-pupil interaction ... for example, questions-answers ... and also... pupil-pupil interaction... like through discussion or games*”. NT1’s response was supported by NT2, who felt that numeracy teachers must also ensure that there exists “*pupils-resources interaction, for example, resources like concrete objects, or course wares, especially those that the maths curriculum suggested*”. To NT4, “*a maths teacher should use a two-way communication approach, that is, teacher to pupils and pupils to teacher communication*”. Hence, the research findings indicated that effective numeracy teachers are those who ensure appropriate interactions, as proposed within the structure of the mathematics curriculum, Knowledge about teaching and learning approaches was also mentioned by the numeracy participants in the study. NT3 felt that “*all maths teachers should know how to use various teaching and learning approaches and to make sure that*

*the process of teaching and learning in classrooms must always involve all pupils in achieving the teaching objectives*". NT1 viewed that numeracy teachers must *"have knowledge and skills to use pupil-centred learning so that learning becomes more attractive for our pupils"*. Numeracy teachers should also consider using varieties of teaching techniques in their classrooms as indicated by NT4, *"...I would suggest that numeracy teachers also must be able to use a variety of teaching techniques, such as storytelling, questioning, showing movies"*. NT5 expressed her view that *"we, as maths teachers must know how to teach our pupils from simple method to abstract, and always relate what we teach them with their prerequisite knowledge"*. Thus, to the numeracy participants in the study, besides having knowledge of and understanding teaching and learning approaches, effective numeracy teachers should identify and consider their students' prerequisite knowledge.

The numeracy participants also indicated the relationship between effective numeracy teachers and the use of teaching and learning materials. For instance, NT2 responded by saying *"we maths teachers must understand why certain resources are significant and some are not. We need to have knowledge about how to effectively use the appropriate resources"*. Among the teaching materials mentioned by NT4 were *"the use of picture cards as stimulus, the use of appropriate maths-kit"*. NT1 added *"numeracy teachers must have the skills to integrate ICT in teaching and learning maths,... for example, can effectively use power-points and CDs"*. NT4 suggested that *"maths teachers not only always use concrete material but must have knowledge about the concept of using these materials"*. NT1, NT2 and NT4's responses were related to strategies and skills that effective numeracy teachers should have.

Aspects related to values were also indicated by the numeracy participants. For example, the value of fairness when conducting mathematics lessons was pointed out by NT2. According to him, *"... but when we are teaching in our class, we need to always be fair towards all pupils in our class"*. This NT2's response was an example of the participants' thoughts about the importance of values in numeracy classrooms.

From the aforementioned responses of the numeracy participants in the open-ended questionnaires, it can be said that effective numeracy teachers are those who ensure that appropriate interactions take

place in the classrooms, have the ability to use various teaching and learning approaches that involve all the learners, and have the ability to identify and incorporate the learners' everyday life experiences during numeracy lessons in the classrooms. It can be noted that, the numeracy participants also view the ability to identify and significantly select useful teaching aids as a characteristic of effective numeracy teachers. Additionally, according to the numeracy participants, numeracy teachers also need to have the knowledge and skills to integrate ICT during numeracy lessons. Hence, to these participants, effective numeracy teaching encompasses classroom interactions, teaching approaches, students' prerequisite knowledge, competence in ICT, and consideration of values.

### *The literacy participants' viewpoints*

Understanding the content of the curriculum is important if a literacy teacher intends to deliver effective lessons. According to LT1 (Literacy Teacher 1), *"in order to be an effective literacy teacher, the teacher should know the areas, concepts, techniques that can be used when teaching literacy in primary schools"*. LT1's response indicated the need for literacy teachers to understand the structure within the curriculum.

The literacy participants viewed content knowledge and pedagogical content knowledge as necessary for effective literacy teachers. Both LT3 and LT4 suggested that *"teachers should be English 'optionists' (specialists) because they have high skills compared to 'non-optionists'"*. With the appropriate content knowledge as well as the pedagogical content knowledge, literacy teachers would then be able to effectively conduct their lessons and ensure that students are actively involved in the classrooms. For instance, LT5 suggested that literacy teachers must be competent in organizing *"student-centred teaching or we can also say student-oriented learning"*. LT2 indicated that literacy teachers *"need to arouse students' interest to learn and appreciate English language"*. Literacy teachers should also make effort to enhance their pedagogical skills as proposed by LT5 who mentioned that *"...we do need to always update our pedagogical skills by continuously reading about it"*. Literacy teachers need to be proficient in English.

LT2 expressed her opinion that “*all literacy teachers must be able to speak English well in the classrooms and not only that, they must be fluent English teachers*”. LT1 suggested that “*to produce successful literacy pupils, all literacy teachers must have all the linguistic skills necessary*”. LT3 indicated that literacy “*teachers must have all the linguistic skills necessary... they should have good mastery of the four language skills ... the listening, speaking, reading and writing*”. LT4 suggested that literacy teachers “*should use simple language when teaching the pupils and they should also use proper intonation*”, which in a sense extended the viewpoint of LT2 above. LT5 felt that literacy teachers must have wide knowledge in vocabulary and “*should know grammar*”. LT1, LT2, LT3, LT4 and LT5’s responses showed that having appropriate content knowledge is important to ensure effective literacy teaching.

On a tone similar to their numeracy colleagues, the literacy participants also upheld the importance of values when delivering the English language curriculum content, as raised by LT4, “*... to ensure our pupils respect us and to motivate them to learn, we in return must be willing to listen to what they have to say too*”.

From these literacy participants’ responses, it can be said that they viewed effective literacy teachers as those who possess knowledge and language skills pertaining to the English language, as well as having a large vocabulary. To these participants, the characteristics of effective literacy teachers also include the ability to use various teaching and learning approaches, which is similar to the view of the numeracy teachers, and also have knowledge about their pupils’ interests and life experiences. Effective literacy teachers, as endorsed by the literacy research participants, need to be knowledgeable of the content prescribed within the syllabus, and also be able to organize student-centred teaching approaches. Noteworthy, the literacy and numeracy teachers also think that values need to be observed when delivering the contents of the lessons. Table 3 shows the examples of the participants’ responses for each theme that was identified in the study.

## **Findings from Phase-2**

The findings from Phase-2 are presented and summarized to give a deeper understanding of the participants’ thoughts about effective numeracy and literacy teachers.

Table 3

*Themes and Examples of Participants' Responses*

Theme	Examples of Participants' Responses
Structure	<p>(i) "...pupils-resources interaction, for example, resources like concrete objects, or course wares, especially those that the maths curriculum suggested" (NT2).</p> <p>(ii) "...in order to be an effective literacy teacher, the teacher should know the areas, concepts, techniques that can be used when teaching literacy in primary schools" (LT1).</p>
Knowledge and Understanding	<p>(i) "...we as maths teachers must know to teach our pupils from simple method to abstract, and always relate what we teach them with their prerequisite knowledge" (NT5).</p> <p>(ii) "...teachers should be English 'optionists' (specialists) because they have high skills compared to 'non-optionists' (LT3).</p>
Strategies and Skills	<p>(i) "...I would suggest that numeracy teachers also must be able to use a variety of teaching techniques, such as storytelling, questioning, showing movies" (NT4).</p> <p>(i) "...we do need to always update our pedagogical skills by continuously reading about it" (LT5).</p>
Values	<p>(i) "... but when we are teaching in our class, we need to always be fair towards all pupils in our class" (NT2).</p> <p>(i) "... to ensure our pupils respect us and to motivate them to learn, me in return must be willing to listen to what they have to say too" (LT4).</p>

***The numeracy group***

The qualitative data for Phase-2 was collected via focus-group discussions (FGD) and reflection sessions – one session for the numeracy group and one session for the literacy group. These sessions were each moderated by two different researchers. The participants of the numeracy group came to a consensus that effective numeracy primary school teachers should have the following characteristics:

1. Be able to teach in dual-language, that is Malay (the national language) as well as English (seemingly this is due to the fact that mathematics teachers need to teach mathematics in English as explicated by the Malaysian Ministry of Education

(Ministry of Education, 2006) that beginning 2003, science and mathematics would be taught in English following a phased implementation schedule).

2. Be able to use SQ3R – Survey, Question, Read, Recite, Review.
3. Know how to translate and relate numeracy terminologies from Malay to English and vice-versa.
4. Be able to use simple language to explain numeracy ideas to pupils.
5. Be able to give brief and concise instructions.
6. Need to acquire proficiency in communication.
7. Need to have adequate knowledge of to numeracy.
8. Be able to use a variety of teaching techniques, such as storytelling, questioning, showing movies.

Additionally, the numeracy participants also indicated that, other than giving direct instructions within the classroom, effective numeracy teachers also needed to be competent in implementing and managing activities within their classrooms. The activities mentioned by them were (a) playing and learning through games, (b) quizzes, (c) word puzzles, (d) integrating ICT, (e) role playing, (f) sing-a-song, and (g) story telling.

### *The literacy group*

As for the literacy group, the effective literacy primary school teachers ought to have the following characteristics:

1. Must always know how to evaluate and review the lessons so that lessons can be improved.
2. Be able to use teaching aids, educational T.V. programmes.
3. Update their pedagogical skills by continuously reading about them
4. Be able to use a variety of teaching aids, or suitable models, or colourful models.
5. Know about drilling skills (based on the principle of ‘the more pupils hear the more they can remember’).
6. Be creative about using songs or rhymes.
7. Know how to carry out regular evaluation of their pupils’ progress.

The findings within Phase-2 of the study point to the fact that effective numeracy and literacy teachers need to develop strategies and skills to implement and handle different types of activities in

their respective classrooms to ensure that meaningful learning is taking place. Interestingly, within this data collection phase, both the numeracy and the literacy participants also related the characteristics of effective numeracy and literacy teachers to values. Generally, both the numeracy and the literacy teachers view that teaching and learning help to promote social and cultural values such as respect for differences, active communication, a participatory attitude to society, and meaningful experiences of the range of different cultures and lifestyles that exist within the Malaysian culture. These values are fostered through inclusive and context-sensitive classroom management strategies, a choice of teaching materials that reflect social diversity and cultural plurality, and the development of international networks of communication and exchange between pupils from different contexts and cultures. Hence, social and cultural values can obviously be promoted right across the school curriculum. Language and mathematics teachers benefit by cooperating with colleagues from other disciplines when promoting these values. Based on the findings from Phase-2, both the numeracy and the literacy participants’ responses with regard to values can be summarized as shown in Table 4.

Table 4

*The Research Participants’ Views on Values that Effective Teachers of numeracy and Literacy Need To Have*

Numeracy Teachers	Literacy Teachers
• Fair towards all pupils	• Must have patience
• Entertain pupils’ questions	• Have sense of humor
• Know every pupil’s name	• Understand students’ abilities
• Be caring	• Be creative
• Knowledgeable	• Should make class fun and joyful
• Be full of ideas	• Give praises
• Have patience	• Attract students’ attention
• Have a sense of humour	• Be willing to listen
• Support pupils’ learning	• Be clean
• Be flexible	• Be jovial
• Be tolerant	

From Table 4, there are elements (e.g. patience, sense of humour, fairness, good listener) that cut across the two groups of teachers, which suggest almost similar characteristics, as far as value is concerned, that effective teachers of numeracy and literacy should possess.

## DISCUSSION

The findings provide evidence of the research participants' thoughts or perceptions of the primary school numeracy and literacy teachers need-to-have characteristics in order for them to effectively function as transmitters of knowledge as well as facilitators for meaningful learning of literacy and numeracy in classrooms. The participants suggested characteristics which can be noted as necessary and appropriate for enhancing the quality of numeracy and literacy learning in primary schools. High quality literacy teaching demands high quality literacy teachers and thus the education system must attempt to maximize the expertise of teachers in teaching literacy (Medwell, Wray, Poulson, & Fox, 1998), which undoubtedly is also true for numeracy teachers and the teaching of numeracy in primary schools.

In sum, to ensure meaningful numeracy and literacy learning among primary school pupils, the participants in the study viewed effective primary numeracy and literacy teachers as those who (a) understand the curriculum structure, (b) are aware of the teaching and learning approaches outlined within the curriculum, (c) ensure that appropriate interactions take place in classrooms, (d) have knowledge about pupils' prerequisite numeracy or literacy knowledge, (e) possess knowledge about numeracy or literacy teaching strategies and teaching skills, (f) have sufficient content and pedagogical content knowledge, and (g) consider and advocate appropriate values when teaching.

Interestingly, however, none of the research participants mentioned or proposed 'explanation' as a skill that numeracy or literacy teachers should possess. Perhaps a further study could look into how the literacy and numeracy teachers' explain lesson contents within their classrooms, whereby the characteristics of their explanation skills can be analyzed.



The findings would enlighten teachers on how to solve issues related to numeracy or literacy teaching. For instance, they would be able to choose appropriate spoken, written or visual texts or materials that are best suited for their own pupils' needs and interests. As such, they can make the necessary adjustments pertaining to the contents of the syllabus; decide on the most suitable methods, approaches and techniques to be employed; plan the most appropriate activities to be carried out; and choose, design or adapt the teaching materials that are best suited for their pupils in different settings and from diverse numeracy or literacy proficiency levels. The relevant authorities or parties related to the teaching and learning of literacy and numeracy in primary schools may consider the findings within the current study as a basis or guideline for the selection of numeracy and literacy teacher trainees, and also in the professional training and development of primary school literacy and numeracy teachers.

## CONCLUSION

Based on the analysis of the qualitative data obtained from Phase-1 and Phase-2 of the study, we came to the consensus to situate the findings pertaining to the characteristics of effective teachers of numeracy within four main themes, namely structure, knowledge and understanding, strategies and skills, and values. The description of each theme was formulated after thorough, repeated readings, discussions, and interpretations of the content of the data. In a sense, the descriptions of the themes for the characteristics of effective teachers of numeracy and numeracy had actually emerged from the research participants' viewpoints, who themselves were experienced primary school teachers of mathematics and science (Table 3). Hence, the content in Table 3 could be considered as the baseline framework pertaining to the characteristics of effective primary school teachers of numeracy and literacy from the viewpoints of a sample of trained and experienced literacy and numeracy teachers. Notably, within the context of language learning for instance, it is generally viewed that the greater a teacher's language competence is, the more creative and effective his or her teaching will be. Nevertheless, within both the Mathematics and the English language curriculum for primary schools in Malaysia, teachers are encouraged to question and challenge every aspect of their education. Thus numeracy and literacy primary school teachers must not accept

anything as a norm. They should be able to reflect on what they have learnt and what they have seen or done in practice which could contribute towards the knowledge about their literacy or numeracy teaching. Additionally, they should be able to assess the value of this knowledge and understanding against the intended learning outcomes for a given group of their pupils.

## RECOMMENDATIONS

We believe that this study has pointed out the needs of determining the appropriate characteristics that primary school numeracy and literacy teachers could use as reference when implementing and realizing the literacy and numeracy curriculum contents in their classrooms. We acknowledge the fact the primary numeracy and literacy teachers backgrounds, teaching philosophies, current practices and employment conditions, professional sources and supports are among the issues they face in translating and delivering the curriculum. These are indeed other possible factors that could serve as constraints for quality and effective numeracy and literacy teaching in primary schools. We do feel there is a need for an in-depth study of other samples of literacy and numeracy teachers because this sort of investigation would lead to a variety of models of good practices that take into account the diversity of teachers' experiences as well as the academic competence of primary school pupils, which could ultimately project the effective characteristics of the literacy and the numeracy teachers within the nation as they set out to face the challenges and constraints in supporting the literacy and numeracy pupils, who are striving to achieve the targeted competence in the areas of literacy and numeracy in Malaysia as explicated within the curriculum.

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