

Faculty of Language and Communication

Effects of Images on the Recall and Retention of Year 1 Malaysian Pupils' Vocabulary Breadth and Depth

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Doctor of Philosophy
2021

Effects of Images on the Recall and Retention of Year 1 Malaysian Pupils' Vocabulary Breadth and Depth

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A thesis submitted

In fulfillment of the requirements for the degree of Doctor of Philosophy

(Language Learning and Teaching)

Faculty of Language and Communication
UNIVERSITI MALAYSIA SARAWAK
2021

DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



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Date : 25 November 2021

ACKNOWLEDGEMENT

I am eternally grateful to the many people who have participated in one way or another to make the writing of this thesis possible. Their contributions are truly appreciated and gratefully acknowledged. Among the most momentous of all my academic journeys, this undertaking has taught me much, as well as humbled me.

To my supervisors, Professor Dr Ambigapathy Pandian and Associate Professor Dr Soubakeavathi A/P Rethinasam, your continuous advice and guidance have provided me with the much needed support and encouragement. Thank you very much.

I also take delight in thanking friends and colleagues, as well the school teachers and pupils who have each played a role in this immensely enriching experience. A special mention goes to Debbie for your steadfast friendship and support, and to Low who silently cheered for me and took pride in my milestones.

Not to be forgotten is my family who deserves my deepest appreciation and gratitude. To my mother-in-law and sister, Chan Kooi Wah and Bee Bee, your unwavering support means the world to me, especially in caring for Justin. As for my husband, Keong, and son, Justin, your understanding and patience never fail to amaze me. Lastly, to my late parents, Lee Hean Swee and Tan Kheng Poh, who remain always in my heart. This thesis is dedicated in memory to both of you.

"*I am able to graciously survive the PhD from the grace that comes from enthusiasm, perseverance, willpower, fellowship, love, and prayer"*

ABSTRACT

This study examined the impact pictures had on the English vocabulary breadth and depth knowledge of Malaysian Year 1 pupils in rural national primary schools through the Picture Word Inductive Model (PWIM). Designed by Calhoun (1999), the approach primarily utilises pictures to elicit words from learners' existing listening and speaking vocabularies. Additionally, the use of mother tongue is permitted. The intervention employed a pretest-posttest-delayed posttest control-group design and adapted the Yes-No Recognition Test (YNRT) as well as the Word Associates Test (WAT) to measure the recall and retention of subjects' vocabulary breadth and depth respectively. Both instruments were duly tested for reliability. A total of 180 pupils from three primary schools in the same district participated in the research, comprising the Experimental group (n = 90) and the Control group (n = 90). Data collected from pretests, posttests, and delayed posttests was analysed and assessed for statistically significant differences between the experimental and the control group. The findings revealed that those who experienced the PWIM intervention achieved superior vocabulary scores at the posttest and delayed posttest levels compared to those in the control group, denoting greater vocabulary breadth and depth recall and retention that reflects the effectiveness of the intervention in enhancing vocabulary acquisition among young Malaysian learners.

Keywords: Images, vocabulary breadth and depth, recall, retention, PWIM

Kesan Gambar ke atas Daya Ingat Kembali dan Retensi Perolehan Perbendaharaan Kata dalam Kalangan Pelajar Tahun 1 di Malaysia

ABSTRAK

Kajian ini bertujuan untuk mengenal pasti kesan gambar terhadap perolehan perbendaharaan kata dalam kalangan sekumpulan pelajar Tahun 1 di sekolah rendah kebangsaan menggunakan Model Induktif Gambar-Kata (PWIM). Model yang dibangunkan oleh Calhoun (1999), menggunakan gambar untuk mencungkil perkataan daripada perbendaharaan kata lisan dan sebutan pelajar. Tambahan, penggunaan bahasa ibunda adalah dibenarkan. Intervensi menggunakan reka bentuk praujian-pascaujian-tertunda, pascaujian kumpulan kawalan Yes-No Recognition Test (YNRT) serta Word Associates Test (WAT) bagi mengukur daya ingat kembali dan retensi perolehan perbendaharaan kata pelajar. Kedua-dua instrumen dinilai bagi memastikan kebolehpercayaannya. Sejumlah 180 pelajar daripada 3 buah sekolah rendah di daerah yang sama menyertai kajian ini yang terdiri daripada kumpulan eksperimental (n = 90) dan kumpulan kawalan (n = 90). Data yang terkumpul daripada praujian, pascaujian, dan pascaujian tertunda dianalisis dan dinilai untuk meneliti perbezaan signifikan dari segi eksperimental dan kumpulan kawalan. Kajian menunjukkan bahawa mereka yang menjalani intervensi tersebut mencatatkan markah perbendaharaan kata yang sangat tinggi pada tahap pascaujian dan pascaujian tertunda berbanding kumpulan kawalan menandakan bahawa daya ingat kembali dan pengekalan pelajar mencerminkan keberkesanan intervensi dalam memperkasakan pemerolehan perbendaharaan kata dalam kalangan pelajar Malaysia.

Kata kunci: *Gambar, perbendaharaan kata, daya ingat kembali, retensi, PWIM*

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LIST OF ABBREVIATIONS

AEA	Area Education Agency
CEFR	Common European Framework of Reference
DCT	Dual-Coding Theory
DKSP	Dokumen Standard Kurikulum dan Pentaksiran Standard
EFL	English as a Foreign Language
ELSQC	English Language Standards and Quality Council
ESL	English as a Second Language
HOTS	Higher Order Thinking Skills
IELTS	International English Language Testing System
IRA	International Reading Association
KBSR	Kurikulum Baru Sekolah Rendah
KPM	Kementerian Pendidikan Malaysia
KSSR	Kurikulum Standard Sekolah Rendah
L1	First Language
L2	Second Language
LAD	Language Acquisition Device
LINUS	Literacy and Numeracy Screening
LTM	Long Term Memory
MoE	Ministry of Education
MSM	Multi Store Memory
MUET	Malaysian University English Test
NELP	National Early Literacy Panel
NICHD	National Institute of Child Health and Human Development

NIFL	National Institute for Literacy
NPS	National Primary School
NTCPS	National-Type Chinese Primary School
NTTPS	National-Type Tamil Primary School
OECD	Organisation for Economic Cooperation and Development
PPVT	Peabody Picture Vocabulary Test
PPVT-4	Peabody Picture Vocabulary Test-4th Edition
PPVT-III	Peabody Picture Vocabulary Test-Third Edition
PPVT-R	Peabody Picture Vocabulary Test (revised edition of 1981)
PSE	Picture Superiority Effect
PWIM	Picture Word Inductive Model
PWIM-A	Picture Word Inductive Model -Adapted
SBELC	Standards-Based English Language Curriculum
SJK	Sekolah Jenis Kebangsaan
SJK (C)	Sekolah Jenis Kebangsaan (Cina)
SJK (T)	Sekolah Jenis Kebangsaan (Tamil)
SK	Sekolah Kebangsaan
SL	Second Language
SLA	Second Language Acquisition
SM	Sensory Memory
STM	Short Term Memory
TAP	Transfer-Appropriate Processing
TOEFL	Test of English as a Foreign Language
TVIP	Test de Vocabulario en Imagenes Peabody (Spanish version)

VKS	Vocabulary Knowledge Scale
VLT	Vocabulary Levels Test
WAF	Word Associates Format
WAT	Word Association Test
WAT-M	Word Association Test (modified for the study)
WAT-SV	Word Association Test (by Schoonen and Verhallan)
YNVT	Interactive and Print Yes-No Vocabulary Test

CHAPTER 1

BACKGROUND OF THE STUDY

1.1 Introduction

Over the years, language researchers (Armstrong, 2000; Harmer, 2001; Kim & Gilman, 2008; Mayer & Sims, 1994) have postulated that pictures, employed correctly, is an important medium for more effective learning, particularly within the realm of vocabulary acquisition (Sadoski, 2005). Pictures warrant comprehensive attention for they are a major component of cognitive processing (Cohen, 2012). Paivio's dual coding theory states specifically that information has always been processed via two distinct channels, verbal and visual, advocating usage of pictures in bridging vocabulary to comprehension to facilitate deeper processing.

According to Anderson (1971), by adding an imagery component individuals learn two to three times as much as those who learn with just words. Recent studies on vocabulary instructions (e.g., Boulware-Gooden et al., 2007; Carpenter & Olson, 2012; Kim & Gilman, 2008; Moore & Calvert, 2000; St. John & Vance, 2014) have documented positive findings. Both Kim and Gilman (2008), and Moore and Calvert (2000) stated that pairing pictures with words supports vocabulary learning. Moreover, Boulware-Gooden et al.'s (2007) study with young learners recorded higher vocabulary measure after experiencing a vocabulary acquisition strategy that used images as opposed to their counterparts who did not. Underscoring the effectiveness of using pictures in language learning, more current studies such as Carpenter and Olson (2012), and St. John and Vance's research (2014) that investigated the efficacy of teaching methods involving pictures in language development, reported successful language learning, in particular vocabulary knowledge.

Reputedly, pictures also contribute to increased enjoyment of the learning process as well as aid to heighten the level of interaction and motivation among learners. Ryan (1993, as cited in Topsakal & Oversby, 2012) professed that carefully selected pictures can "be a catalyst giving rise to the production of thousands of words" (p. 1). Thus, rendering learning of vocabulary highly more effective with the employment of pictures. There appears to be a general consensus that images do not only contribute to more effective learning but they also have an edge over recall and retention as well since recollection by pictures is by far superior than just words by themselves (e.g., Hornby, 2004; Nelson, 1979; Nelson, Reed, & Walling, 1976; Pavio, 1986; Underwood, 1989). Cohen (2012) further stressed that learners would benefit in terms of acquiring the meaning of the lexical items, remembering them, as well as retaining the knowledge over time.

Pictures are deemed exceedingly fitting for language learning, particularly in the teaching of a variety of English language components such as vocabulary. Specialists in research-based instructional strategies, Joyce, Weil, and Calhoun (2008) advocated specifically that pictures be used for vocabulary acquisition among children as it has been proven to be highly effective. The first edition of Models of Teaching focuses extensively on various teaching models (Joyce & Weil, 1972) and it was conceived to provide teachers with a base for professional teaching towards more effective learning and teaching. Over the years, the models were further honed and improved upon in subsequent editions, the latest being the Models of Teaching (9th ed.) by Joyce, Weil, and Calhoun (2015). One of the models of teaching highlighted is the Picture Word Inductive Model (PWIM). Calhoun (1999) has been employing PWIM since 1976, and with such great success that today, PWIM is employed in classrooms in America, Canada, Sweden and Australia, among others, to build sight vocabularies and teach beginning reading and writing. Closer to home, Loh

(2012, 2017), a senior lecturer at the National Institute of Education, Nanyang Technological University in Singapore also recommended PWIM for its effectiveness in engaging pupils and abetting them in their learning and understanding of vocabulary, particularly in the case of young learners. Loh (2017) employed Picture Word Inductive Model on his grade 1 class that was made up of 7 year olds.

The significance of vocabulary development is well-established with the value of vocabulary knowledge closely entwined with its capacity affecting students' literacy development which further extends to their overall academic achievement. The notion that learners' vocabulary needs have to be seen early in their schooling is no longer as controversial given consistent findings that vocabulary instructions are a critical element of early language and literacy programmes. Hence, there is broad consensus that there is a real urgency to get children off to an early start in vocabulary learning, preferably at preschool level. It has been established that those (children) who begin formal schooling with limited vocabulary knowledge may be compounded by the Matthew effect that can only serve to further handicap them in language development (Stanovich, 1986).

Matthew Effect, derived from the verse, "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath." (Matthew 25:29), refers to the stronger getting stronger while the weaker gets weaker (Lamb, 2011). In other words, where language education is concerned, Matthew effect refers to the notion that those stronger in literacy skills will prevail and continue to improve while the weaker ones will deteriorate or stagnate, at best. Based on Stanovich's (2000) observation, within the domain of reading, children who begin school with even the slightest edge in phonemic awareness, start reading independently faster which results in

additional practice that will see an increase in enjoyment in reading and this in turn encourages them to read more. Alternatively, weaker ones will be slower in starting independent reading. Also, children tend to abhor early reading should they encounter difficulty in the activity, thus ending up reading even less than the strong readers. Hence, if steps are not taken to rectify the situation, the gap between these two groups can only grow wider with the strong getting stronger whilst the weak gets weaker.

Consequently, vocabulary acquisition should not be neglected. Instead, it should be accorded the due attention it deserves, predominantly among young learners. In this vein, the researcher proposed to adapt Calhoun's (1999) PWIM model of teaching on Year 1 pupils from national primary schools, national-type Chinese primary schools and national-type Tamil primary schools in a rural area in Malaysia. The quasi-experimental study aims to examine how the adapted PWIM affects the recall and retention of the vocabulary breadth and depth of these young learners.

1.2 Vocabulary

The study of vocabulary knowledge has grown over time with the importance of addressing underachievement in vocabulary knowledge among young learners well-documented (Biemiller, 2003; Hadley & Dickinson, 2018). Consistent findings have pointed to the possibility that learners, as young as those in preschool, with a gap in vocabulary knowledge will experience compromised language proficiency later in life (Biemiller & Slonim, 2001; Cunningham & Stanovich, 1998; Wagner et al., 1997). Thus, researchers conclude that it is of critical importance to start attending to the vocabulary needs of children as young as preschool, if not younger (McKeown & Beck, 2014).

Both learners and teachers are in solidarity that vocabulary knowledge remains essential to both first and second language learning (Duppenthaler, 2007) with researchers such as Laufer (1997), Nation (1994) and Laufer and Sim (1985a), unanimous in their opinions that possessing a moderate basic vocabulary size is absolutely necessary in order for one to learn a language.

1.2.1 Vocabulary role in language proficiency

Lexical incompetence remains a primary concern to second language learners (Naginder, 2013) though these learners incessantly face diverse challenges at various stages in language learning. Augmenting learners' vocabulary knowledge, irrespective of age, has been central to educational research. This is especially so when cumulative findings evinced the call to enlarge learners' vocabulary knowledge that would in turn lead to, not only improved language proficiency of learners (Anderson & Freebody, 1981; Beck, McKeown, & Kucan, 2002; Cunningham & Stanovich, 1998; Davis, 1968), but to learners' long-term academic achievement as well (Cunningham & Stanovich, 1997; National Reading Panel, 2000). Inadequate vocabulary knowledge has also been linked to achievement gaps found among learners, regardless of the learners' ethnicity and social economic background, as well as those with learning disabilities (Biemiller & Slonim, 2001; Proctor et al., 2005). Possibly, this has resulted in increased focus on this area of research although in the earlier part of 1980s, neglect of vocabulary research has received harsh criticism (Meara, 1980, 1984). However, from late 1980s vocabulary has garnered added awareness in the mainstream of L2 acquisition (Nation, 1997) where it is no longer a victim of discrimination among language acquisition researchers (Levenston, 1979). This trend has persisted with

more efforts being expanded on second language acquisition research (Hadley & Dickinson, 2018; McKeown & Beck, 2014).

Researchers have over the years, emphasized on the prevailing link that exists between vocabulary and second language acquisition (e.g., Banta, 2004; Caroll, 1971; Laufer, 1997; McKeown & Beck, 2014; McKeown & Curtis, 1987; Nation, 1990; Neuman & Wright, 2014; Nikolova, 2002; Staeher, 2008; Su et al., 2018; Wesche & Paribakht, 1996; Zimmerman, 1997). Their research findings pertaining to language development and literacy have unceasingly and consistently supported the positive and strong correlation between learners' vocabulary size and literacy development. Research indicates a similar general consensus among Malaysian researchers that ties vocabulary knowledge to successful second language acquisition (Ainon, 2016; Anis & Valid, 2015; Varatharajoo, 2016; Kamariah, Mahani, & Bordin, 2016; Mohd Haniff, 2017; Naeimi & Chow, 2015; Naginder, 2013; Noor Arina Nadiah & Melor, 2016; Subon, 2016; Tan, 2016; Yee & Harzuwani, 2016). Thus, vocabulary instruction is the key to improved language proficiency and this is further extended to language skills and academic achievement.

Much of the research conducted on vocabulary size and second language proficiency demonstrates a tendency towards studies on the correlation between vocabulary knowledge and reading comprehension. Within this realm, there exists an inextricable link between these two domains; that of how learners' vocabulary size correlates strongly and positively to learners' reading comprehension (Baker, Simmons, & Kameenui, 1995; Baumann, Kameenui, & Ash, 2003; Beck, McKeown, & Kucan, 2002; Beglar & Hunt, 1999; Graves, 2000; Laufer, 1992; NICHD, 2000; Snow, 2002; Staehr, 2008; Stahl & Fairbanks, 1986). Empirical studies have also pinpointed vocabulary as an important predictor of general

reading ability (Stanovich, Cunningham, & West, 1998) and comprehension with strong correlations, ranging from 0.50 to 0.85, between vocabulary size tests and reading comprehension tests (e.g. Biemiller, 2003; Laufer, 1992; Nation & Coady, 1988; Qian, 1999, 2002). While Schmitt (2000) stressed on how dependent second language readers are on vocabulary knowledge for smooth and effective reading, Biemiller (2010) went so far as to say that some young learners were wrongly classified as having reading disability when a below-threshold vocabulary size was at fault.

A considerable amount of research has also been expanded on the relationship between vocabulary knowledge and writing. Definite hyphotheses (Astika, 1993; Beglar & Hunt, 1999; Laufer & Nation, 1995; Llach & Gallego, 2009; Linnarud, 1986) suggest of vocabulary knowledge's substantial influences on the quality of one's essay. Astika (1993) discovered that vocabulary knowledge contributed to a very high percentile, 84% of the variance in the assessments when he analysed five factors - content, organisation, vocabulary, language use and mechanics – in 120 writing samples. Likewise, existing empirical findings from Milton, Wade, and Hopkins (2010), Staehr (2009) and Beglar and Hunt (1999) have indicated a positive relationship between vocabulary size and listening comprehension. In 2007, Staehr likewise documented a positive score of .70 on the correlation between a vocabulary level test and a listening comprehension test during a study on EFL learners. On oral competence and vocabulary knowledge, findings of past studies by researchers such as Koizumi and In'nami (2013), Oya, Monalo, and Greenwood (2009), Koizumi (2005), Takiguchi (2003), Koizumi and Kurizaki (2002), Ishizuka, (2000), Higgs and Clifford (1982), and Adams (1980) reported positive correlations between the two variables. Koizumi and In'nami (2013) confirmed that productive vocabulary knowledge "substantially explain(s) L2 speaking proficiency" (p. 910). Research findings have also

indicated that the size of learners' vocabulary knowledge can influence their overall academic success in school (Baumann, Kameenui, & Ash, 2003; Bromley, 2007; Carlisle, 2002; Cunningham and Stanovich, 1997; Graves, 2006; Graves & Watts-Taffe, 2002; Laufer, 1992a; Nagy & Scott, 2000). Furthermore, it also appeared to affect one throughout one's life span (Biemiller, 2012) with the core of these difficulties transpiring in the early stages of life (Rowe, Raudenbush, & Goldin-Meadow, 2012).

As mentioned previously, vocabulary teaching and learning may have received scant attention in the early days of language acquisition (Alemi & Tayebi, 2011) with very little research being conducted in the field of ESL (Folse, 2004; Hunt & Beglar, 2005;). Nevertheless, since then, vocabulary has been acknowledged time and again as the central player in second language learning and teaching in theoretical and empirical second language acquisition vocabulary research, resulting in higher visibility in this area of studies.

Closer to home, vested interest can be found in vocabulary interventions among Malaysian researchers and academicians with the emergence of more studies pertaining to vocabulary acquisition and English language proficiency in areas such as reading comprehension, writing, speaking and listening, including action and experimental studies related to vocabulary interventions. Based on the results of their studies, Malaysian researchers such as Ahmad Asman et al. (2009), Ainon (2016), Pandian (2003), Anis and Valid (2015), Ann Rosnida, Zainor, and Mazlin (2007), Varatharajoo (2016), Chin (2005), Fatimah (1999), Giridharan (2013), Letchumanan and Tan (2012), Lim (2003), Mohamed Ismail and Lim (2016), Naeimi and Chow (2015), Naginder (2013), Noor Arina Nadiah and Melor (2015), Noorizah and Zaini (2009), Nurul Aleena (2006), Radzuwan (2011), Rafidah and Muhammad Nasri (2011), SeeToh (2005), Sharafi-Nejad, Raftari, and Subon (2016),

Sivabalan (2013), Tan (2016), Tuluhong (2006), Vijayaletchumy (2009), and Yee and Wahab (2016) have highlighted the significance of vocabulary knowledge in the course of second language learning and the significance of vocabulary knowledge to academic performance or accomplishments and in both writing and speaking, formal and informal. Therefore, it stands to reason that a lack of vocabulary knowledge renders learners incapable of coping with the basic language skills and is therefore, a hindrance to their achieving mastery of the target language.

In the Malaysian context, despite the positive correlation between vocabulary knowledge and language proficiency, vocabulary instruction has not been accorded the priority it deserves in the Malaysian Education Blueprint (KPM, n.d., 2013). There is no mention of specific vocabulary instruction in the current *Dokumen Standard Kurikulum dan Pentaksiran* (KPM, 2017). Neither was vocabulary instruction mentioned in the one before this (KPM, 2015). The nearest to vocabulary instruction that can be found is specific instructions on phonics. Allegedly, Malaysian learners are challenged in L2 learning chiefly due to lack of vocabulary knowledge (Zakaria, 2005). A more current study on factors leading to learners' difficulties in learning English language in Malaysia (Nor Hani et al., 2017) found vocabulary knowledge inadequacy to be a major contributing factor. Yet, today in Malaysian classrooms, structural and grammatical patterns of the language seem to prevail over vocabulary and learners are expected to pick-up vocabulary "naturally", without specific lessons on vocabulary. Hence, it would not be wrong to perceive vocabulary as the stepchild in L2 learning. As aptly put by Segler (2001, p. 1),"…as the "distant cousin" of language teaching and "the Cinderella of the field of second language acquisition (SLA) research."

A lack of emphasis on teaching of vocabulary in Malaysian classrooms seem prevalent. A study that investigated frequency of vocabulary exercises in ESL lessons found it ranked fourth out of the nine language activities in data collected (Fauziah & Nik Fauzee, 2002). Similarly dismaying, vocabulary learning is one of the lowest ranked in the students' list of preferred learning activities (Teh, 2004).

Given the substantial evidence linking vocabulary knowledge to language proficiency and overall academic performance, vocabulary learning should be among the key tasks of schooling – preferably starting early in children's schooling given the advantages a child will possess if he or she has a headstart in vocabulary acquisition (Burns, Griffin, & Snow, 1999; Carroll, 1971; Kerbow et al., 1999; McKeown & Curtis, 1987).

1.2.2 Vocabulary acquisition

There are many dimensions to vocabulary acquisition as reflected in the multitude of diverse areas of research conducted on the topic. Nagy, Anderson, and Herman (1987) described the process of acquiring word knowledge as occurring in stages. Initially, upon encountering a new word, information on how it is related to the reading material will be stored in memory. Eventually, each time they see or hear the word this information will be reinforced and this will be increasingly so when the word is used in more diverse context in each different occasion, thus resulting in the learner gradually acquiring "ownership" of the word.

The notion of vocabulary learning occuring along a continuum of development is also widely received. Waring (2002) mooted the idea of one progressing along a continuum of knowledge as one acquires additional knowledge of a given word. This basic idea further extends to the general notion of placing receptive and productive vocabulary at either end of

the continuum. This is in tandem with Anderson and Freebody's (1981) reflection on how a person, particularly a child, expands his or her lexical knowledge along the directions of breadth and depth.

On the other hand, in his infamous theory of SLA, Krashen differentiated the disparities between acquisition and learning of which Nation (2008) supports. To Krashen, acquisition is a subconscious and intuitive process of acquiring language abilities; whereas learning remains a conscious and explicit process. Vocabulary acquisition, as defined by Krashen (1989) is incidental learning that happens through incidence of occurrence with learners making guesses based on their existing knowledge. Therefore, within this context, language acquisition happens when a learner is exposed to meaningful and comprehensible input without conscious attention given to forms, thus implying that learners can often effectively infer meaning from context. Based on this thread, Krashen (1989) advocated learning large quantities of vocabulary through a flood of input.

Alternatively, Folse (2004), Gass (1999) and Channel (1998) looked at language learning as a process that occurs through conscious study of forms. As pointed out by a critic of Krashen, Oxfrod, and Crookall (1990), learners could just ignore words unfamiliar to them, not necessarily having to make effort to learn its meaning. This highlights the importance of assisting learners, in particular beginners, to explicitly learn the basic word families (Laufer, 1997). Some researchers (Folse, 2004; Gass, 1999) maintained the standpoint that acquisition and learning are considered similar since both terms start with an input that integrates new linguistic information into the existing linguistic system and eventually produces an output of newly integrated or acquired knowledge. Hence, the terms

acquisition and learning are found employed interchangeably in the field of second language research as in the present study.

The above-mentioned divergence is frequently accompanied by different theories on the cognitive process involved in vocabulary acquisition but the general consensus reached among some of the renowned leading authorities in this field is that vocabulary acquisition progresses gradually and is incremental (Folse, 2004; Krashen, 1989; Laufer, 1991; Meara, 1980; Nation, 1990; Schmitt, 1995). Furthermore, approaches to teaching L2 vocabulary do fall on a range (Coady, 1997), with one end being the incidental approach where learners experience natural acquisition (Krashen, 1989) while on the opposing end learners experience explicit instruction and the development approach (Oxford & Crookall, 1990; Paribakht & Wesche, 1997; Qian, 1996; Raptis, 1997).

1.2.3 Vocabulary acquisition among young learners

There is a real urgency to initiate vocabulary teaching early in a child's schooling with some researchers advocating starting as early as preschool (McKeown & Beck, 2014). Widely accepted as a key component in literacy development and academic achievement, a child's vocabulary knowledge level upon entering school and his or her capability to acquire vocabulary are considered two major components in predicting success in reading comprehension and academic achievements (Sweeny & Mason, 2011), particularly concerning later reading comprehension (Hadley & Dickinson, 2018). Moreover, a research carried out by members of the Massachusetts Reading Association Studies and Research Committee on vocabulary instruction that spanned a decade (2000 to 2010), vocabulary instruction has to be purposeful and this refers to direct interventional vocabulary instruction

on small groups of children so as to ensure that their vocabulary development is effectively supported and where possible, boosted (Sweeny & Mason, 2011).

The urgency to get young learners off to an early start where acquiring vocabulary is concerned is well-justified given the substantial empirical evidence on the significance of vocabulary knowledge to literacy development. As far back as in the 1970s, researchers have already advocated that one of the most basic objectives of schooling in the early years, is to teach vocabulary (Carrol, 1971; McKeown & Curtis, 1987) as far as language learning is concerned. This remains consistent with Burns, Griffin, and Snow's (1999) observations that children possessing low language skills and less phonemic awareness and letter knowledge are those most at risk of facing literacy problems in school. Evidently, the vocabulary gap in children can be witnessed by as young as three years old (Hart & Risley, 1995), rendering teaching vocabulary as one of the primary tasks of a school.

Furthermore, the foundation for acquisition of conventional literacy too depends on how early a child is exposed to vocabulary development (Teale & Sulzby, 1986). As Burns et al. (1999, as cited in Lee Goss & Andren, 2014) noted, the child who is more well-equipped with language components before the start of formal schooling is likely to fare better in literacy development. Children that are exposed to rich language patterns will also tend to gain a superior understanding of what written language sounds like (Sulzby, 1985; Sulzby, Buhle, & Kaiser, 1999).

Rooted on the cogency of previous frameworks on literacy development (Burns et al., 1999; Clay, 1991; Cunningham & Allington, 2015; Teale & Sulzby,1986) children embark on language expansion way before the venture of formal learning in school begins. The cohort most in danger of facing underachievement in learning at school are those armed

with scanty basic vocabulary knowledge when they first start schooling (Biemiller, 2003; Biemiller & Boote, 2006; Stahl & Nagy, 2006). Studies show that children's vocabulary size is in tandem with their level of comprehension; the smaller the vocabulary size, the lower the comprehension level and vice versa. Since they comprehend less, the tendency to read will lessen and reading less will result in a shrinking vocabulary size that will lead to less comprehension that will increase with time (Biemiller & Slonim, 2001; Stanovich, 1986, 2000). The effect, termed as Matthew effect, is not to be underestimated. Put in this manner, children with lesser vocabularies will continue to straggle after those with greater vocabularies and it appears that the source of these difficulties transpires very early in life. Therefore, successes or struggles with literacy development can be observed very early in a learner's life and possession of the necessary level of vocabulary proficiency dictates its triumph or failure (Kerbow et al., 1999). In essence, it is vital to embark on a journey of vocabulary knowledge building in the early stage of schooling (Biemiller & Slonim, 2001).

Since significant differences in vocabulary size among children can be detected very early (Rowe, Raudenbush, & Goldin-Meadow, 2012), as early as second grade (Biemiller, 2003), it makes sense to start focusing on vocabulary building during early schooling. After all, as put forth by McKeown, Beck, and Blake (2009), the amount of vocabulary knowledge a child possess is a contributing factor to individual learning discrepancies among young children beginning formal schooling.There are also suggestions that unless one proceeds to explicitly increase the vocabulary knowledge of these young learners, a year of kindergarten contributes minimally to a child's vocabulary knowledge regardless of the grade the child is enrolled in (Cantalini, 1987; Christian et al., 2000; Morrison, Smith, & Dow-Ehrensberger, 1995). A child's store of vocabulary is primarily dictated by the words acquired from parents and those who came into contact with the child (Biemiller, 2012).

Hence, as advised by Cunningham and Stanovich (1997), and Hazenberg and Hulstijn (1995), where feasible, efforts to enhance vocabulary acquisition should be initiated as early as possible. There are actually cases where those with below-threshold vocabularies were mistaken for having learning disability (Biemiller, 2010). Therefore, there is definite merit if it can be made mandatory for young learners to begin vocabulary knowledge stockpiling (Astika, 1993, as cited in Webb & Nation, 2017; Chall, 1958, as cited in Hedgcock & Ferris, 2018; Koda, 1989, 2007) as vocabulary is undeniably an excellent predictor of language competence. Deficient vocabulary knowledge among children is predominantly responsible for their inability to comprehend materials they need to read in school (Chall & Conard, 1991; Chall, Jacobs, & Baldwin, 1990; Lescaux & Kieffer, 2010; Scarborough, 2001; Silverman & Crandall, 2010). So, likely, the single best thing we could do to increase literacy would be to increase the vocabulary size of learners during their primary years, preferably starting from Year 1. Hence, the purposeful selection of Year 1 subjects for the present study.

1.2.4 Vocabulary threshold

It is apparent that students need to acquire a vocabulary size sufficiently large to touch the "lexical threshold" (Laufer, 1997, p. 3). However, different researchers providing different figures for the threshold rendered it non-conclusive. Yet, a majority would agree that a "lexical threshold" is necessary for effective communication and academic reading. Waring and Nation (1997), and Nation (1994) put the figure at 2000 word families as the ideal size for meaningful learning, arguing that this amount makes up around 87% of the words in formal written texts and exceeds 95% in informal spoken texts. On the other hand, Laufer (1997) set the level slightly higher than Nation's (2001) at 3000 word families as the

said figure is deemed sufficient to cover 95% of the words in most texts. As for beginners, Laufer's (1992) threshold for them to read unsimplified texts is at 3000-word level, a level in tandem with Schmitt and Schmitt's (2014) estimation of what is needed for ESL learners to comprehend graded readers. Interestingly, a word family would include a base word, its inflected forms, and a few reasonably regular derived forms. So, a 3000-word family would approximately be the equal of 5000 words.

As for young children, according to Beck and McKeown (1991, as cited in Subon, 2016), the range of working vocabulary a five or six-year-old has is between 2500 and 5000 words while an average person learns approximately 3000 words yearly in his or her early school years. Therefore, beginning learners and readers should target the threshold where they can begin to learn from context. This is predominantly vital to those beginning formal schooling; one needs to know sufficient words on a page and to comprehend what is read. Otherwise, one will be highly challenged to learn from context.

Earlier, Liu and Nation (1985) reported that it is necessary for a learner to have a sizable vocabulary of approximately 3000 words that will cover a minimum of 95% of a text, for effective learning - from context with unsimplified text - to take place. However, more recent research highlighted requirement of at least 98% of the vocabulary in a text for comfortable reading (Nation & Webb, 2011). In addition, Nation (2006) suggested that between 6000 and 7000 words are required to provide 98% coverage in daily listening, while between 8000 and 9000 words are required for pleasure reading. This further substantiates claims that a learner needs more start-up vocabulary compared with previous figures, and this is just to comprehend general texts.

1.2.5 Vocabulary breadth and depth

There is an exposition for accepting that the quantity and quality of vocabulary knowledge as imperative prerequisites to successful language acquisition and development (Hadley & Dickson, 2018; Hoffman, Peal, & Paciga, 2014; McKeown et al., 2018; Meara, 1996; Nation, 2001; Nagy, 1988; Pearson, Hiebert, & Kamil, 2007; Qian, 1999; Read, 1988, 1989, 2004; Schooneen & Verhallen, 2008; Wesche & Paribakht 1996), both in the past and in the present. However, as highlighted, vocabulary breadth (quantity) and depth (quality) are closely interconnected and therefore, should not be perceived as two individual constructs (Tannenbaum, Torgesen, & Wagner, 2006). In their work, researchers such as Qian (1998, 2002), Wesche and Paribakht (1996), and Read (1988, 1989) adopted the approach that vocabulary knowledge encompasses two main dimensions at the least; breadth and depth.

One of the most popular definitions for vocabulary found in literature is Anderson and Freebody's (1981) classification of vocabulary breadth as how many words are known and vocabulary depth as how well those words are known (Read, 2004). Vocabulary breadth has also been defined as vocabulary size, referring to the number of words one has at least some minimum knowledge of meaning (Qian, 1999). On the other hand, to Nation (2006) vocabulary size equates the words known to a language learner in numerical term. Similarly, Meara's (2005) vocabulary size and Daller, Milton, and Treffers-Daller's (2007) lexical breadth are very similar in that both are concerned with quantity rather than quality. The terms "breadth" and "size" may have been used intermittently in numerous vocabulary studies over the years but in essence, vocabulary breadth only takes into consideration the

estimated total overall number of words in one's lexicon while disregarding how well each item is understood (Hadley & Dickson, 2018).

As for vocabulary depth, Nation (2006) defined it as how well a word is comprehended or used by language learners while Qian (1999) referred to vocabulary depth as a learner's level of knowledge of various aspects of a given word. Despite noteworthy efforts to define vocabulary depth, literature pertaining to the concept of depth is still peppered with perplexity (Schmitt, 2014).

1.3 The Picture Word Inductive Model (PWIM)

The PWIM is an instructional teaching model based on Emily F. Calhoun's extensive research on early literacy. According to Calhoun (1999, p. 21), "PWIM is an inquiry-oriented language arts strategy that uses pictures containing familiar objects and actions to elicit words from children's listening and speaking vocabularies." Developed by Calhoun (1999), PWIM is an addition to the family of Models of Teaching of Bruce Joyce and Marsha Weil (Joyce, Weil, & Calhoun, 2015). Deemed to be the centrum of some very effective curriculums targeting literacy skills development, the approach is applicable on learners of all age groups though Calhoun (1999) used PWIM primarily with young learners, starting with preschoolers and extending to those in primary schools.

Largely indentified with research-based instructional method of teaching vocabulary to beginning readers, PWIM's vigour lies mainly with assisting learners to develop substantial sight vocabularies via the natural ways for children to approach the learning of a language (Joyce, Weil, & Calhoun, 2009). The core tenet of PWIM is its employment of pictures as a stimulus in classroom activities geared at promoting language learning. Apart

from using pictures and texts to teach vocabulary, this teaching model incorporates the inductive thinking and the concept attainment models of teaching.

Additionally, for this study, the PWIM was further adapted to allow the use of mother tongue within the collaborative setting. For example, to teach the word "playground", the teacher will first point to the picture of a playground and make attempts to elicit the word "playground" from the learners' existing vocabulary knowledge. Learners are permitted to say the word "playground" in their mother tongue if they do not know the word in English. The teacher would then provide the synonym of the word in English which would subsequently be written next to the picture of the playground. As the study was carried out in both national-type primary schools (Chinese and Tamil) and national primary schools, pupils' exposure to their respective mother-tongues in the classrooms is a regular occurrence. This trait further contributed to sampling homogeneity.

In short, the adapted PWIM intervention is a combination of the inductive thinking and concept attainment models of teaching with the inquiry-oriented method of employing pictures and words, and the mother tongue to teach or induce vocabulary acquisition within a collaborative setting that addresses the framework of the current Year 1 Standards-Based English Language Curriculum (SBELC) which focuses on principles such as back to basics literacy skills to form strong foundation of language skills, fun and meaning learning and pupil-centeredness learning and teaching (*DKSP*, 2017).

Review of research studies on PWIM (e.g., Calhoun, 1999; Feng, 2011; Joyce, Weil, & Calhoun, 2009; Swartzendruber, 2007; Wong, 2009) suggests positive recommendations, particularly in English language learning and teaching among young learners and more nature ones; promoting the effectiveness of the teaching model in improving second

language skills. A sizeable number of such studies on PWIM are found to focus on vocabulary acquisition and enhancement with a few specifically on the implementation of PWIM in enhancing vocabulary knowledge, reading comprehension and writing in the context of promoting literacy skills (Calhoun, et al., 2001; Joyce, Hrycauk, & Calhoun, 2001, 2003). Joyce and his associates (2001) documented an increase from 30% to 90% in the mean percentage of words recognized after three cycles of PWIM while Calhoun et al.'s (2001) research shows that a group of grade 1 pupils achieved 2.1% gain as compared to 0.25% for the past four or five years.

Henceforth, this study saw to the implementation of PWIM in exploring its effects on the vocabulary knowledge of young second language learners of the target language in the Malaysian context; Year 1 pupils from Malaysian national and national-type primary schools.

1.4 Statement of the Research Problem

Evidently, as depicted in the current Malaysian scenario, competency in English language is not assured despite it being included as a subject in the curriculum from Year 1 at national or national-type schools. The ordinary Malaysian will have chalked up approximately an average of 14-15 years of English language education assuming he or she goes through the whole course of the country's formal education that stretches from preschool to tertiary levels. Ironically, as reported by Hazita in 2016, more than half of Malaysian pupils were found to be still illiterate in English language after having gone through the compulsory six years of primary education (GoM 2016, pp. 10-12). This is the scenario confronting the English education landscape in Malaysia; one and half decade spent

studying the language and yet still unable to attain a credible level of competency in the language.

Malaysia's educational system has evolved considerably from the pre-independent period to the present. From the colonial era where education was segregated into disparate ethnic-based linguistic streams that are both socially and scholastically confining, the post-independent period (1957-current) witnesses continual modernization and integration of the country's education institution. The country's earliest education policy reform in 1955, following the country's first general election, resulted in the formation of "an education institution linguistically plural in form, integrally national in content, Malay in its symbolism" (Rudner, 1977, p. 24). Gradually, English language was replaced by the Malay language as the language of instruction in the classrooms of our national public schools. Notwithstanding government's aims of national development that encompass the multiplexity of societal and economic influences, as well as politically regulated intent, the mandated importance of being comparably competent in English literacy skills globally remains and is not to be taken lightly. The massive efforts put forth by government and stakeholders in trying to upgrade the English language proficiency of our students in recent years speak volumes of the paramount significance of the language. Obviously, our learners' substandard literacy level is not due to inadequate or insufficient attention accorded to the teaching and learning of English language,

In the 2019 budget, the education ministry is the largest recipient with an allocation of 19.1% of total government expenditure, translating into RM60.2 billion ("2019 Budget: Education gets biggest allocation," 2018). Similarly, when 2018 budget was announced, education snared the lion share of the country's budget. RM61.6 billion was allotted ("2018

Budget: Sizable allocation for education shows government's commitment," 2017) despite the less than favourable economic situation at that point in time. The substantial amounts set aside by the Malaysian government for numerous English language education reforms witnessed in the last three decades is clear indication of the importance placed on this matter.

The most recent effort to elevate the English language standard to an established literacy standard is the Subject Grade Point Average (*Gred Purata Mata Pelajaran, GPMP*). It is a set target in English that all Malaysian students are required to meet to ascertain that schools in every state perform at a certain level in the said subject. Another recent endeavor is the English Language Education Reform Roadmap (2015-2025), introduced in 2013 and 2015, and in the Malaysia Education Blueprint (2013-2025) (*Kementerian Pendidikan Malaysia, KPM,* 2013), an upscaling of English language education standards can be found embodied in each new reform introduced. Take for instance, the curriculum reform targets at least 90% literacy acquisition by the end of Year 3 (or lower primary level) of the child's primary education on the LINUS LBI 2.0 programme based on 12 constructs (MoE, 2014) of which the twelfth is "Able to construct sentences with guidance". Yet, pupils still fail to achieve these established literacy standards, falling short of a reasonable level of competency expected of them after so many years of learning the language in school. Unemployment among our graduates remains high with reasons provided as lacking in communication skills due to the scantiness of their English ("Clear need for English proficiency," 2017). More recently, Datuk Shamsuddin Bardan, executive director of Malaysian Employers Federation, in an article in the Malay Mail ("Employers blame poor communication, language skills for unemployed Bumi grads," 2018) declared that a paucity of English language proficiency coupled with weak communication skills are mainly responsible for the difficulties faced by

graduates in securing employment. Hence, the call for further remediation and increased enhancement.

Introduced in 2013 in line with *KSSR*, the SBELC placed importance of equal proportion on English literacy skills such as basic reading literacy, phonics, penmanship, language arts and higher order thinking skills (HOTS) that include skills such as critical and creative thinking, and reasoning skills as well. In this new curriculum, the number of hours allocated for teaching of English is increased to six hours per week, an unmistakable indication of the importance that is placed on English literacy at primary entry level. The new curriculum covers four modules, listening and speaking, reading, writing, and language arts. Despite such efforts, the performance of students at both school and tertiary in English language remain unsatisfactory as can be witnessed in the number of those reaching Year 6 unable to read, write or speak in English.

Furthermore, in Haye's (2014) assessment of English provision in primary schools, studies by various researchers (Bauldauf et al., 2011; Nunan, 2013) on international comparisons in the Asia pacific region have revealed that as far as learners at primary levels are concerned, it is futile to lower the age at entry level for English language learning as it fails as an attempt to increase the level of proficiency. In Malaysia, children as young as three years old start learning English language in pre-school and yet, despite starting at such a tender age a sizeable number of Malaysian students still find themselves unable to master the language upon completion of secondary school (Hiew, 2012; Subon, 2016). Hence, it is not surprising to have their lack of vocabulary knowledge being held responsible for their lack of mastery in English language (Naginder, Othman, & Kabilan, 2008; Tan, 2016; Zakaria, 2005). Studies conducted in secondary schools and institutions of higher learning

further blamed lexical incompetence for learners' inability to measure up to expections in the four basic language skills of listening, speaking, reading and writing (Naginder et al., 2008). Consequently, Malaysian students are handicapped by a lack of vocabulary knowledge, a contributing factor to language skills acquisition.

The English language proficiency among the Malaysian youths continuing to lean towards a decline has not only aroused the concerns of parents, educator and stakeholders (Murugesan, 2003) but the situation has turned progressively grave in the present years to the extent that it has threatened the realisation of the nations' aspirations to be fully developed and economically competitive, the country's Vision 2020 (GoM, 1996). Further compounded by globalisation and internationalisation, a tremendous amount of expectations has been placed on the Malaysian education system to measure up to international standards as well as the 21st century global needs. Where English language is concerned, the onus is on the English Language Standards and Quality Council (ELSQC), not only to upheld and improve the English language but also to allign the local English standards with that of an internationally recognised one, the Common European Framework of Reference (CEFR) for languages. Hence, the dire need for an intervention to further enhance the English language proficiency of the people.

Furthermore, as attested by Mohd. Sofi (2003), Malaysian teachers' main focus is on academic excellence in examinations given how examination orientated the Malaysian education system is. As such, in their pursuits of excellent results the teachers may use first language, rote learning and teaching, and pattern drillings of questions. This notion is supported by Norris (1993, p. 35) who noted that "when teacher performance is judged in terms of pupil performance on attainment tests teachers will tend to protect themselves

against the consequences of low scores and teach to the test." Hence, under such circumstances, it is not surprising that there is minimal focus on the teaching of the very basic structure of the language, which is vocabulary itself. There is no mention of specific vocabulary instructions in the current *Dokumen Standard Kurikulum dan pentaksiran Standard, DSKP* (*KPM*, 2017) or in the previous one (*KPM*, 2015).

As for the *Kurikulum Standard Sekolah Rendah (KSSR*), the programme aims to enhance students' HOTS, placing emphasis on the integration of the four skills as well as language areas via communicative language teaching (MoE, 1989). While the programme is praiseworthy for its admirable intentions, it serves to contribute to the neglect of vocabulary acquisition in our Malaysian classrooms (Wong & Rafik-Galea, 2004). As stated by Stern (1992), the communicative language teaching approach overly emphasises on the single concept "communication", providing little or minimum direction on how to handle vocabulary although supportive vocabulary is clearly needed for practical language use in communicative language teaching (Schmitt, 2000). Undeniably, the gap in vocabulary knowledge is an immediate concern and needs to be addressed accordingly. It is apparent that a good foundation in vocabulary is crucial to language learning and having a headstart would provide one with credible scaffolding for more effective language acquisition. As contended by Snow (1999) and Trevarthen (1993, 1994), it is essential for language learning to take place early in one's life as a child is distinctively placed for language development early in life and subsequently, for considerable accelerated learning.

In the wake of such mindset, there exists a real need for an effective vocabulary acquisition programme at school level, commencing with Year 1 pupils, given the cumulative evidence that promote enhanced effective learning starting with young learners.

Furthermore, at this point of searching, to my knowledge, there has been no recorded evidence of a study on the effectiveness of the intervention method on the recall and retention of vocabulary breadth and depth within a collaborative setting in the Malaysian context. Therefore, such a study on the vocabulary acquisition of Year 1 pupils would fill the gap in ESL research, particularly on young learners' vocabulary recall and retention in the Malaysian context. As Read (2000) aptly put it, "Words are the basic building blocks of language, the units of meaning from which larger structures such as sentences, paragraphs and whole texts are formed" (p. 1).

1.5 Aims, Objectives and Significance of the Study

This research focuses on the impact of the adapted PWIM vocabulary intervention (PWIM-A) in a quasi-experimental research on the vocabulary acquisition of Year 1 pupils in public primary schools in a rural area in Perak, Malaysia. As such, the study focuses on the impact on vocabulary recall and retention for breadth and depth, and it does not intend to debate the strengths and weaknesses of the intervention.

The objectives of the study are to examine if the vocabulary knowledge recall and retention of the target pupils for breadth and depth are enhanced after experiencing the intervention as compared to those pupils who were taught via the traditional classroom approach.

1.5.1 Research Objectives

The aims of this research:

Vocabulary breadth

RO 1: To examine if the target pupils' vocabulary breadth knowledge recall is enhanced with the PWIM-A intervention as compared to those who did not receive the intervention.

RO 2: To examine if the target pupils' vocabulary breadth knowledge retention is enhanced the PWIM-A intervention as compared to those who did not receive the intervention.

Vocabulary depth

RO 3: To examine if the target pupils' vocabulary depth knowledge recall is enhanced with the PWIM-A intervention as compared to those who did not receive the intervention.

RO 4: To examine if the target pupils' vocabulary depth knowledge retention is enhanced with the PWIM-A intervention as compared to those who did not receive the intervention.

1.5.2 Research Questions

This present study addressed the following research questions:

Vocabulary breadth

RQ1: Is there a difference in the vocabulary breadth knowledge recall between the PWIM-A group and the Control group?

RQ2: Is there a difference in the vocabulary breadth knowledge retention between the PWIM-A group and the Control group?

Vocabulary depth

RQ3: Is there a difference in the vocabulary depth knowledge recall between the PWIM-A group and the Control group?

RQ4: Is there a difference in the vocabulary depth knowledge retention between the PWIM-A group and the Control group?

1.5.3 Research Hypotheses

To answer the research questions listed in the previous section, the following null hypotheses were put to test.

Vocabulary breadth

Hypothesis 1 (H_{o1}):

There is no significant difference in the vocabulary breadth knowledge recall between the PWIM-A group and the Control group.

Hypothesis 2 (H_{o2}):

There is no significant difference in the vocabulary breadth knowledge retention between the PWIM-A group and the Control group.

Vocabulary depth

Hypothesis 3 (H_{o3}):

There is no significant difference in the vocabulary depth knowledge recall between the PWIM-A group and the Control group.

Hypothesis 4 (H_{o4}):

There is no significant difference in the vocabulary depth knowledge retention between the PWIM-A group and the Control group.

1.6 Significance of the Study

Over the years, various educational reforms have been undertaken by stakeholders in the country in an immense effort to uplift the standard of our education to be at par with that of the international level. Take for example, the Malaysian Education Blueprint (2013-2015), Roadmap 2015-2025 and the Subject Grade Point Average (*Gred Purata Mata Pelajaran, GPMP*) target in English.

Therefore, the data and empirical information gathered from this study would provide valuable insights set to bring benefits, not only to immediate stakeholders but also to the domain of second language acquisition in terms of vocabulary knowledge advancement. First-hand beneficiaries such as pupils and teachers would profit from elevated levels of English language proficiency while research findings are additional learning and teaching resources that academicians as well as module writers would find helpful in developing or upgrading of teaching materials. To the policy makers, for if proven effective, this intervention could serve as a supplementary instruction or even possibly an alternative intervention that could be implemented in mainstream education to uplift the teaching and learning process another notch, particularly in the area of vocabulary acquisition.

At this juncture, an intervention dedicated to vocabulary acquisition is deemed timely. It is envisaged that the intervention if proven successful would be able to not only effectively promote vocabulary acquisition but enhances language competence as well based on the positive correlation between vocabulary knowledge and language proficiency. Of equal importance is its ability to serve as a systematic guide and reference for the development of vocabulary knowledge in the classrooms. Thus, the gained insights of this

study set to bring benefits, not only to the students and teachers, and module writers but to policy makers as well.

1.7 Operational Definition of Terms

The aim of this section is to present readers with a broad understanding of the major terms used in this thesis.

1.7.1 Vocabulary Knowledge

Vocabulary knowledge is genetically defined as knowledge of words and word meanings (Lehr, Osborne, & Hiebert, 2004). More precisely, Stahl (2005) equates vocabulary knowledge with knowledge. The equation carries the implication that having knowledge of a word entails the ability to define it as well as knows its meaning in context. This present study utilises an operational definition of vocabulary as knowledge of words and word meanings in oral and print language. Throughout this study, vocabulary and vocabulary knowledge are used interchangeably as the same concept. However, the researcher is aware that different researchers may treat these terms differently.

1.7.2 Vocabulary Breadth and Depth

Instead of being perceived as a single entity, vocabulary knowledge is seen as comprising of two key dimensions, vocabulary breadth and vocabulary depth:

Vocabulary Breadth

The number of words that we know when we read or see them is classified as vocabulary breadth (Nation, 2006). In the present research, the breadth component concerns the words one recognises/knows when read or seen in numerical form.

Vocabulary Depth

Alternatively, vocabulary depth refers to how well we know the words that we read or see (Nation, 2006). For the present research, the depth component concerns the words read or seen that can be recognised/known in terms of its relations to other words presented in a semantic network.

1.7.3 Vocabulary Acquisition

There exist two stances among researchers; one, differentiating the term "acquisition" from "learning" (Krashen, 1983) and the other, equating "acquisition" with "learning" (Folse, 2004; Gass, 1999). Ample evidence likewise supports the general consensus of both acquisition and learning as a process with dynamic aspect rather than a static aspect. Hence, to numerous researchers of SLA (e.g., Folse, 2004; Gass, 1999), acquisition is comparable to learning and vice versa since both commence with an input that integrates new linguistic information into the existing linguistic system and conclude with an output of newly integrated or acquired knowledge. In the present study, "acquisition" and "learning" are employed interchangeably as the same concept throughout the study. Thus, the operational definition of vocabulary acquisition/learning refers to having knowledge of words or word meanings in oral and print language, in receptive and productive forms.

1.7.4 Young Learners

Those aged 12 and below are classified by Moon (2000) as young learners whereas Scott and Ytreberd (1995) indicate in their study that young learners are children that fall within the age of five to ten years. On the other hand, Slattery and Willis (2001) termed those aged below seven as very young learners. The young learners employed in the present study

refers to children enrolled in Year 1 in national and national-type primary schools in the country.

1.7.5 Vocabulary Knowledge Recall

Vocabulary knowledge recall refers to the vocabulary knowledge remembered or retained in memory almost immediately after some form of vocabulary lessons (Craik & Lockhart, 1972; Craik & Tulving, 1975; Laufer & Hulstijn, 2001). In research, short-term retention is acknowledged as 'recall' and upon instantaneous completion of intervention, testing procedure is generally administered for assessment purposes (Revesz, Sachs, & Mackey, 2011). Comparably, Primsleur's (1967) time frame for recall is a lapse of between five seconds and five days. In the present research, vocabulary knowledge recall for breadth and depth were assessed via posttests administered almost immediately after the intervention period which falls within the five seconds to five days range.

1.7.6 Vocabulary Knowledge Retention

Vocabulary knowledge retention is about retaining vocabulary knowledge over a longer period of time after having experienced some form of vocabulary interventions. Gu (2003) termed the delayed recall after two weeks of completion of intervention as "long term retention" (p. 12). On the other hand, retention is referred to as the ability to associate words with their meanings after a lapse of more than five days and up to two years (Primsleur, 1967). For research purposes, retention is generally assessed some time after subjects have experienced intervention (Revesz, Sachs, & Mackey, 2011). Hence, retention is based on subjects' ability to maintain knowledge learnt during intervention; the less knowledge lost, the higher the retention. In the present research, vocabulary knowledge retention for breadth

and depth were assessed via delayed posttests approximately two weeks after the intervention period.

1.7.7 Vocabulary Testing

Measuring vocabulary knowledge is deemed necessary since vocabulary knowledge is widely accredited for being one of the best predictors of basic literacy skills and its leverage on one's overall academic prowess.

Vocabulary Breadth

Meara and Buxton's (1987) Interactive and Print Yes-No Vocabulary Test (YNVT) was adopted for testing of vocabulary breadth in the present research. One of the better-known and more widely accepted tests for vocabulary breadth, especially for young learners, the Yes-No test was adapted to measure the participants' vocabulary breadth for recall and retention in pre-, post- and delayed posttests. Employing the test-retest reliability method (over time), the reliability of YNVT was tested prior to administering it on the present research samples.

Vocabulary Depth

Read's (1993, 1998) well-established Word Associates Test (WAT) format involving word associations has been adapted specifically for the younger target group of Malaysian children in the present research. Designed to assess these pupils' deep word knowledge, the Word Associates Test for Malaysians (WAT-M) focuses on the operationalisation of the extension of word knowledge. The test was utilised in the present research to measure the participants' vocabulary depth for recall and retention in pre-, post- and delayed posttests.

Prior to that, WAT-M was also tested for reliability via test-retest reliability over time method.

1.7.8 Collaborative Learning

Collaborative learning redefines traditional classroom student-teacher relationship as it involves activities which require pupils to collaborate to work on projects or for joint problem solving. Collaborative learning is a philosophy that centralises small groups of students' active involvement in completing assigned tasks and working towards a common goal, with teachers as facilitators. It is an umbrella term for diverse educational approaches that involved joint intellectual efforts mainly by students, or students and teachers (Smith & MacGregor, 1992). It has become a 21st century trend in higher education institutions where the traditional one-way method of teaching and learning (i.e. teachers teach and students listen), has transformed into a two-way approach (i.e. interactions between student-student, student-teacher, and student-content). The focus is on students' collaboration in solving problems, completing various tasks and projects, creating, and innovating (Laal & Laal, 2012; Rabbany et al., 2013). Essentially, the two way learning process implies that teachers could also learn from their students' discovery and research (Laal & Laal, 2012).

1.8 Summary

This study sets out to identify the impact of PWIM-A on the vocabulary breadth and depth knowledge recall and retention of pupils in rural Malaysia. The thesis highlights the role vocabulary knowledge plays in language development with a detailed description of the research that encompasses related literature reviews and frameworks, research methodology and procedures, and research findings.

The thesis is organised into five chapters. This introductory chapter presents the background of the study and provides an outline of the research questions and objectives, significance of the study and the statement of problems. Terms used in the study are elaborated upon at the end of Chapter 1.

Chapter 2 concerns literature review that includes a concise overview of the research. The various theories and hypothesis related to vocabulary acquisition and the adapted PWIM are as outlined. The chapter concludes with an outline of the conceptual and theoretical framework within which the research took place.

Chapter 3 elaborates on the methodology and the research design employed in this research. This chapter further describes the procedures related to the sample selection and choice of instruments for data collection alongside a detailed analysis of testing instruments.

Chapter 4 examines data collected through pre-, post- and delayed posttesting. Findings were charted with details of methods of analysis documented alongside the results. The different findings were compartmentalised accordingly to provide answers specifically to the respective research questions and hypotheses. Further supporting data was obtained via questionnaires. This chapter limits itself to mere reporting based on data collected and there are no attempts at discussions of the documented findings.

Finally, in Chapter 5, a comprehensive discussion of the study is presented. Findings reported in earlier chapter are related back to literature reviewed in chapter 2 with the stated hypotheses confirmed, refuted or just discussed in the light of data garnered and analysed in Chapter 4. Included are implications of these results for the recall and retention of vocabulary breadth and depth. Recommendations and suggestions for future avenues of research along

similar vein as well as any future research, and conclusion form this research winded up the final chapter of this thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

This chapter begins with the notion that vocabulary knowledge is significantly correlated to literacy development, namely reading comprehension, writing, listening and oral competence, as well as overall academic achievement. Meanwhile, the following sections focus on the two dimensions of vocabulary, breadth and depth, and the measurements of vocabulary breadth and depth. Next, the chapter touches on second language vocabulary learning strategies before moving on to elaborate on PWIM that includes implementations and past studies in connection with this model of teaching. In the subsequent sections, the researcher explores the theories underpinning the intervention that are summarised in a framework. Lastly, it concludes with a section summarising what has been discussed in the chapter.

2.2 Vocabulary

Language instructors as well as learners concede that vocabulary knowledge garners the most attention when it comes to second or foreign language learning where inadequate vocabulary knowledge often takes the blame for many of the difficulties encountered in language use (Nation, 1990).

According to Stahl and Nagy (2006), vocabulary encompasses all the words one knows from listening and uses in speech, and in print that involves reading and writing; vocabulary is referred to as such in the present study. On a lighter note, it is generally defined as the knowledge of words and word meanings (Lehr, Osborne, & Hiebert, 2004) that

learners should have knowledge of to be able to read and comprehend more and more exacting text (Kamil & Hiebert, 2005). Mastery of form, meaning and use of words in three broad classifications (Schmitt & Meara, 1997) will afford learners native-like competency and fluency in the said language.

2.2.1 Significance of Vocabulary

Wilkins (1972) clearly highlighted the importance of vocabulary knowledge when he drew attention to the idea that one without vocabulary knowledge is not able to convey even an iota of idea or opinion. Arguably one of the most formidable, if not the most among components in language acquisition, vocabulary knowledge is irrevocably stressed in many studies pertaining to second language acquisition. As aptly put by Nation (2001), "words are not isolated units of language" (p. 27) and as such, vocabulary is not learnt in isolation. It is its ability to influence students' literacy development which extends to their overall achievement academically that gives weight to vocabulary knowledge.

Vocabulary knowledge provides the foundation for the four language skills with researchers, particularly those within the domain of second language acquisition bearing testimony to that (Banta, 2004; Carroll, 1971; McKeown & Beck, 2014; McKeown & Curtis, 1987; Nation, 1990; Neuman & Wright, 2014; Nikolova, 2002; Laufer, 1997; Staehr, 2008; Su et al., 2018; Wesche & Paribakht, 1996; Zimmerman, 1997). As Hunt and Beglar (2005) claimed, vocabulary is the core of language use and comprehension. Vocabulary development is therefore crucial to mastering a second language (Schmitt, 2008) and it is imperative to imbed vocabulary building in literacy development regardless of learners' age (Calhoun, 1999). These simply underline the inevitable need of a certain vocabulary size to function independently in any target language.

Furthermore, recent studies on vocabulary have reinforced findings that learners' underachievement in vocabulary knowledge need to be seen to as it remains a significant facet of academic accomplishments among learners. For instance, studies conducted by Hadley et al., (2019), McKeown et al. (2018), Hill, Wagovich, and Manfra (2017), McLeod, Hardy, and Kaiser (2017), Cheng and Matthews (2016), Marcotte et al. (2016), Kelley and Kinney (2016), Dennis et al. (2016), Ford-Connors and Paratore (2015), Cuticelli et al. (2014) and Carlisle, Kelcey, and Berebitsky (2013). Additionally, it has been found that it is in the best interest of learners to start young as elementary school students who begin formal schooling with limitations in their vocabulary knowledge are at risk for significant underachievement in reading comprehension and school learning (Biemiller, 2003; Graves, 2006; Nagy, 2005, as cited in Ford-Connors & Paratore, 2015).

Adopting a similar stance are various Malaysian researchers who correlate vocabulary knowledge to successful second language acquisition (Ainon, 2016; Ashrafzadeh & Nimehchisalem, 2015; Varatharajoo, 2016; Kamariah, Mahani, & Bordin, 2016; Mohd Tahir, 2017; Naeimi & Chow, 2015; Naginder, 2013; Noor Arina Nadiah & Melor, 2016; Subon, 2016; Tan, 2016; Yee & Wahab, 2016). Take for example, Radzuwan (2011) employed children's stories as tool to enhance vocabulary acquisition and Subramaninam (2009) who leveraged on image sketching among primary school children. Additionally, Ann Rosnida et al. (2007) attempted vocabulary acquisition through vocabulary scrapbook while Nurul Aleena (2006) used picture books and the whole word approach in aiding students with regards to early reading. The collective strength of previous frameworks advances the principle that vocabulary instruction is the centrum to improving language proficiency and this is further extended to language skills and academic achievement.

Vocabulary teaching and learning have gained the due attention of L2 researchers and the many studies pertaining to the significance of vocabulary in supporting foreign language acquisition over the past years stand as testimony. Though there may be controversy on the best approach in second language teaching and learning but both Malaysian and foreign researchers are in total accord as far as the significance of vocabulary knowledge in L2 learning is concerned.

2.2.1.1 Vocabulary and reading comprehension

As far back as in the early 1920s, second language researchers have noted that incessant development in word knowledge eventually leads to increased reading power (NICHD, 2000), acknowledging for over 90 years the huge impact vocabulary instruction has on students' reading achievement. This could have accounted for much of the research conducted on vocabulary size and second language proficiency, demonstrating a tendency towards vocabulary knowledge and reading comprehension.

Within this realm, findings pointed to an inextricable link between vocabulary knowledge and reading comprehension, that of how the size learners' vocabulary correlates strongly and positively to learners' reading comprehension (Baker, Simmons, & Kame'enui, 1995; Baumann, Kame'enui, & Ash, 2003; Beck, McKeown, & Kucan, 2002; Beglar & Hunt, 1999; Graves, 2000; Laufer, 1992; NICHD, 2000; Snow, 2002; Staehr, 2008; Stahl & Fairbanks, 1986). Empirical studies have found vocabulary an important predictor of overall reading ability (Stanovich, Cunningham, & West, 1998) and comprehension with strong correlations, ranging from .50 to .85 between vocabulary size tests and reading comprehension tests (Biemiller, 2003; Coady, 1988; Laufer, 1992; Nation & Schmitt, 2000; Qian, 1999, 2002) stressed on how dependent second language readers are on vocabulary knowledge for smooth and effective reading. As for Biemiller (2010), he claimed that young

learners had been tagged as having reading disability when the real issue faced is being stuck with below-threshold vocabularies.

The magnitude of the contribution vocabulary knowledge makes to reading comprehension is well exemplified in the aforementioned studies. Research has further unearthed that students who struggle to read – due either, to inadequate vocabularies or ineffective vocabulary acquisition strategies – typically shun reading altogether. This sets in motion the well-known Matthew Effect – Stanovich's (1986) application of Matthew (25:29), "the rich gets richer and the poor gets poorer." In the context of vocabulary development, a good reader will acquire more words as a good reader reads more and proceeds to be a better reader while a poor reader will acquire less words as a poor reader reads less and slides into reading less.

This clearly shows the need for the learning of a sufficient base of vocabulary at the very onset of their education (Waring & Nation, 1997).

2.2.1.2 Vocabulary and writing

A considerable amount of research has also been expended on the relationship between vocabulary knowledge and writing. Llach and Gallego (2009), Beglar and Hunt (1999), Laufer and Nation (1995), Astika (1993) and Linnarud (1986) opined that vocabulary knowledge has substantial influences in the quality of one's essay. Astika's (1993) analysis of 120 writing samples for content, organisation, vocabulary, language use and mechanics has revealed that the vocabulary fragment accounted for as high as 84% of the variance in the assessments. Similarly, Engber (1995) found teachers' holistic evaluations of quality writing to be dependent on learners' lexical proficiency.

Other studies on EFL essays have also revealed the emphasis teachers placed on texts' lexical richness as well as its complexity in grading students' writing work (Daller & Phelan, 2007; Meara & Bell, 2001). Laufer and Nation (1995) have also documented a correlation that positively linked the lexical sophistication of learners' written compositions to their vocabulary size. Moreover, with the emphasis teachers placed on lexical sophistication it seems plausible that vocabulary size and grading of written compositions are closely associated. This merely reinforced Nation's (2001) claim that "vocabulary plays a significant role in the assessment of the quality of written work" (p. 178). However, though a close relationship between the two variables may be indicated in research findings, it should not be assumed that learners with more extensive vocabulary will automatically score higher in their writing given how multifaceted the relationship between vocabulary size and written compositions assessments is. As such, an expanded vocabulary size need not necessarily guarantee a more prolific writer.

2.2.1.3 Vocabulary and listening

There may be less research focusing on how vocabulary impacts listening but the documented empirical findings bespoke of positive correlation between vocabulary size and listening comprehension (Beglar & Hunt, 1999; Milton, Wade, & Hopkins, 2010; Staehr, 2009). Staehr's (2007) research, conducted on a group of advanced EFL learners, established a substantial correlation score of 0.70 between Nation's (1990) Vocabulary Levels Test and Cambridge Certificate of Proficiency in English, a listening comprehension test that indicate the central role vocabulary size occupies in listening comprehension. Also, from his analysis of the Wellington Corpus of Spoken English, Nation (2006) revealed that a vocabulary size of between 6000 and 7000 word families is generally needed for 98% of text coverage, assuming that adequate comprehension is achieved at this level of coverage. Earlier, Adolphs

and Schmitt (2003) too produced similar conclusions based on their analysis of the spoken CANCODE corpus. With the support of such empirical data, it is justifiable to stipulate that a reasonably compelling link exists between learners' vocabulary size and their listening comprehension.

Despite such proclamations, there are also opposing opinions that state otherwise. Contrarily, Kelly (1991) asserted that vocabulary knowledge is the major impediment to successful listening comprehension for EFL learners while Bonk (2000) was convinced that knowledge of lexis in listening texts and comprehension of the texts are only imperceptibly linked. In retrospect, such conclusions could be due to scanty and ambiguous empirical data supporting the research findings (Kelly, 1991) or they could be the fault of the procedures employed to assess word knowledge and listening comprehension as in the case of Bonk's (2000) research.

2.2.1.4 Vocabulary and oral competence

On oral competence and vocabulary knowledge, findings of past studies by researchers such as Koizumi and In'nami (2013), Oya, Monalo and Greenwood (2009), Koizumi (2005), Takiguchi (2003), Koizumi and Kurizaki (2002), Ishizuka, (2000), Higgs and Clifford (1982) and Adams (1980) reported positive correlations between the two variables. However, to be precise, mere possession of a substantial vocabulary size may not be sufficient to ensure oral competence because as cautioned by Nation (1989), the ability to access as well as retrieve the lexis is of equal importance. So much so this could the contributing factor to the lack of success of many efforts that research the interrelation between pre-teaching vocabulary and comprehension of texts.

Nevertheless, there are researchers such as Koizumi and In'nami (2013) who confirmed that productive vocabulary knowledge "substantially explain(s) L2 speaking proficiency" (p. 910). Underscoring the significance of vocabulary knowledge to oral competence, more recent studies (Garbati & Mady, 2015; Seffar, 2015; Uchihara & Saito, 2017) investigating L2 learners' vocabulary knowledge and its relationship to oral competence have came up with evidence of positive correlations. In Seffar's (2015) study, both students and teachers listed a lack of vocabulary as a major obstacle to oral proficiency while Garbati and Mady (2015) posited that one's ability to express opinions is in tandem with one's reservoir of vocabulary knowledge. As for Uchihara and Saito (2017) who explored vocabulary knowledge as predictive measure of L2 learners' global and specific components in speech production, their findings showed moderately significant scores with fluency measure but not with global constructs. In short, productive vocabulary knowledge might envisage the fluency of L2 learners and not the intelligibility nor how native-like their speech sounds.

In retrospect, the integral role played by vocabulary knowledge in L2 oral fluency in part is plausible due to the fact that bigger vocabulary size warrants better organised lexical networks (Meara, 1990, 2006) which extends to retrieval of lexical items more efficiently and immediate in instantaneous communication (Kormos, 2006; Levelt, 1989; Skehan, 2009).

2.2.1.5 Vocabulary and academic success

Irrespective of the cause, limited vocabulary knowledge stands accused of jeopardising learners' overall academic success in school (Bromley, 2007; Baumann & Kame'enui, 1991; Baumann, Kame'enui, & Ash, 2003; Carlisle, 2002; Cunningham & Stanovich, 1997; Graves, 2006; Graves & Watts-Taffe, 2002; Hazenberg & Hulstijn, 1996;

Laufer, 1992a; Nagy & Scott, 2000). Therefore, by failing to enhance a child's vocabulary size one might eventually be held responsible for that child's underachievement in school. Recent theories (Baker, Simmons, & Kame'enui, 1998; Morgan et al., 2015; Nagy, 2005) assert that a learner's vocabulary knowledge is a forceful barometer and predictor of how he or she performs academically in school. Logically, given the highly positive correlation between vocabulary size and language development, a lack in vocabulary knowledge will risk impairing the development of language skills of which a student is very much dependent on for ultimate academic achievement. Not only does vocabulary size impacts academically, it is also capable of affecting one's life beyond school (Biemiller, 2012) with the core of these difficulties transpiring in the early stages of life (Rowe, Raudenbush, & Goldin-Meadow, 2012).

Inadequate vocabulary knowledge results in low literacy attainment which in turn, leads to impaired academic achievement and personal improvishment. More so in this era of globalisation where the quality of a nation's workforce largely determines the nation's growth and its global competitiveness, predominantly so with the increasing demand for adequate proficiency in English language. Definitely, individuals that are poorly equipped language wise will be sidelined and marginalised. Thus, hampering the nation's developmental potential.

In the past, there have been instances where vocabulary teaching and learning were overlooked in the early days of language acquisition (Alemi & Tayebi, 2011) with scant attention on research conducted in the field of ESL (Folse, 2004; Hunt & Beglar, 2005). However, the fact that vocabulary plays such a critical role in second language learning and

teaching has been acknowledged time and again in theoretical and empirical second language acquisition vocabulary research (Eyckmans, 2004).

2.2.2 Vocabulary knowledge: Breadth and Depth

Over the past three decades, studies conducted on vocabulary knowledge (e.g., Hadley & Dickinson, 2018; Hoffman, Peal, & Paciga, 2014; McKeown et al., 2018; Meara, 1996; Nagy, 1988; Nation, 2001; Nation & Beglar, 2007; Pearson, Hiebert, & Kamil, 2007; Qian, 1999; Read, 1988, 1989, 2004; Schoonen & Verhallen, 2008; Wesche & Paribakht, 1996) have divulged that both quantity and quality of vocabulary knowledge are important prerequisites that language development depends on for its success. Vocabulary knowledge is no more acknowledged as a single entity but rather it encompasses two main dimensions at the least; breadth and depth (Qian, 1998, 2002; Wesche & Paribakht, 1996). Attempts in the past to define vocabulary breadth and depth have resulted in varied yet complementary frameworks which can be traced to Richard's (1976, as cited in Schmitt & Meara, 1997) vocabulary knowledge framework. Studies documented have highlighted a general consensus that word knowledge is constructed as a continuum spanning levels and dimensions.

In 1976, Richard identified seven aspects of word knowledge (syntactic behavior, associations, semantic value, different meanings, underlying form and derivations). Nation (1990), on the other hand, broke it down to eight types, namely form, grammatical pattern, meaning, function and relation, among others. Meanwhile, Chapelle (1998) argued that four dimensions is sufficient to categorise vocabulary knowledge – vocabulary size, knowledge of word characteristics, lexicon organization, and processes of lexical access. Qian's (2002) framework, supporting Chapelle's (1998) four vocabulary knowledge dimensions,

comprises vocabulary size and depth, lexical organization, and automaticity of receptive – productive knowledge.

Based on researchers' frameworks (e.g. Anderson & Freebody, 1981; Aviad & Laufer, 2013; Daller, Milton, & Treffers-Daller, 2007; Meara & Wolter, 2004; Milton, 2009), it can be summarised that vocabulary knowledge fundamentally embraces two dimensions, vocabulary breadth or size, and depth or quality, of vocabulary knowledge. Anderson and Freebody's (1981) defined vocabulary breadth as how many words are known and vocabulary depth as how well those words are known. Straightforward and easily comprehensible, Anderson and Freebody's (1981, as cited in Read, 2004) definition has been documented time and again in literature pertaining to vocabulary since early 20th century.

Anderson and Freebody's (1981) differentiation of depth of knowledge in contrast to breadth of knowledge lies in the dimension of vocabulary knowledge. To Anderson and Freebody, breadth refers to the number of words for which the person knows the substantial aspects of meaning to some degree. On the other hand, depth is quality of understanding the meaning of a word. Therefore, one is assumed to possess adequately deep understanding of a word if he or she understands all of its distinctions under ordinary conditions.

However, vocabulary breadth and depth are closely interrelated and should not be advocated as two wholly detached constructs (Tannenbaum, Torgesen, & Wagner, 2006).

2.2.2.1 Defining vocabulary breadth

Qian (1999) defined vocabulary breadth as vocabulary size which is the number of words for which a learner has at least some minimum knowledge of meaning. According to Nation (2006), vocabulary size simply applies to the number of words known to a language learner. Thus, "breadth" has a competing term in "size" and vocabulary breadth and

vocabulary size are used intermittently in numerous vocabulary studies over the years, likewise in the present one.

Essentially, vocabulary breadth can be considered an estimation of the total overall number of words in one's lexicon whilst ignoring how exhaustively each word is known (Hadley & Dickinson, 2018). However, the estimates of one's vocabulary size depends largely on how it has been defined, rendering the task a deceptively tricky one (Meara, 1996; Nation, 1993; Read, 2000) where the term "breadth" or "size" is generally applied to indicate a shallower and less comprehensive understanding of individual words (Hoffman, Teale, & Paciga, 2014). In short, vocabulary breadth refers to the number of words a learner knows superficially.

Studies have demonstrated that measuring vocabulary breadth is a fruitful endeavor as well as effectual orientation direction (Nation, 2006; Read, 2000). Undoubtedly, it has dominated the field of vocabulary research particularly when young learners are involved. This inclination for the breadth domain is admissible but arguably insufficient and inadequate, particularly for in-depth vocabulary studies.

2.2.2.2 Defining vocabulary depth

Nation (2006) elucidated vocabulary depth as how well a word is comprehended or applied by language learners. However, Schmitt (2014) acknowledged that while there are notable efforts to define vocabulary depth, still literature surrounding the concept of depth is besieged with confusion. As defined by Qian (1999), vocabulary depth refers to a learner's level of knowledge of various aspects of a given word, with the depth dimension enveloping components such as pronunciation, spelling, meaning, register, frequency, and morphological, syntactic, and collocational properties. This is in tandem with Silverman and

Hartranft's (2015) definition of depth as a learner's knowledge of a word in multiple aspects. Both Qian (1999) and Silverman and Hartranft's (2015) notion of depth that deemed word knowledge as a compilation of diverse features can be described as a "components" approach (Schmitt, 2014). Nation (2001) also supported the "components" approach but added morphology, collocations and grammatical functions to the basket of elements. Nation (2001) stressed that three factors have to be taken into account in getting acquainted with a word; form, meaning and the use of the word. In support of Nation's (2001) claim, both Beglar (2010) and Harmer (2007) opined that words should be learned in context no less while Nagy (1988) has already mentioned that to know the meaning of a sentence in a text a learner has to first comprehend what words in the sentence mean.

Therefore, to know a word well is to know the depth of a word in that one has to know its meaning, its grammatical category, its derivations, its pragmatic and value and its collocations (Nation, 2001; Read, 2004; Schoonen & Verhallen, 2008). In the case of the present study, the depth of a word is tested via its association with other words.

2.2.3 Vocabulary Size

Size of vocabulary knowledge is characteristically operationalised as knowledge of the form and meaning connection (Schmitt, 2014). Fundamentally, it is known lexical items stated in numerical which makes it relatively simple to comprehend. Given the prominent role vocabulary knowledge portrays in the sphere of second language proficiency, naturally the next question to arise is, "How many words are needed by a second language learner?" Opinions vary on the estimated number of words needed but prevalent consensus exhibits a tendency towards the need for a decent vocabulary size to facilitate one's reading, writing and listening activities (Bromley, 2004; Laufer, 1997; Milton, Wade, & Hopkins, 2010;

Nation, 1990; Nikolova, 2002; O'Grady, 1997; Staehr, 2008). As highlighted by Nation (1993), vocabulary knowledge permits language use and by extension, language use permits vocabulary knowledge growth. In turn, vocabulary knowledge growth permits further language use and, so forth.

Further underscoring the significance of vocabulary, Schmitt (2000) emphasised that lexical knowledge is vital to acquisition of second language, in tandem with the stance adopted by Meara (1996) that learners' proficiency in a broad range of language skills are dependent upon their vocabulary size; the smaller the size, the less proficient and the bigger the size, the more proficient. Rivers (1983, as cited in Nunan, 1991) went on to argue that language structures and functions learnt will be rendered useless without a reasonable volume of vocabulary knowledge. Hence, it is logical to surmise that one should prioritise the teaching of vocabulary over other elements, particularly in the early stage of learning.

The aforementioned findings merely implied that the degree of successful second language use depends on vocabulary size, judging by the role vocabulary plays in formation of complete spoken and written texts. Widdowson's (1978) postulation that ungrammatical utterances with accurate vocabulary is by far easier to comprehend than accurate grammar but inaccurate vocabulary strikes a chord with many learners.

Vocabulary lists, compiled as early as the fifteenth century, were largely influenced by the implicit assumption that the best method to learn a language is to learn words you see most frequently. West (1926, as cited in Prichard & Matsumoto, 2011) mooted the notion of having adequate word coverage for effective reading comprehension and he was among the first to do so. Additionally, previous studies revealed that the requisite for basic oral communication comprises possessing a threshold of 2000 most frequent word families

(Schonell et al., 1956) that form written texts and typical academic texts in the range of approximately 87% and 80% respectively (Nation, 1990).

At the same time, according to the threshold hypothesis in reading comprehension attaining a minimum level of vocabulary is a necessity for L2 learners to accomplish passable levels of comprehension (Laufer, 1992, 1997; Laufer & Sim, 1985, 1985a; Nation, 1990, 2001). Laufer (1997) and Laufer and Nation (1999) concluded that in order to afford up to 95% coverage of words in a text, one would need to acquire a threshold level of around 3000 word families (approximately 5000 words). Apparently, the 3000-word level is deemed the turning point where "readers" start to outnumber "non-readers", inclusive of those who managed a score of at least 56% on the reading test (Laufer & Sim, 1985). Also, according to Laufer (1997), this is the level to grade reading as satisfactory regardless of generic language skills.

Furthermore, findings indicate that a student should know 12 out of 14 word meanings for sufficient comprehension, placing the vocabulary threshold level at between 80% and 90% (Carver, 1994; Hirsh & Nation, 1992; Hu & Nation, 2000; Liu & Nation, 1985). As for academic texts such as an economics textbook, an approximate range of 4000 to 5000 word families is judged necessary for easy comprehension (Sutarsyah, Nation, & Kennedy, 1994) while at tertiary level an estimated base of a minimum 10000 word families is required (Hazenberg & Hulstijn, 1996), a level that is the equivalence of half of what an adult native speaker knows averagely.

More recently conducted vocabulary studies came up with findings that portray 98% as the percentile of the vocabulary in a text a learner needs to have to achieve comfortable reading (Nation & Webb, 2011). For daily listening, between 6000 and 7000 words are

required for 98% coverage, and between 8000 and 9000 words for pleasure reading (Nation, 2006). These figures serve to highlight the need to possess an even larger vocabulary knowledge for one to achieve the status of a competent L2 user, thus emphasising the necessity for an increase in a learner's vocabulary size, particularly that of Malaysian students.

Based on Waring and Nation's (1997) report, a five-year-old native speaker typically begins school with a vocabulary of around 4000 to 5000 word families and will add on approximately 1000 word families per year until completing university with a vocabulary size of around 20000 word families. In the report, the vocabulary growth of non native speakers is also at the same rate of 1000 word families per year once they start formal schooling where English is the primary language. However, the initial gap in vocabulary knowledge between these two groups is never bridged. The existing situation in Malaysian primary classrooms where English is taught as a subject for four to four hour and 30 minutes per week clearly exemplifies the need to put aside some time to focus specifically on teaching of vocabulary, starting with Year 1 pupils.

In America, the IRA's (2002) estimation of how many words students in the States learn per school year (at 2000 words) fall way below John and Lenski's (2005) estimation of 4000 words learnt per school year. Therefore, simple arithmetic tells that a teacher would in all likelihood need to teach 22 new vocabulary words daily for the whole school year in order for the students to learn 4000 words within a school year. Students would need eight new words per day for an average of about 3000 words per year (Baumann & Kameenui, 1991; Beck & McKeown, 1991; Graves, 1986).

Undeniably an important component in SLA, vocabulary remains but only one of the numerous components of language skills. Therefore, whilst acknowledging the significance of vocabulary knowledge, it should also not be perceived as a prerequisite to achieving language proficiency automatically.

2.3 Vocabulary Acquisition

According to Krashen (2009), acquisition is a learning process that occurs without conscious instruction from a third party. Learners' output is assured so long there is fitting input, with "input" referring to the environment. As postulated by Krashen (n.d., p. 1), "acquisition requires meaningful interaction in the target language – natural communication – in which speakers is concerned not with the form of their utterances but with the messages they are conveying and understanding." Therefore, correction of errors made and explicit teaching by a third party is of no consequence (Brown, Cazden, & Bellugi, 1973; Brown & Hanlon, 1970), rendering language acquisition to a process that is without conscious attention to forms (Krashen, 2002), very similar to how a child acquires a language, be it first or second. As stated by Krashen (2002), "Acquirers need not have a conscious awareness of the "rules" they possess, and may self-correct only on the basis of a "feel for grammaticality" (p. 2).

Again, conscious language learning is said to depend on conscious study of forms to take place (Krashen, 2002) with error correction and the presentation of explicit rules pertaining to learning a language playing a substantial part (Krashen & Seliger, 1975). Krashen's explanation on the process of vocabulary acquisition clearly distinguishes the disparity between acquisition and learning. There are contradictory opinions from other researchers that state otherwise (Folse, 2004; Gass, 1999; Oxfrod & Crookall, 1990, as cited

in Alizadeh, 2016) but in Krashen's (1983) acquisition-learning hypothesis, acquisition is considered by far superior to learning in terms of its benefits in generating fluent, rapid, and natural speech.

Based on various but complementary ideas and frameworks, there appears a general consensus that learning of vocabulary knowledge takes place and progresses gradually and incrementally (Folse, 2004; Krashen, 1989; Laufer, 1991; Meara, 1980; Nation, 1990; Schmitt, 1995). Coady (1997) opined that approaches to teaching L2 vocabulary fall on a continuum. It extends from the incidental approach where learning takes the form of acquisition happening naturally (Krashen, 1989), to the intentional approach where learning occurs through direct instruction (Oxford & Crookall, 1990; Paribakht & Wesche, 1997; Qian, 1996; Raptis, 1997)

Thus, vocabulary acquisition via the incidental approach and explicit instruction and development exists at the opposite ends of a continuum. Nation (1997) further advocated that the approach which emphasises strategies for extracting meaning from context in teaching language learners rests in the centre of the continuum, thus implying that context still dominates in the continuum. Such strategies have been defined as decontextualised, semicontextualised, fully contextualised, and are adaptable (Oxford & Crookall, 1990).

Acquisition of vocabulary knowledge is generally construed as a continuum comprising several degrees of knowledge, beginning with less and gradually progressing to more knowledge of a given word (Waring, 2002). This basic notion is extended beyond the single word level to the general notion that encompasses mastery of both receptive and productive vocabulary via incremental expansion that similarly applies to the shift from breadth to depth knowledge (Eyckmans, 2004; Waring, 2002). This ties with Anderson and

Freebody's (1981) reflection on how a person, particularly a child, expands his or her lexical knowledge along the directions of breadth and depth.

2.4 Vocabulary Testing

Assessment is viewed upon as of paramount importance to effective instructions. Anderson and Freebody (1981) consider vocabulary knowledge scales to be authoritative predictors of linguistic capability as well as potentiality. Laufer and Nation (1999) stressed on the ability of teachers to pin down the state of their students' vocabulary knowledge as well as the availability of diverse measures in investigating vocabulary growth as factors that impact vocabulary instructions evaluation and decision making concerning appropriate strategies for learners. Measures in instruction which appraise target vocabulary words provide data on learning from the specified instruction. Furthermore, such information can serve to identify those in need of additional or specific instructions.

Typical assessments of learners' vocabulary knowledge are quite without imagination. As lamented by McKeown and Beck (2014), most vocabulary knowledge assessments appraise learners for word definition at one end and general comprehension at the other end. Such measures tend to produce outcomes that veer from one extreme to another, leaving a wide gap in between. Vocabulary knowledge entails diverse aspects in its multi-dimensional state with distinction frequently made between size/breadth of vocabulary and depth of knowledge. The exact nature of lexical knowledge, being the complex phenomenon it embraces, leads researchers into a dispute that minimum difference segregates the two constructs. However, as stated by Schmitt (2014), how vocabulary size and depth are conceptualised and measured defines the relationship between both,

particularly when depth, through regression analysis is portrayed as possessing distinctive descriptive power as compared to size singularly.

Vocabulary testing has been and is still on the receiving end of commendable attention of researchers, both established and lesser known ones in L2 teaching and learning. For example, studies on vocabulary testing and construct validity of the instruments (Chapelle, 1994; Perkins & Linville, 1987; Tan, 2016; Zhang & Koda, 2017), evaluation of test instruments effectiveness (Henning, 1991; Laufer & Nation, 1995; Schoonen & Verhallen, 2008; Zhang & Koda, 2017) and examination of the field of vocabulary testing (Hadley & Dickson, 2018; Read, 2000; Schmitt, 1995, 2014). Sustained and escalating interests in the area of testing can be taken to mean that knowledge obtained on detailed break-downs of language learners' proficiency is of certain value to researchers in terms of diagnostic, placement and curriculum-design purposes.

Conversely, despite the accelerated deliberation on vocabulary assessment, researchers have expressed concern on the impecunious state of its assessment (Hoffman, Teale, & Paciga, 2014; Pearson, Hiebert, & Kamil, 2007). The complexity of conceptualizing vocabulary, in that they are overlapping and interrelated, renders it challenging to obtain acceptable measures of either breadth or depth (Schmitt, 2014). The boundaries of these two constructs are nebulous and blending occurs based on how each conceptualization is defined and operationalised. Hence, how vocabulary is measured largely determines the relationship between vocabulary breadth and depth. Take for example, Vermeer (2001) who suggested that vocabulary breadth/size should just remain indistinguishable from vocabulary depth. Vermeer's statement of no conceptual difference was made based on his study on different vocabulary tests involving 50 young Dutch

learners. Findings illustrate similarity of results between size test and depth test which is not unexpected since the depth test employed in the study only tapped into more profound semantic knowledge of a single meaning sense, rendering both types of tests to types of meaning tests. In all probability, totally different findings might be documented had Vermeer measured vocabulary depth knowledge differently.

Some of the most widely adopted vocabulary measures include Nation's (1983, 1990) Vocabulary Levels Test (VLT), Wesche and Paribakht's (1996) Vocabulary Knowledge Scale (VKS), Read's (1993, 1998) WAT, Dunn and Dunn's (1997) Peabody Picture Vocabulary Test (PPVT) and Meara and Buxton's (1987) YNVT.

2.4.1 Measuring Young Learners' Vocabulary

Hadley and Dickson (2018) argued that a richer and more varied theoretical foundation which provides for the intricacies of how well a word is known would certainly benefit young learners' vocabulary assessment. In support of Hadley and Dickson's argument, Pearson, Hiebert, and Kamil (2007) and Hoffman, Teale, and Paciga (2014) advocated a more robust theoretical framework that would pave the way for substantially more in-depth study on the terrain of early childhood vocabulary assessments, with fresh insight into the designs and evaluations of measures. Pearson and associates strongly recommended that vocabulary measures research ought not to consolidate assessments under the all-inclusive term of vocabulary, rather the dimensions of vocabulary knowledge should be distinguished.

Those critical (e.g. Hoffman et al., 2014) of an all-inclusive term of vocabulary measures have proposed that assessments of vocabulary breadth and depth knowledge should be administered as separate entities. A report by National Early Literacy Panel

(NCFL, 2009) that defined vocabulary as encompassing only vocabulary breadth shows pre-school learners' vocabulary size to be a weak predictor (r = .25) of reading comprehension while a later vocabulary depth test records a significantly stronger predictor (r = .45). More studies on vocabulary testing merely corroborated the NELP's report (Cane & Oakhill, 2014; Dickinson, Golinkoff, & Pasek, 2010; Proctor et al., 2012; Roth, Speece, & Cooper, 2002). Criticisms on the over-reliance on standardized assessments that targeted vocabulary breadth in majority of vocabulary research are justifiable seeing that many test instruments only tested for vocabulary breadth knowledge, particularly when it involved young learners. Therefore, vocabulary size is necessary and helpful but should not be considered sufficient for a comprehensive study. The crux of the matter remains that testing of vocabulary depth knowledge among young learners is glaringly neglected in Malaysia.

A cursory observation of the history of vocabulary knowledge and its correlation to language learning and development reveals the susceptibility in separating vocabulary into two constructs for testing purposes so to better support young learners' language and literacy development. A comprehensive overview of vocabulary testing (Hadley & Dickson, 2018; Meara & Buxton, 1987; Nation, 1990; Paul, Stallman, & O'Rourke, 1990; Read, 2000; Schmitt, 2014; Schoonen & Verhallen, 2007; Vermeer, 2001; Webb & Sasao, 2013; Wesche & Paribakht, 1996) helps to shed light on issues and directions pertaining to standard instruments developed to assess both breadth and depth, for teaching and research purposes too. Among those test measures most widely employed by researchers include the YNVT (Meara & Buxton, 1987), PPVT (Dunn & Dunn, 1981) and VLT (Nation, 1983) for breadth and VKS (Wesche & Paribakht, 1996) and WAT (Read, 1993, 2000) for depth, specifically to assess the vocabulary knowledge of primary school children.

2.4.2 Measuring Vocabulary Breadth

The Peabody Picture Vocabulary Test-4th Edition (PPVT-4) is the latest edition of a multi-choice test by Dunn and Dunn (2007), aimed at measuring respondent's receptive vocabulary; proclaimed suitable for anyone from two years six months to 90 (or more) years of age. PPVT-4 updates the Peabody Picture Vocabulary Test-Third Edition (PPVT-III) (Dunn & Dunn, 1997), a second revision of the PPVT scales of 1959, the first revision being the PPVT-R, Peabody Picture Vocabulary Test (revised edition of 1981). Popularly used in large-scale data collections as well as assessments on samples of any age group, it was originally designed to test only for English language. Subsequently, a Spanish version, Test de Vocabulario en Imagenes Peabody (TVIP) and a French adaptation of the PPVT-R, Échelle de vocabulaire en images Peabody were introduced in later years. However, after year 2000, the Spanish version ceased being used as a vocabulary measure.

Administration, scoring and interpretation of the PPVT, revised and otherwise, entails no special training. Scoring is swift and purposeful, requiring no oral or written responses as well as no reading by the respondent. Prior to year 2000, the sample would view the pictures on the PPVT easel and selects, by pointing, the one picture that corresponds to the word from a set of four alternatives provided. Subsequently, starting from year 2000, the examiner reads from a PPVT word list while the sample does the matching of picture to word.

Generally, the PPVT is found constructive as a screening device for verbal ability and for giftedness and for mental retardation, particularly among preschool children. The test has been proven functional especially for those faced with impairment, linguistic as well as physical since they would not be required to speak, read or write. Despite the lustrous

reputation it enjoys, PPVT is by no means flawless as a tool to measure young learners' vocabulary knowledge. One of its drawbacks is that PPVT is found to contain obscure elements of substantial racial and ethnic variations that remain in multivariate analyses even with demographic and socio-economic controls (for details see The NLSY Children, 1992, Chap 2, p. 65). In addition, there are also concerns over its ability or suitability to measure if a vocabulary intervention has affected general vocabulary growth (National Reading Panel, 2000). Suffice to note that this research has made Meara and Buxton's (1987) Interactive and Print Yes-No Recognition Test the choice measure for vocabulary breadth.

The Yes-No vocabulary test has been touted as one of the most well known standard vocabulary size tests (Eyckmans, 2004; Pellicer-Sánchez & Schmitt, 2012) with Read (2000) placing the test at par with Nation's (1983) infamous VLT as the most authoritative vocabulary size test, a standard instrument for research or assessments purposes. The present study adapted the Interactive and Print Yes-No Vocabulary Test by Meara and Buxton (1987) to measure for vocabulary breadth via pretest, posttest and delayed posttest.

Various complementary ideas and findings from previous vocabulary testing frameworks have upheld theYNVT, time and again, as a reliable and valid source of estimating the receptive vocabulary size of L2 learners in research (Admiraal & Meara, 2002; Culligan, 2008; Meara & Buxton, 1987; Mochida & Harrington, 2006; Shillaw, 1996). The Yes-No test is deemed a very straightforward test that is particularly appropriate for young learners as they are just required to tick words that are known to them in a set of words presented to them. The Yes-No test is originally derived from a simple format known as "checklist".

As far as the YNVT is concerned, easy development of items rendered it simple to construct and with limited task demands made, administration of test is undemanding. Moreover, marking of test scripts is also made simple with the adoption of straightforward and automatic scoring (Beeckmans et al., 2001; Eychmans, 2004; Meara, 1990; Nation, 1990; Pellicer-Sánchez & Schmitt, 2012). Eyckmans's statement that it is mandatory for vocabulary size tests to consist of many items in order for the test to remain valid and reliable lends support to Read's (2000) observation that such testing instruments tend to be discrete and context independent in nature. The sample size necessary for making reliable estimates is then made achievable as a large number of words can be tested within a short testing time. A larger sample size would also result in better representation of population studied. Thus, a test as such the YNVT can claim to sanction the testing of a large number of words in a short span of time and also encompassing a higher sampling rate as compared to what most other formats can offer – a definite advantage when it comes to measuring vocabulary size of a large number of young samples.

Meara (1996) further affirmed that the test is suitable as a measuring tool for vocabulary size of L2 learners, irrespective of proficiency levels. Furthermore, by repeatedly administering the test one can track the rate new words are acquired by learners, thus rendering it appropriate to measure vocabulary growth over relatively short periods of time (Meara, 1993). An earlier study (Anderson & Freebody, 1983) on using the Yes-No test to gauge children's L1 vocabulary size, discovered that within the same time span, the number of words that can be tested for word recognition were twice of that in a multiple-choice test. At that point, they also discovered that the test was simple and straightforward to construct; specialised or highly trained personnel is not a prerequisite where composition of test items is concerned. Anderson and Freebody (1983, p. 269) concluded that "a score on a Yes-No

test provides a much more valid indicator of whether an examinee actually knows the meaning of the tested words than a score on a standardized multiple choice test." Hence, it exemplifies a validated instrument that is both time and resource efficient, rendering it hugely popular with researchers (Beeckmans et al., 2001; Eyckmans, 2004; Hermans, 2000; Pellicer-Sánchez & Schmitt, 2012; Shillaw, 1996).

Studies carried out by Tilley (1936) and Sims (1929) are considered among the earliest efforts to validate the YNVT. Subsequent validation studies also indicate strong correlations with measures of vocabulary size (e.g., Anderson & Freebody, 1983; Beeckmans et al., 2001; Harrington & Carey, 2009; Lemhöfer & Broersma, 2012; Meara & Buxton, 1987; Meara & Jones, 1988; Mochida & Harrington, 2006). The value reported by Meara and Buxton (1987, p. 148) is .97 while Beeckmans et al. (2001, p. 244) obtained .82 - .87. Comparatively, Mochida and Harrington's (2006, p. 84) recorded value of .61 - .86 shows a slightly lower figure. However, Mochida and Harrington (2006) attributed it to Meara and Buxton (1987) and Beeckmans et al.'s (2001) significantly larger size samples (n = 100 and n = 488, respectively). On the contrary, there are also studies that produced findings that are otherwise (e.g., Cameron, 2002; Eyckmans et al., 2007). While findings by Eyckmans et al., (2007) show weak correlations, Cameroon's (2002) data illustrates both strong and weak correlations between the scores of the YNVT and those of the VLT, with earlier studies documenting very strong correlations compared to his later studies. It is to be noted that research findings appear to endorse the YNVT as a more than adequate test instrument for measuring vocabulary breadth.

As aforementioned, the YNVT aims to measure vocabulary size through word recognition. The test format consists of a list of sample words of certain frequency levels in

the target language which learners are to indicate the words known to them by putting a tick next to the words, and to ignore the unknown ones. Therefore, a student is deemed to "know" the word if he or she recognises it a word and ticks it. According to Sims (1929), Tilley (1936) and Zimmerman et al. (1977), the YNVT was primarily used in L1 study in the early days of language research. Scoring is recorded by counting the number of "ticks" each learner has on his or her test paper.

However, despite its popularity and merits, and generally positive validation evidences, YNVT has its shortcomings and is subjected to criticisms. It has been denounced for producing inconsistent scores with L1 that differs (Meara, 1990), as well as the inability to measure vocabulary depth. The most glaring shortcoming might be in the scoring section of the test format. Although there are doubts that learners might respond positively to words they do not know, still they are given the benefit of the doubt. This places the reliabiliry as well as the validity of the test at risk. As stressed by Meara (2010), a testee's overestimation or underestimation of the word is likely to skewer research findings. By overestimating, a testee would respond "yes" to words he or she does not know while underestimating a word would lead him or her to respond "no" to words known. Learners' self-report of their word knowledge is likely a poor and unreliable indicator of their actual knowledge of vocabulary and the outcome could very well be an inflated or deflated vocabulary knowledge size (Nation, 1990).

Consequently, much efforts have been expanded to rectify this limitation. Amongst the earliest effort, Zimmerman et al. (1977) incorporated the single detection theory based on psychology to form the "correction for guessing" formula to address the limitation which was subsequently employed by Meara and Buxton (1987) in the Yes-No test. Anderson and

Freebody (1983) and Zimmerman et al. (1977) further decided to add on pseudowords to the list for a more accurate estimation of word knowledge as this leads to adjusting the score downwards. Meara and Buxton (1987) then developed a Yes-No test consisting of a mixture of real words and pseudowords in the proportion of 60 to 40. This was after applying the adjusted Yes-No format to L2 learners. Additionally, a computerised checklist, the Eurocentres Vocabulary Size Test (Meara & Jones, 1990) was designed where the frequency statistics of list by Thorndike and Lorge (1944) were used to sample words from 10 frequency bands. A book of paper-and-pencil Yes-No tests called the EFL Vocabulary Test (Meara, 1992) similarly used this basic methodology with some changes made to the scoring mechanism.

In the present study, the researcher adapted the YNVT by substituting the words in the test format with words listed in the word list in the *DKSP*, as provided by the MoE (2017). In addition, instead of putting a tick to a word the pupil thinks that he or she knows, the pupil reads aloud the word. Only if the pupil could read the word aloud correctly, then he or she is deemed to "know" the word and the teacher would put a tick next to the word. A cross would be put next to the word if the subject could not read the word or read it wrongly. Thus, the YNVT was adapted to rectify the weakness of possible word knowledge inflation through learners' self-report of their word knowledge.

As highlighted by Meara (1992), the YNVT is not designed with the intension to measure deep lexical knowledge. Neither does it allow for testing of multiple meanings of the target words. Though such measure may only afford one with a minuscule fraction of the complexity of the vocabulary knowledge, still as Cameron (2002) put it, a word recognition count represents a helpful indicator of a learner's outer limit vocabulary knowledge; if a

learner understands or is able to use a word with depth of meaning, it is assumed the word will also be known in the Yes-No format. The Yes-No test claims its position as a reliable and valid test for measuring language learners' vocabulary size and its ability to measure a great number of items on a huge cohort of samples in a relatively short time without burdening testers in terms of administering the test and markings. Hence, for measuring of vocabulary depth in this study, the researcher has adopted Read's (1998) WAT, a test that is widespread and manifold in its use to assess lexical quality. As postulated by Paul, Stallman, and O'Rourke, (1990, p. 1), "the choice of test format depends on the type of information desired."

2.4.3 Measuring Vocabulary Depth

In contrast to breadth measures that deal with size, depth measures typically assess lexical quality. As cited in Zhang and Koda (2017), Read (2000) distinguished between the "developmental" approach and the "dimensional" approach in literature pertaining to L2 vocabulary depth assessment. The "developmental" approach depicted in Wesche and Paribakht's (1996) VKS, reflects the incremental nature of vocabulary acquisition where mastery of word is attained from zero knowledge via ability to apply the word in contexts. Conversely, the "dimensional" approach embraces a wide dimension of word knowledge such as form, meaning, and its usage which include receptive and productive senses and spoken and written modalities (Nation 2001; Schmitt 2014). Subsequently, Read (2004) added precision of meaning, comprehensive word knowledge and network knowledge, another dimension of word knowledge.

The immense scope serves as a deterrent to assessing every single aspect of word knowledge (Schmitt, 2014). To be practical, an increase in the features of words assessed

would only lead to a decrease in the total number of words of appraised. Read (2000) acknowledged that the number of words assessed has to be reduced if the aspects of word knowledge assessed keep increasing. Testing just a small number of words would be detrimental to purpose of testing. Hence, Read (1993, 1998) made the decision to focus on network knowledge and with the word association concept as its foundation, he pioneered the Word Associates Format (WAF). Notably, word association tasks have long been employed to examine children's mental lexicon (Aitchison, 1994; Entwisle, 1996; Nelson, 1977). Read (1998) went on to develop the Word Associates Test (WAT), one of the most widely used vocabulary depth test in research. WAT differs from WAF in that WAT takes a controlled format rather than a free association task as in WAF. As a result of Meara's (1983, 2009) concerns with the free association paradigm in that testees' responses could be "very diverse and unstable across test administrations" (as cited in Zhang & Koda, 2017, p. 3) and coupled with complicated scoring procedures, the revised WAT was developed.

Fundamentally, Read's (1993) WAT is a test format "that would involve a simple response task and allow broad coverage of a set of words while, at the same time, probing depth of knowledge of words in some meaningful way" (p. 358). Clearly, words were not viewed as detached items, rather they co-existed as part of a semantic network. Thus, it can be concluded that WAT focuses on word associations as opposed to word meanings. Both test formats demonstrated very impressive level of reliability with the earlier version and the revised WAT showed very high reliability of .90 (Read, 1993) and .93 (Read, 1998) respectively. In addition, both also documented strong correlations with word matching tests; earlier version recorded correlations of .76 - .81 (Read, 1993) while the later version spotted correlations of .82 - .86 (Read, 1998). Figure 2.1 and 2.2 present examples of the typical format of a WAT item (Read, 1993, 1998).

Example 1:

edit			
arithmetic	film	pole	publishing
revise	risk	surface	text

Figure 2.1: Word Associates Test item (Read, 1993, p. 359)

Example 2:

sudden

beautiful	quick	surprising

change	doctor	noise

Figure 2.2: Word Associates Test item (Read, 1998, p. 46)

However, WAT was designed with university students in mind and as such, "cannot *a priori* be generalized to its use with children" (Schoonen & Verhallan, 2008, p. 217) and therefore, is suitably inappropriate for the present study. With the present study's focus on young learners, Year 1 pupils in mind, the adapted WAT (WAT-M) employed in the study is guided by Schoonen and Verhallan's (2008) Word Association Test (WAT-SV) that has been reworked specifically to measure the vocabulary depth of young learners learning Dutch as a second language in a primary school.

According to Schoonen and Verhallan (2008), it was a lack of testing instruments on depth of lexical knowledge among primary school children that led to the emergence of WAT-SV. Efforts were applied to simplify the test in two ways: firstly, by reducing the possibly associated words from eight to six that consists of three associates and three distractors; secondly, by adopting the word web format where children are asked to draw connecting lines to mark the words visually (see Figure 2.3). The validity and reliability of the test's format as adapted for use with young children is established, recording a strong

correlation of .75 with that of a word definition task. In tandem is Greidanus, Bogaards, van der Linden, Nienhuis and de Wolf's (2004) study that documented very good reliability (.84 - .89) of the WAT targeted at Dutch students of varying age groups who were studying French as a second language at that point.

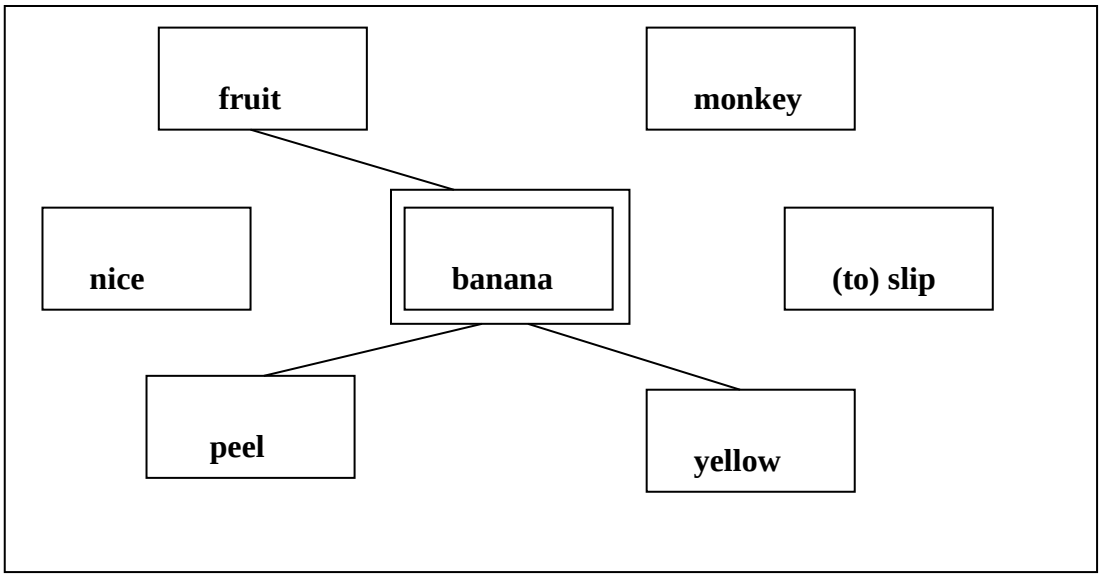


Figure 2.3: Word Association Test-SV item (Schoonen & Verhallen, 2008, p. 219)

The WAT-SV is designed to steer the children towards making a deliberate effort to analyse and pick meaning relations that are appropriately relevant to the stimulus word. Therefore, children have to distinguish between words that are "closely related to the stimulus word and words that are associated with the word in a more incidental, context-bound way" (Schoonen & Verhallen, 2008, p. 219). This is testing of depth as acceptable answers stand for various forms of relationship imbedded in a semantic network (Verhallen, 1994) with the difference between "correct" and "wrong" answers accepted as not absolute. Schoonen and Verhallen conducted a pilot initially to test 27 items on 133 children in an experimental study, after which the set of items was increased to 50. Eventually, 50 items were deemed too many for young children and so the number was randomly reduced to 25

items. The revised version with 25 items tested was found to be manageable for young children. The present study tested 30 items, a number deemed suitably appropriate when referring to Schoonen and Verhallen's study in 2008.

The scoring procedures of the WAT were also of some concern to researchers with marginal attention paid to its selection process (Zhang & Koda, 2017). Literature of past studies recorded at least three methods adopted in scouring, termed by Schmitt, Ng, and Garras (2011) as the One-Point, Correct-Wrong and All-or-Nothing methods. One-Point, employed by Read (1993) in his initial study, scores learners' responses based solely on their associate selection with total disregards to neither selection nor non-selection of a distractor. Concerns over distorted data due to learners taking advantage on this point of scoring should they posses prior knowledge leads to the development of a revised method, the Correct-Wrong method (e.g., Greidanus, Beks, & Wakely, 2005; Greidanus et al., 2004; Zhang, 2012). However, Zhang and Koda (2017) pointed out that the Correct-Wrong method, apart from being criticised for its complexity and tediousness, is also judged to be not necessarily more accurate than the One-Point method. Of the three methods, the All-or-Nothing method remains the simplest and the strictest in terms of scores. Furthermore, it has also been purposefully adapted to thwart guessing where a point is awarded only if it precisely matches the correct answer (Schoonen & Verhallen, 2008, as cited in Zhang & Koda, 2017).

Validation reports on WAT found in a more recent study by Schmitt, Ng, and Garras (2011) documented correlations of .884, .871 and .877 for the All-or-Nothing, One-Point, and Correct-Wrong methods respectively for the WAT with six options. The eight-option format WAT, on the other hand, records different correlations. Based on the validation reports, as well as the aforementioned features of each of the scores method, the All-or-Nothing method is deemed the better option for this study that employed the WAT-M with

6-option format. The selection is supported by Schmitt et al.'s, (2011) conclusion that the Correct-Wrong method is to discounted for its comparative higher complexity that does not produce enhanced results anyway while advocating the All-or-Nothing method. Lending further support to the researcher's choice of scoring method is Schoonen and Verhallen (2008) who adopted the All-or-Nothing method for scoring in their study on assessment of deep word knowledge in young second language learners. Additionally, like Schoonen and Verhallen (2008), this study considered the word web as one whole item in scoring, contrary to Read (1993). The justification being, "treating each stimulus word-associated word relation as a separate item causes unwanted interdependence between the items which might inflate reliability estimate" (Schoonen & Verhallen, 2008, p. 221). Since scoring students' answers in a WAT is essentially a mechanical task, interrater reliability is not a matter of concern (Cohen et al., 2018).

2.5 Strategies of Vocabulary Learning in a Second Language

Over the past two centuries, approaches to vocabulary development have experienced various changes. According to Richards and Rodgers (2007), among the earliest of dominant method is the Grammar-Translation Method which aims to equip learners with the skills to read, understand and write classical materials while omitting direct vocabulary instruction. Then, in the 1880s, linguists such Henry Sweet, Wilhelm Vector and Paul Passy started the reform movement whereby phonetics was established, thus revitalizing linguistics. This provides novel insights into speech processes, highlighting speech as the primary form of language and not written words as in previous times. The next major approach introduced was Michael West's Reading Method specifically targeted at vocabulary improvement, with emphasis very much on boosting vocabulary skill to facilitate

reading skill (Tiryaki & Tütüniş, 2012). In the middle of 1990s there was an emergence of audio-lingual teaching and subsequently, the communicative language approach. In later years, we have Krashen and Terrell's (1983) Natural Approach where vocabulary knowledge plays the central role as mainstay of meaning of which comprehension of the message depends upon.

Hence, all along vocabulary knowledge has been acknowledged as a necessary element to attain language proficiency, irrespective of whether it is first or second language. Collectively, previous framework devoted to vocabulary interventions has amounted to a significant sum and current studies on language development still devote considerable attention on this particular area.

Amidst this technology-inundated millennial age, incorporating technology into learning programmes is an emerging trend. To this point, research on game-based learning and language education has increased in volume. Studies conducted have demonstrated that by integrating gamification into language learning, not only are learners' learning achievement positively augmented but it also promotes motivation and persistence in learning (Hwang, Yand, & Wang, 2013; Zarzycka-Piskorz, 2016). Furthermore, game-based learning lowers learning anxiety in learners as well as facilitates learning and sustains interest among learners (Kapp, 2014). In a recent study on how game-based learning affected the vocabulary acquisition of first-year ESL learners, Wu (2018) constructed a mobile game based English vocabulary practice system with attention on learning effectiveness and motivation. Statistical results recorded higher learning effectiveness and positive learning motivation. Additionally, a very recent study on gamification focuses on Kahoot!, a gaming system designed with interactive learning in mind. Tan et al. (2019) exposed their subjects

to the use of Kahoot! on the learning and application of media language features and devices for a semester. Participants' reactions were then observed for motivation and engagement, and fostering and reinforcing learning.

Drama activities is another approach recommended for teaching of new lexical items. Alber and Foil (2003) proposed the activity to carry out guided exercises, advance the dynamics of learning as well as promote independent learning (see also Demircioglu, 2010). Drama also makes it feasible to augment communication in the target language as well as boost fluency, engagement and active participation, particularly with emergent and intermediate learners (Kao & O'Neill, 1998; Stinson, 2008; Stinson & Freebody, 2006). A recent study by Eskelinen (2017) shows that the elements an effective vocabulary instruction should possess are found in drama. As stated by Rimbey et al. (2016), the properties are repeated exposures to words, definitional and contextual information of the words, and importantly, drama engages learners actively with words in deep and meaningful ways. Since the 1970s, drama has been emphasised in communicative language teaching and since the 1990s, in related task-based language teaching approaches as an effective approach for language acquisitions (Nunan, 2004). However, the notion that drama presents a rather concrete and constricted picture of lexis remains debatable (Eskelinen, 2017) as vocabulary acquisition is found to be influenced by components that are more complex and numerous than those mentioned (Moir & Nation, 2008).

Interest has also been detected in the use of films in the teaching of lexical items. Literature on research incorporating films within the framework of vocabulary learning include works by Paivio (1971), Shirazi, Account, and Simin (2016) and Zarei (2009) who investigated the effects of subtitle film monitoring on second language learners' target

language skills. On the other hand, Munir (2016) studied vocabulary acquisition among young learners using cartoon films. Statistical analysis gleaned from pre-, post- and delayed posttests data recorded significant results in the subjects' vocabulary acquisition. Other researchers such as Etemadi (2012) looked at documentary as an avenue to learn content comprehension of English films and vocabulary recognition.

The read-aloud experience is another well-accepted approach to vocabulary acquisition and is considered by many as a vital medium for rich vocabulary and content. As opined by certain researchers, the read-aloud approach serves as a significant framework for effective language development regardless of age groups (Coyne et al., 2013; McKeown & Beck, 2013; Sweeny & Mason, 2011) and is often singled out for emergent mono and bilingual learners (August & Shanahan, 2006). Brabham and Lynch-Brown (2002) investigated varying type of reading-aloud approaches by teachers such as just reading, performance reading and interactional reading, and measured their effects on first and third graders' vocabulary growth and reading comprehension. More recently, Neuman and Kafer (2018) designed a theoretically-based instructional program based on the read-aloud experience to help enhance young learners' knowledge network across different disciplines. Targeting young learners from low-income families, Neuman and Kafer (2018) conducted a year-long intervention consisting of reading-aloud sessions using cross-cutting concepts and vocabulary within taxonomic categories. Children ranging from preK to Grade One were examined on their vocabulary, science concepts, language, and knowledge of the information genre. For more on read-aloud experiences, see also Cervetti, Wright, and Hwang (2016) and Gonzalez et al. (2014).

Over the years, extensive reading has also aroused a respectable amount of interest as an approach to vocabulary development as it has been found to greatly benefit learners' language development. Take for instance, Davies (1995) who advocates extensive reading programmes as an essential activity in every classroom for its efficacy in promoting pupils' language development in all manners. Lending support to Davies' stance is Day and Bamford (1998) who claim that extensive reading's benefits in empowering learners with a broader passive and active vocabulary knowledge and also in improving overall comprehension skills. There are researchers who believed that the benefits of reading extensively do not merely stop at increasing learners' range of vocabulary and structural awareness, but extends beyond to develop automaticity and enhance background knowledge. It is claimed that the activity improves comprehension skills and promote confidence, and motivation (Grabe, 1991; Nation & Wang, 1999; Pigada & Schmitt, 2006; Tan, 2016). According to Nagy and Herman (1987), extensive reading is capable of helping young learners between grade three and 12 learn up to 3000 words a year. Hedgcock and Ferries (2018), Suk (2017), Tan (2016), Liu and Young (2015), and Lee and Mallider (2011) are among researchers who have conducted studies in this area in recent years.

The mnemonics techniques in second language learning is also a popular approach with regards to vocabulary development. Atkinson (1972, 1975) and Atkinson and Raugh (1975) assumed that one's memory can be effectively boosted via mnemonic devices, thus perceiving vocabulary learning as a memory issue essentially. Atkinson's (1975) keyword method, one of the most studied mnemonics, committed a new word to memory through linkage to a keyword, a sound-alike native word (the acoustic link) via an interactive image that involves the foreign word and the native word (the imagery link). Vijayaletchumy et al. (2009) and Vijayaletchumy (2009) conducted an interesting study on vocabulary learning

through image sketching - an adaptation of the mnemonic technique - on a group of primary school children in Malaysia with positive findings. Pupils who sketched an image of the word or expression reported improved vocabulary knowledge. More encompassing reviews on the application of mnemonic techniques in second language vocabulary learning are accessible (see also Cohen, 1987; Hulstijn, 1997; Nation, 1982; Pressley, Levin, & Miller, 1982).

The encoding strategy, another vocabulary development method, focuses on individual differences to determine an individual's progress in this area (Miyake & Shah, 1999). As posited by Gu (2003), vocabulary retention depends on how one performs in memory strategies with the cultural background of the learner playing a part in the preference for memorization and the ability to memorise. This perspective has resulted in swinging the focus on vocabulary acquisition strategies; various aspects of word list repetition have veered towards deeper processing strategies in areas such as memory, form, meaning, and use.

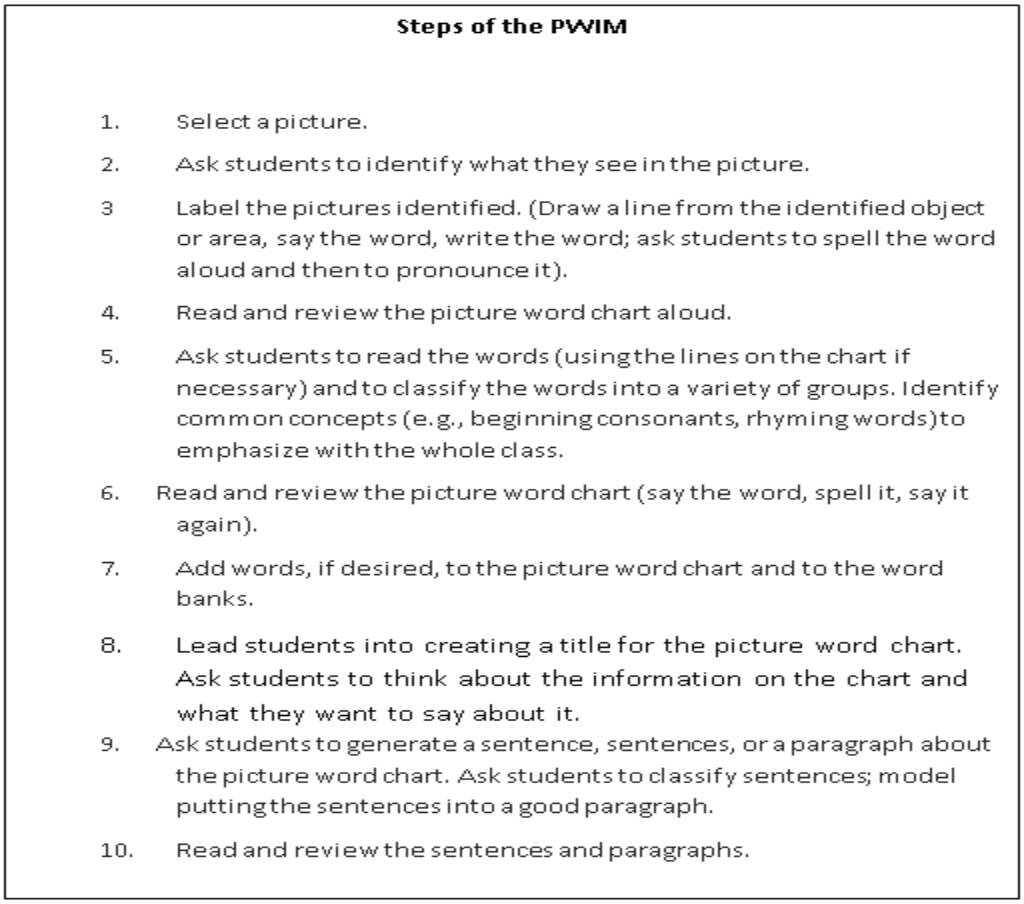
All things considered, the rapidly expanding noteworthy studies on vocabulary learning has afforded insights on the vigour of the various approaches. However, many contentions persist leaving many reservations remained unanswered. Thus, it is imperative for researchers to proceed and hopefully, in the course of added fresh or alternative studies secure more concrete conclusions ultimately. Apart from the abovementioned approaches, amongst earliest domain knowledge on vocabulary acquisition strategies include dictionary strategies, note-taking, vocabulary rehearsal strategies, metacognition and semantic network.

2.6 The Picture Word Inductive Model (PWIM)

The present study examined the impact of pictures, via an adapted version of Calhoun's (1999) PWIM, on the English language vocabulary recall and retention of Year 1 pupils. The instrument is "...an inquiry-oriented language arts strategy that uses pictures containing familiar objects and actions to elicit words from children's listening and speaking vocabularies" (Calhoun, 1999, p. 21). This model of teaching has its grounding in the field of literacy development, how literacy is acquired and cognitive development as well (Joyce, Weil, & Calhoun, 2008). Central to the model is learners' nature of learning as they go about building knowledge based on language in print and developing skills on extracting and organising information.

Thus, according to Joyce Bruce and his associates, besides attaining skills in phonetic and structural analysis, there is a need not only for one to possess a huge sight vocabulary but also to expand upon constantly. Based on findings from their studies on literacy, Joyce et al. (2008) claimed that children become literate by means of a progression of measures. Foremost, children learn to understand and reproduce the languages that they are exposed to in a natural manner, in that these children tend to acquire expansive vocabularies and complex syntaxes if expansive vocabularies and complex syntaxes are continually used with them. Joyce et al. (2008) next consider children to be natural conceptualisers, thinking inductively and compartmentalising since birth, and are proficient at "organizing what they perceive, as they reach toward language as a source of meaning" (p. 129). Finally, socialization through interaction with people and reading enables children to attain ideas and information. Hence, the emphasis on capitalising on the natural ways children approach the learning of a language.

Designed to be a component for language arts curriculum, PWIM is applicable with both young and older beginning or early-stage readers (Joyce et al., 2008). The model can be employed with classes, small groups and individuals, encouraging learners to inquire about words that lead to the expansion of their sight vocabularies (Calhoun, 1999; Joyce & Calhoun, 1998). Acknowledging Ehri's (1999) claim of sight vocabulary growth as an essential conduit to literacy, the structure of PWIM addresses the said development and the issue of vocabulary retention as well (Joyce et al., 2008). The basic lesson structure of the PWIM is as shown in Figure 2.4.



Steps of the PWIM

1. Select a picture.
2. Ask students to identify what they see in the picture.
3. Label the pictures identified. (Draw a line from the identified object or area, say the word, write the word; ask students to spell the word aloud and then to pronounce it).
4. Read and review the picture word chart aloud.
5. Ask students to read the words (using the lines on the chart if necessary) and to classify the words into a variety of groups. Identify common concepts (e.g., beginning consonants, rhyming words) to emphasize with the whole class.
6. Read and review the picture word chart (say the word, spell it, say it again).
7. Add words, if desired, to the picture word chart and to the word banks.
8. Lead students into creating a title for the picture word chart. Ask students to think about the information on the chart and what they want to say about it.
9. Ask students to generate a sentence, sentences, or a paragraph about the picture word chart. Ask students to classify sentences; model putting the sentences into a good paragraph.
10. Read and review the sentences and paragraphs.

Figure 2.4: Lesson structure of the Picture Word Inductive Model (Calhoun, 1999, p. 23)

The PWIM instructional structures of inquiry cycles and recycles through the steps shown in Figure 2.4. An enlarged picture is employed as a stimulus for each cycle to generate vocabulary items, with the duration of each cycle varying between three days to two months. Although the duration of each cycle is dependent upon the richness of the picture to a large extent, learners' age and language development too play an important role in deciding the time frame. The teacher's language objectives are not to be left out either (Calhoun, 1999). The teacher involved should be given full discretionary power over the selection of the pictures and gets to decide on the duration of a full sequence, the length of units, and the number of lessons within a unit (Calhoun, 1999).

Joyce and Calhoun (1998) suggested that the instructional sequence of the PWIM intervention should occur four times per week for four weeks with each session lasting approximately fifteen to twenty minutes while Joyce, Weil, and Calhoun (2004) proposed that a full PWIM cycle lasts from two to six weeks. The suggested duration of a full PWIM cycle may varies but the consensus is that the duration depends very much on students' needs and language development, and the teachers' objectives (Calhoun, 1999; Joyce & Calhoun, 1998; Joyce et al., 2008). For instance, Nancy Werner, a Grade 1 teacher in Hempsill Hill School in Nottingham, England, took four weeks to complete a full PWIM cycle, with each session lasting 30 to 45 minutes. On the other hand, Lisa Mueller from Northern Lights, Alberta, using a picture of a scene at a wet market in Kuala Lumpur, engaged her Grade 1 students for 22 sessions, each session lasting 50 minutes (Joyce et al., 2008).

Also, while conducting her research, Calhoun (1999) observed that children were motivated to become successful learners as they generally enjoy participating in the interactive lessons of the PWIM. They did not only enjoy seeking out the objects and actions

in the picture, but they also took pride in creating sentences from words generated, while at the same time learning useful language concepts and generalisations. Hence, PWIM is successful largely because the model is based on inquiry into how young learners learn and ways to enhance their learning, together with their literacy development (Calhoun, 1999).

The PWIM approach has enjoyed more than moderate success with readers/learners in their early years and also with those in middle and higher grades (Calhoun, 1999; Joyce & Calhoun, 1998; Joyce, Hrycauk, & Calhoun, 2001). It can potentially benefit a wide spectrum of learners, in age groups as well as language abilities. It is particularly rewarding to those in the initial stages of learning a second language such as our Year 1 pupils.

2.6.1 Implementation and Past Studies of PWIM

Over the years, numerous studies pertaining to PWIM have been well documented contributing further to the corpus of research in the area. Similarly, some organistions have implemented this model of teaching within their community.

2.6.2 Implementation of PWIM

Among the earliest of PWIM's implementation was an action research conducted by Calhoun, Poirier, Simon, and Mueller (2001) on a cohort of first graders (n = 22) who sat for the Alberta Diagnostic test, thus affording her and her fellow researchers with estimates of reading achievement based on grade levels. The significant gains documented in vocabulary, reading skills and comprehension among the subjects advocate the PWIM as an effective means in assisting students to advance their literacy development.

Over the years, studies involving learners of various proficiency levels and age groups have been successfully carried out in schools in the United States of America and

Canada. These studies researched how PWIM impacted vocabulary acquisition and literacy development. For instance, in Canada, PWIM has been very successfully implemented in Alberta and British Colombia with learners ranging from kindergarten to Grade 12. Walford (2007) oversaw a PWIM mentoring project that witnessed the involvement of twenty-two associate teachers and 66 teachers with pupils from kindergarten to Grade 8 in Ontario. This particular mentoring project was the third stage of an extended school-university partnership research programme pioneered by Ontario Institute Studies in Education of the University of Ontario in 2000 (Walford, 2007).

Another Canadian school that has applied this inductive literacy model extensively as a teaching strategy and found the results very positive in improving learning for all children, especially among English language learners, primary pupils and those at risk is the Armitage Village Public School in the York Region District School Board. Teacher Joanne Meyers, a long-time partner with Ontario Institute Studies in Education, led the initiative in the school (Walford, 2007).

Additionally, three studies involving a first grade teacher, a French immersion first grade teacher and a fourth/fifth grade teacher for students with special needs, spanned an entire year documenting the effects of PWIM on pupils' vocabulary development, reading comprehension, and other literacy skills (Calhoun et al., 2001). The subjects showed significant gains on the vocabulary and comprehension subtests and as a result, PWIM was subsequently adopted by these three teachers to advocate a multidimensional curriculum aim at teaching beginning reading and writing (Calhoun et al., 2001).

Well-backed by research that has produced data from hundreds of elementary school children and older ones that include struggling readers (see Joyce et al., 2006), PWIM has

been employed as part of the school curriculum in countries such as the United States of America, Canada, and the United Kingdom. Take for instance, the Iowa Department of Education that started implementing PWIM at the elementary level in schools in Iowa, USA during the early 2010s (Hutchison et al., 2013). By utilising the Statewide Reading Team as a vehicle to provide support in terms of data, instructional materials, curriculum, assessments and staff development among others, the Iowa Department of Education reached out to all stakeholders in its efforts to enhance literacy development (Joyce & Calhoun, 2010). Though there exsits other mechanisms such as the IOWA Communications Network (ICN) interactive broadcasts for supporting the development of individuals and groups, the SWRT remained a central component. Comprising primarily regional intermediate service consultants, district office staff from large school districts, teachers and principals, the Statewide Reading Team has been tasked with collaborating with the PWIM Facilitation Team to provide optimum site-support and staff development for teachers to begin implementing PWIM in their classrooms and to work with peers.

Currently, the PWIM is still being implemented in elementary schools as a means to enhance student learning in the areas of vocabulary, reading comprehension, and writing techniques. Among some of the schools involved are the Walnut Community School District, the Harlan Community School District, the Denison Community School District, the South Tama County Community School District and St. Marys School in Clayton County.

The Saskatchewan Ministry of Education also expanded massive efforts and resources on improving literacy development among elementary school children in the county. As early as 2002, the Board of Education of Saskatoon Public Schools (Saskatoon

Public Schools, n.d.) has identified "Early Learning and Literacy" as one of the core strategies related to students' learning goals. Hence, the implementation of PWIM at Saskatoon Public Schools in Saskatchewan, Canada. Aiming to have all children from grade K to 12 reading at or above grade level, the "Literacy for Life" project was officially launched in 2004. In addition, 45 elementary schools under the Elementary Schools Division adopted variations of the PWIM to teach reading and writing to students from kindergarten to Grade two, categorised under Early Years Literacy. The development and implementation of this programme has been supported by Emily Calhoun and Bruce Joyce over the years and based on Saskatoon Public Schools' (n.d.) progress reports, dated from 2004 to the present, showed that the students have achieved significant gains in literacy. Presently employed in the classrooms of elementary schools in Saskatchewan to enhance literacy development, the PWIM instructions can also be found in Saskatchewan Reads, publications with an online version saskatchewanreads.wordpress.com, that focus specifically on instructional approaches, assessment and intervention pertaining to the English Language Arts Grades one, two and three curricula with special emphasis on reading. Created primarily to sustain the Premier's vision document, "Saskatchewan Plan for Growth: Vision 2020 and Beyond", Saskatchewan Reads (n.d.) enjoys the full support of all 28 school boards in the province and the Government of Saskatchewan. Apart from providing a framework for school divisions to assemble their respective initiatives and to provide practical and onsite support to teachers, it highlights practices that have shown potential or proven successful in school divisions and First Nations communities within Saskatchewan. Examples include PWIM, Reader's Workshop, Balanced Literacy, Scaffolded/Guided Reading, Levelled Literacy Intervention and Running Records, among others.

The implementation of PWIM of such an enormity in Iowa and Saskatchewan, among other areas and that it has sustained over the years speaks in magnitude for the effectiveness of the method in enhancing learners' language skills. Various but complementary ideas and framework on vocabulary acquisition and literacy development have remained steadfast on the significance of vocabulary knowledge, particularly for young learners as well as the key role it plays in the development of vital language skills. Suffice to say then, that it is essential to explore the effectiveness of adapted form of the PWIM in our Malaysian classrooms since it could potentially enhance Malaysian learners' vocabulary development as it has been proven with learners of other countries, empirically as well as in practicality.

2.6.3 Past Studies of PWIM

In recent years, a seemingly robust interest in research on second language learning that embraces picture superiority has been detected in an impressive new corpus of research on the PWIM strategy for second language learning, notably on writing skills specifically. It is interesting to note that many of the more current studies on PWIM borders on similarity in terms of the objectives of the research and the samples as well. More than half of the studies on PWIM in the past few years concentrated on writing skills, chiefly writing recount, narrative and descriptive writing with subjecting comprising mainly eighth graders and junior high school students. Another point to be taken note of is the logistic of the studies, majority of which were conducted in Medan and Jakarta, Indonesia with a handful in China and Taiwan.

Although quite a number of studies on PWIM have been recorded in recent years but those focusing specifically on how PWIM impacts vocabulary acquisition are rather limited

in number, more so with young learners. Jiang (2015), a native from mainland China, included vocabulary acquisition in his study but he mainly investigated the effects of PWIM on the narrative writing skills of seventh graders in China. Jiang (2014), Yurfalah (2014), Li (2011), Yuliana (2010), Loh (2010) and Swartzendruber (2007) studied how PWIM affects vocabulary knowledge but only Loh's (2010) study was conducted on first graders while the rest were carried out on older learners. It is also to be emphasised that of the small number of the PWIM studies on vocabulary acquisition, a smaller number still looked at retention while none explored the impact of PWIM on the vocabulary depth of first graders. Hence, the conspicuous gap in this particular field of research.

For instance, Jiang's (2015) thesis explored year four and seven subjects' vocabulary breadth recall via vocabulary posttests. On the other hand, Yurfalah's (2014) attention was on seventh grade subjects' perceptions of the PWIM on vocabulary learning, obtained through questionnaire. Another example is Feng's (2011) doctorate thesis that investigated the participating teachers' and the year four, five and six students' perspectives towards PWIM through observations and interviews conducted. On the other hand, Loh (2010), a teacher in Singapore, based his study on observing and analyzing the impact of PWIM on a group of year one pupils' responses when they were exposed to the approach during lessons in class.

Comparatively, other than those studies carried out by Calhoun and her fellow associates (e.g., Calhoun, 1999; Calhoun et al., 2001; Joyce, Hrycauk, & Calhoun, 2003), Swartzendruber's (2007) action research on how PWIM impacted the vocabulary acquisition of a group of year two pupils is more comprehensive. Even so, her study only covered vocabulary breadth recall and there were only fourteen subjects in her research. Obviously,

there is a lack of in-depth study on the recall and retention of vocabulary breadth and depth of young learners, especially in the Malaysian context. Thus, the attempt to fill such a gap in literacy research with this study.

Other facets of literacy were explored within this domain, whereby studies conducted were further detailed and summarised. A more recent study, Nurani and Rosyada's (2017) experimental research, was conducted to look at the effectiveness of PWIM in enhancing older students' communicative competence. A total of 47 11th-grade students in Jakarta participated in the study and analysed data denote significant positive effects on subjects' grammar, fluency, pronunciation and vocabulary knowledge as well as an increase in motivation and creativity.

A few recent PWIM studies on writing skills have also been recorded. Utilizing the PWIM, Siti Apiah's (2016) bachelor thesis in Bahasa Melayu specifically focused on grade eight students' writing in recount text. Data collected in a quasi-experimental study showed significant improvement in pupils' capabilities to write recount text. In tandem, Yuniati's (2015) experimental study also explored the effectiveness of PWIM in teaching writing recount text on eighth grade Indonesian pupils. Pre-test and post-test were administered on the subjects with an increased score in the post-test as compared to the pre-test recorded; signifying that PWIM is effective in teaching writing recount text. Similarly, another study on PWIM's effects on writing recount text was carried out by Erniwati and Tjut (2013) with documented findings showing improvement in students' writing recount achievement.

Additionally, an experimental study on PWIM and writing narrative text conducted by Nangin Sarinta (2015) on 120 grade 11 students of a public school in Indonesia documented positive results. Similarly, Jiang and Perkins (2013), in an exploratory study,

investigated how 30 Chinese seventh graders' narrative writing skills were impacted by PWIM. It was found that participants exemplified the positive influence of PWIM on their narrative writing, reacting positively to the approach. In 2015, Jiang conducted another study to research the perception of 30 primary school children in China on the impact PWIM has on narrative writing. The participants responded positively to PWIM and exemplified the positive influence of PWIM on their narrative writing.

The effects of PWIM on writing descriptive essays were also examined by Kurniawan and Andini (2015) and Zuraida Kartika (2013). Kurniawan and Andini (2015) experimented six PWIM treatments on junior high school students in Indonesia while Zuraida Kartika (2013) aimed to find out how PWIM impacts pupils' vocabularies in descriptive writing and the structures of descriptive text via an action research on grade eight pupils, also from Indonesia. Results obtained pointed at a significant increase (from 78.1% to 100%) in the pupils' abilities to write descriptive texts. In addition, a classroom action research to find out the effectiveness of PWIM in enhancing a group of eighth graders' descriptive text was carried out with data collected showing significant improvements. Zuraida Kartika's (2013) study recorded positive results.

Further studies on PWIM and writing skills encompass Fitri's (2015) experimental study that focused on a group of eighth grade pupils in Padang, Indonesia. Data collected from the study were analysed using t-tests and results indicated a significant difference in the writing of those who experienced the PWIM approach as compared to those who did not. Another Indonesian study on 30 tenth graders who participated in a research pertaining to PWIM and writing skills also shows improvement in these students' writing after having gone through the PWIM intervention (Damanik & Ownie, 2012).

Concerning vocabulary acquisition, Yurfalah's (2014) thesis examined the effectiveness of PWIM in teaching vocabulary to seventh grade students in an Indonesian public school while at the same time, investigated samples' perceptions on PWIM as a tool to teach vocabulary. The eventual conclusion drawn is that PWIM effectively improves students' vocabulary knowledge and is viewed as a positive alternative method in creating effective learning experience. On the other hand, Putri (2013) merged the mnemonic strategy with PWIM in investigating the effectiveness of the combined approach on vocabulary acquisition among elementary school students of Indonesia. The study discovered that the strategy not only succeeded in assisting the development of the students' vocabulary but it also generated increased interest in learning the English language. Concurrently, findings of another study also recorded a significant difference in the vocabulary achievement of seventh graders (n = 180) after experiencing the PWIM intervention. Upon completion of her experimental study, Yuliana (2010) proposed the PWIM teaching model as an alternative method vocabulary teaching.

Another recent study on PWIM was Jiang's (2014) PhD dissertation where investigations were conducted on 234 samples comprising fourth and seventh graders from mainland China. Spanning seven weeks, the intervention set out to measure the vocabulary acquisition of samples based on grade levels. Research instruments include pre- and post vocabulary tests and questionnaire, interviews and observations. Jiang also investigated the possibility of a cognitive overload for English learners in China when words and pictures are processed concurrently. Although his findings indicated no significant difference on samples' vocabulary knowledge based on grade levels, majority of the subjects commended on the numerous strengths exhibited by PWIM while a few glossed over its weaknesses. On the whole, Jiang's samples espouse PWIM as a teaching model for vocabulary learning. An

action research was also conducted by Nasution and Murni (2013) to determine if PWIM affects students' questioning achievement. Instruments include oral test, diary notes, interview, observation and questionnaire. Results documented higher scores after implementation and more positive responses from the twenty-two samples were recorded.

PWIM was further analysed from the perspective of Bruner's (1961) constructs of learning and the cognitive load theory by Jiang and Perkins (2013). In this aspect, the model has been found to exemplify the tenets of Bruner's structure of learning, spiral curriculum, and discovery learning. Accordingly, PWIM, as a model of instructions, might prove to be a cognitive overload for learners who are exposed to words and pictures that are a novelty. Hence, the suggestions of alternatively looking at cognitive load theory based instructions with the aim to assuage the cognitive demand imposed by the learning tasks.

Li (2011) collected data to explore the efficacy of the PWIM on vocabulary acquisition 16 SL fourth graders in Sweden. Findings show the group that experienced PWIM gain comparatively higher test scores, are more active and enjoy the lessons more as compared to the group taught using the word-list, indicating the PWIM is effective in second language vocabulary acquisition.

A study that aims to investigate both teachers and students' perspectives toward the integration of the PWIM and cooperative learning as an alternative instruction to the current approach adopted in Taiwan elementary learners' classrooms for teaching English literacy was carried out by Feng (2011). He also investigated motivational factors towards learning a foreign language. Results of the survey conducted indicate that teachers and students alike are enthusiastic and highly recommend PWIM as an alternative approach to language learning. According to the teachers, there is noted improvement in their students' English

vocabulary and in their ability to construct meaningful sentences. Also, PWIM encourages students to be more autonomous and promotes higher level of interactions among the students. Feng further claimed that the students became more motivated towards leaning of English language.

Research was also conducted to investigate PWIM as an effective model of teaching for individuals with learning impairments. Bishop (2011) revealed that PWIM was often employed as a basis in the designing of virtual learning environments, typically to assist learners facing difficulties in literacy development and also to help them to overcome their impairments.

Loh (2010) in contrast, experienced resistance in implementing the PWIM among his first graders in a new school in Singapore. Barbara Spilchuk, a teacher, and a school principal in Alberta, Canada exposed Loh and his colleagues to PWIM when she visited the school in Singapore. Some questioned the effectiveness of PWIM in preference for word frame that works on drawing students' attention to a selected word by obstructing words that are girded. Despite the disagreeable experience, he remained convinced of the effectiveness of the approach and further advocates PWIM as a powerful tool that utilises pictures, combined with children's spoken and listening vocabulary, to build their reading and writing vocabulary.

A mixed method research case study carried out by Wong (2009) employed both qualitative and quantitative method to examine the influence of PWIM on the development of literacy skills of twenty preschool children in Canada. The study reported significantly improved literacy skills among the children who underwent the PWIM intervention. Lending further support to Wong's (2009) stand is Calhoun et al. (2011) who concluded that PWIM

does not only effectively expands learners' speaking, listening and writing vocabulary, but teaches reading strategies and fosters analytical skills at the same time. Thus, justifying PWIM as a concrete reading, writing, thinking program.

Additionally, a study was conducted to explore the academic achievement and wellbeing of a cohort of preschoolers in Seattle, Washington via PWIM. Decker (2007) discovered PWIM to be highly engaging with classroom participation on a high level while boosting learners' confidence at the same time. As such, results indicate that the model benefits both academic achievement and student well-being, apart from being both teacher and student friendly.

The PWIM was also featured in a partnership literacy project between a university and a school initiated by Walford (2007) to investigate and develop mentorship strategies for teachers. With the intention of exploring the impact of the PWIM on literacy instruction, workshops for teachers were conducted on the effectual employment of PWIM on young learners ranging from preschoolers to eighth graders. Apart from being highly engaged, participants were also found to have planned and delivered additional lessons with the PWIM model. Notable observations were that students are able to make key connections to various language structures such as syntax and phonetics, among others, by thinking inductively. Thus, concluding that PWIM possesses a powerful impact on literacy learning among learners.

Swartzendruber's (2007) dissertation further explored how the PWIM impacts vocabulary acquisition and reading comprehension via a quasi-experimental study. Her study covered two cycles within thirteen days of intervention with an experimental group consisting of fourteen students and a control group of twenty-one students. Data recorded

showed that the experimental group did outperform the control group significantly in vocabulary and reading comprehension scores. However, a significant difference was documented within the results of the experimental group. Meanwhile, Wood and Tinajero (2002) incorporated collaborative learning into the PWIM teaching model to look at content and concept development for second language learning, specifically in vocabulary knowledge, writing skills and overall academic achievement. Positive results obtained denote that PWIM can be employed in classroom teaching regardless of subjects.

Convinced of the effectiveness of the PWIM model of teaching, more studies on PWIM were conducted by a team of researchers headed by Emily Calhoun and Bruce Joyce. For example, Calhoun et al. (2011) carried out an action research using PWIM on grade one Canadian learners to further develop existing literacy strategies. Considerable gains in vocabulary, reading skills, and reading comprehension were documented, further advancing the strengths of PWIM as an instructional approach particularly targeted at vocabulary acquisition.

Effort to address the literacy problem of a school district in Alberta, Canada led to the adoption of PWIM as the core of a new multidimensional curriculum. Developed purposefully with such aim in mind, Joyce, Hrycauk, and Calhoun (2001) conducted an intervention programme expressly to enhance the vocabulary knowledge and subsequently, to develop the reading and writing skills of elementary, middle and high school students in that district. Noticeable gains were recorded in the students' scores on standardised vocabulary and reading comprehension tests, across all age groups, thus indicating the effectiveness of a research based literacy curriculum in reading.

The collective strength of previous research framework, coupled with an impressive current corpus of research on PWIM as a model of teaching have provide for substantial domain knowledge within the realm of literacy development. However, since Calhoun's (1999) work on PWIM with young learners, particularly in the area of vocabulary acquisition, there have been scant studies that focus extensively on vocabulary development among ESL or EFL emergent learners, excluding those carried out by Emily Calhoun and Bruce Joyce, with their group of researchers. Among the abovementioned studies, only those by Jiang (2014), Li (2011) and Swartzendruber's (2007) explored vocabulary acquisition among learners (fourth to seventh graders) in relation to the PWIM instruction. Numerous recent studies carried out in Indonesia were documented but they are mainly on older school children and are focused largely on the effects of PWIM on writing skills.

Based on the review of studies on PWIM, the conspicuous absence of extensive experimental PWIM studies on Malaysian learners highlights an existing gap in research on the impact of PWIM as an instructional strategy on the vocabulary acquisition of young learners in Malaysia. Undeniably, such a study will definitely contribute constructively towards adding to the corpus of knowledge on another model of teaching, the PWIM, that focus primarily on vocabulary breadth and depth learning, and subsequently language development.

2.7 Theories of Picture Word Inductive Model (PWIM)

Leveraging on the corpus of basic as well as applied research and synthesizing other models of teaching on how children become literate, namely development of language, process of learning to read and write, and the connection between reading and writing,

Calhoun (1999) oversees the development of PWIM from her maiden attempt in 1976 until today.

The essence of PWIM lies in drawing upon children's natural ability for language acquisition and capitalizing on learners' ability to think inductively. Employing pictures that contain familiar objects and actions to, PWIM instructors strive to elicit words from their learners' listening and speaking vocabulary. The fundamental of this teaching model is impressive for the extensiveness of its grounding and applications. It does not only steer the learners towards inquiring about words to expand their sight reading and writing vocabularies but tutors on discerning phonetic and structural principles while encouraging reading, writing, comprehending, and composing by way of observing and analysing at the same time (Calhoun, 1999).

PWIM, as a model of teaching, is pivotal in constructing knowledge of printed language on top of sharpening the skills of extracting and categorising information among learners. Priding itself on the versatility, as well as the adaptability of the model, its instructional sequence cycles and recycles through the steps of the PWIM. The duration of a full sequence of a PWIM unit is flexible; the teacher just needs to align the richness of the picture, the pupils' age and language development to his or her language objectives. Similarly, pictures used are at the discretion of teachers as with the duration of each PWIM session. Accordingly designed as a key building block of language arts curriculum for beginning-level learners of a language, PWIM resides within the information processing family (Calhoun, 1999; Joyce & Calhoun, 1998).

The PWIM is one of the eight models in the information-processing family which applied cognitive psychology (Joyce, Weil, & Calhoun, 2004). Simply put, cognitive

psychology expresses keen interests in how a person thinks, knows and remembers. Applications of this branch of psychology study mental processes such as language use, memory, attention, problem-solving among others. Models in the information-processing family focus on ways in how a person can improve in acquiring information, organizing data, framing problems, and generating solutions (Joyce et al., 2004).

Pictures play the main role in PWIM to stimulate language development. At the same time PWIM also weaves the inductive thinking and concept attainment models of teaching into its own model. Joyce and his associates (2004) stress that PWIM forms the core of some very effective curricula that serve, not only as a reading programme for kindergarten and primary students, but also as "safety net" programmes for older beginning readers and writers in secondary and high school. As such, this model of teaching is based on an instructional environment that endeavours to be the components of subsequent learning for the learners. This instructional environment has close ties with the developmental priming mechanisms summarised by Ramey and Ramey (1998), as well as Krashen's (1983) acquisition learning hypothesis and Paivio's (1971) dual-coding theory.

2.7.1 Theory of Cognitive Psychology

Joyce et al. (2004) have categorised models of teachings into four families and had them classified accordingly. Among them is the information processing family that exploits cognitive psychology, one of the core approaches within psychology which scrutinises how a person deliberates, recollects, and knows. A major feature of cognitive psychology lies in its ability not only to help an individual understand and remember, but also to link ideas and thoughts and in the process learning takes place. As in PWIM, one acquires new words through summing up prevailing knowledge, be it in mother tongue or in the target language,

with the assistance of pictures containing items familiar to one. Pictures could trigger one's exsiting vocabulary knowledge via associating familiar items with information that exsits within one's subconciousness. Additionally, the cognitive stresses on the value of internal feedback, unlike behaviourists who place importance mainly on feedback that are in the form of application of consequences from the environment (Huitt, 2006).

From the abundance of reviews based on the learning experiences of researchers, a few basic principles of the information processing system have emerged. One rudimentary principle that found consensus among majority of psychologists in this area is the assumption that the mental system has a limited capacity. Fundamentally, this implies that new information can be encoded, stored and retrieved but with constraints on the volume and the rate (Broadbent, 1973; Case, 1978). Another key principle that has found support among most cognitive psychologists is acknowledgement that stimuli is handled by a control mechanism that guides and controls processing of information such as encoding, transformation, storage, retrieval and others (Atkinson & Shiffrin, 1971). The third dominant principle lies in the way new information interact with stored information while the fourth refers to explicit genetic features within humans that rule the method by which they achieve new information. In the adapted PWIM, the number of words taught was limited to five words per session given that constraints exsit in the volume and rate of processing of new words learnt. Additionally, processing of new words took place when new words intermingled with leaners' existing working vocabulary, i.e., their stored information. In short, the information processing family model of teaching (Joyce et al., 2004) based its approach on the application of cognitive psychology and studies the structure of mental processing and its operations set within distinct contexts, environments, or ecologies.

Renner et al. (1976) conducted cross-sectional studies on children of various western cultures and concluded that cognitive development happened via four stages, the sensorimotor, preoperational, concrete operations and formal operational stage. Supporting such findings are Huitt and Hummel (2003) who agreed that Piaget's theory of cognitive development ultimately consists of two major facets; one is the process of coming to know and the other is the basic stages one moves through as we gradually acquire this ability. In cognitive development, the first two phrases happen during infancy and early childhood and involve sensorimotor and preoperational movements respectively. On the other hand, the last two phases are during elementary and early adolescence, and adolescence and adulthood when concrete and formal operations take place respectively. In the case of the present study, subjects are in the "elementary and early adolescence" category. Therefore, it is deemed permissible that PWIM with its structured steps of lessons be implemented on seven-year-olds who are ready for formal tangible operations.

Huitt and Hummel (2003) discovered that more than half of those in the seven-year old age group fall within the Piagetian stage of concrete operational stage, a reference to Piaget's theory of cognitive development. This is the stage where the operational thinking of a child develops and egocentric thought diminishes and a child's intelligence is exhibited via manipulating symbols that are associated to tangible objects in a logical and systematic manner. The next largest cohort of children was detected in the preoperational stage where symbols, language, nature and memory are gainfully employed to highlight intelligence. While a child's imagination is being developed actively, thinking is done in a nonlogical, nonreversible manner with egocentric thinking predominating. Hence, the present study purposefully selected seven-year-olds as subjects since this group of children displays such traits.

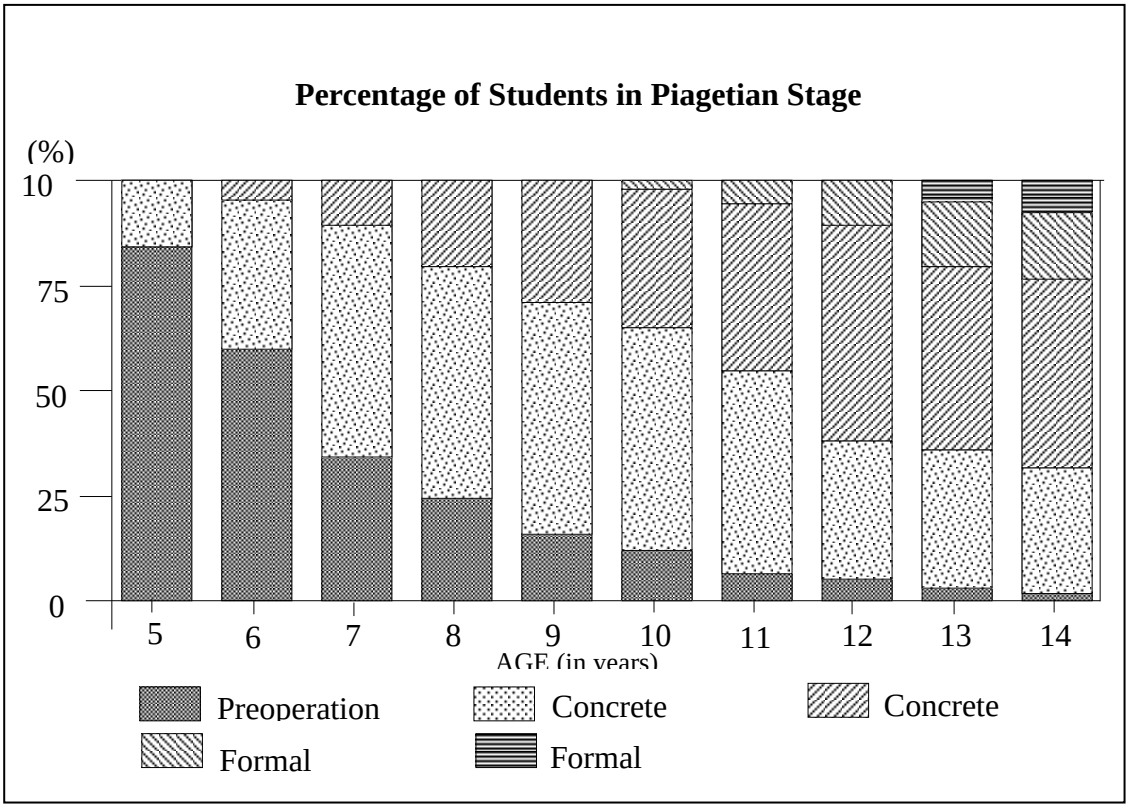


Figure 2.5: Piaget's Theory of Cognitive Development (Huitt & Hummel, 2003)

As mentioned previously, within the domain of cognitive psychology there exists diverse opinions but most cognitive psychologists are unanimous in their support on a few basic principles such as the faculty of the mental system is limited in nature. According to Huitt and Hummel (2003), this appears to be endorsed by cognitive psychologists in general. Accordingly, a person's mental structure is restricted in the flow and processing of information by the system. Apprently, such restrictions occur at very specific points of which encoding, transformation, processing, storage, retrieval, and utilisation of information are areas of restriction that exhibit a need for a control mechanism to oversee them. In PWIM that stresses on inductive thinking and concept attainment, there appears to be a two-way flow of information; a dynamic operation of bottom-up processing and top-down processing where meaning is centered on the picture used and the associations among items in the

picture. Akin to the difference between inductive reasoning and deductive reasoning as reasoned by cognitive psychologists. The human minds are also assumed to have been genetically prepared to process and organise information in specific ways.

Educational objectives have been classically categorised into three domains, namely the cognitive, the affective, and the psychomotor according to Bloom's Taxonomy of the Cognitive Domain (Bloom et al., 1956). However, swayed by outcome achievement, Bloom's taxonomy was revised by Anderson and Krathwohl in 2001 to meet new demands in education objectives. Apart from reappraising the various levels in the taxonomy hierarchy, Anderson and Krathwohl (2001) appended a conceptualization of knowledge dimensions to these processing levels; factual, conceptual, procedural, and metacognition.

Having digested that, language learning is a dimension that had cognitive psychologists constantly arguing over its development, with non-conclusive hyphotheses pertaining to the processes underlying human behaviour that gives rise to further discussions and future studies.

2.7.1.1 The information processing approach to cognition

Information processing theory specifically focuses on aspects of memory encoding and retrieval in its discussions on mechanisms pertaining to how learning occurs. Contrasting with behaviourist notions that advocate responses to stimuli, cognitive theory equates thought mechanisms to stages of receiving input, processing it and delivering the output, thus underlying information processing and constructive processing (Neisser, 1967). Hence, as shown in the PWIM model of teaching information is first gathered from the senses via picture and promptings from teacher, then stored and processed by the brain. The ultimate behavioural response points to the basis of information processing theory. As such,

cognition extends beyond accepting and retrieving information. This is inline with Neisser's (1967) claim that the term cognition can be narrowed to the process of encoding, structuring, storing, retrieving and using or otherwise acquiring knowledge, within the domain of psychology of learning.

Memory remains a primary issue in cognition research. Likewise, in the present research with it's focus on short term and long term retrieval of new words learnt via the PWIM intervention. Researchers with differing as well as complementary hypothesis and framework on this issuer appeared to agreed that information stored away has to be accessed first if retrieval is to take place (see Atkinson & Shiffrin, 1968; Bartlett, 1955, as cited in Wagoner, 2015; Broadbent, 1975; Case, 1978; Driscoll, 2001). Cognitive psychologists are generally in accord that new information intermingles with amassed information which is further exemplified either by way of a bottom-up where new information initiates coordinating with prevailing concepts or top-down system that contrasts bottom-up or a combination of both systems (Gibson, 1979; Lutz & Huitt, 2003).

Atkinson and Shriffin's (1968) stage model of memory has prevailed over the years in research on information processing. Widely acknowledged as the most extensively embraced model of information processing in research, the stage model's core hypothesis is wrapped around learning with memory being viewed as sporadic and multi-staged where freshly taken in information is manipulated before it is stored (Bruner, 1986; Huitt, 2000; Lutz & Huitt, 2003). Each store is looked upon as a unitary composition bearing its own distinctive individual features in terms of encoding, capacity and duration.

2.7.1.2 The Multi Store Model (MSM)

The Multi Store Model (MSM) by Atkinson and Shriffin (1968) is rooted in the basic assumption that memory is composed of multiple stores or stages. It is a classic model of memory that has been widely accepted over the years with series of stores consisting of sensory memory, short-term or working memory and long-term memory (Huitt, 2003). As featured in Figure 2.6, memory is described in terms of information flowing through a system; data travel through the three stores sequentially from sensory memory to short-term memory and in due course to long-term memory. In the model, focus is on storage and processing of information in each stage. Information is looked upon as being very fluid as it flows from one store to another with processing occurring in a serial, discontinuous manner (Atkinson & Shriffin, 1968).

As seen in Figure 2.6, the structural features of the MSM include three memory stores that hold different characteristics in terms of encoding, storage capacity and duration information.

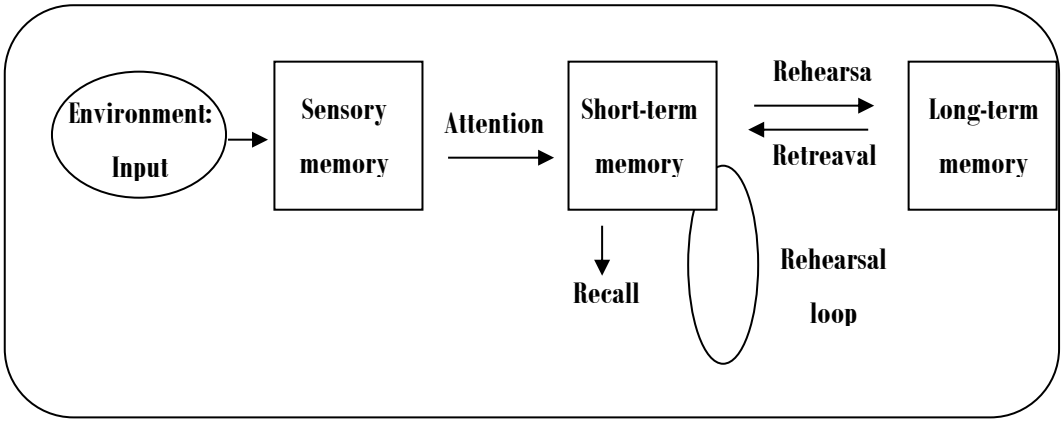


Figure 2.6: Multi Store Model. Adapted from "Multi Store Model of Memory - S. A. Atkinson and R. M. Shiffrin, 1968" (McLeod, 2007)

Certain elements in the MSM are within the control of individuals such as the attention paid to information, thus taking charge of what flows from Sensory Memory (SM) to Short-term Memory (STM). It is also possible to exert control on rehearsal and by extension determine the duration information is held in STM and therefore, its passage to Long-term Memory (LTM). Finally, retrieval is also controlled, depending on methods applied to access selected information.

As postulated by Atkinson and Shiffrin (1968), the sense organs will first discern the information which will eventually flows into the SM. Based on MSM's memory model, there has to be selective attention for data to transfer from SM to STM where recall takes place. In PWIM, the first step is to get leaners engaged in a picture containing items familiar to them. Teachers will attempt to draw learners' attention to a particular item with the intention of inducing words from their exsisting listening or speaking vocabulary. Therefore, learners' attention to the new words are attended to immediately. Thus, as documented, once the information is attended to it moves into the STM and subsequently, from there information is then transported to the LTM. According to Fernandes, Wammes, and Meade (2018), this will only occur with rehearsals of that information now held in STM since rehearsed information stands a higher chance of dwelling in STM for a longer period than it would otherwise have. PWIM also stresses on rehersals; teachers will get learners to repeat the new words over and over. Thus, with sufficient rehearsals, those new words taught to learners may then continue its journey from recall into retention, i.e., LTM. Also, PWIM places importance on the meaningfulness content of an item which plays a substantial role in LTM; meaningful repetitions and content quality are important factors. As stated in MSM's model of memory, the exercise of transferring information found in STM to LTM necessitates encoding or consolidation of information (Anderson, 2000).

Atkinson and Shiffrin's (1968) MSM also include the mechanisms of forgetting in each store. In STM, information may be lost by way of decay, forgetting due to passage of time and displacement which refers to replacement of old information by new information coming into the memory store. As for LTM, it is suggested that decay and interference are to be blamed for forgetting of information. Interference refers to either aged information interrupting new-proactive interference or fresh information superseding the old.

The significant assumptions of Atkinson and Shiffrin's (1968) model of information processing is that there exist three separate stores with data passing from one to the other in a linear, and that the STM and LTM are entirely separate. Each store differs in terms of encoding that comes in the form of visual, acoustic and semantic, capacity and duration. Visual refers to images while acoustic and semantic concerns sound and meaning respectively. Undeniably, the model possesses its limitations and with the limitations comes its fair share of criticisms from fellow researchers in the field of psychology. However, the MSM too can claim acknowledgment as a model that is familiar to many researchers and is often viewed upon as a point of reference in many new models of memory.

(a) Sensory memory (SM)

Representing the primary stage of stimuli perception, SM is found to be massive in capacity but transitory in duration. It is further hypothesised that perceptions that remained in the lower stage will eventually be lost. In order to be able to be recalled these perceptions have first to be shoved into an upper stage where amalgamation with memory would then happen. Therefore, it is vital to draw learners' attention to the items in the picture and to get them sufficiently engaged through the subsequent steps of PWIM. It is of utmost importance to transfer fresh information to the next stage of processing since stagnant data start decaying

swiftly if remains static. SM is nothing more than just a "holding place" to store unanalysed information temporarily. Researchers (e.g., Atkinson & Shiffrin, 1968; Baddeley, 1966; Huitt, 2003; Lutz & Huitt, 2003; McLeod, 2007a) reminded that the duration is less than half a second for vision stimuli and is about 3 seconds for audio stimuli.

Therefore, attention and automaticity are the two key influences on SM (Duff et al., 2020) which are among two factors PWIM model of teaching stresses on. Attention is defined as "limitations in our perceptual processing and response generation: to attend to one this is to not attend to others" (Suthers, 1996, p. 1). While attention facilitates the integration and transmission of the information being attended, the impact of factors such as connotation and intricacy of new stimulus as well as similarities between contending stimuli, among others, should also not be dismissed (Duncan, 2012). Conversely, when new information is repeated over and over as in automaticity, redirection of attention to other stimuli is permitted and so is multitasking without learners being distracted from acquiring new information. Hence, in PWIM automaticity occurs when learners were asked to continuously repeat reading and spelling of the new words after the teacher, so much so that attention requirements are non-existence or minimised.

At this stage another significant factor that needs to be highlighted is pattern recognition and understanding with regards to recognition of fresh stimuli in sensory. To acquire new information, matching new stimuli to existing memory structures is very important. As articulated by Driscoll (2001), pattern recognition refers to "the process whereby environmental stimuli are recognised as exemplars of concepts and principles already in memory" (p. 84). Therefore, if new information is not meaningfully introduced, storage in memory will not take place.

Associated largely with senses, the sensory registers are iconic and echoic memories, the sensory store for vision and auditory respectively. Iconic memory, coined by Neisser (1967) from the word "icon", is a pictorial representation that involves images seen as remembered by the brain – memory of visual stimuli. Sperling's (1963) experiment demonstrated beyond doubts that while visual sensory memory exists, retainment remains very brief. According to Huitt (2003) and Lutz and Huitt (2003), for iconic memory, the image will last less than half a second and it is impossible to be invoked voluntarily at a later time. In comparison, the echoic memory, dubbed as such by Neisser (1967), lasted for about three seconds in Guttman and Julesz's (1963) attempt to measure echoic memory. Empirical evidences in later studies (Lu et al., 1992), aided by new brain scanning technology further support Guttman and Julesz's findings in 1963.

The lesson structure of PWIM addresses both iconic and echoic memory when words are first elicited from learners' listening and speaking vocabulary via pictures containing objects familiar to subjects, and then labelled on the picture parts indentified. PWIM also attends to pattern recognition which Driscoll (2001) deemed essential in acquiring new data since words elicited are based on existing memory structures in the form of familiar objects in picture.

As aforementioned, SM may be huge in capacity but its duration is brief. Being so, it is commendable to selectively attend to those material deemed sufficiently important to the learner so to facilitate its transfer to subsequent stages of processing. It is essential to attend to new information prior to decays. Logically, stimulus with enticing features has a much higher chance of grasping an individual's attention where orienting response is more

likely to be obtained. Also, individuals are likely to be more attentive if the stimulus activates a familiar pattern, with researchers utilizing students' prior relevant learning.

(b) Short-term memory (STM)

Constituting the second stage of information processing, the STM specifically refers to holding of information in a state of conscious awareness for a limited duration (Anderson, 2000) and it is frequently termed as working memory by Baddeley (2001). In Freudian terms, this is conscious memory and is part of a human memory that is activated when information is absorbed and processed (Lutz & Huitt, 2003), more effectively so via images as compared to words (Zormpa et al., 2019).

STM can only last for approximately 15 to 30 seconds before decay starts to kick in if information remains unrehearsed (Anderson & Shiffrin, 1968; Baddeley, 1998; Huitt, 2003; Lutz & Huitt 2003). One key step in PWIM is having learners repeat reading aloud new words that have just been taught to them. As stated in MSM, memory at this particular stage can be prolonged with effective information processing via either route or maintenance rehearsal (Huitt, 2003). In short, STM results from plying attention onto an external stimulus or an internal thought, or both. Furthermore, further processing to serve as reinforcement is necessary to avoid new information from suffering decay.

Lutz and Huitt (2003) further suggested that for retention to occur, it is essential to incorporate new information into the memory structure. Hence, inferring that successful transfers of new information from STM to LTM necessitate a more multifarious embellishment than continuance rehearsal schemes. Should stimuli differ immensely from existing structures, existing structures need to be revised to match the new stimuli. Otherwise, structures that are totally fresh or with linkage to relevant existing ones have to

be created in memory as a stand-alone. Thus, meaningful repetitions and organisations remain two main concepts in information processing at this stage (Atkinson & Shiffrin, 1968; Huitt, 2003), as well as to maintain information in STM.

Elaborative rehearsal is mooted as an effective vehicle through which information is able to be absorbed into existing memory structure (Sepp et al., 2019). Thus, the magnitude of encoding cannot be overstated for the direct impact it has on teaching and learning since the aim of education is learning. Repetition without giving meaning to new incoming information is simply not effective enough.

Both maintenance and elaborative rehearsals dwell within the basic steps of the adapted PWIM in the current research. Learners repeatedly hear and see words identified, spelt and written correctly, as well as participated in spelling them correctly. Words are further organised and categorised with the guidance of teachers. It is to be noted that concept attainment in elaborative rehearsal is a structured inquiry in PWIM, specifically designed by Calhoun (1999) to elucidate ideas and to introduce content features.

Additionally, Baddley's (2001) model concerning STM also proclaimed that individuals possess varying degree of cognitive load and selective processing happens when humans choose only relevant information to focus on. In addition, automaticity requires minimum cognitive resources. The capacity in STM is limited in terms of the number of units that can be processed at any one time. In his research, Miller (1956, as cited in Neisser, 2014) discovered that STM can at any one time hold between five to nine items. Applying a range of "+2 or -2", "7 +/- 2" came to be known as Miller's Magic Number – the number of items that can be effectively stored in STM at any one time. However, more recently, the recommended maximum number of stimuli that can be processed at one go it stands at "5 +

2" (Lutz & Huitt, 2003). In the current PWIM study, five words are taught each lesson in accordance to the number of items that can be stored in STM as suggested.

Ultimately, the crux of the matter is that new information or data must be acted upon and integrated into the systems in one way or another for acquisition to take place. It is crucial for new information to be transported to long-term memory, otherwise no learning will occur. Singular maintenance rehearsal is judged inadequate to create a long lasting effect.

(c) Long-term memory (LTM)

Within the LTM store resides the entire perceptions, knowledge, and information previously accumulated by an individual. Unlike STM, LTM provides storage for information or data of unlimited capacity and for extended period of time (Atkinson & Shiffrin, 1968). However, it should be noted that LTM is not a static file system that is used only for information retrieval. As put forth by Abbot (2002), long-term memory "is that more permanent store in which information can reside in a dormant state – out of mind and unused – until you fetch it back into consciousness" (p. 1).

To integrate new information, communication has to subsist between LTM and STM with LTM being in a constant dynamic state. Lutz and Huitt (2003) also believed that it is tremendously important to discover the ways information are stored or can be stored. For instance, if the new data are verbal rather than pictorial, presentation in verbal constructs would be more viable compared to visual ones. Contrarily, knowledge unit in pictorial would be more readily stored in memory in imagery constructs. It appears that memory store structures are the core of concern, as well as the center of controversy among researchers.

Along the years, researchers within this domain are convinced that a specialised categorization system exists within the human mind and that each separate operational function is served by distinctive memory structure in the human brain. With the notion of categorization as guidance, Bruner (1966, as cited in Anderson, 1988, p. 1) hypothesised that "To perceive is to categorise, to conceptualise is to categorise, to learn is to form categories, to make decisions is to categorise." On the learning progress of young learners, Bruner (1966) propounded enactive, iconic and symbolic representation. Enactive representation entails learners' first hand experiences while iconic and symbolic deal with relating to the experiences and generating linkage between ideas respectively. PWIM's lesson structures basically deal with presentation of representations in the form of pictures that learners could relate their experiences and ideas to. Such lesson structures support Bruner's theory on spiral curriculum that advices a continual development from enactive to iconic and to symbolic representation for effective learning that applies on both children and adults.

There exists a distinction between episodic and semantic memory (Tulving, 1972). Both memory types can be recalled and manipulated easily; episodic memory's store focuses on personal experience and precise happenings while semantic memory concerns general knowledge that are remembered. Another researcher, Eliasmith (2001) verbalised episodic memories as circumstantial memory that provides subjects vague memory of the actual situation - more to provide background memory than to process new information. In contrast, semantic memory in handling broad spectrum of intangible information, can be recalled autonomously. PWIM model of teaching utilises both episodic and semantic memory in its instruments to enhance recall and retention of new words taught to learners.

Both Abbott and Huitt labeled it declarative memory that can be put into words or verbalised with stored data or information easily retrieved and expressed in conscious thoughts and sharing. As for procedural memory, Huitt (2000, p. 4) termed it as a "how to" knowledge, that is how to do something. In LTM, procedural memory is connected to but not narrowed down to automaticity where its definition is often associated to learned skills and the ability to recall instruction-like memory (Duff et al., 2020). In terms of imagery, it is described by Paivio (1971) as a memory structure that amass and hoard all information to do with pictures. Deemed extremely practical for context and visual presentation of information, imagery captures information much like a photograph.

Similarly, the adapted model of PWIM in the current study focuses more on semantic memory although it still touches on episodic memory. Through the incorporation of categorization as part of its lesson structure, PWIM imparts knowledge on coding of information with a hierarchical arrangement of related categories. The steps of PWIM take learners from learning how to categorise a word from a general category to a more specific one and to pre-determine objects or situations based on the respective categories that they can fit in. Though there are emergence of new organisational forms, the core principle behind long-term storage of knowledge appears to remain linked to concepts and strategies distinctively associated to the encoding and categorising of new information.

Huitt (2003) further added that information in LTM is stored in interrelated networks of schemas that in turns are responsible for shaping complex knowledge structures. Related schemas ensure that attention will be diverted to relevant information while non-relevant information will be duly disregarded (Anderson, 2000). Therefore, we are able to remember relevant knowledge when we are presented with similar information. In this phase, both

duration and capacity are unlimited. Encoding is extremely important and though to a large extent semantic, it can be visual and auditory as well.

In sum, the consensus reached is that information is processed and stored in three stages whereby information is transferred from SM to STM if attention is paid to it. Next, transfer of information from STM to LTM takes place with the aid of rehearsals. Alternatively, other researchers (Baddeley, 2010; Baddeley, Hitch, & Allen, 2009; Craik & Lockheart, 1972; McLeod, 2007, 2008; Vallar, 2006) have put forth the notion of that LTM is segregated into declarative and procedural, rather than a sinle unitary unit store as in MSM and that distinction arises in terms of encoding, duration and capacity between STM and LTM. Still, it has been concluded that deep processing resulting from elaborative rehearsal leads to more accurate retention as well as recall as compared to shallow processing that arises from maintenance rehearsal (Craik & Lockhart, 1972). In the present study, PWIM too adopted elaborative rehearsal that basically involves semantic processing that occurs with the encoding of meaning of words in its lesson structures.

2.7.1.3 Inductive thinking

The inductive thinking concept incorporated in PWIM is based chiefly on the work of the late curriculum theorist, Taba (1967) and those of other researchers (Schwab, 1965, as cited in Joyce, Calhoun, & Hopkins, 1999; Tennyson & Cocchiarella, 1986) who have over the years contributed to the corpus of teaching strategies pertaining to thinking skills. The focus of their research was predominantly on information seeking and organisation, creating and testing of hypothesis, and identifying the correlation among sets of data. Eventually, Taba (1967) concluded that learners' mental ability is of major concern in learning and that thinking skills should only be imparted through teaching strategies that are

specifically produced for such skills. In addition, she stressed that it is necessary to employ these strategies sequentially as one thinking skill builds on the other.

The inductive thinking model of learning and teaching is designed specifically to instruct on concept formation and the application of concepts simultaneously (Joyce, Weil, & Calhoun, 2009). Hence, the model focuses on cognitive tasks with the primary objective of developing learners' mental abilities. Taba's (1967) model was further adapted by Joyce and Calhoun (1996, 1998), and Joyce, Hrycaauk, and Calhoun (2001) for PWIM where inductive thinking skills was incorporated into its lessons structures that require teachers to draw words from learners' existing vocabulary inductively based on pictures that contain scenes or items familiar to the learners.

Joyce and associates (2009) considered learners to be "natural conceptualisers" (p.86) and capitalising on this natural tendency, they sanctioned the importance of providing students with conducive learning environments and allocating them tasks appropriate in forming and using concepts while all the while consciously guiding them throughout to hone their skills in doing so. Summarised, the core of the inductive model is learning how to create and extend concepts while deciding on the basis on which to build categories.

As Joyce et al. (2009) postulated, the inductive model "causes students to collect information and examine it closely, to organise the information into concepts, and to learn to manipulate those concepts" (p. 87). It was further claimed that employed consistently over time, this strategy is able to not only enhance students' abilities to form concept efficiently but it will also broaden the students' range of perspectives in which they view information. Each time, the content objectives of inquiring into and mastering important topics in the

curriculum are carefully fused with the process objectives of learning to build, test and to use categories.

In 1976, Taba developed three teaching strategies that she built around the three basic thinking tasks identified with each task corresponding to a juncture in the inductive thinking process. The three tasks are concept formation, interpretation of data and application of principles. Her first task, concept formation, the fundamental teaching strategy, revolves around three components; classifying and detailing of relevant data, clustering items according to group similarity, and identifying categories for the groups. Interpretation of data, the second strategy is developed towards specific operation skills, interpreting and inferring of relationships, and generalising. Taba's (1976) third teaching strategy is application of principles pertaining to new challenges such as predicting the outcomes of prefixed circumstances, providing explanations for the predictions and verification of predictions.

Joyce et al.'s (2009) guidelines for designing of lessons and units are based on the four phases identified and evolved from Taba's work on inductive thinking. The first is identifying and enumerating the relevant data while the second phase is segregating these items based on their common attributes. The third phase is to interpret the data and develop label for the categories while the last phase is to convert these categories into skills or hypotheses. The guidelines for designing lessons and units are formed based on these four phases.

Within the inductive thinking framework, the vital goal is for a learner to successfully learn how to think inductively (Joyce et al., 2009) and to achieve that, students cannot simply be taught or led through it. Instead, regular practice is much needed. The existing guidelines

for the designing of lessons and units are created with that goal in mind; namely focus, conceptual control, and converting conceptual understanding to skills. The environment consists of classification, reclassification, and development of hypothesis.

The lesson structure of an inductive thinking model of teaching primarily stress on focus, conceptual control and converting conceptual understanding to skills (Joyce et al., 2009). The issue of focus concerns helping learners to develop and master the art of concentrating in the absence of constraints that might hamper their capabilities to create ideas. Learners are provided with relevant data and steered to assimilate attributes of the items. In PWIM learners are given word cards. The guidelines next stress on learners achieving conceptual mastery. In PWIM's structural instructions, the aim is to make a distinction of the words and cluster them accordingly into categories based on common traits. The final concern is to help learners generate hypothesis by way of transferring conceptual understanding to skills. Here, learners are to explore word identification via recognition and mindful application of items learnt in reading and spelling.

More recent studies along the line of inductive thinking were detected among researchers such as Mousa (2017), Bharti (2015), Billing (2013), and not so recent ones such as Prusty (2006) and Kumar (2002). Mousa's empirical studies on inductive reasoning in 2017 laid claims to increased cognitive skills such as logical and strategic reasoning among subjects' post intervention. These findings are in tandem with Prusty (2006) who concluded that the inductive thinking model is more effective on enhancing learner's inductive reasoning facility and concept attainment ability as compared to traditional approach. As for Bharti (2015) who explored inductive thinking on scientific creativity, positive findings were recorded with pre achievements considered as covariate with gender and intelligence

variables not taken into account. In a similar vein, Billing (2013), who experimented inductive thinking on learners' achievement motivation and deep and surface learning approach in learning science also recorded significant difference in achievement motivation but the difference gained is non-significant for the later. Further underscoring the effectiveness of the inductive thinking approach is Wanjari (2005) who stressed that the model positively impacts her subjects' achievement in science and scientific creativity and the learners' attitude towards learning. Kumar (2002), on the other hand, opined that learners' retention of knowledge is greater through the inductive thinking model as compared to traditional method.

2.7.1.4 Concept attainment

Concept Attainment is fundamentally entrenched in a constructivist approach to teaching and learning (Bruner, Goodnow, & Austin, 1956). According to Bruner, Goodnow, and Austin (1967), concept attainment is "the search for and listing of attributes that can be used to distinguish exemplars from nonexemplars of various categories" (p. 233). This instructional model empowers learners to leverage on prior knowledge while utilising the processes of comparing and contrasting to establish the attributes of a concept, progress to build concepts and to categorise new information learnt into varying concepts. In PWIM, learners are encouraged to come up with categories for new words learnt. Then, they are gradually led into putting those new words into the different categories. In doing so, the PWIM learners are also exposed to knowledge on building hyphothesis around different categories.

Derived from Bruner's (1961) study on concepts and the manners they are attained (Bruner et al., 1956), the terms are deemed imperative for deeper understanding of conceptual learning. The terminology basically encompasses name, attributes, attribute

value, exemplars and rule or definition. Name is a term bestowed on a concept once the said concept is ascertained while attributes refer to the characteristics of a particular concept. On the other hand, the degree of variation an attribute experiences is known as attribute value. Exemplars which are subsets of a collection of data, denote a range of all instances of a concept. As explained in Bruner et al. (1967), there are positive exemplars, instances containing all critical attributes, and there are negative exemplars, those not containing all critical attributes. Hence, concept learning takes place via comparison of positive exemplars and subsequently, contrasting them with negative exemplars. Rule or definition is simply a statement detailing the fundamental attributes of a concept. Hence, in the concept attainment process, new ideas are introduced–and defined by students–inductively through the "act(s) of categorization" (Bruner et al., 1956, p. 244).

Concept attainment, as a structured inquiry in PWIM is designed to elucidate ideas and to introduce content features. From Calhoun's (1999) standpoint in concept attainment, a grouping or category would have already been formed and according to its lesson structures, learners are required to decipher the attributes of the group or category. To do so, it is essential for learners to figure out the differences and similarities of the examples, so called exemplars, that contain attributes of the concept with those that do not until total mastery is attained. Thus, learners learn to develop hypotheses about the nature of the group through comparisons made between positive and negative exemplars (Joyce et al., 2009).

It is to be noted that concept attainment should not be confused with concept formation as there is a distinctive difference between the two in the stages of concept formation (Eysenck & Wilson, 1976). As explained by Joyce and Weil (1985), the concept already exists in concept attainment whereas new categories of concept are only being

formed in concept formation. In short, concept attainment prioritises identification of category so that positive and negative exemplars can be differentiated, in contrast with concept formation that decides the basis on which the categories are built upon.

Additionally, concept teaching serves as avenue not only to analyse learners' thinking processes but also to facilitate the build up of effective strategies (Bruer, 1997). Analysis of the approach adopted by learners towards information found in the exemplars helps towards understanding how learners strategise to attain concepts. To this end, what defines attributes and whether attribute values are a consideration should not be marred with confusion, particularly where teachers are concerned.

Instructions on precise concepts, as well as the nature of the concepts itself guided the formation of the concept attainment strategies. Simultaneously, addressing the relationship between a concept learning task and working memory, Bruner et al. (1956) characterised its teaching strategy as "a pattern of decisions in the acquisition, retention, and utilisation of information that serves to meet certain objectives" (p. 54). In turn, learners are provided with opportunities to brush up on concept building strategies as well as to improve their inductive reasoning. Effectively serving as means for presentation of organised information of a broad array of topics, it can reach out to learners at every stage of development.

As depicted by Joyce et al. (2009), the concept attainment model consists of three phrases; the first being data presentation to learner while the second phase involves learners testing their attainment of the concept, and the third and last phase engages learners in analysing the strategies by which they attain the concepts. The objective of the model is, as stated by Bruner et al. (1956, p. 54), "...to minimise amount of strain on inference and

memory capacity while at the same time insuring that a concept will be attained." The teachers are primarily responsible for providing samples, documenting data of learners and asking probing questions to illicit answers from them. The guidelines for designing of lessons and units are based on these phases (see Figure 2.7):

Concept Attainment Model

Phase 1: Presentation of data and identification of concept:

1. Teacher presents labelled examples.
2. Students compare attributes in positive and negative examples.
3. Students generate and test hypothesis
4. Students state a definition according to the essential attributes

Phase 2: Testing attainment of the concept

1. Students identify additional unlabeled examples as yes or no.
2. Teacher confirms hypothesis, names concept, and restates definitions according to essential attributes
3. Students generate examples.

Phase 3: Analysis of thinking strategies

1. Students describe thoughts
2. Students discuss roles of hypothesis and attributes
3. Students discuss types and number of hypothesis

Figure 2.7: Concept attainment model. Adapted from "Models of Teaching (*Eighth Edition*)," (Joyce, Weil, & Calhoun, 2009, p. 117)

Based on cumulative data from their studies on the external and internal condition of concept learning, as well as behavioral analysis of concepts Klausmeier and Allen (1978) indentified four levels of concept attainment. The levels, concrete level, identity level,

classificatory level and formal level are hierarchical in nature with specific cognitive operations. They are as presented in Figure 2.8:

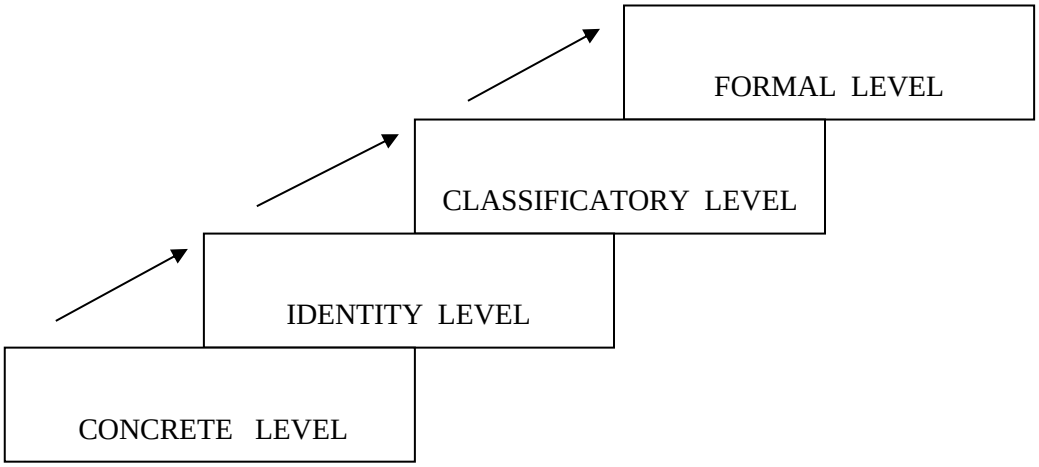


Figure 2.8: Levels of concept attainment (Klausmeier & Allen, 1978, p. 17)

The framework's basic elements involve the identification of levels at which a concept is learned, spanning from its earliest manifestation to its most mature understanding at four successive levels (see Figure 2.8). According to Klausmeier and Allen (1978), it is the interaction between neural maturation and development that enables an individual to advance from one level to another in attainment of a similar concept, beginning at the base, the concrete level. Singularly, neural maturation is insufficient for the process to become functional. The interaction between neural maturation and learning remains the causal effect for the functional outcome. Having attained the concept at the prior level, individuals then proceed to engage in new mental operations required of another (a higher) level.

A cursory observation of the corpus of recent studies on the incorporation of concept attainment in teaching models and the subsequent impacts on learners' achievement reveals significant improvement in achievement levels. One study recorded improved motivation and interest among participants after experiencing the approach. More recently, researchers

who conducted studies on the effectiveness of the concept attainment model in teaching and learning include Amit and Mathur (2013), Bhargava (2013), Kalani, (2008), Mahmood (2017) and Rajwinder (2018).

For instance, Amit and Mathur (2013), and Rajwinder (2018) explored the approach on the learning of chemistry and physics respectively, with secondary school students aged between fourteen to fifteen years as samples. Both researchers stressed that those exposed to the concept attainment method performed much better as compared to those who were not, providing further support to Bruner et al. (1956) concept attainment strategy as an effective teaching tool. Amit and Mathur's study in 2013 was by far more extensive compared to Rajwinder's (2018) study and serves to endorse the superiority of the concept attainment model of teaching in advancing understanding of concepts in physic regardless of gender and with pre–physics scores taken as covariates. The samples also reported higher interest in the subject when taught via the model.

Both Kalani (2008) and Mahmood (2017) similarly documented positive findings on the teaching of science among secondary school students using the concept attainment model. In tandem with the aforementioned studies, Mahmood (2017) opined that concept attainment should be adopted in classroom teachings in general and specifically recommended for teaching of science concepts in view of the significant results obtained in his study. Covering two schools in India, one private and the other a public school, a total of 120 participants were subjected to an Achievement Science Test and Jalota's (1972, as cited in Basu, 2016) Group Test of General Mental Ability. Kalani (2008), who explored the recall and retention of science concepts via the concept attainment model, claimed that her samples

achieved higher scores in both recall and retention tests as opposed to the control group who were taught the conventional approach.

Another recent study pertaining to social sciences was conducted by Bhargava (2013) on the effects of concept attainment on the achievement of 74 Year 9 students in social sciences. Subjects were exposed to instructional materials prepared accordingly and subsequently pre- and post-tested. Analysed data show that the experimental group outperformed the control group who received conventional method of teaching instead. The researcher further clarified that concept attainment is deemed effective in clarifying ideas and concepts, and in introducing challenging aspects of contents.

In the above-mentioned divergence of studies, a consensus in the form of cumulative documented data can be detected in prescribing to the effectiveness of Bruner et al. (1956) concept attainment model of teaching. In the present study, the instructional model of the adapted PWIM is guided by the phases of the concept attainment model in its design. Namely, as stated in Bruner et al's. work, the predominant aims of the concept attainment model are to promote long-term learning and to steer them towards acquiring the habit of making analysis through inductive reasoning.

2.7.2 General Systems Theory: Developmental Priming Mechanisms

PWIM's instructional environment is also associated very closely to the situation articulated by Ramey and Ramey (1998). Since the 1960s, together with fellow researchers of life-science disciplines, Ramey and Ramey have focused on causal factors in developmental discrepancies related to young children and their intellectual performance and social competence. This is not surprising given that school achievement is at the forefront of many countries' domestic social policy concerns, including that of Malaysia.

Recent scientific advances in the fields of early childhood education have supplied scientific evidences that affirm learning and brain development that occurs early in life produces enduring and significant outcomes.

In Ramey and Ramey's (1998) earlier research efforts, six developmental priming mechanisms were derived from General Systems Theory and identified as being associated repeatedly with positive cognitive, social, and emotional outcomes of children, and likely affecting adults' ongoing development (Calhoun, 1999). The presence of the priming mechanism in children's lives on a recurrent and predictable basis is of absolute importance for their overall well-being. In line with Ramey and Ramey's (1998) stance, children are more likely to possess the much needed opportunities to draw on their natural curiosity for optimum all-round development should they be provided with suitably appropriate enriched early care and learning opportunities. Children who lack exposure to these developmental priming mechanisms are hypothesised to be cognitively and linguistically impaired, and their social development compromised (Ramey & Ramey, 2002), with the effects of the impact encroaching into their teenage years and adulthood.

The mechanisms are part of a theoretical framework that can be traced to the General Systems Theory. Ramey et al. (1995) further applied it to two-generational early intervention programmes. Over time, there have been further contributions by other researchers (e.g., Bradley et al., 1989; Demetriou, Merrell, & Tymms, 2017; Raad & Leyla, 2017) that have contributed towards the corpus on transactional experiences and these have been summarised by Ramey and Ramey (1998) and presented in Figure 2.9.

Developmental Priming Mechanisms

1. Encouragement of exploration
2. Mentoring in basic cognitive and social skills
3. Celebrating new skills
4. Guided rehearsal and extension of new skills
5. Protection from inappropriate punishment or ridicule for developmental advances, and
6. Stimulation in language and symbolic communication

Figure 2.9: Developmental priming mechanisms. Adapted from "Early Intervention and Early Experience," (Ramey & Ramey, 1998, p. 115)

According to Calhoun (1999), "the framework of PWIM addresses five of the six priming mechanisms for continued development namely the first, the second, the third, the fourth, and the sixth priming mechanisms" (p. 26). In PWIM lesson structures, these five priming mechanisms are actively promoted. Take for example, the first priming mechanisms "Encouragement of exploration". In PWIM, learners are highly encouraged to explore words related to the PWIM picture put up. Teachers will guide and support learners to throw out words that are connected to the picture. Learners will be praised for participating in lessons in accordance to the sixth priming mechanism. Also, guided rehearsals of new words taught to learners are in PWIM's framework. PWIM model of teaching also teaches and trains learners on word expansion based on the new words they have learned, thus addressing the forth primning mechanism. As for priming mechanisms two and six, mentoring by teachers as well as peers take place both consciously and subconsciously throughout each PWIM lesson and it is in the lesson structure that teachers are to encourage learners to produce as many words as possible in relation to picture shown to them.

Ramey and Ramey tested the hypothesis that continual presence of the developmental priming mechanisms in the lives of children from economically poor and uneducated families could be efficacious in boosting their language skills and academic achievement at preschool level. It is funded primarily by the National Institute of Child Health and Human Development, the U.S. Department of Education, the Maternal and Child Health Bureau of the Public Health Service, the Administration on Children, Youth and Families, and the Robert Wood Johnson Foundation. Advancing similar principles, Ramey and Ramey attested (1998, as cited in Demetriou, Merrell, &Tymms, 2017) that early success measures of preschool interventions are often preliminarily judged by the children's store of language skills as well as attention span, which are deemed best predictors of subsequent academic success.

Thereupon, research on a revised developmental priming mechanisms in the form of "seven essential types of experiences" (Ramey & Ramey, 1998, p. 474) similarly discovered that these experiences as essential for normal intellectual and behavioural development in children, irrespective of their social or economic background. With the support of extensive scientific evidence, copious aspects of development in a child are documented to be causally linked to these seven types of experiences that deal with promoting exploration, providing guidance in fundamental skills, acknowledging progress achieved, developing fresh skills, guarding against improper censure, ridiculing and penalty, and lastly, enriching effective communication (Ramey & Ramey, 2004).

Notwithstanding the minor differences and the addition of one mechanism, both demonstrate the significance of providing children with enriched learning opportunities within a warm and responsive social context for maximum cognitive and linguistics

development. It is obvious that Calhoun (1999), Joyce, Hrycauk, and Calhoun (2001), and Ramey and Ramey (1998, 1999a, 1999b, 2004) remained steadfast in their affirmation that immersion in a rich and highly interactive language environment that comes with optimum types and amounts of language and cognitive experiences, will result positively in children's early language and cognitive development, marginalised though they may be in other ways.

Therefore, in the application of the PWIM-A in this study the instructional environment created among students in the intervention group other than addressing the initial five priming mechanisms as stated by Calhoun also include the seventh experience, enriching effective communication.

2.7.3 Picture Superiority Effect (PSE)

PWIM's framework is essentially based on the idea that pictures are remembered better than words with documented evidence as first mooted by Kirkpatrick (1984). Anchored by the notion that memory of pictures is superior, i.e., the picture superiority effect, the lesson structures in Calhoun's (1999) PWIM are constructed around utilising pictures to enhance language development. PSE is viewed as aligned to theories that emphasis encoding and storage processes, as well as retrieval factors as the points of effects since the process of remembering is broadly envisaged as engagement of encoding, storage and retrieval. Distinct theories that underpinned approaches employing pictures for language enhancement such as the present Pwim-A study are Paivio's dual-coding theory (Paivio, 1971, 1986, 1991), Nelson's sensory-semantic model (Nelson, 1979; Nelson, Reed, & McEnroy, 1977) and the principle of transfer appropriate processing as suggested by Roediger (1990), and Weldon and Roediger (1987).

Pictures are also generally known to be more diverse and distinct in its facets and as such, it has been hypothesised that memory effect can be attributed to perceptual features. In PWIM, leaners' attention is first drawn to pictures and then only attempts are made to label items in the pictures with words drawn from learners based on their perceptions of the picture. Opportunities exsits for distinctive memory encoding due to varieties in pictures unlike words that are limited, spoken or otherwise.

It is also significant to the present study that PSE is applicable to both recall and recognition (Madigan, 1983; Paivio, 1991; Tan et al., 2020) with retention being enhanced typically by imaginal coding (Roediger & Weldon, 1987). The objectives of the present study are to look at the recall and retention of vocabulary knowledge after being exposed to PSE. This is carried out with documented research data supporting the fact that picture superiority is largely resolved by conceptual processing through the presumption that pictures are processed semantically with a greater probability or efficiency as compared to words.

The notion of superior memory of pictures being applicable to recognition, recall and retention in the present study is underpinned by Paivio's dual-coding theory (DCT), Nelson et al. (1977) sensory-semantic model and transfer-appropriate processing (TAP) approach by by Roediger (1990). Perceptual form possessing strong influence on pictures superiority is evidently elaborated in Paivio's dual-coding theory with the assumption that verbal and pictorial input are independently handled within two different memory stores. Additionally, the sensory-semantic model links storage to perceptual form, conceiving of a semantic store where common codes embody connotations of events, regardless of input form while TAP elaborates on PSE through conceptual processing. Both perceptual and conceptual factors

pertaining to PSE are further reiterated through the encoding theories and TAP in the ensuing sections.

2.7.3.1 Perceptual superiority

The perceptual format as to how study items are presented form the core for picture superiority in memory (Ensor, Surprenant, & Neath, 2019) with theorists promoting the notion of picture superiority as resulting from richer perceptual encoding. The dual-coding theory and the sensory-semantic model are among the most widely known ones.

Of the numerous encoding theories based hypotheses that arise from research conducted on pictures versus words and picture plus words, one of the most prominent is Paivio's DCT (Kassim, 2018; Lee, Pandian, & Rethinasamy, 2019). Propounded by Paivio in 1971, the DCT suggests that picture superiority reflects a difference in the way pictures are decoded. Paivio (1986, 1991b, 1995) further claimed that since pictures are dual coded, by eliciting a verbal code and an image code it has a definite edge over words which encoded verbally, are just single coded.

Nelson and his colleagues (Nelson, Reed, & McEvoy, 1977; Nelson, Reed, & Walling, 1976) suggested the sensory-semantic theory, the second encoding theory of picture superiority. It differs from the Paivio's dual-code theory in that the relative order of access to phonemic information is different for both sensory and semantic codes (Nelson, Reed, & Walling, 1976). Both dual-coding theory and the sensory-semantic model stressed on the differences detected in encoding between pictures and words in describing picture superiority.

Paivio's dual-code model is representative of the teaching model employed by PWIM that also embraces both verbal and nonverbal, two interdependent types of memory

codes, to process and store information. Specifically, the picture superiority effect results from greater processing for pictures than for texts only (Aryanto, 2020; Nelson et al., 1977; Paivio, 1971, 1991a). Not to be discounted are semantic processing theory and TAP. The former highlights activation of sensory and semantic codes in a pre-determined sequence while the later embraces conceptual processing in its explanation on picture superiority.

Paivio's (1971) DCT is widely acknowledged in explaining the superior effects images possess over texts. As illustrated by Paivio (1971, 1986, 1991), the operation of the human mind is seen as within pictures and words representations, two distinct fractions in mental representations that are stored in independent yet interconnecting systems. Pictures are presented by an image code while words are by a verbal code. Both are differently represented but remain connected via existing interconnecting systems that allows one to evoke the other. As for memory, the human memory is similarly perceived as comprising verbal memory and image memory, again two independent yet functionally interacting stores. These are the fundamentals that underpin the PWIM that employs pictures and accompanying words principally to evoke learners' existing vocabulary knowledge for language development as well as to enhance their recall and retention of new information.

PSE is set within this framework. According to Paivio (1971), pictures are better remembered than words simply because it is dual coded while it is implausible for words to be so. According to Kassim (2018) and Aryanto (2020), storage of one memory traces has lower probability in retrieving stored events compared to two memory traces. In PWIM, rather than giving a list of words to learners and teaching them to read and spell based on the word list, this model of teaching make use of dual-coding to maximise learning and teaching experience. In the present study, learning takes place with teachers highlighting

items in picture and labelling those items together with the learners. There is a plethora of empirical evidence supporting the superiority of a dual coded model over a single coded one, especially within the realm of young learners (Nelson & Kosslyn, 1976; Nelson, Reed & McEvoy, 1977; Nelson, Reed, & Walling, 1976; Wilgosh, 1975, as cited in Levie & Hathaway, 1988), evidently naming a picture spontaneously is more conceivable than imaging the pictorial reference of words (Baadte & Meinhardt-Injac, 2019; Snodgrass et al., 1974, as cited in Hockley, 2008).

Past studies have discovered that visual is found to retain double the information of those in the auditory condition. Apparently learning style has zero influence on the retention of information as recorded in Cuevas and Dawson's (2017) investigation on retention of visual and auditory information between learning styles and dual coding. This implies that principles of dual-coding should be incorporated for the greater benefit of students such as utilising pictures in the classroom for more effective learning and teaching sessions as what PWIM does. In a similar vein, Koć-Januchta et al.'s (2017) study on verbal and visual learners' eye-tracking in the context of multimedia learning produce findings that whilst the cognitive style of learners' visualizer-verbalizer might influence learning behaviour and preferences when studying with texts and pictures, visualizers attained better results, denoting the effectiveness of the dual-coding principles.

As elaborated by Paivio (1976), DCT has shown that human cognition is able to handle language, together with nonverbal objects and event simultaneously. The researcher has also made the claim that language system does not only concern linguistic input and output in the form of speech and writing but it also serves as a symbolic purpose to nonverbal

objects, events, and behaviours, and that this dual functionality has to be accommodated in a representational theory.

Based on his dual-coding theory, Paivio (1976) assumes that there exist two distinct and separate systems to serve human memory and cognition in learning. One system deals with language in the form of verbal information such as printed words, speech sounds, Braille and motor feedback from writing. The other system is for processing nonverbal information such as pictures or objects, environmental sounds, fellable objects, motor feedback from the physical exploration of objects. Although these two systems are capable of functioning separately they can also function together, complementing each other in a state of interconnectivity. It appears that representation in one system can activate those in the other, thus enhancing recall (Al-Seghayer, 2001; Lee, Pandian, & Rethinasamy, 2019). This notion is also supported by Pandian and Narusuman (2003) who opined that the combined use of verbal and nonverbal processing system may increase memory retention and therefore, facilitates learning. Take for instance, the word "banana" may evoke an image of a banana and the picture of a banana serves to reinforce the concept of fruit. Linking the word and image together serves to improve memory recall and retention, thus resulting in improved learning for the learners. However, when the systems function independently both pictures and words can independently activate nonverbal or verbal memory codes that in turn are indirectly activated by imagery and verbal encoding tasks (Al-Seghayer, 2001), thus exemplifying PWIM's framework in enhancing language acquisition and recall and retention of new information. As shown in Figure 2.10, the general model of DCT is one of mental structures and processes where processing takes place between the structural units (Sadoski & Paivio, 2012).

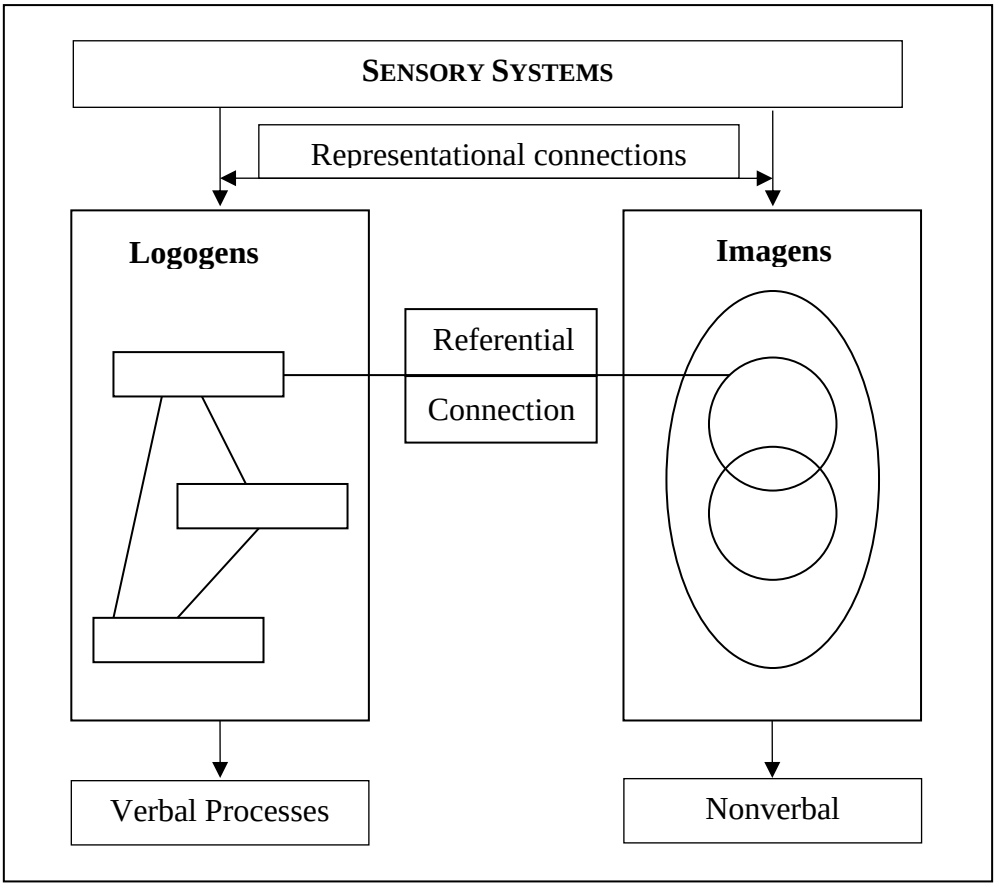


Figure 2.10: Information processing (Paivio, 1971, p. 65)

According to Lim (2003), learners may select the manner of information processing based on individual needs and learning style. This flexibility in choice helps in their learning and when presented with multiple ways of learning, each learning method complements one another to enhance learning.

Paivio's (1971) coding hypothesis works on the idea of two different types of representational units, imagen of mental images and logogens of verbal entities. Imagens are images or picture-like representations while logogens point to linguistic information such as words and sentences. Thus, PWIM framework as based on Paivio's (1971) DCT can be deduced that using pictures with words simultaneously which represents dual coded

information is much easier to retrieve and to retain as compared to monocoded information. As claimed by Paivio (1971), imagens are processed much faster in the recalling of information through synchronous processing as compared to the sequential access of information in the verbal system. Paivio and Begg (1981, p. 68) exemplified Paivio's DCT as in Table 2.1.

Table 2.1: The two systems that serve memory

Sensory modality	**Symbolic systems**	
	Verbal	**Nonverbal**
Visual	Printed words	Picture or objects
Auditory	Speech sounds	Environmental sounds
Tactual	Braille	Fellable objects
Kinaesthetic	Motor feedback from writing	Motor feedback from the physical exploration of objects

Notes. Adapted from *Psychology of language* (p. 68), by A. Paivio and I. Begg, 1981, Englewood Cliffs, NJ: Prentice Hall.

Furthermore, Chun and Plass (1997) also acknowledged that where vocabulary acquisition is concerned, dual coding of information in the form of a verbal and a nonverbal

mental depiction could happen within a verbal and nonverbal system. In order for this to happen information of the item has to be presented contiguously, visually as well as verbally as such a situation permits storage in short-term memory and assembling of referential linkages between the two representations simultaneously. This is found within the lesson structures of PWIM. Take for instance, to teach the word “apple”, teacher will refer to the picture of an apple and read the word aloud. As such, whenever the same word is encountered the referential mental image is immediately projected, thus referring to its textual definition. Such connections give rise to additional retrieval routes to reclaim or obtain a vocabulary item that alternatively may lead to additive effects in recall. In short, a vocabulary learning approach that leans on associations between the verbal and nonverbal system will marginally augment vocabulary acquisition.

Based on DCT, it is therefore possible for learners to have options in selecting the manner of information processing befitting needs and preferred learning styles since the multiple learning methods complement each other to further enhance learning and that flexibility in making choices aids learning. In comparison with the PWIM method of vocabulary learning, learners are actively encouraged to think inductively with the usage of pictures that contain recognizable items and actions to elicit words from their listening and speaking vocabulary. Hence, when learners acquire vocabulary knowledge via the PWIM approach they are actually exploiting both their sensory systems of logogens and imagens (Lee, Pandian, & Rethinsamy, 2020).

In the vocabulary learning process, they first recognise the speech sounds and then make the referential connection with the pictures or objects to enable them to recall the meaning of the word. In the event they are unable to produce the speech sound in the target

language they may resort to the equivalent speech sound in their mother tongue. Here, the teacher must take extra precaution to guide them to recognise the correct speech sound in the target language eventually. Subsequently, learning is further enforced by the use of the printed words to enhance the retention of the meaning of the target word. These combinations of multiple ways of learning via the PWIM method have proven to be effective in vocabulary acquisition, especially among beginning learners of both native and non-native speakers (Calhoun, 1999; Joyce & Calhoun, 1998; Lee, Pandian, & Rethinasamy, 2020; Ramey & Ramey, 2002; Schwab, 1965; Tennyson & Cocchiarella, 1986). Hence, it is assumed that the adapted PWIM will have a similar effect as the original PWIM.

Initially proposed to elucidate the powerful mnemonics effects of imagery, Paivio's DCT has evolved way past its implications for cognitive psychology. The sheer diversity of notions, both controversial and complementary, that surfaces from the incarnation of the line of thoughts in the dual-coding theory is perceived as being responsible for the resurgence of scientific and philosophical attention in imagery. Widely conceded as one of the foremost theories of cognition in the 20th century, its' influences embrace an extensive array of psychological issues such as thinking processes and styles, language acquisition and understanding, the psychology of language skills as well as performances of athletes (Sadoski & Paivio, 2012).

The DCT has for years remained an underlying area of educational and psychological discussions. Recent studies on dual-coding theory comprised the influence of visual-verbal cognitive style on learning from text-picture combinations (Höffler, Prechtl, & Nerdel, 2010, Riding & Douglas, 1993) and the disparities between visualizers and verbalizers by means of eye-tracking, a direct observational method (Mehigan et al., 2011; Tsianos et al., 2009)

as well as in the context of multimedia erudition (Koć-Januchta et al., 2017). Yang and his associates (Yang et al., 2018) acknowledged that the dual-coding theory is generally looked upon as a notable theoretical base in literacy instructions, endorsing technology-integrated practices based on their reviews of reading theories that focused on conventional classrooms instructional practices that shifted to digital settings.

Similarly, the **s**ensory-semantic theory is another encoding theory proposed by Nelson and his colleagues (Nelson, Reed, & McEvoy, 1977; Nelson, Reed, & Walling, 1976) to expound the superiority of pictures over words. This particular model is based on the presumptions that it is possible to activate both sensory and semantic codes for both forms of representations notwithstanding a notable difference in the relative sequence of how both gain access to phonemic information. For pictures, phonemic access is indirect with semantic processing occurring prior to name codes becoming accessible. In the case of words, direct phonemic access does not necessitate the call for earlier semantic processing. Thus, pictures have to be meaningfully understood before labelling can occur. Adversely, words do not require semantic access for the activation of phonemic codes. PWIM, as employed in the present study is aligned to this theory in that phonemic access occur indirectly with semantic processing simultaneously prior to name codes becoming accessible. Focus is very much on the picture where learners are first directed to the items in it before words are being brought into the lesson gradually.

Additionally, high levels of conceptual similarity among the labels for the pictures result in inconsistent effect. Therefore, in PWIM only one picture is used at any one time during lesson and the picture contains only one concept since pictorial superiority effect stands disrupted by either schematic or conceptual that are highly similar (Nelson et al.,

1976) which might cause eradication or reversal of the classic pictorial superiority effect. PWIM avoids label similarity because based on the principle of sensory semantic processing, it will bring about disrupted performances irrespective of other variables particularly when tasks necessitate either serial reconstruction or serial recall of the order of the two types of stimuli, pictures and words. Thus, justifying the apparent necessity of labelling stimuli in remembering serial order.

The DCT and sensory-semantic theory both present a description of picture superiority based on differences in encoding between pictures and words although Nelson and his fellow colleagues' sensory–semantic model differ from the Paivio's DCT in the relative order of access to phonemic information for both sensory and semantic codes. Nelson's (1977) sensory-semantic model is as illustrated in Figure 2.11.

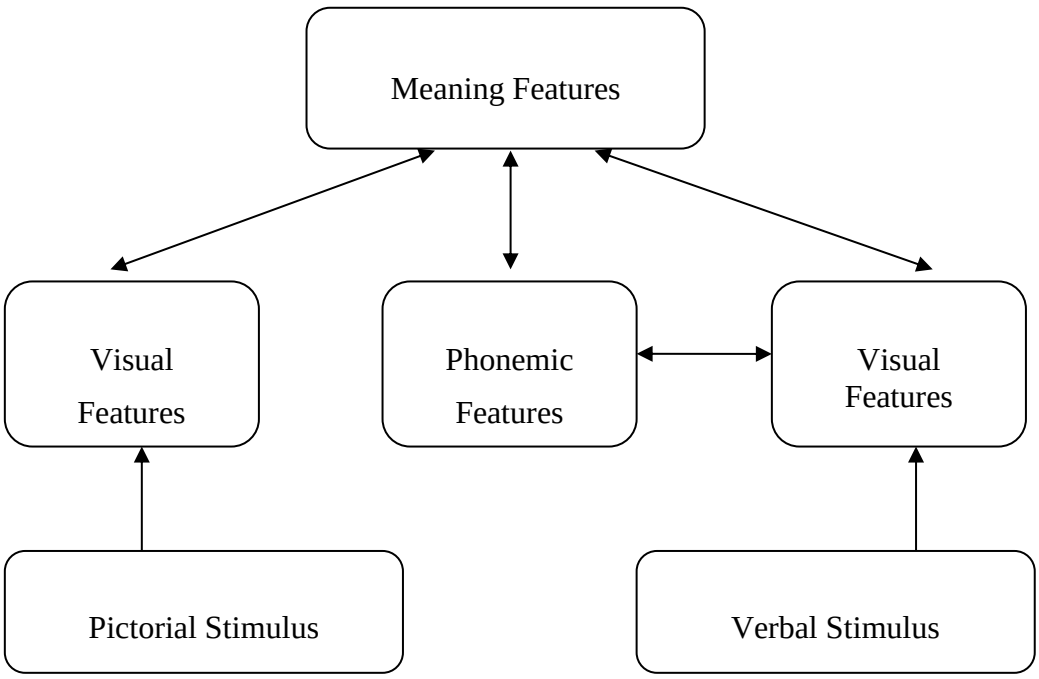


Figure 2.11: The Sensory-semantic model of picture and word encoding (Nelson, Reed, & McEnvoy, 1977, p. 486)

As illustrated above, different stimulus targets different features or codes that results in different activation order. Unlike verbal stimulus, the meaning features for picture stimulus can be accessed with the bypassing of the processing of phonemic features, an assumption that has received tremendous support from Nelson and Brooks (1973), Nelson and Reed (1976), Potter and Faulconer (1975), and Seymour (1973). Evidently, within the sensory-semantic model lies a distinction between the processing features and the activation of mnemonic codes as an end product of processing those particular features.

Thus, a picture needs to be processed prior to naming it whereas activation of a verbal stimulus is possible even without any previous semantic processing. Nelson, Reed, and McEvoy (1977) linked the PSE to a given level of processing through pictures and their labels as paired stimuli, underpinning the basic framework of PWIM that involves processing of phonemic features together with presentation of words to evoke language learning. Particularly for words without the benefit of meaningful context, some levels of processing of phonemic features are necessary to achieve semantic access and this can be achieved through the steps of PWIM (Lee et al., 2019). Additional processing devoted to any features simply increases the likelihood that they will be reintegrated into a functionally effective code. Finally, it's assumed that task requirements have the control over the magnitude of processing targeted at specific attributes (Craik & Tulving, 1975).

Findings signified equal amount of conceptual interference for both pictures and labels irrespective of the categories of the stimuli. It also discounted the level of schematic or visual similarity among the pictures, thus indicating that interference for both picture and label is free from the influence of the type of stimulus generating it. As put forth by Nelson et al. (1977, p. 486), "representations for simple pictures and their labels are functionally

identical, and superior recognition performance for pictures is produced by the greater distinctiveness of their sensory codes." In short, serial reconstruction or serial recall tasks for both pictures and words are disrupted by high label similarity (Nelson et al., 1977). This denotes that label codes are equally reintegrated and used as far as pictures and words are concerned. As such, disruption ensues regardless of status of schematic similarity, conceptual similarity or amount of study time (Nelson, Brooks, & Borden, 1973). The need for verbal labelling in this case is apparent. As for the stance taken on paired-associate tasks, high levels of label similarity possess zero impact since such tasks require stimulus recognition per se and not recognition of order where pictures are not named (Nelson & Brooks, 1973; Nelson & Reeds, 1976). It is quite obvious there is no apparent need for verbal labeling with labeling being task independent.

According to the sensory-semantic model, either the superior effectualness of reintegrated sensory codes or the greater odds of processing semantic information can be the contributing factor to PSE in serial reconstruction. As suggested by evidence of effects linked to manipulations of schematic and conceptual similarity both are affirmed to have the ability to influence performances (Nelson, Reed, & Walling, 1976). Further extrapolating Nelson et al. (1976) notion of the apparent need for labeling where serial reconstruction tasks are concerned and that accessibility of labels are greater for words compared to pictures, the influential strand of thought is that the reconstruction of the order of labels is more difficult as compared to pictures, markedly when schematic and conceptual similarity are low. Hence, the PSE is reversed when conceptual similarity is high.

The conceptualization of the sensory-semantic model bears substantial similarity to Paivio's (1971, 1976) DCT. More recent studies by researchers such as Curran and Doyle

(2011), and McBride and Dosher (2002) serve to reiterate findings postulated by Nelson, Reed, and Walling (1976) on superior encoding for pictures as opposed to words that in turn facilitates greater recollection for pictures. On a broader outlook, the PSE has been confirmed to be as effective for older people as well (Cherry et al., 2012; Davies et al., 2003). Their studies which examined memory for words versus pictures involved subjects as old as those in their 90s. Likewise, the PWIM model of teaching is deemed effective with learners of various age groups and proficiency levels, including marginalised learners.

2.7.3.2 Conceptual superiority

Conceptual processing is claimed to determine picture superiority. It is an alternative reflection that presupposes conceptual processing at studying stage will be paired more effectively with similarly processing at testing stage given that tests on recall and recognition, explicit memory tests, are mostly conceptual in nature. Thus, pictures have the edge over words in accordance to the principle of transfer-appropriate processing.

Transfer-appropriate processing (TAP) was originally proposed as a principle of memory processing relations based on the rationale that human beings are naturally faster in performing tasks that they have been exposed to previously. TAP is viewed as complementary to encoded representations of stimuli's properties and their context. (Tulving, 1979; Tulving & Thomson, 1973).

TAP's initial framework stresses on explicit memory and how it is facilitated by the degree of overlapping between processes engaged during first and second exposure; the greater the overlap, the greater the performance. Repetitions feature prominently in PWIM's lessons structure; learners are led into repeating newly taught words aloud as well as spelling those words aloud over and over again. Evidently, explicit testings have shown pictures to

be better remembered compared to words. Subsequently, as witnessed in the work of researchers such as Kavitha (1996), Roediger, Srinivas, and Weldon (1989), Blaxton (1989), Roediger and Blaxton (1987) among others, implicit memory duly made its way into the framework with comprehensive implicit testings proclaiming that words produce more priming than pictures.

In the case of the PWIM model of teaching, it utilises pictures primarily in its framework and follows up with illiciting words related to the picture from learners' exsisting listening and speaking vocabulary to enhance one's recall and retention of new information, thus using both pictures and words for mnore effective priming. According to Roediger (1990), it is unnecessary to possess conscious recollection of past experiences as a prerequisite to perform in retention measure transfer, a form of implicit testing which is typically touted also as priming. Explicit measures of human memory, recall or recognition, is basically deemed a reflection of past conscious reminiscence.

Hence, applications of TAP have taken into account the deliberations on dissimilarities and disconnections found between implicit and explicit memory which were embodied and adapted within the implicit memory domain. Also, laboratory evidence of dissociations has contributed towards paving the way for orientation towards distinguishing of perceptual and conceptual processes (Roediger & McDermott, 1993). In this regard, researchers while acknowledging that process differences are correlated to performances differences between implicit and explicit memory, concede that a simple one-to-one equation as such is hardly likely to do justice to the complicated process relating to memory and performance. More recent findings (Veltre, Cho, & Neely, 2015) on memory performance and test-based TAP further demonstrated that review testing leads to higher

achievement in a final test as compared to restudying of test materials. Results of the 2015 study suggested that the degree of overlapping between the retrieval processes in the final memory test and that of a review test is higher than that of the encoding operations executed during restudy of test materials. Henceforth, an ensuing emergence of an alternative TAP framework by Graf and his fellow associates (Graf & Ryan, 1990; Graf & Schacter, 1987; Schacter & Graf, 1986) that works around the notion that integrative and elaborative processes are intricately linked to implicit and explicit memory enhancements respectively.

Empirical evidence attained in an experiment conducted by Weldon and Roediger (1987) highlights the existence of dissociations between priming tests in normal subjects which are in good agreement with TAP approach to explaining dissociations (See Figure 2.12).

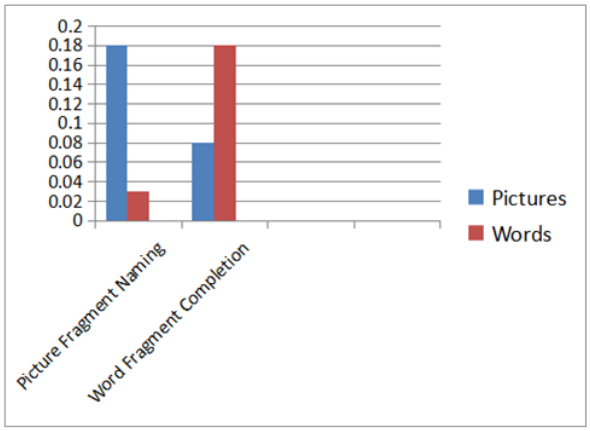


Figure 2.12: Altering retrieval demands reverses the PSE
(Weldon & Roediger, 1987, p. 277)

As appeared in Figure 2.12, there is a distinct dissociation between two implicit tests; there is greater priming by pictures compared to words on the picture-fragment naming test and contrarily so for the word-fragment test. Data obtained were found to be in tandem with the TAP approach in accounting for the dissociations between explicit and implicit tests that

appeared in common subjects that were explained as an operation of assorted independent variables (Balxton, 1989; Roediger, Weldon, & Challis, 1989; Roediger & Balxton, 1987). Thus, the TAP approach also accounts for dissociations between explicit tests (Morris, Bransford, & Franks, 1977) as well as implicit tests (Roediger, Srinivas, & Weldon, 1989).

In sum, interrelation between encoding and retrieval is TAP's expositions for picture superiority. Thus, there is greater possibility for pictures to access meaning during encoding and less so for words (Aryanto, 2020; Weldon & Roediger, 1987; Weldon, Roediger, & Challis, 1989). Hence, the framework as well as the lesson structures of PWIM that prioritise pictures containing items familiar to learners for recognition, recall and retention. Pictures outperform words on recall and recognition tasks, as explained by Weldon and Roediger (1987) and more conspicuous so when tasks demand conceptual retrieval. This resonates with Stenberg's (2006, p. 815) assumption that "pictures are processed semantically with a higher probability or higher efficiency than words are", an alternative approach that supports conceptual superiority in PSE.

2.8 Theoretical framework

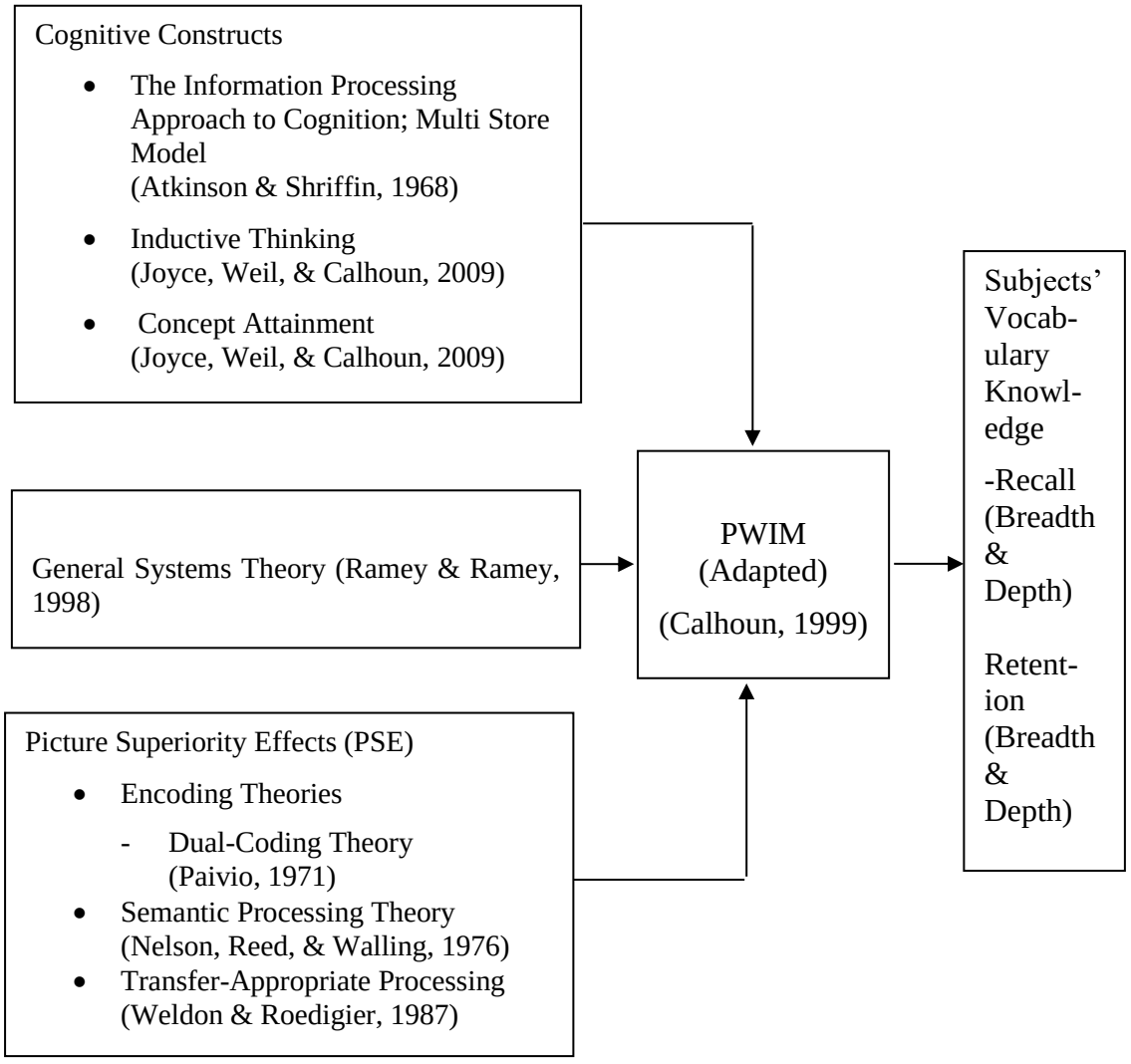


Figure 2.13: Theoretical framework of the present study

2.9 Summary

Chapter 2 recapitulated the essential points of the present study; dimensions of breadth and depth in vocabulary knowledge, their correlation to language development and strategies of vocabulary learning, testing instruments, structure of PWIM and theoretical framework of the present study with the theories underpinning the intervention elaborated in detail.

This chapter started off with the background on vocabulary knowledge in two dimensions, breadth and depth. Numerous researchers' (Hadley & Dickinson, 2018; Hoffman et al., 2014; Nation, 2006; Qian, 1999; Read, 2000) definition of vocabulary breadth and depth were presented and tools employed to measure for both vocabulary breadth and depth knowledge were also meticulously discussed. Testing instruments in the present study consisted of Meara and Buxton's (1987) YNVT for vocabulary breadth and Read's (1998) WAT for vocabulary depth. Subjects in this study were tested for both vocabulary breadth and depth given the significant correlation both dimensions possess to literacy development.

Also, serving as a reminder on the significant role vocabulary plays in second language learning and development, this chapter discussed the correlation of vocabulary knowledge to various language skills. specifically reading comprehension, writing, listening and oral competence, and academic achievement as well. It remains a critically important component in language development and mastery (McKeown & Beck, 2014; Neuman & Wright, 2014; Su et. al., 2018).

The strategies employed in SL vocabulary learning were also covered with the researcher tracing the major approaches in the area of research. Among the earliest of dominant method is the Grammar-Translation Method before we witnessed the reform movement that revitalised linguistics with the establishment of phonetics. Next major approach introduced is Michael West's Reading Method that specifically targeted vocabulary improvement while the mid 90's witnessed the emergence of audio-lingual teaching, followed by the communicative language approach, and Krashen and Terrell's (1983) Natural Approach that too focused on vocabulary knowledge. Additionally, studies

utilizing dramas, films and music had also been explored. However, in recent years, incorporating technology into learning programs seems to be an emerging trend amidst this technology-inundated millennial age. A very recent study carried out by Tan et. al., (2019) used Kahoot!, a gaming system designed with interactive learning in mind for fostering and reinforcing language learning. Although there is no outright concord on an absolute approach for language or vocabulary learning, the numerous current studies pertaining to this topic indicate sustained interest in this domain.

Subsequently, the structure of Calhoun's (1999) PWIM model of teaching was reviewed in this chapter. The lesson structures as well as the steps of adapted PWIM were discoursed in depth. Discussions also touched on the implementations of PWIM in earlier studies carried out. On the whole, PWIM is deemed an effective approach for teaching of vocabulary, beginning reading and writing especially to young learners but in this study the focus is narrowed to vocabulary learning.

The succeeding section in the chapter was assigned to the theories underpinning PWIM. As summarised in the study's theoretical framework, the theories encompassed Atkinson and Shriffin's (1968) MSM, an information processing approach to cognition, Joyce, Weil, and Calhoun's (2009) inductive thinking and concept attainment theories, the general system's theory by Ramey and Ramey (1998), and PSE that comprises Paivio's (1971) DCT, semantic processing theory (Nelson, Reed, & Walling, 1976) and TAP (Weldon & Roedigier, 1987). MSM's principles are based on mechanisms of three memory stores in encoding, storage and duration, i.e., how information journeys from one box to the following. In the case of inductive thinking, it evolves round thinking skills that are imparted through learning strategies to enhance learners' cognitive skills such as inductive reasoning

facilities. On the other hand, PWIM incorporates concept attainment theory in its lesson structures to elucidate ideas, introduce content features and to train leaners in mastering listing of attributes and establishing the attributes of a concept. Additionally, PWIM's instructional setting is closely linked to the state expressed in Ramey and Ramey's developmental priming mechanisms formulated particularly for children. Lastly, there is the PSE that fundamentally supports superiority of pictures over words for both recall and retention of new information. Encoding theories such as DCT form the basis for PSE with representational units composed as logogens and imagens. Both semantic processing theory and TAP too proposed conceptualisation of sensory-semantic model of both implicit and explicit memory in PSE.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The present study focuses on the effects of the adapted PWIM (PWIM-A) on the breadth and depth vocabulary knowledge recall and retention of groups of Year 1 pupils enrolled in rural primary schools in Malaysia.

This chapter describes the present study's research methodology that encompasses research administration procedures that consist of research design and group design, sampling and sample selections. This will be followed by a description of the intervention procedures and research instruments employed for data collection purposes, as well as data analysis procedures. Also included are analyses to determine the reliability of the research instruments and the pilot study that resolves to fine-tune research design and protocols, as well as to verify the full functionality of the present study's methodology before actual application.

3.2 Research Design

The present research utilised the quasi-experimental design, specifically the pretest, posttest and delayed posttest control group design. Bearing in mind the study's objectives, the experimental design was purposefully selected for the essential feature it possesses, which as stated by Cohen, Manion, and Morrison (2018) constitutes the deliberate control and manipulations of conditions that involve changes in a variable's value so that the effect of the change on another variable can be documented. Gay (1992) remains convinced that only the experimental approach is capable of examining and experimenting with hypotheses

pertaining to cause-and-effect relationships; the most plausible method in solving both practical and theoretical educational predicaments.

The choice of this study's research design is further strengthened with Moore and McCabe's (1993) postulations that "the experimental design is deemed the best method and indeed, the only fully compelling method of establishing causation to conduct a carefully designed experiment in which the effects of possible lurking variables are controlled" (p. 202). Although the design may be lacking in random selection and assignment (Shadish et al., 2002) but commonly, the power lies with the researcher on distribution and designation of treatment and control conditions through alternative criterion other than random assignment (DiNardo, 2008). "Often in educational research, it is simply not possible for investigators to undertake true experiments" (Cohen et al., 2018, p. 406). The researcher was able to exert control over whom to measure but not over when with regards to the intervention in this study. Yet, ultimately, a quasi-experiment is "considered worthwhile because they permit researchers to reach reasonable conclusions" (Ary et al., 2009, p. 316) as in the case of the present study.

Furthermore, a quasi-experimental study that assumes the method of exploring cause-and-effect relationships such as the present study permits greater conception of intervention attributes and executions as causal relationships can be ascertained by employing the presence or absence technique where a condition or treatment is applied to one group, termed treatment or experimental group in manipulation of an independent variable while denying the comparison or control group the condition or treatment. The present study, a classroom experiment with naturally assembled cohorts that consisted of intact classes of Year 1 pupils are highly homogeneous as further underlined by comparison

of mean scores from pre-tests administered, as well as supporting data garnered via questionnaire.

In this study the pretest-posttest-delayed posttest control group design was adopted for its suitability in exploring the effects of educational interventions. It remains a preferred method that is widely employed to primarily appraise and compare groups for changes detected upon experiencing treatments (Dimitrov & Rumrill, 2003). As in the present study, the pre-test is a key attribute in ascertaining the equivalence of the PWIM-A and Control group, thus ensuring both groups are comparable and denoting a high level of internal validity within the study. Here, selection bias can be discounted since no extreme disparities were detected on the groups' pretest scores.

Subjects in the study were made up of Year 1 pupils in three primary rural schools in Malaysia; experimental groups experienced the intervention while the control groups experienced the conventional approach adopted in Malaysian classrooms. Pre-, post- and delayed posttests for vocabulary breadth and depth were administered on both type of research groups to test for knowledge recall and retention over time respectively. As such, the research design employed is termed as pretest-posttest-delayed posttest control-group design (Revesz, Sachs, & Mackey, 2011) and is represented as follows in Figure 3.1:

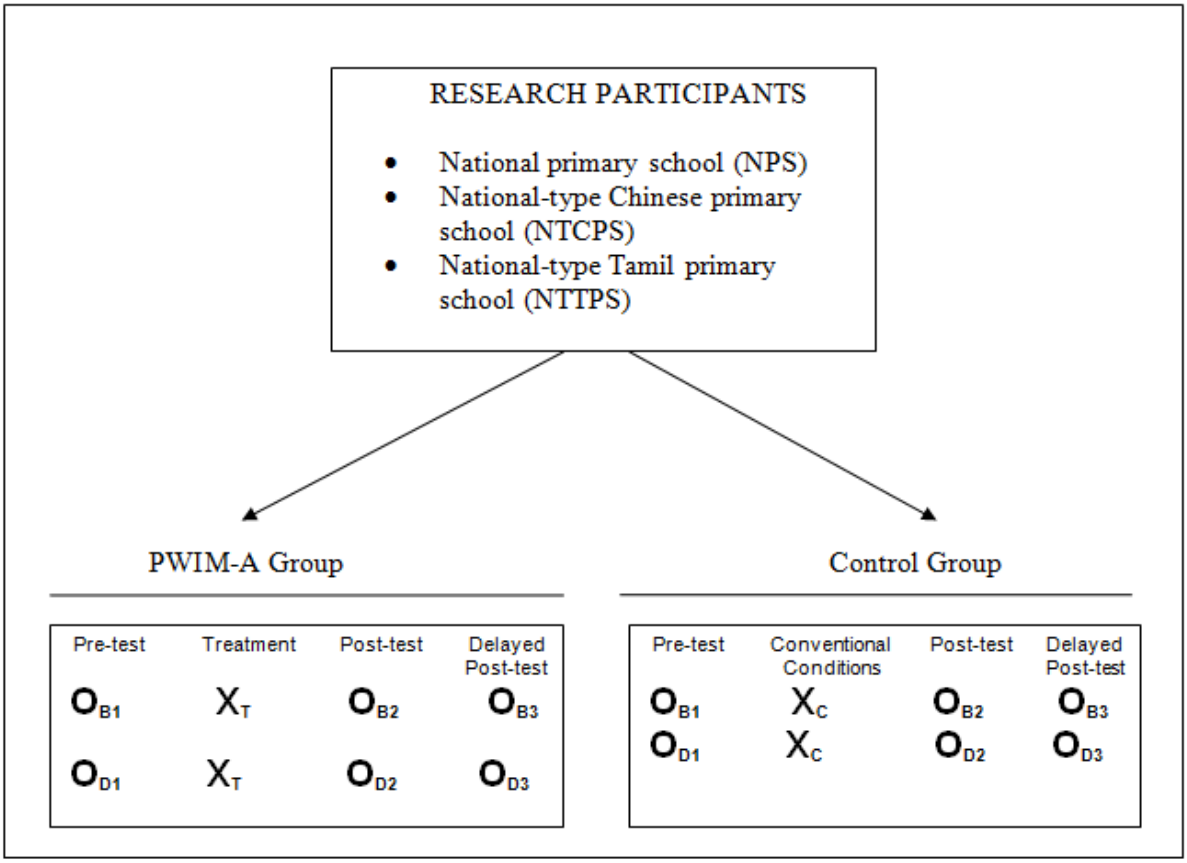


Figure 3.1: Pretest-posttest-delayed posttest control-group design of the present study (adapted from Johnson and Christensen, 2012)
X_T represents the experimental treatment conditions while X_C represents the conventional conditions, and O_{B1}, O_{B2} and O_{B3} represent the pre-test, posttest, and delayed posttest assessments for vocabulary breadth respectively while O_{B1}, O_{B2} and O_{B3} represent the pre-test, posttest, and delayed posttest assessments for vocabulary depth

In Malaysia, the NPS, NTCPS and NTTPS form the largest coalition among the varying types of primary schools in the country. Thus, by involving the population from these mainstream primary schools this study's samples would reflect a broader representative of the population in Malaysia. This study applied random assignment via the random singling out of a slip of paper from the two printed slips that are dropped into a box as done by Gravetter and Forzano in their study in 2012. It remains crucial for researchers to attempt randomisation "whenever and wherever possible" (Johnson and Christensen,

2012, p. 301) although the practical considerations of experimental research are no less important.

However, versatile as the design may be it is still restrained by threats to internal and external validity (Bell, 2010). The former refers to the extent of changes resulting from treatment in experimental settings while the latter is the scale that treatment effect can be generalised across certain factors, e.g., populations, intervention variables, and measurement instruments. Additionally, external validity threats cover interaction effects of selection biases and treatment, as well as reactive interaction effect and reactive effect of the PWIM-A intervention. Factors, including history, maturation, instruments, statistical regression toward the mean, differential selection of participants, mortality, and interactions of factors such as selection and maturation (Dimitrov & Rumrill, 2003).

3.3 Conceptual Framework

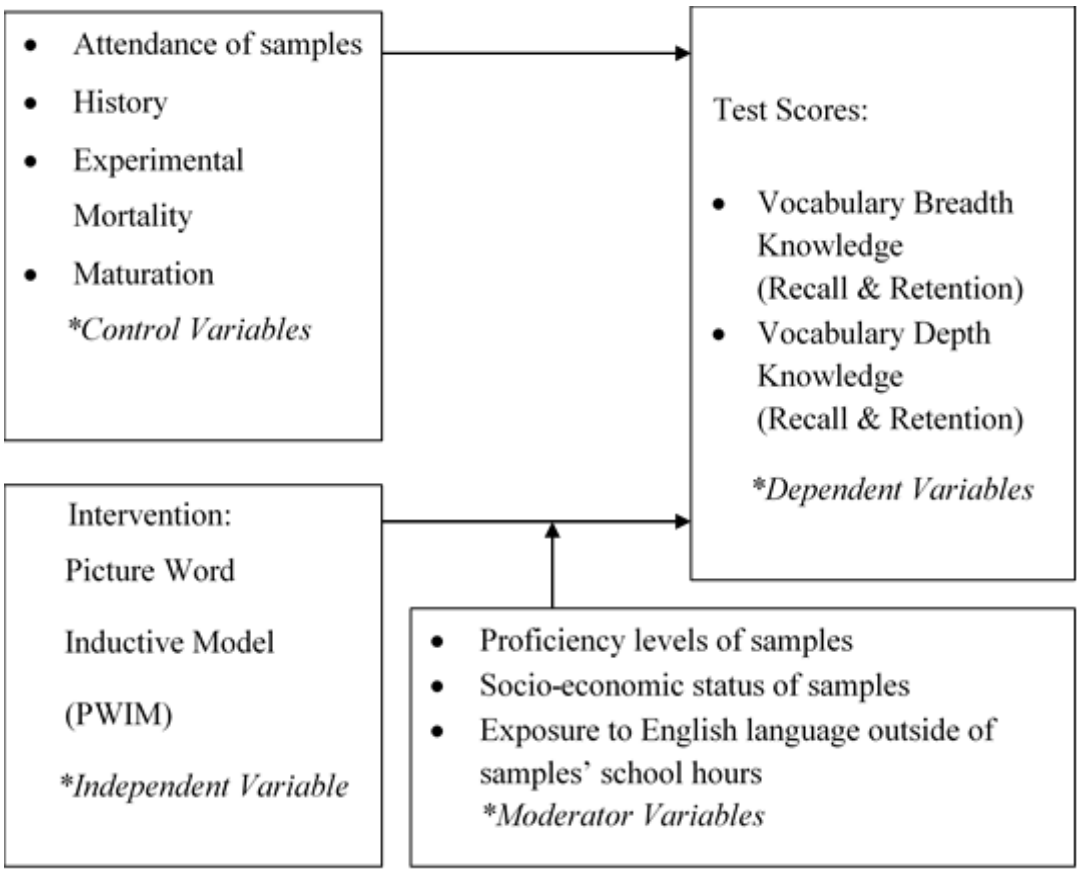


Figure 3.2: Conceptual framework of the study

Miles and Huberman (1994) defined conceptual framework as a visual presentation that "explains, either graphically or in narrative form, the main things to be studied – the key factors, concepts, or variables – and the presumed relationships among them" (p. 18). The components of a conceptual framework embrace causal and intermediate effects, and outcomes. In research, a conceptual framework can be presented in various forms such as flow diagrams, tree diagrams, mind maps or shape based diagrams. The conceptual framework of the current study adopted the flow diagram with a causal network.

A cause-effect relationship forms the basis of experimental research points, with researchers striving to verify such a relationship. As posited by Locke (1975, p. 324), "That

which produces any simple or complex idea, we denote by the general name cause, and that which is produced, effect" (as cited in Shadish, Cook, & Campbell, 2002, p. 4). Causal relationships are generally not deterministic, rather they increase the probability that an effect will occur. Therefore, all such relationships are context dependent to varying degrees and experimental effects are generalised (Shadish et al., 2002).

So, in research it is imperative to identify the relevant variables. Basic variables include independent and dependent variables, moderator variables, mediating or intervening variables and control or extraneous variables.

3.3.1 Dependent and Independent Variables

In the present cause-effects study, the distinction between independent and dependent variables is predominantly relevant. Basically, it is anticipated that a dependent variable in this study will experience changes with the experimental manipulation of the independent variable that stays impervious to the influence of other variables.

In the present study, the dependent variable refers to the vocabulary test scores of the samples whereas the independent variable would be the intervention, the adapted PWIM. In this case, the vocabulary test scores of the samples would depend on the intervention that's being manipulated by the researcher.

3.3.2 Moderator Variables

A moderator variable is also commonly referred to as the interaction effect (Jose, 2013) due to the influences it can exert on the relationship between the dependent and independent variable. Hence, they have been taken into consideration in the present quasi-experimental study. In the current study, the moderator variables comprise of samples'

English language proficiency, their socio-economic status and their exposure to English language outside of school hours. To ascertain homogeneity of samples, the pupils participating in the current study were subjected to questionnaire pertaining to the moderator variables and pupils' pretest scores were compared for baseline similarity that provided indication of homogeneity level in English language proficiency. This is to minimise the moderator variables' influences on independent variable's effects on a dependent variable.

3.3.3 Control Variables

The present study's internal validity risks being compromised should control variables be overlooked or purposefully disregarded. As stated by Jose (2013), control variables possess an effect on the dependent variable and therefore, by extension on the independent variable. This is particularly so in a cause-effect relationship such as this PWIM study. Therefore, to generate a more plausible cause-effect relationship it is deemed necessary to either eliminate or alternatively standardise it so that similar influence is exerted on all the subjects in the study.

a) Attendance

In the present study, attendance of the subject during the intervention period need to be taken into consideration since previous studies have revealed a causal effect of absence on performance for students; student absenteeism is negatively related to academic performance (Balkis, Arslan, & Erdinc, 2016) though the effects may vary with other factors such as student ability (Arulampalam, Naylor, & Smith, 2007). In the case of the subjects in the present study, missing a portion of the intervention would most likely leave an impact on the scores of the vocabulary tests. As such, subjects' attendance would be noted during the intervention period since absenteeism would possibly have effects on the concerned

subjects' vocabulary test scores and therefore, by extension on the effectiveness of the intervention.

b) History

History is another control variable that according to Cohen, Manion, and Morrison (2007), involves relevant events that may happen unintentionally between pre-test and post-test, and generate effects that could be taken for treatment impacts. In the present study, as all the subjects attended mainstream public schools they are exposed to standardised materials/text books as provided by the government, teaching method generally employed in the Malaysian classrooms, number of hours of lesson time, regulated academic calendar, among others. To garner supporting data on subjects' exposure to the English language, questionnaires were utilised and as reported in the following chapter, no extreme disparities among subjects were recorded. The subjects were not exposed to additional English language lessons or English courses/programmes outside of school hours and neither were they provided with extra English language materials that could possibly increase their proficiency in the said language.

c) Experimental mortality

Experimental mortality, similarly termed as "attrition", refers to the loss of subjects from experimental groups (Yount, 2006; Jurs & Glass, 1971, as cited in Jones, 2018). The chances of such an incident taking place are higher in longitudinal studies as compared to studies with relative shorter time span (Cohen et al., 2007; Jurs & Glass, 1971) such as the present study. Although experimental mortality may not a serious threat in the present study given that the duration of the study spanned only one school term, it should still receive due attention based on the possible impact this variable has on research findings. In addition, all

the subjects were settled with their family within the vicinity of their respective schools and the parents were working in industries within the area. No cases of attrition have been recorded during the pilot study and the actual study.

d) Maturation

Maturation concerns age related cognitive development (Newman & Benz, 1998) and therefore, is a significant factor in an experimental educational study (Campbell & Stanley, 1966) such as the present PWIM study. Subjects undergo maturation and changes during treatment but the maturation process among the subjects in the present study can be considered less acute since the intervention period covers a short period of time. Therefore, as the present study spanned approximately one school term it falls short of the criteria of a long term research, and by this token, the threat of maturation is not a major concern with regards to the present study. Another point to be taken is that subjects of the same age group and similar social and economic background are very likely to mature and to develop similarly (Mubarak al-Tamimi, 2006). This is in tandem with Ary et al.'s (2009) postulation that maturation remains a threat only when research groups differ in their susceptibility to maturation. Hence, the maturation variable, though note-worthy, can be disregarded in this study.

3.4 Subjects

In this study, focus is specifically on Year 1 pupils from rural Malaysian schools whereby subjects were selected with representativeness or comparability in mind from Malaysian primary schools in rural areas. Seven-year-old pupils were purposefully selected as samples for this study as findings have persistently point to the urgency of initiating vocabulary building early in children's schooling with early vocabulary knowledge strongly

predicting later literacy success (Biemiller & Slonim, 2001; Cunningham & Stanovich, 1998; Hart & Risley, 1995; McKeown & Beck, 2014).

The selection of a subset of individuals from a target population that is aimed at assessing certain characteristics of the target population is termed as sampling (Neuman, 2000; Saunders, Lewis, & Thornhill, 2012). Purposive sampling such as the cohort in this study where the young learners in the study were primarily selected for their appropriateness in this study pertaining to PWIM (Csiernik, Birnbaum, & Pierce, 2010; Trochim, 2006) has long been accepted for both quantitative and qualitative research (Cohen et al., 2018; Onwuegbuzie & Collins, 2007). Subjects were targeted by researchers with the precise intention of answering a research study's questions and hypotheses.

The present study applied selective control techniques via an equivalent control group that possess the greatest probable similarity to the experimental group which fundamentally replicates what the experimental group would likely to experience had it not undergone treatment. Thus, assisting to ameliorate the pretest-posttest design. The internal validity threat of its design was further addressed with the administration of pre-test and additionally employs intact groups, thus ruling out disruption of existing research setting. To a certain extent, this will work towards thwarting the design's external validity threat as the experimental procedure's reactive effects will be reduced. Johnson and Christensen (2012) further expounded on the role a control group plays as a comparison for opposing hypotheses. "The pretest, posttest control-group design is an excellent design because it does an excellent job of controlling for rival hypotheses that would threaten the internal validity of the experiment" (p. 303).

The present study adopted the probability sampling procedures as opposed to non-probability sampling and closely followed the stages involved in the processing of sampling in primary data collection as advocated by Cohen et al., (2013) that takes into account defining the target population, settling on a sampling frame, determining the sampling size and selecting a sampling method, and applying the chosen sampling method in practice.

Samples for the present study were purposefully selected from schools situated in rural areas in Malaysia based on the list of primary schools provided by the Perak State Education Department. National and national-type primary schools are the mainstream primary schools in the country. Therefore, having subjects from these schools would contribute to make this study a more comprehensive one. The research objectives, as stated, are to determine how the adapted PWIM impacts the recall and retention of the subjects' vocabulary breadth and depth knowledge. They are not to compare the performances of the subjects in their respective schools. The focus is on the effectiveness of the intervention on the subjects. Subsequently, the approval and permission of the headmasters and headmistress of those schools were sought prior to finalizing the participating schools in the current research. All three participating primary schools are located in Kuala Kurau and possess similar postcode (34350), and are classified as schools in rural area. It is to be noted that with due respect to the unanimous request made by the heads of the participating primary schools to remain anonymous, the schools concerned will not be identified other than their general locations.

Rural schools are selected as disparity was documented in the achievement and proficiency levels in English of learners in rural and urban schools. A study conducted by How (2018) and her fellow researchers on the vitality of English language at primary level

discovered that urban-rural setting is a significant thread on the vitality of English language among learners.

Compared to their urban counterparts, rural learners recorded lower proficiency levels as well as lower achievement (Talif & Edwin, 2001, as cited in Haida Umiera & Melur, 2018). On a similar vein, based on her research on English language and the local practices in rural Malaysia, Hazita (2016, p. 113) proposed that, "the business of learning and teaching English in rural areas merits specialized attention and should be addressed expediently." Moreover, Tan Sri Mohd Sheriff Mohd Kassim, in an article in the Star ("Clear need for English proficiency", 2017, online) similarly highlighted the existence of a rural-urban divide in English proficiency and stressed that all efforts must be made to raise English language proficiency in all rural schools in order to afford those in rural areas equal opportunities in tertiary education as well as job prospects.

Thus, sampling for this study, as selected based on the aforementioned reasons, resonates with Maxwell's (1997) definition for purpose sampling in which "particular settings, persons or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices" (p. 87). It is also selected to achieve representativeness or comparability for this particular category is recommended for studies that require a sample as similar as possible in representing a larger number of cases or in comparisons of dissimilar kind of cases (Teddlie & Yu, 2007).

As for sample size, particularly in a research such as the present one that involves statistics, sample size is an important but at times understated factor. As stated by Cohen, Manion, and Morrison (2018), the size should closely typify a cross section of the population one is intending to study keeping in mind purpose of the study plus the nature of the target

population. Thus, an adequate sample size will enable the researcher to produce conclusions on a study backed by sufficiently accurate documented findings. After all, an undersized study would result in waste of resources with irrelevant data whereas an oversized one would exhaust resources with the possibility of negative effects affecting post intervention. Typically, in a correlation study like this causal-comparative PWIM study, a minimum of thirty participants is recommended (Cohen et al., 2007; 2018; Hogg & Tanis, 2005). The sample size for this research numbered 180 (n = 180), with 90 subjects in both experimental and control group. The subjects hailed from three primary schools within the vicinity of Kuala Kurau; School A (Experimental Group, n = 30; Control Group, n = 31), School B (Experimental Group, n = 28; Control Group, n = 26) and School C (Experimental Group, n = 32; Control Group, n = 33).

A cursory glance at the margin employed in past studies pertaining to vocabulary knowledge development among children indicates that number 180 is comparable. Some recently conducted comparable studies are as seen in Table 3.1:

Table 3.1: Examples of language studies on young learners

Study	**Subjects (*n*)**	**Level of Subjects**
Chen & Lee (2018)	30	4th graders
Toub et al. (2018)	2 studies (n = 249 & n = 101)	preschoolers
Young & Rasinki (2018)	70	2nd graders
Wegener et al. (2017)	36	4th graders

Table 3.1 continued

Elleman et al. (2017)	68	3rd to 5th graders
Hadley et al. (2016)	240	preschoolers
Philips (2016)	14	2nd graders
Jiang (2014)	234	117, 4th and 7th graders
McKeown & Beck (2014)	131	preschoolers
Feng (2011)	71	4th, 5th & 6th graders

The subjects in the present study consisted of eligible individuals from an existing data base of similar interest within one community. These subjects are intact classes of Year 1 pupils in primary schools in Kuala Kurau. Since the fundamental concern of the study is comparison of intervention effects homogeneity of subjects is strived for to diminish between-subject discrepancies, thus allowing for more transparent comparisons to be made. Subjects, apart from hailing from the same community and being in similar age group, also share comparable socio-economic, cultural and institutional background. This will further increase the clarity of the PWIM effects though it is plausibly impossible to attain perfect or absolute homogeneity.

For the study, two groups of pupils were duly considered from each primary school. They were selected also because these groups happened to be the only two Year 1 classes in the respective participating primary schools. In each school, one group of the students formed the experimental (PWIM-A) group while the other participated as Control group. As advocated by Johnson and Christensen (2012), randomisation should be attempted whenever

and wherever possible. Therefore, to decide on the experimental and control groups, Gravetter and Forzano's (2012) recommendation of using printed slips of paper randomly was taken into account in assigning the different groups. The researcher randomly picked one of the two printed slips of paper from a box with the two slips printed with "PWIM-A group" and "Control group" respectively from a box in determining group assignments for the present study.

Additionally, preliminary vocabulary breadth and depth testing via the adapted Interactive and Print Yes-No Vocabulary Test by Meara and Buxton (1987) and Word Associates Test (Read, 1998) respectively were duly administered on each subject with no significant differences recorded on the test scores. This denote equivalence among samples in term of vocabulary knowledge level as pre-testing does permit a researcher to gauge for equivalence and control for selection bias on the dependent variable as well. However, precaution against other possible threats to validity should be maintained and control still be attempted. They include history, maturation and experimental mortality among others (Cohen, Manion, & Morrison, 2013). Albeit the arguments that may arise, Ary et al., (2009) claimed that it is improbable that elements such as history and maturation can seriously threaten validity since comparable duration is engaged with both experimental and control groups subjected to the same pre-test. However, the aforementioned threats were addressed earlier in this chapter.

Information pertaining to subjects' background was obtained via questionnaires. They were utilised to record all 180 participants' exposure to English language at home and in school, and whether they receive additional English lessons out of normal school hours. Details of their background were also documented. Their class teachers assisted in ensuring

that all questions posed in the questionnaire were dutifully answered given that participants were young learners aged seven.

On the whole, the subjects were highly homogeneous in age, educational level, socio-economic status, as well as demographically. All 180 participants were enrolled in Year 1 and lived within the vicinity of their schools. Their fathers were mostly fishermen, farmers or shopkeepers (89.9%). The remaining (8.9%) were working either as mechanics or hawkers while two fathers (1.2%) worked as clerks. Almost all of the participants' mothers are not working. The household income of the participants averages RM12000.00 per annum, indicating that participants were highly homogeneous in terms of socio-economic status.

Responses gathered from the questionnaires administered to all the participants indicated that the subjects were highly homogeneous in their exposure to English language at home. All participants indicated "Never" with regards to reading English materials such as newspaper and magazines, and only 2.2% and 8.8% indicated "Rarely" with regards to reading English story books and listening to English songs respectively. 16.7% participants indicated "Occasionally" that they watched English programmes on television while 83.3% indicated "Rarely". Additionally, 98.9% indicated "Never" with regards to using English to communicate while 1.1% indicated "Rarely". All participants indicated "Never" with regards to attending extra English classes after school hours.

Participants were also found to be highly homogeneously in their exposure to English language in school based on responses garnered. All participants indicated "Never" with regards to reading English materials such as newspaper and magazines. 48.9% indicated "Rarely" with regards to reading English story books during library periods and all indicated

"Never" to listening to English songs. As for exposure to English language via computer, 31.1% indicated "Never", 55.6% indicated "Rarely" and 13.3% indicated "Occasionally". Additionally, during English lessons in school, 28.9% indicated "Never", 65.6% "Rarely" while 5.5% indicated "Occasionally" with regards to communicating in English language. Almost all of the participants indicated "Never" when it comes to using English language to communicate in school outside of English lesson. Only 2.2% indicated "Rarely". All participants indicated "Never" with regards to having extra English lessons after school hours, affirming that they did not attend any additional English language classes or English tuition.

Overall, the participants' overall exposure to English was comparable, as were their age and educational level. Likewise, their proficiency in English language is also comparable as detected in the pretest results that denote baseline similarity. Additionally, no extreme disparities were observed in their socio-economic status and demographic background, denoting homogeneity among participants.

3.5 Intervention

The present study is primarily concerned with the effects of images on young learners' vocabulary knowledge acquisition in the breadth and depth dimension. The approach in this study is anchored in Calhoun's (1999) model of the Picture Word Inductive Model (PWIM) that is defined as "an inquiry-oriented language arts strategy that buses pictures containing familiar objects and actions to elicit words from children's listening and speaking vocabulary" (p. 21).

Guided by Calhoun's (1999) PWIM model of instruction, the structure of the PWIM was adopted and further adapted accordingly to accommodate the objectives of the study.

Granted that PWIM extends to teaching writing, focus of study is on vocabulary knowledge acquisition. Therefore, the present study stops at Step 7 of the original steps of the PWIM in accordance to suggestion put forth by Calhoun (1999, p. 22) that "teachers using the model to develop sight word vocabulary…may stop at Step 7" (see Figure 3.3) though the original cycle ends with the paragraph development.

Steps of PWIM

1. Select a picture.
2. Ask students to identify what they see in the picture.
3 Label the pictures identified. (Draw a line from the identified object or area, say the word, write the word; ask students to spell the word aloud and then to pronounce it).
4. Read and review the picture word chart aloud.
5. Ask students to read the words (using the lines on the chart if necessary) and to classify the words into a variety of groups. Identify common concepts (e.g., beginning consonants, rhyming words) to emphasize with the whole class.
6. Read and review the picture word chart (say the word, spell it, say it again).
7. Add words, if desired, to the picture word chart and to the word banks.
8. Lead students into creating a title for the picture word chart. Ask students to think about the information on the chart and what they want to say about it.
9. Ask students to generate a sentence, sentences, or a paragraph about the picture word chart. Ask students to classify sentences; model putting the sentences into a good paragraph.
10. Read and review the sentences and paragraphs

Figure 3.3: Lesson structure of the Picture Word Inductive Model (Calhoun, 1999, p. 23)

The structure of the intervention for the present study followed closely Step 1 to Step 7 in the original PWIM lesson structure. However, the instructional sequence of the adapted model was adjusted to incorporate the CL setting into the lesson structures and permits the

use of the learners' mother tongue. The lesson structure of the adapted intervention is as follows (see Figure 3.4).

Steps of the intervention (As adapted)

1. Teacher instructs pupils to get into groups and the desired sitting arrangements.
2. Teacher puts up the selected picture for the lesson on the board.
3. Teacher writes the objectives (e.g., to learn target words) for the lesson on the board.
4. Teacher draws pupils' attention to picture, circle the items for target words and asks pupils to identify what they see in the picture, prompting pupils to induce targeted words for that lesson.
5. Teacher labels one of the picture parts identified on the board by drawing a line from the identified object or area, say the word, write the word; pupils to read and spell the word aloud.
6. Each group of pupils will be given a picture similar to the one on the board and they are encouraged to come out with the targeted words and go through Step 5. Pupils may use their mother tongue if they do not know the words in English but the teacher is to translate it into English immediately.
7. When all groups are done, teacher labels the picture parts identified (of target words) on the board by drawing a line from the identified object or area, say the word, write the word; pupils to read and spell the word aloud.
8. Read and review the picture word chart aloud (say word, spell it, say it again)
9. Ask students to read the words (using the lines on the chart if necessary). Identify concepts (e.g., colours, parts of the body) and emphasize with the whole class.
10. Provide students with cards to build their own sets of words to take home.
11. Finally, read and review the picture word chart.

Figure 3.4: Lesson structure of the Picture Word Inductive Model as adapted for the present study

In the present study, interventions for the experimental groups were conducted in a collaborative learning setting and use of the learners' mother tongue was integrated into the lesson structure to further facilitate lessons and to cultivate pupils' active participation in classroom. Although the use of Malay was permitted in the NPS experimental group while the experimental groups in NTCPS and NTTPS were allowed to use Chinese and Tamil respectively during interventions, the teachers in charge would immediately translate the words in mother tongue to English language. As highlighted by Kabilan and Raja Ida (2008), the use of mother tongue serves to heighten pupils' participation in classroom activities. Hence, evoking a more conducive and effective teaching-learning environment. Allowing the use of mother tongue is also aligned with the culture of the respective schools that uses mother tongue in the teaching of subjects other than the national language (Malay) and English language. For instance, in NPS Malay language is the lingua franca while in NTCPS and NTTPS, Chinese and Tamil are used respectively in all other subjects except for the subjects of the language.

The general instructional sequence of the adapted lesson structure employed in the study requires pupils to study a picture selected by the teacher, identify what they see in the picture for the teacher to label, read and review the words generated, and then use the picture word chart to read their own sets of words. Refer to Appendix A for an example of the lesson plan for the intervention. Employing a single-factor three-cycle design with a single independent variable, the intervention stretched over three consecutive cycles. It occurred once a week, with two weeks forming one cycle. As explained by Calhoun (1999), the duration of a full cycle of the PWIM is flexible and the teacher in charge possesses discretionary powers over the length of the duration and the lessons as well. In the present study, the duration of each intervention session was fixed at 30 minutes, once a week, to be

conducted during a double slot of English lesson as requested by the headmasters and headmistress of the respective participating primary schools. Suggestions to hold the intervention sessions after school hours was duly rejected by the relevant authorities with reasons given as parents would not be happy since this would incur inconvenience in logistic issues and also the children might be hungry if they were to go home later than usual. The researcher was also imposed a cap of no more than half a school term (approximately three to four months) on the intervention period. The schedule for the intervention is tabled as below in Table 3.2:

Table 3.2: Schedule for the intervention

Cycle	Week	Words	Picture
1	Week 1 & 2	10 Words	Picture A
2	Week 3 & 4	10 Words	Picture B
3	Week 5 & 6	10 Words	Picture C

Hence, the actual intervention in the present study covered a period of approximately six weeks with all the PWIM-A groups receiving equal amount of intervention sessions and intervention time while the Control groups were taught via typical classroom instructions employed in the national primary classrooms in Malaysia. Details of lesson structure as carried out in the Control Group's classroom are documented on page 191 (Figure 3.4). All lessons were conducted in the classrooms of the respective schools during a double slot with the permission and approval of the headmasters and headmistress of the primary schools involved in the study. Therefore, all participating groups received a total of 180 minutes of lesson time with the implementation of the intervention.

In terms of the number of words taught, each cycle involves the learning of 10 different words with five words targeted for each intervention session. Thirty words were

taught in total and the independent variable in the study is in the form of the adapted PWIM approach. Apart from experiencing the intervention, the participants were also subjected to a questionnaire, a preliminary vocabulary test and, pretests, posttests and delayed posttests for vocabulary breadth and depth.

3.6 Instruments

Instruments for the present study include pictures from the Year 1 textbook (enlarged), test materials and questionnaire.

3.6.1 Selection of Target Word List

Words taught in the present study were selected from a preliminary test administered on a total of 60 subjects, a class of Year 1 pupils from the NPS, NTCPS and NTTPS that participated in the actual study later on. These pupils were tested in their ability to read aloud the words listed in the Year 1-word list provided in the *DSKP* (MoE, 2017).

A total of 30 words with the highest number of crosses were then identified for the intervention programme in this study. As one of the objectives of the study includes looking at the impact of the intervention on the subjects' vocabulary depth, the number of words taught in the intervention was limited to 30 based on past studies pertaining to measuring of young learners' vocabulary depth that employed words association task as test instrument. The present study similarly adapted Read's (1998) WAT to test for vocabulary depth. Schoonen and Verhallen (2008), in an exhaustive study on assessment of deep word knowledge involving 822 young first and second language learners from different parts of the Netherlands, proclaimed 25 items as suitably sufficient for testing vocabulary depth of young children. Adapting Read's (1998) WAT, Schoonen and Verhallen piloted their experimental study with 27 test items on 133 children but the number subsequently swelled

to 50 set items in their actual study. However, the number was eventually reduced to the recommended 25 as Schoonen and Verhallen (2008) discovered that, "50 items were possibly too many for young children" (p. 220). On the other hand, Vermeer (2001) considered 10 set words sufficient in his statement, "To measure depth of vocabulary, 10 words were examined by means of association task..." (p. 223). Hence, the present study examined 30 set words in an adapted WAT to measure subjects' vocabulary depth.

The 30 words selected (for having the most number of crosses) for the intervention programme in the study are derived from 189 words listed in the word list of English for Year 1 in the *DSKP* (MoE, 2017). In sum, the first 30 words with the highest number of "crosses" in the preliminary word list test would be selected for the intervention. This is to ensure that only those words in the Year 1- word list that cannot be read by the most number of pupils are selected for the study. Given that the selected words were those not known to the largest number of Year 1 pupils of the year before the study was conducted, it is deemed highly likely that the subjects for the main study (those who were in Year 1 at the point the study was carried out) who are from the same schools would encounter the same difficulty.

3.6.2 Selection of Pictures

The pictures in the study were taken from the Year 1 textbook. They were enlarged and used in the study as the words selected are from the word list in the *DKSP* (MoE, 2017) and are found in the Year 1 textbook. Teachers involved in the research were given discretionary power to select the pictures used in the study, in line with Calhoun's (1999) suggestion that, "the pictures are selected by the teacher" (p. 72). The current English textbook (Super Minds) used in the Malaysian classrooms is meant for two years of study, Year 1 and Year 2. The textbook contains nine units and according to the teachers who

participated in the study, Unit 1 to Unit 4 (page four to 57) would be taught in Year 1 while the remaining five units (Unit 5 to Unit 9) would be taught in Year 2. As only the first four units of the current English textbook (Super Minds) would be taught in Year 1, the teachers had unanimously decided to confine their selection of pictures to those found within Unit 1 to Unit 4.

The decision on the number of pictures used was reached based on Calhoun's (1999) postulation that, "For prekindergarten through first grade (maybe even second grade), 12 good pictures are all you need for a school year. In fact, for most kindergarten and first grade classes, six or eight good pictures may be enough because of the time needed to build sight vocabulary" (p. 71). Since the subjects in the present study were in Year 1 and the duration of the study stretched three to four months, translated into approximately one quarter of a school year, a total of three pictures in the Year 1 textbook were used. A picture covered two lessons with five words taught in each lesson. Altogether, 10 words were taught using one picture in the study.

PWIM pictures/posters of various subject areas can be bought from institutions like Heartland AEA (Area Education Agency) in Iowa, USA and Regina Public Schools in Saskatchewan. They are also available on loan for free from GHAEA Media Resources with a regular loan period of six weeks. These pictures share some basic details such as they are laminated (for easy mantainence), contain only images and most pictures are 20" x 30" in size. Pictures smaller than 20" x 30" are deemed not suitably large enough while bigger sized ones are encouraged should budget permits.

Therefore, the pictures selected for this study were adapted accordingly whereby all three pictures were enlarged to 36" x 48", laminated and contained only images.

3.6.3 Test Materials

(a) Interactive and print yes-no vocabulary test

The present study adapted Meara and Buxton's (1987) Interactive and print Yes-No test to test for subjects' vocabulary breadth knowledge at pre-, post and delayed posttest levels based on the fact that YNVT has been consistently touted by L2 researchers as a reliable and valid avenue of estimating the receptive vocabulary size of L2 learners regardless of their proficiency levels (Culligan 2008; Huibregtse, Admiraal, & Meara 2002; Meara & Buxton 1987; Mochida & Harrington 2006; Shillaw, 1996). Efforts to validate it have documented strong correlations of above .8 and .9. Meara and Buxton (1987, p. 148) reported "a value of .97" while Beeckmans et al. (2001, p. 244) obtained ".82 - .87".

Another reason for the researcher's decision in selecting YNVT is due to its easy and straightforward scoring system, apart from being undemanding in its construction and administration. This makes it possible for a researcher to achieve with ease the prerequisite sample size for reliable estimates since a large number of words can be covered within the given testing time. Thus, it can be concluded that those positive points probably prompted researchers of L2 acquisition to regard the test as a highly recommendable vocabulary size measuring tool. Furthermore, as stated by Meara (1993, 2000) it is possible to track the rate learners acquire new words by virtue of repeated use of the test. Apparently, the profiles rendered by the test are sufficiently sensitive to measure vocabulary growth over relatively short periods of time.

Reflecting on much earlier research efforts such as Anderson and Freebody's (1983) study, the Yes-No test is found to be successful in testing twice the number of words for word recognition as compared to a multiple-choice test within the same time span. Anderson

and Freebody (1983, p. 269) further concluded that "a score on a yes-no test provides a much more valid indicator of whether an examinee actually knows the meaning of the tested words than a score on a standardized multiple choice test." Additionally, another considerable advantage of the test is that it is not mandatory to recruit trained item writers or specialised markers or examiners since scoring is mechanical as the test items are not entrenched in a complex context of distracters. The teachers who participated in the study confirmed that they had no issues administering nor grading subjects' tests. Hence, it exemplifies an approach that maximises efficient use of both examiner and examinee's time and one that is widely used in experimental research.

Initially employed in L1 research, the YNVT originated from the "checklist," a simple test format consisting of words in the target language the requires students to self-report by ticking those words they know (Sims, 1929; Tilley, 1936). The weakness it poses here is glaringly so; obviously, a self-reporting method of scoring runs the risk of an inflation of vocabulary knowledge among learners. The researcher fully supports Nation and Webb's (2011) criticism of the scoring method as a poor and unreliable indicator of the students' actual knowledge of vocabulary at best. To the researcher, it is not unreasonable to presume that there will be some who will tick "Yes" for words they have no knowledge of.

Naturally, there have been past attempts to rectify the aforementioned weakness. Attempts include adding pseudowords to the word list to provide a better estimate of word knowledge and subsequently, to adjusting the score downwards (Anderson & Freebody, 1983). With similar objectives in mind, Meara and Buxton (1987) developed a Yes-No test with 60 real words and 40 pseudowords while Meara and Jones (1990) came up with the Eurocentres Vocabulary Size Test, a computerised checklist where the frequency statistics

of list by Thorndike and Lorge (1944) were used to sample words from 10 frequency bands. The EFL Vocabulary Test, essentially a book of paper-and-pencil Yes-No tests, too utilised this basic methodology with some adjustments made to the scoring system (Meara, 1992).

For the present study, the researcher modified the YNVT by substituting the words in the test with words chosen from the word list in the *DSKP* as provided by the MoE (2017). In addition, rather than merely self-reporting a word one presumes to know, the subjects are required to read aloud the words. If he or she is able to read a particular word aloud correctly, the teacher would put a tick next to the word, assuming he or she "knows" the word. By remaining silent the subject would earn a cross, likewise if he or she reads it wrongly. In the present study, the YNVT was adapted to measure vocabulary breadth through reading aloud of the words tested, thus rectifying the weakness of possible word knowledge inflation through learners' self-report that is based on presumption of their word knowledge. The adapted Yes-No test was subjected to a test-retest and subsequently pilot-tested prior to being utilised in the actual study.

The researcher supports the consensus that YNVT is definitely not equipped for measuring of deep lexical knowledge that would involve spelling, word associations, grammatical information and multiple meanings of the target words. Such a vocabulary measure like YVNT is likely to enable one to look into only a diminutive portion of the intricacy and the complexity of a person's vocabulary knowledge. On the other hand, it is not wrong to acknowledge that words identified in the Yes-No format are highly likely known to a learner and may be used with any depth of meaning. Thus, a word recognition count remains a utilitarian indication of the outer limits of the learner's vocabulary knowledge.

As an attestation to the YNVT's value in measuring for vocabulary breadth, it was incorporated into the European DIALANG project, a computer-based diagnostic language assessment system that provides free testing of various language skills, of which vocabulary is one, in fourteen European languages. Within this learner-oriented framework, it is possible for anyone in this universe to arrive at a profile of their vocabulary size irrespective of the types of language.

The teachers involved in the present study conducted the tests in three stages, pre-, post- and delayed posttest, on a one-to-one basis. The pretests were administered to inspect the subjects in both Control and PWIM-A group for baseline similarities prior to subjecting the latter to treatment. Subsequently, similarly formatted posttests and delayed posttests were administered to measure the recall and retention rate of the subjects respectively (see Appendices B, C and D for a sample of the vocabulary breadth pretest, posttest and delayed posttest respectively).

(b) Word Associates Test (WAT)

Read (1993) pioneered the Word Associates Format (WAF) and went on to develop the WAT in 1998 by adopting the word association concept as the foundation for the test. A cursory observation of vocabulary tests for young learners would reveal that it is not exceptional for children's mental lexicon to be examined via word association tasks. Accordingly, (e.g., Aitchison, 1994; Entwisl, 1996; Nelson, 1977), word association tasks are commonly used for testing of young learners' vocabulary knowledge.

Read's (1998) WAT remains one of the most widely utilised tests for vocabulary depth in research, in particular among young learners. The key difference between WAT and WAF lies in the format of the test; WAT assumes an organised format unlike a free

association task as in WAF. Fundamentally, WAT centers on word associations where words are seen as belonging to a semantic network and not as detached items. According to Read (1998), WAT works around a simple response task with an expansive coverage of a set of words while consenting to meaningful investigations of word depth knowledge. Previous records show that WAT demonstrated very high reliability; .90 and above; .93 (Read, 1998) and .90 (Read, 1993). However, Read's (1993, 1998) WAT was designed with older learners (undergraduates) in mind while the subjects of the present study consisted of young learners. For this reason, the adapted WAT (WAT-M) employed in the present study was guided by Schoonen and Verhallen's (2008) Word Association Test that was modified to measure the vocabulary depth of young learners.

Schoonen and Verhallan (2008) modified Read's (1998) WAT to measure the vocabulary depth of young learners in their study on 795 young learners from 19 primary schools in various parts of Netherland who were learning Dutch as a second language. They simplified Read's (1998) WAT by reducing the original eight possibly associated words to only six possibly associated words that are made up of three associates and three distractors, as well as the adoption of the word web as just one whole item. The modified version of Schoonen and Verhallen's (2008) WAT recorded a strong correlation of .75 with that of a word definition task. Greidanus, Bogaards, Van der Linden, Nienhuis and de Wolf's (2004) study similarly documented very good reliability of .84 to .89 for WAT on students of various age groups who were studying French as a second language. Thus, establishing the validity and reliability of the WAT's format as adapted for use with young learners.

WAT-M, as adapted for the present study, requires young learners to distinguish between words that are closely related to the stimulus word and words that are associated

with it. This represents testing of depth as acceptable answers stand for various forms of relationship imbedded within a semantic network (Verhallen, 1994) with the difference between "correct" and "wrong" answers accepted as not absolute. In 2008, Schonnen and Verhallen initially tested their subjects for 50 items but the number was finally reduced to only 25 as it was found that 50 items were too much for young learners to handle. Meanwhile an earlier study conducted by the Department of General Linguistics, University of Amsterdam (Schonnen & Verhallen, 2008) on WAT, tested for 27 items on 133 children between Grades 3 to Grade 5. The WAT-M employed in the present study tested the Malaysian Year 1 pupils for 30 items.

The scoring procedure of WAT deserves due attention given the implications it leaves on research findings (Zhang & Koda, 2017). Previous studies have documented three methods adopted in scoring; the One-Point, Correct-Wrong and All-or-Nothing methods (Schmitt, Ng, & Garras, 2011). The present study duly selected the All-or-Nothing scoring procedure for its simplicity in scoring and its strictness in awarding points. According to Schoonen and Verhallen (2008, as cited in Zhang & Koda, 2017), the All-or-Nothing method was adapted specifically to award points only for precise matching of correct answers, thus rendering testees' guessing attempts for correct answers inconsequential. The One-Point and Correct-Wrong methods were discarded for the weakness detected in them. Employed in Read's (1993) initial study on depth testing, the One-Point method scores learners' responses based solely on their associate selection. The total disregards for selection and non-selection of a distractor subject studies to threats of distorted data (Greidanus, Beks, & Wakely, 2005, as cited in Schmitt et al., 2011; Greidanus et al., 2004; Zhang, 2012). As for the Correct-Wrong method, it was censured for its complexity and tediousness (Zhang & Koda, 2017). Moreover, it was found to be not necessarily more accurate than the One-Point method.

With regards to validation of WAT (the version with six options), a more recent study by Schmitt et al., (2011) recorded correlations of .884, .871 and .877 for the All-or-Nothing, One-Point, and Correct-Wrong scoring methods respectively, demonstrating highest reliability for the All-or-Nothing method. Hence, taking into consideration the validation reports and coupled with the aforementioned elements of each of the scores method, the All-or-Nothing scoring method is deemed the better alternative for the present study that employed the adapted WAT with six-option format. Also, this scoring procedure is in line with Schoonen and Verhallen's (2008) preferred scoring method in their study on assessment of deep word knowledge in young second language learners. The scoring process in WAT-M is essentially a mechanical task, thus rendering inter-rater reliability a non-necessity as suggested by Cohen et al. (2018). Please refer to Appendices E, F and G for a sample of the respective vocabulary depth pretest, posttest and delayed posttest used in the present study.

Vocabulary test reliability is important as it concerns precision and accuracy (Leppink & Pérez-Fuster, 2016). As defined by Joppe (2000), reliability refers to, "the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable" (p. 1). Hence, a replication research such the present study that adapted the PWIM model of teaching has selected to adopt reliability over time in the form of test/re-test to attest for its test instruments reliability.

Test-retest reliability is of uppermost importance as it is exemplified by consistency and replicability over time in the test instruments. Hence, the notion of replicability of results. Although past studies that utilised this method have shown that the intervals between

tests can be extremely flexible - shorter than an hour and longer than a year - its length rests not only on the purpose and context of the study but also on the subjects in the research (Leppink & Pérez-Fuster, 2017). Apparently the length is deemed acceptable so long it is sufficiently lengthy for memory effects to start fading away and at the same time is sufficiently brief for maturation not to happen (Leppink & van den Heuvel, 2015; Leppink & van Merriënboer, 2015; Leppink, Paas, van der Vleuten, van Gog, van Merriënboer, 2013).

The interval between tests in the present study is seven days; the re-test was administered seven days after the subjects sat for the test. A look at studies on the length of duration between test and re-test has produced diverse results. For instance, Crocker and Algina (2006) found that an interval of six months to two years is considered appropriate in a research on vocational interest inventory involving adult participants. However, in a more recent study conducted by Vaz et al. (2013) on 187 Australian students with a mean age of 12 years and three months, a four-week test re-test design was deemed suitable. Additionally, in Leark, Wallace and Fitzderald's (2004) study, test-retest reliability was investigated via two different time intervals, 90 minutes and seven days (+ two days) on 64 children, some as young as six years old. Analysis on both time intervals yielded significant positive correlations ($p<.05$) but the r value for seven days' interval is higher (.81 for seven days interval and .79 for 90 min interval), denoting higher measures of reliability. Correlation coefficients of .70 and above are generally considered acceptable as adequate measure but some researchers (Anastasi & Urbina, 1997; Domino, 2000) stressed on the necessity of a more stringent criterion of .80 for correlation coefficients. Leark et al. (2004) claimed that a longer interval than the one week used in their study indicated less stability in comparison to shorter intervals. Providing further support to their findings is Llorente et al. (2001) study

that recorded lower coefficients in lengthier intervals. Hence, an interval of seven days as adopted in the present study's test-retest design.

According to Cohen et al. (2007), T-tests can be utilised to verify reliability whereby a significant level of .05 or higher denotes reliability and by extension, that indicates a measure of stability in the instrument measured. The present study's results for the tests and re-tests of the vocabulary breadth and depth tests are as shown in Table 3.3 and Table 3.4 respectively below:

(a) Vocabulary breadth test reliability analysis

The adapted Interactive and Print Yes-No Vocabulary Test (Meara & Buxton, 1987) was administered on the subjects twice; the second time was after a one-week interval following the administration of the same test the first time. The results of the test re-test are presented as follows in Table 3.3:

Table 3.3: T-test results for the reliability of the Interactive and Print Yes-No Recognition Test: Vocabulary breadth knowledge

	Sig.
Yes-No Recognition Test: (Vocabulary breadth knowledg)	.992

Table 3.3 shows the Sig. (*p*) value obtained to be more than .05 ($p > .05$) at p = .992, indicating statistically no significant differences between group means and thus denoting the test's reliability in terms of stability over time. The result recorded demonstrated that the test

is a reliable instrument to be employed in the main study as the subjects in the main study similarly consist of Year 1 pupils enrolled in national primary schools in rural areas.

(b) Vocabulary depth test reliability analysis

The adapted Word Associates Test (WAT-M) was administered on the subjects twice; the second time was after a one-week interval following the administration of the same test the first time. The results of the test re-test are presented as follows in Table 3.4:

Table 3.4: T-test results for the reliability of the WAT-M: Vocabulary depth knowledge

	Sig.
Word Associates Test (WAT-M): (Vocabulary depth knowledge)	.891

As reflected in Table 3.4, the Sig. (*p*) value obtained to be more than .05 ($p > .05$) at $p = .891$, indicating statistically no significant differences between group means and thus denoting the test's reliability in terms of stability over time. The result recorded demonstrated that the test is a reliable instrument to be employed in the main study as the subjects in the main study similarly consist of Year 1 pupils enrolled in national primary schools in rural areas.

Summary

The present study's results for the tests and re-tests of the vocabulary breadth and depth tests recorded .992 (excellent reliability) and .891 (good reliability) respectively for coefficients stability. The vocabulary breadth's correlation of .992 is taken to mean that

99.2% is true score variance and 0.8% is error variance while the depth's correlation of .891 is interpreted as 89.1% true score variance and 10.9% error variance.

The present research is deemed reliable as it has demonstrated that parallel results were attained when the vocabulary tests were conducted on a similar cohort of subjects within a similar context. Thus, in context the reliability of both vocabulary breadth and depth test instruments can be contemplated as 'stability over time' which basically implies that the results of a test and re-test administered on a similar group of participants within a suitably fitting time span should be comparable.

3.6.4 Questionnaire

Cohen et al. (2018) proposed rule of thumb that applies to selection of types of questionnaire is simple, "the larger the size of the sample, the more structured, closed and numerical the questionnaire may have to be, and the smaller the size of the sample, the less structured, more open and word-based the questionnaire can be" (p. 474). The questionnaire administered in the present study was devised to garner supporting data in the present study.

The questionnaire is highly structured and in line with Cohen and his fellow researchers' recommendations, the researcher strives to ensure that the questions presented are straightforward and articulate, precise and unambiguous, and that the questions are answerable. It is equally important for the question types to fit the purpose and able to yield functional and relevant data (Champagne, 2014). Therefore, keeping in mind the issues highlighted by a group of researchers (Black, 1999; Champagne, 2014; Dillman, Smyth, & Christian, 2014; Hilton, 2017; Krosnick & Presser, 2010), the questionnaire was designed with practical considerations such as operationalisation, ethics, question order and planning, question construct and wording, and administration purposes. Additionally, it is also guided

by a list of useful points for constructing questionnaire that Cohen et al. (2018) summarised from the guide prepared by Sellitz, Wrightsman, and Cook (1976; see Cohen et al., 2018, p. 498).

Piloting of a questionnaire is considered vital since it is primarily executed to augment the reliability, validity and practicability of the questionnaire (Dillman et al., 2014; Krosnick and Presser, 2010; Owen, Fox, & Bird, 2016; Wilson and McLean, 1994). Prior to piloting the questionnaire, it was first administered on a small group of Year 1 pupils to check the questionnaire generally for clarity of items and layout, as well as its flow. Five respondents were randomly chosen to answer the questionnaire. Folded pieces of paper were placed in a box and each pupil in the class get to pick a piece. Only five pieces of paper were marked with a 'tick' and pupils who got them would be selected to answer the questionnaire. This way, each pupil in the class had an equal chance of being chosen as a participant in the study.

The pre-piloting efforts resulted in certain amendments being made to its formulation of question and response modes, as well as the total number of questions asked in the questionnaire. One question was added to Part 1 while a subsidiary topic was included to check for exposure due to additional English lessons; the amended questionnaire now has three sub-topics in Part 2 as compared to two sub-topics previously. In addition, Part 2 of the original questionnaire (see Appendix H) has both simple dichotomous questions and rating scales but this has been revised to include only rating scales (see Appendix I for the amended questionnaire). As Cohen et al. (2018) said, rating scales are extensively employed in research for affording versatility in response options. The changes are as simplified in Table 3.5

Table 3.5: Summary of amendments made to questionnaire

Original Questionnaire	Amended Questionaire
Part 1	
Q.1-7	Q.1-8
Part 2	
A. At Home (Q.8-21) (Dichotomous questions & Rating scales)	A. At Home (Q.9-21) (Rating scales)
B. In School (Q.22-37) (Dichotomous questions & Rating scales)	B. In School (Q.22-36) (Rating scales) C. English Tuition after School (37-40) (Rating scales)

Subsequently, the questionnaire was piloted on 60 subjects, a number deemed "sufficiently sizeable and representative number of respondents (e.g. 50-100)" (Cohen et al., 2018, p. 497) before it was distributed to the 180 respondents participating in the actual study.

The questionnaire in the present study serves to provide additional data on subjects' background and plays no role in determining the outcome of the intervention. As documented in some past studies, use of questionnaires or interviews is just an option to acquire supporting data (Denzin, 1978; Jick, 1979; Patton, 2002). The pretest-posttest-delayed posttest control group design with intervention and test instruments takes priority in steering the present study as elucidated in Creswell et al. (2003) concurrent nested design. In another study, questionnaire may well serves as triangulation which is essentially a means to cross-check information in search for irregularities in research (O'Donoghue & Punch, 2003), an accepted measure to improve the validity and reliability of studies.

Interpretation of questionnaire results follows a scoring system suggested by Oxford (1990) which is based on the means of a five point Likert scale. Adopting Oxford's (1990) score assessment system, each particular exposure to target language as measured in the survey instrument is defined as never (range is from 1.0 to 1.4) or rarely (range is from 1.5 to 2.4), occasionally (range is from 2.5 to 3.4) or often (range is from 3.5 to 4.4) and very often (range is from 4.5 to 5.0).

The questionnaire administered for the present research covers a variety of topics relating to the subjects' demographic and socioeconomic background and also their exposure to the English language in school and at home. The questions aim to gather information reflecting the demographic and socioeconomic background of the respondents, as well as the level of their exposure to English language in school and at home.

The questionnaire is divided into several sections and administered pre-intervention to gain insight on the following:

Part 1: Personal particulars (Questions No. 1 to 8): to record personal data of pupils.

Part 2: Exposure to the English language

A) At home (Questions No. 9 to 21): to record the level of English language exposure at home.

B) In school (Questions No. 22 to 36): to record the level of English language exposure in school during lessons and in between lessons.

C) English tuition after school (Questions No. 37 to 40): to record if pupils receive additional English lessons after school.

The questionnaire consists of close-ended items and five-point Likert scale items. Open-ended items are excluded here because as stated by Morrow, Jackson, Disch and Mood (2011), they tend to generate irrelevant or irregular information that leads to complications in data analysis although they are able to amass richer and more substantial data. Cohen et al. (2018) similarly favored closed-ended questions to facilitate analysis, "particularly with large samples" (p. 500). Especially with studies involving young respondents, like in the case of the present study where respondents are seven year olds, questions should be kept simple for easy comprehension and answering.

The sample size for the main study numbered 180. Since questionnaires possess the edge in terms of being more time- and cost-effective (Morrow et al., 2011; Oxford & Burry-Stock, 1995; Phellas, Bloch, & Seale, 2011), it is deemed appropriate to utilise questionnaire in the present study especially since the issue of time constraint has to be factored in based on the stipulations put forth by the headmasters and headmistress of the participating schools. The questionnaire was employed as a secondary instrument to provide supporting data in the present study.

Cronbach's alpha was computed to check the reliability of the questionnaire items and the results are presented in Table 3.6:

Table 3.6: Cronbach's alpha: Analysis of questionnaire items reliability

	Score (α)
Likert scale items	.887
Non-Likert scale items	.836

The questionnaire administered to the samples in the present study was investigated for internal-consistency reliability via the computation of Cronbach's alpha, a measure commonly employed for internal consistency. The SPSS software was utilised to estimate the reliability of the questionnaire that include both Likert scale and non-Likert scale items. George and Mallery (2003) afford the following rules of thumb for the interpretation of Cronbach's alpha readings: $\alpha > .90$: Excellent, $\alpha > .80$: Good, $\alpha > .70$: Acceptable, $\alpha > .60$: Questionable, $\alpha > .50$: Poor, and $\alpha < .50$: Unacceptable (p. 231). The Cronbach's alpha scores for Likert and non-Likert scale items documented for the questionnaire (Appendix I) in the present study are $\alpha = .887$ and $\alpha = .836$ respectively, denoting good reliability for the questionnaire items and as stated by Gliem and Gliem (2003, p. 87), "an alpha of .80 is probably a reasonable goal". Therefore, all items are retained. The following section describes the data collection procedure of the present study.

3.7 Data Collection Procedures

A summary of the procedures of the present study is tabled as follows in Table 3.7:

Table 3.7: A summary of the study schedule

Phase	Stage	Time
1	Preliminary vocabulary testing	End 2017
2	Piloting	Mid 2018
3	Briefing and training of teachers	Mid 2018
4	Pre-testing	3rd quarter, 2018
5	Intervention period	3rd quarter, 2018
6	Post-testing and Delayed post-testing	End 2018

3.7.1 Phase 1: Preliminary Vocabulary Testing for Word Selection and Picture Selection

Pupils were subjected to a preliminary word list test (Appendix J) for the purpose of selecting target words for the present study. A total of 60 pupils from the three schools that took part in the actual study sat for the test during the last week of school in November 2017. The teachers of the respective schools administered the test after being briefed by the researcher. Out of a total of 189 words in the word list, 30 of the least known words among the subjects were then selected as the target words for the actual study.

The pupils were individually tested by the researcher; each pupil read aloud all the words listed in the preliminary test, one word at a time (see Appendix J for a copy of the Preliminary Word List Test). Each correct answer scores a tick while a cross is given for each wrong answer. A pupil also gets a cross when no answer is given. Pupils were tested orally and individually in an attempt to minimise correct answers procured through guesswork. Once the test has been completed, the number of ticks and crosses for each word were tallied. The scores for all the words in the word list were then tabulated (Appendix K).

Based on the 30 words the teachers involved in the actual study then selected three pictures from the Year 1 textbook and had them enlarged for the intervention.

3.7.2 Phase 2: Piloting and Administrating Test-retest

Piloting was carried out to check on the overall practicality of the present study's methodology and to ascertain the reliability of the test instruments. The study was piloted in one primary school and the participating teacher selected the 10 words from the list of 30 words together with the picture that was used in the pilot study. The teacher was trained in

the PWIM-A approach over a weekend prior to conducting the two-week long study. A total of 60 subjects participated in the piloting effort.

Subsequently, test-retest was conducted to check vocabulary testing instruments for reliability over time. There was an interval of one week between the tests. In the present study, the re-test was administered seven days after the test was undertaken. In between the tests was the one-week school holiday during which the participants did not attend school or lessons, thus negating any possible intervening effects. Also, given their age at seven years, it is highly unlikely that they would remember the questions in the test, much less spend the time between the tests reading up on the subject tested on their own accord. The participants were not given feedback on the test and they were also not informed of the re-test that they would undertake upon returning to school after the holidays. Hence, addressing the concerns posed by Cooper and Schindler (2003) and Joppe (2000) over subjects being affected by intervening effects due to too short a time frame between the test and re-test as well as too long a duration that provides opportunities for subjects' interests to build up and for them to increase knowledge. This phase concluded one week before school closed for the mid-year school holiday.

3.7.3 Phase 3: Briefing and Training of Teachers

Teachers involved in the actual study were briefed and trained in the PWIM-A approach. The researcher carried out the training in one of the participating primary schools. Apart from receiving training in the PWIM-A approach, the teachers were also briefed on the objectives of the intervention and implementation procedures. The researcher spent a total of 16 hours training and briefing the teachers.

The teachers involved in the actual study were exposed to the PWIM-A approach before commencement of the actual study. The three teachers received training on the steps of PWIM-A and were given precise instructions on how to conduct the intervention. The researcher further stressed on the objectives of the intervention and its implementation procedures. With the permission of the principal, training sessions took place in one of the participating primary schools during the mid-year school holiday. All in, the training sessions clocked up a total of 16 hours, including mock lessons held during training. There were no issues arising and teachers involved participated effectively.

The teachers who participated in the actual study are comparable in terms of teaching experience and qualifications. All the teachers graduated from our public university with a bachelor's degree but not in English or TESOL. The degrees obtained are either in mathematics or science but they have all taught English language to Year 1 pupils in their respective schools for more than five years, and have regularly attended English language teaching courses over the years (see Appendix L).

3.7.4 Phase 4: Pre-testing, Pre-intervention Questionnaire and Obtaining Consent

The actual study kicked off with pre-testing of subjects. Prior to the implementation of the intervention, all subjects in both experimental and control groups were subjected to pretesting. The pupils sat for the vocabulary breadth and depth tests in their respective classrooms and they were not given any notices nor was explanation given for conducting the tests in adherence to the single blinding procedure practiced in the study. In the phase, subjects were also subjected to a questionnaire. They were required to answer all items in the questionnaire (Appendix I) with the assistance of their teacher.

This phase also concerns obtaining consent from the relevant parties. First and foremost, permission to carry out the present study in the respective primary schools has to be obtained from the Ministry of Education (see Appendix M). This study too necessitates procuring the consent and collaboration of subjects' parents/guardians, arising from the concerned parties' right to freedom and self-determination (Cohen et al., 2013). In this matter, measures undertaken include distributing Parental consent forms to parents/guardians through the schools' PTA (Parent Teacher Association) to safeguard against loss of documents since subjects were seven-year-olds (see Appendix N). The researcher refrained from obtaining the subjects' verbal assent since they were considered minors and as such is not accepted legally. Should subjects be older (minimum age is 18), verbal assent can then be obtained individually in the presence of witnesses to ensure that each of them exercises his or her right to consent or not to participating in the research.

3.7.5 Phase 5: Intervention Period

In the present study, each intervention session lasted 25 to 30 minutes and was held once a week during an English double slot. A total of five target words were taught in each session as it is estimated that for the words to remain in the students' active vocabulary, the number is around five to seven words (Wallace, 1988). The number of target words ties with the concept of "chunking" that refers to Miller's (1956) infamous "7 + 2" formula whereby the capacity of a person's short-term memory is limited to seven items or chunks. Alternatively, Huitt (2003) suggested that more recent research has proposed that the number may be more like "5 + 2". "Chunking" found support with researchers such as Schuessler (2017), Gobet & Lane (2012), Ellis (1996) and Chase and Simon (1973). Thus, the quantity of words to be taught per session was pre-determined at five words.

The intervention programme stretched over approximately 16 weeks with a full cycle set at two weeks. Each cycle witnessed the employment of one picture and each intervention session was scheduled for 25 to 30 minutes once a week. Decisions made were also in accordance to the time frame agreed upon by the heads of the respective participating schools who further emphasised that as far as possible there should not be undue disruption to the schools' schedules and that any inconveniences or unwarranted workload for both teachers and pupils should best be avoided. It is to be noted that the implementation of the intervention depends largely on the goodwill of the participating schools' headmasters and headmistress despite permission being granted by the Ministry of Education. Hence, it is only reasonable to acquiesce to their requests. As opined by Cohen et al. (2017) in their discussion relating to research constraints, research must operate within practical boundaries.

Therefore, the study was conducted over a period of approximately three to four months where a total of 30 words were taught in six lessons, with each lesson lasting for 25 to 30 minutes per week. The 30 words were grouped into six clusters with each cluster containing five words taught in one lesson. A total of three pictures were used; one picture for every two clusters of words. As each cycle of the adapted lesson structure uses a picture as a common stimulus for the generation of words, therefore one cycle in this study spanned two weeks with 10 words being taught per cycle.

The teachers followed the lesson plan that observed the steps of the adapted lesson structure (for each lesson) (see Appendix A) with their respective experimental groups and dutifully engaged the steps that comprised the adapted lesson cycle in his/her lessons while continuing as normal with their control groups (see Appendix O for further details). Sporadic

visits to the participating schools were made to observe the teachers when they were in class with the experimental groups and the control groups as well.

In the classroom of the control groups, the teachers were generally very much in control of the instructional process. According to the participating teachers, lessons would begin with the teacher reading aloud from the textbook and pupils repeating after them as a class. Following that, pupils would either be asked to do written exercises or writings, or in some cases there would be interactive class activities. Pupils were expected to follow closely the precise instructions given by teachers. Below is the conventional lesson structure practised in the classrooms as provided by the participating teachers (Figure 3.5).

Lesson structure of the English lesson of the control groups

1. Pupils asked to open textbook and teacher reads aloud the words/sentences in the textbook.
2. Pupils listen to teacher and then read aloud, individually or as a group.
3. Teacher drills the pupils.
4. Teacher either asks pupils to get into groups for interactive class activities or instructs pupils to do exercises in workbooks or writings in exercise books.

Figure 3.5: Lesson structure of the English lessons of the control groups

As reflected in Figure 3.5, the teacher generally adopts the direct instruction approach where she positions herself in front of the class and assumes total control of classroom activities. All the teachers who participated in the study agreed that this is normally how English lessons are conducted in their schools. In addition, they also confirmed that this was the sole approach they used with their control groups, thus indicating that classroom approach among the control groups during intervention period is comparable. In addition, subjects in the control group were not exposed to the PWIM method during the

intervention period although each teacher took charge of both experimental and control group. The lesson structure as seen in Figure 3.4 is typically a teacher-centred method of learning often adopted in the Malaysian classrooms, particularly with primary pupils.

3.7.6 Phase 6: Post-testing and Delayed Post-testing

Immediately upon completion of the intervention programme, subjects in both PWIM-A and control groups in the respective primary schools were subjected to posttests to measure for vocabulary breadth and depth knowledge recall. Next, the delayed posttests was administered approximately two weeks after the administration of the posttests to measure for retention of both vocabulary breadth and depth. Upon completion of the tests the researcher had a question and answer session with each teacher involved (see Appendix P for sample questions asked). The question and answer sessions were merely carried out to give the teachers an opportunity to express their overall viewpoints on the intervention and subjects' responses.

3.8 Data Analysis Procedures

The following matrix in Table 3.8 summarises the methodological framework of the present study.

Table 3.8: Research matrix

Research Question (RQ)	Hypothesis (H_o)	Data Sources	Types of Statistics Used
RQ 1 *(samples' recall of vocabulary breadth)*	Null Hypothesis 1 H_{o1}: There is no significant difference in the vocabulary breadth posttest scores of both intervention and control groups	Posttest	(a) Descriptive: • means and • standard deviation (b) Inferential: • independent samples *t*-test

Table 3.8 continued

RQ 2 *(samples' retention of vocabulary breadth)*	Null Hypothesis 2 H_{o2}: There is no significant difference in the vocabulary breadth posttest and delayed posttest scores of both intervention and control groups	Posttest & Delayed Posttest	(a) Descriptive: • means and • standard deviation (b) Inferential: • independent samples *t*-test
RQ 3 *(samples' recall of vocabulary depth)*	Null Hypothesis 3 H_{o3}: There is no significant difference in the vocabulary depth posttest scores of both intervention and control groups	Posttest	(a) Descriptive: • means and • standard deviation (b) Inferential: • independent samples *t*-test
RQ 4 *(samples' retention of vocabulary depth)*	Null Hypothesis 4 H_{o6}: There is no significant difference in the vocabulary depth posttest and delayed posttest scores of both intervention and control groups	Posttest & Delayed Posttest	(a) Descriptive: • means and • standard deviation (b) Inferential: • independent samples t-test

As shown in Table 3.8, both descriptive and inferential statistics are employed for the present study's analysis of data and to draw conclusions. The descriptive statistics summarised and described the data collected via the test instruments while inferential statistics put the study's hypothesis to test. Means and standard deviation (*SD*) of the test scores were analysed to answer the four research questions (RQ 1, RQ 2, RQ 3, and RQ 4) in tabulated description while independent samples t-tests were calculated at a confidence interval of 95% ($p<.05$) to test the study's hypothesis (H_{o1}, H_{02}, H_{03} and H_{04}).

RQ 1 and RQ 3 in Table 3.8 refer to samples' vocabulary breadth and depth knowledge recall respectively whereby the means and *SD* at posttest level would be calculated and compared between the experimental group and control group; posttest means

and *SD* of experimental and control group for vocabulary breadth would be compared. Similarly, the posttest means and *SD* of experimental and control group for vocabulary depth would be compared. Results would indicate that the group with higher mean scores has achieved higher vocabulary breadth/depth knowledge recall as compared to the group with lower mean scores. Therefore, if the experimental group in the present study has a higher mean scores than the control group this would denote that the PWIM-A is more effective in enhancing vocabulary breadth/depth knowledge recall than the traditional classroom approach employed with the Control group.

As for the present study's hypothesis (H_{01} and H_{03}), the independent sample *t*-test would be applied to verify the acceptance or rejection of them. By adopting a pre-determined significance level *(*p<.05), H_{01} and H_{03} are either accepted to conclude that there is no significant difference between the two groups' means or alternatively, they are rejected to conclude that there is significant difference between the two groups' means for vocabulary breadth and depth knowledge recall respectively following exposure to the PWIM-A intervention. At 95% confidence interval of the difference (p <.05), should the Sig. (p) value obtained is above .05 (p>.05) this would indicate there is no statistically significant difference between the group means at post-test level. Hence, the study's null hypothesis of no significant difference in the vocabulary breadth/depth knowledge recall between the experimental and control group would be accepted. The result would be interpreted as the group with higher mean scores has not performed significantly better than the group with the lower mean scores. On the other hand, should the Sig. (p) value obtained is less than .05 (p<.05) this would indicate that statistically significant difference exists between the group means at post-test level, rejecting the study's null hypothesis of no significant difference in the vocabulary knowledge breadth/depth recall between the experimental and control group.

Thus, result would indicate that the group with higher mean scores has performed significantly better than the group with lower mean scores in vocabulary breadth/depth knowledge recall.

Likewise, RQ 2 and RQ 4 in Table 3.8 that target vocabulary breadth and depth knowledge retention respectively would be addressed via comparisons of the means and *SD* between the experimental group and control group at posttest/delayed posttest level. For vocabulary knowledge retention, comparisons of the mean scores difference between posttest and delayed posttest are made to determine which group achieves higher retention. The smaller the difference between posttest and delayed posttest mean scores the greater the retention and, vice versa. This would indicate that the group with a smaller difference (between posttest and delayed posttest mean scores) has achieved higher vocabulary breadth/depth knowledge retention as compared to the group with a bigger difference. Hence, this particular group has performed significantly better in vocabulary breadth/depth knowledge retention as compared to the other group.

Similarly, the independent sample *t*-test would be applied to verify the acceptance or rejection of hypothesis H_{02} and H_{04}. If the Sig. (*p*) value obtained is above .05 ($p>.05$), the hypothesis this would indicate there is no statistically significant difference between the group means at this level, accepting the present study's null hypothesis of no significant difference in the vocabulary breadth/depth knowledge retention between the experimental and control group. Alternatively, the null hypothesis of no significant difference would be rejected if the Sig. (*p*) value registered below .05 ($p<.05$), indicating the presence of statistically significant difference between the group means at posttest/delayed posttest level; there is significant difference in the vocabulary knowledge breadth/depth retention between

the experimental and control group. Hence, result would signify that the group with lower difference in mean scores has performed significantly better than the group with greater difference in mean scores in vocabulary breadth/depth knowledge retention.

3.9 Pilot Study Results

The scores of the tests were tabulated and duly analysed via the Statistical Package for the Social Sciences (SPSS). The Levene's Test for Equality of Variance tested the assumption of homogeneity of variances whereby the null-hypothesis (H_o: $\sigma^2_1 = \sigma^2_2$) assumes no difference between the groups' variances. As shown in Table 3.9 below, the Sig. (*p*) values obtained for both breadth and depth pre-, post- and delayed posttests were more than .05 ($p > .05$), thus the null hypothesis of no difference between the groups' variances was accepted.

Table 3.9: Levene's Test for assumption of homogeneity of variances

	Breadth		**Depth**	
	F	***Sig***	***F***	***Sig***
Pre-test	.017	.896	.489	.487
Post-test	.876	.353	.545	.463
Delayed post-test	.542	.464	1.117	.295

Pre-test

Next, independent sample *t*-tests were carried out to check for baseline similarity between the experimental and control group at pre-test level. Employing an alpha level of .05, the null hypothesis of no significant difference in vocabulary breadth and depth at the pre-test level between groups was tested. The Sig. (*p*) value obtained was more than .05 ($p > .05$) at $p = .872$ and .868 for breadth and depth respectively, indicating no statistically

significant difference between group means at the pre-test level, thus denoting baseline similarities (see Table 3.10)

Table 3.10: Independent samples t-test: Comparison of pre-test scores between groups for breadth and depth

						95% Confidence interval of the Difference	
Equal Variances Assumed	***t***	***df***	**Sig.**	**M diff**	**SE diff**	**Lower bound**	**Upper bound**
Breadth	.162	58	.872	.033	.206	-.379	.446
Depth	.167	58	.868	.033	.199	-.366	.432

Post-test

Following that, the post-test mean scores of the Experimental group were compared against the Control group; the higher breadth and depth post-test mean scores of the experimental group at 6.77 (*SD* = .898) and 5.13 (*SD* = .900) respectively indicate better performance in terms of vocabulary knowledge recall for breadth and depth as compared to the control group that recorded 6.03 (*SD* = .809) and 4.73 (*SD* = .691) for breadth and depth respectively. In addition, the Sig. (*p*) value obtained was less than .05 (p <.05) at *p* = .002 and .005 for breadth and depth respectively, indicating statistically significant differences between group means at the post-test level. Therefore, overall results signify that the Experimental group significantly outperformed the Control group in terms of vocabulary knowledge recall for breadth (see Table 3.11 and Table 3.12).

Table 3.11: Post-test results: Vocabulary knowledge recall for breadth and depth

Group	*n*	Breadth		Depth	
		M	***SD***	***M***	***SD***
Experimental	30	6.77	.898	5.13	.900
Control	30	6.03	.809	4.73	.691

Table 3.12: Independent samples *t*-test: Comparison of post-test scores between groups for breadth and depth

						95% Confidence interval of the Difference	
Equal Variances Assumed	***t***	***df***	**Sig.**	**M diff**	**SE diff**	**Lower bound**	**Upper bound**
Breadth	3.324	58	.002	733	.221	.292	1.175
Depth	1.931	58	.005	604	.307	.105	.815

Delayed post-test

Subsequently, the differences between the post-test and the delayed post-test mean scores of the Experimental group were compared against the Control group. The smaller differences recorded by the experimental group at .87 (*SD* = .507) and .90 (*SD* = .548) for breadth and depth respectively denote better performance in terms of vocabulary knowledge retention for breadth and depth as compared to the control group that recorded 1.23 (*SD* = .504) and 1.33 (*SD* = .479) for breadth and depth respectively. Additionally, the Sig. (*p*) value obtained was less than .05 ($p < .05$) at $p = .007$ and .002 for breadth and depth respectively, indicating statistically significant differences between group means at the delayed post-test level. Therefore, overall results signify that the Experimental group's performance is significantly better than the Control group's performance in terms of vocabulary knowledge retention for breadth (see Table 3.13 and Table 3.14).

Table 3.13: Post- and delayed post-test results: Vocabulary knowledge retention for breadth and depth

Group	*n*	Breadth		Depth	
		M	***SD***	***M***	***SD***
Experimental	30	.87	.507	.90	.548
Control	30	1.23	.504	1.33	.479

Table 3.14: Independent samples *t*-test: Comparison between groups for differences in post- and delayed post-test for breadth and depth

						95% Confidence interval of the Difference	
Equal Variances Assumed	***t***	***df***	**Sig.**	**M diff**	**SE diff**	**Lower bound**	**Upper bound**
Breadth	-2.808	58	.007	-.367	.131	-.628	.105
Depth	-3.261	58	.002	-.433	.133	-.699	-.167

Overall, there was no issue in the administration of the questionnaire. The questionnaire was completed with assistance from the teacher. Overall, no extreme disparities were detected among the participants in terms of exposure to English language during and after school hours. Their responses further affirmed the presence of similarities among subjects that extend to include factors such as age and educational level, socio-economic and institutional environments. The subjects consist of Year 1 pupils living in Kuala Kurau, a rural area in Perak where majority are from low income groups working as farmers, fishermen or shopkeepers.

3.10 Limitations and Delimitations

3.10.1 Limitations

As is customary in research, limitations exist in the current study. Bearing in mind the goal for greater equivalence in between groups comparability, it is generally advocated in educational study that one instructor should preferably teach all research groups throughout the period of study (Ary et al., 2009). However, very often this is beyond the control of the researcher due to practicality issues such as scheduling and logistics, as well as administrative concerns. As in the case of the present research, assigning of instructors to research groups is not within the control of the researcher since the matter was governed by administrative resolution of the respective participating schools. However, upon the request of the researcher, the heads of the respective primary schools consented to assigning the same English teacher for both experimental and control groups but still, it involved more than the ideal one instructor as suggested by Ary et al. (2009) and Bradley (2009). As such, having different teachers carrying out the intervention could be instrumental to disparities in terms of the participating teachers' qualifications and teaching experiences as well as classroom practices during the study. Nevertheless, the teachers concerned were comparable with regards to qualifications and experience teaching English language, as well as management of their research groups (for example, use of the same textbook and guided by similar curriculum framework and scheme of work, and covering the same units in class within the same period of time). Also, the teachers involved received training in the PWIM approach together and were constantly reminded to strictly employ the steps of the treatment throughout the intervention period. Hence, this limitation is to a reasonable extent controlled.

Secondly, purposive sampling was employed for the present study. It is to be noted that while generalisations made may be rationalised, representativeness remains confined to

distinct cohorts only (Barbie, 2008; Black, 1991; Cohen, Manion, & Morrison, 2018). Intact groups in the form of intact classes, as employed in the present research, may not match the vigour of true experimental research but still, it is deemed appropriate given the nature of this study. In the present study, subjects consisted of Year 1 pupils and therefore may not be generalised to include those in other age groups. Also, subjects were from rural schools and therefore are not representative of the whole population of Year 1 pupils as that would inherently include urban schools. Moreover, administrative protocols in the participating schools coupled with scheduling issues rendered randomisation not feasible. Still, despite this limitation, a quasi-experimental approach has proven to be fruitful (Leedy & Ormrod, 2010) because as noted by Brewer (2000), a quasi-experimental approach allows for the examination of the existing condition via a study's set-up, albeit an approximation. Moreover, reality is "many experimental situations occur in which researchers need to use intact groups. This might happen because of the availability of the participants or because the setting prohibits forming artificial groups" (Creswell, 2005, p. 297), as in the case of the present research

Additionally, as two intact classes (one as control and the other as experimental group) in each type of primary schools were utilised in the study, the threat of contamination effects resulting from interaction among subjects exists. Pupils in the experimental group might have shared what they learned with those in the control group. Thus, the necessity to "blind" subjects. As stated by Sullivan (2011), it is generally tricky to carry out blinding in educational studies given the complex nature of the situation. However, due to the cooperation of the participating teachers and the headmasters of the respective schools, a single-blind was imposed on the subjects in the present study whereby information pertaining to the study was completely withheld from the pupils. To the best knowledge of

the researcher, the subjects in both groups were not aware that they were participants of a research study. Additionally, the participating teachers in the respective schools were instructed not to discuss the study with any other teachers to avoid disclosure of the study through slip of the tongue. Overall, the intervention was carried out on a semblance of normality, thus addressing this limitation.

3.10.2 Delimitations

The first delimitation is that the study's focus was on seven-year old children with regards to their vocabulary acquisition. The focus on seven-year olds is due to the necessity as well as the urgency of providing young learners an early start in vocabulary building in view of its significance in literacy development (McKeown & Beck, 2014). The parameters of the population in the study are classified as Year 1 pupils, enrolled in public schools in Malaysia. Hence, its findings are representative of pupils of this age group only and cannot be generalised to encompass those who are not of this age group.

In addition, the setting of the present research was confined to national and national-type primary schools within a rural area in Perak and therefore, findings of the study cannot be inclusive of primary schools external of these parameters that are of non-comparable equivalence. The national and national-type primary schools comprise Malaysian pupils mainly of the three major ethnicities, Malay, Chinese and Indians. Collectively, they constitute a fairly representative setting of the population in national schools in Malaysia. Based on these observations, it was deemed fitting and feasible to carry out the present study in such settings.

It is also to be noted that the aim of the study is to look at the effectiveness of the treatment in augmenting young learners' vocabulary knowledge recall and retention for both

breadth and depth. As such, identifying or comparing the strengths and weaknesses of the treatment and the current teaching approach adopted in the Malaysian classrooms is excluded in the scope of the present study. Throughout, the PWIM-A was operationalised as autonomous out-of-classroom activities. Great care was taken to ensure that there's minimal disruption to existing classroom instruction and practises in all the participating schools.

CHAPTER 4

DATA ANALYSIS

4.1 Introduction

This chapter reports the data obtained from the Interactive and Print Yes-No Vocabulary Test (Meara & Buxton, 1987) and Word Associates Test (Read, 1998) that were duly administered to measure the vocabulary breadth and depth knowledge of the subjects respectively. The results of Levene's Test and the pre-, post- and delayed post-test scores were analysed using the SPSS (Version 24) computer software analysis and results are presented using descriptive and inferential statistics. The results for vocabulary breadth knowledge are tabled first and following that, the results for vocabulary depth knowledge to to address the research questions and hypotheses posed.

The Levene's Test for Equality of Variance was carried out essentially to test for homogeneity of variances between sample groups while the independent *t*-test evaluated the overall interaction between factors on the dependent variable, as well as determined the differences between means. The post- and delayed post-test results were investigated for the recall and retention of target words. Subsequently, supporting data in the form of responses obtained from the questionnaire administered to the participants are presented to augment the primary results.

4.2 Results

The results of the vocabulary breadth and depth pre-, post- and delayed post-tests were duly presented. A summary of data collected is presented as follows in Table 4.1:

Table 4.1: Summary of mean scores: Vocabulary breadth and depth

Vocabulary	Subjects	Mean		
		Pre-test	Post-test	Delayed Post-test
Breadth	PWIM-A	7.19	11.56	10.22
	Control	7.17	10.06	8.05
Depth	PWIM-A	5.67	9.49	8.40
	Control	5.66	8.31	6.58

The vocabulary breadth and depth mean scores of both experimental (PWIM-A) and Control group are as tabulated in Table 4.1. The groups' pretest means were compared to determine baseline similiarity while vocabulary knowledge recall depends on their posttest scores and the delayed posttest scores decide their retention of new vocabulary items learned during the intervention. Results of the present study are explained in detail below.

4.2.1 Vocabulary Breadth Knowledge

4.2.1.1 Levene's Test: to test the assumption of homogeneity of variance

The Levene's Test for Equality of Variance was conducted to test the assumption of homogeneity of variance where the null hypothesis assumes no difference between the variances of the two groups (H_o: $\sigma^2_1 = \sigma^2_2$; H_a: $\sigma^2_1 \neq \sigma^2_2$). Fundamentally, Levene's Test checks for assumption of equal variances. Data results associated with "Equal variances assumed" will be accordingly employed for data interpretation should the assumption of homogeneity of variance is met. Otherwise, data results associated with "Equal variances not assumed" will be employed instead, in accordance to Cochran and Cox's (1957) adjustment for the standard error of the estimate and the Satterthwaite's (1946) adjustment for the degrees of freedom. Hence, the Sig. (*p*) values obtained in the tests will determine the set of data used in interpretating the results of a study. The results are tabled as follows in Table 4.2:

Table 4.2: Levene's Test for assumption of homogeneity of variances

	F	***Sig.***
Pre-test	.364	.547
Post-test	6.367	.013
Delayed post-test	5.399	.021

Table 4.2 shows the *F* value obtained for the pre-, post- and delayed posttest at .364, 6.367 and 5.399 respectively. The Sig. (*p*) value obtained was .547 for pre-test, resulting in the alpha exceeding .05 ($p > .05$), thus accepting the null hypothesis of no difference between the groups' variances. This indicates that assumption of homogeneity of variances was met and therefore, results of data associated with the "Equal Variances Assumed" employed. The Sig. (*p*) values obtained for post- and delayed post-test was .013 and .021 respectively, resulting in the alpha falling below .05 ($p < .05$), thus rejecting the null hypothesis of no difference between the groups' variances. This indicates that assumption of homogeneity of variances was not met and therefore, results of data associated with the "Equal Variances Not Assumed" employed. This is in reference to Cochran and Cox (1957) adjustment for the standard of error of the estimate and the Satterthwaite (1946) adjustment for the standard error for the degrees of freedom.

4.2.1.2 Vocabulary breadth recall

(a) Research Question 1

RQ1: Is there a difference in the vocabulary breadth knowledge recall between the PWIM-A group and the Control group?

To address the first research question (RQ1), the scores of the posttest were tabled and an independent sample *t*-test was conducted to compare the posttest vocabulary scores

between groups to test the efficacy of the adapted PWIM approach for vocabulary breadth recall. The pretest scores were first analysed to check for baseline similarity between the two groups. The PWIM-A and Control group's vocabulary breadth pretest mean scores are as follows in Table 4.3:

Table 4.3: Descriptive statistics of pretest for baseline similarity between groups

	PWIM-A		**Control**	
Test	***M***	***SD***	***M***	***SD***
Pretest	7.19	1.748	7.17	1.913

As reflected in Table 4.3, the mean scores of the pre-test for both PWIM-A group and Control group only differ slightly, denoting baseline similarity at 7.19 (*SD* = 1.748) and 7.17 (*SD* = 1.913) respectively. Employing an alpha level of .05, an independent samples *t*-test was conducted to determine if statistically significant difference exists between the pre-test group means. The statistical analysis results of the pretest are as follows in Table 4.4:

Table 4.4: Independent samples *t*-test of pretest for significant difference between groups

	Levene's Test for Equality of Variances		***T*-test for Equality of Mean**						
								95% Confidence Interval of the Difference	
Equal Variances	***F***	***Sig.***	***t***	***df***	**Sig. 2-tailed**	***M Diff.***	***SE diff***	**Lower**	**Upper**
Assumed	.364	.547	0.000	178.000	1.000	0.000	.273	-.539	.539
Not assumed			0.000	176.558	1.000	0.000	.273	-.539	.539

Notes. α = .05

The null hypothesis of no significant difference in vocabulary breadth at the pre-test level between groups was tested. As shown in Table 4.4, the Sig. (*p*) value obtained was

more than the alpha of .05 ($p > .05$) at p = 1.000, indicating no statistically significant difference between group means at the pre-test level. This allows for the acceptance of the null hypothesis of no significant difference in vocabulary breadth between the PWIM-A group and the Control group at the pre-test level, denoting baseline similarity at 7.19 (*SD* = 1.748) and 7.17 (*SD* = 1.913) respectively.

The scores of the posttest were tabled and compared for differences in vocabulary breadth recall between groups. The posttest mean scores of the groups are as follows in Table 4.5:

Table 4.5: Descriptive statistics of posttest for vocabulary breadth knowledge recall

Test	PWIM-A (*n* = 90)		Control (*n* = 90)	
	M	***SD***	***M***	***SD***
Posttest	11.56	3.145	10.06	2.381

Table 4.5 shows the post-test mean scores for the PWIM-A group ($n = 90$, $M = 11.56$, $SD = 3.145$) and the Control group ($n = 90$, $M = 10.06$, $SD = 2.381$). The PWIM-A group recorded a higher mean score at 11.56 (*SD* = 3.145) compared to the Control group at 10.06 (*SD* = 2.381), denoting greater vocabulary knowledge recall by the experimental group. Results indicate that the subjects that underwent the adapted PWIM intervention experienced greater vocabulary breadth recall than those in the Control group.

The results presented demonstrate the vocabulary breadth knowledge recall difference between the PWIM-A group and the Control group, thereby addressing the first research question (RQ1) posed. On the whole, the PWIM-A group outperformed the Control group in vocabulary breadth knowledge recall.

(b) Hypothesis 1

H_{o1}: There is no significant difference in the vocabulary breadth knowledge recall between the PWIM-A group and the Control group.

To address the first hypothesis (H_{o1}), an independent samples *t*-test was employed to evaluate the difference between group means at the post-test level (recall) at an alpha level of .05. The independent samples *t*-test also tested the null hypothesis of no significant difference in the vocabulary breath knowledge recall between the experimental and control group. Analysed results from data collected indicates that there are statistically significant differences between the vocabulary breadth recall of the PWIM-A and Control group. Table 4.6 shows the statistical analysis of the results.

Table 4.6: Independent samples *t*-test of posttest for significant difference in recall

	Levene's Test for Equality of Variances		***T*-test for Equality of Mean**						
								95% Confidence Interval of the Difference	
Equal Variances	***F***	***Sig.***	***t***	***df***	**Sig. 2-tailed**	***M Diff.***	***SE diff***	**Lower**	**Upper**
Assumed	6.367	.013	3.607	178.000	.000	1.500	.416	0.679	2.321
Not assumed			3.607	165.811	.000	1.500	.416	0.679	2.321

Notes. α = .05

As shown in Table 4.6 the Sig. (*p*) value obtained was less than .05 (p < .05) at *p* = .000, indicating statistically significant differences between the PWIM-A and Control group at post-test level (recall). This allows for the rejection of the null hypothesis (H_{o1}) of no significant difference in the vocabulary breadth knowledge recall between groups, and the acceptance of the alternative hypothesis (H_1) that there exists a significant difference in the vocabulary breadth knowledge recall between the PWIM-A group and the Control group.

This test was statistically significant, t (166) = 3.607, p = .000 (p < .05); rejecting the null hypothesis (H_{o1}) of no significant difference in the post-test scores. The 95% confidence interval for the vocabulary post-test mean ranged from .679 to 2.321. This confidence interval excluded the value of 0, indicating the null hypotheses that there was no statistically significant relationship between the pair of variables is not true. Hence, the intervention experienced by the subjects has resulted in positive gain scores in their vocabulary acquisition. An examination of the statistics indicates that the intervention group (M = 11.56, SD = 3.145) performed significantly higher in the vocabulary post-test than the control group (M = 10.06, SD = 2.381). Specifically, the results suggest that when pupils were exposed to the PWIM-A method, they experienced significantly higher vocabulary recall. In other words, subjects in the PWIM-A group were able to significantly better recalled the items learnt during the intervention period as compared to the Control group that wer not taught via the PWIM-A approach.

4.2.1.3 Vocabulary breadth retention

(a) Research Question 2

RQ2: Is there a difference in the vocabulary breadth knowledge retention between the PWIM-A group and the Control group?

To address the second research question (RQ2), the difference between the scores of post- and delayed post-test were compared to measure for retention. Results are as tabulated in Table 4.7.

Table 4.7: Descriptive statistics of differences between posttest and delayed posttest for vocabulary breadth knowledge retention

Test	PWIM-A (*n* = 90)		Control (*n* = 90)	
	M	***SD***	***M***	***SD***
Posttest	11.56	3.145	10.06	2.381
Delayed Posttest	10.22	2.743	8.05	2.162
Mean Difference	-1.33		-2.01	

As seen in Table 4.7, the difference between the mean of post-test and delayed post-test for PWIM-A group and Control group is 1.33 and 2.01 respectively. The finding suggests that the decrease (2.01) in Control group's mean scores is greater than the PWIM-A group's decrease (1.33), denoting greater decay (lower retention) of vocabulary items learned by the Control group as compared to PWIM-A group. Detailed comparison of the differences between groups is as follows in Table 4.8:

Table 4.8: Comparison of differences between posttest and delayed posttest for vocabulary breadth knowledge retention

Group	*n*	Differences between Posttest and Delayed Posttest	
		M	***SD***
PWIM-A	90	1.33	.948
Control	90	2.01	1.137

The difference in the post- and delayed post-test mean scores in Table 4.8 that measured the subjects' vocabulary knowledge retention for breadth is 1.33 (*SD* = .948) for the PWIM-A group and 2.01 (*SD* = 1.137) for the Control group. The smaller difference in mean scores (*M* = 1.33) recorded by the PWIM-A group suggests less decay of vocabulary

items learned (i.e. higher vocabulary knowledge retention) as compared to the Control group (M = 2.01). Employing an alpha level of .05, an independent samples *t*-test was conducted to determine if statistically significant difference exists between the differences of post- and delayed post-test group means.

(b) Hypothesis 2

H_{o2}: There is no significant difference in the vocabulary breadth knowledge retention between the PWIM-A group and the Control group.

To address the second hypothesis (H_{o2}), an independent samples *t*-test was conducted to evaluate the difference between group means at the post- and delayed posttest level (retention) at an alpha level of .05 and tested the null hypothesis of no significant difference in the vocabulary breath knowledge retention between the experimental and control group. The statistical analysis of the results is as shown below in Table 4.9.

Table 4.9: Independent samples *t*-test of posttest/delayed posttest for significant difference in vocabulary breadth knowledge retention

	Levene's Test for Equality of Variances		***T*-test for Equality of Mean**						
								95% Confidence Interval of the Difference	
Equal Variances	***F***	***Sig.***	***t***	***df***	**Sig. 2-tailed**	***M Diff.***	***SE diff***	**Lower**	**Upper**
Assumed	5.399	.021	-4.344	178.000	.000	-.678	.156	-.986	-.370
Not assumed			-4.344	172.447	.000	-.678	.156	-.986	-.370

Notes. α = .05

The null hypothesis of no significant difference in the retention of vocabulary breadth knowledge between groups was tested. Table 4.9 shows that the Sig. (*p*) value obtained was less than .05 ($p < .05$) at $p = .000$, indicating statistically significant differences between group means for differences at the post- and delayed post-test levels (retention). This allows for the rejection of the null hypothesis (H_{02}) of no significant difference in the vocabulary breadth knowledge retention between groups, and the acceptance of the alternative hypothesis (H_2) that there exists a significant difference in the vocabulary breadth knowledge retention between the PWIM-A group and the Control group.

This test was statistically significant, $t\ (172) = -4.344$, $p = .000$ ($p < .05$); rejecting the null hypothesis (H_{o2}) of no significant difference in the difference between post- and delayed posttest scores. The 95% confidence interval ranged from -.986 to -.370 and excluded the value of 0, rejecting the null hypotheses that there was no statistically significant relationship between the pair of variables. Hence, the intervention experienced by the subjects has resulted in greater retention. The statistics indicate that the intervention group ($M = 1.33$, $SD = .948$) performed significantly higher in vocabulary breadth knowledge retention than the control group ($M = 2.01$, $SD = 1.137$). Specifically, the results suggest that when pupils were exposed to the PWIM method, they experienced significantly higher vocabulary retention. Therefore, the overall results signify that the PWIM-A group were able to significantly better retained the items learnt during the intervention period as compared to the Control group that was not taught via the PWIM-A approach.

4.2.2 Vocabulary Depth Knowledge

4.2.2.1 Levene's Test: to test the assumption of homogeneity of variance

The Levene's Test for Equality of Variance was conducted to test the assumption of homogeneity of variance where the null hypothesis assumes no difference between the variances of the two groups (Ho: σ21 = σ22; Ha: σ21 ≠ σ22). The results are tabled as follows in Table 4.10:

Table 4.10: Levene's Test for assumption of homogeneity of variances

	F	***Sig***
Pre-test	.604	.438
Post-test	2.009	.158
Delayed post-test	9.888	.002

As shown in Table 4.10, the F value obtained for the pre-, post- and delayed posttest is .604, 2.009 and 9.888 respectively. The Sig. (*p*) value obtained is .438 and .158 for pre- and post-test respectively, the resulting p-values of more than .05 ($p > .05$), thus accepting the null hypothesis of no difference between the groups' variances. This indicates that the assumption of homogeneity of variances was met and therefore, the data results associated with the "Equal Variances Assumed" would be used. The Sig. (*p*) values obtained for delayed post-test is .002, resulting in less than the alpha of .05 ($p < .05$), thus rejecting the null hypothesis of no difference between the groups' variances and denoting that the assumption of homogeneity of variances was not met. Therefore, taking into account Cochran and Cox's (1957) adjustment for the standard of error of the estimate and the Satterthwaite's (1946) adjustment for the standard error for the degrees of freedom, the data results associated with the "Equal Variances Not Assumed" would be used.

4.2.2.2 Vocabulary depth recall

(a) Research Question 3

RQ3: Is there a difference in the vocabulary depth knowledge recall between the PWIM-A group and the Control group?

To address the third research question (RQ3), the posttest mean of the groups was compared to test the efficacy of the adapted PWIM approach for vocabulary recall. The pre-test scores were first analysed to determine for baseline similarity between the two groups in vocabulary depth knowledge. The PWIM-A and Control group's vocabulary depth pretest mean scores are as follows in Table 4.11:

Table 4.11: Descriptive statistics of pretest for baseline similarity between groups

	PWIM-A		**Control**	
Test	***M***	***SD***	***M***	***SD***
Pretest	5.67	2.011	5.66	1.768

Table 4.11 shows that the difference between the mean of the pre-test for PWIM-A (M = 5.67) and Control group (M = 5.66) is very small, indicating baseline similarity at 5.67 (SD = 2.011) and 5.66 (SD = 1.768) respectively. Employing an alpha level of .05, an independent samples t-test was conducted to determine if statistically significant difference exists between the pre-test group means. Analysed result indicates that there is no statistically significant difference between group means at the pre-test level. The statistical analysis results of the pretest are tabled as follows in Table 4.12:

Table 4.12: Independent samples *t*-test of pretest for significant difference between groups

	Levene's Test for Equality of Variances		***T*-test for Equality of Mean**						
								95% Confidence Interval of the Difference	
Equal Variances	***F***	***Sig.***	***t***	***df***	**Sig. 2-tailed**	***M Diff.***	***SE diff***	**Lower**	**Upper**
Assumed	.604	.438	.039	178.000	.969	.011	.282	-.546	.568
Not assumed			.039	175.133	.969	.011	.282	-.546	.568

Notes. α = .05

The null hypothesis of no significant difference in vocabulary depth knowledge at the pre-test level between groups was tested. As reflected in Table 4.12, the Sig. (*p*) value obtained is more than .05 ($p > .05$) at $p = .969$, indicating no statistically significant difference between group means at the pre-test level. This allows for the acceptance of the null hypothesis of no significant difference in vocabulary depth knowledge between the PWIM-A group and the Control group at the pre-test level, denoting baseline similarity at 5.67 ($SD = 2.011$) and 5.66 ($SD = 1.768$) respectively.

The scores of the posttest were tabled and compared for differences in vocabulary depth recall between groups. Analysed results from data collected indicates that there are statistically significant differences between the vocabulary depth recall of the PWIM-A and Control group The posttest mean scores for both groups are as follows in Table 4.13.

Table 4.13: Descriptive statistics of posttest for vocabulary depth knowledge recall

Test	PWIM-A (*n* = 90)		Control (*n* = 90)	
	M	***SD***	***M***	***SD***
Posttest	9.49	2.653	8.31	2.227

Table 4.13 shows the post-test mean scores for the PWIM-A group ($n = 90$, $M = 9.49$, $SD = 2.653$) and the Control group ($n = 90$, $M = 8.31$, $SD = 2.227$). Analysis of data collected shows the PWIM-A group recorded a higher mean score at 9.49 ($SD = 2.653$) compared to the Control group at 8.31 ($SD = 2.227$), denoting greater vocabulary knowledge recall by the experimental group. Results indicate that the subjects that underwent the adapted PWIM intervention experienced greater vocabulary depth recall than those in the Control group.

The results presented demonstrate the vocabulary depth knowledge recall differences between the PWIM-A group and the Control group, thereby addressing the third research question (RQ3) posed. On the whole, the PWIM-A group outperformed the Control group in vocabulary depth knowledge recall.

(b) Hypothesis 3

H_{o3}: There is no significant difference in the vocabulary depth knowledge recall between the PWIM-A group and the Control group.

To address the third hypothesis (H_{o3}), an independent samples *t*-test was employed to evaluate the difference between group means at the post-test level (recall) at an alpha level of .05 and tested the null hypothesis of no significant difference in the vocabulary depth

knowledge recall between the experimental and control group. Results analysed fropm data collected indicates that there is statistically significant difference between the PWIM-A and Control group at the post-test level. Table 4.14 shows the statistical analysis of the results.

Table 4.14: Independent samples T-test of posttest for significant difference in recall between groups

	Levene's Test for Equality of Variances		***T*-test for Equality of Mean**						
								95% Confidence Interval of the Difference	
Equal Variances	***F***	***Sig.***	***t***	***df***	**Sig. 2-tailed**	***M Diff.***	***SE diff***	**Lower**	**Upper**
Assumed	2.009	.158	3.226	178.000	.001	1.178	.365	.457	1.898
Not assumed			3.226	172.802	.001	1.178	.365	.457	1.898

Notes. α = .05

As reflected in Table 4.14, the Sig. (*p*) value obtained was less than .05 ($p < .05$) at $p = .001$, indicating statistically significant differences between the PWIM-A and Control group at post-test level (recall). This allows for the rejection of the null hypothesis (H_{o3}) of no significant difference in the vocabulary depth knowledge recall between groups, and the acceptance of the alternative hypothesis (H_3) that there exists a significant difference in the vocabulary depth knowledge recall between the PWIM-A group and the Control group.

This test was significant, t (173) = 3.226, $p = .001$ ($p < .05$); rejecting the null hypothesis of no significant difference in the post-test scores. The 95% confidence interval for the vocabulary post-test mean ranged from .457 to 1.898. This confidence interval excluded the value of 0, indicating the null hypotheses that there was no statistically

significant relationship between the pair of variables was not true. Hence, the intervention experienced by the subjects has resulted in positive gain scores in their vocabulary acquisition. Statistics indicate that the intervention group (M = 9.49, SD = 2.653) performed significantly higher in the vocabulary post-test than did the control group (M = 8.31, SD = 2.227). Specifically, the results suggest that when pupils were exposed to the PWIM method, they experienced significantly higher vocabulary depth knowledge recall.

4.2.2.3 4Vocabulary depth retention

(a) Research Question 4

RQ4: Is there a difference in the vocabulary depth knowledge retention between the PWIM-A group and the Control group?

To address the fourth research question (RQ4), the difference between the scores of post- and delayed post-test were compared to measure for retention. Results are as tabulated in Table 4.15.

Table 4.15: Descriptive statistics of differences between posttest and delayed posttest for vocabulary depth knowledge retention

Test	PWIM-A (n = 90)		Control (n = 90)	
	M	***SD***	***M***	***SD***
Posttest	9.49	2.653	8.31	2.227
Delayed Posttest	8.40	2.312	6.58	1.574
Mean Difference	-1.09		-1.73	

The difference between the mean of post-test and delayed post-test for PWIM-A group and Control group is 1.09 and 1.73 respectively. The findings suggest that the decrease (1.73) in Control group's mean scores is higher than the PWIM-A group's decrease (1.09).

A greater decrease in the means obtained by the Control group shows that it experienced greater decay whivh translates into lower retention of vocabulary items learned as compared to the PWIM-A group that experienced lower decrease in means. Detailed comparison of the differences between groups is as follows in Table 4.16:

Table 4.16: Comparison of differences between posttest and delayed posttest for vocabulary depth knowledge retention

		Differences between Posttest and Delayed Posttest	
Group	***n***	***M***	***SD***
PWIM-A	90	1.09	.744
Control	90	1.73	.922

Table 4.16, shows the difference in the post- and delayed post-test mean scores that measured the subjects' vocabulary knowledge retention for depth; 1.09 (*SD* = .744) for the PWIM-A group and 1.73 (*SD* = .922) for the Control group. The smaller difference in mean scores at *M* = 1.09 recorded by the PWIM-A group suggested less decay of vocabulary items learned (i.e. higher vocabulary knowledge retention) as compared to the Control group (*M* = 1.73). Employing an alpha level of .05, an independent samples *t*-test was conducted to determine if statistically significant difference exists between the differences of post- and delayed post-test group means.

(b) Hypothesis 4

H_{o4}: There is no significant difference in the vocabulary depth knowledge retention between the PWIM-A group and the Control group.

To address the fourth hypothesis (H_{o4}), the independent samples *t*-test was employed to evaluate the differences between group means at the post- and delayed post-test level (retention) at an alpha level of .05 and tested the null hypothesis of no significant difference in the vocabulary depth knowledge retention between the experimental and control group. The statistical analysis of the results is as shown below in Table 4.17.

Table 4.17: Independent samples *t*-test of posttest/delayed posttest for significant differences in vocabulary depth knowledge retention

	Levene's Test for Equality of Variances		***T*-test for Equality of Mean**						
								95% Confidence Interval of the Difference	
Equal Variances	***F***	***Sig.***	***t***	***df***	**Sig. 2-tailed**	***M Diff.***	***SE diff***	**Lower**	**Upper**
Assumed	9.888	.002	-5.161	178.000	.000	-.644	.125	-.891	-.398
Not assumed			-5.161	170.453	.000	-.644	.125	-.891	-.398

Notes. $\alpha = .05$

The null hypothesis of no significant difference in the retention of vocabulary depth knowledge between groups was tested. Table 4.17 indicates that the Sig. (*p*) value obtained was less than .05 ($p < .05$) at $p = .000$, indicating statistically significant differences between group means for differences at the post- and delayed post-test levels (retention). This allows for the rejection of the null hypothesis (H_{o4}) of no significant difference in the vocabulary depth knowledge retention between groups, and the acceptance of the alternative hypothesis (H_4) that there exists a significant difference in the vocabulary depth knowledge retention between the PWIM-A group and the Control group.

This test was significant, t (170) = -5.161, p = .000 (p < .05); rejecting the null hypothesis (H_{o4}) of no significant difference in the difference between post- and delayed posttest scores. The 95% confidence interval ranged from -.891 to -.398 and excluded the value of 0, rejecting the null hypotheses that there was no statistically significant relationship between the pair of variables. Hence, the intervention experienced by the subjects has resulted in greater retention. Statistics indicate that the PWIM-A group (M = 1.09, SD = .744) performed significantly higher in vocabulary depth knowledge retention than the Control group (M = 1.73, SD = .922). Specifically, the results suggest that when pupils were exposed to the PWIM method, they experienced significantly higher vocabulary retention. Therefore, the overall results signify that the PWIM-A group were able to significantly better retain the items learnt during the intervention period as compared to the Control group that was not taught via the PWIM-A approach.

4.2.3 Summary

In essence, the results indicate that both PWIM-A and Control group possessed baseline similarity in that there were no significant differences between group means at the pretest level for vocabulary breadth and depth. However, results at the post-and delayed posttest levels indicate that the PWIM-A group performed significantly better than the Control group for both breadth and depth components (see Appendices Q and R for the test scores, and the pictures employed in the study in Appendix S). The findings are summarised in Table 4.18:

Table 4.18: Summary of test performance between groups

Vocabulary	Pre-test	Post-test (Recall) & Delayed Post-test (Retention)
Breadth	PWIM-A = Control	PWIM-A > Control
Depth	PWIM-A = Control	PWIM-A > Control

4.3 Discussion of the Findings

This section discusses in detail the findings presented in section 4.2 on the pupils' recall and retention of vocabulary breadth and depth after the PWIM-A intervention in comparison to the control group that underwent traditional classroom instruction and were not exposed to the intervention experienced by those in the experimental group.

4.3.1 Vocabulary Breadth Knowledge Recall

Research Question 1 (RQ1), pertaining to the difference in the vocabulary breadth knowledge recall between the PWIM-A group and the Control group was examined via the comparison of means and standard deviations at post test level between the groups. At the pre test level, both groups recorded mean scores that differed minimally at 7.19 (*SD* = 1.748) and 7.17 (*SD* = 1.914) respectively, denoting baseline similarity. At the post test level that measured subjects' recall of vocabulary breadth knowledge, the scores clearly differed at 11.56 (*SD* = 3.145) and 10.06 (*SD* = 2.381) respectively. Descriptive statistics confirmed that the experimental group which received intervention (*M* = 11.56, *SD* = 3.145) recorded higher vocabulary breadth recall than those in the control group (*M* = 10.06, SD = 2.381). The Sig. (*p*) values derived from inferential statistics analysis at less than .05 ($p < .05$) affirmed statistically significant differences between the group means, hence allowing for

the rejection of Null Hypothesis 1 (H_{o1}) of no significant difference in the vocabulary breadth knowledge recall between the groups.

The evidence affirms that by employing pictures concurrently with words, vocabulary breadth recall of young learners is effectively enhanced, supporting the encoding theories on Picture Superiority Effect. PWIM-A used pictures primarily in its lesson structures, leaning on learners' existing sensory systems of logogens and imagens for enhanced language learning which is consistent with the superior effects of pictures over words. Results of the present study further points to perceptual superiority for distinctive memory encoding. Paivio's (1976) theory of dual-coding is grounded on the basis that cognition and memory are largely aided by two distinct yet interconnected codes, one verbal for language and another nonverbal for imagery. The sensory-semantic theory proposed by Nelson et al. (1977) too stresses on activation of sensory and semantic codes although its processes differ slightly from that of Paivio's DCT in the sequence of phonemic access. With PWIM-A, phonemic access and semantic processing happened indirectly ahead of name codes, thus supporting the encoding theories of DCT and the sensory-semantic theory. The superior vocabulary breadth recall recorded by experimental group that experienced the picture based intervention program supports the encoding theories.

It is commonly accepted that concrete language has the advantage over abstract language in terms of being readily represented and processed in both codes, visual and verbal (Sadoski, 2005). As obviously pointed out in the encoding theories that formed the PSE backbone, abstract language is at a disadvantage compared to concrete language since the former relies primarily on a network of verbal associations that the later similarly has access to and nonverbal mode as well This is in tandem with researchers who are exponents of a

picture-word superiority over singular words in recall, such as Christiansen (2009), Banta (2004), Thornbury (2004), Al-Seghayer (2001) and Haber and Myers (1982). Generally, although the use of pictures for sight word learning remains controversial with it being accused of interfering with learners' attention to details in print form, thus hindering rather than assisting in the learning process (Schallert, 1980; Solman, Singh, & Kehoe, 1992; Wu & Solman, 1993), the positive impact seems to outweigh the negative impact of utilising pictures for L2 learning.

It is also apparent that permitting the use of mother tongue in the process of inducing words familiar to learners in the present study has positively impacted recall. Mother tongue largely refers to speaker's dominant and home language. The use of mother tongue is undeniably dominant in the rural NPS, NTCPS and NTTPS primary schools as the pupils also experience notable exposure of these languages in other subjects at the school apart from those being the medium of instruction in the respective schools. Arguably, this contributes to the increased recall of the words among the students experiencing intervention whereby the use of mother tongue is forbidden during normal English lessons. As stated by Kabilan and Raja Ida (2008), the use of mother tongue facilitates learning and at the same time encourages and stimulates learners to participate actively in classroom activities. It has great potential as a learning source of value for L2 instruction especially in cases where both learners and teachers possess similar mother tongue (He, 2012) as in the present study with Malay teachers teaching in NPS and, Chinese and Indian teachers teaching in NTPCS and NTPTS respectively.

PWIM, as Joyce et al. (2004) claimed, belongs to the cognitive psychology based information processing family that promotes learning via linking of thoughts and ideas, a

notion that underlines the lesson structures of PWIM-A that utilised pictures containing familiar sights to elicit words originating from learners' listening and speaking vocabulary. Thus, fusing existing knowledge with new information, itself a significant process to acquiring and storing of knowledge as expanded in the theory of cognitive psychology. Cognitive psychology fundamentally studies how human beings deliberate, knows and recollects. PWIM-A exploited a major feature of cognitive psychology that aids in understanding and remembering new items taught, thus assisting subjects in the study not only in developing sight vocabularies in the natural way but to recall new vocabulary items taught. This is as shown in the results obtained from the present experimental study.

Additionally, word recall also relies on conceptual processing (Roediger, 1990; Richardson-Klavehn, 1988; Schacter, 1987). Allegedly, relying on conceptual aspects produces superior outcome in a memory test in contrast to relying on perceptual aspects. The framework of PWIM is underpinned by Joyce et al.'s (2004) concept attainment theory where learners are gently led and encouraged towards successful concept building. Theoretically, pictures essentially are deemed encoded with more conceptual processing (Weldon & Roediger, 1987), thus clearly explaining the higher and more significant recall ability among young learners as detected in the documented post test results of this study.

PWIM lesson structure too demands that words induced are repeated in multiple cycles (Calhoun, 1999). The significant positive result on vocabulary breadth recall are in tandem with Thornburg's (2004) claim that repetition is a significant process in aiding recall, as featured in Bruner's (1960) spiral curriculum theory stresses on reinforcement among the four characteristics, readiness, content structure, sequencing and reinforcement for effective instruction. During the intervention, when the Year 1 pupils were introduced to the pictures

with objects and situations that were already familiar in their daily life, teacher built upon this store of existing knowledge and further introduced/repeated the correct words and spelling to before reinforcing the new words further with repetitions on the part of the pupils.

Spiral learning is enabled through PWIM-A's step of revisiting basic vocabulary items over and over again, building upon these basic ideas and incorporating elaborations that help understanding and mastery. Atkinson and Shiffrin's (1968) hypothesis on short term retrieval or recall stresses on repetitions for knowledge recall as found in the information processing approach. The strength of recall is also very much related to the selective attention that is given to the piece of information while it is being transmitted from sensory memory to short term memory through rehearsals (Atkinson & Shiffrin, 1968) which consolidates the information (Anderson, 2000) failing which, information can be lost or decayed and forgotten (Atkinson & Shiffrin, 1968). The PWIM model of teaching endorses meaningful repetitions rather than rote repetitions in its framework. Hence, as indicated by the present study's findings, vocabulary knowledge recall is significantly higher via the PWIM-A model.

PWIM-A group of subjects' more enhanced vocabulary breadth knowledge recall could also be aligned to Atkinson and Shiffrin's (1968) theory of stage model of memory. Accordingly, the mental system is assumed to have a limited capacity, indicating that though new information can be encoded, stored and recall but there exist constraints on volume and rate of retrieval. This theory is also supported by Mayer (2009) who advanced the Segmenting Principle by explaining that when complex continuous lessons are broken down into smaller segments, working memory overload can be avoided, therefore augmenting quality processing of new information. In the case of the PWIM-A intervention, Miller's

(1956) chunking, a theory that is aligned to the theory of cognitive development, is practised. Chunking is an information organizing process that aids in the encoding and storage of vocabulary knowledge in Atkinson and Shiffrin's MSM store for short term memory. In the intervention, five words were taught per session, thus adhering to the recommended information chunking number of "7+2" to aid attention and facilitate mental storage for recall and retention. Miller (1956) first found that people could best handle between five to nine pieces of information and eventually culminating in him deriving a mean of seven in a series of experiment regarding cognitive load. Therefore, implementation of PWIM-A with a five-word cycle leading to pupils' significant vocabulary breadth recall in this study is clear supportive evidence of the success of chunking and segmented principle, bolstered by selective attention.

Past studies modeled on Calhoun's (1999) PWIM have been detected in various parts of the world. However, only a small number chose to focus specifically on vocabulary knowledge acquisition while most concentrated on the effects of PWIM on learners' writing skills. Studies on PWIM pertaining to vocabulary learning undertaken by researchers such as Eliya Fitri (2016), Deni (2014) and Li (2011) have similarly produced positive findings on vocabulary recall. For instance, in 2016, Eliya Fitri conducted an action research involving second graders (n = 31) in Indonesia. Pre- and post tests were administered and the mean scores of pre- and both post tests were duly compared. Higher mean scores for the post tests was recorded as compared to pre test, denoting enhanced vocabulary learning among those who underwent the PWIM intervention.

Meanwhile, Deni's (2014) research design was quasi-experimental with non-equivalent sample. Subjects forming the experimental group experienced the PWIM

intervention while the control group was taught via the traditional method typically employed in the Indonesian classrooms. Her study was conducted over a period of one month and eventual findings based on comparison of post test mean scores between experimental and control group denote higher post test scores for experimental group compared to control group. Hence, it is in tandem with the findings of the present research that signified a higher vocabulary breadth knowledge recall via the adapted PWIM model of teaching.

As for Li (2011) who conducted his study on a group of Grade 4 Swedish pupils (n = 16), he likewise reported higher (but not significant) post test scores and positive feedback from the experimental group regarding PWIM implementation in the classroom. Quantitative and qualitative data were collected via pre- and post vocabulary tests and administered questionnaire respectively. However, it is to be noted that the number of subjects was very small at $n = 8$ for each group. Besides, documented reliability or validity coefficients of instruments employed in the study are conspicuously absent.

Conversely, Jiang (2014) who had 55 subjects (4th and 7th graders) consisting of mainland Chinese students for his study reported that those who were taught the traditional classroom approach managed higher scores in the post test compared to those in the experimental group that were exposed to PWIM, indicating poorer vocabulary recall after experiencing PWIM approach. He explored the effectiveness of PWIM for vocabulary learning within the communicative language teaching framework. Jiang (2014) implemented a total of 13 and 22 PWIM sessions for fourth and seventh graders respectively, with each session lasting less than 10 minutes. The instruments in his study include vocabulary test (pre- and post test) and questionnaire. His qualitative instrument looked at cognitive overload and redundancy effect of PWIM and the perceptions of subjects on its effects on

English language learning for vocabulary and writing, as well as PWIM's strengths and weaknesses. Although analysed data indicated negative findings for recall (post test) among the experimental group and positive findings for traditional Chinese classroom approach, the question of reliability and validity seems to arise like in the case of Li's (2011) study. Jiang (2014) professed that the vocabulary tests used in his study were simulated mid-term tests randomly selected by the two English teachers participating in the study. Unlike the vocabulary tests adapted specifically for the present study, the vocabulary tests in Jiang's (2014) study were not specially selected ones with reported reliability or validity coefficients. Hence, the findings are not comparable. In 2015, Jiang carried out another PWIM study to explore the perceptions of 7th graders in China of PWIM on their narrative writing skills and documented positive findings.

Another researcher, Loh (2010), a primary school teacher in Singapore, also posted positive findings in terms of vocabulary learning and further advocated PWIM as an interesting and effective activity for vocabulary enhancement. He experimented with the PWIM model of teaching on his Year 1 class in vocabulary learning. However, it appeared to be a rather superficial inquiry and classroom observations (during intervention) of subjects' engagements and achievements served as the base for his findings.

Although the various past studies mentioned have posted similarly positive findings with regards to vocabulary breadth recall, it's interesting to note that instruments, particularly vocabulary tests, as well as methodology that comprise issues such as designs of study, number of PWIM cycles and duration of each session, number of subjects among others, are non-comparable with regards to the present study. Therefore, they cannot be used

to compare but serves as indication that the researcher is aware of the various studies conducted in this particular field.

In contrast, the present study finds comparable similarity with a longitudinal study conducted by Calhoun et al. (2001) that spanned an entire school year. Calhoun et al (2001) employed the PWIM in multiple cycles of inquiry and each cycle lasted from two to six weeks. Likewise, the present study covered a longer period; three cycles spanning 12 weeks which is approximately one quarter of the entire school year in Malaysia. Therefore, the conclusion that can be drawn is that PWIM has a significant positive impact on vocabulary recall. Perhaps the findings would be more evident should the period of implementation be of a longer duration with more cycles.

In sum, PWIM contributes to significantly higher vocabulary breadth recall among the pupils due to the fact that it is designed to enhance learning by having features such as images with familiar objects, allowance for mother tongue word association, activation of verbal and non-verbal processing system, meaningful repetition, spiral learning and segmenting with ideal chunks of words.

4.3.2 Vocabulary Breadth Knowledge Retention

The second research question, RQ2, in relation to the disparity in the retention of vocabulary breadth knowledge between the PWIM-A group and the Control group, was investigated via the comparison of means and standard deviations between the experimental and control group in post and delayed posttests, administered immediately after the intervention period and approximately two weeks after respectively. Retention is based on how well the vocabulary knowledge is maintained after a certain period of experiencing an intervention (Revesz, Sachs, & Mackey, 2011) with the less knowledge lost denoting the

higher the retention. Descriptive statistics confirmed that the experimental the group which received intervention (M = 10.22, SD = 2.743) recorded higher vocabulary breadth retention than those in the control group (M = 8.05, SD = 2.162). The greater decrease in the post and delayed posttest means of the control group (-2.01) provides evidence that there is a greater decay of vocabulary breadth retention among the subjects that experienced traditional classroom approach compared to the PWIM-A group (-1.33). The Sig. (p) values derived from inferential statistics analysis at less than .05 ($p < .05$) affirmed statistically significant differences between the group means, hence allowing for the rejection of null Hypothesis 2 (H_{o2}) of no significant difference in the vocabulary breadth knowledge retention between the groups.

Evidently, repetitions that embraces attentiveness make for meaningful rehearsal which represents deep semantic processing that leads to the fabrication of long-lasting memories, i.e. retention. The experimental group's significant positive results in vocabulary breadth retention are in line with the theory that underscores Atkinson and Shiffrin's (1968) multi-store memory model that accentuates continuous repetitions as well as organisations of information for a successful transfer of new information from STM (recall) to LTM (retention), a notion that has earned the support of researchers such as Bradley (2001), Camitelli and Gobet (2011), and Huitt (2003). Additionally, as explained in the MSM model, for effective retention of newly acquired knowledge after a period of time despite the introduction of new information or threat of decay, it must first be encoded by creating memory with the assistance of existing knowledge and reinforced undoubtedly through multiple meaningful repetitions. The lesson structure of PWIM-A as implemented in this study required pupils to undergo multiple repetitions of words taught; reading and spelling the words aloud multiple times while focusing at the picture of the word. The positive result

is also in tandem with the hypotheses of other researchers (2016; Ellis, 2002; Roitblat & Laufer, 2008; Yoshii, 2014) that advocate reinforcement via deliberate practice for effective long term retention of words.

As stated, Calhoun (1999) has incorporated concept attainment and inductive thinking into the PWIM model. Thus, its lesson structure stresses primarily on semantic memory - focus, categorising information and imparting them hierarchically based on conceptual relevance. While inductive thinking coax learners into gathering information and scrutinising them, concept attainment guides and trains them to identify and form categories withy confidence. Inductive thinking is also claimed to help hone learners' skills in forming concept. As for concept attainment, Calhoun (1999) incorporated it into PWIM framework not only to probe for ideas but also to introduce content features that has helped in retention of new information learned, as demonstrated by Bruner et al. (1956) in their study. Accordingly, semantic memory can be recalled autonomously and subsequently retained in handling a wide-ranging of both tangible and intangible information. Thus, effectively enhancing information retention as found via data collected in the present study. Atkinson and Shiffrin's (1968) MSM model also stresses on presence of content features in easing information from STM to LTM where retention takes place. The positive result indicates the relevance of the theories of the MSM model, inductive thinking and concept attainment, combined in justifying the enhanced retention of new words learned.

PWIM-A main tool is pictures; it is the employment of pictures itself that makes a distinction in the way a word in effectively encoded. Therefore, the present study's positive result pertaining to retention of vocabulary breadth retention demonstrates the superior effects of pictures over words. In DCT, pictures gain prominence over text in previous

research as interesting, comprehensible and relevant pictures are generally found to be superior to text not only in terms of recall and recognition (Madigan, 1983; Paivio, 1991a) but also retention, enhanced typically by imaginal coding (Roediger & Weldon, 1987). Apart from the DCT supporting employment of pictures for higher retention, Atkinson and Shiffrin (1968) too acknowledged that knowledge unit in pictorial form is more readily as well as more effectively stored for retrieval in their MSM model. Thus, minimising memory decay which means enhancing retention.

Pictures as an effective vehicle for long-term retrieval of new words is aligned with the stance that encoding, storage and retrieval are central to fostering retention as also theoretically proposed in Paivio's dual-coding theory (Paivio, 1971, 1986, 1991a), Nelson's sensory-semantic model (Nelson, 1979; Nelson, Reed, & McEnroy, 1977) and the principle of transfer appropriate processing by Roediger (1990) and, Weldon and Roediger (1987). The underlying theories depict pictures as dual coded and the retrieval process is therefore activated by separate and yet interrelated dual codes of storage that lend weight to the effectiveness of pictures on vocabulary retention.

Empirical findings supporting dual coding theory are found again and again at least in the last 30 years and counting. From earlier past studies on young learners (Nelson & Kosslyn, 1976; Nelson, Reed, & McEvoy, 1977; Nelson, Reed, & Walling, 1976; Wilgosh, 1975) to Pandian and Narusuman (2003) who observed that long-term memory or retention is enhanced by verbal and non-verbal coding, and to a more current study by Cuevas and Dawson (2017), the notion of visual coding superiority for vocabulary recall and retention is evidently supported. Dual coding continues to be deemed beneficial for more efficacious learning and retention. Irrefutably, PWIM-A leverages on the effectiveness of sensory

system that encodes logogens and imogens to facilitate and enhance vocabulary learning, recall and retention. Moreover, in the PWIM structure where pictures with items familiar to pupils are used, there prevail attempts to associate words taught with something tangible in everyday life, affording meaning in learning. As propounded by Sousa (2001) and also Sprenger (1999), information learned meaningfully as well as sensibly remains retained in storage in the memory. This notion can be detected in a study on brain-compatible activities and L2 vocabulary learning and retention undertaken by Lago and Seepho in 2012.

The lesser decay, translating into higher retention, as reflected in the delayed posttest scores among pupils who were exposed to the PWIM-A model confirms that its steps of intervention from associating existing concepts with new knowledge, to effective encoding and storage as well as meaningful repetitions help to enhance the retention of vocabulary breadth compared to traditional method of learning in our Malaysian classrooms.

Past studies as mentioned in the earlier section of this chapter did not explore vocabulary retention of learners. Thus, there is no justification for comparisons since there are no comparable studies between the present and past studies.

4.3.3 Vocabulary Depth Knowledge Recall

Research Question 3 (RQ3), pertaining to the difference in the vocabulary depth knowledge recall between the experimental and control group was investigated through the comparison of means and standard deviations at post test level between the groups. It concerns how much of the words taught are understood or its meaning are correctly associated with other words by pupils in post tests administered immediately after the intervention. At the pre test level, both groups recorded mean scores that differed minimally at 5.67 (*SD* = 2.011) and 5.66 (*SD* = 1.768) respectively, thus denoting baseline similarity.

At the post test level that measured subjects' recall of vocabulary depth knowledge, the scores obviously differed at 9.49 (*SD* = 2.653) and 8.31 (*SD* = 2.227) respectively. This is reflected in the descriptive analysis that indicate the group that was exposed to the adapted PWIM (*M* = 9.49, *SD* = 2.653) achieved higher vocabulary depth recall than those in the control group (*M* = 8.31, *SD* = 2.227). The Sig. (*p*) values derived from inferential statistics analysis at less than .05 ($p < .05$) affirmed statistically significant differences between the group means, hence allowing for the rejection of null Hypothesis 3 (H_{o3}) of no significant difference in the vocabulary depth knowledge recall between the groups.

In this study, vocabulary depth refers to words read or seen that can be identified or known in terms of its relations to other words presented in a semantic network. Thus, possessing vocabulary depth knowledge denotes knowing a word well, translated into knowing the word's meaning, grammatical category, its derivations, its pragmatic and value and its collocations (Nation, 2001; Read, 2004; Schoonen & Verhallen, 2008). PWIM's essential framework takes into consideration mental processes in how new words intermingle with existing stored information in leaners with distinctive contexts and environmental influences that allows for deeper processing that leads to acquisition and recall of depth knowledge. Thus, supporting the application of cognitive psychology theory that stresses on information processing via a configuration of ideas and thoughts for deeper processing of knowledge for more effective depth retrieval, i.e. recall. The significantly greater recall for vocabulary depth knowledge among pupils in the experimental group is possibly due to the conceptual processing that occur within the framework of PWIM. The steps of PWIM require learners to throw out words previously encountered that are associated with picture shown; they are guided and encouraged to produce as many words as possible that they can somehow relate to the picture, thus incurring more in-depth

information processing. Previous research findings supported deeper information processing within such a framework for enhanced information recall among learners (Roediger, 1990; Richardson-Klavehn & Bjork, 1988; Schacter, 1987).

Atkinson and Shriffin's (1968) MSM model similarly underscores information processing in their description on the sequential flow of information from sensory memory to short and long term memory for recall and retention. A widely-accepted classic model of memory, the MSM model prioritises storage and processing in each of the boxes; the longer the duration and the more extensive the encoding process, the longer the duration and the more information that can be stored for retrieval. Therefore, the positive results showing greater vocabulary depth recall support the theory of the MSM underpinning PWIM given its framework that leans on cognitive psychology, repetitive mode and concept attainment for the formation of its lessons structure. The repetitive cycles within the PWIM structure sanction extended and more in-depth processing, thus contributing towards more effective vocabulary depth knowledge recall.

In learning new vocabulary items, concept attainment is deemed essential for deeper processing for depth knowledge acquisition; concept attainment embeds information within a learner's understanding. The PWIM model of teaching was designed by Calhoun (1999) specifically to take learners, regardless of their age, from vocabulary development to writing via conceptual processing and inductive thinking within a cognitive psychology framework. Joyce et al. (2009) described the concept attainment model as consisting of three phases. In the first and second phase, data are presented to the learner and is conceptualised respectively while in the third stage, the learner analyses strategies in attaining the concept as what the subjects of the present study experienced when they were exposed to the PWM-A during the

actual study. Concept attainment is interposed within the steps of the adapted PWIM intervention where pupils are guided to develop hypotheses about the attributes of vocabulary acquired. Having the opportunity to scrutinise new information based on its attributes, assign value, exemplars and rules of definition (Bruner et al., 1956) allows learners to acquire a deeper understanding of new knowledge that subsequently results in higher depth recall of knowledge learned. Thus, minimising interference and at the same time, optimising memory capacity (Bruner, Goodnow, & Austin, 1956) for more effective vocabulary depth recall as shown through the data in the present study. In addition, development of analysis habits among the learners with the ultimate goal of enhancing long term learning are among the key objectives of the concept attainment model (Bruner et al., 1956). Many past research findings (Bhargava, 2013; Kalani, 2008; Kumar & Mathur, 2013; Mahmood, 2017; Rajwinder, 2018) are in support of the effectiveness of this particular concept attainment model and similar to this study, the researcher also documented significantly higher recall among pupils in the experimental group as compared to the control group.

How the extensive employment of pictures in the PWIM model of teaching in aiding vocabulary depth knowledge recall can be credited to conceptual processing via the transfer-appropriate-processing approach or TAP (Roediger, 1990). TAP links the notion that humans always perform better on familiar tasks due to past knowledge or experience to the concept of memory processing. When one has deeper impression on an item it simply indicates one has experienced greater conceptual processing for it. Apparently, associating vocabulary learning with visual stimuli leads to more successful encoding processes, thus allowing for more in-depth information stored in one's memory for later retrieval of information conceptually. The present study's results of greater vocabulary depth recall

experienced by subjects that underwent the PWIM-A intervention substantiated the theory underlining the PSE that claimed images contribute to not only more effective learning but also superior recall and retention as compared to learning merely using texts as previously discovered by Hornby (2004), Underwood (1989), Pavio (1986), and Nelson, Reed, and Walling (1979). The memory formed after encoding of new words in association with visual stimuli obviously helped subjects in recalling the meanings of these words in their vocabulary depth posttest. More recent studies, such as those by Ramezanali (2017), Al-Seghayer (2016) and Sadeghi, Khezrlou and Modirkhameneh (2016) are aligned with the findings of this study, demonstrating that concurrent dual presentation codes are more effective in promoting vocabulary recall and retention than single coded ones.

PWIM was also designed for vocabulary acquisition to take place within an instructional environment that is markedly associated to Ramey and Ramey's (1998) developmental priming mechanisms that highlights cognitive and social expansion of children. The greater achievement of pupils who underwent the PWIM intervention could also be due to the five out of six developmental priming mechanism by Ramey and Ramey (1998) that takes place within the PWIM framework (Calhoun, 1999); namely the encouragement of exploration, mentoring in basic cognitive and social skills, celebrating new skills, guided extension and rehearsals of new skill and stimulation in language and symbolic stimulation with an addition of the seventh experience of guidance and limitation of behaviour. Learning in a conducive environment such as this promotes maximum cognitive and linguistic development irrespective of any other social or economic disadvantages that the learners may experience being in rural schools as participants of this study.

As mentioned previously, fewer past PWIM studies focused on vocabulary as compared to those that investigated writing skills. Moreover, in those studies that investigated the impact PWIM has on vocabulary, there are no distinctions made between the breadth and depth dimension of vocabulary. To the knowledge of the researcher, a study conducted by Li in 2011 came remotely close to looking at vocabulary depth recall of young learners. Li (2011) conducted his study on a group of Grade 4 Swedish pupils (n = 16); *n = 8* for experimental group (PWIM) and *n = 8* for control group (Word List). Quantitative and qualitative data were collected via pre- and post vocabulary tests and administered questionnaire respectively. Li's (2011) subjects were taught 10 words (spelling, pronunciation and general understanding of words taught) and duly tested at pre test level for 45 items, made up of 10 multiple choice questions and five picture-word matching questions. After experiencing intervention, both groups sat for a post test consisting of 30 items made up of 12 blank-filling questions, 11 word-matching items and seven picture-word items. The subjects in his study were administered only one type of vocabulary test though upon closer scrutiny, the items tested both breadth and depth but without segregating one dimension from the other. Also, the vocabulary tests are researcher generated assessments. Li reported higher (but not significant) post test scores and positive feedback from the experimental group regarding PWIM implementation in the classroom. However, there is the question of reliability and validity with regards to instruments and methodology as there was no mention of reliability or validity of instruments. Neither was there justifications for the very small number of subjects at *n = 8* for each group.

4.3.4 Vocabulary Depth Knowledge Retention

The fourth research question (RQ4), concerning the difference in the retention of vocabulary depth knowledge between the experimental and control group, was examined

through a comparison of the difference in the post and delayed post test mean scores between the groups that measures retention; the smaller the difference the less the decay, denoting higher retention. Descriptive statistics indicate that the experimental group which received intervention (M = 8.40, SD = 2.312) recorded higher vocabulary depth retention than those in the control group (M = 6.38, SD = 1.574). The greater decrease in the post and delayed posttest means of the control group (-1.73) provides evidence that there is a greater decay of vocabulary depth retention among the subjects that experienced traditional classroom approach compared to the PWIM-A group (-1.09). The Sig. (p) values derived from inferential statistics analysis at less than .05 ($p < .05$) indicate statistically significant differences between the group means, hence allowing for the rejection of null Hypothesis 4 (H_{o4}) of no significant difference in the vocabulary depth knowledge retention between the groups.

The results denoting enhanced retention of vocabulary depth knowledge can be attributed to the PWIM lesson structure that employs pictures as the key instrument in the teaching process. Paivio, together with Nelson and colleagues are convinced that learning via dual modes, logogen and imagen, leads to greater information retention resulting from more effective memory storage organization. Data collected in this study espouse both dual-coding and semantic processing theory that underpin perceptual encoding superiority of images in augmenting retention of vocabulary depth knowledge which found support from researchers such as Mokoto and Jeffa (2002), Nemati (2009), as well as Chun and Plass (1996).

By utilising pictures, semantic processing occurs simultaneously with indirect phonemic access – ahead of name codes becoming accessible. In terms of perceptual

superiority that results from richer perceptual coding, Nelson et al.'s semantic processing model provides the underlying theory supporting superior retention of vocabulary items in the adapted PWIM intervention. Pairing meaningful pictures with words clearly contributes to improve acquisition of deeper knowledge of the words and being able to make associations rather than memorization works towards increasing the number of words retained and understood in terms of its association with other related words. Moreover, in PWIM, pictures selected contain items or scenes familiar to learners for deeper information processing that has been found to help in retention of in-depth information or knowledge. Associating fresh information to past experiences enable learners to construct more meaning to what they are learning. The semantic processing theory advocates meaningfulness in pictures for the retention quality of the said material (Anderson, 2000) and opposes high level of similarity that will bring about inconsistent retention level. PWIM employs only one picture at any one time.

The positive retention of vocabulary depth knowledge result obtained by the group that were exposed to the PWIM approach is arguably due to multiple meaningful repetitions that are practised in the model of teaching. In Atkinson and Shiffrin's (1968) MSM model, longer and deeper information processing is recommended not lonely for effective transfer of information from STM box to LTM box but also to effectively hold them in the LTM box. Multiple rounds of meaningful repetitions is a highly commended activity that allows learners to further retain the new words in their long term memory, thus reinforcing retention of depth knowledge. The structure of PWIM-A clearly stresses on repetitions for conceptual processing for deeper acquisition. Hence, the positive findings indicate that deeper and richer semantic processing is needed for retention holds true.

Apart from deep processing, the performance of the experimental group indicated that learning which constitutes concept attainment cum categorization yields larger vocabulary depth knowledge gains that translate into smaller decrease that was sustained over time. Underlying theories of the present study pertaining to information processing and concept building and categorisation/organisation, the current study's findings have demonstrated the construct to be effectual for retention of vocabulary depth knowledge over time. Apparently, the effectiveness of long term memory storage is linked to how information is organised. Categorization of words based on their broader relevance to more specific ones followed by making predictions about objects or categories allow for better encoding and storing processes, hence producing marginally higher retention rate among learners. Additionally, interrelated schemas form complex knowledge structures in the LTM (Huitt, 2003) as related schemas allow learner to be attentive selectively to relevant information instead of nonrelevant information (Anderson, 2000). It can be affirmed that greater part of researchers is united in their stand promoting deeper and richer semantic processing for more effective retention.

CHAPTER 5

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter discusses and interprets the findings presented in Chapter 4. It begins with an overview of the research, discussion of findings, summary of the research, recommendations for future research, limitations as well as the final conclusions of the research.

5.2 Summary

The aim of this study is to discover the effects of the adapted PWIM intervention on rural Malaysian Year 1 pupils' vocabulary knowledge. Specifically, the study's objectives are focused on examining how the intervention impacts the recall and retention of subjects' vocabulary knowledge in both breadth and depth dimension. A quasi-experimental research with pretest-posttest-delayed posttest control group design has been adopted for the said purpose.

A total of 180 Year 1 pupils from three primary schools in rural Malaysia participated in the actual study while 60 pupils from another primary school took part in the pilot study. Utilising purposive sampling, the pupils were selected with representativeness and comparability in mind. Subjects were randomly assigned to experimental and control groups through flipping of a coin.

Primary instruments employed in the study include a word list taught via the intervention, pictures selected from the Year 1 textbook, vocabulary breadth and depth test materials, as well as questionnaire to provide additional data on subjects' background and

general exposure to English language. Using three pictures, subjects in the experimental group were taught a total of 30 words via The PWIM-A approach. Test materials consist of the YNVT breadth test and the WAT depth test that have been adapted accordingly.

Efforts were also expanded on data collection procedures to ensure that the actual study could proceed smoothly. Firstly, the researcher administered a preliminary vocabulary test to select words to be taught in the intervention. Out of a total of 189 words provided in *DKSP* (MoE, 2017), 30 words were picked based on the results of the preliminary vocabulary test - those 30 words were least known to subjects. The teachers then selected the three pictures based on the 30 words.

Next, piloting of the actual study was carried out to check on data collections procedures and to ascertain the reliability of the test instruments. 10 words were taught using one picture during the two-week long pilot study that witnessed 60 subjects participating in it. Subsequently, the adapted YNVT and WAT test materials were tested for reliability in test and re-test for reliability over time with seven days' interval between the tests. Sig. (p) values obtained are .992 for YNVT (vocabulary breath test) and .891 for WAT (vocabulary depth test). The results indicate statistically no significant differences between group means denoting tests' reliability.

The following phase involved training of the teachers who would participate in actual study. This took place after piloting where they were instructed and trained in the PWIM-A approach. Teachers concerned were also briefed on the objectives of the intervention as well as provided details of implementation procedures. The researcher conducted the training sessions in one of the participating primary schools.

Once the teachers have been trained in the PWIM-A approach, the actual study kicked off with pretesting the subjects. It was also during this phase that the researcher sought the consent of the subjects' parents/guardians for their children's participation in the study. After pretesting, the intervention began in earnest where an intervention session lasting 25 to 30 minutes was held with the experimental group once a week for six weeks. Five words were taught during each session and one picture was employed for 10 words. Once the last five words were taught, a posttest was administered to check for recall of new words learnt during intervention. Later, approximately two weeks after the administration of the posttests, the subjects sat for a delayed posttest that was meant to measure for retention. Upon completion of the tests the researcher had a question and answer session with each teacher involved (see Appendix P for sample questions asked). The question and answer sessions were merely carried out to give the teachers an opportunity to express their overall viewpoints on the intervention and also what they have observed from subjects' responses.

Results achieved indicate that subjects who went through the intervention did significantly better than those in the control group in both recall and retention of vocabulary breadth and depth knowledge. In other words, after experiencing PWIM-A, the pupils could better recall and retain the new words learnt during the intervention period as compared to those pupils who were not taught via this approach. Thus, it can be concluded that PWIM-A brings a positive significant difference to the breadth and depth of pupils' vocabulary knowledge in terms of recall and retention.

5.3 Theoretical Contribution

The findings of this study contribute to the relevant literature on recall and retention of vocabulary breadth and depth knowledge in the context of rural young learners in Malaysia. The study proposes a model to elucidate the approach in which enlarged pictures impacts vocabulary acquisition that further enhances vocabulary teaching creativity. On the basis of the findings, this study makes specific theoretical contributions. First, the findings confirm the direct role that pictures play in promoting effective vocabulary knowledge recall and retention which further affirms the picture superiority effects. The empirical evidence attained in this study of greater recall and retention for both vocabulary breadth and depth knowledge indicate the reliability of the encoding theories, namely the dual-coding theory, semantic processing theory and transfer-appropriate theory, that underpinned PSE for memory enhancement. This is particularly so for retention as previous studies within this domain are largely concentrated on recall. Similarly, this study also contributes to highlight the reliability of the theories where vocabulary depth is concerned. Undeniably, the focal point of past vocabulary studies lies mainly on one dimension only, vocabulary size or breath. The findings indicate too the reliability of the existing theories for learning that requires deeper processing. Thus, contributing towards the advancement and expansion of existing knowledge that was previously rich only in a single dimension, vocabulary size, and recall.

In addition, the findings indicate the reliability of the information processing approach to cognition on aspects of memory encoding and retrieval. Atkinson and Shiffrin's (1968) multi store model that advocates rehearsed information for prolonged duration and capacity in storage for later retrieval proves consistent with the findings of this study that recorded enhanced recall and retention of both vocabulary breadth and depth. The structure

of PWIM entails meaningful repetitions and the subjects' enhanced vocabulary knowledge indicates successful knowledge retrieval from the MSM's short-term and long-term memory store. Hence, the theory that advocates multi meaningful rehearsals and by extension passage from the short-term to long-term memory store, as well as the duration information is stored in the respective store matches the practical outcomes of the study.

Thus, this study advances our understanding of the PWIM-A approach in augmenting vocabulary knowledge among seven-year-old pupils in the Malaysian context. By exploring the basic structure of the PWIM model of teaching that exploits a learner's facility for thinking inductively and concept attainment, this study extends the vocabulary acquisition research stream in generic literacy areas as well as in vocabulary depth discipline, which has tended to favour its breadth component in general, particularly when it concerns young learners. The findings also contribute to further deepen research on retention of both vocabulary dimensions which inclines to conclude at the vocabulary breadth recall stage. This study leads to the conclusion that a teaching model like the PWIM could significantly contribute towards improving Malaysian learners' vocabulary knowledge and by extension uplift their English language proficiency, especially the young learners in rural Malaysia since this study is specifically adapted for them.

5.4 Contributions for Future Research

Currently the Malaysian curriculum of English proficiency is delivered by English teachers via the Commincative Language Teaching approach. This study was conducted to examine the effects of picture oriented model of PWIM in English language vocabulary acquisition among Year 1 pupils of three ethnic based rural schools in Malaysia. The results of this study have provided evidence of the effectiveness of PWIM in vocabulary learning.

5.4.1 Recommendations for English Language Teacher

Vocabulary teaching via an effective method such as PWIM should be implemented in the classroom as it has already been proven to enhance the achievement of Year 1 pupils learning English vocabulary in this study. It is hoped that with the empirical findings presented here, teachers are aware of an alternative method to traditional classroom instruction in improving young children second language acquisition. As the front liners of English language teaching and one of its direct stakeholders, teachers who are receptive to the idea of trying this approach in class will be able to compare for themselves the ease and effectiveness of teaching vocabulary using picture and text and carrying out the entire steps in the PWIM-A intervention model.

The fact that pictures are interesting and easy to understand makes it more easily received and processed by young learners. After multiple repetitions and exposure, the words are embedded in the learners' long term memory and recall as well as retention are facilitated not only in terms of higher word counts but also in deeper understanding of its meanings. Through pictures and words spelled out by the teachers, learners also learn and gradually grow to think inductively and develop concepts when encountering new words. Apparently, based on the findings of this study children as young as seven years old in Year 1, are able to attain conceptual and inductive thinking successfully. If teachers are interested in exploring pictures as a vocabulary learning tool, the PWIM-A presented here has already listed the steps of intervention for classroom application. Teachers will find it easy to follow as the teachers involved in this study had not reported any difficulty in following the steps of the intervention model. On the contrary, they enjoyed the ease of experience that came with the implementation through the course of this study.

Teachers in Malaysian schools are strongly encouraged to adopt or adapt the steps of PWIM when teaching young learners especially as this study has proven that vocabulary acquisition has been improved significantly with the PWIM-A intervention. It is also suggested that learners are allowed to use their mother tongue when first identifying the stimulus if it helps to facilitate the process of vocabulary acquisition.

As vocabulary is the building block of learning English as a second language, Malaysian teachers should be encouraged to use pictures in vocabulary learning to generate more interest from the learners and improve communication skills. The bigger the vocabulary size, the more proficient the learner is in the language and the more successful the learner is in academic achievement (Bromley, 2004; Ellis, 1997).

In order to facilitate PWIM implementation by Malaysian teachers in their classrooms, the researcher is proposing a lesson plan for the PWIM which was adapted from Calhoun's (1999) and used in the present study (see Figure 5.1). Refer to Appendix A for the lesson plan of PWIM-A for Year 1 pupils in Malaysia.

Steps of the PWIM-A (as adapted for the study)

Steps of the PWIM-A intervention

1. Teacher instructs pupils to get into groups and the desired sitting arrangements.
2. Teacher puts up the selected picture for the lesson on the board.
3. Teacher writes the objectives (e.g., to learn target words) of the lesson on the board.
4. Teacher draws pupils' attention to picture, circle the items for target words and asks pupils to identify what they see in the picture, prompting pupils to induce targeted words for that lesson.
5. Teacher labels the picture part identified on the board by drawing a line from the identified object or area, say the word and then write it; pupils to read and spell the word aloud.
6. Each group of pupils given cards and a picture similar to the one on the board and they are encouraged to come out with the targeted words and go through Step 5. Pupils may use their mother tongue if they do not know the words in English but they are to ask their teacher and teacher is to translate it into English immediately (Teacher walks around and monitors the activities).
7. When all groups are done, teacher identifies and labels the picture parts one by one on the board by drawing a line from the identified object or area, say the word, write the word; pupils to read and spell the word aloud.
8. Read and review the picture word chart aloud (say word, spell it, say it again)
9. Ask pupils to read the words (using the lines on the chart if necessary). Identify and emphasize concepts (e.g., colours, parts of the body) with the whole class.
10. Teacher instructs pupils to use cards given earlier to build their own sets of words to take home.
11. Finally, read and review the picture word chart.

Figure 5.1: Steps of PWIM-A

5.4.2 Recommendations for Module Writers

The findings of this study would benefit module writers by enlightening them to the basis of the PWIM constructions and how it affects vocabulary acquisition of young learners especially in the local context. The English modules at school could be revised to accommodate the implementation of PWIM in order to improve English proficiency among Malaysian Year 1 students and perhaps be extended to other primary school levels to increase chances of these pupils in achieving higher standard of English at the secondary and subsequently tertiary level of education.

As a result of successful vocabulary acquisition among young learners in this study, it is predicted that the current module of English teaching at primary schools could also be supported and carried out successfully. Undeniably, vocabulary is needed in listening, speaking, reading, writing and language arts, and an intervention using the PWIM instructional design would possibly help address the problem of Malaysian school students having difficulty in reading, writing and speaking as reported by Subon (2016) and Hiew, (2012), especially when it has been established that English proficiency inferiority is due to problems rooted in limited vocabulary knowledge (Naginder, Othman, & Kabilan, 2008; Tan, 2016; Zakaria, 2005).

PWIM can be included in the English curriculum as a supplementary intervention or an alternative method altogether as deemed fit by the module writers in aligning the instructional materials and approach within the broader philosophy of English language education and educational system in Malaysia.

5.4.3 Recommendations for Policy Makers

The constantly changing policies regarding English language education is arguably the inability to zoom in on the right cause of the problem and matching it to an effective intervention. From the 1950's until 2019, Malaysia has prioritised the education sector among others, and rightfully so, the government also has been emphasizing on the importance of learning and mastering English as a second language. In attempting to achieve greater economical development and attracting foreign investments, English is continuously being taught under various plans and curricula, yet the state of English proficiency among students and graduates is still found deplorable as reported by the Malaysian Employers Federation, in an article in the Malay Mail ("Employers blame poor communication, language skills for unemployed Bumi grads", 2018).

Doubts concerning the return on investment of PWIM can be easily cleared and its practicality assured. The PWIM requires the use of pictures and word cards. Both are affordable and easily attainable even in the interiors where use of electronic gadgets might be impossible due to financial and electrical resource issues. Certainly, the implementation of PWIM is economically viable and is definitely affordable given the RM60.2 billion budget allocated to the education sector by the Malaysian government in 2019. The focus on English language education should be diverted to vocabulary acquisition enhancement especially in primary schools as many researchers have come up with findings that continue to prove that vocabulary serves as the building blocks to the overall enhancement of English language proficiency (Biemiller, 2012; Carlisle, 2002; Coady, 1997; Nation & Webb, 2011). Although massive efforts have been put forth by our government to improve English language proficiency among our students due to the importance of the language globally, it is unfortunate that despite learning English for about 14-15 years at school, the proficiency

level attained by our students still remain less than satisfactory. Therefore, it is timely that PWIM be given a chance to improve Malaysians' state of English proficiency.

Arguably, targets set in Subject Grade Point Average (Gred Purata Mata Pelajaran, GPMP), English Language Education Reform Roadmap (2015-2025), Malaysian Education Blueprint (2013-2025), Linus LBI 2.0, and Standards-Based English Language Curriculum (SBELC) could be achieved if schools could begin with enhancing vocabulary knowledge. Since data in the study has demonstrated the ability of PWIM to enhance the recall and retention of vocabulary breadth and depth of young learners, policy makers should look at appropriating PWIM into classroom instructions as soon as possible. Funding and support should also be extended to language researchers to continue providing research evidence that could lead to the overall improvement of English teaching and learning that will eventually benefit learners, teachers and the nation.

5.5 Directions for Future Research

Although the area of second language acquisition and vocabulary acquisition using PWIM has been explored in various research designs over the years, it is important to continue to develop insights into the benefits of PWIM. Several suggestions follow on future research that perhaps will replicate, adapt or develop similar studies on PWIM in other language environments.

Apart from looking at how PWIM benefits primary school students between the age of seven to 12, it is also important to determine if PWIM can be applied to secondary school students who are currently struggling to cope with higher level English materials despite completing six years of primary education. PWIM could be a supplementary programme for Secondary 1 specifically or any other level as necessary. In major public examination levels

of *UPSR, PT3* and *SPM*, teachers are concerned about academic excellence and therefore the popular approaches are mostly rote learning, pattern drilling questions or using first language (Mohd. Sofi, 2003). This is done at the cost of neglecting vocabulary depth knowledge which actually could probably be easily accomplished through the PWIM intervention. The necessity of starting PWIM with learners as young as Year 1 has already been established in this study. However, there is room to study PWIM's effect on the current secondary school students who are behind in their English proficiency. Based on Malaysia Education Blueprint the target is to have 70% of our students pass English language with a credit but to date, the percentile of those who have successfully done so falls below 30% (Noor Azimah, 2019). These students will eventually move on to tertiary education and end up being ill equipped to compete in the job market that is already overflowing with unemployable graduates who are lacking in English language proficiency.

Similarly, PWIM could also possibly be employed as an intervention among MUET Band 1, 2, or 3 undergraduates. Future studies should try replicating this study on samples of adult learners in local universities as most findings of PWIM studies are of young learners and it is an applicable model to older beginning readers or writers according to Joyce, Weil, and Calhoun (2004). This study can be built on to examine a broader scope of research not only for vocabulary learning but also other skills such as reading and writing.

5.5 Conclusions

There has been a gap in the research corpus of vocabulary instruction using a dual coded model. The importance of vocabulary knowledge cannot be underscored as no practical language use is possible without vocabulary knowledge. Having discovered past research that emphasised on the importance of vocabulary knowledge in reading and writing,

this study was designed purposefully to determine if PWIM intervention could enhance vocabulary knowledge achievement in not only breadth but also depth among young learners. New insights into vocabulary learning benefits among Malaysian young learners have been established in this study. These improvements are evident after learning vocabulary PWIM, an inquiry oriented language arts strategy. Based on these findings the researcher advocates that PWIM is implemented across classrooms in Malaysia. It is likely that with the improvement in vocabulary breadth and depth, other language skills could be improved as well. The primary concern at the national level as far as English proficiency is concern, has always been the deplorable state of English proficiency among Malaysian students and graduates even after undergoing more than a decade of learning English. Therefore, the findings of this study should be taken into consideration in addressing this problem.

The findings of this study also contribute to the corpus of existing research on second language vocabulary acquisition indicating that learning new words from pictures, attaining concepts and conducting inductive thinking with multiple repetitions can be interesting and effective. Also worth noting, the use of mother tongue in identifying stimulus before being introduced to the correct word encourages learners to participate in the intervention with confidence.

We need to get the appropriate and effective vocabulary teaching and learning strategy as soon as possible to Malaysian classrooms as Malaysia needs to be more competitive globally and without proper intervention, we will continue having the same English proficiency problem despite all the funding that the government is allocating to English education in Malaysian schools. We need to build vocabulary knowledge before

expanding into other areas of language skills. PWIM can clearly contribute towards successful language development.

REFERENCES

2018 Budget: Sizable allocation for education shows government's commitment. (2017, October 27). *New Straits Times (Online)*. https://www.nst.com.my/news/nation/2017/10/296075/2018-budget-sizeable-allocation-education-shows-governments-commitment

2019 Budget: Education gets biggest allocation. (2018, November 2). *New Straits Times (Online)*. https://www.nst.com.my/news/nation/2018/11/427594/2019-budget-educati on-gets-biggest-allocation

Abbot, B. (2002). *Human memory. Fort Wayne: Indiana University-Purdue University at Fort Wayne, Psychology Department*. http://users.ipfw.edu/abbot/120/LongTerm Memory.html

Adams, A. H., Johnson, M. S., & Connors, J. S. (1980). *Success in kindergarten reading and writing*. Good Year Books.

Adams, M. J. (1990). *Beginning to read*. MIT Press.

Agresti, A, & Finlay, B. (2008). *Statistical methods for the social sciences* (4th ed.). Pearson.

Ahmad, A. M. (2009). *The development of vocabulary learning strategies and their effects on the acquisition of vocabulary knowledge: A longitudinal study* [Unpublished doctoral dissertation]. Universiti Sains Malaysia.

Ahmad, A. M., Rafizah, M. R., Mohamad Fadhili, Y., Azaharee, A., & Abdul Rashid, M. (2009). Vocabulary learning strategies of adult ESL learners. *The English Teacher, 38*(1), 133-145.

Ahmad, A. M., Rafizah, M. R., Mohamad Fadhili, Y., Azaharee, A., Mahani, M., Mohd

Izwan, O., Zahrullaili, A. Z., Aminarashid, M., Surina, N., & Abdul Rashid, M. (2010). Vocabulary knowledge of adult ESL learners. *CCSE English Language Teaching*, *3*(1), 71-80.

Ahmad, A. M., Rafiah, M. R., Muhammad Nasri, M. H., & Abdul, R. M. (2011). Metacognitive regulation of Malaysian adult ESL learners in vocabulary acquisition. *International Journal of Business and Social Science*, *2*(7), 174-180.

Ahmad, H., Yunus, M. M., & Hasana, N. H. (2016, September). *English vocabulary size and vocabulary learning strategies of UiTM Pre-Diploma students* [Paper presentation]. International Conference on Language, Education, Humanities and Innovation, Bali, Indonasia.

Ahmed, M. O. (1986). Vocabulary learning strategies. In P. Meara (Ed.), *Beyond words* (pp. 3-14). British Association for Applied Linguistics in association with Centre for Information on Language Teaching and Research.

Aida, E. (2012). Effects of bimodal subtitling of English movies on content comprehension and vocabulary recognition. *International Journal of English Linguistics*, *2*(1), 239-248.

Ainon, O. (2016). Read-aloud technique to enhance pre-school children's vocabulary in a rural school in Malaysia. *International Journal of Early Childhood Education Care*, *5*(1), 17-27.

Ainslie, D. (2000). Word detectives. *The Reading Teacher*, *54*(4), 360-364.

Aitchison, J. (1994). *Words in the mind: An introduction to the mental lexicon* (2nd ed.). Blackwell.

Alam, M. (2017). Study of effectiveness of concept attainment model of teaching on achievement in science among secondary school students. *International Journal of*

Advanced Research, 5(9), 93-97.

Alber, S. R., & Foil, C. R. (2003). Drama activities that promote and extend your students' vocabulary proficiency. *Intervention in School & Clinic, 39*(1), 22-29.

Alemi, M., & Tayebi, A. (2011). The influence of incidental and intentional vocabulary acquisition and vocabulary strategy use on learning L2 vocabularies. *Journal of Language Teaching and Research, 2*(1), 81-98.

Ales, P. (2010). The language medium policy in Malaysia: A plural society model? *Review of European Studies, 2*(2), 192-200.

Ali, M. S. (2003a). *English language teaching in primary schools: Policy and implementation concerns*. School Based Research. https://kajianberasaskansekolah.files.wordpress.com/2008/04/article70.pdf

Ali, M. S. (2003b). English language teaching in primary schools: Policy and Implementation Concerns. *IPBA E-Journal, 7*(4), 1-14.

Alizadeh, I. (2016). Vocabulary teaching techniques: A review of common practices. *International Journal of Research in English Education, 1*(1), 22-30.

Allington, R. L., & Cunningham, P. M. (1996). *Schools that work: Where all children can read and write*. Addison Wesley Longman.

Ally, B. A., & Budson, A. E. (2007). The worth of pictures: Using high density event related potentials to understand the memorial power of pictures and the dynamics of recognition memory. *NeuroImage, 35*(1), 378-395.

Al-Seghayer, K. (2001). The effect of multimedia annotation modes on L2 vocabulary acquisition: A comparative study. *Language Learning & Technology, 5*(1), 202-232.

Altrichter, H., Feldman, A., Posch, P., & Somekh, B. (2008). *Teachers investigate their work: An introduction to research across the professions*. Routledge.

Amit, K., & Mathur, M. (2013). Effect of concept attainment model on acquisition of physics concepts. *Universal Journal of Educational Research*, *1*(3), 165-169.

Anastasi, A., & Urbina, S. (1997). *Psychological testing* (7th ed.). Prentice Hall.

Anderson, J. R. (1976). *Language, memory, and thought*. Erlbaum.

Anderson, J. R. (1983). *The architecture of cognition*. Harvard University Press.

Anderson, J. R. (1987). Skill acquisition: Compilation of weak-method problem solutions. *Psychological Review*, *94*(2), 192-210.

Anderson, J. R. (2000). *Learning and memory: An integrated approach*. John Wiley & Sons.

Anderson, J. R. (2009). *Cognitive psychology and its implications* (7th ed.). Worth Publishers.

Anderson, J. R., & Bower, G. H. (1973). *Human associative memory*. Winston.

Anderson, L. W., & Krathwohl, D. R. (2001). *A Taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.

Anderson, M. (1998). *Educational Psychology*. Cortland College Press.

Anderson, R. C. (1971). Encoding processes in the storage and retrieval of sentences. *Journal of Experimental Psychology*, *91*(2), 338-341.

Anderson, R. C., & Freebody, P. (1981). Vocabulary knowledge. In J. T. Guthrie (Ed.), *Comprehension and teaching: Research reviews* (p. 77–117). International Reading Association.

Anderson, R. C., & Freebody, P. (1983). Reading comprehension and the assessment and acquisition of word knowledge. In B. Huxton (Ed.), *Advances in reading/Language Research* (pp. 231-256). JAI Press.

Anis, A., & Valid, N. (2015). Vocabulary knowledge: Malaysian tertiary level learners' major problem in summary writing. *Journal of Language Teaching and*

Research, *6*(2), 286-291.

Ann, R. M. D., Zainor, I. Z., & Mazlin, M. (2007, June). *Vocabulary learning through vocabulary scrapbook* [Paper presentation]. The Second Biennial International Conference on Teaching and Learning of English in Asia: Exploring New Frontiers (TELiA2), Langkawi, Malaysia.

Anne, S. G., Maher, M. R., Tinto, V., Smith, B. L., & Macgregor, J. T. (1992). *Collaborative learning: A sourcebook for higher education*. NCTLA Publisher.

Anstey, M., & Bull, G. (2000). *Reading the visual*. Harcourt Australia Pty Limited.

Armstrong, T. (2000). *Multiple intelligences in the classroom*. ASCD Publisher.

Arulampalam, W., Naylor, R. A., & Smith, J. P. (2007). *Am I missing something? The effects of absence from class on student performance*. University of Warwick Press.

Ary, D., Jacobs, L. C., Razavieh, A., & Sorensen, C. K. (2009). *Introduction to research in education* (8th ed.). Cengage Learning.

Aryanto, C. B. (2020). Do you remember the words? Dual-coding method on long term memory. *Jurnal Psikologi*, *19*(4), 314-322.

Astika, G. G. (1993). Analytical assessment of foreign students' writing. *Regional Language Centre Journal*, *24*(1), 61-72.

Atkinson, R. C. (1972). Optimizing the learning of a second language vocabulary. *Journal of Experimental Psychology*, *96*(1), 124-129.

Atkinson, R. C. (1975). Mnemotechnics in second language learning. *American Psychologist*, *30*(8), 821-828.

Atkinson, R. C., & Ruagh, M. R. (1975). An application of the mnemonic keyword method to the acquisition of a Russian vocabulary. *Journal of Experimental Psychology*, *104*(2), 126-133.

Atkinson, R. C., & Shiffrin, R. M. (1971). The control of short-term memory. *Scientific American*, *225*(2), 82-90.

Atkinson, R. C., & Shiffrin, R. M. (1986). Human memory: A proposed system and its control processes Human memory: A proposed system and its control processes. In K. W. Spence & J. T. Spence (Ed.), *The psychology of learning and motivation* (pp. 89-195). Academic Press.

August, D., & Shanahan, T. (2006). *Developing literacy in second-language learners*. Lawrence Erlbaum Associates.

Aviad, T. L., & Laufer, B. (2013). Lexical properties in the writing of foreign language learners over eight years of study: single words and collocations. In Bardel, C. Lindquist & L. Laufer (Ed.), *L2 vocabulary acquisition, knowledge and use new perspectives on assessment and corpus analysis* (pp. 127-148). European Second Language Association.

Azman, H. (2016). Implementation and Challenges of English Language Education Reform in Malaysian Primary Schools. *3L: Language, Linguistics, Literature*, *22*(3), 65-78.

Baadte, C., & Meinhardt-Injac, B. (2019). The picture superiority effect in associative memory: A developmental study. *British Journal for Developmental Psychology, 37*(3), 382-395.

Babbie, E. R. (1990). *Survey research methods* (4th ed.). Wadsworth.

Babbie, E. R. (2008). *The basics of social research* (4th ed.). Thomson Wadsworth.

Baddeley, A. D. (1966). The influence of acoustic and semantic similarity on long-term memory for word sequences. *Quarterly Journal of Experimental Psychology*, *18*(4), 302-309.

Baddeley, A. D. (1986). *Working memory*. Oxford University Press.

Baddeley, A. D. (1996). Exploring the central executive. *Quarterly Journal of Experimental Psychology Section A Human Experimental Psychology*, *49*(4), 5-28.

Baddeley, A. D. (1998). Recent developments in working memory. *Curr Opin Neurobiol*, *8*(2), 234-238.

Baddeley, A. D. (2001). Is working memory still working? *American Psychologist*, *56*(11), 851-864.

Baddeley, A. D. (2003). Working memory: looking back and looking forward. *Nature Reviews Neuroscienc*, *4*(10), 829-839.

Baddeley, A. D. (2007). *Working memory, thought and action*. Oxford University Press.

Baddeley, A. D. (2010). Working memory. *Current Biology*, *20*(4), 136-140.

Baddeley, A. D., & Hitch, G. J. (1974). Working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (pp. 47-89). Academic Press.

Baddeley, A. D., Hitch, G. J., & Allen, R. J. (2009). Working memory and binding in sentence recall. *Journal of Memory and Language*, *61*(3), 438-456.

Baker, S. K., Simmons, D. C., & Kame'enui, E. J. (1995). Vocabulary acquisition: Synthesis of the research. *Eugene Journal*, *13*(1), 38-41.

Baldauf, R. B., Kaplan, R. B., Kamwangamalu, N., & Bryant, P. (2011). Success or failure of primary second/foreign language programmes in Asia: What do the data tell us? *Current Issues in Language Planning*, *12*(2), 309-323.

Balkis, M., Arslan, G., & Erdinc, D. (2016). The School Absenteeism among High School Students: Contributing Factors. *Educational Sciences: Theory and Practice*, *16*(6), 5-17.

Banta, J. G. (2004). Reading pictures: Searching for excellence in picture books. In I. L.

Chicago (Ed.), *A Guide to the medal and honour books* (pp. 9-18). ALA Editions.

Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge University Press.

Basu, J. (2016). Present status and challenges of intellectual assessment in India. *Journal of School & Educational Psychology, 4*(4), 231-240.

Bauer, L., & Nation, P. (1993). Word families. *Oxford Journals: International Journal of Lexicography, 6*(4), 253-279.

Baumann, J. F. (2009). Vocabulary and reading comprehension: The nexus of meaning. In S. E. Israel & G. G. Duffy (Eds.), *Handbook of research on reading comprehension* (pp. 323-346). Routledge.

Baumann, J. F., & Kame'enui, E. J. (1991). Research on vocabulary instruction: Ode to Voltaire. In J. Flood, J. J. Lapp, & J. R. Squire (Ed.), *Handbook of research on teaching the English language arts* (pp. 604-632). MacMillan.

Baumann, J. F., Edwards, E. C., Boland, E. M., Olejnik, S., & Kame'enui, E. J. (2003). Vocabulary tricks: Effects of instruction in morphology and context on fifth-grade students' ability to derive and infer word meanings. *American Educational Research Journal, 40*(2), 447-494.

Baumann, J. F., Kame'enui, E. J., & Ash, G. E. (2003). Research on vocabulary instruction: Voltaire redux. In J. Flood, D. Lapp, J. R. Squire, & J. M. Jensen (Eds.), *Handbook on research on teaching the English language arts* (pp. 752-785). Erlbaum.

Bawden, D. L., & Sonenstein, F. L. (n.d.). *Quasi-experimental designs*. The Urban Institute. www.childwelfare.com/courses/Documents/bawden.htm

Bearne, E. (2003). Rethinking literacy: Communication, representation and text. *Reading Literacy and Language, 7*(3), 98-103.

Beck, I. L., & McKeown, M. G. (1990). Conditions of vocabulary acquisition. In R. Barr, M. L. Kamil, P. B. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (pp. 789-814). Longman.

Beck, I. L., & McKeown, M. G. (1991). Social studies texts are hard to understand: Mediating some of the difficulties. *Language Arts*, *68*(6), 482-490.

Beck, I. L., & McKeown, M. G. (2001). Text talk: Capturing the benefits of read-aloud experiences for young children. In M. F. Graves (Ed.), *Essential readings on vocabulary instruction* (pp. 35-47). International Reading Association.

Beck, I. L., & McKeown, M. G. (2007). Increasing young low income children's oral vocabulary repertoires through rich and focused instruction. *Elementary School Journal*, *107*(3), 251-271.

Beck, I. L., McKeown, M. G., & Kucan, L. (2002). *Bringing words to life: Robust vocabulary instruction*. Guilford Press.

Beck, I. L., & McKeown, M. G., & Kucan, L. (2013). *Bringing words to life: Robust vocabulary instruction* (2nd ed.). Guilford Press.

Becker, W. C. (1977). Teaching reading and language to the disadvantaged? What we have learned from field research. *Harvard Educational Review*, *47*(4), 518-543.

Bedell, D. A., & Oxford, R. (1996). Cross-cultural comparisons of language learning strategies in the People's Republic of China and other countries. In *Language learning strategies around the world: Cross-cultural perspectives* (pp. 47-60). University of Hawaii Press.

Beeckmans, R., Eyckmans, J., Janssens, V., Dufranne, D., & Van de Velde, H. (2001). Examining the Yes-No vocabulary test: Some methodological issues in theory and practice. *Language Testing*, *18*(3), 235-274.

Beglar, D. (2010). A rasch-based validation of the vocabulary size test. *Language Testing*, *27*(1), 101-118.

Beglar, D., & Hunt, A. (1999). Revising and validating the 2000 word level and university word level vocabulary tests. *Language Testing*, *16*(2), 131-162.

Bell, B. A. (2010). Pretest-posttest design. In N. J. Salkind (Ed.), *Encyclopedia of research design* (pp. 1087-1092). Sage Publications.

Berg, B. L. (2001). *Qualitative research methods for the social sciences*. Allyn & Bacon.

Best, J. W. (1977). *Research in education* (3rd ed.). Prentice-Hall Inc.

Best, J. W., & Khan, B. (2006). *Research in education*. Prentice-Hall International.

Bhargava, R. (2013). Effect of concept attainment model on achievement in social sciences. *International Journal of Science and Research*, *5*(5), 699-701.

Biemiller, A. (2003). Vocabulary: Needed if more children are to read well. *Reading Psychology*, *2*(3), 323-335.

Biemiller, A. (2010). Vocabulary development and implications for reading problems. In A. McGill-Franzen, & R. Allington (Ed.), *Handbook of reading disabilities research* (pp. 208-218). Routledge.

Biemiller, A. (2012). Teaching vocabulary in the primary grades: Vocabulary instruction needed. In J. Baumann, & E. Kame'enui (Ed.), *Reading vocabulary: Research to practice* (pp. 34-50). Guilford Press.

Biemiller, A., & Boote, C. (2006). An effective method for building meaning vocabulary in primary grades. *Journal of Educational Psychology*, *98*(1), 44-62.

Biemiller, A., & Slonim, N. (2001). Estimating root word vocabulary growth in normative advantaged populations: Evidence for a common sequence of vocabulary acquisition. *Journal of Educational Psychology*, *93*(3), 498-520.

Big, P. (2013, January). *Brain Case Study: Patient HM*. https://bigpictureeducation.com/brain-case-study-patient-hm

Billing, H. (2013). Effect of Inductive Thinking Model on Achievement Motivation of Students in Relation to their Learning Approach. *International Journal of Education and Psychological Research*, *2*(4), 49-59.

Bishop, J. (2003). *A touch–screen learning environment for educating individuals with learning impairments*. Crocels Working Paper Series (CS4S10). http://www.academia.edu/2886434/A_Touch-Screen_LearningEnvironment_for_educating_individuals_with_learning_impairments

Blachowicz, C., & Fisher, P. (2000). Vocabulary instruction. In M. Kamil, P. Mosenthal, P. D. Pearson, & R. Barr (Ed.), *Handbook of reading research* (pp. 503-523). Erlbaum.

Black, T. R. (1999). *Doing quantitative in the social sciences*. Sage Publications.

Blaxton, T. A. (1989). Investigating dissociations among memory measures: Support for a transfer-appropriate processing framework. *Journal of Experimental Psychology: Learning. Memory. & Cognition*, *15*(4), 657-668.

Brabham, E. G., & Lynch-Brown, C. (2002). Effects of teachers' reading aloud styles on vocabulary acquisition and comprehension of students in the early elementary grades. *Journal of Educational Psychology*, *94*(3), 465-473.

Bradley, K. (2009). *Quasi-experimental research*. Education.com. https://www.education.com/reference/article/quasiexperimental-research/

Bradley, R. H., Caldwell, B. M., Rock, S., Ramey, C. T., Barnard, K. E., Gray, C., Hammond, M. A., Mitchell, S., Gottfried, A. W., Siegel, L., & Johnson, D. L. (1986). Home environment and cognitive development in the first 3 years of life: A collaborative study involving six sites and three ethnic groups in North

America. *Developmental Psychology*, *25*(2), 217–235.

Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2008). *Visual long-term memory has a massive storage capacity for object details* [Paper presentation]. National Academy of Sciences (PNAS) 2008, Kuala Lumpur, Malaysia.

Bransford, J. (1979). *Human cognition: Learning, understanding, and remembering*. Wadsworth.

Breakwell, G. M. (2000). Interviewing. In G. M. Breakwell, S. Hammond, and C. Fife-Shaw (Ed.), *Research Methods in Psychology* (pp. 239-250). Sage.

Brewer, M. B. (2000). Research design and issues of validity. In H.T. Reis, & C.M. Judd (Ed.), *Handbook of research methods in social psychology* (pp. 3-16). Cambridge University Press.

Broadbent, D. (1975). The magic number seven after 15 years. In A. Kennedy, & A. Wilkes (Eds.), *Studies in long term memory* (pp. 3-18). Wiley.

Bromley, K. (2004). Rethinking vocabulary instruction. *The Language and Literacy Spectrum*, *14*(1), 3-12.

Bromley, K. (2007). 9 things every teacher should know about words and vocabulary instruction. *Journal of Adolescent and Adult Literacy*, *50*(7), 528-537.

Brown, R. (1973). *A first language*. Harvard University Press.

Brown, R., & Hanlon, C. (1970). Derivational complexity and order of acquisition in child speech. In J. Hayes (Ed.), *Cognition and the development of language* (pp. 155-207). John Wiley.

Brown, R., Cazden, C., & Bellugi, U. (1973). The child's grammar from I to III. In C. Ferguson, & D. Slobin (Ed.), *Studies of child language development* (pp. 295-333). Holt, Rinehart, and Winston.

Bruer, J. T. (1997). Education and the brain: A bridge too far. *Educational Researcher*, *26*(8), 4-16.

Bruner, J. S. (1966). *Toward a theory of instruction*. Belkapp Press.

Bruner, J. S. (1986). *Actual minds, possible worlds*. Harvard University Press.

Bruner, J. S., Goodnow, J. J., & Austin, G. A. (1956). *A Study of Thinking*. John Wiley & Sons.

Bruner, J. S., Goodnow, J. J., & Austin, G. A. (1967). *A study of thinking*. Science Editions.

Burns, S. M., Griffin, P., & Snow, C. E. (1999). *Starting out right: A guide to promoting children's reading success*. National Academy Press.

Bye-bye PPSMI. (2011, November 13). *The Star Online*. http://thestar.com.my/education/story.asp?file=/2011/11/13/education/ 9878350&sec=education

Cain, K., & Oakhill, J. (2014). Reading comprehension and vocabulary: Is vocabulary more important for some aspects of comprehension? *L'Année Psychologique, 114*(4), 647-662.

Calhoun, E. (1999). *Teaching beginning reading and writing with the picture word inductive model*. Association for Supervision and Curriculum Development (ASCD).

Calhoun, E., Poirier, E. T., Simon, N., & Mueller, L. (2001, April). *Teacher and district research: Three inquiries into the picture word inductive model* [Paper presentation]. American Educational Research Association, Seattle, WA.

Cameron, L. (2002). Measuring vocabulary size in English as an additional language. *Language Teaching Research*, *6*(2), 145-173.

Campbell, D. T., & Stanley, J. C. (1966). *Experimental and quasi-experimental designs for research*. Houghton Mifflin Co.

Campbell, J. (2018). English language and an inclusive Malaysia. *3L: The Southeast Asian*

Journal of English Language Studies, *24*(3), 206-219.

Canale, M., & Swain, M. (1980). Theoretical basis of communicative approaches to second language learning and testing. *Applied Linguistics*, *1*(1), 1-47.

Canning-Wilson, C. (2001). Visuals & language learning: Is there a connection? *The Weekly Column*, *48*(1), 1-8.

Cantalini, M. (1987). *The effects of age and gender on school readiness and school success* [Unpublished doctoral dissertation]. Ontario Institute for Studies in Education.

Carlisle, J. F. (2002). *Fostering vocabulary development in elementary classrooms*. University of Michigan, Center for the Improvement of Early Reading Achievement.

Carlisle, J. F., Kelcey, B., & Berebitsky, D. (2013). Teachers' support of students' vocabulary learning during literacy instruction in high poverty elementary schools. *American Educational Research Journal*, *50*(6), 1360–1391.

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Sage Publications.

Carpenter, S., & Olson, K. (2012). Are pictures good for learning new vocabulary in a foreign language? Only if you think they are not. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *38*(1), 92-101.

Carroll, J. B. (1971). Development of native language skills beyond the early years. In C. Reed (Ed.), *The learning of language* (pp. 97-156). Appleton-Century-Crofts.

Carver, R. P. (1994). Percentage of unknown vocabulary words in text as a function of the relative difficulty of the text: Implications for instruction. *Journal of Reading Behavior*, *26*(4), 413-437.

Case, R. (1978). Intellectual development from birth to adulthood: A neo-Piagetian

interpretation. In R. Siegler (Ed.), *Children's thinking: What develops?* (pp. 37-71). Lawrence Erlbaum Associates, Inc.

Cervetti, G. N., Wright, T. S., & Hwang, H. J. (2016). Conceptual coherence,comprehension, and vocabulary acquisition: A knowledge effect? *Reading and Writing: An Interdisciplinary Journal*, *29*(4), 761-779.

Chall, J. S. (1958). *Readability: An appraisal of research and application*. Ohio University Press.

Chall, J. S., & Conard, S. S. (1991). *Should textbooks challenge students?* Teachers College Press.

Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (1990). *The reading crisis: Why poor children fall behind*. Harvard University Press.

Champagne, M. V. (2014). *The survey playbook: How to create the perfect survey*. CreateSpace Independent Publishing Platform.

Chapelle, C. A. (1994). Are C-tests valid measures for L2 vocabulary research? *Second Language Research*, *10*(2), 157-187.

Chase, W. G., & Simon, H. A. (1973). Perception in chess. *Cognitive Psychology*, *4*(1), 55-81.

Chen, Z. -H., & Lee, S. Y. (2018). Application-driven educational game to assist young children in learning English vocabulary. *Educational Technology & Society*, *21*(1), 70-81.

Cheng, J., & Matthews, J. (2018). The relationship between three measures of L2 vocabulary knowledge and L2 listening and reading. *Language Testing*, *35*(1), 3-25.

Cherry, K. E., Brown, J. S., Walker, E. J., Smitherman, E. A., Boudreaux, E. O., Volaufova, J., & Jazwinski, S. M. (2012). Semantic Encoding Enhances the Pictorial Superiority

Effect in the Oldest-Old. *Neuropsychology, Development, and Cognition. Section B, Aging, Neuropsychology and Cognition*, *19*(1-2), 319-337.

Chin, C. N. (2005). *The effectiveness of KBSM English language Form 1 textbook's word list* [Unpublished master's thesis]. Universiti Sains Malaysia.

Chiu, M. M. (2000). Group problem solving processes: Social interactions and individual actions. *Journal for the Theory of Social Behavior*, *30*(1), 27-50.

Chiu, M. M. (2008). Flowing toward correct contributions during groups' mathematics problem solving: A statistical discourse analysis. *Journal of the Learning Sciences*, *17*(3), 415-463.

Cho, K., & Krashen, S. (1994). Acquisition of vocabulary from the Sweet Valley kids series: Adult ESL acquisition. *Journal of Reading*, *37*(8), 662-667.

Chomsky, N. (1965). *Aspects of the theory of syntax*. M.I.T. Press.

Choy, S. C., & Salah, T. (2006). An investigation into the changes in perceptions of and attitudes towards learning English in a Malaysian college. *International Journal of Teaching and Learning in Higher Education*, *18*(2), 120-130.

Christian, K., Morrison, F. J., Frazier, J. A., & Massetti, G. (2000). Specificity in the nature and timing of cognitive growth in kindergarten and first grade. *Journal of Cognition and Development*, *1*(4), 429-448.

Chun, D. M., & Plass, J. L. (1996). Effects of multimedia annotations on vocabulary acquisition. *The Modern Language Journal*, *80*(2), 183-198.

Chun, D. M., & Plass, J. L. (1997). Research on text comprehension in multimedia environments. *Language Learning & Technology*, *1*(1), 60-81.

Chung, S. F. (2005). A Communicative Approach to Teaching Grammar: Theory and Practice. *The English Teacher*, *34*(1), 33-50.

Clarke, M. (1980). The short circuit hypothesis of ESL reading - or when language competence interferes with reading performance. *Nodern Language Journal*, *64*(2), 203-208.

Clay, M. M. (1991). Reading recovery surprises. In D. E. DeFord, C. C. Lyons, & G. S. Pinnel (Ed.), *Bridges to literacy: Learning from reading recovery* (pp. 57-76). Heinemann.

Clay, M. M. (1993). *An observation survey of early literacy achievement*. Heinemann Education.

Clear need for English proficiency. (2017, March 13). *The Star Online*. https://www.thestar.com.my/opinion/letters/2017/03/13/clear-need-for-english-proficiency/

Coady, J. (1997). L2 Vocabulary acquisition: A synthesis of research. In J. Coady, & T. Huckin (Ed.), *Second language vocabulary acquisition* (pp. 197-261, 273-291). Cambridge University Press.

Cochran, W. G., & Cox, G. M. (1957). *Experimental designs* (2nd ed.). John Wiley & Sons.

Cohen, A. D., & Aphek, E. (1979). *Easifying second language learning* (No. ED163 753). Jerusalem: A research report under the auspices of Brandeis University and submitted to the Jacob Hiatt Institute.

Cohen, A. D. (1987). The use of verbal and imagery mnemonics in second-language vocabulary learning. *Studies in Second Language Acquisition, 9*(1), 43-62.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (7th ed.). Routledge.

Cohen, L., Manion, L., & Morrison, K. (2013). *Research methods in education (Updated version)* (7th ed.). Routledge.

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.

Cohen, M. T. (2012). Strengthening science vocabulary through the use of imagery interventions with college students. *Creative Education*, *3*(7), 1251-1258.

Collins, A. M., & Loftus, J. (1975). Spreading Activation theory of semantic processing. *Psychological Review, 82*(6), 407-428.

Collins, A. M., & Quillian, R. M. (1969). Retrieval time from semantic memory. *Journal of Verbal Learning and Verbal Behavior*, *8*(2), 240-247.

Concannon, S. J. (1975). Illustrations in books for children: Review of research. *The Reading Teacher*, *29*(2), 254-256.

Cook, V. J. (2001). Using the first language in the classroom. *The Canadian Modern Language Review*, *57*(3), 402-403.

Cooper, D. R., & Schindler, P. S. (2003). *Business research methods* (8th ed.). McGraw-Hil.

Corcoran, K., & Sharpe, K. (2016). Neuroscience and the human person. In T. M. Crisp, S. L. Porter & G. A. Ten Elshof (Eds.), *Neuroscience and the soul: the human person in philosophy, science, and theology* (pp. 121-136). William B. Eerdmans Publishing Company.

Cottrell, R. R., & McKenzie, J. F. (2011). *Health promotion and education research methods: Using the five chapter thesis/dissertation model* (2nd ed.). Ones & Bartlett.

Coyne, M. D., Little, M., Rawlinson, D., Simmons, D., Kwok, O., Kim, M., & Civetelli, C. (2013). Replicating the impact of a supplemental beginning reading intervention: The role of instructional context. *Journal of Research on Educational Effectiveness, 6*(1),

1-23.

Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *ournal of Verbal Thinking and Verbal Behavior, 11*(1), 671-684.

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General, 104*(3), 268-294.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Sage Publications.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed.). Pearson.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed.). Pearson Education Inc.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In A. Tashakkori, & C. Teddlie (Eds.), *Handbook on mixed methods in the behavioral and social sciences* (pp. 209-240). Sage Publications.

Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*. Holt, RineHart, &Winston Inc.

Crow, J. T., & Quigley, J. R. (1985). A semantic field approach to passive vocabulary acquisition for reading comprehension. *TESOL Quarterly*, *19*(3), 497-513.

Crystal, D. (1997). *The Cambridge encyclopedia of language* (2nd ed.). Cambridge University Press.

Csiernik, R., Birnbaum, R., & Pierce, B. D. (2010). *Practising social work research: Case studies for learning*. University of Toronto Press Incorporated.

Cuevas, J., & Dawson, B. L. (2017). A test of two alternative cognitive processing models:

Learning styles and dual coding. *Theory and Research in Education, 16*(1), 40-64.

Culligan, B. (2008). *Estimating word difficulty using Yes-No tests in an IRT framework and its application for pedagogic objectives* [Unpublished doctoral dissertation]. Temple University.

Cumming, G. (2012). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Routledge.

Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology, 33*(6), 934-945.

Cunningham, A. E., & Stanovich, K. E. (1998). What reading does for the mind. *American Educator, 22*(1/2), 8-15.

Cunningham, G. K. (1998). *Assessment in the classroom: Constructing and interpreting tests*. Falmer Press.

Cunningham, P. M., & Allington, R. L. (2015). *Classrooms that work: they can all read and write* (6th ed.). Pearson.

Cunningsworth, A. (1995). *Choosing your coursebook*. Macmillan Heinemann ELT.

Curran, T., & Doyle, J. (2011). Picture superiority doubly dissociates the erp correlates of recollection and familiarity. *Journal of Cognitive Neuroscience, 23*(5), 1247-1262.

Cuticelli, M., Coyne, M. D., Ware, S. M., Oldham, A., & Rattan, S. L. (2015). Improving vocabulary skills of kindergarten students through a multi-tier instructional approach. *Intervention in School and Clinic, 50*(3), 150-156.

Daller, H., Milton, J., & Treffers-Daller, J. (2007). Editors' introduction: Conventions, terminology and an overview of the book. In H. Daller, J. Milton, & J. Treffers-Daller (Ed.), *Modelling and assessing vocabulary knowledge* (pp. 1-32). Cambridge

University Press.

Damanik, W. R., & Ownie, S. J. (2012). Improving students' achievement in writing procedure text through Picture Word Inductive Model. *Transform Journal of English Language Teaching and Learning*, *2*(3), 1-8.

Dane, F. C. (1990). *Research methods*. Brooks/Cole Publishing Company.

Dane, F. C. (2003). *Research methods*. Brooks/Cole Publishing Company.

David, M. K., & Govindasamy, S. (2005). Negotiating a language policy for Malaysia: Local demand for affirmative action versus challenges from globalization. In A. S. Canagarajah (Ed.), *Reclaiming the local in Language policy and practice* (pp. 123-146). Lawrence, Erlbaum Associates.

Davis, C. (1995). Extensive reading: An expensive extravagance? *ELT Journal*, *49*(4), 329-336.

Davis, F. B. (1944). Fundamental factors of comprehension in reading. *Psychometrika*, *9*(3), 185-197.

Davis, F. B. (1968). Research in comprehension in reading. *Reading Research Quarterly*, *3*(4), 499-545.

Davis, H. P., Small, S. A., Stern, Y., Mayeux, R., Feldstein, S. N., & Keller, F. R. (2003). Acquisition, recall, and forgetting of verbal information in long-term memory by young, middle-aged, and elderly individuals. *Cortex*, *39*(4-5), 1063-1091.

Day, R. R., & Bamford, J. (1998). *Extensive reading in the second language classroom*. Cambridge University Press.

De Vaus, D. A. (1993). *Surveys in social research* (3rd ed.). UCL Press.

Decker, L. (2007, October). *Picture word induction model*. Lori Decker's Portfolio. http://loridecker.files.wordpress.com/2010/07/picture-word-induction-

model.docx

Demetriou, A., Merrell, C., & Tymms, P. (2017). Mapping and predicting literacy and reasoning skills from early to later primary school. *Learning and Individual Differences*, *54*(1), 217-255.

Demircioglu, S. (2010). Teaching English vocabulary to young learners via drama. *Procedia: Social and Behavioral Sciences*, *2*(2), 439-443.

Dennis, L. R., Whalon, K., Kraut, L., & Herron, D. (2016). Effects of a teacher versus ipad-facilitated intervention on the vocabulary of at-risk preschool children. *Journal Of Early Intervention*, *38*(3), 98-121.

Denzin, N. K. (1978). *The research act*. McGraw-Hill.

Department of General Linguistics, University of Amsterdam. (1995). *De operationalisatie van diepe woordkennis. Tussentijds onderzoeksverslag*. The operationalization of deep word knowledge. Preliminary research report.

Diamond, L., & Gutlohn, L. (2006). *Teaching vocabulary*. Reading Rockets. http://www.readingrockets.org/article/9943/

Dickinson, D. K., Collins, M. F., Nesbitt, T. S., Hassinger-Das, B., Hadley, E. B., Hirsh-Pasek, K., & Golinkoff, R. M. (2018). Effects of teacher-delivered book reading and play on vocabulary learning and self-regulation among low-income preschool children. *Journal of Cognition and Development*, *29*(1), 43-53.

Dickinson, D. K., Golinkoff, R. M., & Pasek, K. H. (2010). Speaking out for language: Why language is central to reading development. *Educational Researcher*, *39*(4), 305-310.

Diem, K. G. (2002). Using research methods to evaluate your extension program. *Journal of Extension*, *40*(6), 20-32.

Diener, E., & Crandall, R. (1978). *Ethics in social and behavioral research*. University of Chicago Press.

Dillenbourg, P. (1999). What do you mean by collaborative learning? In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational approaches* (pp. 1-19). Elsevier.

Dillenbourg, P., Baker, M., Blaye, A., & O'Malley, C. (1996). The evolution of research on collaborative learning. In E. Spada, & P. Reiman (Eds.), *Learning in humans and machine: Towards an interdisciplinary learning science* (pp. 189-211). Elsevier.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail and mixed-mode surveys: The tailored design method* (4th ed.). John Wiley & Sons.

Dimitrov, D. M., & Rumrill, P. D. (2003). Pretest-posttest designs and measurement of change. *Speaking of Research, 20*(2), 159-165.

DiNardo, J. (2008). Natural experiments and quasi-natural experiments. In S. N. Durlauf, & L. E. Blume (Eds.), *The new Palgrave dictionary of economics* (pp. 856-859). Palgrave Macmillan.

Dirani, J., Raad, H., & Leyla, A. (2017). Safe start: An early childhood mental health program in a tertiary healthcare setting – a critical review. *Infant Health Journal*, *39*(2), 85-91.

Domino, G. (2000). *Psychological testing*. Prentice Hall.

Driscoll, M. (2001). *Psychology of learning for assessment* (2nd ed.). Allyn and Bacon.

Dudovskiy, J. (2016). The ultimate guide to writing a dissertation in business studies: A step-by-step assistance. *eBook Journal of Mixed Methods Research*, *4*(1), 6-16.

Duff, M. C., Covington, N. V., Hilverman, C., & Cohen, N. J. (2020). Semantic memory and the hippocampus: Revisiting, reaffirming, and extending the reach of their

critical relationship. *Frontiers in Human Neuroscience, 13*(1), 389-471.

Dugdale, G., & Clark, C. (2008). *Literacy changes lives: An advocacy resource*. National Literacy Trust.

Dulay, H., & Burt, M. (1975). A new approach to discovering universal strategies of child second language acquisition. In D. Dato (Ed.), *Developmental psycholinguistics: Theory and applications* (pp. 209-233). Georgetown University Press.

Dunn, L. M., & Dunn, D. M. (1997). *Peabody picture vocabulary test* (3rd ed.). American Guidance Service.

Dunn, L. M., & Dunn, D. M. (2007). *The peabody picture vocabulary test* (4th ed.). NCS Pearson, Inc.

Dunn, M., & Dunn, L. M. (1981). *Peabody picture vocabulary test revised*. American Guidance Service.

Duppenthaler, P. (2007). Vocabulary acquisition: The research and its pedagogical implications. *Studies and Essays*, *15*(2), 1-14.

Durso, F. T., & Johnson, M. K. (1980). The effects of orienting tasks on recognition, recall, and modality confusion of pictures and words. *Journal of Verbal Learning and Verbal Behavior*, *19*(4), 416-429.

Ehri, L. C. (1999). Phases of development in learning to read words. In J. Oakhill, & R. Beard (Ed.), *Reading development and the teaching of reading: A psychological perspective* (pp. 79-108). Balckwell Science.

Eliasmith, C. (2001). *Memory. Dictionary of philosophy of mind*. Washington State University Press.

Elleman, A. M., Steacy, L. M., Olinghouse, N. G., & Compton, D. L. (2017). Examining child and word characteristics in vocabulary learning of struggling readers. *Scientific*

Studies of Reading, *21*(2), 133-145.

Ellis, N. C. (1996). Sequencing in SLA: Phonological memory, chunking and points of order. *Studies in Second Language Acquisition*, *18*(1), 91-126.

Ellis, N. C. (2002a). Frequency effects in language processing. *Studies in Second Language Acquisition*, *24*(2), 143-188.

Ellis, N. C. (2002b). Sequencing in SLA: Phonological memory, chunking and points of order. *Studies in Second Language Acquisition*, *18*(1), 91-126.

Ellis, R. (2005). Principles of instructed language learning. *The Asian EFL Journal Quarterly*, *7*(3), 9-24.

Employers blame poor communication, language skills for unemployed Bumi grads. (2018, August 8). *Malay Mail (Online)*. https://www.malaymail.com/news/malaysia/2018/11/08/employers-blame-poor-communication-language-skills-for-unemployed-bumi-grad/1691146

Engber, C. A. (1995). The relationship of lexical proficiency to the quality of ESL compositions. *Journal of Second Language Writing*, *4*(2), 139-155.

Entwisle, D. R. (1966). *Word associations of young children*. John Hopkins Press.

Ensor, T. M., Surprenant, A. M., & Neath, I. (2019). Increasing word distinctiveness eliminates the picture superiority effect in recognition: Evidence for the physical-distinctiveness account. *Memory & Cognition, 47*(1)**,** 182-193.

Eskelinen, M. (2017). *Drama as a method of teaching EFL vocabulary: A material package for lower secondary school teachers* [Unpublished master's thesis]. University of Jyväskylä.

Eyckmans, J., Van de Velde, H., Van Hout, R., & Boers, F. (2007). Learners' response behaviour in Yes-No vocabulary tests. In H. Daller, M. Milton, & J. Treffers-

Daller (Eds.), *Modelling and assessing vocabulary knowledge* (pp. 59-76). Cambridge University Press.

Eyckmans, J. (2004). *Measuring receptive vocabulary size: Reliability and validity of the Yes-No vocabulary test for French-speaking learners of Dutch*. LOT Press.

Eysenck, H. J., & Wilson, G. D. (1976). *A textbook of human psychology*. University Park Press.

Farrokhi, F., & Mahmoudi-Hamidabad, A. (2012). Rethinking convenience sampling: Defining quality criteria. *Theory and Practice in Language Studies, 2*(4), 784-792.

Fernandes, M. A. , Wammes, J. D., & Meade, M. E. (2018). The Surprisingly Powerful Influence of Drawing on Memory. *Current Directions in Psychological Science, 27*(5), 302-308.

Fitri, N. (2015). Promoting Picture Word Inductive Model (PWIM) to develop students' writing skill. *Premise: Journal of English Education, 4*(1), 1-7.

Flower, L., & Hayes, J. R. (1994). A cognitive process theory of writing. In R. B. Ruddell, M. R. Ruddell, & H. Singer (Eds.), *Theoretical models and processes of reading* (pp. 928-950). International Reading.

Folse, K. (2014). *Vocabulary myths*. University of Michigan Press.

Ford-Connors, E., & Paratore, J. R. (2015). Vocabulary instruction in fifth grade and beyond: Sources of word learning and productive contexts for development. *Review of Educational Research, 85*(1), 50-91.

Fowler, F. J. (2009). *Survey research methods*. Sage.

Frankfort-Nachmias, C., & Nachmias, D. (1992). *Research methods in the social science*. Edward Arnold.

Friederici, A. D. (2011). The brain basis of language processing: from structure to

function. *Physiological Reviews, 91*(4), 1357–1392.

Gairns, R., & Redman, S. (1968). *Working with words*. Cambridge University Press.

Garbati, J. F., & Mady, C. J. (2015). Oral skill development in second languages: A review in search of best practices. *Theory and Practise in Language Studies, 5*(9), 1763-1770.

Gass, S. M., & Selinker, L. (2008). *Second language acquisition: An introductory course* (3rd ed.). Routledge.

Gass, S. M. (1999). Discussion: Incidental vocabulary learning. *Studies in Second Language Acquisition, 21*(2), 319-334.

Gathercole, S., & Baddeley, A. (1993). *Working memory and language*. Psychology Press.

Gay, L. R., & Diehl, P. L. (1992). *Research methods for business & management*. Macmillan Publishing Co.

Gay, L. R. (1992). *Educational research* (4th ed.). Merrill.

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Allyn & Bacon.

Gibson, J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.

Gifford, A. (2000). Broading concepts through vocabulary development. *Reading Improvement, 37*(1), 2-12.

Gill, S. K. (2005). Language policy in Malaysia: Reversing direction. *Language Planning, 4*(3), 241-260.

Giridharan, B. (2013). *English vocabulary acquisition patterns in adult tertiary L2 learners* [Paper presentation]. International Higher Education Teaching and Learning Association Conference: Exploring spaces for learning (13SCNF0100), Orlando, Florida.

Glanzer, M., & Cunitz, A. R. (1966). Two storage mechanisms in free recall. *Journal of Verbal Learning and Verbal Behavior*, *5*(4), 351-360.

Gliem, J. A., & Gliem, R. R. (2003, October). *Calculating, interpreting, and reporting Cronbach's Alpha reliability coefficient for Likert-type scales* [Paper presentation]. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, Ohio State University, Columbus.

Gobet, F., & Lane, P. C. R. (2012). Chunking mechanisms and learning. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning*. Springer.

Gokhale, A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education, 7*(1), 22-30.

Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ for character, health and lifelong achievement*. Bantam Books.

Gonzalez, J., Pollard-Durodola, S., Simmons, D., Taylor, A., Davis, M., Fogarty, M.,& Simmons, L. (2014). Enhancing preschool children's vocabulary: Effects of teacher talk before, during and after shared reading. *Early Childhood Research Quarterly*, *29*(2), 214-226.

Goswami, U. (2001). Early phonological development and the acquisition of literacy. In S. B. Neuman, & D. K. Dickinson (Eds.), *Handbook of early literacy research* (pp. 111-125). Guilford.

Government of Malaysia. (1996). *Vision 2020*. ISIS Malaysia.

Government of Malaysia. (2001). *Eighth Malaysia Plan 2001-2005*. Economic Planning Unit.

Government of Malaysia. (2012). *Malaysia Education Blueprint: 2013-2025*. Economic Planning Unit.

Government of Malaysia. (2016). *Strategy paper 10: Transforming education system*. Economic Planning Unit.

Grabe, W. (1991). Current developments in second language reading research. *TESOL Quarterly, 25*(3), 375-406.

Graf, P., & Ryan, L. (1990). Transfer-appropriate processing for implicit and explicit memory. *Journal of Experimental Psychology: Learning. Memory. & Cognition, 16*(6), 978-992.

Graf, P., & Schacter, D. L. (1987). Selective effects of interference on implicit and explicit memory for new associations. *Journal of Experimental Psychology: Learning, Memory. & Cognition, 13*(1), 45-53.

Graves, M. F., & Watts-Taffe, S. M. (2002). The place of word consciousness in a research-based vocabulary program. In A. E. Farstrup, & S. J. Samuels (Eds.), *What research has to say about reading instruction* (p. 140–165). International Reading Association.

Graves, M. F. (1986). Vocabulary learning and instruction. *Review of Research in Education, 13*(1), 49-89.

Graves, M. F. (2000). A vocabulary program to complement and bolster a middle-grade comprehension program. In B. M. Taylor, M. F. Graves, & P. Van den Broek (Eds.), *Reading for meaning: Fostering comprehension in the middle grades* (pp. 116-135). International Reading Association.

Graves, M. F. (2006). *The vocabulary book: Learning and instruction*. International Reading Association.

Gravetter, F. J., & Forzano, L. B. (2012). *Research methods for the behavioral sciences* (4th ed.). Wadsworth.

Gregg, K. R. (1984). Krashen's monitor and Occam's razor. *Applied Linguistics*, *5*(2), 79-100.

Greidanus, T., Beks, B., & Wakely, R. (2005). Testing the development of French word knowledge by advanced Dutch- and English-speaking learners and native speakers. *The Modern Language Journal*, *89*(2), 221-233.

Greidanus, T., Bogaards, P., Van der Linden, E., Nienhuis, L., & de Wolf, T. (2004). The construction and validation of a deep word knowledge test for advanced learners of French. In P. Bogaards & B. Laufer-Dvorkin (Eds.), *Vocabulary in a second language: Selection, acquisition, and testing* (pp. 191-208). John Benjamins.

Gu, Y. (2003). Vocabulary learning in a second language: Person, task, context and strategies. *TESL-EJ*, *7*(2), 57-65.

Gupta, P., & MacWhinney, B. (1997). Vocabulary acquisition and verbal short-term memory: Computational and neural bases. *Brain and Language*, *59*(2), 267-333.

Guttman, N., & Julesz, B. (1963). Lower limits of auditory periodicity analysis. *Journal of the Acoustical Society of America*, *35*(4), 61-70.

Ha, P. L., Kho, J., & Ch'ng, B. (2013). Nation building, English as an international language, medium of instruction, and language debate: Malaysia and possible ways forward. *Journal of International and Comparative Education*, *2*(2), 58-71.

Hadley, E. B., Dickinson, D. K., Hirsh-Pasek, K., Colinkoff, R. M., & Nesbitt, K. T. (2016). Examining the acquisition of vocabulary knowledge depth among preschool students. *Reading Research Quarterly*, *51*(2), 181-198.

Hadley, E., & Dickinson, D. (2018). Measuring young children's word knowledge: A conceptual review. *Journal of Early Chlidhood Literacy*, *33*(2), 1-29.

Hadley, E. B., Dickinson, D. K., Hirsh-Pasek, K., & Golinkoff, R. M. (2019). Building

semantic networks: The impact of a vocabulary intervention on preschoolers' depth of word knowledge. *Reading Research Quarterly*, *54*(1), 41-61.

Haniff, M. (2017). Research and trends in the studies of explicit vocabulary instructions and vocabulary acquisition. *Research and Reviews: Journal of educational Studies*, *3*(2), 1-7.

Harmer, J. (2007). *The practice of English language teaching* (3rd ed.). Pearson Longman.

Harrington, M., & Carey, M. (2009). The on-line Yes-No test as a placement tool. *System*, *37*(4), 614-626.

Hart, B., & Risley, T. R. (1995). *Meaningful differences*. Paul H. Brookes.

Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap by age 3. *American Educator*, *27*(1), 4-9.

Hashim, F. (1999). Enabling a reader through picture books: A case study. *Literacy Across Cultures*, *3*(1), 23-39.

Hashim, H. U., & Yunus, M. M. (2018). English as a second language (ESL) learning: Setting the right environment for second language acquisition. *Tadris: Journal of Education and Teacher Training*, *3*(2), 207-215.

Hassan, F., & Selamat, N. F. (2002). Why aren't students proficient in ESL: The teachers' perspective. *The English Teacher*, *28*(1), 7-18.

Hayes, D. (2014). *Factors influencing success in teaching English in state Primary schools*. British Council/E324.

Hazenberg, S., & Hulstijn, J. H. (1996). Defining a minimal receptive second language vocabulary for non-native university students: an empirical investigation. *Applied Linguistics*, *17*(2), 145-163.

He, A. E. (2012). Systematic use of mother tongue as learning/teaching resources in target

language instruction. *Multilingual Education*, *2*(1), 12-24.

Heath, S. B. (2000). Seeing our way into learning. *Cambridge Journal of Education*, *30*(1), 121-131.

Hedgcock, J. S., & Ferries, D. R. (2018). Reading for quantity: Extensive reading in L2 reading instructions. In B. Chap (Ed.), *Teaching readers of English: Students texts, contexts* (pp. 219-253). Routledge.

Heffner, C. L. (2014). *Research methods: Introduction to research*. http://allpsych.com /researchmethods/introduction

Henning, G. (1991). *A study of the effects of contextualization and familiarization on responses to the TOEFL vocabulary test items TOEFL*. Educational Testing Service.

Henriksen, B. (1996). *Semantisation - a key process for vocabulary learning and use*. AILA Symposium Press.

Hermans, D. (2000). *Word production in a foreign language* [Unpublished master's thesis]. University of Nijmegen.

Hiew, W. (2012). English language teaching and learning issues in Malaysia: Learners' perceptions via facebook dialogue journal. *Journal of Arts, Science & Commerce*, *3*(1), 11-19.

Higa, M. (1963). Interference effects of intralist word relationships in verbal learning. *Journal of Verbal Learning and Verbal Behavior*, *2*(2), 170-175.

Higgs, T. V., & Clifford, R. (1982). The push towards communication. In V. Higgs (Ed.), *Curriculum, competence, and the foreign language teacher* (pp. 57-79). National Textbook Company.

Hill, M. S., Wagovich, S. A., & Manfra, L. (2017). Word learning during reading: effects of language ability in school-age children. *Communication Disorders Quarterly*, *39*(1),

270-280.

Hilton, C. E. (2017). The importance of pretesting questionnaires: a field research example of cognitive pretesting the Exercise Referral Quality of Life Scale (ER-QLS). *International Journal of Social Research Methodology*, *20*(1), 21-34.

Hirsh, D., & Nation, I. S. P. (1992). What vocabulary size is needed to read unsimplified texts for pleasure? *Reading in a Foreign Language*, *8*(2), 689-696.

Hockley, W. E. (2008). The picture superiority effect in associative recognition. *Memory and Cognition*, *36*(7), 1351-1359.

Hoffman, A. J. (2016). *Philosophical foundations of evolutionary psychology*. Lexington Books.

Hoffman, J. L., Teale, W. H., & Paciga, K. A. (2014). Assessing vocabulary learning in early childhood. *Journal of Early Childhood Literacy*, *14*(4), 459-481.

Hogg, R. V., & Tanis, E. A. (2005). *Probability and statistical inference* (7th ed.). Prentice Hall.

Hollan, J., Hutchins, E., & Kirsh, D. (2000). Distributed cognition: Toward a new foundation of human-computer interaction research. *ACM Transactions on Computer-Human Interaction*, *7*(2), 174-196.

Hornby, S. (2004). Book review: Library anxiety: Theory, research and application. *Journal of Librarianship and Information Science*, *36*(3), 138-139.

Hu, M., & Nation, I. S. P. (2000). Unknown vocabulary density and reading comprehension. *Reading in a Foreign Language*, *13*(1), 403-430.

Huibregtse, I., Admiraal, W., & Meara, P. (2002). Scores on a yes–no vocabulary test: Correction for guessing and response style. *Language Testing*, *19*(3), 227-245.

Huitt, W., & Hummel, J. (2003). *Piaget's theory of cognitive development*. Valdosta State

University Press.

Huitt, W. (2000). *The information processing approach*. Valdosta State University Press.

Huitt, W. (2003). *The information processing approach to cognition*. Valdosta State University Press.

Huitt, W. (2006). *The cognitive system*. Valdosta State University Press.

Huitt, W. (2011). *Bloom et al.'s taxonomy of the cognitive domain*. Valdosta State University Press.

Hulstijn, J. H. (1997). Mnemonic methods in foreign language vocabulary learning. In J. Coady, & T. Huckin (Eds.), *Second language vocabulary acquisition* (pp. 203-224). Cambridge University Press.

Hunt, A., & Beglar, D. (2005). A framework for developing EFL reading vocabulary. *Reading in a Foreign Language, 17*(1), 23-59.

Hutchison, A., Forbes, S., Hosp, J., & Reynolds, R. (2013). *Report on the state of PK-3 literacy instruction in Iowa: A report commissioned by the Iowa Reading Research Center*. University of Iowa Press.

Hwang, G. J., Yang, L. H., & Wang, S. Y. (2013). A concept map-embedded educational computer game for improving students' learning performance in natural science courses. *Computers and Education, 69*(1), 121-130.

Hymes, D. H. (1966). Two types of linguistic relativity. In W. Bright (Ed.), *Sociolinguistics* (pp. 114-158). Mouton.

Höffler, T. N., Prechtl, H., & Nerdel, C. (2010). Spartial ability: The influence of visual cognitive style when learning from instructional animations and static pictures. *Learning and Individual Differences, 20*(5), 479-483.

InSPIRE II. (n.d.). *Projek InSPIRE II: Komponen bahasa inggeris*. https://sites.google.

com/a/projekinspire.com/www/inggeris

International Reading Association (IRA). (2002). *Evidence-based reading instruction: Putting the national reading panel report into practice*. International Reading Association.

Ishizuka, H. (2000). Correlations between depth of vocabulary knowledge and speaking ability: Can native-like fluency be enhanced by vocabulary knowledge? *STEP (Society for Testing English Proficiency) Bulletin, 12*(1), 13-25.

Jacoby, L. L. (1983). Remembering the data: Analyzing interactive processes in reading. *Journal of Verbal Learning and Verbal Behavior*, *22*(5), 485-508.

Jalota, S. S. (1972). *Manual of group test of general mental ability*. Chandigarh., India: Ivory Printers.

James, W. (1890). *The principles of psychology*. Henry Holt and Company.

Jiang, X., & Perkins, K. (2013). A conceptual paper on the application of the picture word inductive model using bruner's constructivist view of learning and the cognitive load theory. *Interdisciplinary Journal of Teaching and Learning*, *3*(1), 8-17.

Jiang, X. (2014). *Vocabulary learning through use of the Picture-Word Inductive Model for young English learners in China: A mixed methods examination using cognitive load theory* [Unpublished doctoral dissertation]. University of Florida.

Jiang, X. (2015). *Exploring seventh graders' perceptions of the Picture-Word Inductive Model in their narrative writing in China* [Paper presentation]. Proceedings of the 14th Annual South Florida Education Research Conference 2015, Florida, USA.

Jiang, Y. M. (2009). Applying group work to improve college students' oral English. *International Education Studies, 2*(3), 136-139.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in

action. *Administrative Science Quarterly, 24*(1), 602-611.

John, J. L., & Lenski, S. D. (2005). *Improving reading: Strategies and resources* (4th ed.). Kendall/Hunt Publishing Company.

Johnson, B., & Christensen, L. (2012). *Educational research: Quantitative, qualitative, and mixed approaches* (4th ed.). Sage.

Johnston, C. G., James, R. H., Lye, J. N., & McDonald, I. M. (2000). An evaluation of collaborative problem solving for learning economics. *Journal of Economic Education, 31*(1), 13-29.

Jones, C. (2018). SPARK early literacy: Testing the impact of a family–school–community partnership literacy intervention. *School Community Journal, 28*(2), 247-264.

Jones, L. (2004). Testing L2 vocabulary recognition and recall using pictorial and written test items. *Language Learning & Technology, 8*(3), 122-143.

Joppe, M. (2000). *The research process*. http://www.ryerson.ca/~mjoppe/rp.htm

Jose, P. E. (2013). *Review of doing statistical mediation & moderation*. Guilford.

Joyce, B., & Calhoun, E. (1996). *Creating learning experiences*. Association for Supervision and Curriculum Development.

Joyce, B., & Calhoun, E. (1998). *Learning to teach inductively*. Allyn & Bacon.

Joyce, B., & Calhoun, E. (2010). *Models of professional development: A celebration of educators*. Sage.

Joyce, B., & Weil, M. (1972). *Models of teaching*. Prentice Hall.

Joyce, B., Calhoun, E., & Hopskins, D. (1999). *The new structure of school improvement: Inquiring schools and achieving students*. Open University Press.

Joyce, B., Calhoun, E., Jutras, J., & Newlove, K. (2006, November). *Scaling Up: The results of a literacy curriculum implemented across an entire 53-school education*

authority [Paper presentation]. Asian Pacific Educational Research Association, Hong Kong.

Joyce, B., Hrycauk, M., & Calhoun, E. (2001). A second chance for struggling readers. *Educational Leadership*, *58*(6), 42-46.

Joyce, B., Hrycauk, M., & Calhoun, E. (2003). Learning to read in kindergarten: Has curriculum development bypassed the controversies? *Phi Delta Kappan*, *85*(2), 126-132.

Joyce, B., Weil, M., & Calhoun, E. (2004). *Models of teaching* (7th ed.). Pearson Education Inc.

Joyce, B., Weil, M., & Calhoun, E. (2009). *Models of teaching* (8th ed.). Pearson Education Inc.

Joyce, B., Weil, M., & Calhoun, E. (2015). *Models of teaching* (9th ed.). Pearson Education Inc.

Kabilan, M. K., & Raja Ida, R. I. (2008). Challenges faced and the strategies adopted by a Malaysian English language teacher during teaching practice. *English Language Teaching*, *1*(1), 87-95.

Kagan, S. (1994). *Cooperative learning*. Kagan Publishing.

Kalani, A. (2008). A study of effectiveness of concept attainment model over control method for teaching science in relation to achievement and retention. *International Research Journal*, *2*(5), 20-22.

Kamil, M. L., & Hiebert, E. H. (2005). The teaching and learning of vocabulary: Perspectives and persistent issues. In E. H. Hiebert, & M. L. Kamil (Eds.), *Teaching and learning vocabulary: Bringing scientific research to practice* (pp. 269 -284). Erlbaum.

Kao, S., & O'Neill, C. (1998). *Words into worlds: Learning a second language through*

process drama. Ablex Publishing.

Kaplan, R. B., Baldauf, R. B., & Kamwangamalu, N. (2011). Why educational language plans sometimes fail. *Current Issues in Language Planning*, *12*(2), 105-124.

Kapp, K. (2014). *Gamification: Separating fact from fiction*. Online: CLOmedia. http://cedmaeurope.org/newsletter%20articles/Clomedia/Gamification %20%20Separating%20Fact%20from%20Fiction% 20(Mar%2014).pdf

Karunamuni, N. D. (2015). The five-aggregate model of the mind. *SAGE Open*, *5*(2), 1-7.

Kassim, Wan Zulkifli Wan (2018). Utilizing Dual Coding Theory and animated images to enhance ESL students' vocabulary learning. *The English Teacher, 47*(3), 81-91.

Kelley, E. S., & Kinney, K. (2017). Word learning and story comprehension from digital storybooks: Does interaction make a difference? *Journal of Educational Computing Research*, *55*(3), 410-428.

Kementerian Pendidikan Malaysia (KPM). (2013). *Malaysia education blueprint (2013-2025)*. https://www.moe.gov.my/index.php/menumedia/media-cetak/penerbitan/ dasar/1207-malaysia-education-blueprint-2013-2025/file

Kementerian Pendidikan Malaysia (KPM). (2015). *Kementerian Pendidikan Malaysia (KPM)*. https://www.moe.gov.my/

Kementerian Pendidikan Malaysia (KPM). (2017). *Dokumen standard kurikulum pentaksiran tahun 1 (bahasa inggeris)*. https://sumberpendidikan.com/ 2016/07/26 /dskp-bahasa-inggeris-tahun-1/

Kementerian Pendidikan Malaysia (KPM). (n.d.). *Preliminary report. executive summary: Malaysia education blueprint (2013-2025)*. https://www.moe.gov.my/index.php/menumedia/media-cetak/penerbitan/dasar/1242-summary-executive-malaysia-educatio n-blueprint-2013-2025/file

Kerbow, D., Bebring, P. B., Easton, J. Q., Rollow, S. G., & Bryk, S. S. (1999). *Charting Chicago school reform: Democratic localism as a lever for change*. Westview Press.

Kermani, H., & Aldemir, J. (2015). Preparing children for success: integrating science, math, and technology in early childhood classroom. *Early Child Development and Care*, *185*(9), 1504-1527.

Kerr, N. H., & Winograd, E. (1982). Effects of contextual elaboration on face recognition. *Memory and Cognition*, *10*(6), 603-609.

Kim, D., & Gilman, D. A. (2008). Effects of text, audio, and graphic aids in multimedia instruction for vocabulary learning. *Educational Technology & Society*, *11*(3), 114-126.

Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Sage.

Kirk, R. E. (1999). *Statistic: An introduction*. Harcourt Brace.

Kirkpatrick, E. A. (1894). An experimental study of memory. *Psychological Review*, *1*(6), 602-609.

Klare, G. (1974). Assessing readability. *Reading Research Quarterly*, *10*(1), 62-102.

Klatzky, R. (1980). *Human memory* (2nd ed.). Freeman.

Klausmeier, H. J., & Allen, P. S. (1978). *Cognitive development of children and youth: A longitudinal study*. Academic Press.

Kline, P. (1999). *The handbook of psychological testing* (2nd ed.). Routledge.

Kline, R. B. (2004). *Beyond significance testing: Reforming data analysis methods in behavioral research*. American Psychological Association.

Koda, K. (1989). The effects of transferred vocabulary knowledge on the development of L2 reading proficiency. *Foreign Language Annals*, *22*(6), 529-540.

Koda, K. (2007). Reading and language learning: Cross-linguistic constraints on second

language reading development. *Language Learning, 57*(1), 1-44.

Koizumi, R., & In'nami, Y. (2013). Vocabulary knowledge and speaking proficiency among second language learners from novice to intermediate levels. *Journal of Language Teaching and Research, 4*(5), 900-913.

Koizumi, R., & Kurizaki, I. (2002). Speaking characteristics of monologues given by Japanese junior high school students. *Bulletin of the Kanto-Koshin-Etsu English Language Education Society, 16*(1), 17-28.

Koizumi, R. (2005). Predicting speaking ability from vocabulary knowledge. *JLTA Journal, 7*(1), 1-20.

Kormos, J. (2006). *Speech production and second language acquisition*. Erlbaum.

Kost, C. R., Foss, P., & Lenzini, J. J. (1999). Textual and pictorial glosses: Effectiveness on incidental vocabulary growth when reading in a foreign language. *Foreign Language Annals, 32*(1), 89-113.

Koć-Januchta, M., Höffler, T., Thoma, G., Prechtl, H., & Leutner, D. (2017). Visualizers versus verbalizers: Effects of cognitive style on learning with texts and pictures – An eye-tracking study. *Computers in Human Behavior, 68*(1), 170-179.

Krashen, S., & Seliger, H. (1975). The essential contributions of formal instruction in adult second language learning. *TESOL Quarterly, 9*(2), 173-183.

Krashen, S., & Terrell, T. D. (1983). *The natural approach: Language acquisition in the classroom*. Prentice-Hall Europe.

Krashen, S., & Terrell, T. (1988). *The natural approach: Language acquisition in the classroom*. Prentice Hall International Ltd.

Krashen, S. (1976). Formal and informal linguistic environments in language learning and language acquisition. *TESOL Quarterly, 10*(1), 157-168.

Krashen, S. (1982). *Principles and practice in second language acquisition*. Prentice Hall.

Krashen, S. (1983). Theoretical research and second language acquisition theory. In *Practical applications of research* (pp. 54-65). National Textbook.

Krashen, S. (1988). *Second language acquisition and second language learning*. Prentice-Hall International.

Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *The Modern Language Journal, 73*(4), 440-464.

Krashen, S. (2002). *Second language acquisition and second language learning (Online Edition)*. Pergamon Press Inc.

Krashen, S. (2009). *Principles and practice in second language acquisition*. http://www.sdkrashen.com/Principles_and_Practice/Principles_and_ Practice.pdf

Krashen, S. (n.d.). *Stephen Krashen's theory of second language acquisition*. http://www2.vobs.at/ludescher/.../The%20Natural%20 Approach. doc.

Krehel, S. (2003). Poetry performance in the elementary classroom. *Michigan Reading Journal, 35*(3), 20-23.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607-610.

Kress, G., & Leeuwen, T. (1996). *Reading images: The grammar of visual design*. Routledge.

Kress, G., & Leeuwen, T. (2001). *Multimodal discourse*. Arnold.

Kress, G., & Leeuwen, T. (2006). *Reading images: The grammar of visual design* (2nd ed.). Routledge.

Kress, G. (1997). Visual and verbal modes of representation in electronically mediated

communication: The potentials of new forms of text. In I. Snyder (Ed.), *Page to screen: taking literacy into the electronic era* (pp. 53-79). Allen & Unwin.

Kress, G. (2003). *Literacy in the new media age*. Routledge.

Krosnick, J. A., & Presser, S. (2010). Question and questionnaire design. In P. V. Marsden, & J. D. Wright (Eds.), *Handbook of survey research* (pp. 263-313). Emerald Group Publishing Ltd.

Kumar, K. (2002). *An effectiveness of competency based inductive thinking model in science to develop reasoning ability of primary school students* [Unpublished doctoral dissertation]. South Gujarat University.

Kurniawan, S. P., & Tri, A. D. (2015). Picture Word Inductive Model (PWIM) strategy in writing descriptive paragraph. *Jurnal Universitas Islam Riau*, *2*(2), 73-87.

Kuzel, A. J. (1992). Sampling in qualitative inquiry. In B. F. Crabtree, & W. L. Miller (Eds.), *Doing qualitative research* (pp. 31-44). Sage.

Kvale, S. (1996). *Interviews*. Sage.

Kyndt, E., Raes, E., Lismont, B., Timmers, F., Cascallar, E., & Dochy, F. (2013). A meta-analysis of the effects of face-to-face cooperative learning. Do recent studies falsify or verify earlier findings? *Educational Research Review, 10*(1), 133-149.

Laal, M. (2012). Collaborative learning: What is it? *Procedia: Social and Behavioral Sciences*, *31*(11), 491-495.

Labaree, R.V. (2013). *Organising your social sciences research paper: Types of research designs*. University of Southern California.

Lai, E. R. (2011). Metacognition: A literature review. *Pearson Research Reports*, *41*(1), 1-40.

Lamb, M. (2011). A "Matthew Effect" in English language education in a developing

country context. In H. Coleman (Ed.), *Dreams and realities: Developing countries and the English language*. The British Council.

Lantolf, J. P., & Thorne, S. L. (2006). *Socio-cultural theory and the genesis of second language development*. Oxford University Press.

Lao, C. Y., & Krashen, S. (2000). The impact of popular literature study on literacy development in EFL: More evidence for the power of reading. *System*, *28*(2), 261-270.

Larsen-Freeman, D. (2000). *Techniques and principles in language teaching*. Oxford University Press.

Laufer, B. (1991). The development of L2 lexis in the expression of the advanced learner. *Modern Language Journal*, *75*(4), 440-448.

Laufer, B. (1992a). How much lexis is necessary for reading comprehension? In P. J. L. Arnaud & H. Béjoint (Eds.), *Vocabulary and applied linguistics* (pp. 126-132). Macmillan.

Laufer, B. (1992b). Reading in a foreign language: How does L2 lexical knowledge interact with the readers' general academic ability? *Journal of Research in Reading*, *15*(2), 95-103.

LeCompte, M. D., & Preissle, J. (1993). *Ethnography and qualitative design in educational research* (2nd ed.). Academic Press.

LeJeune, N. (2003). Critical components for successful collaborative learning in CS1. *Journal of Computing Sciences in Colleges*, *19*(1), 275-285.

Leark, R. A., Wallace, D. R., & Fitzgerald, R. (2004). Test-retest reliability and standard error of measurement for the Test of Variables of Attention (T.O.V.A.) with healthy school-age children. *Assessment*, *11*(4), 285-289.

Leedy, P. D., & Ormrod, J. E. (2010). Practical research: Planning and design (9th ed). Prentice Hall.

Lee, B. C., Pandian, A., & Rethinasamy, S. (2019). Pictures revisited: A traditional vehicle in enhancing young learners' vocabulary. *International Journal of Language, Literacy and Translation, 2*(2), 54-74.

Lee, B. C., Pandian, A., & Rethinasamy, S. (2020). Recall and retention of vocabulary depth of young learners via PWIM. *Pertanika Journal of Social Science and Humanities 28*(S2 (Special Issue)), 297-319.

Lee, B. C., Pandian, A., Rethinasamy, S., & Tan, D.A.L. (2019). Effects of PWIM in the ESL Classroom: Vocabulary knowledge development among primary Malaysian learners. *3L: The Southeast Asian Journal of English, 25*(4), 179-197.

Lee, H. N., & Mallinder, M. (2011). Role of extensive reading in EFL vocabulary development: review and recommendation. *The English Teacher, XL*, 145-163.

Lee Goss, C., & Andren, K. J. (2014). *The Guilford practical intervention in the school series: Dropout prevention*. Guilford Press.

Lehr, F., Osborn, J., & Hiebert, E. H. (2004). *A focus on vocabulary.* Pacific Resources for Education and Learning.

Leierer, S. J. (2001). Book Review: Bellini, J. L., & Rumrill, P. D. (1999). Research in rehabilitation counseling: A guide to design, methodology, and utilization. Springfield, IL: Charles C. Thomas (252 pages). *Rehabilitation Counseling Bulletin*, *45*(1), 57-58.

Lemhöfer, K., & Broersma, M. (2012). Introducing LexTALE: a quick and valid lexical test for advanced learners of English. *Behavior Research Methods, 44*(2), 325-343.

Lenth, R.V. (2001). Practical guidelines for effective sample size determination. *The*

American Statistician, *55*(3), 187-193.

Leppink, J., Paas, F., van der Vleuten, C.P.M., van Gog, T., & van Merriënboer, J.G.J. (2013). Development of an instrument for measuring different types of cognitive load. *Behaviour Research Methods, 45*(4), 1058-1072.

Leppink, J., & Pérez-Fuster, P. (2016). We need more replication research–A case for test-retest reliability. *Perspectives on Medical Education, 6*(3), 158-164.

Leppink, J., & van den Heuvel, A. (2015). The evolution of cognitive load theory and its application to medical education. *Perspectives on Medical Education, 4*(3), 119-127.

Leppink, J., & van Merriënboer, J. G. J. (2015). The beast of aggregating cognitive load measures in technology-based learning. *Educational Technology & Society, 18*(4), 230-245.

Lescaux, N. K., & Kieffer, M. J. (2010). Exploring sources of reading comprehension difficulties among language minority learners and their classmates in early adolescence. *American Educational Research Journal, 47*(3), 596-632.

Letchumanan, K., & Tan, B. H. (2012). Using computer games to improve secondary school students' vocabulary acquisition in English. *Pertanika Journal of Social Science and Humanities, 23*(3), 725-740.

Levenston, E. A., (1979). Second Language acquisition, issues and problems. *Interlanguage Studies Bulletin, 4*(1), 235-241.

Levelt, W. J. M. (1989). *Speaking: From intention to articulation.* MIT Press.

Levie, W. H., & Hathaway, S. N (1988). Picture recognition memory: A review of research and theory. *Journal of Visual Verbal Languaging, 8*(1), 6-45.

Lewis, M. (2000). Introduction. In M. Lewis (Ed.), *Teaching collocation: Further*

developments in the lexical approach (pp. 8-9). Language Teaching Publications.

Li, X. (2011). *The Picture Word Inductive Model and English Vocabulary Acquisition : A Study in a Swedish Primary School* [Unpublished doctoral dissertation]. Kristianstad University Sweden.

Liang, J. (1995). *The use of group work in college EFL pedagogy in Taiwan: A classroom case study* [Unpublished doctoral dissertation]. New York University.

Lightbow, P., & Spada, N. (1993). *How languages are learned.* Oxford University Press.

Lim, T. H. (2003). *The effectiveness of the use of textual glossary and multimedia annotation in L2 vocabulary learning: A case study of elementary learners of English* [Unpublished master's thesis]. Universiti Sains Malaysia.

Lincoln, Y. S., & Guba, E. (1985). *Naturalistic Inquiry*. Sage.

Linnarud, M. (1986). *Lexis in composition*. CWK Gleerups.

LINUS Programme for early learning. (2012, September 5). *The Star*. https://www.thestar.com.my/news/nation/2012/09/05/linus-programme-for-early-learning/

Liu, I. F., & Young, S. S. C. (2015). An exploration of participative motivations in a community-based online English extensive reading contest with respect to gender difference. *Interactive Learning Environments, 25*(1), 48-61.

Liu, N., & Nation, I. S. P. (1985). Factors affecting guessing vocabulary in context. *RELC Journal*, *16*(1), 33-42.

Llach, M. P. A., & Gallego, M. T. (2009). Examining the relationship between receptive vocabulary size and written skills of primary School. *ATLANTIS. Journal of the Spanish Association of Anglo-American Studies, 31*(1), 129-147.

Llorente, A., Amado, A., Voigt, R., Berretta, M., Fraley, J., & Jensen, C. (2001). Internal consistency, temporal stability, and reproducibility of individual index scores of the

Test of Variables of Attention in children with attention-deficit/hyperactivity disorder. *Archives of Clinical Neuropsychology, 16*(6), 535-546.

Locke, J. (1975). *An essay concerning human understanding*. Clarendon Press.

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2010). *Methods in educational research: From theory to practice* (2nd ed.). John Wiley & Sons.

Loh, J. K. (2010). Reflecting, shaking and being shook: Resistance in a primary classroom. *English Teaching: Practice and Critique, 9*(3), 160-168.

Loh, J. K. (2012). 'Shaking A' and learning. *The Reading Teacher, 65*(7), 460-476.

Loh, J. K. (2017). Vocabulary instructions through the use of pictures. *EFL Magazine.* https://www.eflmagazine.com/vocabulary-instruction-use-pictures/

Lourky, J. P. (1998). Instructions for improving ESL/EFL vocabulary instruction. *Seinan Jogakuin Junior College Bulletin, 45*(1), 1-12.

Lu, Q., Wallrath, L. L., Allan, B. D., Glaser, R. L., Lis, J. T., & Elgin, S. C. (1992). Promoter sequence containing $(CT)_n.(GA)_n$ repeats is critical for the formation of the DNase I hypersensitive sites in the Drosophila Hsp26 gene. *Journal of Molecular Biology, 225*(4), 85-99.

Lutz, S., & Huitt, W. (2003). Information processing and memory: Theory and applications. *Educational Psychology Interactive.* Valdosta State University.

Madigan, S. (1983). Picture memory. In J. C. Yuille (Ed.), *Imagery, memory and cognition*: *Essays in honour of Allan Paivio* (pp.65-89). Lawrence Erlbaum.

Makoto, Y., & Jeffa, F. (2002). Second language incidental vocabulary retention: The effects of picture and annotation types. *CALICO Journal, 20*(1), 33-58.

Marcotte, A. M., Clemens, N. H., Parker, C., & Whitcom, S. A. (2016). Examining the classification accuracy of a vocabulary screening measure with preschoolchildren.

Assessment for Effective Intervention, 41(4), 230–242.

Martella, R. C., Nelson, J. R., Morgan, R. L., & Marchand-Martella, N. E. (2013). *Understanding and interpreting educational research*. Guilford.

Maryam, S. N., Shohreh, R., Shaik, A. M. M. I., & Lin, S. E. (2016). Prior knowledge activation through brainstorming to enhance Malaysian EFL learners' reading comprehension. *International Journal of Linguistics*, *8*(2), 187-198.

Marzano, R. J. (2004). *Building background knowledge for academic achievement: Research on what works in schools*. ASCD Press.

Mason, B., & Krashen, S. (1997). Extensive reading in English as a foreign language. *System, 25*(1), 91-102.

Master of Languages. (2012, September 12). *The Star*. *Star Special*, p. 4.

Maxwell, J. (1997). Designing a qualitative study. In L. , & D. J. Rog (Eds.), *Handbook of applied social research methods* (pp. 69-100). Sage.

Mayer, R., & Sims, V. (1994). For whom is a picture worth a thousand words? Extensions of a dual-coding theory of multimedia learning. *Journal of Educational Technology*, *86*(3), 389-401.

McBride, D. M., & Dosher, B. A. (2002). A comparison of conscious and automatic memory processes for picture and word stimuli: A process dissociation analysis. *Consciousness and Cognition, 11*(3), 423-460.

McCarter, A. K. (2014). *Ability grouping in elementary education* [Unpublished doctoral dissertation]. East Tennessee State University, Tenneessee.

McCarthy, M. J. (1990). *Vocabulary.* Oxford University Press.

McDonough, S. H. (1999). Learner strategies. *Language Teaching, 32*(1), 1-18.

McKeown, M. G., & Beck, I. L. (2014). Effects of vocabulary instruction on measures of

language processing: Comparing two approaches. *Early Childhood Research Quarterly, 29*(4), 520–530.

McKeown, M. G., Beck, I.L., & Blake, R. G. K.(2009). Rethinking Reading Comprehension Instruction: A Comparison of Instruction for Strategies and Content Approaches. *Reading Research Quarterly, 44*(3), 218-253.

McKeown, M. G., Crosson, A. C., Moore, D. W., & Beck, I. L. (2018). Word Knowledge and Comprehension Effects of an Academic Vocabulary Intervention for Middle School Students. *American Educational Research Journal, 55*(3), 572-616.

McKeown, M. G., Deane, P. D., Scott, J. A., Krovetz, R., & Lawless, R. R. (2017). *Vocabulary assessment to support instruction: Building rich word-learning experiences*. Guilford Press.

McKeown, M. G., & Curtis, M. E. (1987). *The nature of vocabulary acquisition.* Lawrence Erlbaum.

McLaughlin, B. (1978). The monitor model: Some methodological considerations. *Language Learning 28*(2), 309-332.

McLaughlin, B. (1987). *Theories of second language learning.* Edward Arnold.

McLeod, S. A. (2007a). *Simply psychology: Multi store model of memory.* http://www.simplypsychology.org/multi-store.html

McLeod, S. A. (2007b). *Levels of processing*. https://www.simplypsychology.org/ levelsofprocessing.html

McLeod, S. A. (2008). *Bruner*. https://www.simplypsychology.org/bruner.html

McLeod, R. H., Hardy, J. K., & Kaiser, A. P. (2017). The effects of play-based intervention on vocabulary acquisition by preschoolers at risk for reading and language delays. *Journal of Early Intervention*, *39*(2), 147-160.

Meara, P. (1980). Vocabulary acquisition: A neglected aspect of language learning. *Language Teaching and Linguistics Abstracts, 13*(3-4), 221-246.

Meara, P. (1983). Word associations in a foreign language. *Nottingham Linguistics Circular, 11*(2), 28-38.

Meara, P. (1984). The study of lexis in interlanguage. In A. Davies, C. Criper, & A. P. R. Howatt (Eds.), *Interlanguage* (pp. 225-235). Edinburgh University Press.

Meara, P. (1990). A note on passive vocabulary. *Second Language Research, 6*(2), 150-154.

Meara, P. (1992). *EFL Vocabulary tests*. Centre for Applied Language Studies, University of Wales.

Meara, P. (1993). The bilingual lexicon and the teaching of vocabulary. In R. Schreuder, & B. Weltens (Eds.), *The bilingual lexicon* (pp. 279-297). John Benjamins.

Meara, P. (1996). The dimensions of lexical competence. In G. Brown, K. Malmkjaer, & J. Williams (Eds.), *Performance and competence in second language acquisition* (pp. 35-53). Cambridge University Press.

Meara, P. (2005). Designing vocabulary tests for English, Spanish and other languages. In C. Butler, M. Gómez-González, & S. Doval Suárez (Eds.), *The dynamics of language use* (pp. 271-286). John Benjamins.

Meara, P. (2006). Emergent properties of multilingual lexicons. *Applied Linguistics, 27*(4), 620-644.

Meara, P. (2009). *Connected words*. Amsterdam: John Benjamins.

Meara, P. (2010). *EFL vocabulary tests* (2nd ed.). Centre for Applied Language Studies, University College Swansea.

Meara, P., & Bell, H. (2001). P_Lex: A simple and effective way of describing the lexical characteristics of short L2 texts. *Prospect, 16*(3), 323-337.

Meara, P., & Buxton, B. (1987). An alternative to multiple choice vocabulary tests. *Language Testing, 4*(2), 142-154.

Meara, P., & Jones, G. (1988). Vocabulary size as a placement indicator. In P. Grunwell (Ed.), *Applied linguistics in society* (pp. 80-87). London: Centre for Information on Language Teaching and Research.

Meara, P., & Jones, G. (1990). *Eurocentres vocabulary size test, Version E1.1/K10.* Eurocentres Learning Service.

Meara, P., & Wolter, B. (2004). V_Links: Beyond vocabulary depth. In D. Albrechtsen, K. Haastrup, & B. Henriksen (Eds.), *Angles on the English-speaking world* (pp. 85-96). Museum Tusculanum.

Meenakshi, B. (2015). Effect of inductive thinking model on achievement in scientific creativity of class IX students. *International Journal of Education and Psychological Research, 4*(2), 32-37.

Mehigan, T. J., Barry, M., Kehoe, A., & Pitt, I. (2011). *Using eye tracking technology to identify visual and verbal learners* [Paper presentation]. Proceedings of the 2011 IEEE International Conference on Multimedia and Expo, Spain.

Metsala, J., & Walley, A. (1998). Spoken vocabulary growth and the segmental restructuring of lexical representations: Precursors to phonemic awareness and early reading ability. In J. Metsala, & L. Ehri (Eds.), *Word recognition in beginning literacy* (pp. 89-120). Erlbaum.

Miles, M., & Huberman, M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage.

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, *63*(2), 81-97.

Milton, J. (2009). *Measuring second language vocabulary acquisition.* Short Run Press.

Milton, J., Wade, J., & Hopkins, N. (2010). Aural word recognition and oral competence in a foreign language. In R. Chacón-Beltrán, C. Abello-Contesse, M. Torreblanca-López, & M. D. López-Jiménez (Eds.), *Further insights into nonnative vocabulary teaching and learning* (pp. 83-97). Multilingual Matters.

Mintzer, M. Z., & Snodgrass, J. G. (1999). The picture superiority effect: Support for the distinctiveness model. *The American Journal of Psychology, 112*(1), 113-146.

Mitchell, M. L., & Jolley, J. M. (2010). *Research design explained* (7th ed.). Wadsworth/Cengage Learning.

Mitnik, R., Recabarren, M., Nussbaum, M., & Soto, A. (2009). Collaborative robotic instruction: A graph teaching experience. *Computers & Education, 53*(2), 330-342.

Miyake, A., & Shah, P. (1999). *Models of working memory: Mechanisms of active maintenance and executive control*. Cambridge University Press.

Mochida, A., & Harrington., M. (2006). The Yes-No test as a measure of receptive vocabulary knowledge. *Language Testing 23*(1), 73-98.

Mohd Tahir, M. H. (2017). Research and trends in the studies of explicit Vocabulary instructions and vocabulary acquisition. *Research & Reviews: Journal of Educational Studies, 3*(2), 1-7.

Moir, J., & Nation, I. S. P. (2008). Vocabulary and good language learners. In C. Griffiths (Ed.), *Lessons from good language learners* (pp.159-173). Cambridge University Press.

Moon, J. (2000). *Children learning English*. Macmillan Heinemann.

Moore, M., & Calvert, S. (2000). Brief report: Vocabulary acquisition for children with autism: Teacher or computer instruction. *Journal of Autism and Developmental*

Disorders, *30*(4), 359-362.

Moore, D., & McCabe, D. (1993). *Introduction to the practice of statistics*. Freeman.

Morgan, P. L., Farkas, G., Hillemeier, M. M., Hammer, C. S., & Maczuga, S. (2015). 24-month-old children with larger oral vocabularies display greater academic and behavioral functioning at kindergarten entry. *Child Development, 86*(5), 1351-1370.

Morris, C. D., Bransford, J. D., & Franks, J. J. (1977). Levels of processing versus transfer appropriate processing. *Journal of Verbal Learning and Verbal Behavior*, *16*(5), 519-533.

Morrison, F. J., Smith, L., & Dow-Ehrensberger, M. (1995). Education and cognitive development: A natural experiment. *Developmental Psychology, 31*(5), 789-799.

Morison, K. R. B. (1993). *Planning and accomplishing school-centered evaluation.* Peter Francis Publishers.

Morrow, J. R., Jackson, A. W., Disch, J. G., & Mood, D. P. (2011). *Measurement and evaluation in human performance* (4th ed.). Human Kinetics.

Mott, F. L. (1998). *The NLSY Children (1992).* Center for Human Resource Research, Ohio State University.

Mousa, M. (2017). The influence of inductive reasoning thinking skills on enhancing performance. *International Humanities Studies*, *4*(3), 37-48.

Mubarak al-Tamimi, N. O. (2006). *The effect of direct reading strategy instruction on students' reading comprehension, metacognitive strategy awareness, and reading attitudes among eleventh grade students in Yemen* [Unpublished doctoral dissertation]. Universiti Sains Malaysia.

Munir, F. (2016). The effectiveness of teaching vocabulary by using cartoon film toward vocabulary mastery of EFL students. *ournal of English Language Teaching and*

Linguistics, 1(1), 13-37.

Murphey, T., & Arao, H. (2001). Changing reported beliefs through near peer role modeling. *TESL-EJ, 5*(3), 1-15.

Murugesan, V. (2003). Malaysia promotes excellence in English. *ESL Magazine, 6*(2), 26-28.

Nachmias, C., & Nachmias, D. (1980). *Research methods in the social sciences.* St. Martin's Press.

Naeimi, M., & Chow, T. V. F. (2015). Vocabulary acquisition through direct and indirect learning strategies. *English Language Teaching, 8*(10), 142-151.

Naginder, K. (2013). The need for autonomous vocabulary learners in the Malaysian ESL classroom. *GEMA: Online Journal of Language Studies, 13*(3), 7-16.

Naginder, K., Nor, H. O., & Kabilan, M. K. (2008). Lexical competence among tertiary students: Teacher-student perspectives. *English Teacher, XXXVII*, 90-104.

Nagy, W. E. (1988). *Teaching vocabulary to improve reading comprehension*. ERIC Clearinghouse on Reading and Communication Skills.

Nagy, W. E. (2005). Why vocabulary instruction needs to be long-term and comprehensive. In E. H. Hiebert, & M. L. Kamil (Eds.), *Teaching and learning vocabulary: Bringing research to practice* (pp. 27-44). Erlbaum.

Nagy, W. E., Anderson, R. C., & Herman, P. A., (1987). Learning word meanings from context during normal reading. *American Educational Research Journal, 24*(2), 237-275.

Nagy, W. E., & Scott, J. (2000). Vocabulary processes. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (pp. 269-284). Erlbaum.

Nangin, S. B. (2015). *The effect of using Picture Word Inductive Model (PWIM) on students'*

achievement in writing narrative text [Unpublished master's thesis]. State University of Medan

Nasution, S. A., & Murni, S. M. (2013). *Improving Students' Questioning Achievement Through Picture Word Inductive Model (PWIM)*. http://portalgaruda.org/download_article.php?article=126830&val =3893

Nation, I. S. P. (1982). Beginning to learn foreign vocabulary: A review of the research. *RELC Journal, 13*(1), 14-36.

Nation, I. S. P. (1983). Testing and teaching vocabulary. *Guidelines, 5*(1), 12-25.

Nation, I. S. P. (1990). *Teaching and learning vocabulary.* Newbury House.

Nation, I. S. P. (1993). Measuring readiness for simplified material: a test of the first 1,000 words of English. In M. L. Tickoo (Ed.), *Simplification: Theory and Application. RELC Anthology Series* (pp. 193-203). Lapea Press.

Nation, I. S. P. (1994a). Review of working with words, teaching and learning vocabulary, vocabulary in action, and vocabulary. *System, 22*(2), 283-287.

Nation, I. S. P. (Ed.). (1994b). *New ways in teaching vocabulary.* TESOL, Inc.

Nation, I. S. P. (1997). Bring today's vocabulary research into tomorrow's classrooms. In G. M. Jacobs (Ed.), *Language classrooms of tomorrow: Issues and responses* (pp. 170-182). SEAMEO Regional Language Centre.

Nation, I. S. P. (2001). *Learning vocabulary in another language.* Cambridge University Press.

Nation, I. S. P. (2005). Ten best ideas for teaching vocabulary. *The Language Teacher, 29*(7), 5-6.

Nation, I. S. P. (2006). How large a vocabulary is needed for reading and listening? *Canadian Modern Language Review, 63*(1), 59-82.

Nation, I. S. P. (2008). *Teaching vocabulary: Strategies and techniques*. Heinle.

Nation, I. S. P. (n.d.). *The second 1000 most common English words*. http://www1.harenet.ne.jp/~waring/ vocab/ wordlists/full2000.txt

Nation, I. S. P., & Beglar, D. (2007). A vocabulary size test. *The Language Teacher, 31*(7), 9-13.

Nation, I. S. P., & Coady, J. (1988). Vocabulary and reading. In R. Carter & M. McCarthy (Eds.), *Vocabulary and language teaching* (pp. 97–110). Longman.

Nation, I. S. P., & Wang, K. (1999). Graded readers and vocabulary. *Reading in a Foreign Language*, *12*(2), 355-380.

Waring, R., & Nation, I. S. P. (1997) Vocabulary size, text coverage, and word lists. In N. Schmitt & M. McCarthy (Eds.), *Vocabulary: Description, Acquisition and Pedagogy* (pp.6-19). Cambridge University Press.

Nation, I. S. P., & Webb, S. (2011). *Researching and analyzing vocabulary.* Heinle.

National Center for Family Literacy (NCFL). (2009). *Developing early literacy: Report of the National Early Literacy Panel*. National Institute for Literacy.

National Institute of Child Health and Human Development (NICHD) (2000). *Report of the national reading panel: Teaching children to read.* http://www.nichd.nih.gov/ publications/nrp/report.cfm

National Institute for Literacy (NIFL). (n.d.). Frequently asked questions. http://www.nifl.gov /about/faq.html

National Reading Panel. (2000). *Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. US Government Printing Office.

Neisser, U. (1967). *Cognitive psychology*. Appleton-Century-Crofts.

Neisser, U. (2014). *Cognitive psychology* (Classic Ed.). Psychology Press.

Nelson, D. L. (1979). Remembering pictures and words: Appearance, significance, and name. In L. S. Cermak, & F. I. M. Craik (Eds.), *Levels of processing in human memory* (pp. 45-76). Erlbaum.

Nelson, D. L., & Brooks, D. H. (1973). Functional independence of pictures and their verbal memory codes. *Journal of Experimental Psychology, 98*(1), 44-48.

Nelson, D. L, Brooks, D. H., & Borden, R. C. (1974). Effects of formal similarity: Phonetic, graphic or both? *Journal of Experimental Psychology, 103*(1), 91-96.

Nelson, D. L., & Reed, V. S. (1976). On the nature of pictorial encoding: A levels-of-processing. *Journal of Experimental Psychology: Human Learning and Memory, 2*(1), 49-57.

Nelson, D. L., Reed, V. S., & McEvoy, C. L. (1977). Encoding strategy and sensory and semantic interference. *Memory and Cognition, 5*(4), 462-67.

Nelson, D. L., Reed, V. S., & Walling, J. R. (1976). Pictorial superiority effect. *Journal of Experimental Psychology: Human Learning & Memory, 2*(5), 523-528.

Nelson, K. E. (1977). The syntagmatic-paradigmatic shift revisited: A review of research and theory. *Psychological Bulletin, 84*(1), 93-116.

Nelson, K. E., & Kosslyn, S. M. (1976). Recognition of previously labeled or unlabeled pictures by 5-year-olds and adults. *Journal of Experimental Child Psychology, 21*(1), 40-45.

Nemati, A. (2009). Memory vocabulary learning strategies and long-term retention. *International Journal of Vocational and Technical Education, 1*(2), 14-24.

Neubach, A., & Cohen, A. D. (1988). Processing strategies and problems encountered in the use of dictionaries. *Dictionaries: Journal of the Dictionary Society of North America,*

10(1), 1-19.

Neuman, W. L. (2000). *Social research methods: Qualitative and quantitative approaches* (4th ed.). Allyn and Bacon.

Neuman, S. B. (2006). Building vocabulary to build literacy. *Scholastic Early Childhood Toda*y, *21*(2), 9-13.

Neuman, S. B., & Kaefer, T. (2018). Developing low-income children's vocabulary and content knowledge through a shared book reading program. *Contemporary Educational Psychology, 52*(1), 15-24.

Neuman, S. B., & Wright, T. S. (2014). The magic of words: Teaching vocabulary in the early childhood classroom. *American Educator, 38*(2), 4-11.

Newman, I., & Benz, C. R. (1998). *Qualitative-quantitative research methodology: Exploring the interactive continuum*. Southern Illinois University Press.

Nikolova, O. R. (2002). Effects of students' participation in authoring of multimedia materials on student acquisition of vocabulary. *Language Learning & Technology, 6*(1), 100-122.

Nilsen, A. P., & Nilsen, D. L. F. (2003). A new spin on teaching vocabulary: A source-based approach. *The Reading Teacher, 56*(5), 436-439.

Noor, A. N. A. R., & Melor, M. Y. (2016). Using action songs in teaching action words to young ESL learners. *International Journal of Language Education and Applied Linguistic,4* (1), 15-24.

Noor, A. N. A. R. (2019, May 25). Edunation: English language proficiency still an urgent matter. *The Edge Malaysia*. https://www.theedgemarkets.com/article/edunation-english-language-proficiency-still-urgent-matter

Noorizah, M. N., & Zaini, A. (2009, May). *Exploring the vocabulary learning strategies of*

EFL learners [Paper presentation]. Seventh International Conference, Language and Culture: Creating and Fostering Global Communities, Universiti Kebangsaan Malaysia.

Nor, H. M., Maslawati, M., Melor, M. Y., & Azizah, Y. (2017). Identifying the factors contributing to students' difficulties in the English language learning. *Creative Education, 8*(13), 1999-2008.

Norazman, A. M., Faruk, M., Fatimah, P., & Ghazali, B. (2004, August). *Instilling interest in English among primary school students in rural community* [Paper presentation]. First International Language Conference (ILLC) 2004, Penang, Malaysia.

Norris, N. (1993). Evaluation, economics and performance indicators. In J. Elliott (Ed.), *Reconstructing Teacher Education* (pp. 31-38). Falmer Press.

Nunan, D. (1991). *Language Teaching Methodology: A Textbook for Teacher.* Prentice Hall.

Nunan, D. (2003). The impact of English as a global language on educational policies and practices in the Asia-Pacific region. *TESOL Quarterly 37*(4), 589-613.

Nunan, D. 2004. *Task-based language teaching* (1st ed.). Cambridge University Press.

Nurani, S., & Rosyada, A. (2017). Implemented PWIM in developing students' communicative competence of SMK Islam Wijaya Kusuma Jakarta. *Lingua Cultura, 11*(1), 25-30.

Nurul, A. R. A. (2006). *Using whole word approach to teach reading to form one students with reading difficulties in a selected rural secondary school in Samarahan District of Sarawak* [Unpublished master's thesis]. Universiti Teknologi Malaysia.

O'Grady, W. (1997). *Contemporary linguistics: An introduction.* Bedford.

O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition*. Cambridge University Press.

Ong, P. L., Sivapalan, S., Badariah, S., Marsitah, M. R., Shazli, A. H., & Ong, P. H. (2013). Tracking the pathways of education in Malaysia: Roots and routes. *Asian Social Science 9*(10), 93-104.

Onwuegbuzie, A. J., & Collins, K. M. T. (2007). A typology of mixed methods sampling designs in social science research. *The Qualitative Report*, *12*(2), 281-316.

Oppenheim, A. M. (1992). *Questionnaire design, interviewing and attitude measurement*. Pinter Publishers Ltd.

Owen, N., Fox, A., & Bird, T. (2016). The development of a small scale survey instrument of UK teachers to study professional use (and non-use) of and attitudes to social media. *International Journal of Research and method in Education, 39*(2), 170-193.

Oxford, R. (1990). *Language learning strategies*. Heinle & Heinle.

Oxford, R., & Burry-Stock, J. A. (1995). Assessing the use of language learning strategies worldwide with the ESL/EFL version of the strategy inventory for language learning (SILL). *System*, *23*(1), 1-23.

Oxford, R., & Crookall, D. (1990). Vocabulary learning: A critical analysis of techniques. *TESL Canada Journal, 7*(2), 9-30.

Oya, T., Monalo, E., & Greenwood, J. (2009). The influence of language contact and vocabulary knowledge on the speaking performance of Japanese students of English. *The Open Applied Linguistics Journal*, *2*(1), 11-21.

O'Donoghue, T., & Punch, K. (2003). *Qualitative educational research in action: Doing and reflecting*. Routledge.

Paivio, A. D. (1971). *Imagery and verbal processes.* Holt, Rinehart, & Winston.

Paivio, A. D. (1978). A dual coding approach to perception and cognition. In H. L. Pick, & E. Saltzman (Eds.), *Modes of perceiving and processing information* (pp. 39-51).

Erlbaum.

Paivio, A. D. (1986). *Mental representations.* Oxford University Press.

Paivio, A. D. (1990). *Mental representations: A dual coding approach* (2nd ed.). Oxford University Press.

Paivio, A. D. (1991a). *Images in the mind: The evolution of a theory.* Harvester Wheatsheaf.

Paivio, A. D. (1991b). Dual coding theory: Retrospect and current status. *Canadian Journal of Psychology, 45*(3), 255-287.

Paivio, A. D. (1995). Imagery and memory. In M. S. Gazzaniga (Ed.), *The cognitive neurosciences* (pp. 977-986). MIT Press.

Paivio, A. D., & Begg, I. (1981). *Psychology of language.* Prentice Hall.

Pandian, A. (1999). *Global literacy: Vision, revisions, and vistas in education*. Universiti Putra Malaysia Press.

Pandian, A. (2003). *English language teaching and literacy: Research and reflections*. Universiti Putra Malaysia Press.

Pandian, A., & Narusuman, S. (2003). Teachers perceptions and use of computer technology in education. In P. Ambigapathy, G. Chakravarthy, & S. Che Lah (Eds.), *English Language Teaching and Literacy: Reseach and Reflections* (pp. 187-198). Universiti Putra Malaysia Press.

Paribakht, T. S., & Wesche, M. (1997). Vocabulary enhancement activities and reading for meaning in second language vocabulary acquisition. In J. Coady, & T. Huckin (Eds.), *Second language vocabulary acquisition: A rationale for pedagogy* (pp. 174-199). Cambridge University Press.

Parry, K. (1991). Building a vocabulary through academic reading. *TESOL Quarterly, 25*(4), 629-653.

Parry, K. (1993). Too many words: Learning the vocabulary of an academic subject. In T. Huckin, M. Haynes, & J. Coady (Eds.), *Second language reading and vocabulary learning* (pp. 109-129). Ablex.

Parry, K. (1997). Vocabulary and comprehension: Two portraits. In J. Coady, & T. Huckin (Eds.), *Second language vocabulary acquisition: A rationale for pedagogy* (pp. 55-68). Cambridge University Press.

Patton, M. Q. (1980). *Qualitative evaluation methods* (3rd ed.). Sage.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Sage.

Patton, M. Q. (2002*). Qualitative research and evaluation methods* (3rd ed.). Sage.

Paul, P. V., Stallman, A. C., & O'Rourke, J. P. (1990). *Using three test formats to assess good and poor readers' word knowledge*. University of Illinois Press.

Pearson, D. P., Hiebert, E. H., & Kamil, M. L. (2007). Vocabulary assessment: What we know and what we need to learn. *Reading Research Quarterly, 42*(2), 188-323.

Pellicer-Sánchez, A., & Schmitt, N. (2012). Scoring Yes–No vocabulary tests: Reaction time vs. nonword approaches. *Language Testing*, *29*(4), 489-509.

Penny, U. R. (2000). *A Course in language teaching: Practice and theory*. Cambridge University Press.

Perkins, K., & Linville, S. E. (1987). A construct definition study of a standardized ESL vocabulary test. *Language Testing, 4(*2), 125-141.

Phellas, C., Bloch, A., & Seale, C. (2011). Structured methods: Interviews, questionnaires and observations. In C. Seale (Ed.), *Researching society and culture* (pp. 181-205). Sage.

Phillips, M. (2016). The effects of visual *vocabulary* strategies on vocabulary knowledge. *Theses, Dissertations and Capstones*, *98*(7), 1-31.

Pigada, M., & Schmitt, N. (2006). Vocabulary acquisition from extensive reading: A case study. *Reading in a Foreign Language, 18*(1), 1-28.

Pikulski, J. J., & Templeton, S. (2004). *Teaching and developing vocabulary: Key to long-term reading success*. http://www.eduplace.com/marketing/nc/pdf/author pages. pdf

Pillay, H. (1995). *Fragments of a vision: A case study of the implementation of an English language curriculum programme in five Malaysian secondary schools.* [Unpublished doctoral dissertation]. University of East Anglia, Norwich.

Pimsleur, P. (1967). A memory schedule. *The Modern Language Journal, 51*(2), 73-75.

PM Launches Bold Education Blueprint for Excellence. (2012, September 12). *The Star Online.* http://thestar. com.my/news /stor y.asp? sec= nation&file=/2012/9/ 12/nation/12011807

Polit, D. F., & Beck, C. T. (2004). *Nursing research: Principles and methods* (7th ed.). Lippincott Williams & Wilkins.

Poorman, P. B. (2002). Perceptions of thriving by women who have experienced abuse or status-related oppression. *Psychology of Women Quarterly, 26*(1), 51-62.

Potter, M. C., & Faulconer, B. A. (1975). Time to understand pictures and words.*Nature, 253*(5491), 437-438.

Pressley, M. (2001). *Comprehension instruction: What makes sense now, what might make sense soon. Reading Online: Handbook of reading research, Volume III*. Erlbaum.

Pressley, M., Levin, J. R., & Miller, G. E. (1982). The keyword method compared to alternative vocabulary learning strategies. *Contemporary Educational Psychology, 7*(1), 50-60.

Prichard, C., & Matsumoto, Y. (2011). The effect of lexical coverage and dictionary use on L2 reading comprehension. *The Reading Matrix, 11*(3), 207-225.

Primsleur, P. (1967). A memory schedule. *Modern Language Journal, 51*(2), 73-75.

Privitera, G. J. (2012). *Statistics for the behavioral sciences*. Thousand Oaks, CA: Sage.

Proctor, C. P., Carlo, M. S., August, D., Snow, C. E. (2005). Native Spanish-speaking children reading in English: Toward a model of comprehension. *Journal of Educational Psychology, 97*(2), 246-256.

Proctor, C. P., Silverman, R. D., Harring, J. R., & Montecillo, C. (2012). The role of vocabulary depth in predicting reading comprehension among English monolingual and Spanish–English bilingual children in elementary school. *Reading and Writing, 25*(7), 1635-1664.

Prusty, A. (2006). *Effectiveness of Inductive Thinking Model of Teaching on Learner's Achievement in Social Studies* [Unpublished doctoral dissertation]. Utkal University.

Push to Do Much Better. (2012, September, 12). *The Star.* Star Special, p. 2.

Putri, R. E. (2013).Teaching vocabulary through combining Picture Word Inductive Model and mnemonic strategy for elementary school. *Jurnal Mahasiswa Prodi Pendidikan Bahasa Inggris, 2*(1), 91-121.

Qian, D. D. (1996). ESL vocabulary acquisition: Contextualization and decontextualization. *The Canadian Modern Language Review, 53*(1), 120-142.

Qian, D. D. (1998). *Depth of vocabulary knowledge: Assessing its role in adults' reading comprehension in English as a second language* [Unpublished doctoral dissertation]. University of Toronto.

Qian, D. D. (1999). Assessing the roles of depth and breadth of vocabulary knowledge in reading comprehension. *The Canadian Modern Language Review, 56*(2), 282-307.

Qian, D. D. (2002). Investigating the relationship between vocabulary knowledge and academic reading performance: An assessment perspective. *Language Learning,*

52(3), 513-536.

Quillian, M. R. (1962). A revised design for an understanding machine. *Mechanical Translation, 7*(1), 17-29.

Quillian, M. R. (1967).Word concepts: a theory and simulation of some basic semantic capabilities. *Behavioral Science, 12*(5), 410-430.

Raaijmakers, J. G. W., & Shiffrin, R. M. (2003). Models versus descriptions: Real differences and language differences. *Behavioral and Brain Sciences, 26*(6), 753.

Rabbany, R., Elatia, S., Takaffoli, M., & Zaïane, O.R. (2013). Collaborative learning of students in online discussion forums: A social network analysis perspective. In A. Peña-Ayala (Ed.), *Educational data mining: Applications and trends* (pp.1-30). Springer.

Radzuwan, A. R. (2011). Vocabulary learning among less proficient young adults using children's stories. *MEXTESOL Journal, 35*(1), 1-11.

Rajwinder, K. (2018). To study the effectiveness of concept attainment model of teaching on achievement of secondary school students in chemistry. *Scholarly Research Journal for Humanity Science & English Language, 5*(25), 6858-6863.

Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist, 53*(2), 109-120.

Ramey, C. T., & Ramey, S. L. (2002, April 30). *Early childhood education: From efficacy research to improved practice* [Paper presentation]. Early Childhood Cognitive Development: Ready to Read, Ready to Learn: A Call to Leadership, Little Rock, Arkansas.

Ramey, C. T., & Ramey, S. L. (2004). Early learning and school readiness: can early intervention make a difference? *Merrill-Palmer Quarterly, 50*(4), 471-491.

Ramey, C. T., Ramey, S. L., Gaines, R., & Blair, C. (1995). Two-generation early interventions: A child development perspective. In I. Siegel (Series ed.) and S. Smith (Vol. ed.). *Two-generation programs: A new intervention strategy. Advances in Applied Development Psychology* (vol. 9, pp. 199-228). Ablex Publishing Corporation.

Ramey, S. L., & Ramey, C. T. (1999a). *Going to school: How to help your child succeed*. Goddard Press.

Ramey, C. T., & Ramey, S. L. (1999b). *Right from birth: Building your child's foundation for life.* Goddard Press.

Ramey, S. L., & Ramey, C. T. (2000). Early childhood experiences and developmental competence. In J. Waldfogel, & S. Danziger (Eds.), *Securing the future: Investing in children from birth to college* (pp. 122–150). Sage Foundation.

Ramey, C. T., Yeates, K. O., & Short, E. J. (1984). The plasticity of intellectual development: Insights from preventive intervention. *Child Development, 55*(5), 191-192.

Raptis, H. (1997). Is second language reading vocabulary best learned by reading? *The Canadian Modern Language Review, 53*(3), 566-580.

Read, J. (1988). Measuring the vocabulary knowledge of second language learners. *RELC Journal, 19*(2), 12-25.

Read, J. (1989, August). *Towards a deeper assessment of vocabulary knowledge* [Paper presentation]. 8th World Congress of Applied Linguistics, Sydney, Australia.

Read, J. (1993). The development of a new measure of L2 vocabulary knowledge. *Language Testing 10*(3), 355-371.

Read, J. (1998). Validating a test to measure depth of vocabulary knowledge. In A. Kunnan

(Ed.), *Validation in language assessment* (pp. 41-60). Lawrence Erlbaum.

Read, J. (2000). *Assessing vocabulary.* Cambridge University Press.

Read, J. (2004). Plumbing the depths: How should the construct of vocabulary knowledge be defined? In P. Bogaards, & B. Laufer (Eds.), *Vocabulary in a second language: Selection, acquisition, and testing* (pp.209-227). John Benjamins Publishing Company.

Readence, J. E., & Moore, D. W. (1981). A meta-analytic review of the effect of adjunct pictures on reading comprehension. *Psychology in the Schools, 18*(2), 218-224.

Remler, D. K., & Van Ryzin, G. G. (2011). *Research methods in practice: Strategies for description and causation*. Sage.

Renner, J., Stafford, D., Lawson, A., McKinnon, J., Friot, E., & Kellogg, D. (1976). *Research, teaching, and learning with the Piaget model.* University of Oklahoma Press.

Revesz, A., Sachs, R., & Mackey, A. (2011). Task complexity, uptake of recasts, and L2 development. In P. Robinson (Ed.), *Second language task complexity: Researching the cognition hypothesis of language learning and performance* (pp. 203-237). John Benjamins.

Richards, J. C. (1976). The role of vocabulary teaching. *TESOL Quarterly 10*(1), 77-89.

Richards, J. C., & Rodgers, T. S. (1986). *Approaches and methods in language teaching: A description and analysis.* Cambridge University Press.

Richardson-Klavehn, A., & Bjork, R. A. (1988). Measures of memory. *Annual Review of Psychology, 39*(1), 475-543.

Riding, R. J., & Douglas, G. (1993). The effect of cognitive style and mode of presentation on learning performance. *British Journal of Educational Psychology, 63*(2), 297-

307.

Rimbey, M., McKeown, M., Beck, I., & Sandora, C. (2016). Supporting teachers to implement contextualized and interactive vocabulary instruction. *Journal of Education, 196*(2), 69-87.

Rivers, W. M. (1983). *Speaking in many tongues* (3rd ed.). Cambridge University Press.

Roediger, H. L. (1990). Implicit memory: Retention without remembering. *American Psychologist, 45*(9), 1043-1056.

Roediger, H. L., & Blaxton, T. A. (1987). Effects of varying modality, surface features, and retention interval on priming in word fragment completion. *Memory & Cognition, 15*(5), 379-388.

Roediger, H. L., & McDermott, K. B. (1993). Implicit memory in normal human subjects. In H. Spinnler & F. Boller (Eds.), *Handbook of neuropsychology* (pp. 63-131). Elsevier.

Roediger, H. L., & Weldon, M. S. (1987). Reversing the picture superiority effect. In M. A. McDaniel, & M. Pressley (Eds.), *Imagery and related mnemonic processes* (pp. 151-174). Springer.

Roediger, H. L., Srinivas, K., & Weldon, M. S. (1989). Dissociations between implicit measures of retention. In S. Lewandowsky, J. C. Dunn, & K. Kirsner (Eds.), *Implicit memory: Theoretical issues* (pp. 67-84). Erlbaum.

Roediger, H. L., Weldon, M. S., & Challis, B. H. (1989). Explaining dissociations between implicit and explicit measures of retention: A processing account. In H. L. Roediger III, & F. I. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honour of Endel Tulving* (pp. 3-41). Erlbaum.

Roitblat, B., & Laufer, B. (2008, September 10-13). *Long-term retention of new words:*

Number of encounters or type of encounters? [Paper presentation]. EUROSLA 18, in Aix-en-Provence, France.

Roselli, N. (2016). Collaborative learning: Theoretical foundations and applicable strategies to university. *Propósitos y Representaciones, 4*(1), 219-280.

Rosszell, H. R. (2007). *Extensive reading and intensive vocabulary study in a Japanese university* [Unpublished doctoral dissertation]. Temple University.

Roth, F. P., Speece, D. L., & Cooper, D. H. (2002). A longitudinal analysis of the connection between oral language and early reading. *The Journal of Educational Research, 95*(5), 259-272.

Rowe, M. L., Raudenbush, S. W., & Goldin-Meadow, S. (2012). The pace of vocabulary growth helps predict later vocabulary size. *Child Development, 83*(2), 508-525.

Rudner, M. (1977). Education, development and change in Malaysia. *South East Asian Studies, 15*(1), 23-62.

Rumelhart, D., & McClelland, J. (Eds.). (1986). *Parallel distributed processing: Explorations in the microstructure of cognition.* MIT Press.

Rusted, J., & Coltheart, V. (1979). The effect of pictures on the retention of novel words and prose passages. *Journal of Experimental Psychology, 28*(3), 516-524.

Ryan, R. L. (1993). *Using pictures in teaching art and other stuff*. http://www.mun.ca/educ/faculty/mwatch/vol2/ryan2.html

Sacks, O. (2007). The Abyss: Music and amnesia. *The New Yorker,*100-111.

Sadoski, M. (2005). A dual coding view of vocabulary learning. *Reading and Writing Quarterly, 21*(3), 221-238.

Sadoski, M., & Paivio, A. (2012). *Imagery and text: A dual coding theory of reading and writing* (2nd ed.). Routledge.

Samuel, R., & Bakar, Z. (2008). The effectiveness of 'VELT' in promoting English language communication skills: A case study in Malaysia. *International Journal of Education and Development Using ICT, 4*(3), 109-126.

Samuels, S. J. (1970). Effects of pictures on learning to read, comprehension and attitudes. *Review of Educational Research, 40*(3), 397-407.

Saskatchewan Reads (n.d.). *PWIM. In Saskatchewan Reads: A companion document to the Saskatchewan English language arts curriculum-Grades 1, 2, 3*. https://saskatchewanreads.wordpress.com/acknowledgements

Saskatoon Public Schools (n.d.). *Inspiring learning*. http://www. spsd.sk.ca/division/priorities/literacyforlife.html

Satterthwaite, F. E. (1946). An approximate distribution of estimates of variance components. *Biometrics Bulletin, 2*(6), 110-114.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students.* Pearson Education Ltd., Harlow.

Savignon, S., & Berns, M. S. (1984). *Initiatives in communicative language teaching*. Addison-Wesley.

Saville-Trroike, M. (1984). What really matters in second language learning for academic achievement? *TESOL Quarterly, 18*(2), 199-219.

Scarborough, H. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. B. Neuman, & D. Dickinson (Eds.), *Handbook of early literacy research* (pp. 97-110). Guilford Press.

Schacter, D. L. (1987). Implicit memory: History and status. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 13*(3), 501-518.

Schacter, D. L., & Graf, P. (1986). Effects of elaborative processing on implicit and explicit

memory for new associations. *Journal of Experimental Psychology: Learning. Memory. & Cognition, 12*(3), 432-444.

Schacter, D. L., Wagner, A. D., & Buckner, R. L. (2000). Memory systems of 1999. In E. Tulving, & F. I. M. Craik (Eds.), *Handbook of memory* (pp.627-643). Oxford University Press.

Scheurich, J. J. (1995). A postmodernist critique of research interviewing. *Qualitative Studies in Education, 8*(3), 239-252.

Schmitt, M. C., & Gregory, A. E. (2005). The impact of an early literacy intervention: Where are the children now*? Literacy Teaching and Learning: An International Journal of Early Reading and Writing, 10*(1), 1-20.

Schmitt, N. (1995). A fresh approach to vocabulary: Using a word knowledge framework. *RELC Journal, 26*(1), 86-94.

Schmitt, N. (2000). *Vocabulary in language learning*. Cambridge University Press.

Schmitt, N. (2008). *Teaching vocabulary*. Pearson Education.

Schmitt, N. (2014). Size and depth of vocabulary knowledge: What the research shows. *Language Learning, 64*(4), 913-951.

Schmitt, N., & Meara, P. (1997). Researching vocabulary through a word knowledge framework: Word associations and verbal suffixes. *Studies in Second Language Acquisition, 19*(1), 17-36.

Schmitt, N., & Schmitt, D. (1995). Vocabulary notebooks: Theoretical underpinnings and practical suggestions. *English Language Teaching Journal, 49*(2), 133-143.

Schmitt, N., Ng, J. W. C., & Garras, J. (2011). The Word Associates Formats: Validation evidence. *Language Testing, 28*(1), 105-126.

Schonell, F., Meddleton, I., Shaw, B., Routh, M., Popham, D., Gill, G., & Stephens, C.

(1956). *A study of the oral vocabulary of adults.* University of Queensland Press.

Schoonen, R., & Verhallen, M. (2008). The assessment of deep word knowledge in young first and second language learners. *Language Testing, 25*(2), 211-236.

Schuessler, J. H. (2017). Chunking semester projects: Does it enhance student learning? *Journal of Higher Education Theory and Practice, 17*(7), 115-120.

Schütz, R. (2007). *Stephen Krashen's theory of second language acquisition.* http://www.sk.com.br/sk-krash.html

Schwab, J. (1965). *Biological sciences curriculum study: Biology teachers' hand-book.* John Wiley.

Scott, W. A., & Ytreberg, L. H. (1995). *Teaching English to children*. Pearson Education Limited.

SeeToh, H. C. (2005). *A comparative study of the effectiveness of electronic glossary and printed textual glossary in L2 vocabulary learning* [Unpublished master's thesis]. Universiti Sains Malaysia.

Seffar, S. (2015). The effect of vocabulary knowledge on EFL oral competence. *Journal of Research & Method in Education, 5*(6), 8-13.

Sepp, S., Howard, S. J., Tindall-Ford, S., Agostinho, S., & Paas, F. (2019). Cognitive load theory and human movement: Towards an integrated model of working memory. *Educational Psychology Review, 31* (2), 293-317.

Segler, T. A. (2001). *Second language vocabulary acquisition and learning strategies in ICALL environments* [Unpublished doctoral dissertation]. University of UniK.

Sellitz, C., Wrightsman, L. S., & Cook, S. W. (1976). *Research methods in social relations*. Holt, Rinehart & Winston.

Seymour, R. H. K. (1973). A model for reading, naming and comparison. *British Journal*

of Psychology, 64(1), 35-49.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized casual inference*. Houghton Mifflin Co.

Shallice, T., & Warrington, E. K. (1970). Independent functioning of verbal memory stores: A neuropsychological study. *The Quarterly Journal of Experimental Psychology, 22*(2), 261-273.

Sharimllah, R., & Abdul Rahim, H. (2004). Meaning recall and retention: The impact of the translation method on elementary level learners' vocabulary learning. *Regional Language Centre Journal, 35*(2), 161-178.

Shepard, R. N. (1967). Recognition memory for words, sentences, and pictures. *Journal of Verbal Learning and Verbal Behavior, 6*(1), 156-163.

Shillaw, J. (1996). *The application of Rasch modelling to Yes-No vocabulary tests*. Vocabulary Acquisition Research Group, University of Wales Swansea.

Shirazi, R. R., Account, A., & Simin, S. (2016). Effect of pedagogical movie English subtitles on EFL learner's vocabulary improvement. *International Journal of Research Studies in Language Learning, 5*(2), 47-56.

Silitonga, E., & Tjut, E. (2013). Improving students' writing recount achievement through Picture Word Inductive Model (PWIM). *Transform Journal of English Language Teaching and Learning of FBS UNIMED*, *2*(1), 1-10.

Silverman, R. D. (1993). *Interpreting qualitative data*. Sage.

Silverman, R. D., & Crandall, J. D. (2010). Vocabulary practices in prekindergarten and kindergarten classes. *Reading Research Quarterly, 45*(3), 318-340.

Silverman, R. D., & Hartranft, A. M. (2015). *Developing vocabulary and oral language in young children.* Guilford Press.

Simons, H. (1982). Conversation piece: the practise of interviewing in case study research. In R. McCormick (Ed.), *Calling education to account* (pp. 239-246). Heinemann.

Sims, V. M. (1929). The reliability and validity of four types of vocabulary test. *Journal of Educational Research, 20*(2), 91-96.

Siti, A. Y. (2016). *The effectiveness of Picture Word Inductive Model (PWIM) on students' ability in writing recount text* [Unpublished final year project]. Syarif Hidayatullah State Islamic University.

Sivabalan, K. (2013). *Influence of using songs and dictionary in teaching vocabulary*. http://www.fp.utm.my/ePusatSumber/pdffail/ptkghdfwP2/KasturiAPSivabalan.TP.pdf

Sivapalan, S., Ong, P. L., Marsitah, M. R., Ong, P. H., Ong, P. T., & Badariah, S. (2015). Debating education for nation building in Malaysia: National school persistence or vernacular school resistance? *GEOGRAFIA Online Malaysian Journal of Society and Space, 11*(13), 14-23.

Skehan, P. (2009). Modelling second language performance: Integrating complexity, accuracy, fluency, and lexis. *Applied Linguistics*, *30*(4), 510-532.

Skinner, B. F. (1957). *Verbal behavior*. *Action*, Copley Publishing Group.

Skinner, B. F. (1968). *The technology of teaching.* Meredith Corporation.

Slattery, M., & Willis, J. (2001). *English for primary teachers: A handbook for activities and classroom language.* Oxford University Press.

Smith, E. E., Shoben, E. J., & Rips, L. J. (1974). Structure and process in semantic memory: A featural model for semantic decisions. *Psychological Review*, *81*(3), 214-241.

Snodgrass, J. G., Wasser, B., Finkelstein, M., & Goldberg, L. B. (1974). On the fate of visual and verbal memory codes for pictures and words: Evidence for a dual coding

mechanism in recognition memory. *Journal of Verbal Learning & Verbal Behavior, 13*(1), 27-37.

Snow, C. E. (1999). *Facilitating language development promotes literacy learning. effective early education: Cross cultural perspectives.* Falmer Press.

Snow, C. E. (2002). *Reading for understanding: Towards an R&D program in reading comprehension*. RAND Press.

Snow, C. E., Barnes, W. S., Chandler, J., Goodman, I. F., & Hemphill, L. (2000). *Unfilled expectations: Home and school influences on literacy.* Harvard University Press.

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. National Academy Press.

Snow, C. E., & Ferguson, C. (1977). *Talking to Children: Language input and acquisition.* Cambridge University Press.

Sperling, G. (1963). A model for visual memory tasks. *Human Factors, 5*(1), 19-31.

Srinivas, K. (1996). Contrast and illumination effects on explicit and implicit measures of memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 22*(5), 1123-1135.

St. John, P., & Vance, M. (2014). Evaluation of a principled approach to vocabulary learning in mainstream classes. *Child Language Teaching and Therapy, 30*(3), 255-271.

Stæhr, L. S. (2007). *The relationship between vocabulary knowledge and listening comprehension in English as a foreign language*. Copenhagen Business School.

Stæhr, L. S. (2008). Vocabulary size and the skills of listening, reading and writing. *Language Learning Journal, 36*(2), 139-152.

Stæhr, L. S. (2009). Vocabulary knowledge and advanced listening comprehension in English as a foreign language. *Studies in Second Language Acquisition, 31*(4), 577-

607.

Stahl, S. A. (2005). Four problems with teaching word meanings (and what to do to make vocabulary an integral part of instruction). In E. H. Hiebert, & M. L. Kamil (Eds.), *Teaching and learning vocabulary: Bringing research to practice*. Erlbaum.

Stahl, S., & Fairbanks, M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research, 56*(1), 72-110.

Stahl, S., & Nagy, W. E. (2006). *Teaching word meanings.* Lawrence Erlbaum.

Standing, L. (1973). Learning 10,000 pictures. *Quarterly Journal of Experimental Psychology, 25*(2), 207-222.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*(4), 360-407.

Stanovich, K. E., Cunningham, A. E., & West, R. F. (1998). Literacy experiences and the shaping of cognition. In S. G. Paris & H. M. Wellman (Eds.), *Global prospects for education: Development, culture, and schooling* (pp. 253-288). American Psychological Association.

Stern, H. H. (1992). *Issues and options in language teaching*. Oxford University Press.

Stenberg, G. (2006). Conceptual and perceptual factors in the picture superiority effect. *European Journal of Cognitive Psychology*, *18*(6), 813-847.

Stinson, M. (2008). Process drama and teaching English to speakers of other languages. In M. Anderson, J. Hughes, & J. Manuel (Eds.), *Drama and English teaching: Imagination, action and engagement* (pp. 193-213). Oxford University Press.

Stinson, M., & Freebody, K. (2006). The DOL project: an investigation into the contribution of process drama to improved results in English oral communication. *Youth Theatre*

Journal, 20(1), 27-41.

Strange, V., Forest, S., Oakley, A., & The Ripple Study Team (2003). Using research questionnaires with young people in schools: the influence of social context. *International Journal of Social Research Methodology, 6*(4), 337-346.

Su, M., Thiebaut de Schotten, M., Zhao, J., Song, S., Zhou, W., Gong, G., McBride, C., & Ramus, F. (2018). Vocabulary growth rate from preschool to school-age years is reflected in the connectivity of the arcuate fasciculus in 14-year-old children. *Developmental Science, 21*(5), 1-14.

Subon, F. (2016). Direct vocabulary instruction: The effects of contextualized word families on learners' vocabulary acquisition. *Procedia - Social and Behavioral Sciences, 224*(1), 284-291.

Suk, N. (2017). The effects of extensive reading on reading comprehension, reading rate, and vocabulary acquisition. *Reading Research Quarterly, 52*(1), 73-89.

Sullivan, G. M. (2011). Getting off the "Gold Standard": Randomized controlled trials and education research. *The Journal of Graduate Medical Education, 3*(3), 285-289.

Sulzby, E. (1985). Kindergartners as writers and readers. In M. Farr (Ed.), *Advances in writing research: Children's early writing development* (pp. 127-199). Ablex.

Sulzby, E., Buhl, R., & Kaiser, E. (1999). *Kindergarten Literature Program (KLP): Supporting staff development (Videotape and print series).* Comprehensive Regional Assistance Center, Region VI.

Sutarsyah, C., Nation, P., & Kennedy, G. (1994). How useful is EAP vocabulary for ESP? A corpus based case study. *RELC Journal, 25*(2), 34-50.

Suthers, D. (1996). *Attention and automaticity*. University of Pittsburg Press.

Swan, M. (1985). A critical look the communicative approach (2). *ELT Journal,39*(2), 76-

87.

Swartzendruber, K. L. (2007). *The Picture Word Inductive Model and vocabulary Acquisition* [Unpublished master's thesis]. Wichita State University.

Sweeny, S. M., & Mason, P. A. (2011). *Research-based practices* in *vocabulary instruction*: An *analysis of what works in grades PreK-12* [Paper presentation]. Studies & Research Committee, Massachusetts Reading Association.

Taba, H. (1966). *Teaching strategies and cognitive functioning in elementary school children.* San Francisco State College.

Takiguchi, H. (2003). *A study of the development of speaking skills within the framework of fluency, accuracy and complexity among Japanese EFL junior high school students* [Unpublished master's thesis]. Joetsu University of Education.

Takona, J. P. (2002). *Educational research: Principles and practice*. iUniverse-Barnes & Noble.

Talif, R., & Edwin, M. (2001). *A comparative study of the achievement and the proficiency levels in English as a second language among learners in selected rural and urban schools in Peninsular Malaysia* [Paper presentation]. MELTA Home.

Tan, D. A. L. (2016). *Investigating guided extensive reading and vocabulary knowledge performance among remedial ESL learners in a public university in Malaysia* [Unpublished doctoral dissertation]. Universiti Sains Malaysia.

Tan, D. A. L., Lee, B. C., Ganapathy, M., & Shaidatul Akma, A. K. (2019). Language Learning in the 21st Century: Malaysian ESL Students' Perceptions of *Kahoot!*. *International Journal of Virtual & Personal Learning Environments, Special Issue, 9*(2), 55-71.

Tannenbaum, K. R., Torgesen, J. K., & Wagner, R. K. (2006). Relationships between word

knowledge and reading comprehension in third-grade children. *Scientific Studies of Reading, 10*(4), 381-398.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research.* Sage.

Taylor, B. P. (1987). Teaching ESL: Incorporating a communicative, student-centered component. In M. H. Long & J. C. Richards (Eds.), *Methodology in TESOL: A book of readings* (pp. 45-60). Newbury House Publishers.

Teale, W. H., & Sulzby, E. (1986). Emergent literacy as a perspective for examining how young children become readers and writers. In W. H. Teale & E. Sulzby (Eds.), *Emergent literacy: Writing and reading* (pp. vii-xxv). Ablex Publishing.

Teddlie, C., & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of Mixed Methods Research, 1*(1), 77-100.

Teh, C. S. (2004). How alienated are our students in the ESL class? In Jayakaran Mukundan, Dzeelfa Zainal Abidin & Anealka Aziz Hussin (Eds.), *ELT matters 1: Issues in English language learning and teaching* (pp. 255-260). Universiti Putra Malaysia Press.

Tennyson, R. D., & Cocchiarella, M. (1986). An empirically based instructional theory for teaching concepts. *Review of Educational Research, 56*(1), 40-71.

Thornbury, S. (2004). *How to teach vocabulary.* Pearson Education Limited.

Thorndike, E. L., & Lorge, I. (1944). *The teacher's word book of 30,000 words.* Teachers College, Columbia University.

Thurmond, V. (2001). The point of triangulation. *Journal of Nursing Scholarship, 33*(3), 254-256.

Tilley, H. C. (1936). A technique for determining the relative difficulty of word meanings

among elementary school children. *Journal of Experimental Education, 5*(1), 61-64.

Tinkham, T. (1993). The effect of semantic clustering on the learning of second language vocabulary. *System, 21*(3), 371-380.

Topsakal, U. U., & Oversby, J. (2012) Turkish student teachers' ideas about diagrams of a flower and a plant cell. *Journal of Biological Education, 46*(2), 81-92.

Totsika, V., & Sylva, K. (2004). The home observation for measurement of the environment revisited. *Child and Adolescent Mental Health, 9*(1), 25-35.

Toub, T. S., Hassinger-Das, B., M. F., Nesbitt, Ilgaz, H., Weisberg, D. S., Hirsh-Pasek, K., Golinkoff, R. M. , Nicolopoulou, A., & Dickinson, D. K. (2018). The language of play: Developing preschool vocabulary through play following shared book-reading. *Early Childhood research Quarterly, 45*(4), 1-17.

Trevarthen, C. (1993). Playing into reality: Conversations with the infant communicator. In *Winnicott Studies, Number 7* (Spring, pp. 67-84). Karnak Books.

Trevarthen, C. (1994). *Early education transformed.* Falmer Press.

Trochim, W. M. K. (2006). Research methods: Knowledge base (*Online Edition*). www.socialresearchmethods.net

Tsianos, N., Gemanakos, P., Lekkas, Z., Mourlas, C., & Samaras, G. (2009, July 15-17*). Eye tracking users' behavior in relation to cognitive style within an e-learning environment* [Paper presentation]. Conference: The 9th IEEE International Conference on Advanced Learning Technologies, Riga, Latvia.

Tuckman, B. W. (1972). *Conducting educational research*. Holt, Rinehart & Winston.

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving, & W. Donaldson (Eds.), *Organization and memory* (pp.382-402). Academic Press.

Tulving, E. (1979). Relation between encoding specificity and levels of processing. In L. S.

Cermak, & F. l. M. Craik (Eds.), *Levels of processing in human memory* (pp. 405-428). Erlbaum.

Tulving, E., & Thomson, D. M. (1973). Encoding specificity and retrieval processes in episodic memory. *Psychological Review, 80*(5), 359-380.

Tuluhong, T. (2006). *Vocabulary learning strategies of Malaysian Chinese ESL tertiary learners* [Unpublished master's thesis]. Universiti Putra Malaysia.

Turnbull, M. (2001). There is a role for the L1 in second and foreign language teaching but…1. *The Canadian Modern Language Review, 57*(4), 531-540.

Uberti, H. Z., Scruggs, T. E., & Mastropieri, M. A. (2003). Keywords make the difference! Mnemonic instruction in inclusive classrooms. *Teaching Exceptional Children, 35*(3), 56-61.

Uchihara, T., & Saito, K. (2016). Exploring the relationship between productive vocabulary knowledge and second language oral ability (*Online Edition*). *The Language Learning Journal, 47*(1), 64-75.

Vallar, G. (2006). Memory systems: the case of phonological short-term memory. A festschrift for cognitive neuropsychology. *Cogn Neuropsychol, 23*(1), 135-155.

VanPatten, B., & Benati, A. G. (2010). *Key terms in second language acquisition*. Continuum.

Van Teijlingen, E. (2014). *Semi-structured interviews*. BU Graduate School Press.

Varatharajoo, C. (2016). *The effectiveness of morphemic analysis instruction towards ESL students' vocabulary development* [Unpublished doctoral dissertation]. University of Malaya.

Vaz, S., Parsons, R., Passmore, A.E., Andreou, P., & Falkmer, T. (2013). Internal consistency, test-retest reliability and measurement error of the selfreport version of

the social skills rating system in a sample of Australian adolescents. *PLoS ONE, 9*(8), 1-8.

Veltre, M. T., Cho, W. K., & Neely, H. J. (2015) Transfer-appropriate processing in the testing effect. *Memory, 23*(8), 1229-1237

Verhallen, M. (1994). *Lexicale vaardigheden van Turkse en Nederlandse kinderen. Een vergelijkend onderzoek naar betekenistoekenning* [Unpublished doctoral dissertation]. University of Amsterdam.

Verhallen, M., & Schoonen, R. (1998). Lexical knowledge in L1 and L2 of third and fifth graders. *Applied Linguistics, 19*(4), 452-470.

Vermeer, A. (2001). Breadth and depth of vocabulary in rela-tion to L1/L2 acquisition and frequency of input. *Applied Psycholinguistics*, *22*(2), 217-234.

Vijayaletchumi, S. (2009). Learning vocabulary through image sketching among primary school children. *International Journal of Diversity in Organisations, Communities and Nations, 9*(2), 35-42.

Vijayaletchumy, S., Mohd Sahandri, G. H., Noor, A. D., Normaliza, A. R., Nik, R. N. A., & Abdul Rashid, D. M. (2009). Learning vocabulary through image-sketching among primary school children. *International Journal of Diversity in Organisations, Communities and Nations*, *9*(2), 35-42.

Vogt, W. P., & Johnson, R. B. (2011). *Dictionary of statistics & methodology: A nontechnical guide for the social sciences* (4th ed.). Sage.

Vygotsky, L. S. (1978). *Mind in society*: *The development of higher psychological processes*. Harvard University Press.

Vygotsky, L. S. (1986). *Thought and language*. MIT Press.

Vygotsky, L. S. (1997). *Interaction between learning and development.* W.H. Freeman and

Company.

Wagoner, B. (2015). Qualitative experiments in psychology: The case of Frederic Bartlett's methodology. *Forum: Qualitative Social Research, 16*(3), 14-23.

Wagner, R. K., Torgeson, J. K., Rashotte, C. A., Hecht, S. A., Barker, T. A., Burgess, S. R., Donahue, J., & Garon, T. (1997). Changing relations between phonological processing abilities and word-level reading as children develop from beginning to skilled readers: A 5-year longitudinal study. *Developmental Psychology, 33*(3), 468-479.

Walford, G. (2001). *Doing qualitative educational research: A personal guide to the research process*. Continuum.

Walford, K. (2007). Mentoring Teacher Candidates in an inductive literacy model. In C. Rolheiser (Ed.), *School/university partnerships: Transformation of teacher education,* (pp. 21-23). OISE/UT Teacher Education Program.

Wallace, M. (1988). *Teaching vocabulary.* University of Chicago Press.

Walsh, M. (2003). Reading' pictures: What do they reveal? Young children's reading of visual texts. *Reading Literacy and Language, 37*(3), 123-130.

Wanjari, S. S. (2005). *Effectiveness of Concept Attainment Model and Inductive Thinking Model of Teaching on Student's Achievement in Science, Scientific Creativity and Attitude towards Science* [Unpublished doctoral dissertation]. Sant Gadge Baba Amravati University.

Waring, R. (1997). The negative effects of learning words in semantic sets: A replication. *System, 5*(2), 261-274.

Waring, R. (2002). *Scales of vocabulary knowledge in second language vocabulary assessment* [Paper presentation]. Kiyo: The Occasional Papers of Notre Dame

Seishin University, Japan.

Warren, A. (2009). *Time series analysis: Assessing the effects of multiple educational interventions in a small-enrollment course* [Paper presentation]. Physics Education Research Conference 2009.

Warrington, E. K., & Shallice, T. (1969). The selective impairment of auditory verbal short-term memory. *Brain, 92*(4), 885-896.

Watanabe, Y. (1992). *Incidental learning of vocabulary: Retention of inferred meanings vs. given meanings* [Unpublished master's thesis]. University of Hawaii.

Webb, S. A., & Nation, I. S. P. (2017). *How vocabulary is learned: Oxford Handbooks for Language Teachers*. Oxford University Press.

Webb, S. A., & Sasao, Y. (2013). New directions in vocabulary testing. *RELC Journal, 44*(3), 263-277.

Wegener, S., Wang, H., Lissa, P., Robidoux, S., Nation, K., & Castles, A. (2017). Children reading spoken words: interactions between vocabulary and orthographic expectancy. *Short Report: Developmental Science*, *12*(1), 1-9.

Weil, M., & Joyce, B. (1978). *Information processing models of teaching*. Prentice-Hall, Inc.

Weiss, R. S. (1994). *Learning from strangers: The art and method of qualitative interview studies*. The Free Press.

Weldon, M. S., & Roediger, H. L. (1987). Altering retrieval demands reverses the picture superiority effect. *Memory & Cognition, 15*(4), 269-280.

Weldon, M. S., Roediger, H. L., & Challis, B. H. (1989). The properties of retrieval cues constrain the picture superiority effect. *Memory & Cognition, 17*(1), 95-105.

Wesche, M., & Paribakht, T. S. (1996). Assessing second language vocabulary knowledge:

Depth versus breadth. *Canadian Modern Language Review, 53*(1), 13-40.

White, T. G., Graves, M. F., & Slater, W. H. (1990). Growth of reading vocabulary in diverse elementary schools: Decoding and word meaning. *Journal of Educational Psychology, 82*(2), 281-290.

Widdowson, H. G. (1978). *Teaching language as communication*. Oxford University Press.

Widdowson, H. G. (1979). Directions in the teaching of discourse. In C. J. Brumfit, & K. Johnson (Eds.), *The communicative approach to language teaching* (pp. 49-60). Oxford University Press.

Wilgosh, L. (1975). Effects of labels on memory for pictures in four-year-old children. *Journal of Educational Psychology, 67*(3), 375-379.

Wilkins, D. A. (1972). *Linguistics and language teaching*. Edward Arnold.

Wilson, N., & McLean, S. (1994). *Questionnaire design: A practical introduction.* University of Ulster Press

Winters, R. (2001). Vocabulary anchors: Building conceptual connections with young readers. *The Reading Teacher, 54*(7), 659-662.

Wong, A. C. (2009). *The influence of the picture word inductive model on kindergarten students' development of literacy skills* [Unpublished master's thesis]. University of Toronto.

Wong, B. E., & Rafik-Galea, S. (2004). *Foreign language learning: The use of vocabulary strategies* [Paper presentation]. Proceedings of the First International Language Learning Conference 2004, Penang, Malaysia.

Wood, J. (2001). Can software support children's vocabulary development? *Language Learning & Technology, 5*(1), 166-201.

Wood, K. D., & Tinajero, J. V. (2002). Using pictures to teach content to second language

learners. *Middle School Journal, 33*(1), 47-51.

Wu, T. T. (2018). Improving the effectiveness of English vocabulary review by integrating ARCS with mobile game-based learning. *Journal of Computer Assisted Learning, 34*(3), 315-323.

Yang, X., Kuo, L. J., Ji, X., & McTigue, E. (2018).A critical examination of the relationship among research, theory, and practice: Technology and reading instruction. *Computers & Education, 25*(125), 62-73.

Yarmey, A. D. (1974). Effect of labelling-latency of pictures in associative learning of pictorial representations and their word labels. *Canadian Journal of Psychology, 28*(1), 15-23.

Yee, B. C., & Wahab, H. (2016). An action research of using vocabulary wheel to improve year 2 pupils' vocabulary in the Malaysian classroom. *Journal of English Education, 1*(2), 77-83.

Young, C., & Rasinski, T. (2018). Readers theatre: Effects on word recognition automaticity and reading prosody. *Journal of Research in Reading, 41*(3), 475-485.

Yount, R. (2006). Populations and sampling. *Research Design & Statistical Analysis in Christian Ministry* (4th ed.). Napce Press.

Yunus, K., Mohamed, M., & Bordin, W. (2016). The breadth of receptive vocabulary knowledge among English major university student. *Journal of Nusantara Studies, 1*(1), 7-17.

Yu, C. H. (2001). An introduction to computing and interpreting Cronbach Coefficient Alpha in SAS [Paper presentation]. Proceedings of the *26th SAS Users' Group International Conference 2001,* North Carolina, USA.

Yuliana, E. (2010). *The use of Picture Word Inductive Model in teaching vocabulary*

[Unpublished final year project]. Walisongo State Institute for Islamic Studies, Indonesia.

Yuniati, D. (2015). *The effectiveness of Picture Word Inductive Model (PWIM) for teaching recount text* [Unpublished final year project]. Universitas Muhammadiyah Purwokerto, Indonesia.

Yurfalah, D. (2014).*The use of Picture Word Inductive Model in teaching vocabulary: A study at the seventh grade students of a state junior high school in Cidaun Cianjur* [Unpublished master's thesis]. Universitas Pendidikan Indonesia.

Zakaria, Z. (2005). *Dictionary as tool in vocabulary acquisition for rural students* [Unpublished master's thesis]. Universiti Sains Malaysia.

Zarei, A. A. (2009). The effect of bimodal, standard and reversed subtitling on L2 vocabulary recognition and recall. *Pazhuhesh-e Zabanha-ye Khareji, 49*(1), 65-84.

Zarzycka-Piskorz, E. (2016). Kahoot it or not? Can games be motivating in learning grammar? *Teaching English with Technology*, *16*(3), 17-36.

Zhang, D. (2012). Vocabulary and grammar knowledge in second language reading comprehension: A structural equation modeling study. *The Modern Language Journal*, *96*(4), 558–575.

Zhang, D., & Koda, K. (2017). Assessing L2 vocabulary depth with word associates format tests: issues, findings, and suggestions. *Asian-Pacific Journal of Second and Foreign Language Education, 2*(1), 1-30.

Zormpa, E., Brehm, L. E., Hoedemaker, R. S., & Meyer, A. S. (2019) The production effect and the generation effect improve memory in picture naming. *Memory, 27*(3), 340-352.

Ziliak, S. T., & McCloskey, D. N. (2008). *The cult of statistical significance*. University of

Michigan Press.

Zimmerman, C. B. (1997). Historical trends in second language vocabulary instruction. In J. Coady, & T. Huckin (Eds.), *Second language vocabulary acquisition* (pp. 5-19). Cambridge University Press.

Zimmerman, J., Broder, P. K., Shaughnessy, J. J., & Underwood, B. J. (1977). A recognition test of vocabulary using single-detection measures, and some correlated of word and nonword recognition. *Intelligence, 1*(1), 5-31.

Zuraida, K. S. (2013). Improving Students' Writing Descriptive Text by Using the Picture Word Inductive Model (PWIM). *Jurnal Pendidikan dan Pembelajaran*, *2*(5), 1-11.

APPENDICES

Appendix A: PWIM-A (Lesson Plan)

Subject	Vocabulary		
Date		**Day**	
Time		**Duration**	
Class	Year 1	**Number of Pupils**	
Proficiency Level	Below average to average		
Theme	(E.g., Vegetable)		
Topic	Vocabulary		
Objectives	By the end of the lesson, pupils should be able to read, write and clasify the 5 target words correctly.		
Educational Emphases (EE)	Multiple Intelligences : Visual Spatial Mastery Learning : PWIM techniques will be used to ensure all pupils acquire the words Knowledge Acquisition : Words based on enlarged picture are drawn inductively from pupils' existing vocabulary Values and Citizenships : Helping one another Assessment : Pupils' vocabulary acquisition is assessed by criteria linked to the content and learning standards Constructivism : Pupils' centred activity in a collaborative setting as teaching strategy		
Moral Values	Helping one another is caring.		
Teaching Aids	Pointer, Enlarged Pictures and Enlarged Words, Word Cards		

Stages	Content / Teaching and Learning Strategy	Teaching and Learning Activities	Notes / Remarks
Set Induction **(± 5 minutes)**	**Whole Class Activity:** Introduction to enlarged picture. **Words:** • Broccoli • Mushroom • Onion • Potato • Vegetable	1. Teacher greets the class and writes day and date on the whiteboard. 2. Teacher tells pupils that she is going to show them something and puts up enlarged picture on the board. 3. Teacher asks pupils to tell her what they can see in the picture. 4. Teacher helps to induce words from pupils.	**Teaching Aids:** • Enlarged Pic • Pointer **Educational Emphases:** • Read and spell words
Presentation **(± 25 minutes)**	**Whole Class Activity:** 1. Comes up with the target words 2. Read the target words. 3. Spell the target words. **Group Activity:** 1. Each group comes up with all the target words 2. Read and write the target words.	**Whole Class Activity** 1. Teacher points at the item (of the target word), circles it and asks pupils what is it. 2. Teacher encourages pupils to identify what they see. 3. Teacher helps pupils by giving clues. 4. Teacher labels the picture part identified; draw a line from it and write the word. 5. Teacher says the word, spells aloud and says the word again. 6. Pupils read, spell and read again aloud. 7. Teacher goes through Step 1 – 6 with all the target words. **Group Activity** 1. Teacher directs pupils into small groups. 2. Teacher distributes pictures (similar to the enlarged picture up on	**Teaching Aids:** • Pointer • Enlarged pictures (1 to hang in front of class and each group to get 1 enlarged picture of a smaller size) • Word cards **Educational Emphasis:** • Read and spell words • Identify concept

		the board); one to the each group. 3. Teacher directs pupils to go through Step 1 – 6 to identify all target words. 4. Teacher walks around to monitor and offers help if necessary. 5. Teacher reviews the picture word chart on the board with pupils when all the groups are done. 6. Teacher identifies concept and pupils repeat after teacher. 7. Teacher provides cards to pupils to build their own sets of words to take home. 8. Finally, read and review picture word chart and ends lesson.	

Appendix B: Vocabulary Breadth Pretest

National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Vocabulary Breadth Pretest

Experimental/Control Group

Name:_____ Score:____/30

No	Word	✓/ X	No	Word	✓ / X
1	broccoli		16	onion	
2	circle		17	parallelogram	
3	delicious		18	peach	
4	diamond		19	pineapple	
5	eighteen		20	rectangle	
6	eleven		21	seventeen	
7	favourite		22	shape	
8	fourteen		23	sixteen	
9	fifteen		24	square	
10	fruit		25	tangram	
11	guess		26	thirteen	
12	healthy		27	triangle	
13	hungry		28	twelve	
14	mushroom		29	twenty	
15	nineteen		30	vegetable	

Appendix C: Vocabulary Breadth Posttest

National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Vocabulary Breadth Posttest

Experimental/Control Group

Name:_____ Score:____/30

No	Word	✓ / X	No	Word	✓ / X
1	broccoli		16	onion	
2	circle		17	parallelogram	
3	delicious		18	peach	
4	diamond		19	pineapple	
5	eighteen		20	rectangle	
6	eleven		21	seventeen	
7	favourite		22	shape	
8	fourteen		23	sixteen	
9	fifteen		24	square	
10	fruit		25	tangram	
11	guess		26	thirteen	
12	healthy		27	triangle	
13	hungry		28	twelve	
14	mushroom		29	twenty	
15	nineteen		30	vegetable	

Appendix D: Vocabulary Breadth Delayed Posttest

National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Vocabulary Breadth Delayed Posttest

Experimental/Control Group

Name:_____ Score:____/30

No	Word	✓ / X	No	Word	✓ / X
1	broccoli		16	onion	
2	circle		17	parallelogram	
3	delicious		18	peach	
4	diamond		19	pineapple	
5	eighteen		20	rectangle	
6	eleven		21	seventeen	
7	favourite		22	shape	
8	fourteen		23	sixteen	
9	fifteen		24	square	
10	fruit		25	tangram	
11	guess		26	thirteen	
12	healthy		27	triangle	
13	hungry		28	twelve	
14	mushroom		29	twenty	
15	nineteen		30	vegetable	

Appendix E: Vocabulary Depth Pretest

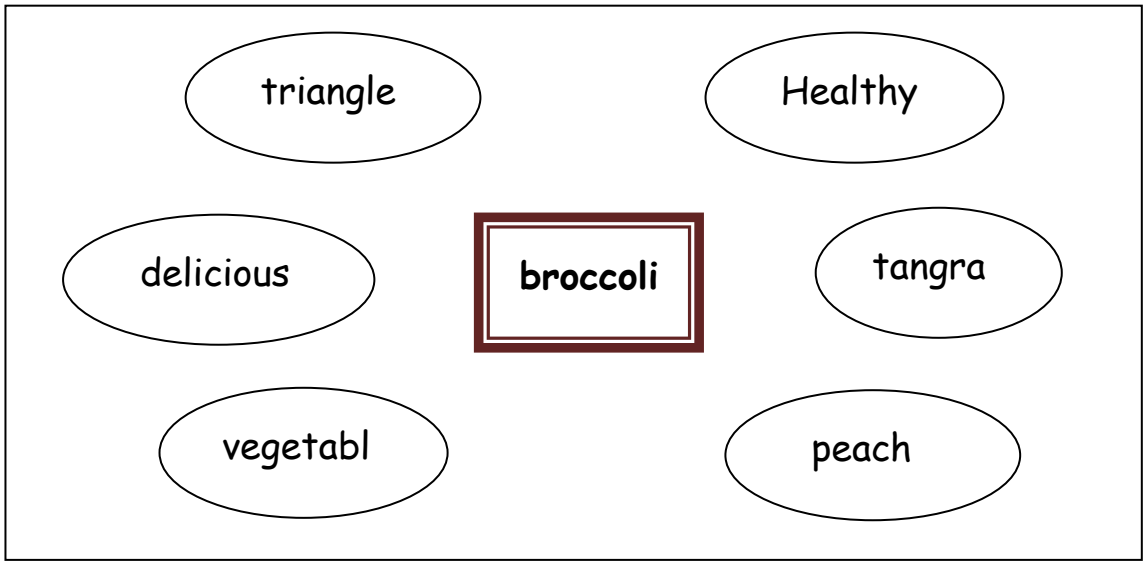
National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Vocabulary Depth Pretest

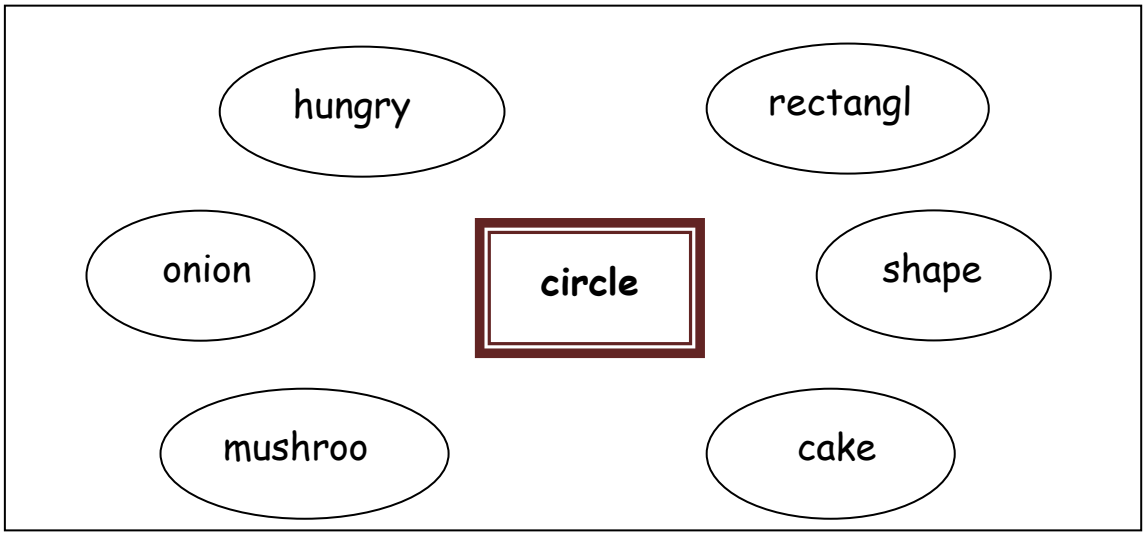
Experimental/Control Group

Name:_____ Score:____/30

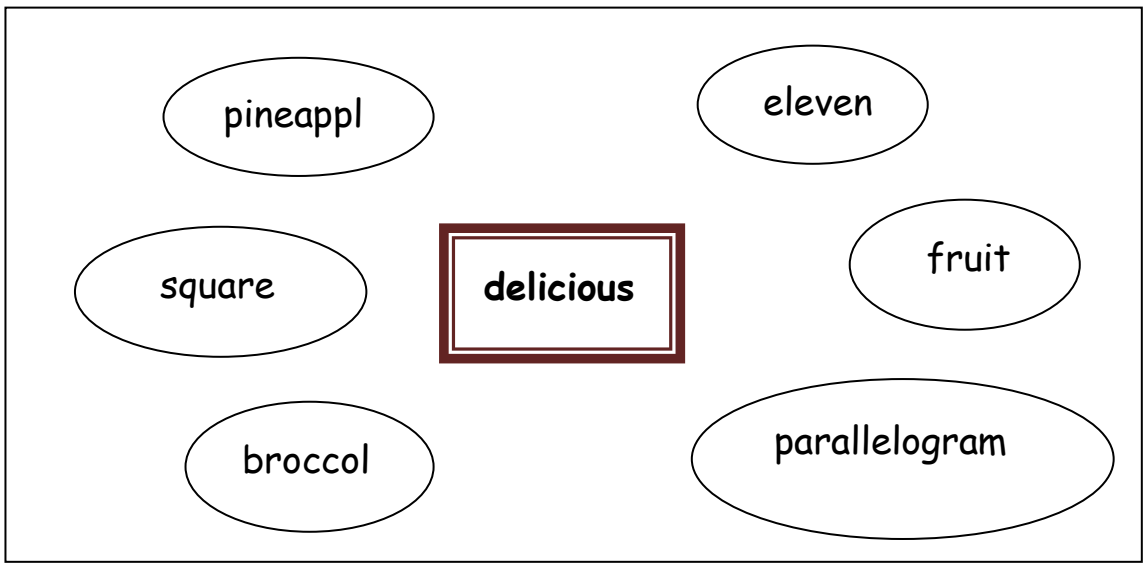
Q.1



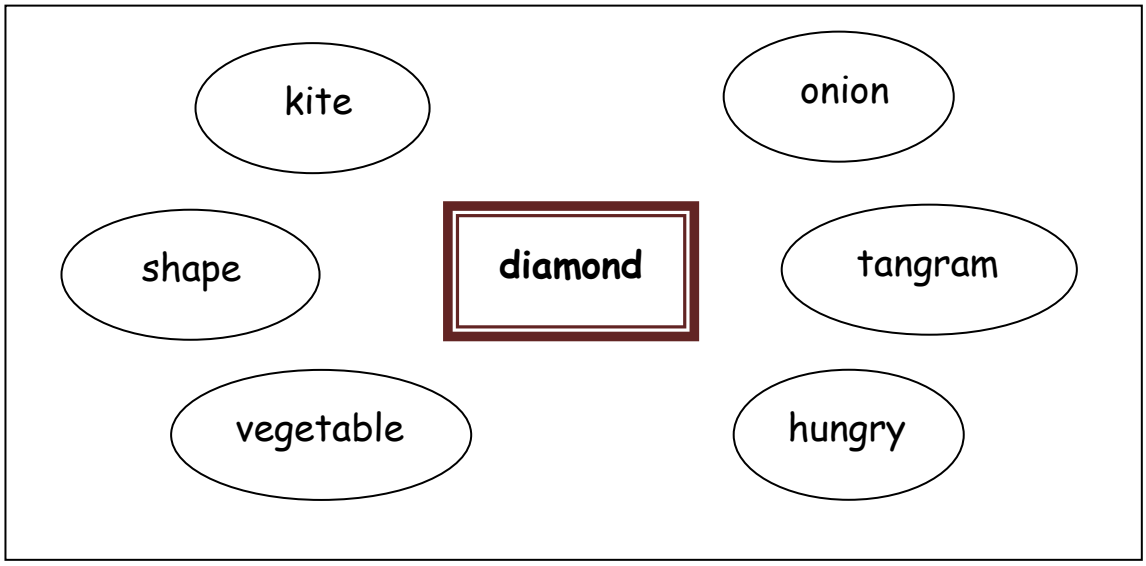
Q.2



Q.3

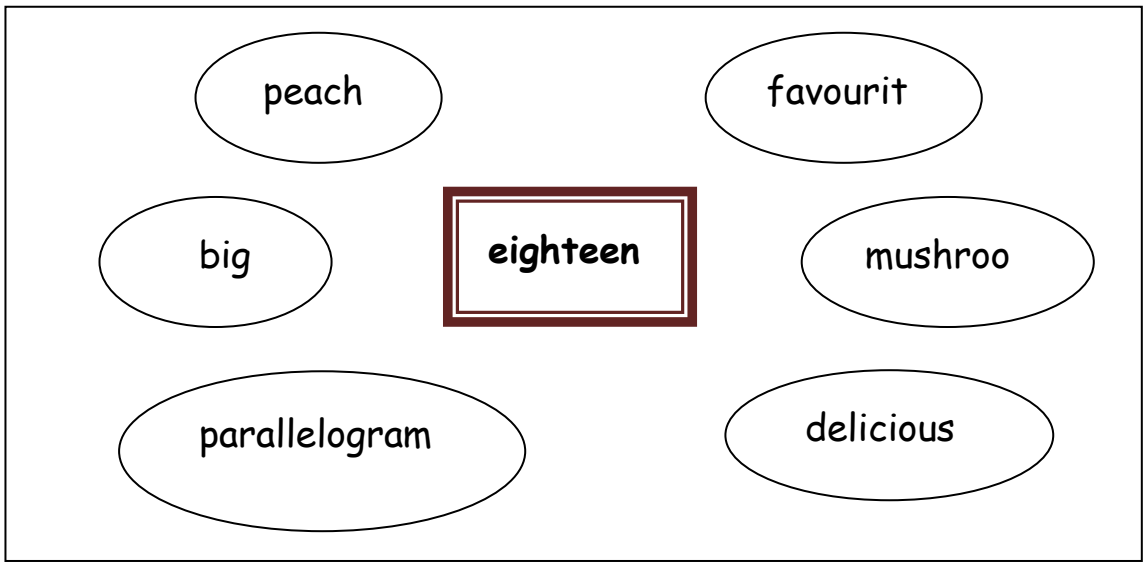

pineappl
eleven
square
delicious
fruit
broccol
parallelogram

Q.4

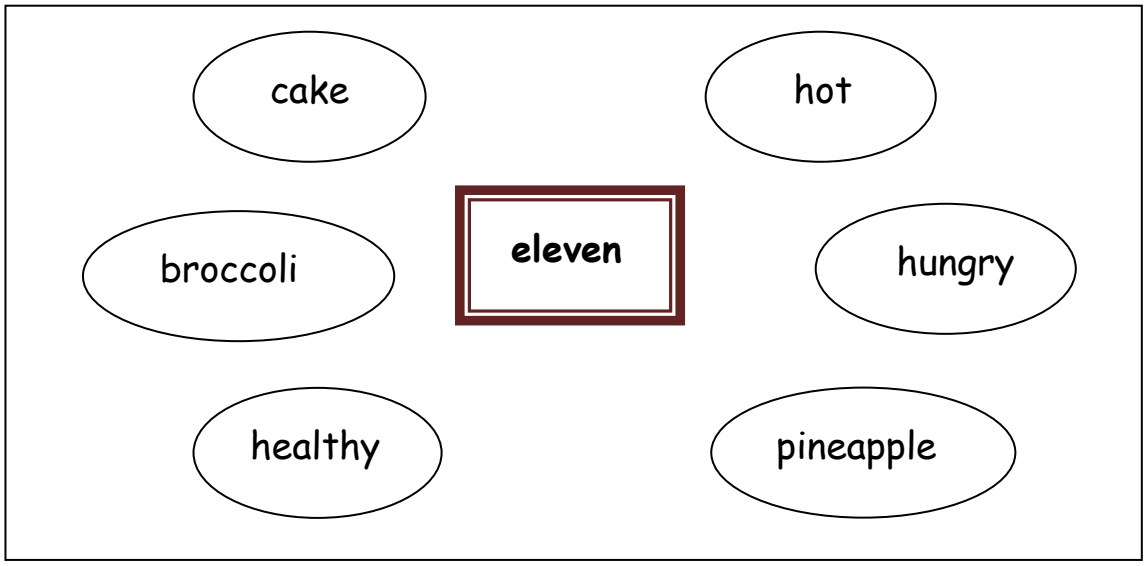

kite
onion
shape
diamond
tangram
vegetable
hungry

Vocabulary Depth Test

Q.5

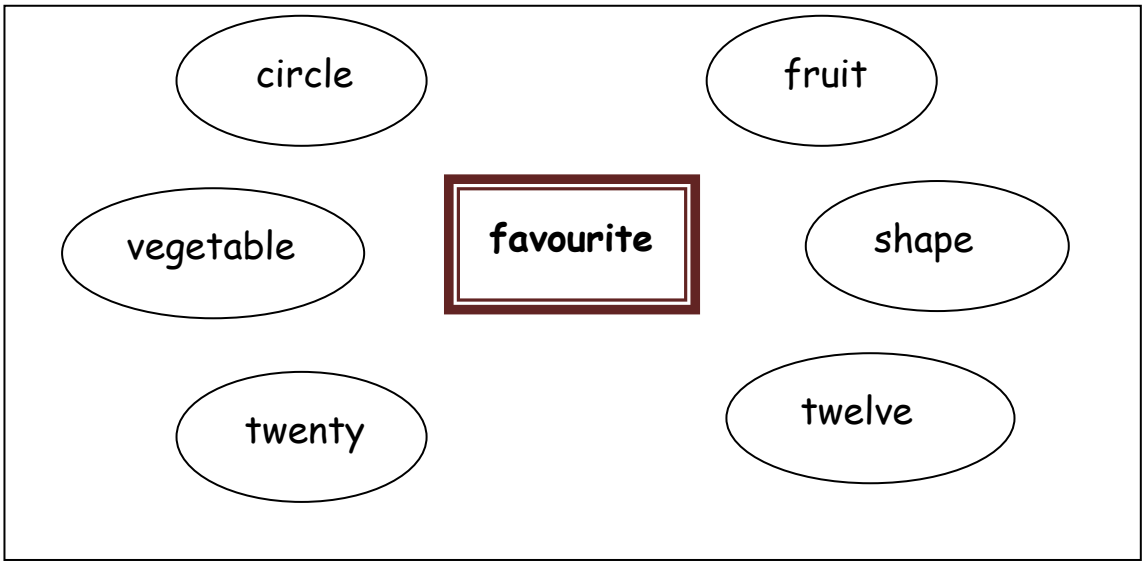


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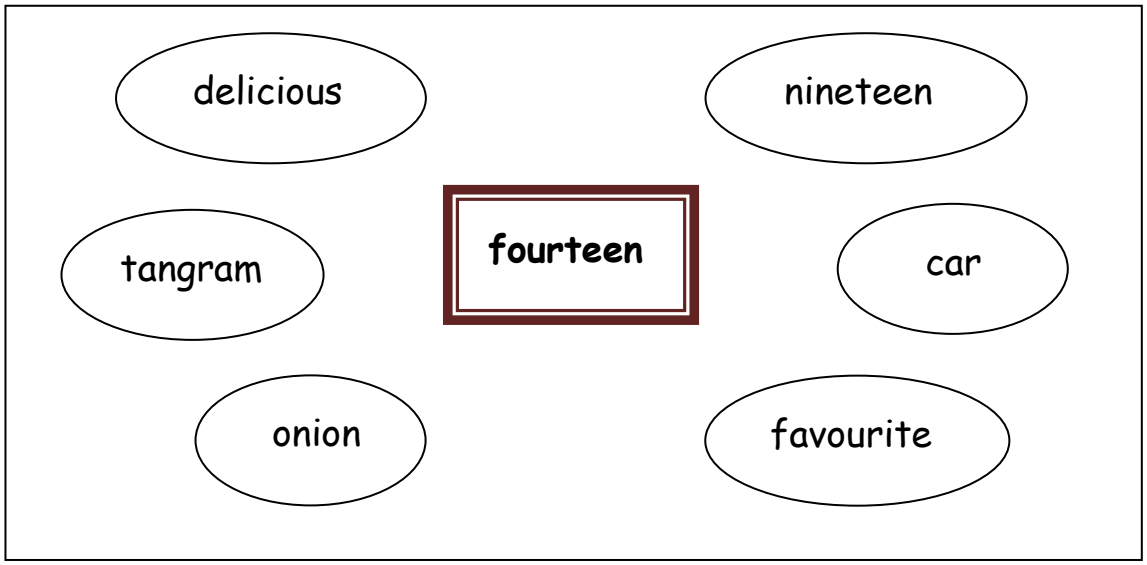


Vocabulary Depth Test

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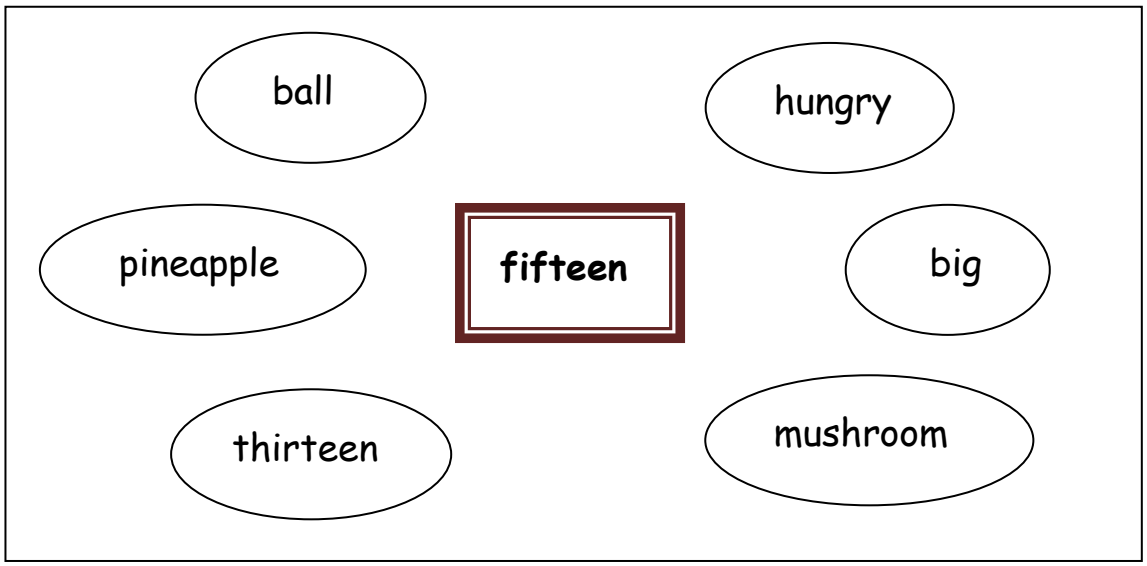


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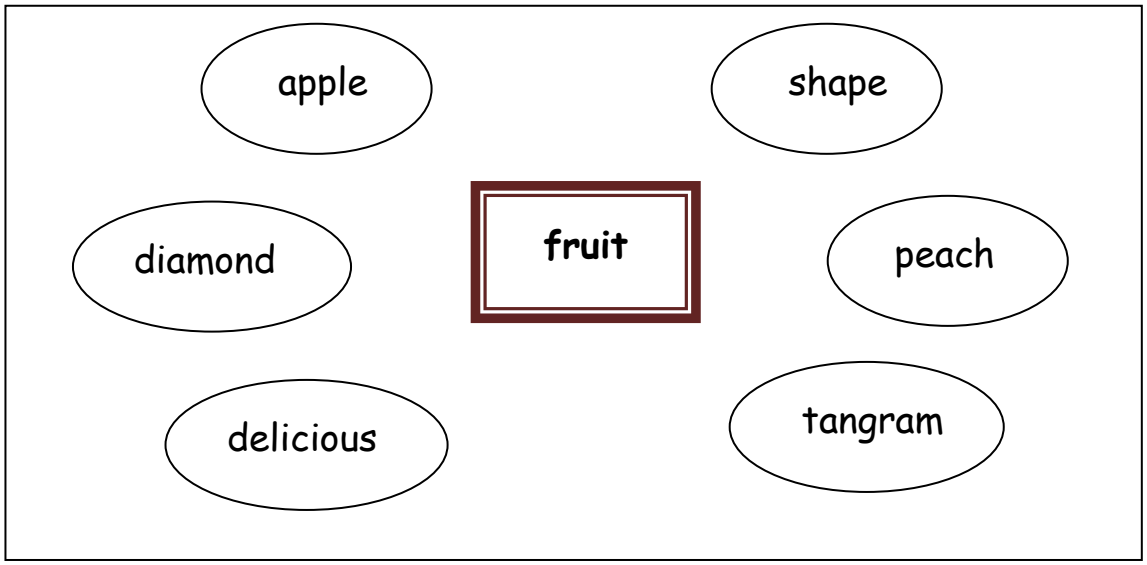


Vocabulary Depth Test

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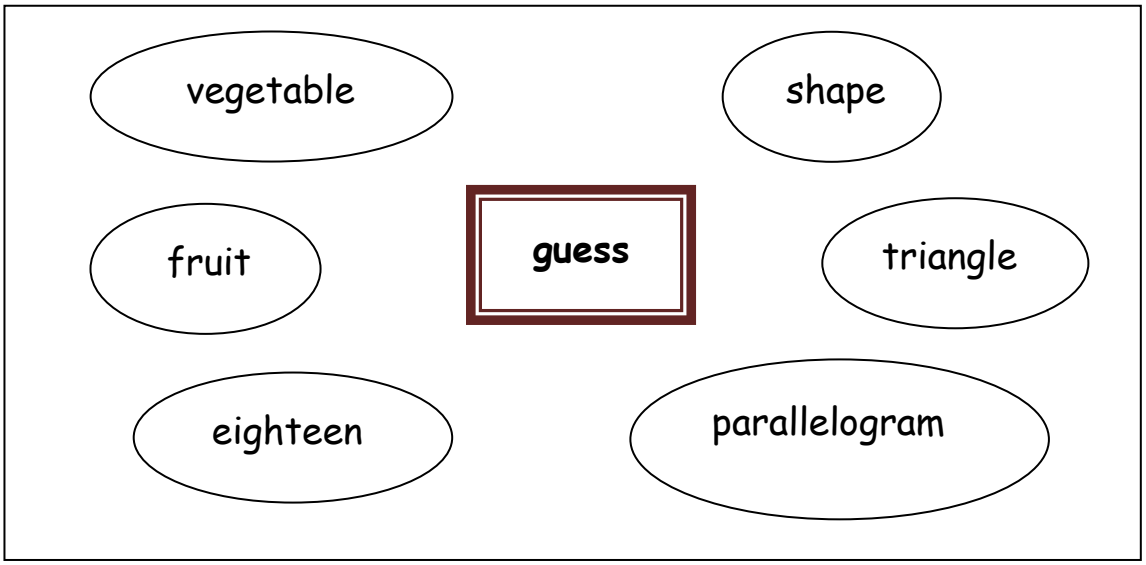


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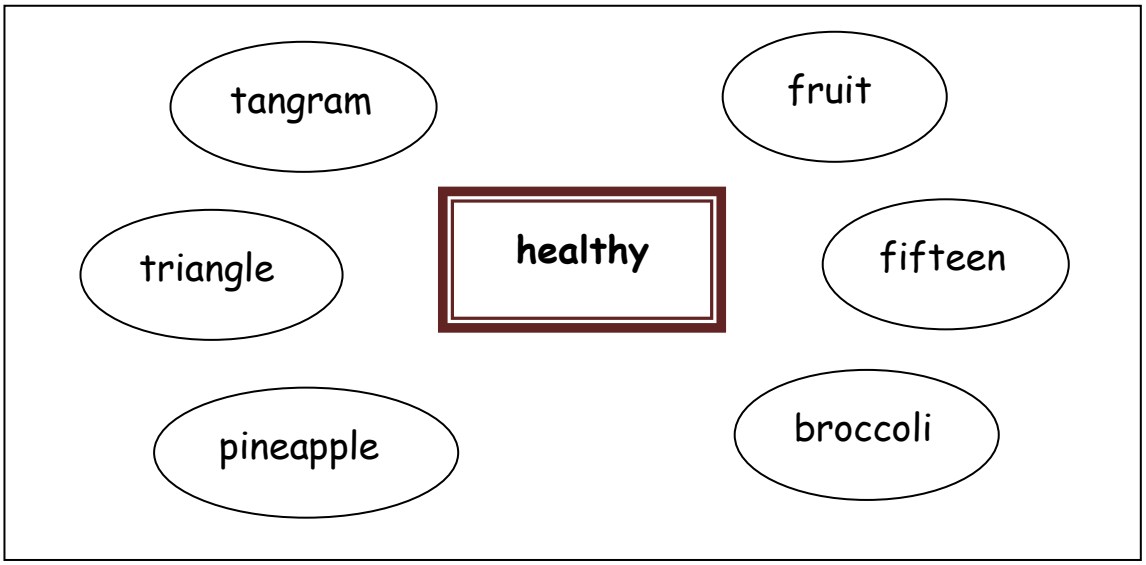


Vocabulary Depth Test

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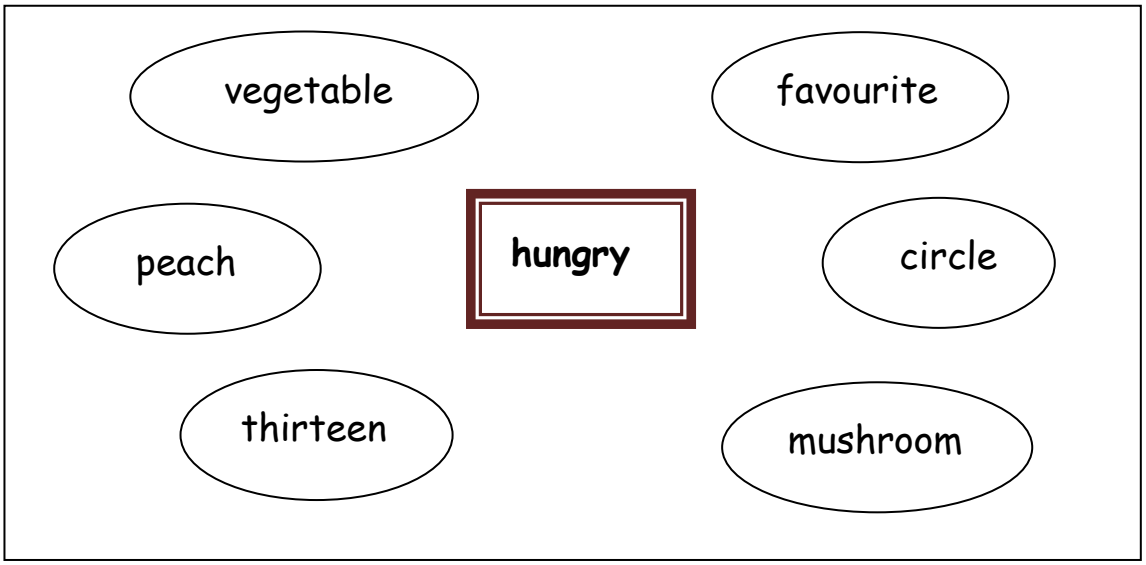


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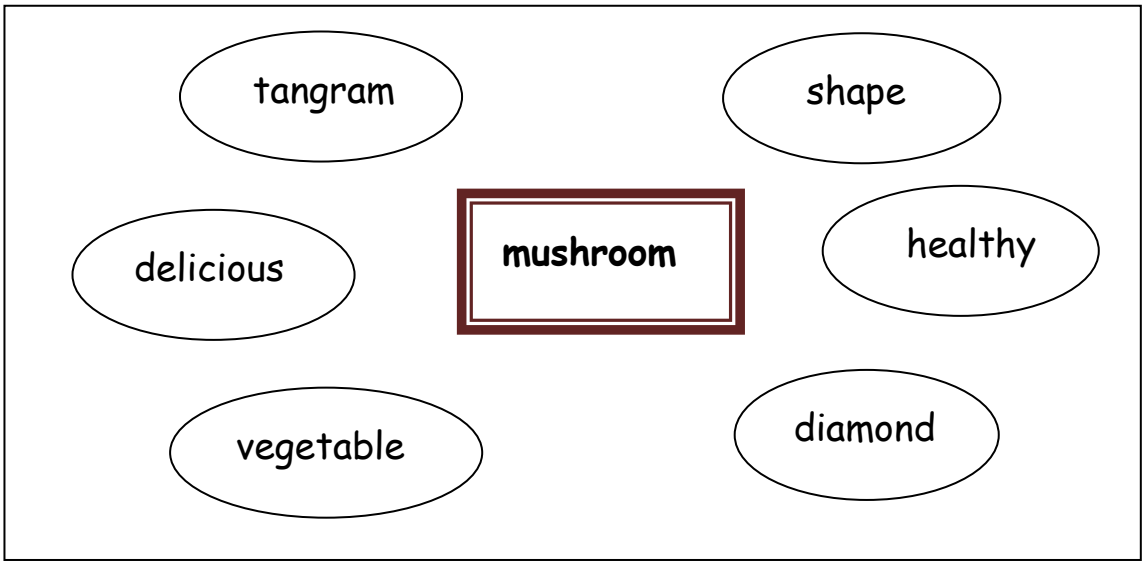


Vocabulary Depth Test

Q.13

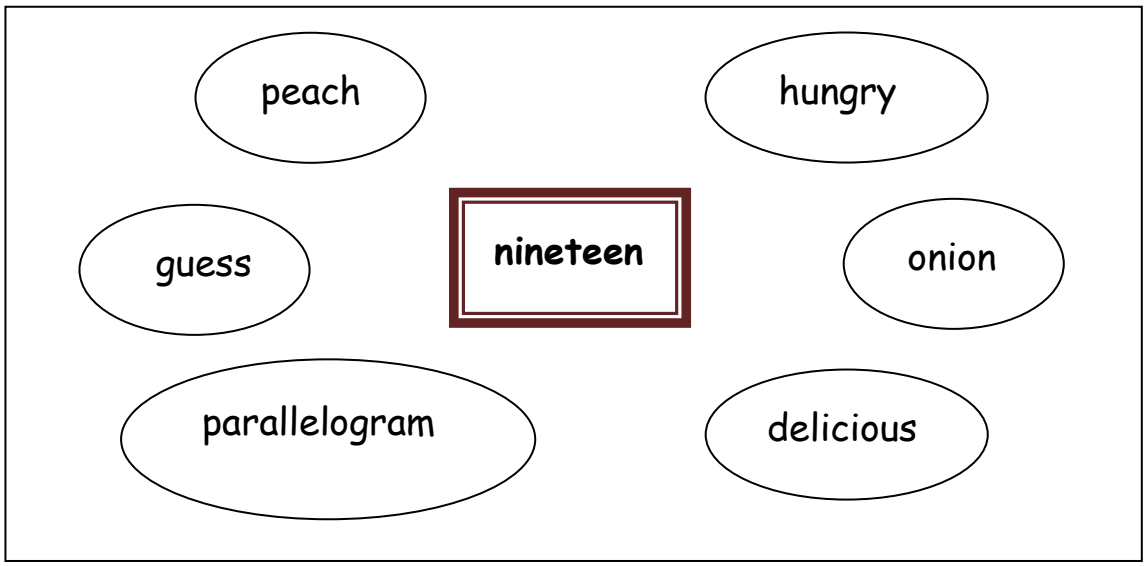


Q.14

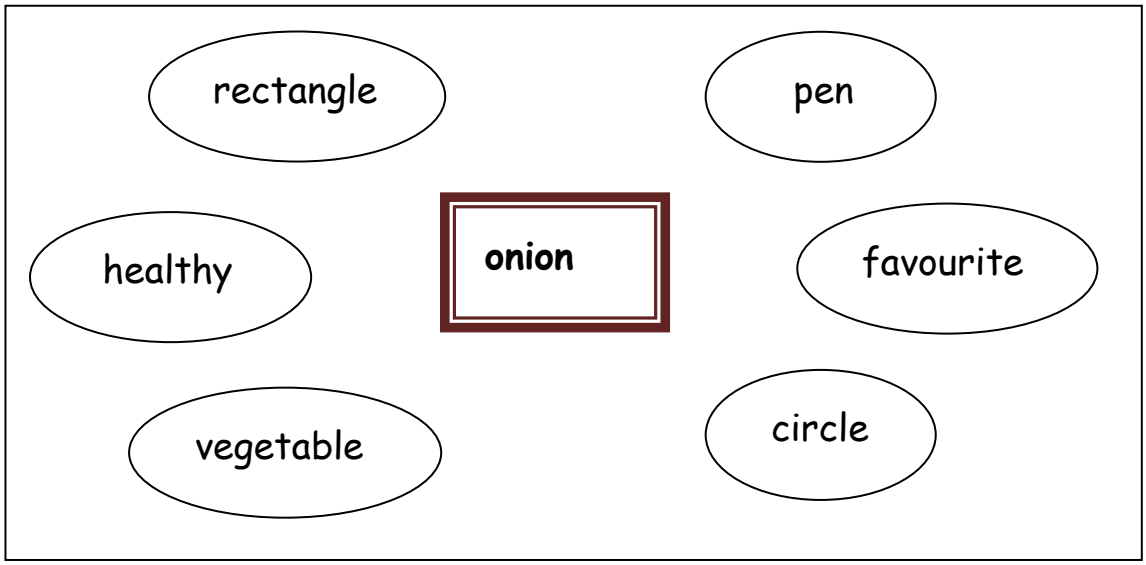


Vocabulary Depth Test

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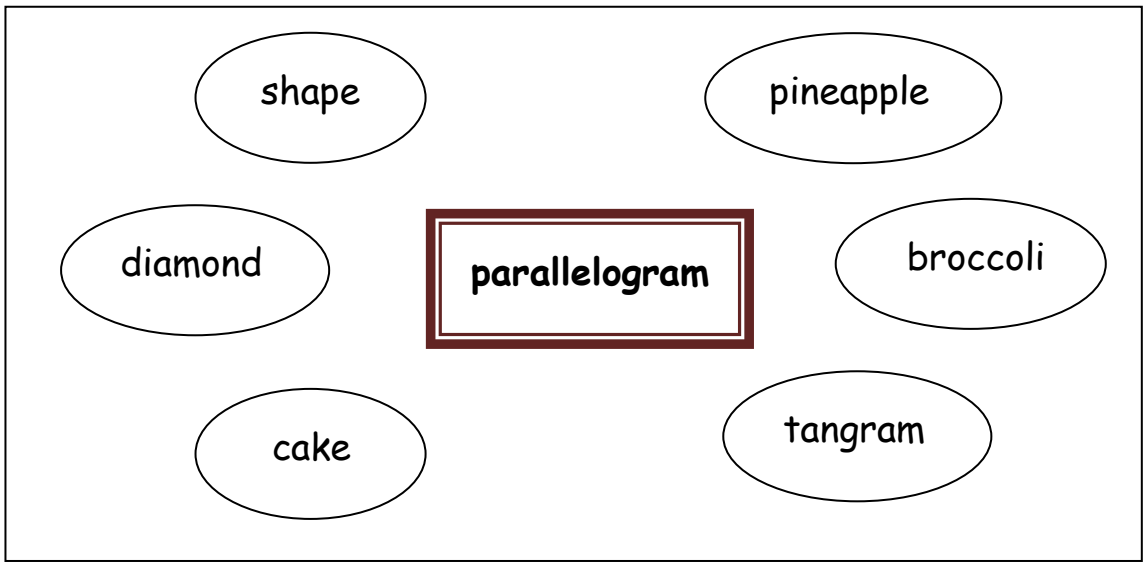


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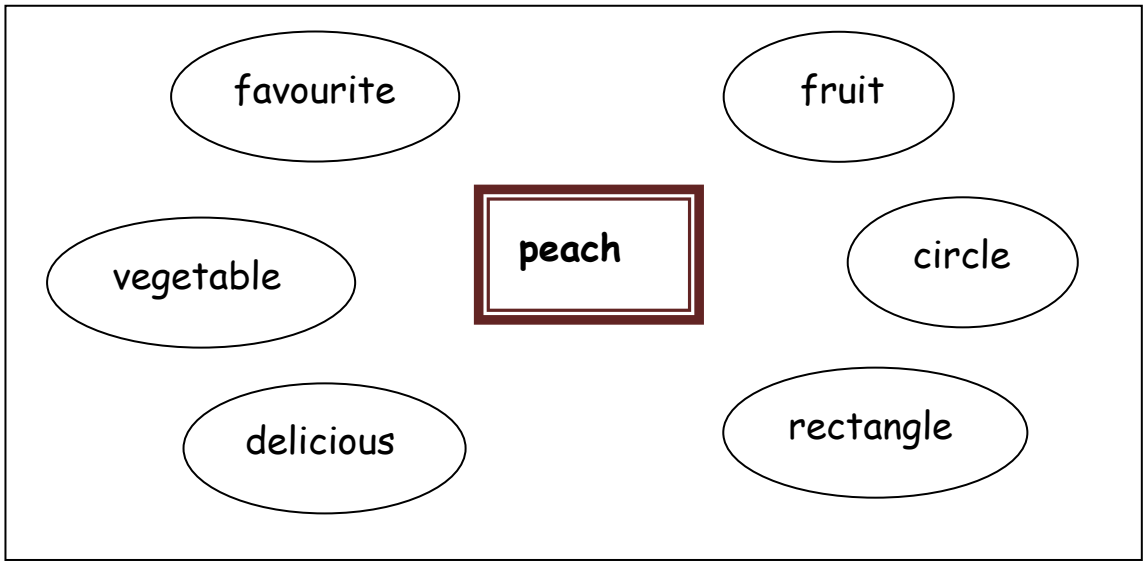


Vocabulary Depth Test

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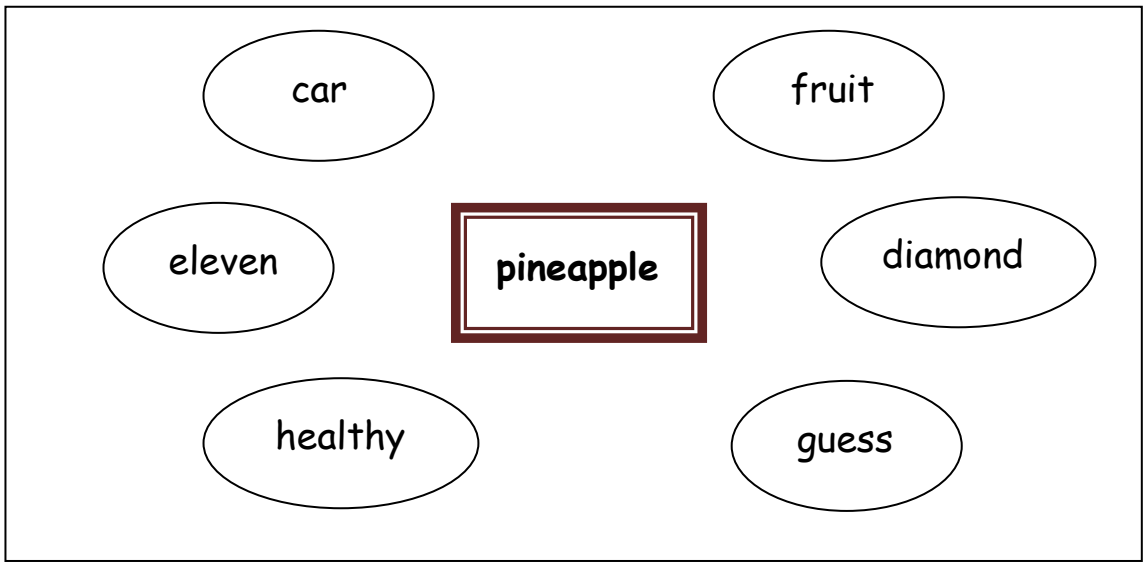


Q.18

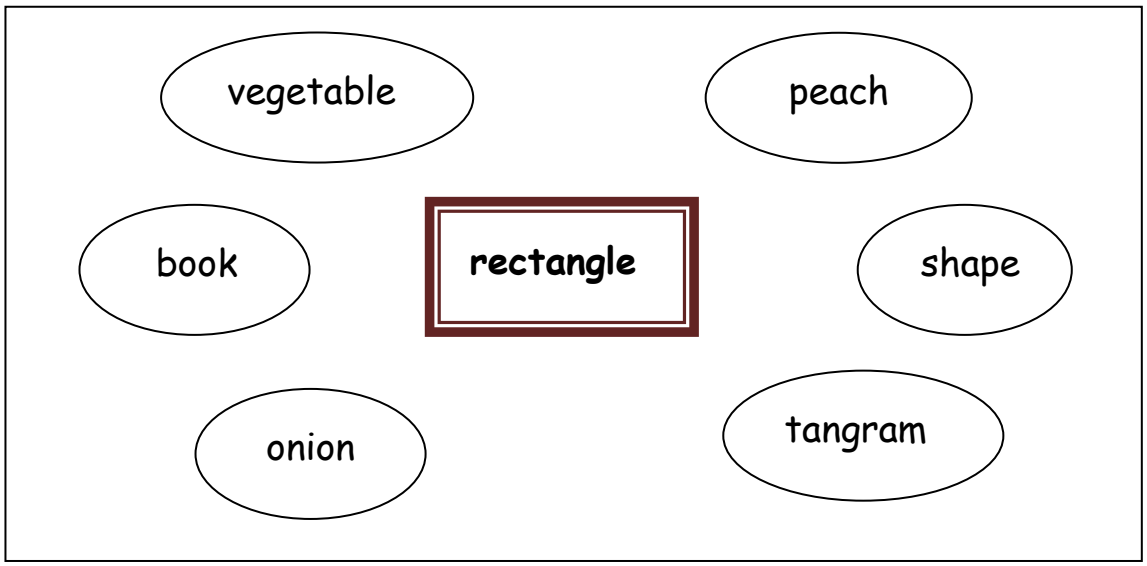


Vocabulary Depth Test

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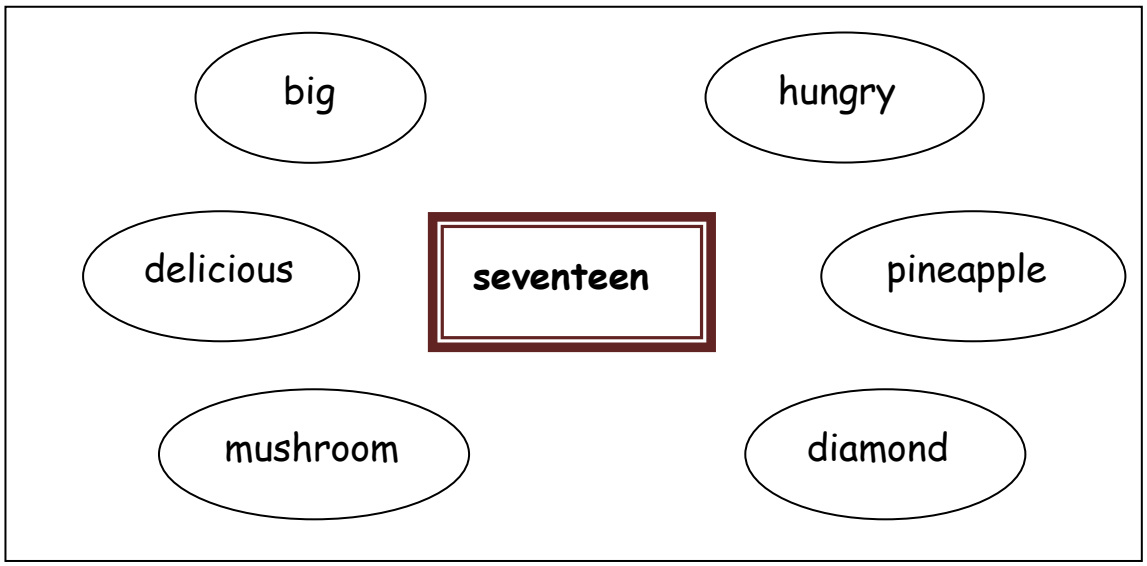


Q.20

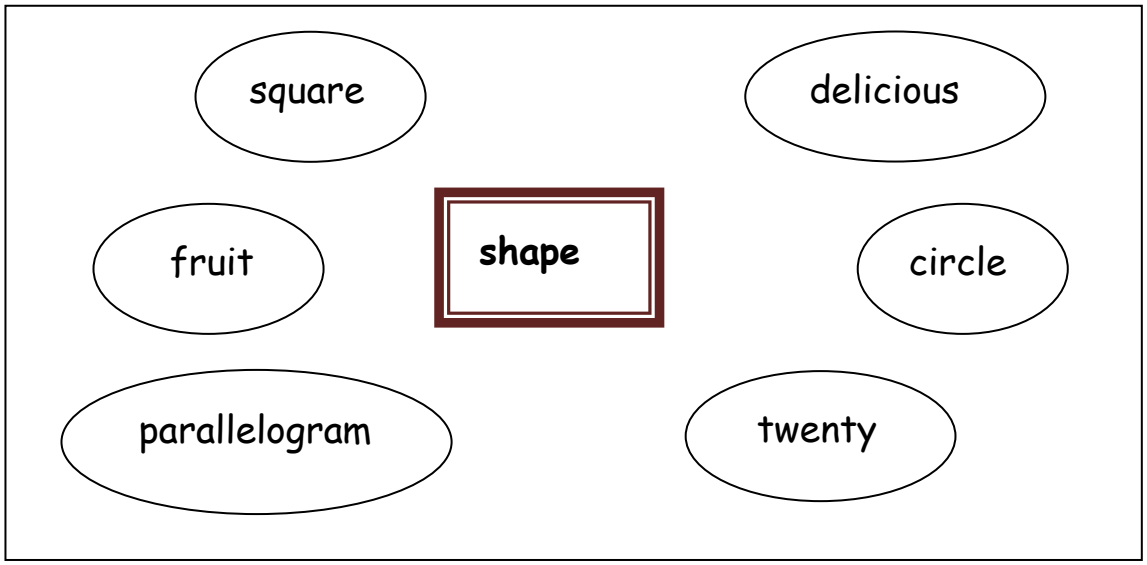


Vocabulary Depth Test

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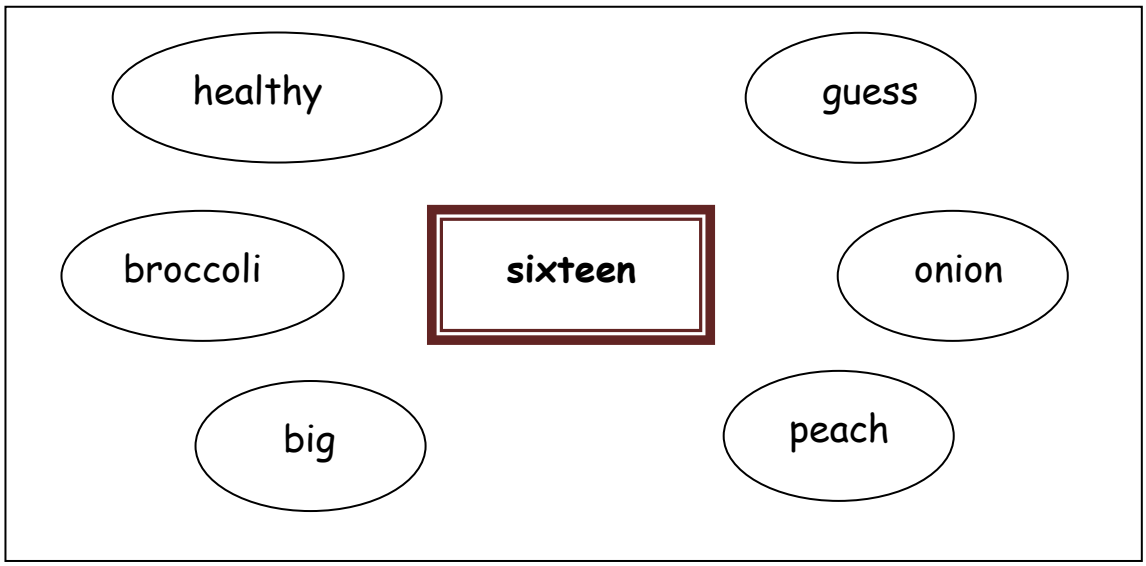


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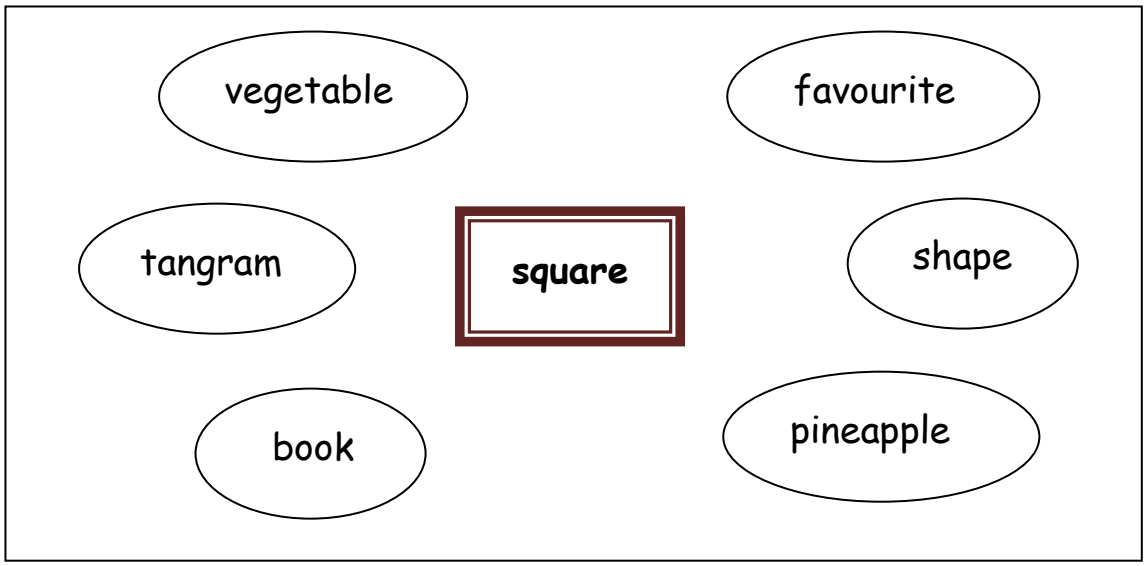


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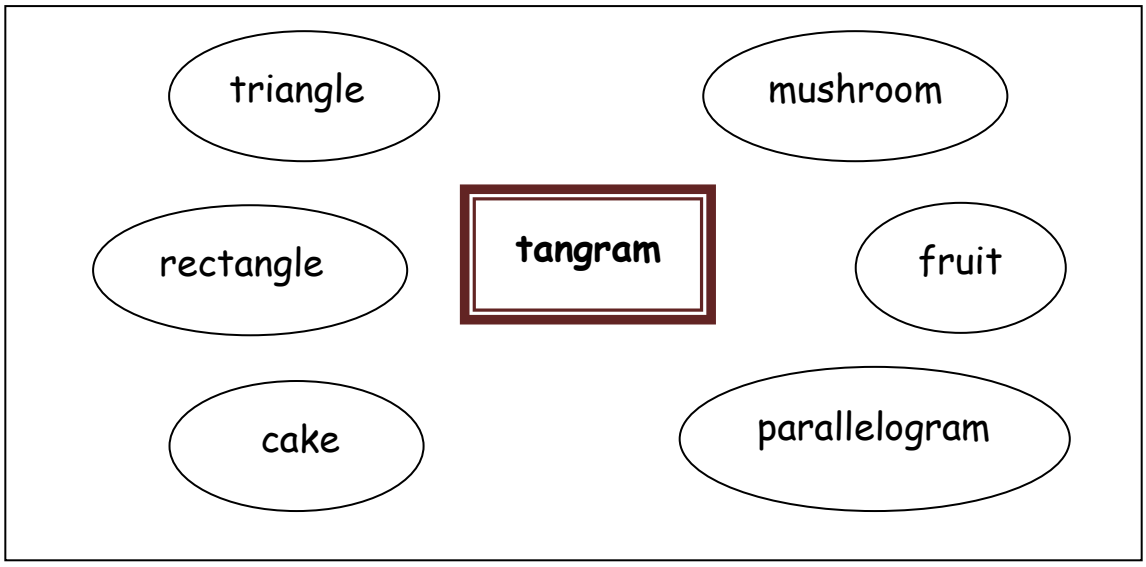


Q.24

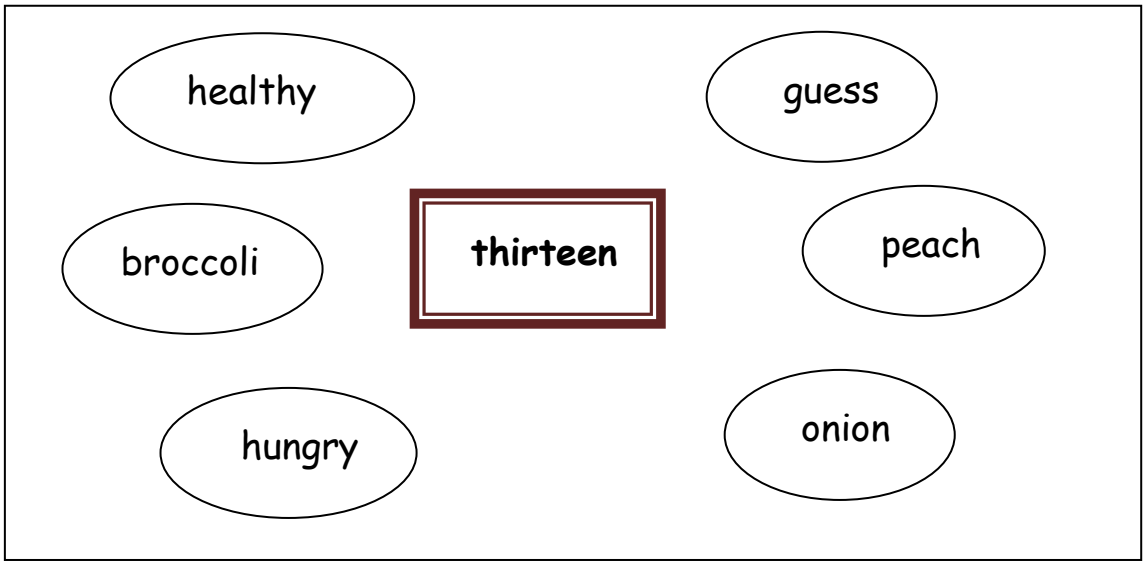


Vocabulary Depth Test

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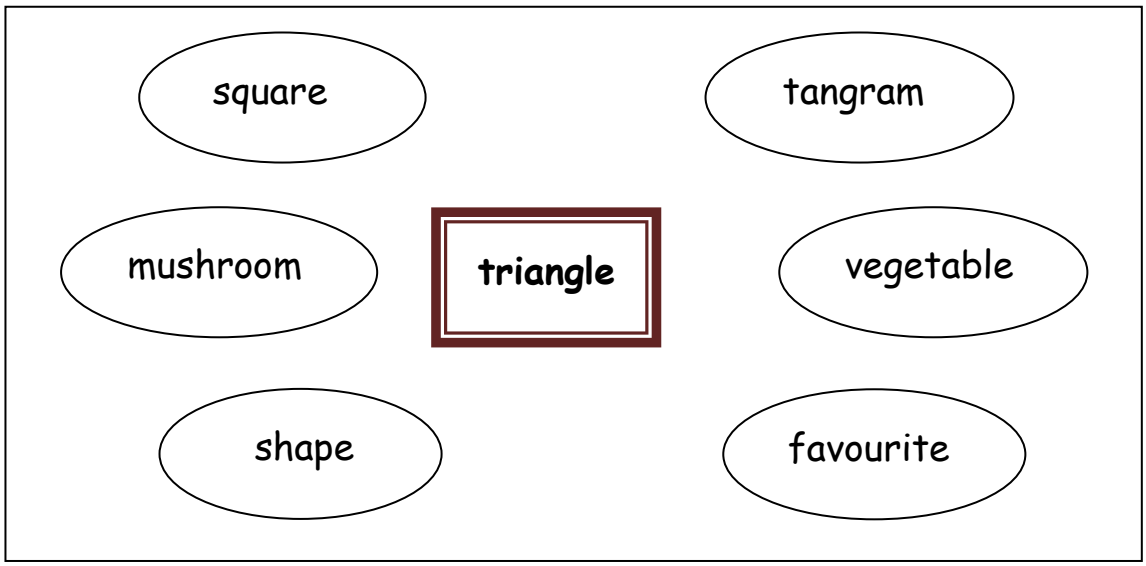


Q.26

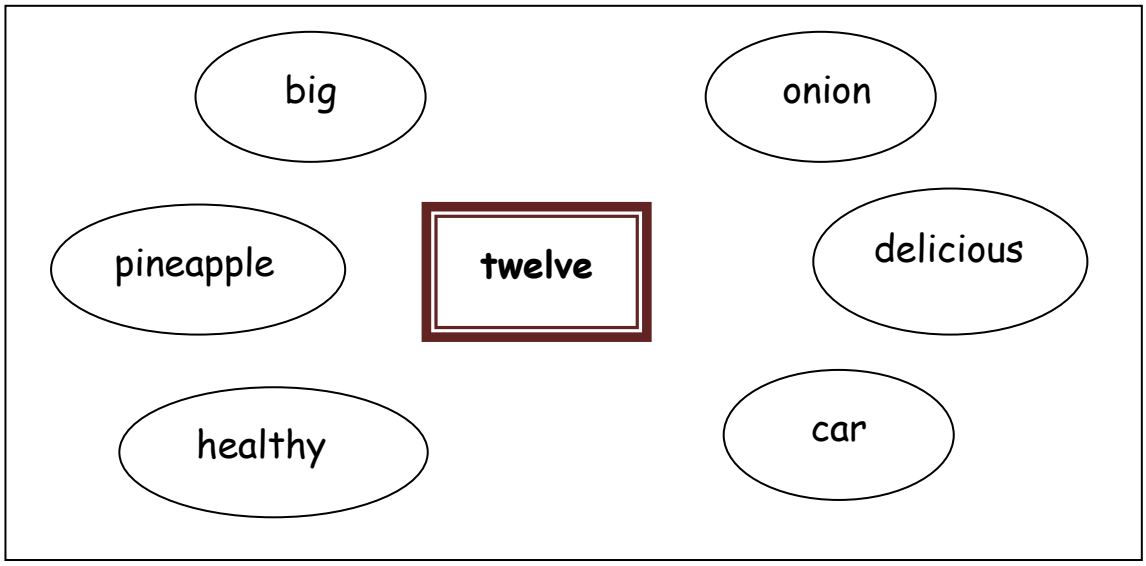


Vocabulary Depth Test

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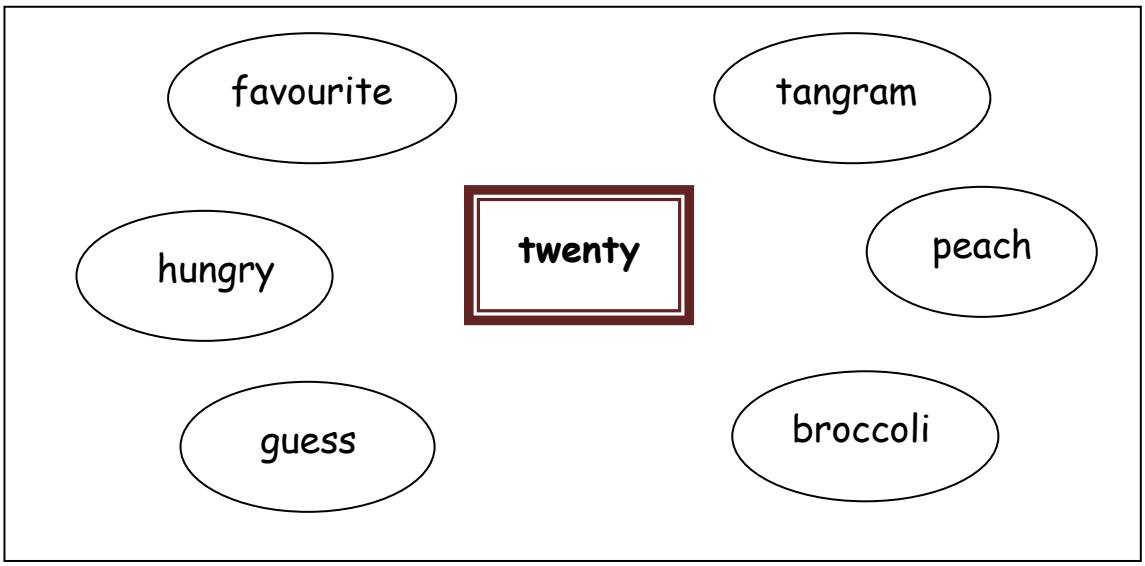


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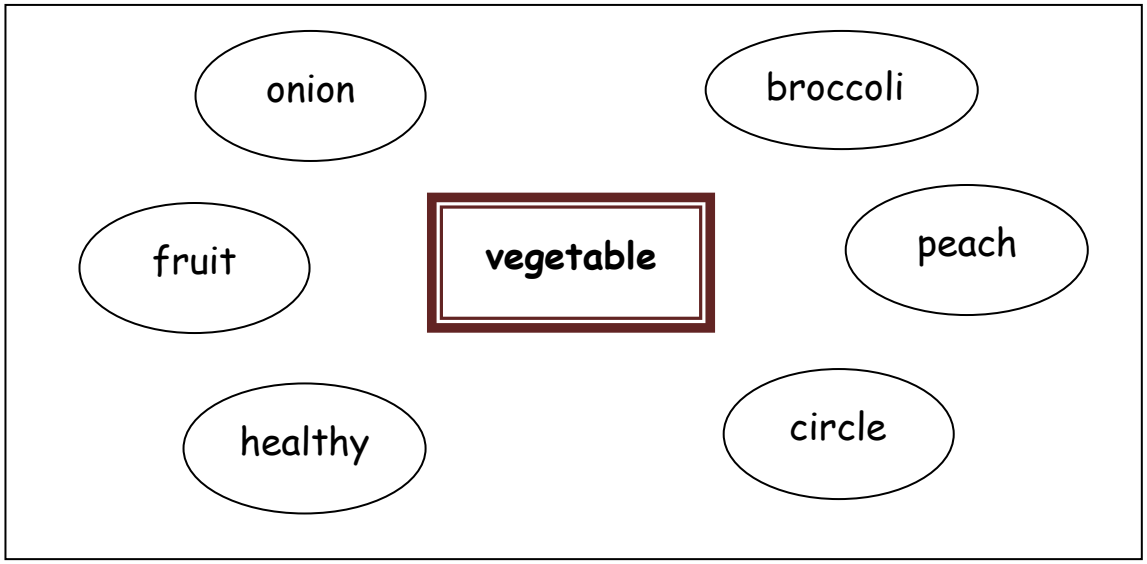


Vocabulary Depth Test

Q.29



Q.30



Appendix F: Vocabulary Depth Posttest

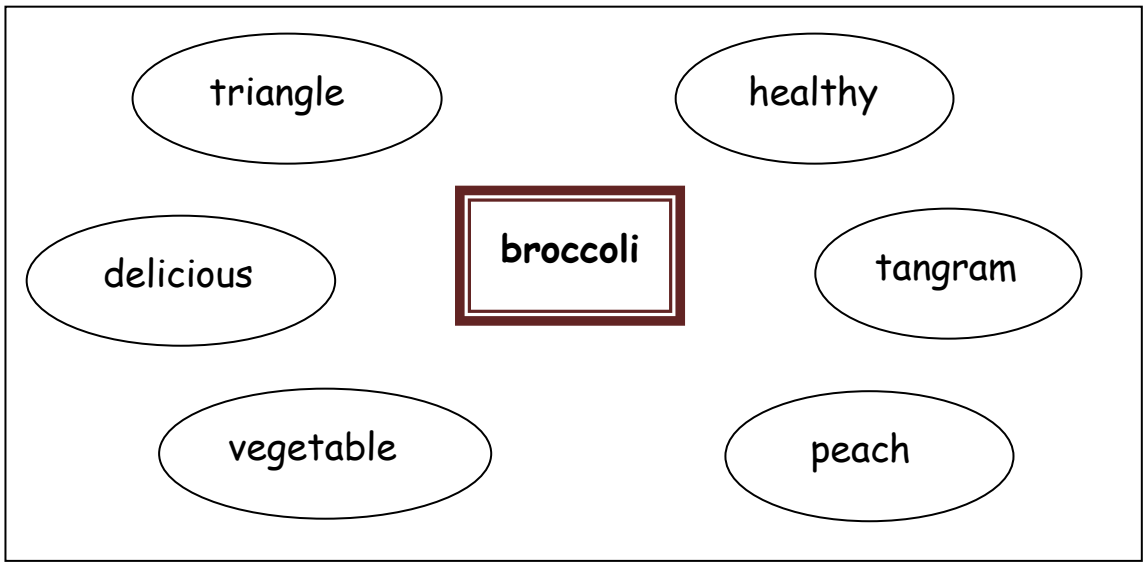
National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Vocabulary Depth Posttest

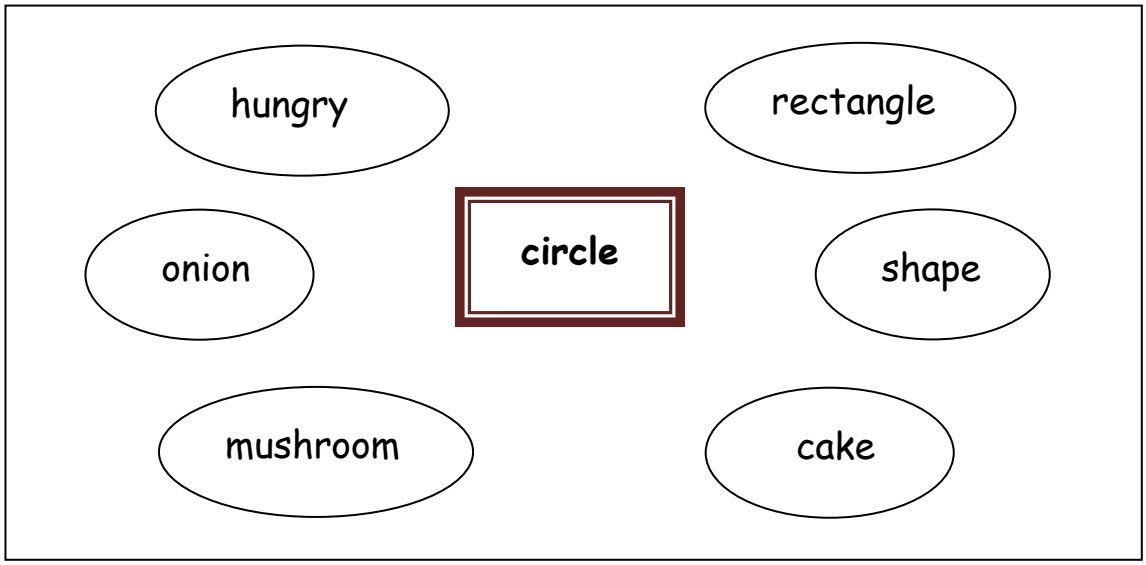
Experimental/Control Group

Name:_____ Score:____/30

Q.1

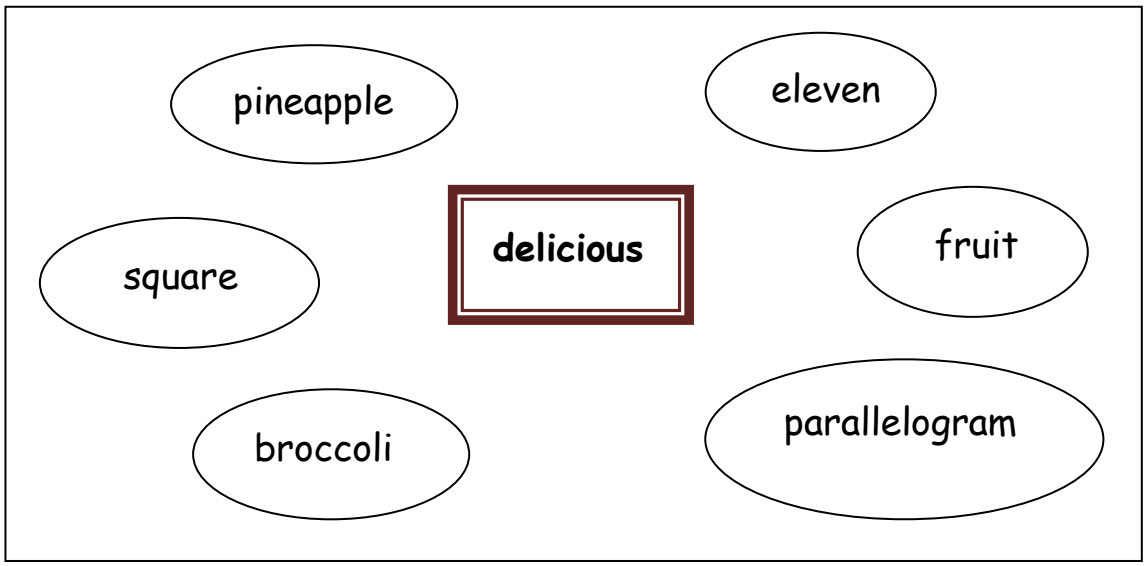


Q.2

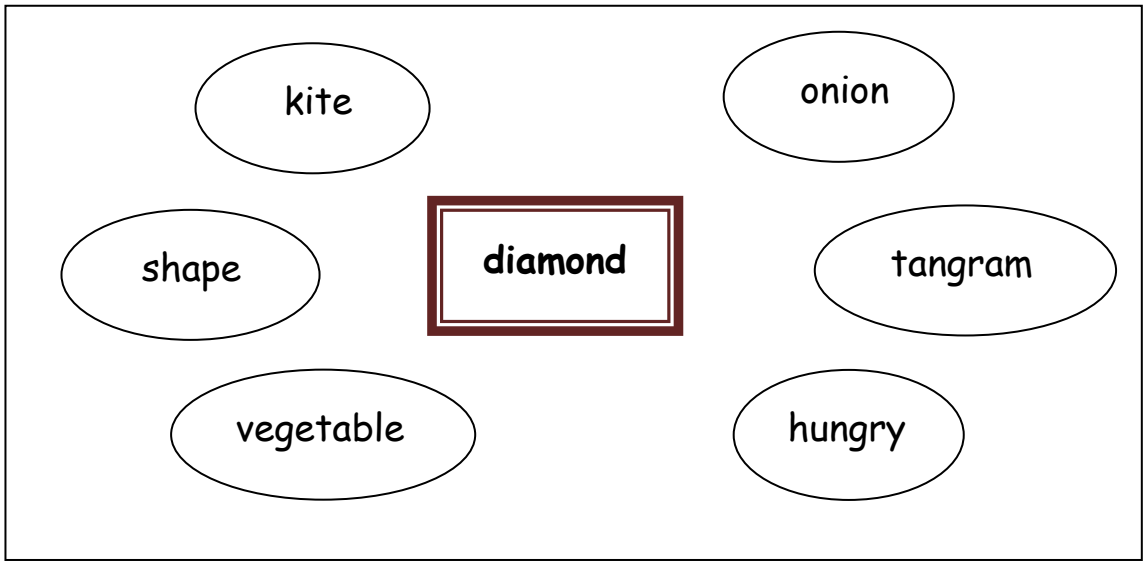


Vocabulary Depth Test

Q.3

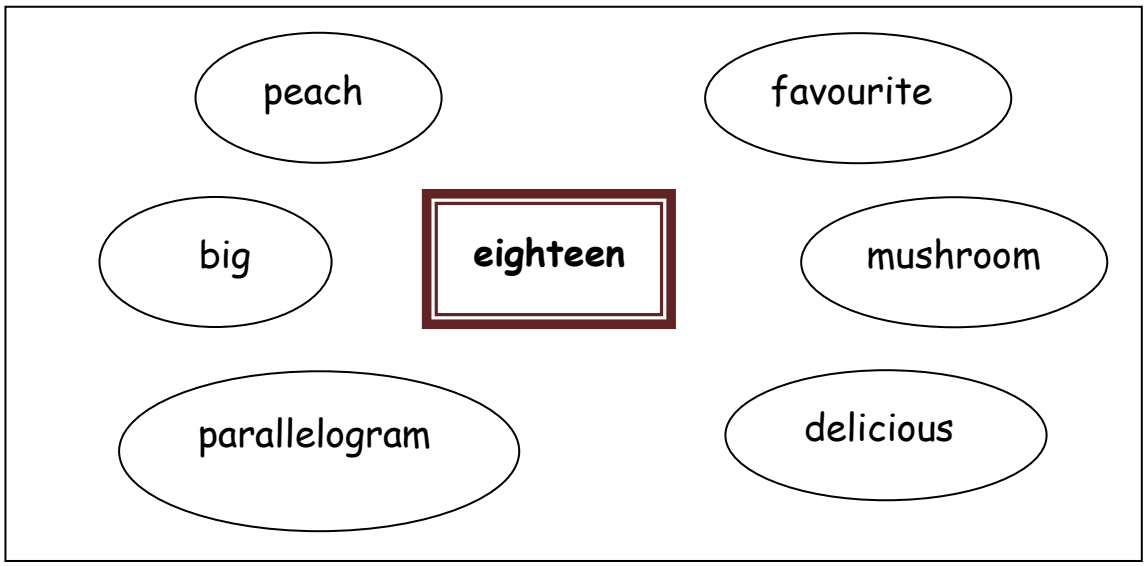


Q.4

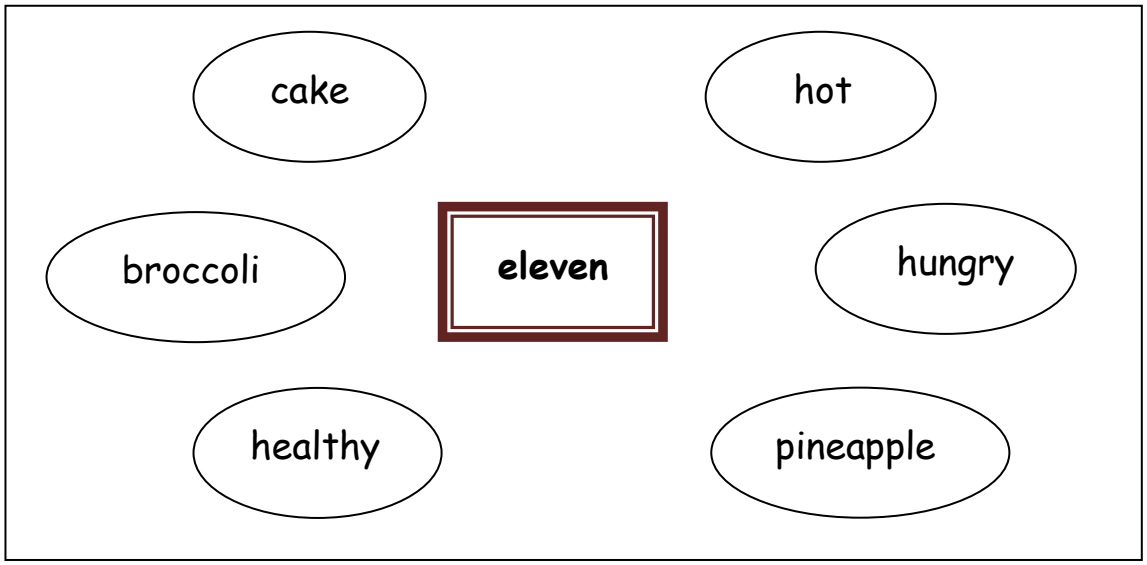


Vocabulary Depth Test

Q.5

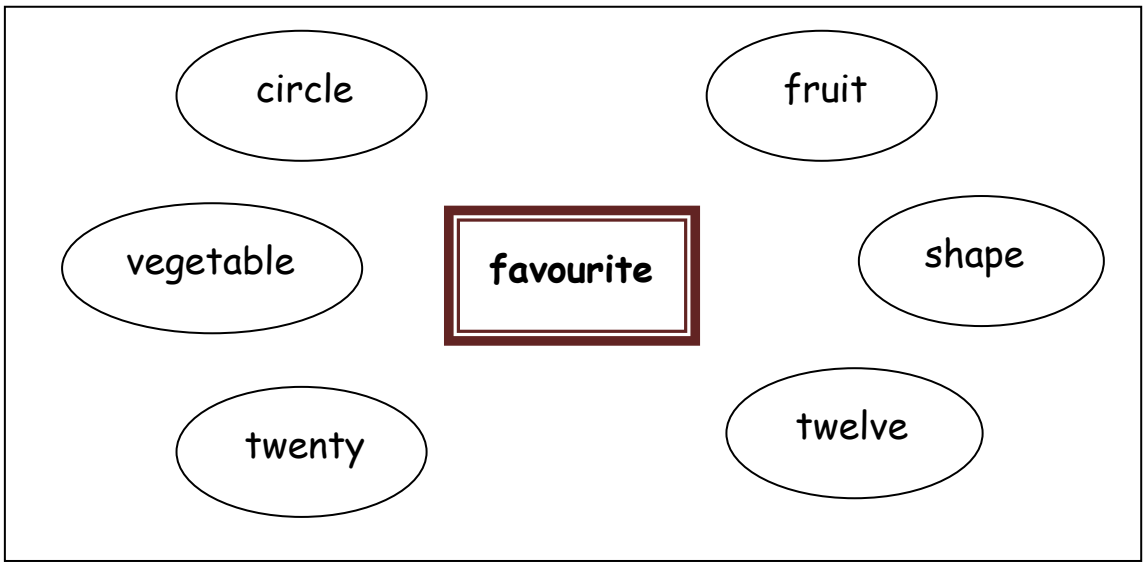


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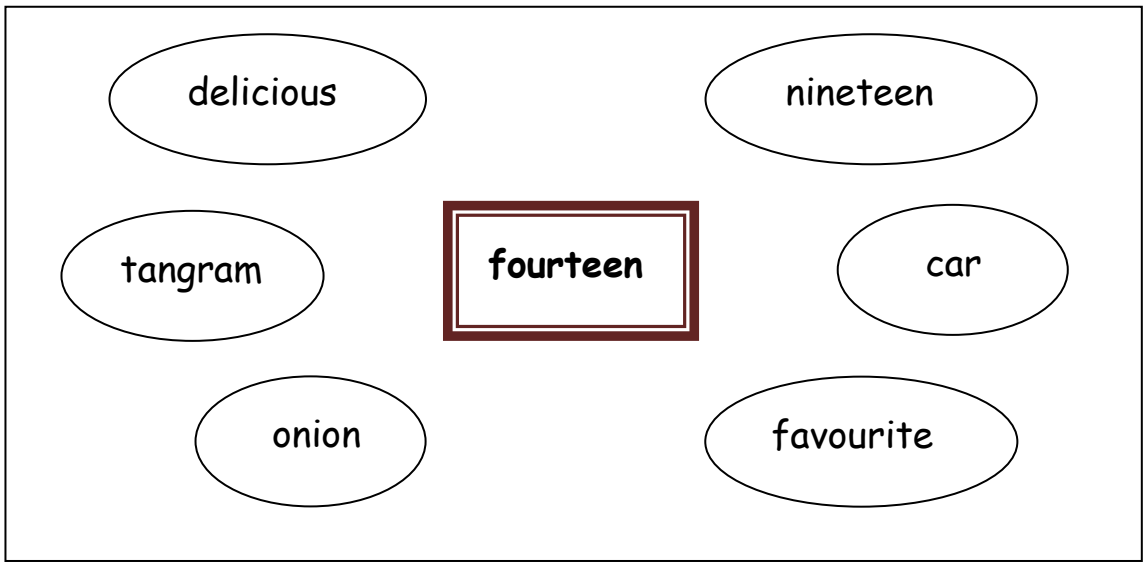


Vocabulary Depth Test

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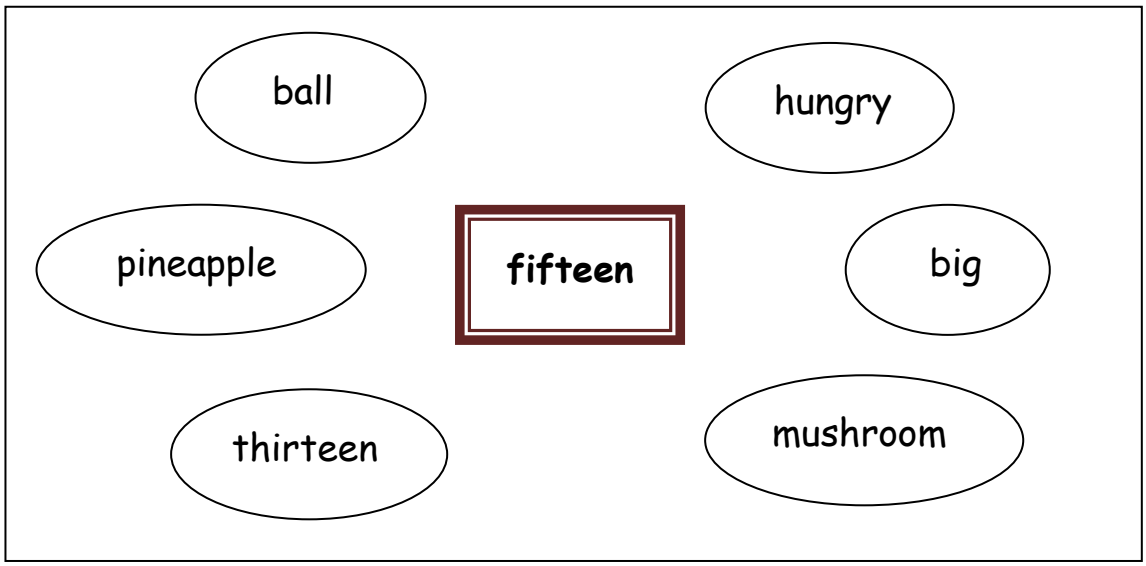


Q.8

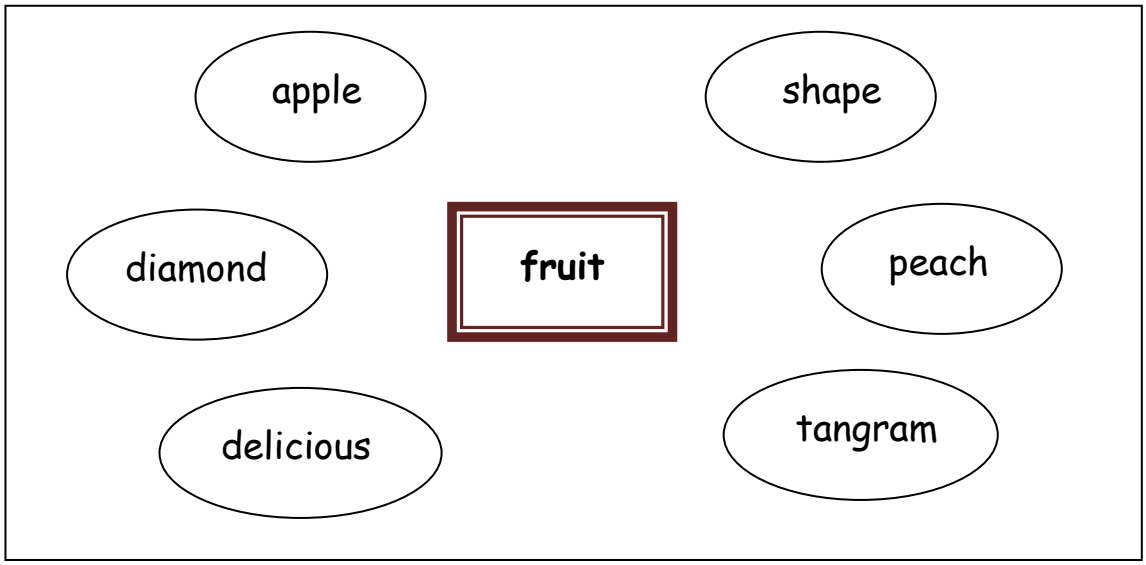


Vocabulary Depth Test

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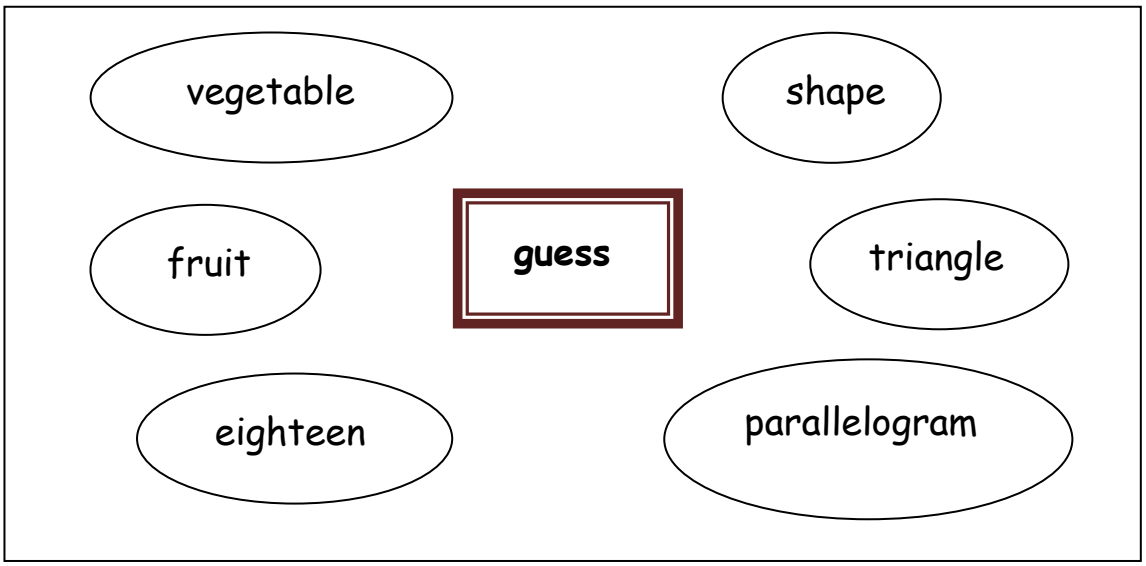


Q.10

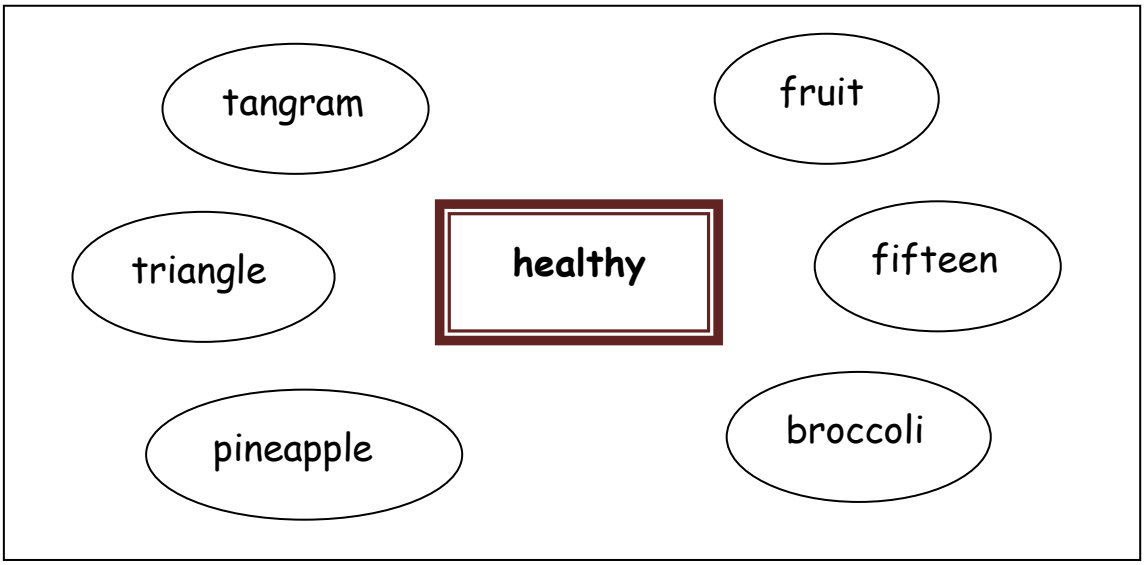


Vocabulary Depth Test

Q.11

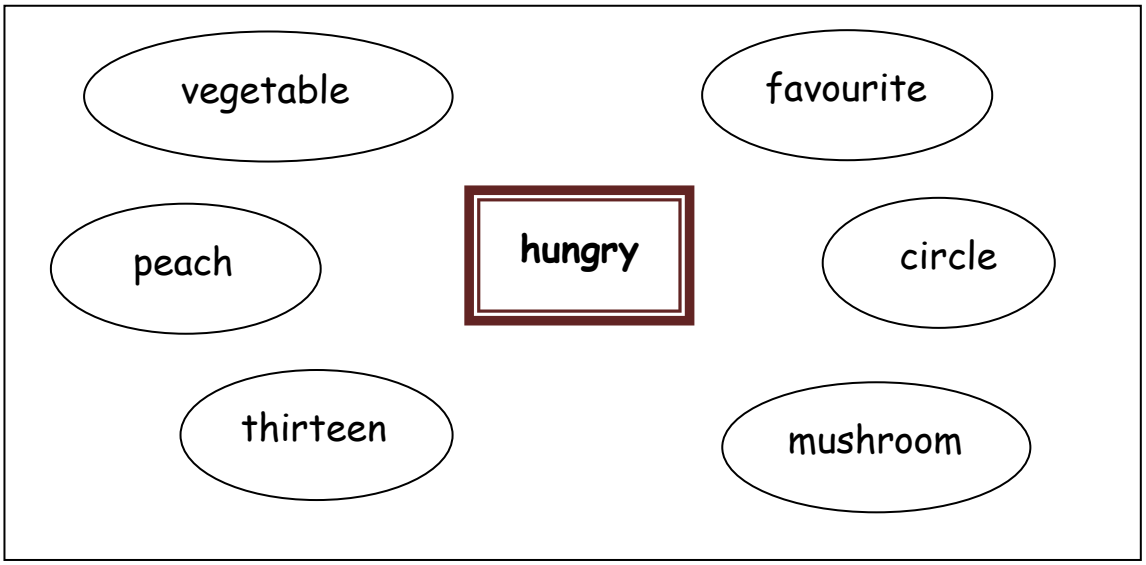


Q.12

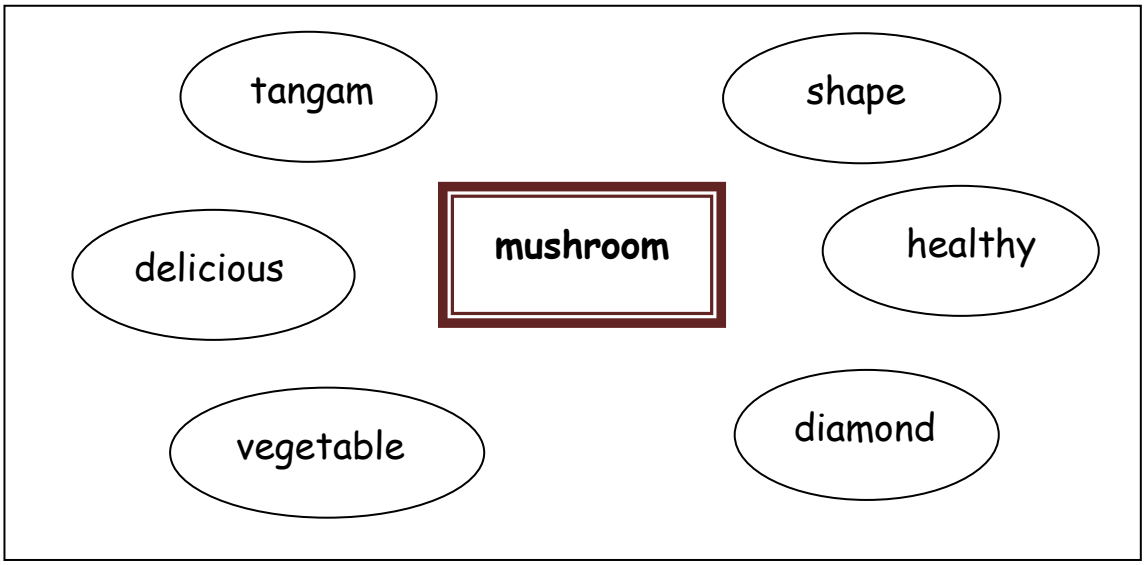


Vocabulary Depth Test

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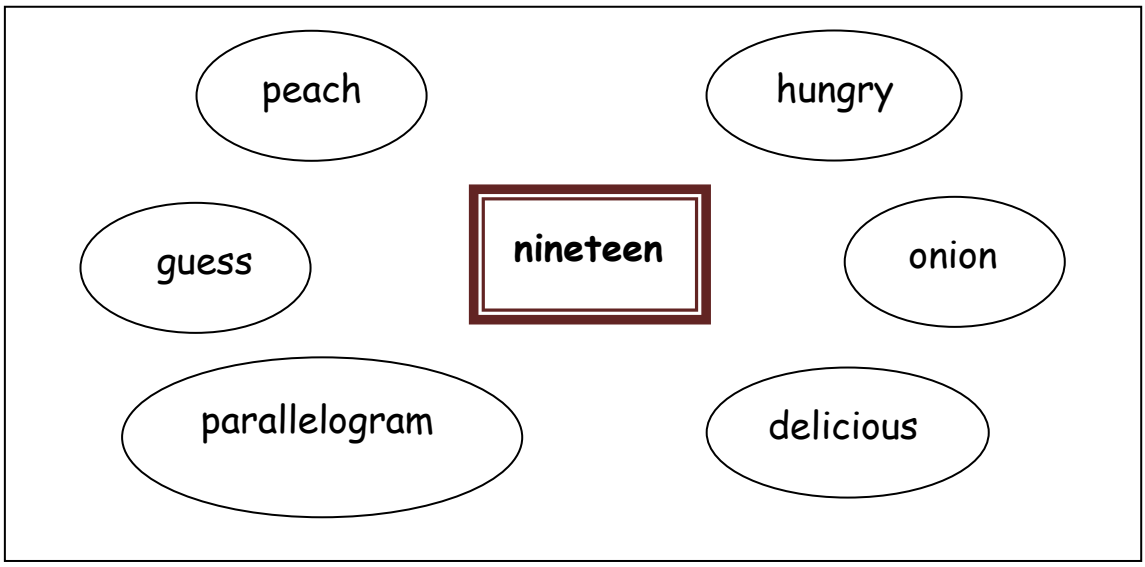


Q.14

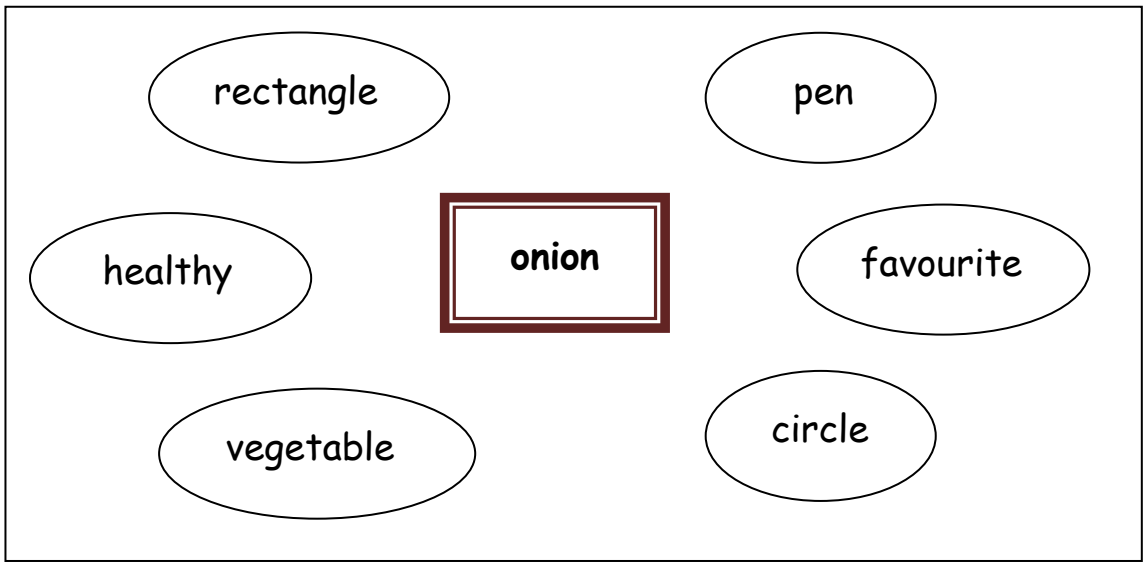


Vocabulary Depth Test

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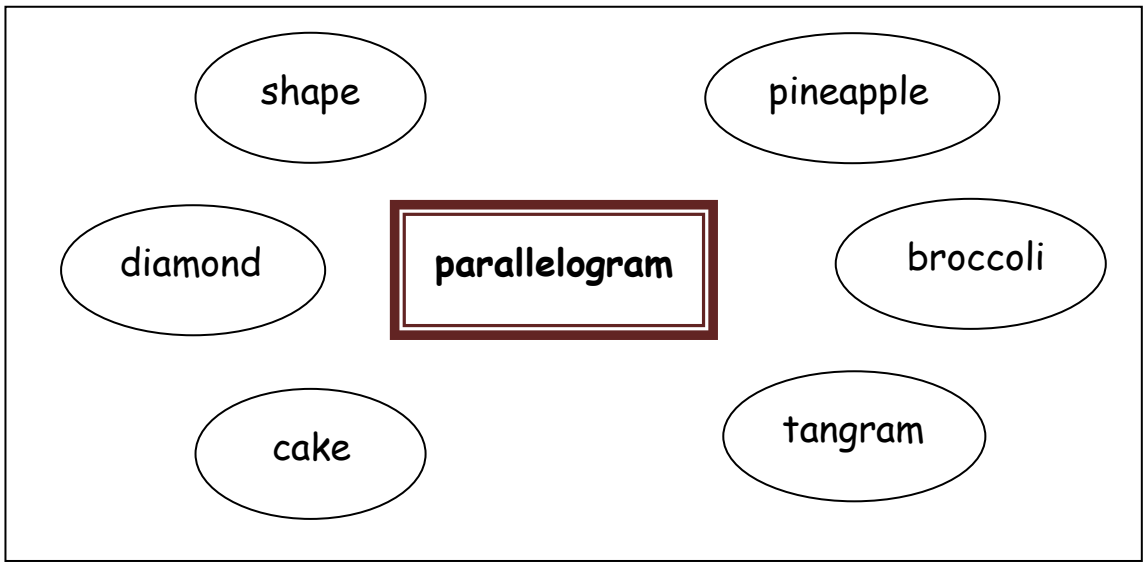


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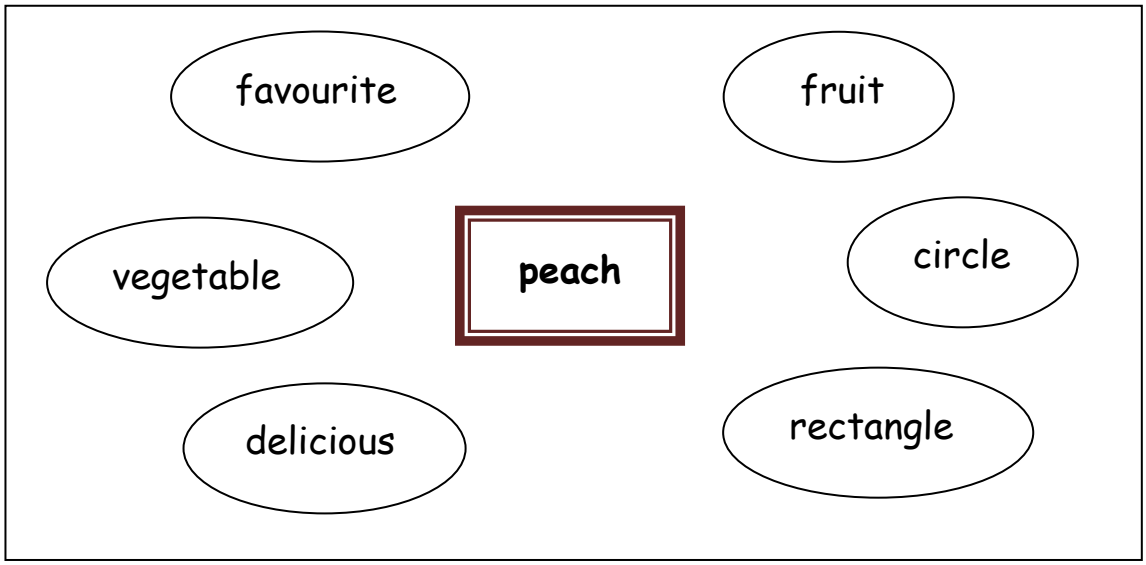


Vocabulary Depth Test

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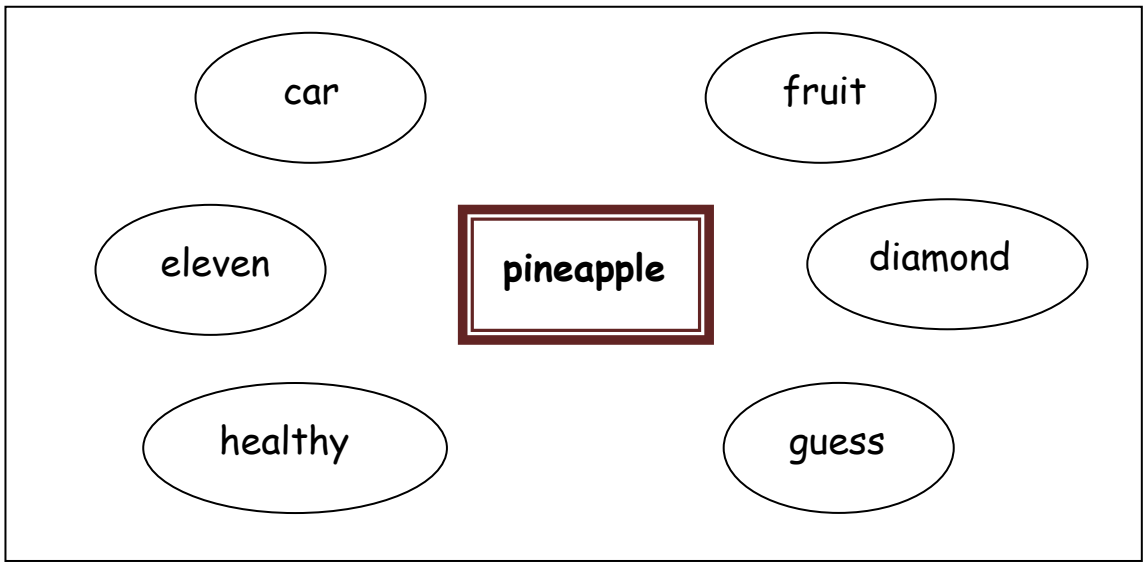


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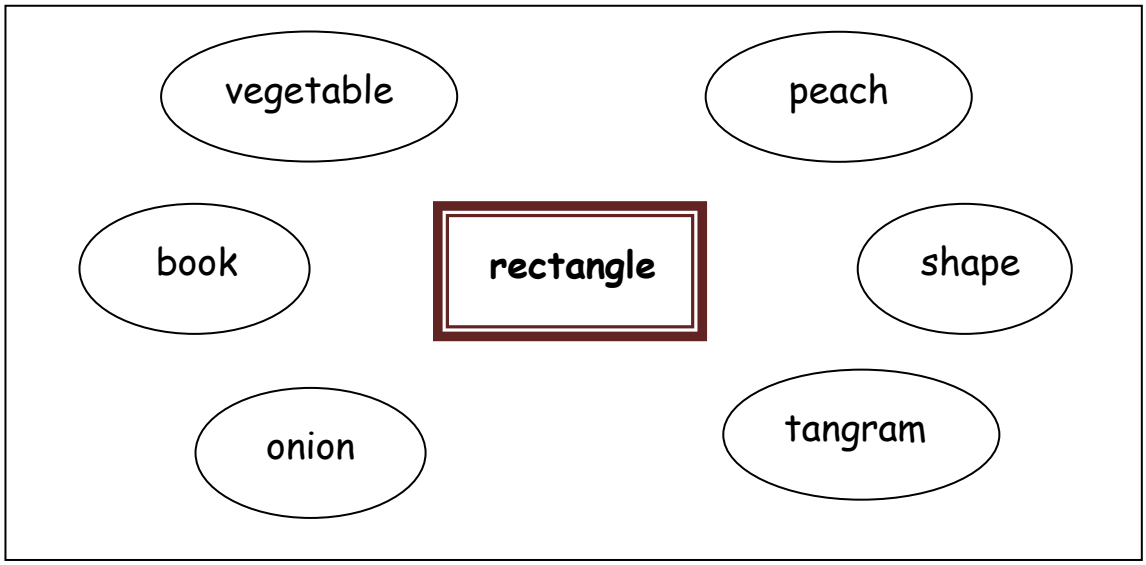


Vocabulary Depth Test

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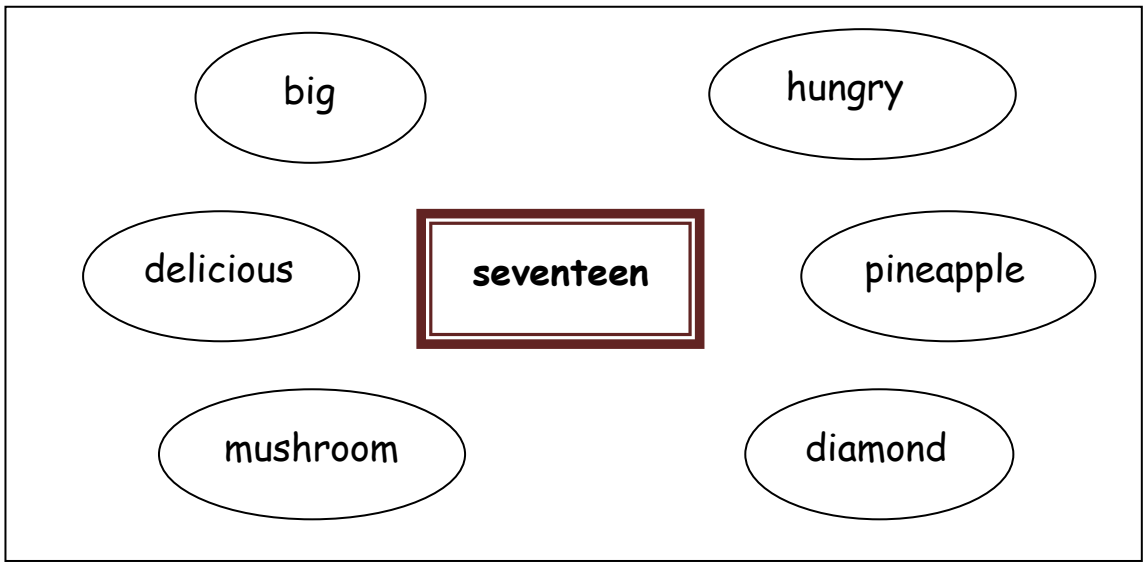


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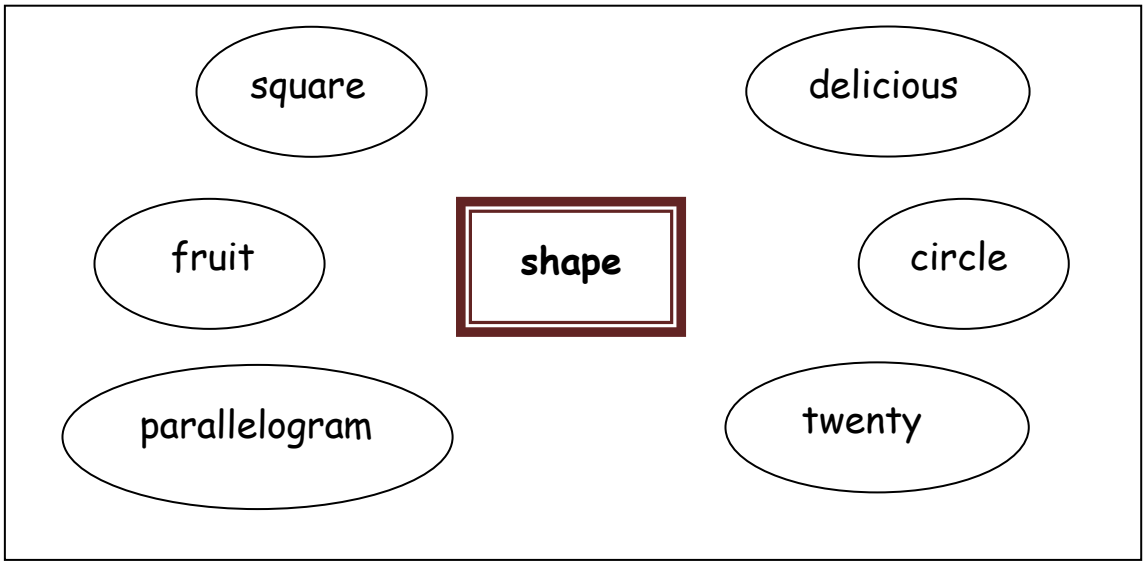


Vocabulary Depth Test

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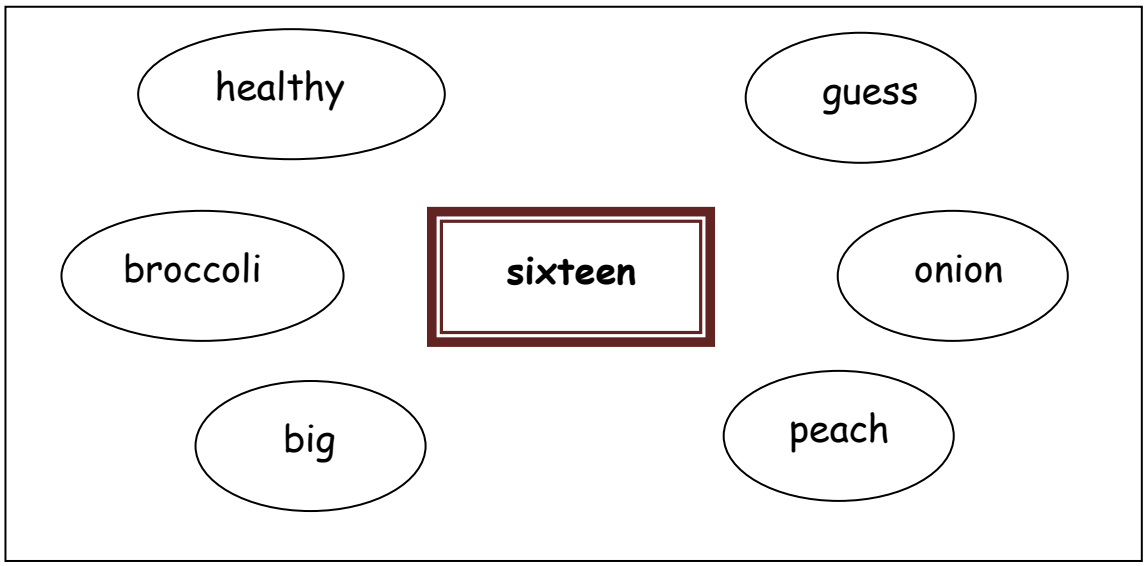


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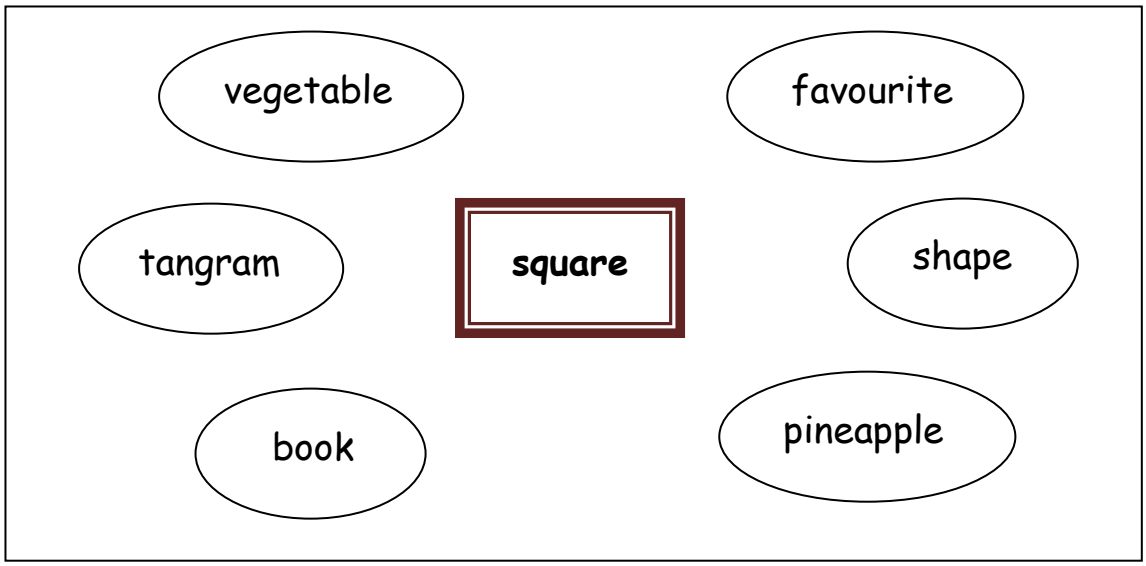


Vocabulary Depth Test

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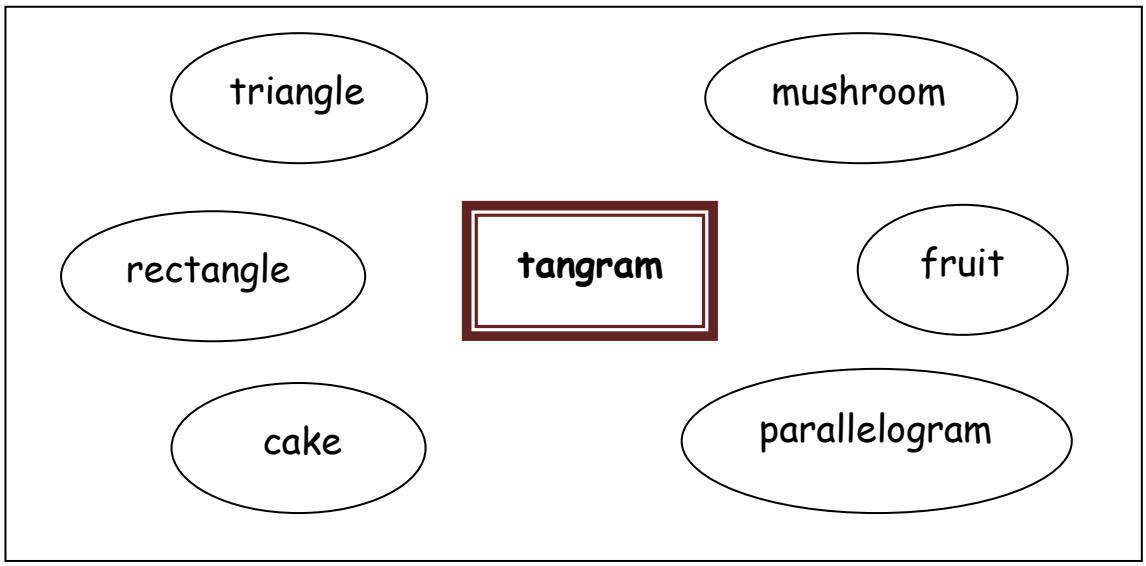


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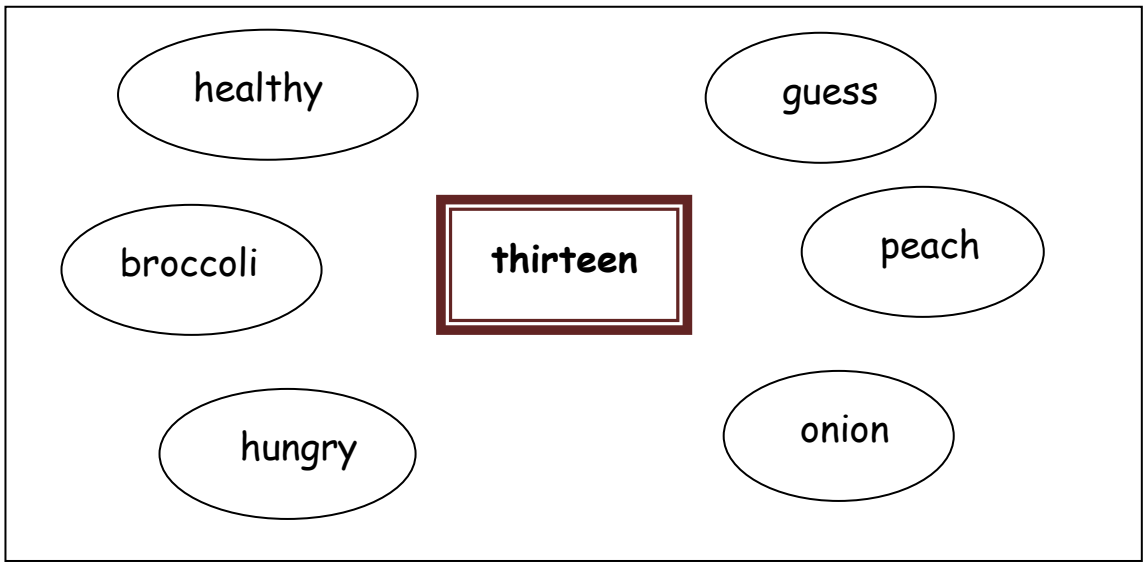


Vocabulary Depth Test

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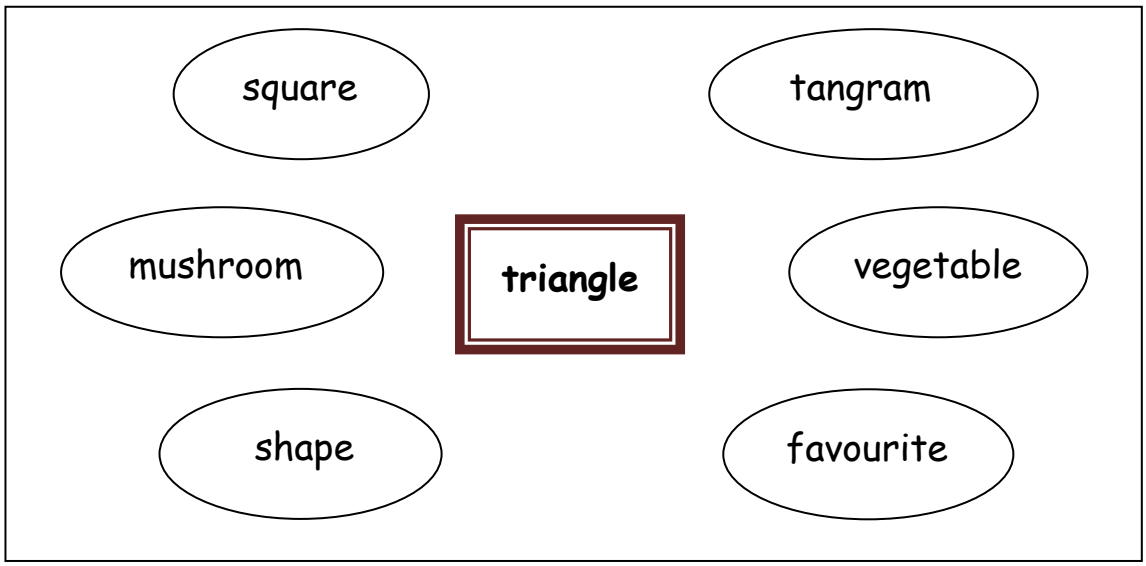


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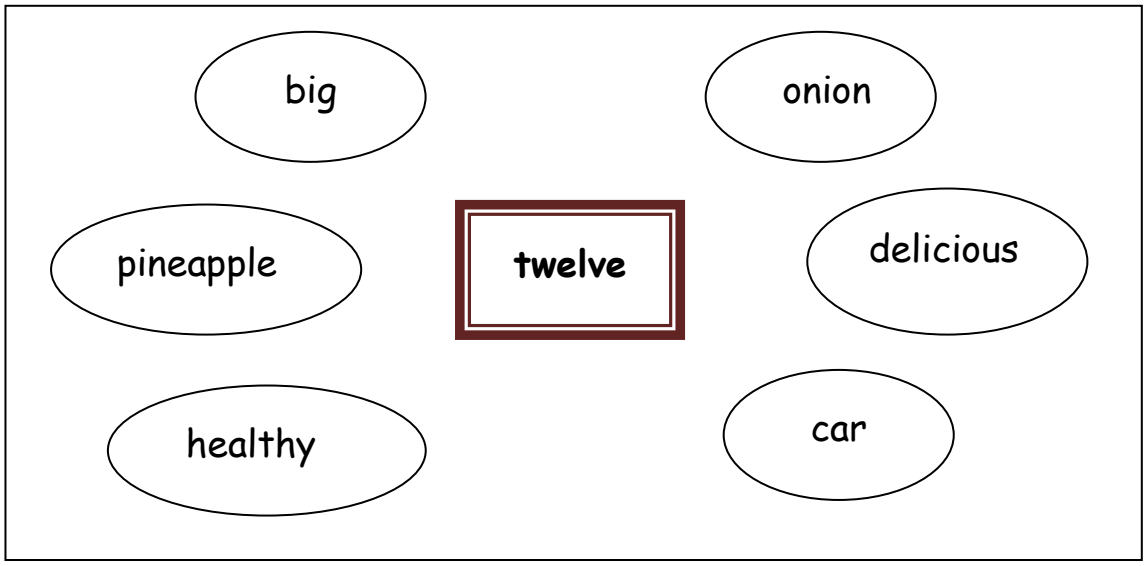


Vocabulary Depth Test

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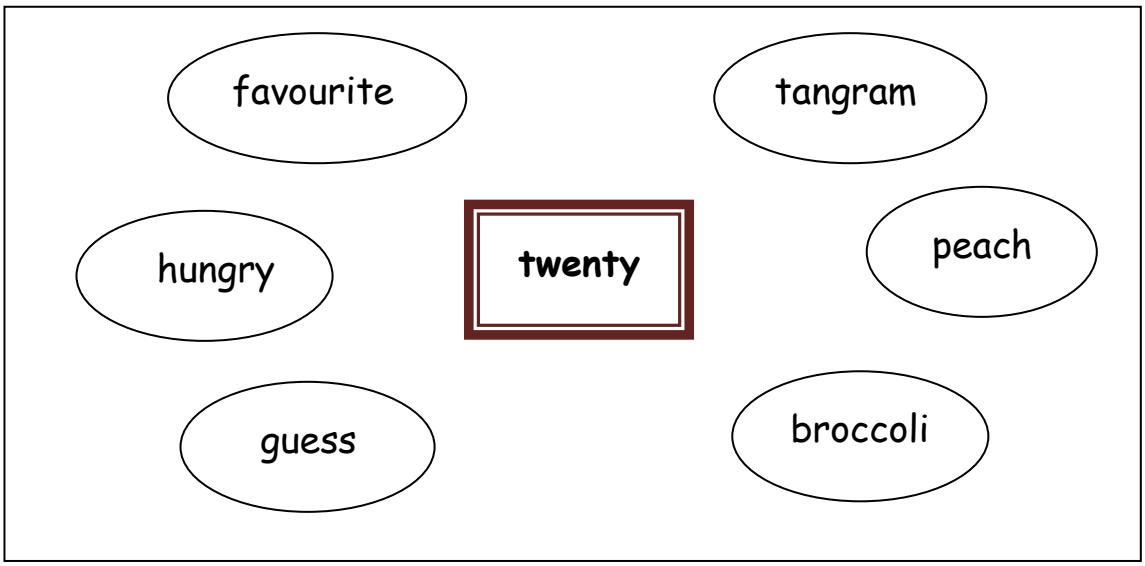


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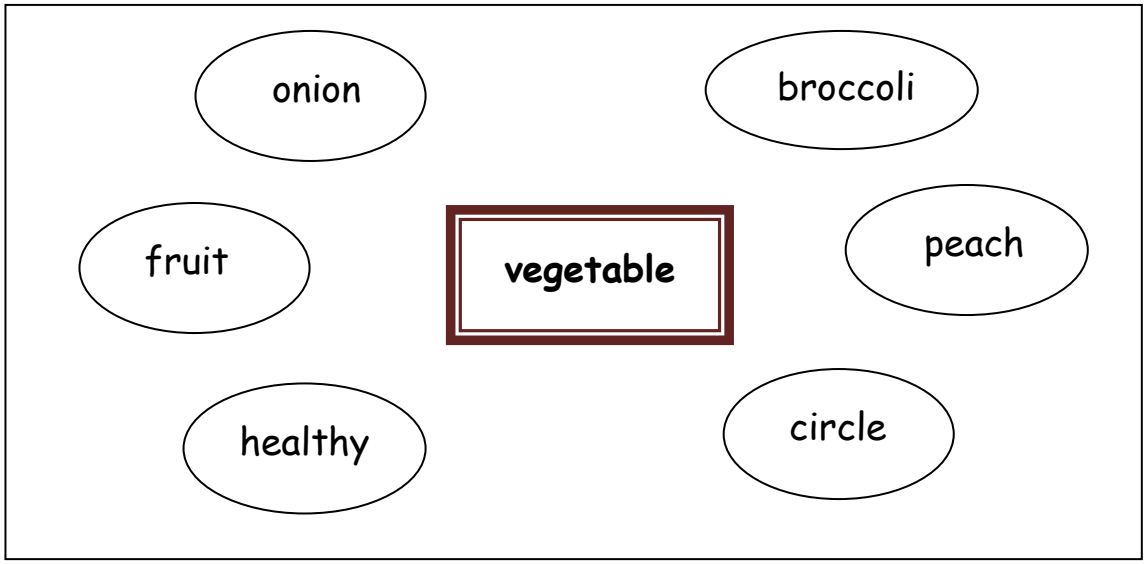


Vocabulary Depth Test

Q.29



Q.30



Appendix G: Vocabulary Depth Delayed Posttest

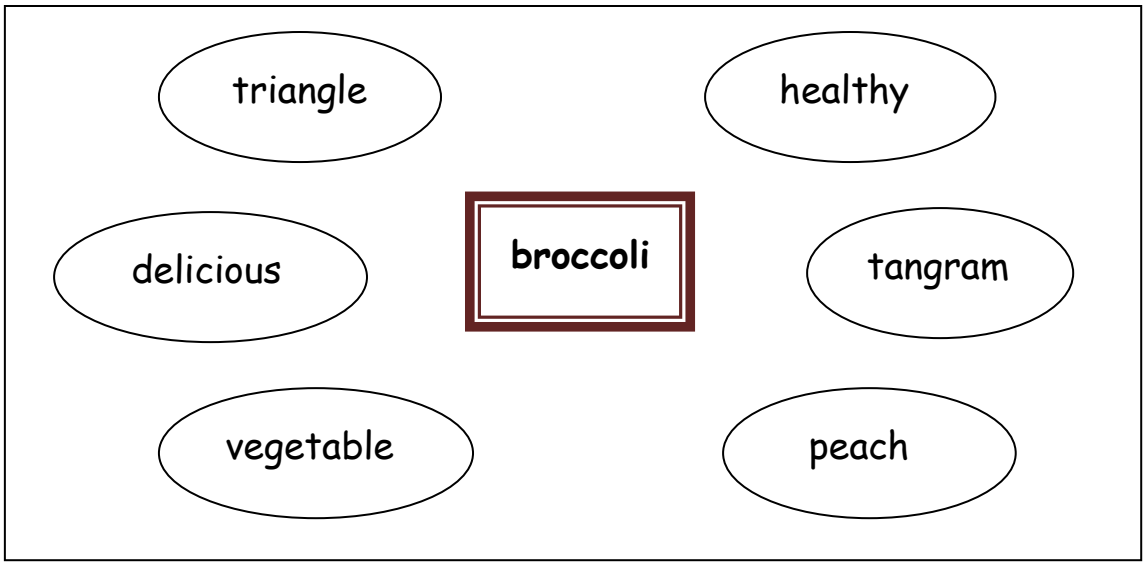
National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Vocabulary Depth Delayed Posttest

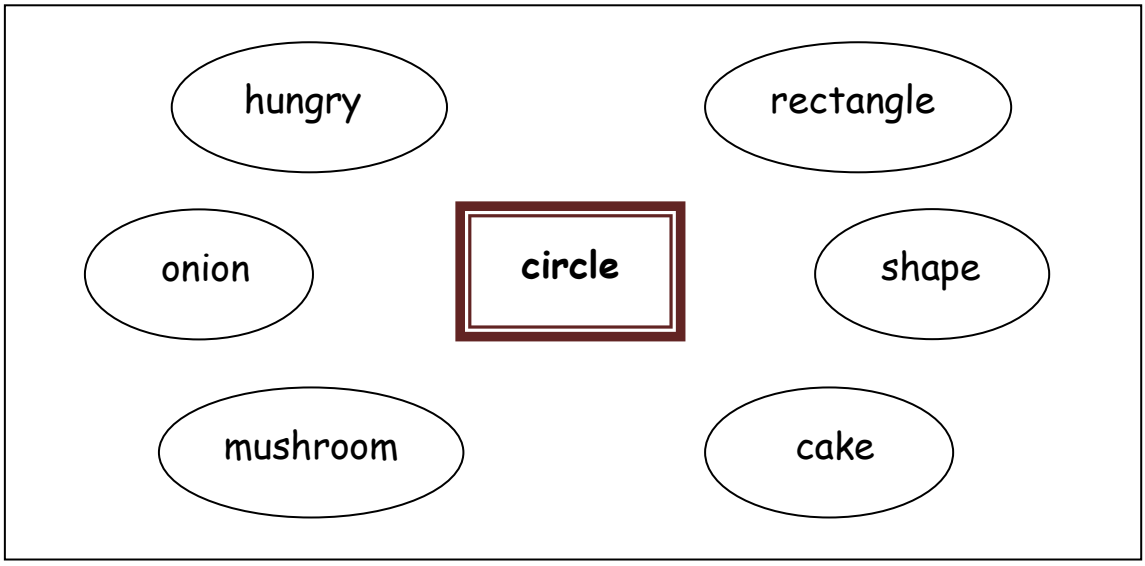
Experimental/Control Group

Name:_____ Score:____/30

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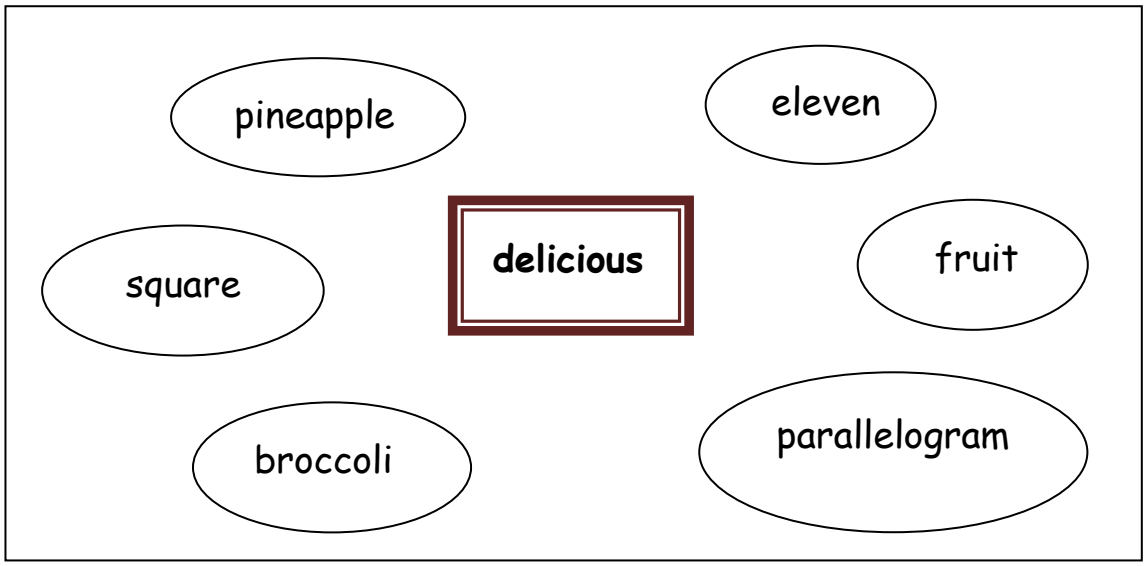


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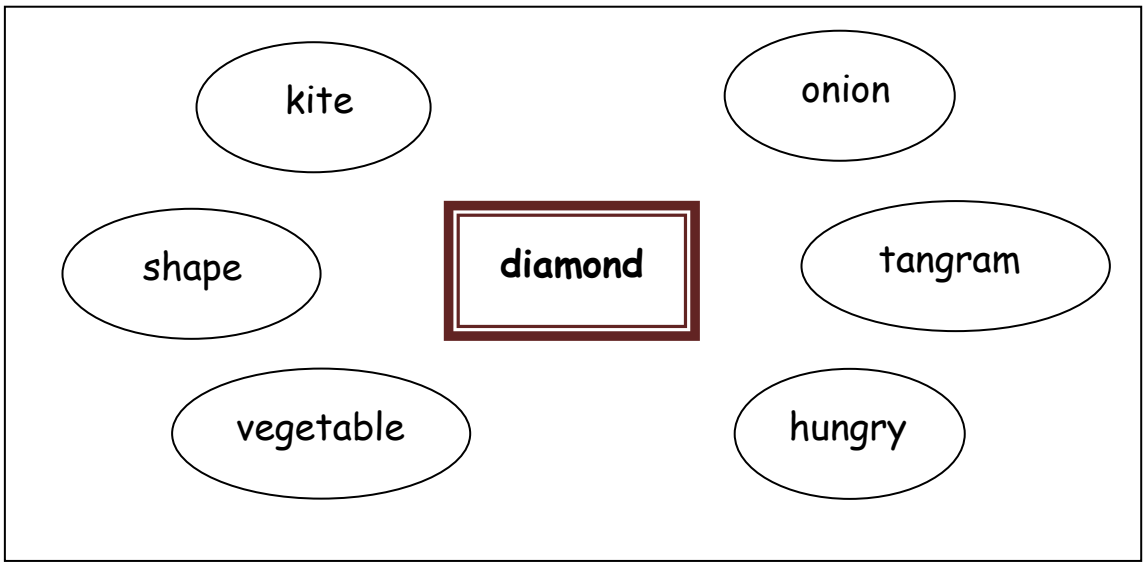


Vocabulary Depth Test

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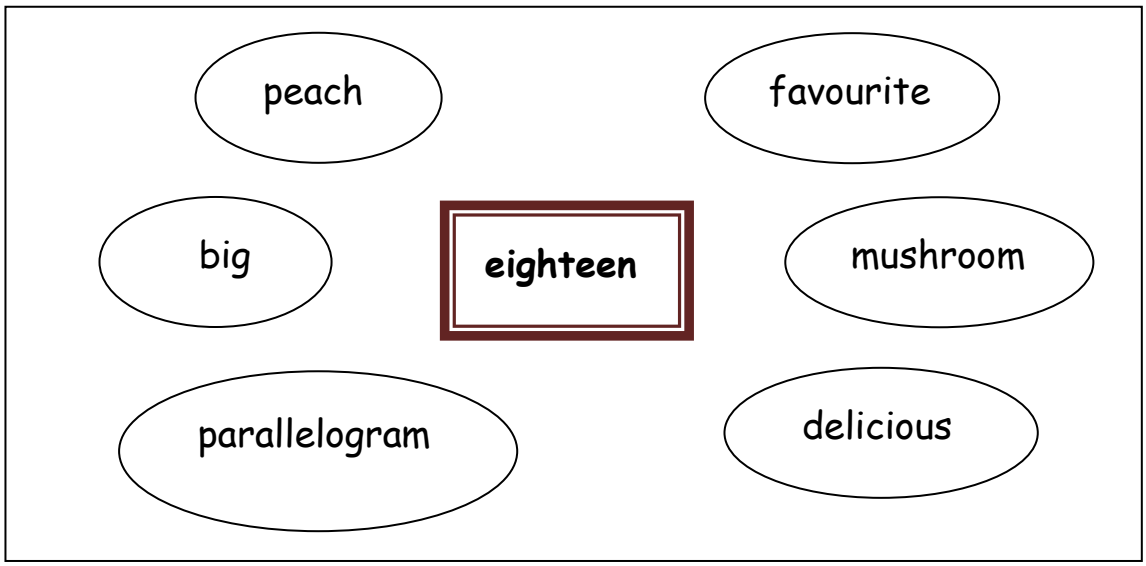


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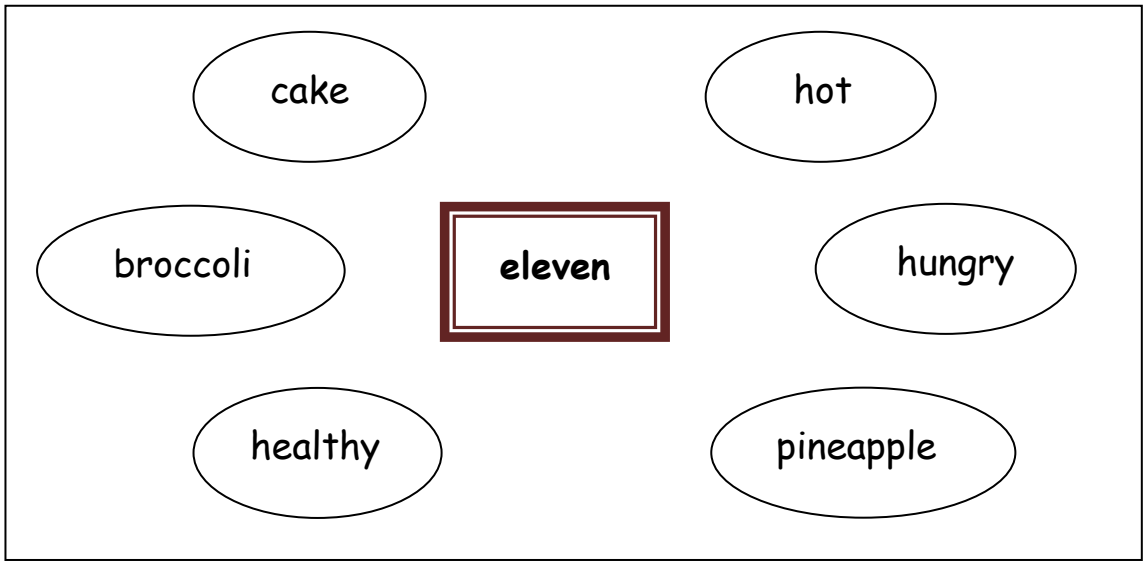


Vocabulary Depth Test

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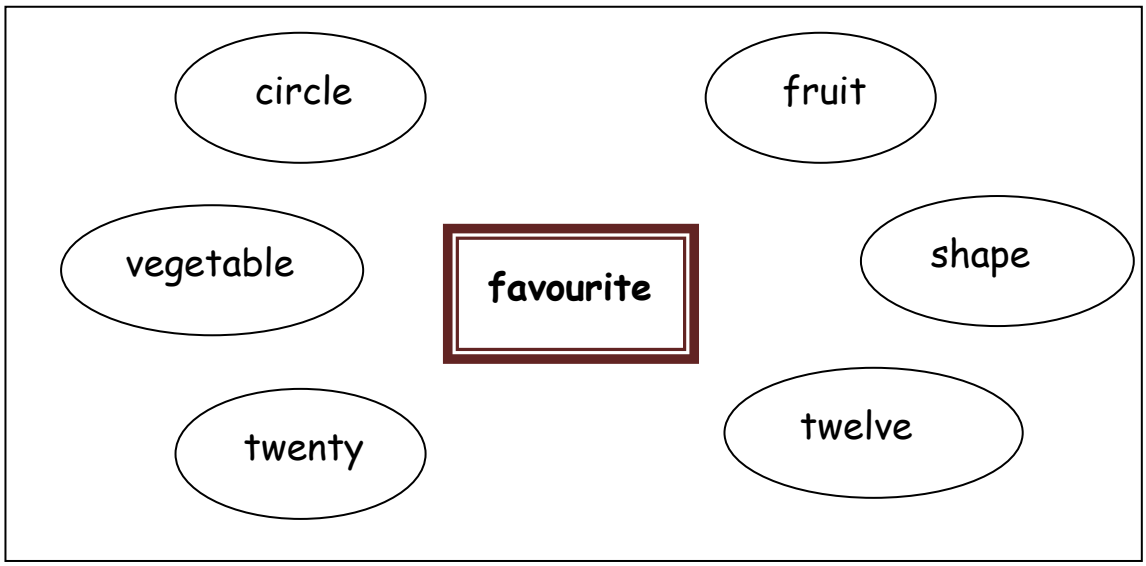


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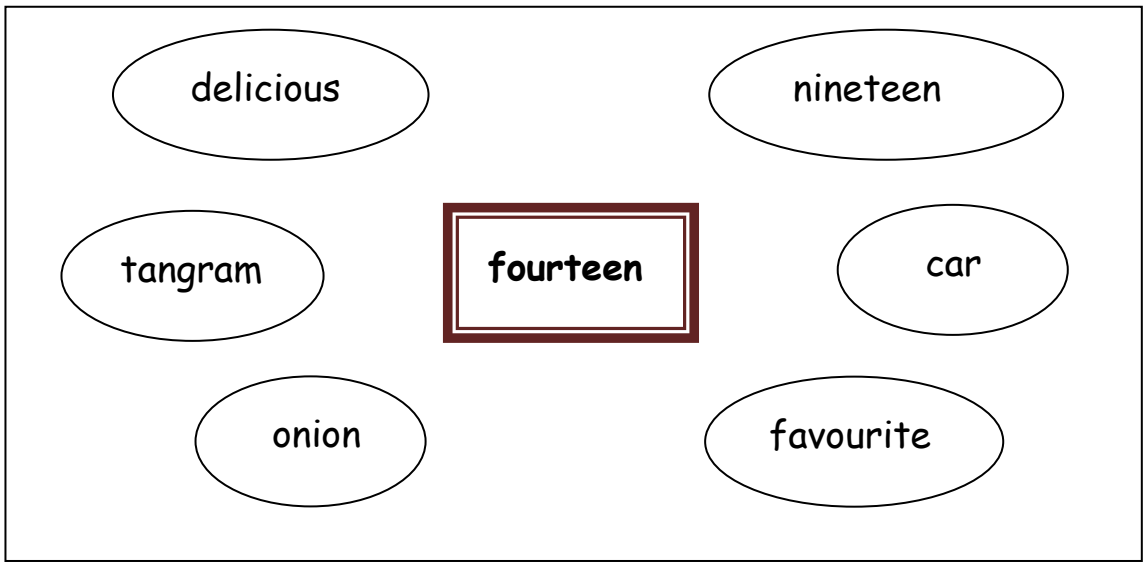


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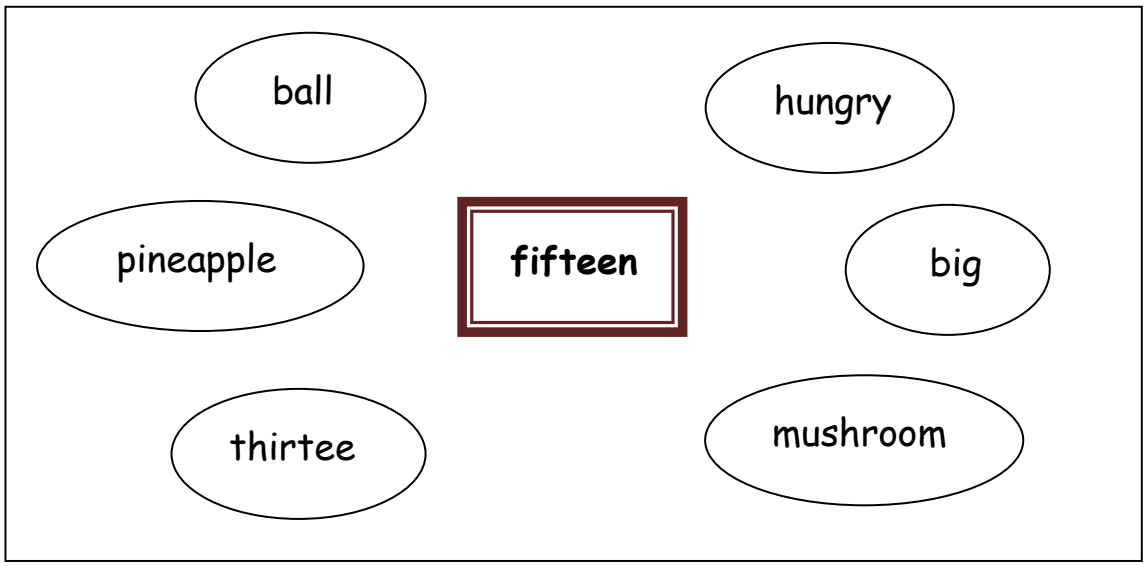


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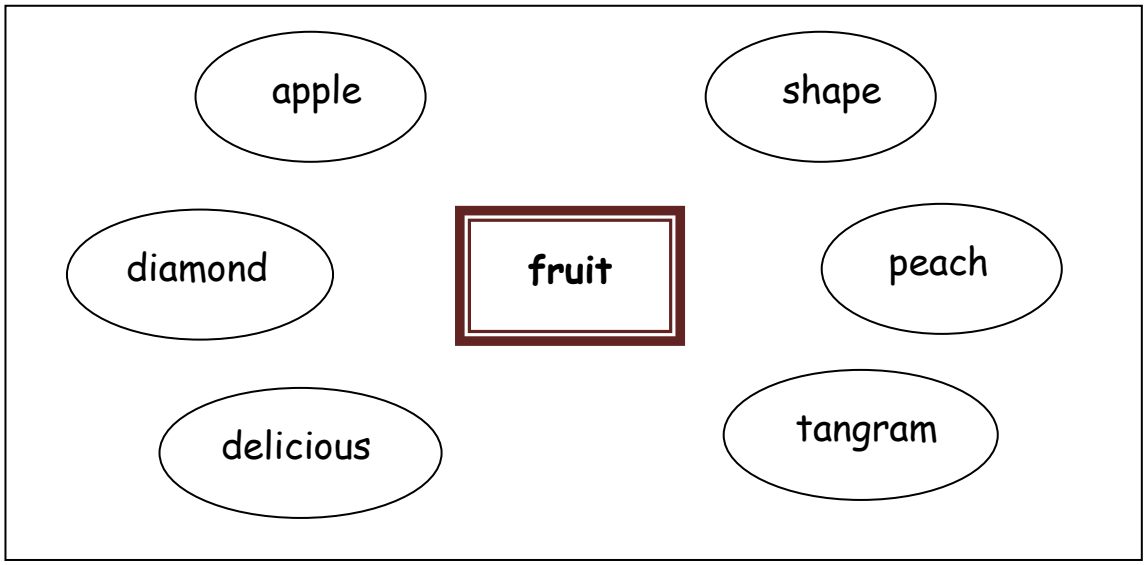


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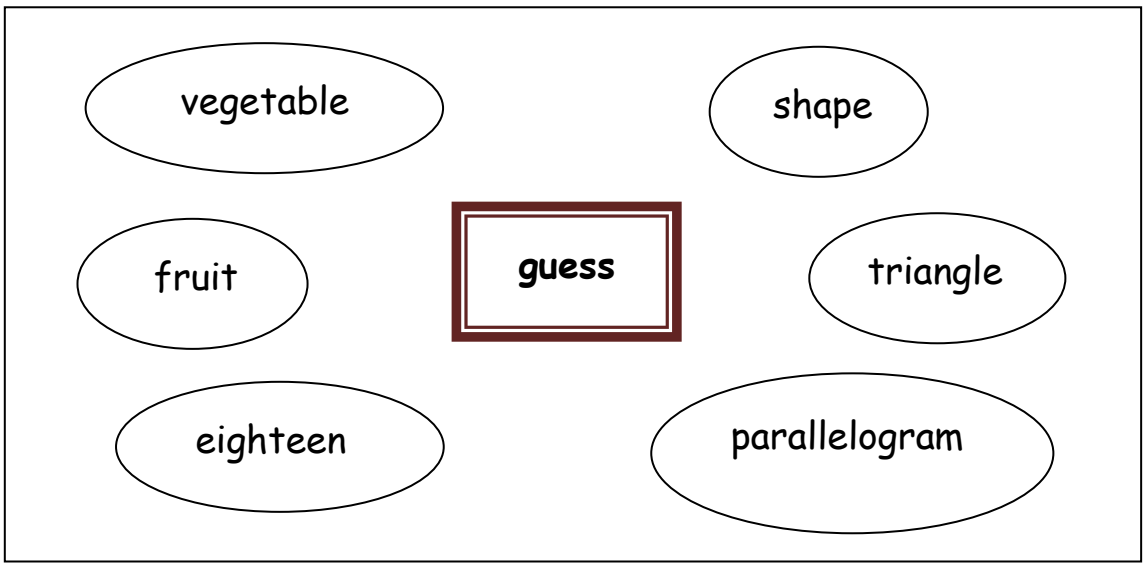


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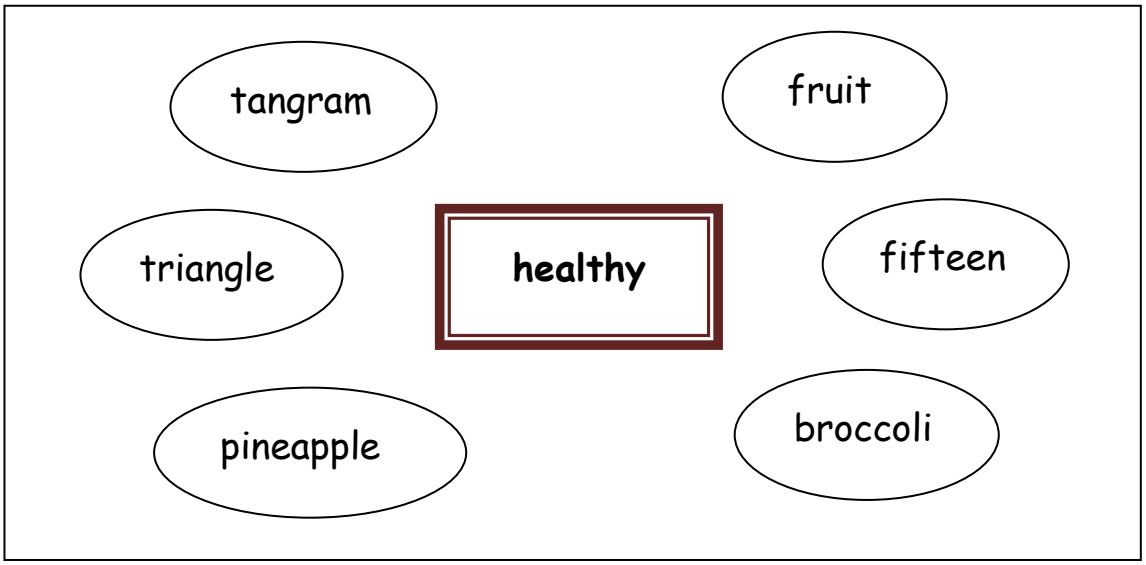


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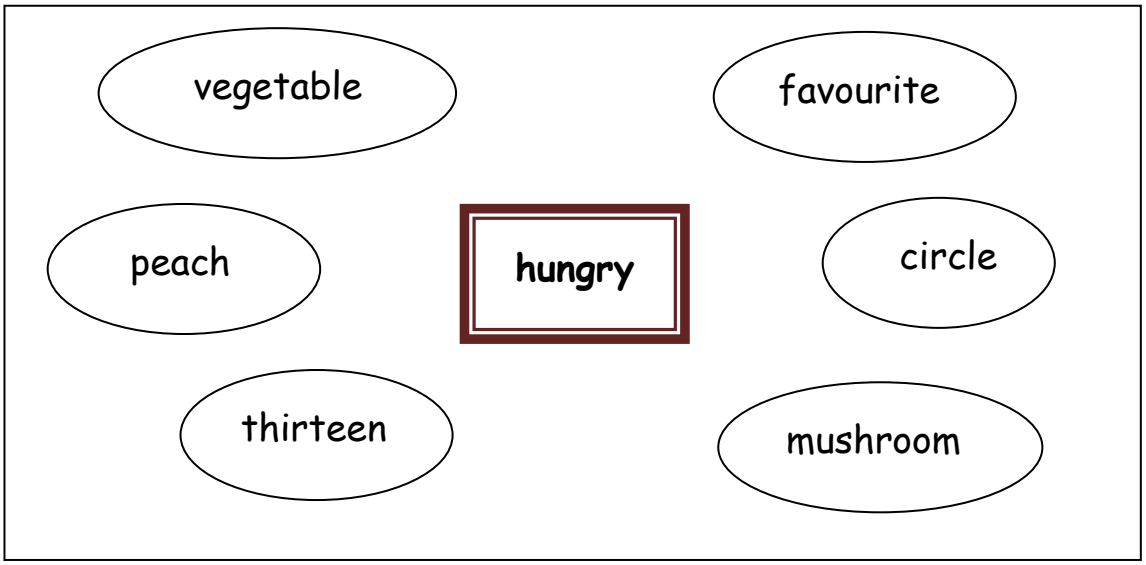


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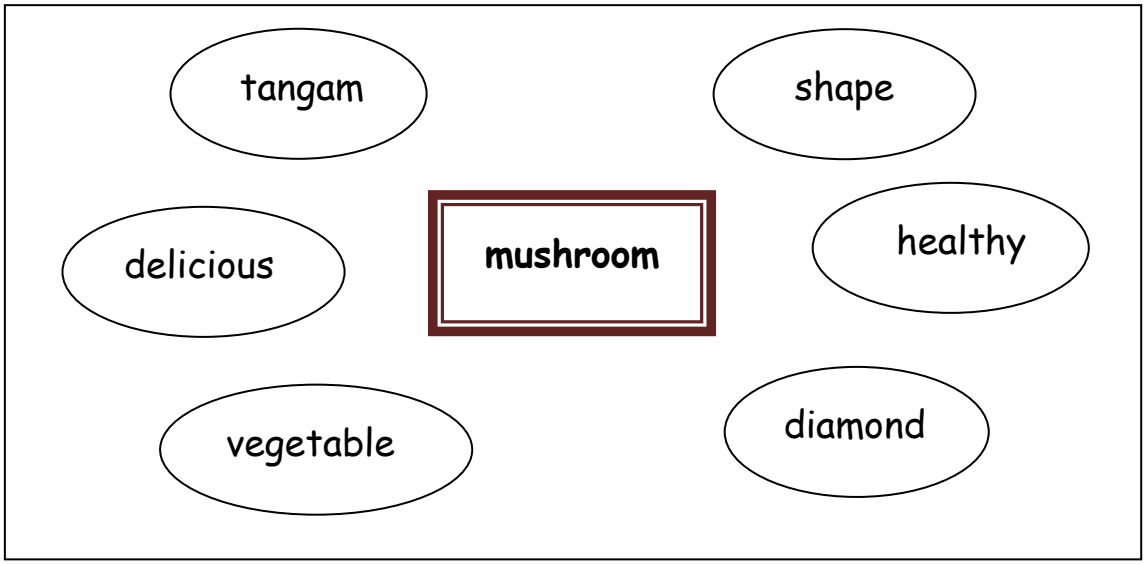


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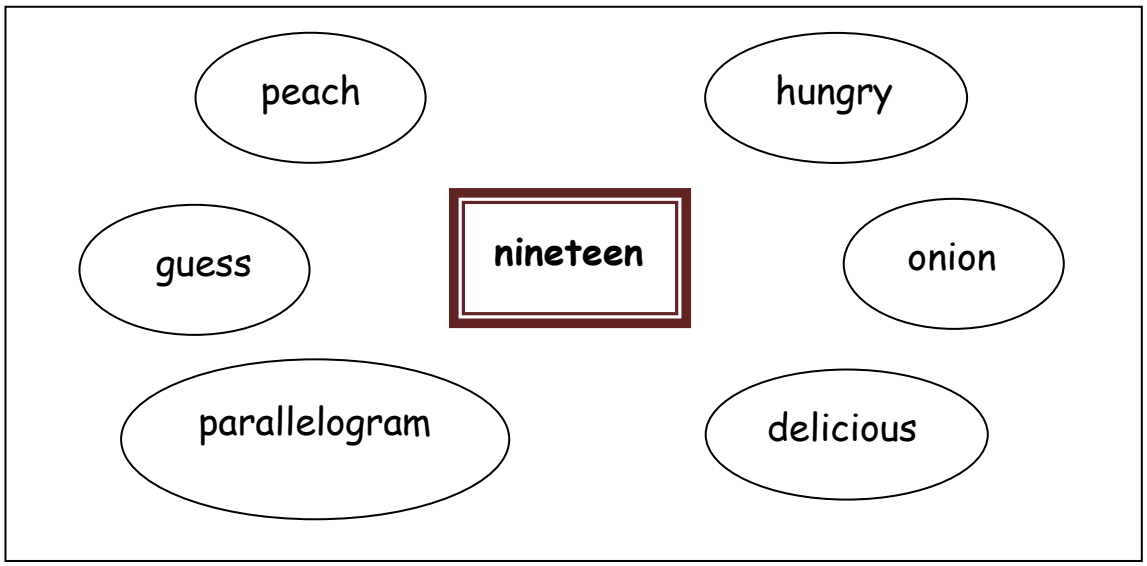


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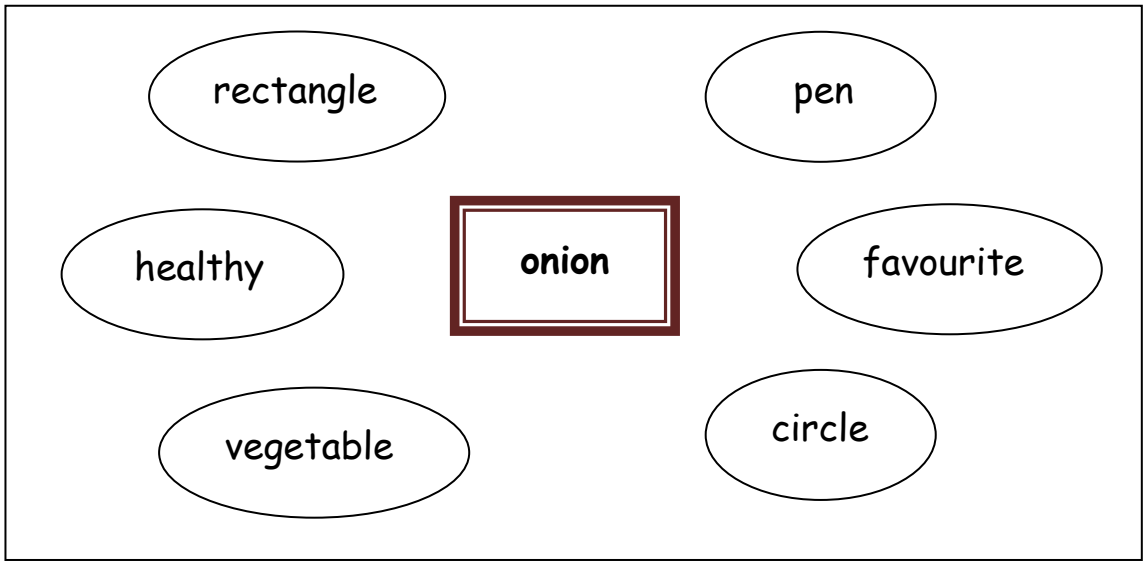


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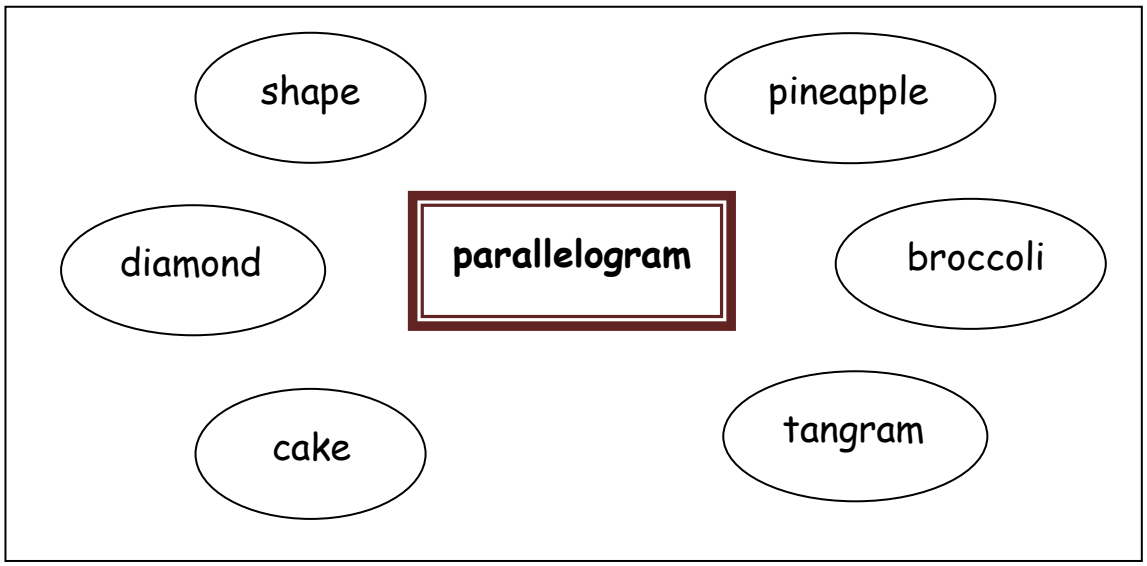


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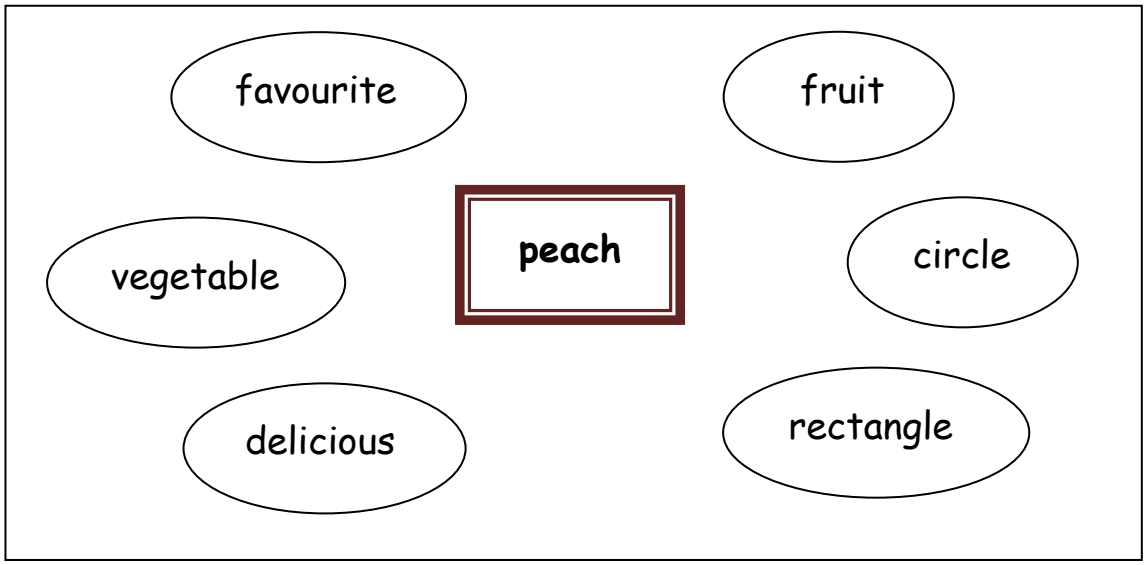


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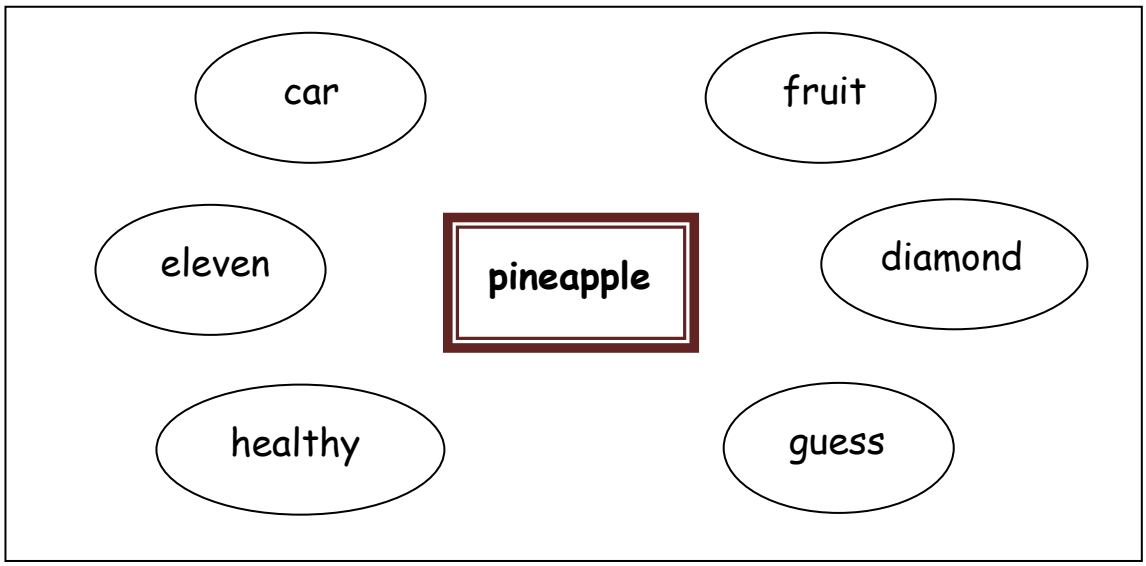


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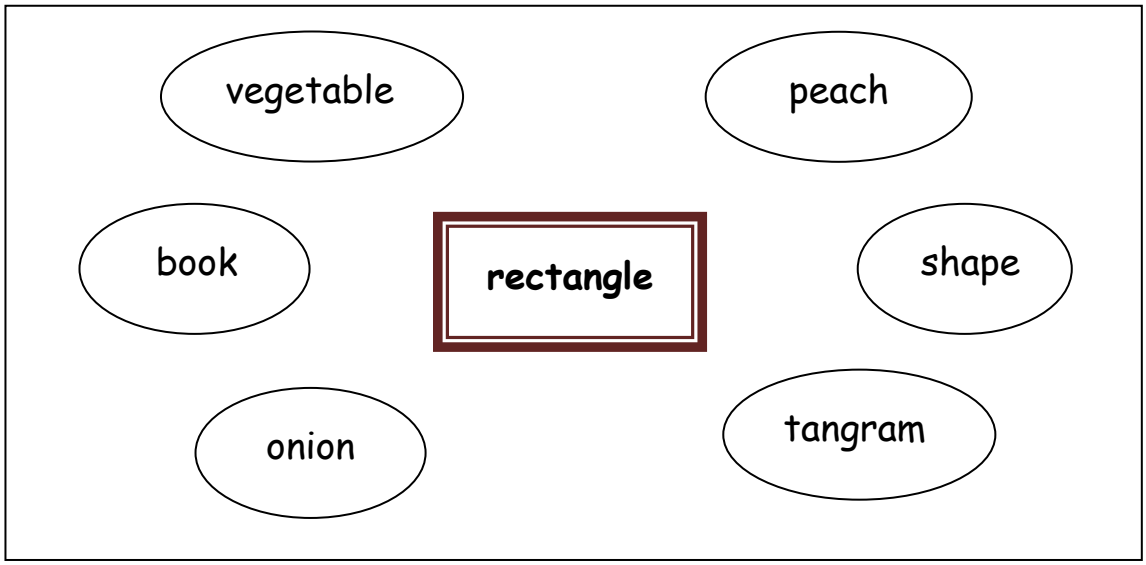


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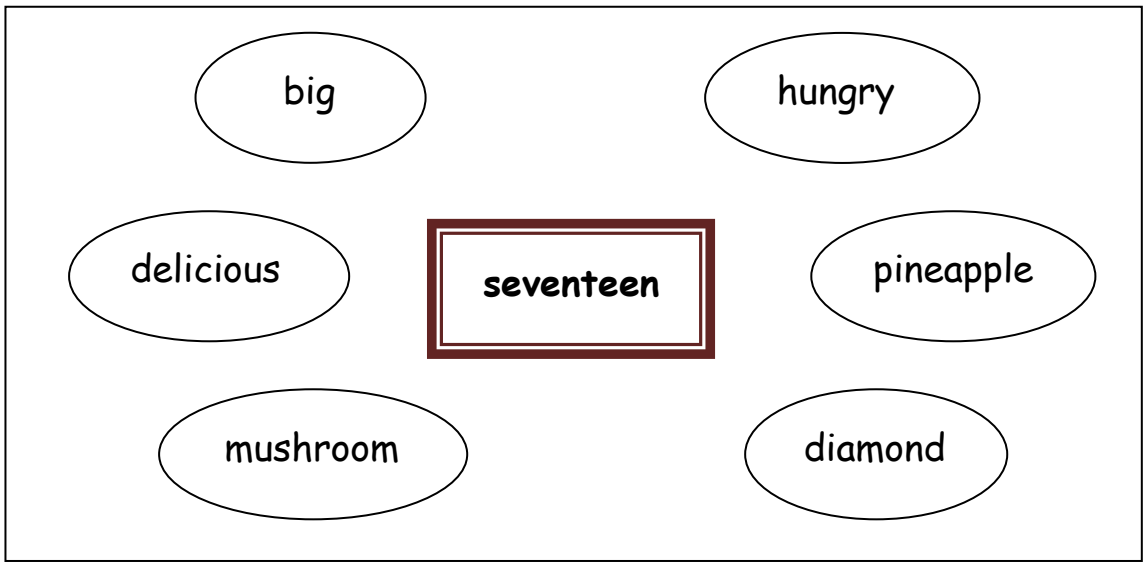


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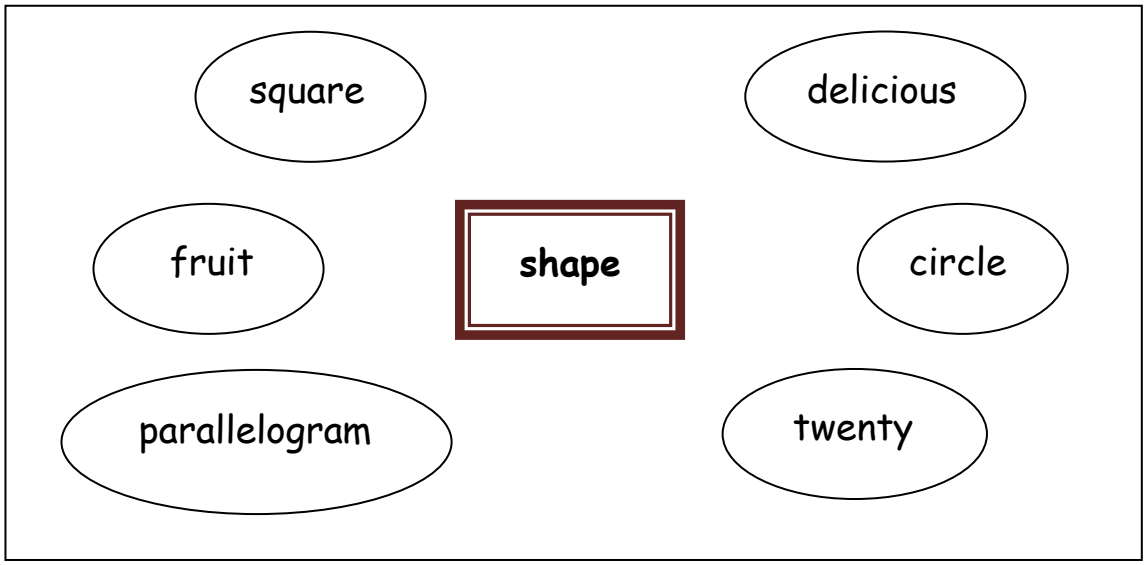


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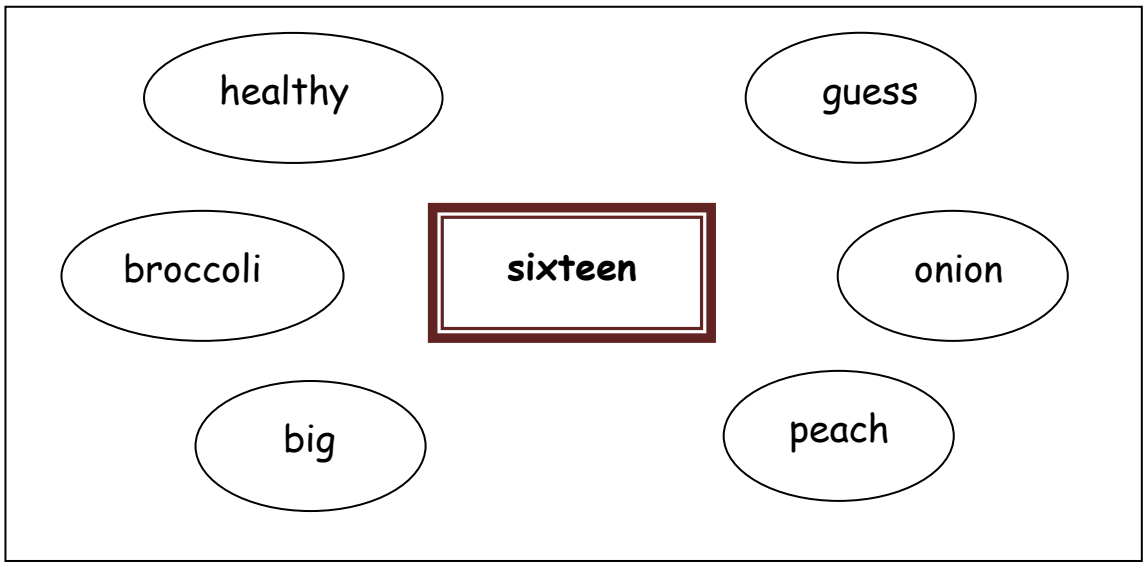


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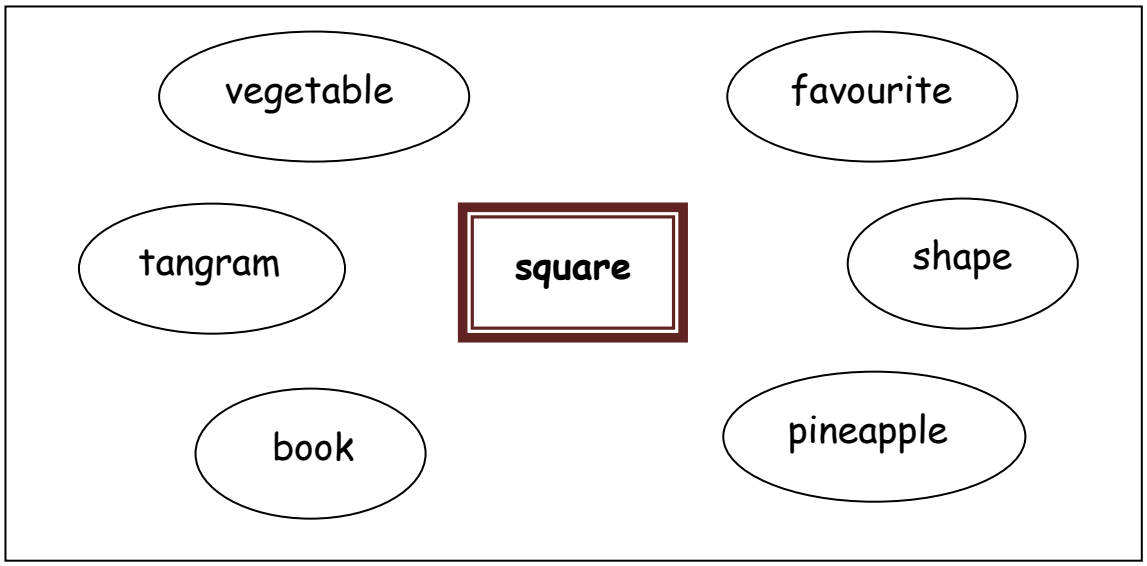


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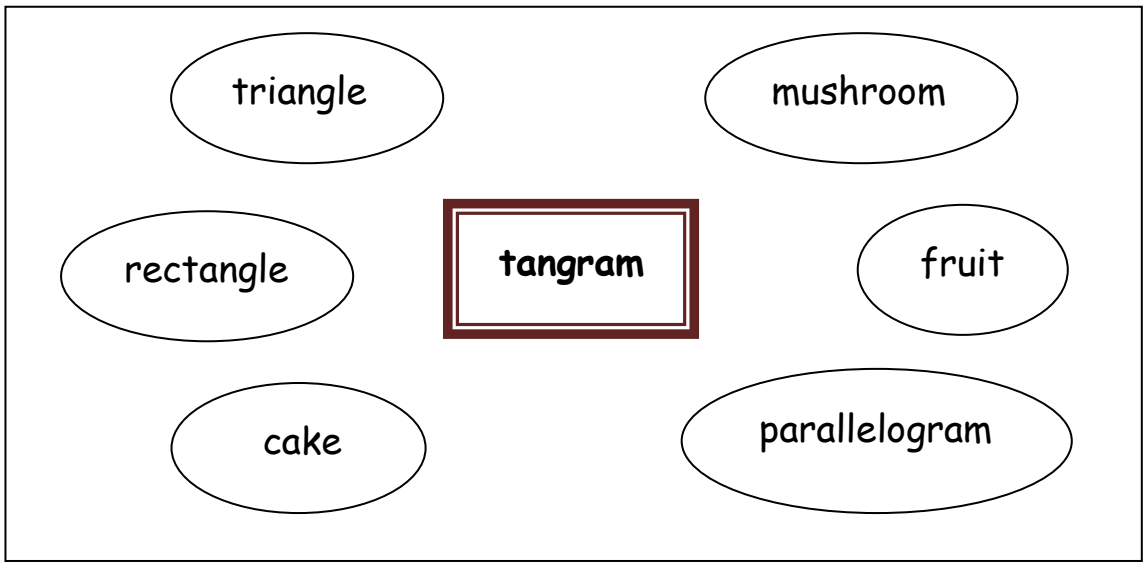


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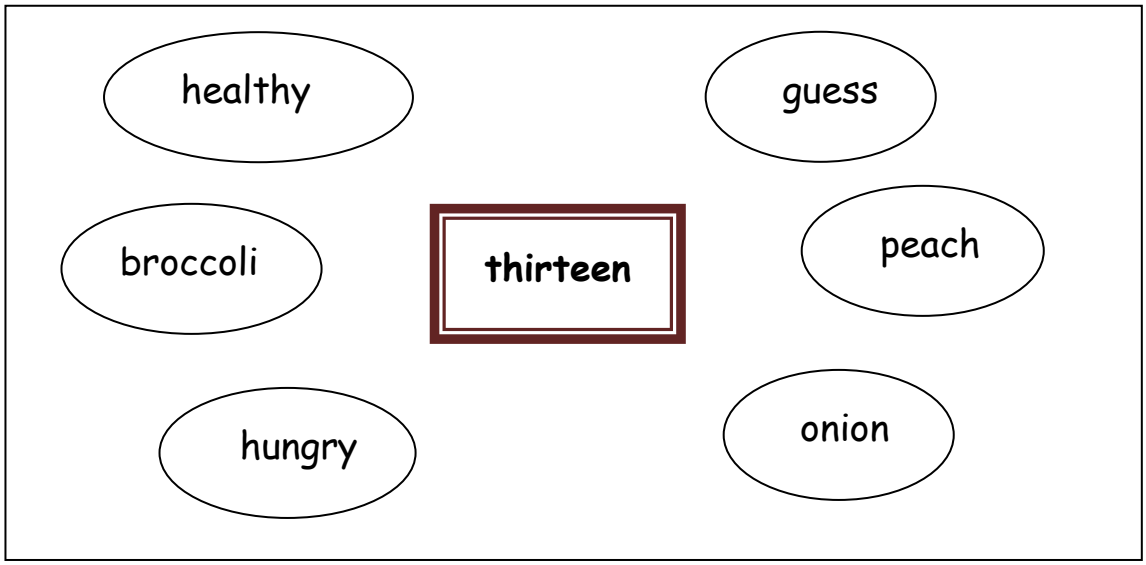


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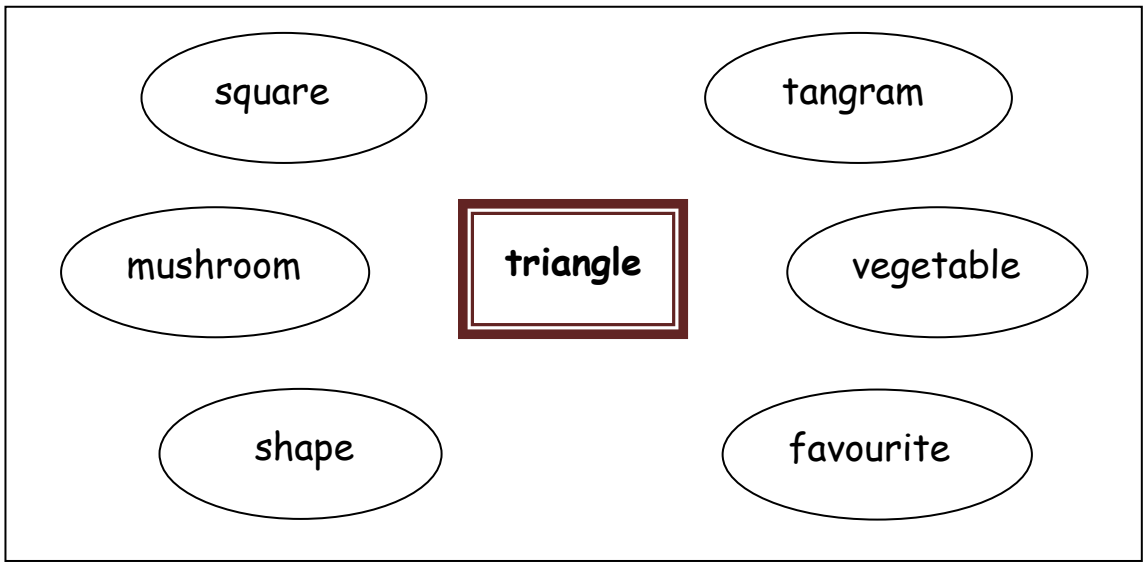


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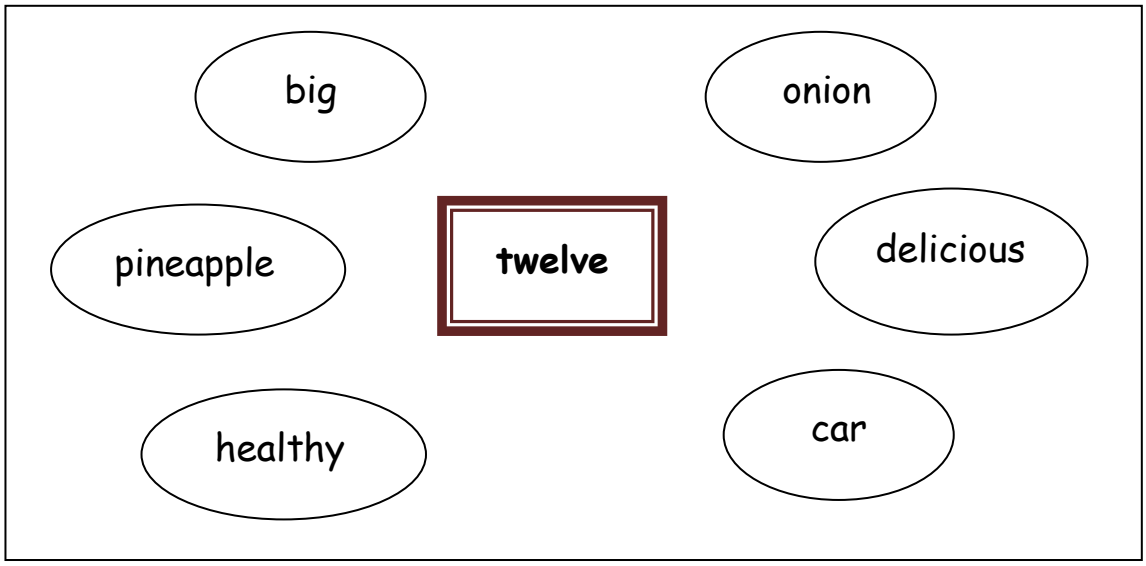


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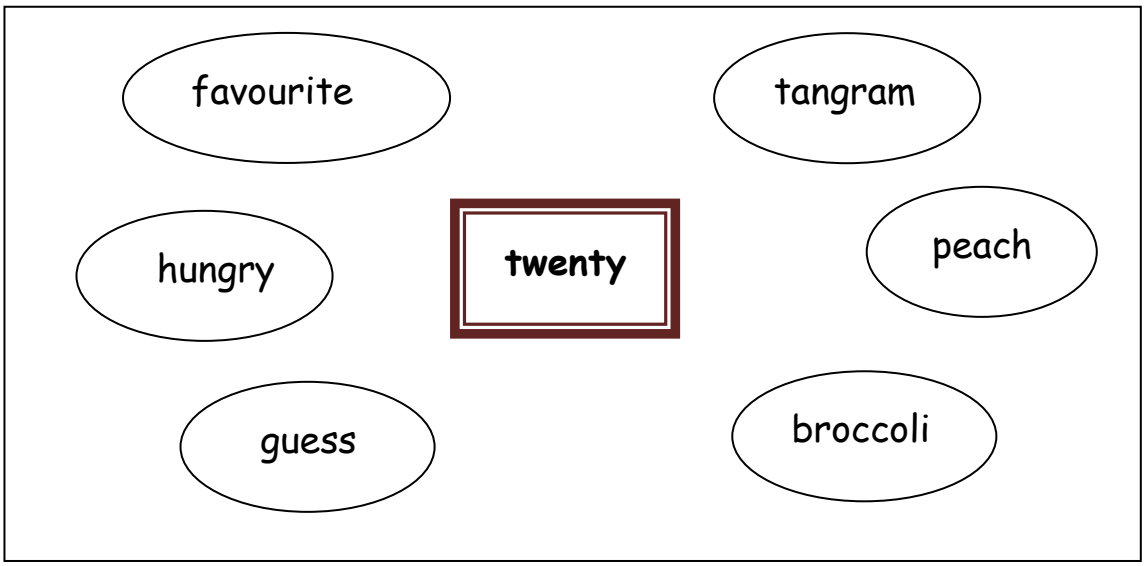


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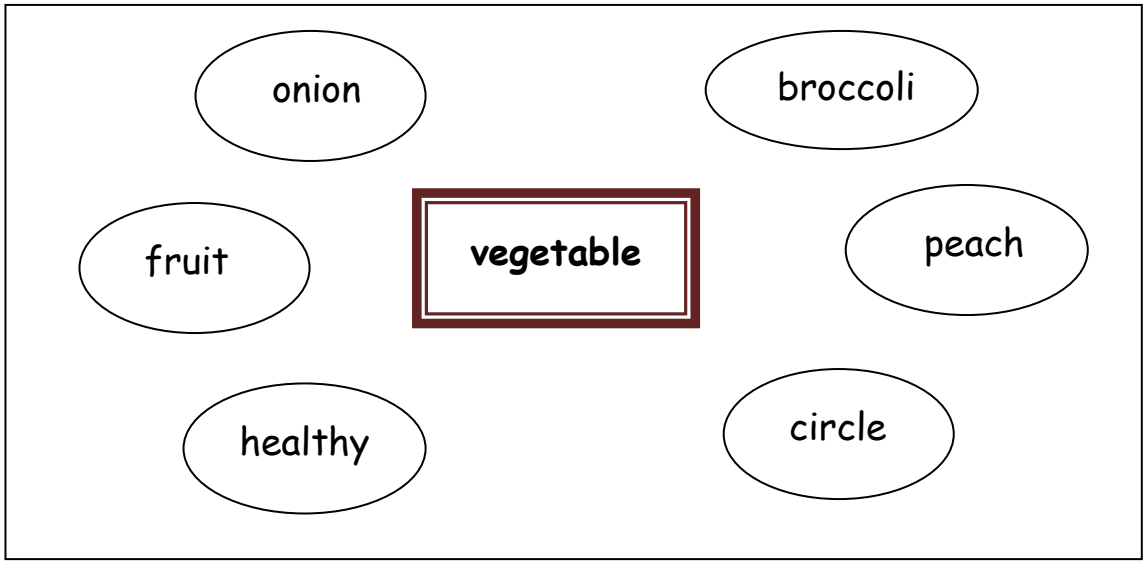


Vocabulary Depth Test

Q.29



Q.30



Appendix H: Questionnaire (Original)

Part 1 – Personal Particulars

Please tick (✓) your answers in the boxes provided / fill in the blanks where necessary

1. Age: _____

2. Sex: Male ☐ Female ☐

3. Race: Malay ☐ Chinese ☐ Indian ☐ Others ☐

4. Nationality: _____

5. Do you live in Kuala Kurau, Perak? Yes ☐ No ☐
   (If no, please specify in which area you live: _____)

6. Father's occupation: _____

7. Mother's occupation: _____

Part 2 – Exposure to the English Language

A. At Home

Please tick (✓) your answers in the boxes provided

8. Does your **house** have a:
   a) television? Yes ☐ (go to Question 9)
   No ☐
   b) radio? Yes ☐ (go to Question 10)
   No ☐
   c) computer? Yes ☐ (go to Question 11)
   No ☐ (go to Question 14)

Please rate the following by ticking (✓) the appropriate box

9. a) How often do you watch English programmes (including news) on the television at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

b) How often do you watch English commercials on the television at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Please go back to Question 8b

10. How often do you listen to English stations on the radio at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Please go back to Question 8c

11. a) How often do you use the computer at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

b) How often are you exposed to the English language when you use the computer at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Please tick (✓) your answers in the boxes provided

12. At home do you have: a) access to the Internet?

Yes ☐ No ☐ (go to Question 14)

Please rate the following by ticking (✓) the appropriate box

13. a) How often do you use the Internet at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

b) How often are you exposed to the English language when you use the Internet at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Please tick (✓) your answers in the boxes provided

14. At home do you have:

a) access to English newspapers?

Yes ☐ (go to Question 15) No ☐

b) access to English magazines?

Yes ☐ (go to Question 16) No ☐

c) access to English storybooks?

Yes ☐ (go to Question 17) No ☐

d) access to English comics?

Yes ☐ (go to Question 18) No ☐

e) access to other English reading materials?

Yes ☐ (go to Question 19) No ☐

Please rate the following by ticking (✓) the appropriate box

15. How often do you read English newspapers at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

16. How often do you read English magazines at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

17. How often do you read English storybooks at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

18. How often do you read English comics at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

19. How often do you read other English materials at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

20. How often do you use the English language to communicate with others when you are at home?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

21. How often do you go for extra English lessons after school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

B. In School

Please tick (✓) your answers in the boxes provided

22. Does your school have a: a) television? Yes ☐ (go to Question 23)

No ☐

b) radio? Yes ☐ (go to Question 24)

No ☐

c) computer? Yes ☐ (go to Question 25)

No ☐ (go to Question 28)

Please rate the following by ticking (✓) the appropriate box

23. a) How often do you watch English programmes (including news) on the television in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

b) How often do you watch English commercials on the television in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

***Please go back to Question 20b*

24. How often do you listen to English stations on the radio in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

***Please go back to Question 20c*

25. a) How often do you use the computer in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

b) How often are you exposed to the English language when you use the computer in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Please tick (✓) your answers in the boxes provided

26. In school do you have: a) access to the Internet?

Yes ☐ No ☐ (go to Question 28)

Please rate the following by ticking (✓) the appropriate box

27. a) How often do you use the Internet in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

b) How often are you exposed to the English language when you use the Internet in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Please tick (✓) your answers in the boxes provided

28. In school do you have: a) access to English newspapers?

Yes ☐ (go to Question 29) No ☐

b) access to English magazines?

Yes ☐ (go to Question 30) No ☐

c) access to English storybooks?

Yes ☐ (go to Question 31) No ☐

d) access to English comics?

Yes ☐ (go to Question 32) No ☐

e) access to other English reading materials?

Yes ☐ (go to Question 33) No ☐

Please rate the following by ticking (✓) the appropriate box

29. How often do you read English newspapers in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

30. How often do you read English magazines in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

31. How often do you read English storybooks in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

32. How often do you read English comics in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

33. How often do you read other English materials in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

34. How often do you use the English language to communicate with others when you are in school (not during English lessons)?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

35. How often do you use the English language to communicate with others during English lessons when you are in school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

36. How often do you use the English language to communicate with others when you are outside of school?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

37. How often do you stay back in school for extra English lessons after school hours?

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Appendix I: Questionnaire (Amended)

School: _SK / SJK (C) / SJK (T)_ Subject: _____

Part 1 – Personal Particulars

Please tick (✓) your answers in the boxes provided / fill in the blanks where necessary

38. Age: _____

39. Sex: Male ☐ Female ☐

40. Race: Malay ☐ Chinese ☐ Indian ☐ Others ☐

41. Nationality: _____

42. Do you live in Kuala Kurau, Perak? Yes ☐ No ☐
(If no, please specify in which area you live: _____)

6. Father's occupation: _____ Father's income: _____

7. Mother's occupation: _____ Mother's income: _____

8. I go to school by: Car ☐ Motorbike ☐ Bicycle ☐ Walk ☐

Others ☐_____

Part 2 – Exposure to the English Language

A. At Home

Please rate the following by ticking (✓) the appropriate box

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

9. I watch English programmes on the television at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

10. I watch the news in English on the television at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

11. I watch English commercials on the television at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

12. I listen to English stations on the radio at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

13. I am exposed to English language when I use the computer at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

14. I am exposed to English language when I use the Internet at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

15. I read English newspapers at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

16. I read English magazines at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

17. I read English storybooks at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

18. I read English comics at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

19. I read other English materials at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

20. I use English language to communicate with others at home.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

21. I have extra English lessons at home after school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

B. In School

Please rate the following by ticking (✓) the appropriate box

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

22. 1 watch English programmes on the television in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

23. I watch the news in English on the television in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

24. I watch English commercials on the television in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

25. I listen to English stations on the radio in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

26. I am exposed to English language when I use the computer in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

27. I am exposed to English language when I use the Internet in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

28. I read English newspapers in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

29. I read English magazines in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

30. I read English storybooks in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

31. I read English comics in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

32. I read other English materials in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

33. I use English language to communicate with others in school (not during English lessons).

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

34. I use English language to communicate with others during English lessons in school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

35. I use English language to communicate with others outside of school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

36. I stay back in school for extra English lessons after school hours.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

C. English Tuition After School

Please rate the following by ticking (✓) the appropriate box

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

37. I go for English tuition after school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

38. I go for English tuition during school holidays.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

39. I go for English language programmes after school.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

40. I go for English language programmes during school holidays.

Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very Often ☐

Appendix J: Preliminary Word List Test

National Primary School/National-type Chinese Primary School/National-type Tamil Primary School

Preliminary Word List Test

Name:_____ Score:____/189

1	amazing		11	bird		21	car	
2	animal		12	blue		22	carrot	
3	apple		13	boat		23	cat	
4	bag		14	book		24	cheese	
5	ball		15	broccoli		25	sandwich	
6	balloon		16	brother		26	chicken	
7	banana		17	brown		27	circle	
8	beautiful		18	butterfly		28	clever	
9	big		19	bye		29	close	
10	bike		20	cake		30	coconut	

Score:____/30

31	cold		41	desk		51	fat	
32	come		42	delicious		52	favourite	
33	back		43	diamond		53	fifteen	
34	computer		44	dog		54	find	
35	game		45	doll		55	fish	
36	cool		46	duck		56	five	
37	corn		47	eight		57	four	
38	crocodile		48	eighteen		58	fourteen	
39	dance		49	elephant		59	frog	
40	day		50	eleven		60	fruit	

Score:___/30

61	giraffe		71	guess		81	kite	
62	go		72	healthy		82	leaf	
63	kart		73	here		83	leaves	
64	grass		74	hot		84	listen	
65	great		75	hour		85	lizard	
66	green		76	how		86	logs	
67	bean		77	hungry		87	long	
68	gray		78	fine		88	lunch	
69	grow		79	mess		89	look	
70	ground		80	goes		90	me	

Score:___/30

91	monster		101	old		111	pea	
92	mum		102	one		112	pen	
93	mushroom		103	onion		113	pencil	
94	my		104	open		114	case	
95	turn		105	orange		115	pepper	
96	new		106	juice		116	pineapple	
97	nice		107	parallelogram		117	pink	
98	nine		108	pass		118	pizza	
99	nineteen		109	peach		119	plane	
100	notebook		110	pear		120	please	

Score:___/30

121	potato		131	rubber		141	sing	
122	purple		132	ruler		142	sister	
123	put		133	run		143	sit	
124	away		134	sausage		144	six	
125	race		135	seven		145	sixteen	
126	rat		136	seventeen		146	small	
127	read		137	shark		147	snake	
128	rectangle		138	sheep		148	sorry	
129	red		139	short		149	speak	
130	robot		140	silly		150	spell	

Score:___/30

151	spend		161	tangram		171	touch	
152	spider		162	tell		172	train	
153	square		163	ten		173	tree	
154	steak		164	thanks		174	triangle	
155	stop		165	there		175	turn	
156	strawberry		166	thirteen		176	around	
157	sweet		167	three		177	twelve	
158	tall		168	this		178	twenty	
159	take		169	tiger		179	two	
160	out		170	tomato		180	ugly	

Score:___/30

181	unhealthy	
182	vegetable	
183	very	
184	watch	
185	out	
186	where	
187	write	
188	yellow	
189	you	
190		

Score:___/9

Total = _____/189

Appendix K: Results of Preliminary Word List Test

	Word	No		Word	No
1	amazing	9	42	day	13
2	animal	10	43	delicious	2
3	apple	15	44	desk	13
4	around	8	45	diamond	5
5	away	9	46	dog	13
6	back	12	47	doll	12
7	bag	14	48	duck	12
8	ball	15	49	eight	11
9	balloon	13	50	eighteen	5
10	banana	12	51	elephant	10
11	bean	11	52	eleven	6
12	beautiful	9	53	fat	13
13	big	17	54	favourite	4
14	bike	10	55	fifteen	5
15	bird	14	56	find	12
16	blue	16	57	fine	12
17	boat	12	58	fish	12
18	book	17	59	five	14
19	broccoli	3	60	four	14
20	brother	11	61	fourteen	5
21	brown	10	62	frog	12
22	butterfly	9	63	fruit	4
23	bye	16	64	game	13
24	cake	18	65	giraffe	10
25	car	16	66	go	12
26	carrot	10	67	goes	12
27	case	9	68	grass	12
28	cat	18	69	gray	10
29	cheese	9	70	great	11
30	chicken	10	71	green	10
31	circle	4	72	ground	8

32	clever	9	73	grow	5
33	close	11	74	guess	4
34	coconut	12	75	healthy	2
35	cold	12	76	here	12
36	come	11	77	hot	12
37	computer	14	78	hour	12
38	cool	11	79	how	11
39	corn	10	80	hungry	3
40	crocodile	11	81	juice	8
41	dance	10	82	kart	9
83	kite	9	127	rat	14
84	leaf	9	128	read	15
85	leaves	7	129	rectangle	4
86	listen	11	130	red	16
87	lizard	10	131	robot	11
88	logs	10	132	rubber	11
89	long	12	133	ruler	14
90	look	12	134	run	11
91	lunch	11	135	sandwich	10
92	me	11	136	sausage	7
93	mess	8	137	seven	15
94	monster	9	138	seventeen	5
95	mum	15	139	shape	3
96	mushroom	4	140	sheep	11
97	my	10	141	short	12
98	new	12	142	silly	12
99	nice	12	143	sing	15
100	nine	13	144	sister	15
101	nineteen	6	145	sit	16
102	notebook	12	146	six	16
103	old	12	147	sixteen	6
104	one	15	148	small	12
105	onion	5	149	snake	13
106	open	12	150	sorry	12

107	orange	12	151	speak	13
108	out	12	152	spell	12
109	paint	11	153	spend	7
110	parallelogram	2	154	spider	11
111	pass	12	155	square	4
112	peach	5	156	steak	6
113	pear	8	157	stop	11
114	pea	12	158	strawberry	7
115	pen	15	159	sweet	12
116	pencil	16	160	tall	12
117	pepper	7	161	take	15
118	pineapple	5	162	tangram	2
119	pink	7	163	tell	11
120	pizza	13	164	ten	16
121	plane	11	165	thanks	15
122	please	10	166	there	12
123	potato	8	167	thirteen	5
124	purple	7	168	this	12
125	put	12	169	three	16
126	race	13	170	tiger	15
171	tomato	15	181	ugly	9
172	touch	8	182	unhealthy	3
173	train	12	183	vegetable	4
174	tree	13	184	very	12
175	triangle	4	185	watch	12
176	turn	11	186	where	12
177	sunny	11	187	write	12
178	twelve	6	188	yellow	8
179	twenty	4	189	you	15
180	two	16			

Appendix L: (Pre Intervention)

School: **NPS/ NTCPS / NTTPS**

A. Background Information

1. Age: _____ years

2. Sex: Male □ Female □

3. Race: Malay □ Chinese □ Indian □ Others □

4. Place of Birth: _____

5. Nationality: _____

6. Qualifications: SPM □ STPM □ Dip Ed □ (Major:_____)
   Degree □ (Major/Minor:_____)
   MA/PhD □

7. Teaching Experience: _____ years

8. No of years teaching English: _____ years

9. Areas of Speciality:_____

10. English Courses/Training Attended: _____

B. Experiences

11. What is the method or approach you typically use in your classroom teaching (to teach English to Year 1 pupils)?

    _____

12. Is your method or approach advocated by the MOE in the teaching of English to Year 1 pupils ?

    _____

    ** If the answer is yes, skip question 13 and go to question 14*

13. What is the method or approach advocated by the MOE to teach Year 1 pupils English and why are you not using the method in your classroom teaching?

    _____

14. Do you specifically teach your Year 1 pupils vocabulary during their English lessons in school? If the answer is no, then why not?

15. Do you usually use teaching aids in your classroom teaching?

If the answer is no, skip question 16 and go to question 17

16. a. What teaching aids do you use and how often do you use them?

b. How effective do you find the teaching aids?

17. Have you heard of the Picture Word Inductive Model (PWIM), a model of teaching?

If the answer is no, skip question 18 and go to question 20

18. Are you currently using the PWIM method to teach your Year 1 pupils vocabulary or have you used the PWIM method to teach your pupils vocabulary before? If yes, do you find the method effective?

If the answer is yes, skip question 19 and go to question 20

19. Why is it that you have not used/are not using the PWIM method to teach your students vocabulary?

20. Are you prepared to solely employ the PWIM method with the experimental group during the period of implementation?

21. Will there be any more English lessons in the school after completion of the study?

22. Will you agreed to being observed by the researcher during some of the intervention sessions?

Appendix M: Surat Kebenaran

KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
ARAS 1-4, BLOK E8
KOMPLEKS KERAJAAN PARCEL E
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62604 PUTRAJAYA

TEL : 0388846591
FAKS : 0388846579

Ruj. Kami : KPM.600-3/2/3-eras(867)
Tarikh : 19 April 2018

LEE BEE CHOO
NO. KP : 640529075068

NO 16, PERSIARAN BATU UBAN
GELUGOR 11700 GELUGOR
PULAU PINANG

Tuan,

KELULUSAN BERSYARAT UNTUK MENJALANKAN KAJIAN :
A QUASI-EXPERIMENTAL STUDY ON THE EFFECTS OF IMAGES ON THE RECALL AND RETENTION OF VOCABULARY BREADTH AND DEPTH OF YEAR 1 LEARNERS IN NATIONAL PRIMARY SCHOOL (NPS), NATIONAL-TYPE CHINESE PRIMARY SCHOOL (NTCPS) AND NATIONAL-TYPE TAMIL PRIMARY SCHOOL (NTTPS) IN A RURAL AREA IN MALAYSIA.

Perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa permohonan tuan untuk menjalankan kajian seperti di bawah telah diluluskan dengan syarat :

" KELULUSAN INI BERGANTUNG KEPADA PERTIMBANGAN PENTADBIR SEKOLAH YANG AKAN DILIBATKAN DALAM KAJIAN INI. "

3. Kelulusan adalah berdasarkan kepada kertas cadangan penyelidikan dan instrumen kajian yang dikemukakan oleh tuan kepada bahagian ini. Walau bagaimanapun kelulusan ini bergantung kepada kebenaran Jabatan Pendidikan Negeri dan Pengetua / Guru Besar yang berkenaan.

4. Surat kelulusan ini sah digunakan bermula dari **1 Jun 2018** hingga **31 Oktober 2018**

5. Tuan dikehendaki menyerahkan senaskhah laporan akhir kajian dalam bentuk *hardcopy* bersama salinan *softcopy* berformat pdf dalam CD kepada Bahagian ini.Tuan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak diterbitkan di mana-mana forum, seminar atau diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan selanjutnya. Terima kasih.

"SEHATI SEJIWA"

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

Ketua Sektor
Sektor Penyelidikan dan Penilaian
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia

salinan kepada:-

JABATAN PENDIDIKAN PERAK

" SURAT INI DIJANA OLEH KOMPUTER DAN TIADA TANDATANGAN DIPERLUKAN "

Appendix N: Consent Form

Consent Form

INFORMATION AND CONSENT FORM

POSTGRADUATE RESEARCH

RESEARCH TITLE: Effects of Images on the Recall and Retention of Year 1 Malaysian Pupils' Vocabulary Breadth and Depth

RESEARCHER: Pn. Lee Bee Choo

INFORMATION ABOUT THE RESEARCH

Your child is invited to participate voluntarily in an interventional research. This research is about improving **English language learning among young learners**.

It is important that you read and understand this research information before agreeing to your child's participation.

The researcher is interested to determine if the use of images in a collaborative (group) setting can improve students' English vocabulary knowledge.

The objectives of this research are:
1. To examine the use of images in primary school level English language learning classrooms – in terms of its effects on vocabulary knowledge recall and retention.
2. To determine if the intervention (use of images) can be implemented in Malaysian primary schools to help students develop specific language skills.

The research is expected to last for approximately four (4) months and is expected to include at least 150 participants from different schools.

PARTICIPANT CRITERIA

This research will **only include** Malaysian Year 1 pupils (of all ethnicities and gender) from Sekolah Kebangsaan (SK), Sekolah Kebangsaan Jenis Cina (SKJC) and Sekolah Kebangsaan Jenis Tamil (SKJT).

RESEARCH PROCEDURES

Selected groups or classes of Malaysian Year 1 pupils will either be the Experimental groups or the Control Groups. This will be done randomly without bias. Listed below are the research procedures:

Experimental Group	Control Group
Questionnaire (about 15 minutes)	Questionnaire (about 15 minutes)
Pre-Test (Vocabulary Breadth & Depth)	Pre-Test (Vocabulary Breadth & Depth)
Learning intervention (images) Note: Normal learning routines will continue as usual	Normal learning routines without intervention
Post-Test (Vocabulary Breadth & Depth)	Post-Test (Vocabulary Breadth & Depth)
Delayed Post-Test (Vocabulary Breadth & Depth)	Delayed Post-Test (Vocabulary Breadth & Depth)
All procedures will be handled by school teachers and supervised by the researcher	

PARTICIPATION

Taking part in this research is voluntary, without monetary reward and without insurance coverage. Participants will not be required to bear any monetary costs. Participants may refuse to take part or stop participating at anytime without penalty. Continuing support for our research efforts, however, is preferred and much appreciated.

Kindly note also that your child's participation may be stopped without your consent if in any way the research eligibility criteria has been violated. The researcher will be in contact should such matters arise.

POSSIBLE BENEFITS

The findings of this research can benefit society through the sharing of knowledge and expertise in the form of publications, conference presentations, and briefings to schools and parents or guardians (if requested). Students and teachers, academicians, course designers, module writers and educational policy makers are also expected to experience direct benefits from this study.

CONFIDENTIALITY

All collected data can only be accessed by the researcher. Anonymity will be preserved and none of the participants will be identified individually. All forms and tests will also be coded to further protect their privacy.

ENQUIRIES

LEE BEE CHOO
Faculty of language and Communication

Universiti Sarawak Malaysia
94300 Kota Samarahan, Kuching, Sarawak
(6)04 6533155
beechoolee77@gamial.com
To be entered into the research, please sign and date the ***Signature Page (Attachment A).***

[Attachment A]

Parental Consent Form (Signature

Research Title:
Effects of Images on the Recall and Retention of Year 1 Malaysian Pupils' Vocabulary Breadth and Depth

Researcher: Lee Bee Choo

For your child to become a part of this research, you must sign this page.
By signing this page, I am confirming the following:

- I have read **all** the information in this **Information and Consent Form**, and have had time to think about it.
- All my enquiries have been answered to my satisfaction.
- I voluntarily agree for my child to be a part of this research and to follow the study procedures.
- My child may freely choose to stop being a part of this research at anytime without penalty.

_____
Participant's (Child) Full Name

_____
Participant's (Child) IC Number

_____
Parent/Guardian's Full Name

_____
Parent/Guardian's IC Number

_____ _____
Signature of Parent/Guardian **Date (dd/mm/yy)**

Consent will be treated as given if this form is not returned by:_____

Appendix O: Schedule for PWIM-A cycle

Cycle/Week	Cluster	Words	Picture
Cycle 1 Week1	1	1. broccoli 2. mushroom 3. onion 4. healthy 5. vegetable	Picture A
Week 2	1	1. delicious 2. fruit 3. hungry 4. peach 5. pineapple	Picture A
Cycle 2 Week 3	2	1. eleven 2. twelve 3. thirteen 4. fourteen 5. fifteen	Picture B
Week 4	2	1. sixteen 2. seventeen 3. eighteen 4. nineteen 5. twenty	Picture B
Cycle 3 Week5	3	1. circle 2. diamond 3. rectangle 4. shape 5. tangram	Picture C
Week 6	3	1. triangle 2. square 3. parallelogram 4. guess 5. favourite	Picture C

Appendix P: (Post Intervention)

School: **NPS/NTCPS/NTTPS**

1. Did you implement the PWIM method solely with the experimental group?

   _____

   *If the answer is "Yes", skip question 2 and 3, and go to question 4

2. What other methods or approaches did you employ with the experimental group?

   _____

3. How often did you employ other methods or approaches (other than PWIM) with the experimental group?

   _____

4. Did you face any problems when you implemented the PWIM method with the experimental group? If yes, what were the problems faced?

   _____

5. What were the pupils' responses during the PWIM implementation in the classroom?

   _____

6. In your opinion, how did the PWIM impact the vocabulary acquisition of the pupils?

   _____

7. Do you plan to continue using the PWIM method to teach your pupils vocabulary?

   _____

8. Would you recommend the PWIM method to others to teach vocabulary?

   _____

Appendix Q: Results of Pre-test, Post-test and Delayed Post-test for Vocabulary Breadth

Experimental Group				Control Group			
Subjects (*n*)	Test			Subjects (*n*)	Test		
	Pre-test	Post-test	Delayed Post-test		Pre-test	Post-test	Delayed Post-test
1	10	19	17	1	6	10	7
2	12	18	17	2	7	12	9
3	8	17	12	3	7	10	7
4	7	16	13	4	8	14	9
5	10	19	16	5	11	14	11
6	9	15	14	6	9	13	10
7	10	18	16	7	7	12	8
8	6	15	13	8	7	10	8
9	8	14	13	9	12	14	11
10	7	15	13	10	11	15	11
11	7	11	9	11	6	8	7
12	8	12	11	12	8	10	8
13	7	10	9	13	7	9	6
14	6	9	9	14	8	11	8
15	7	11	10	15	8	12	10
16	8	11	10	16	7	9	7
17	7	10	7	17	7	12	9
18	7	11	10	18	8	10	9
19	6	11	9	19	6	8	7
20	7	12	11	20	7	10	8
21	8	12	11	21	8	10	9
22	8	13	11	22	8	12	9
23	7	13	12	23	7	11	8
24	8	14	13	24	7	9	7
25	9	13	12	25	9	11	10
26	9	13	12	26	8	11	9
27	7	11	10	27	8	14	9
28	7	12	10	28	7	11	9
29	9	13	11	29	8	10	9
30	7	11	8	30	9	13	10
31	7	10	9	31	5	7	6
32	8	10	10	32	6	8	7
33	8	13	11	33	7	9	8
34	6	10	8	34	6	10	7
35	7	10	9	35	7	9	8
36	8	12	12	36	8	11	9
37	8	11	10	37	7	9	7
38	6	10	9	38	6	8	7

Vocabulary Breadth

Experimental Group					Control Group			
Subjects (*n*)	Test				Subjects (*n*)	Test		
	Pre-test	Post-test	Delayed Post-test			Pre-test	Post-test	Delayed Post-test
39	7	9	9		39	9	12	9
40	6	9	8		40	9	9	8
41	8	12	11		41	5	9	8
42	10	12	11		42	9	10	9
43	8	11	10		43	8	10	9
44	5	9	8		44	10	15	11
45	8	11	10		45	9	11	10
46	10	12	12		46	7	12	9
47	7	11	10		47	8	11	9
48	7	10	9		48	10	11	10
49	6	10	9		49	6	9	8
50	8	13	10		50	6	10	9
51	7	12	10		51	7	9	8
52	7	9	8		52	7	10	8
53	6	10	9		53	6	8	7
54	7	11	9		54	6	8	6
55	8	10	10		55	8	10	9
56	8	10	9		56	7	10	8
57	6	8	8		57	7	9	8
58	6	9	8		58	7	10	8
59	8	10	9		59	7	9	8
60	6	8	7		60	8	10	8
61	4	7	6		61	2	4	3
62	5	7	7		62	3	5	4
63	10	18	16		63	12	14	11
64	6	15	13		64	11	15	11
65	4	7	6		65	4	6	5
66	5	7	7		66	5	7	6
67	8	14	13		67	7	12	8
68	7	15	13		68	7	10	8
69	4	6	6		69	5	6	6
70	3	6	5		70	4	6	5
71	8	11	10		71	8	10	9
72	5	9	8		72	10	15	11
73	7	11	10		73	8	11	9
74	7	10	9		74	7	9	6
75	6	9	9		75	8	11	8
76	8	13	10		76	6	10	9
77	8	17	12		77	7	10	7

Vocabulary Breadth

Experimental Group					Control Group			
Subjects (*n*)	Test				Subjects (*n*)	Test		
	Pre-test	Post-test	Delayed Post-test			Pre-test	Post-test	Delayed Post-test
78	7	16	13		78	8	14	9
79	5	8	7		79	4	6	4
80	3	6	5		80	3	5	4
81	8	12	11		81	5	9	8
82	10	12	11		82	9	10	9
83	7	10	9		83	10	11	10
84	6	10	9		84	6	9	8
85	10	19	17		85	6	10	7
86	12	18	17		86	7	12	9
87	7	11	10		87	8	10	9
88	6	11	9		88	6	8	7
89	5	8	6		89	4	6	5
90	3	6	5		90	3	6	4
	647	1040	920			645	905	724
Mean	7.19	11.56	10.22		*Mean*	7.17	10.06	8.05

Appendix R: Results of Pre-test, Post-test and Delayed Post-test for vocabulary depth

Experimental Group				Control Group			
Subjects (*n*)	Test			Subjects (*n*)	Test		
	Pre-test	Post-test	Delayed Post-test		Pre-test	Post-test	Delayed Post-test
1	8	13	11	1	6	9	7
2	7	10	10	2	7	9	7
3	9	13	12	3	9	11	9
4	6	10	8	4	8	13	10
5	6	11	9	5	8	12	9
6	12	16	15	6	10	14	11
7	9	16	12	7	7	11	9
8	5	11	10	8	3	6	5
9	6	10	9	9	9	11	10
10	4	7	7	10	5	9	6
11	5	9	8	11	3	5	4
12	6	9	8	12	6	8	6
13	4	8	7	13	5	8	6
14	4	6	6	14	6	7	7
15	5	8	7	15	7	8	7
16	6	10	8	16	5	8	6
17	5	7	7	17	7	9	8
18	6	8	7	18	6	8	7
19	7	9	8	19	4	6	5
20	5	9	8	20	5	7	5
21	6	10	9	21	5	7	5
22	5	8	7	22	6	9	8
23	7	11	10	23	4	5	4
24	5	9	7	24	6	9	7
25	4	9	8	25	5	7	6
26	5	8	8	26	7	10	7
27	6	11	10	27	7	8	7
28	6	9	8	28	4	7	5
29	5	9	8	29	5	8	6
30	4	7	6	30	6	8	6
31	7	10	9	31	5	7	5
32	3	7	6	32	4	8	5
33	6	9	8	33	6	8	8
34	4	7	6	34	9	13	9
35	9	14	13	35	5	7	6
36	7	13	11	36	6	9	7
37	8	12	10	37	5	10	6
38	2	7	6	38	3	5	5

Vocabulary Depth

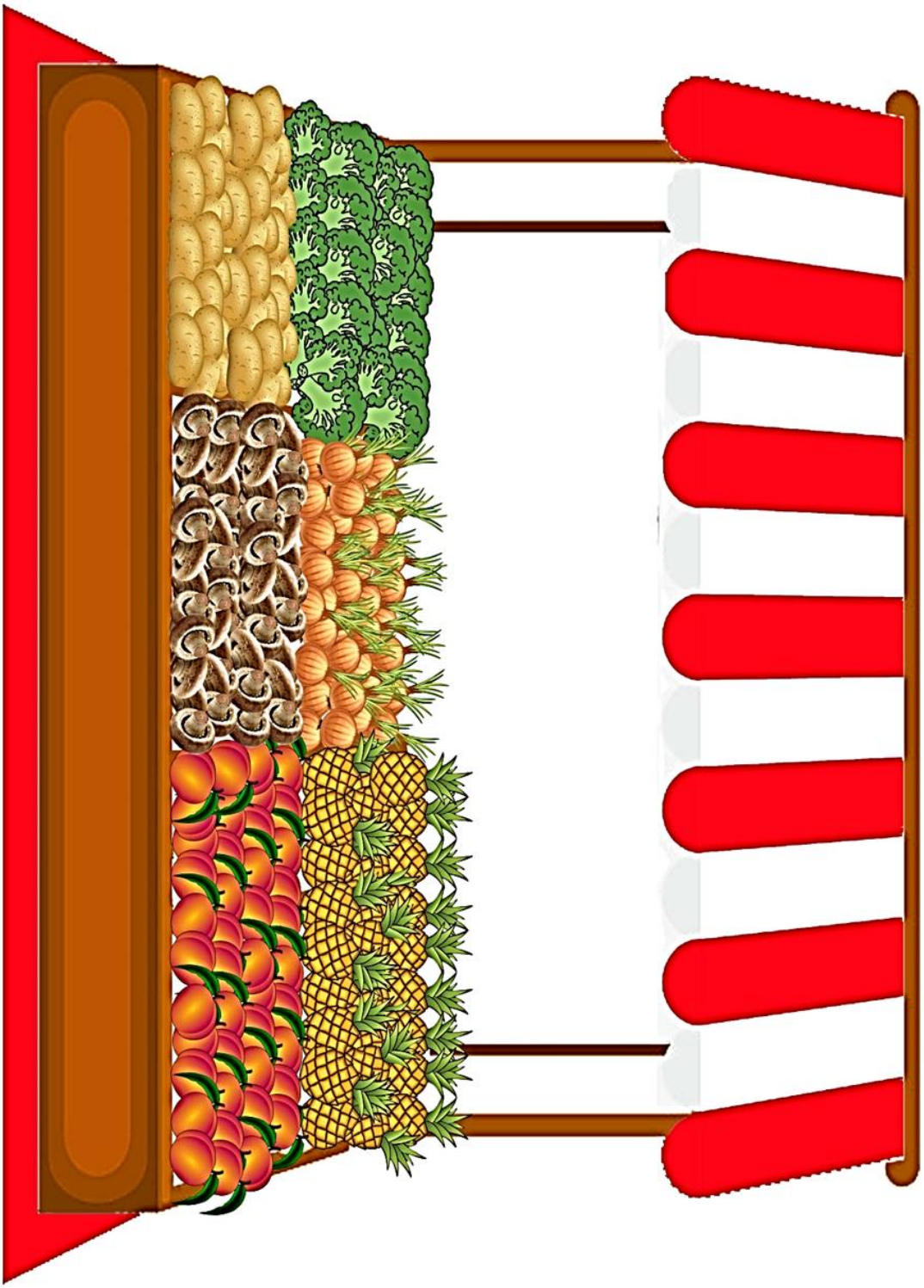
Experimental Group				Control Group			
Subjects (*n*)	Test			Subjects (*n*)	Test		
	Pre-test	Post-test	Delayed Post-test		Pre-test	Post-test	Delayed Post-test
39	7	10	9	39	6	9	7
40	4	6	6	40	5	7	6
41	3	8	7	41	4	6	5
42	6	11	10	42	6	6	5
43	4	8	6	43	4	7	5
44	5	8	8	44	6	10	7
45	4	9	8	45	7	10	10
46	9	16	14	46	6	9	7
47	3	7	6	47	8	10	8
48	6	11	10	48	6	9	8
49	8	10	10	49	4	7	5
50	5	8	7	50	4	8	7
51	7	13	11	51	5	9	5
52	5	7	6	52	8	10	10
53	8	11	10	53	6	8	7
54	5	8	6	54	5	8	6
55	6	10	9	55	5	7	6
56	3	7	7	56	6	11	9
57	6	9	8	57	6	8	7
58	6	10	9	58	6	9	7
59	5	8	8	59	7	10	8
60	9	15	13	60	5	7	5
61	6	10	9	61	9	11	10
62	3	5	5	62	2	4	2
63	6	11	10	63	7	8	7
64	6	9	8	64	4	7	5
65	2	5	4	65	3	5	4
66	8	12	10	66	5	10	6
67	6	11	9	67	8	12	9
68	2	5	4	68	2	4	2
69	3	5	5	69	3	5	4
70	4	8	6	70	4	7	5
71	8	13	11	71	6	9	7
72	5	8	7	72	4	8	7
73	2	7	6	73	3	5	5
74	6	10	8	74	8	13	10
75	6	10	9	75	5	7	5
76	6	9	8	76	6	8	7
77	7	11	10	77	4	5	4

Vocabulary Depth

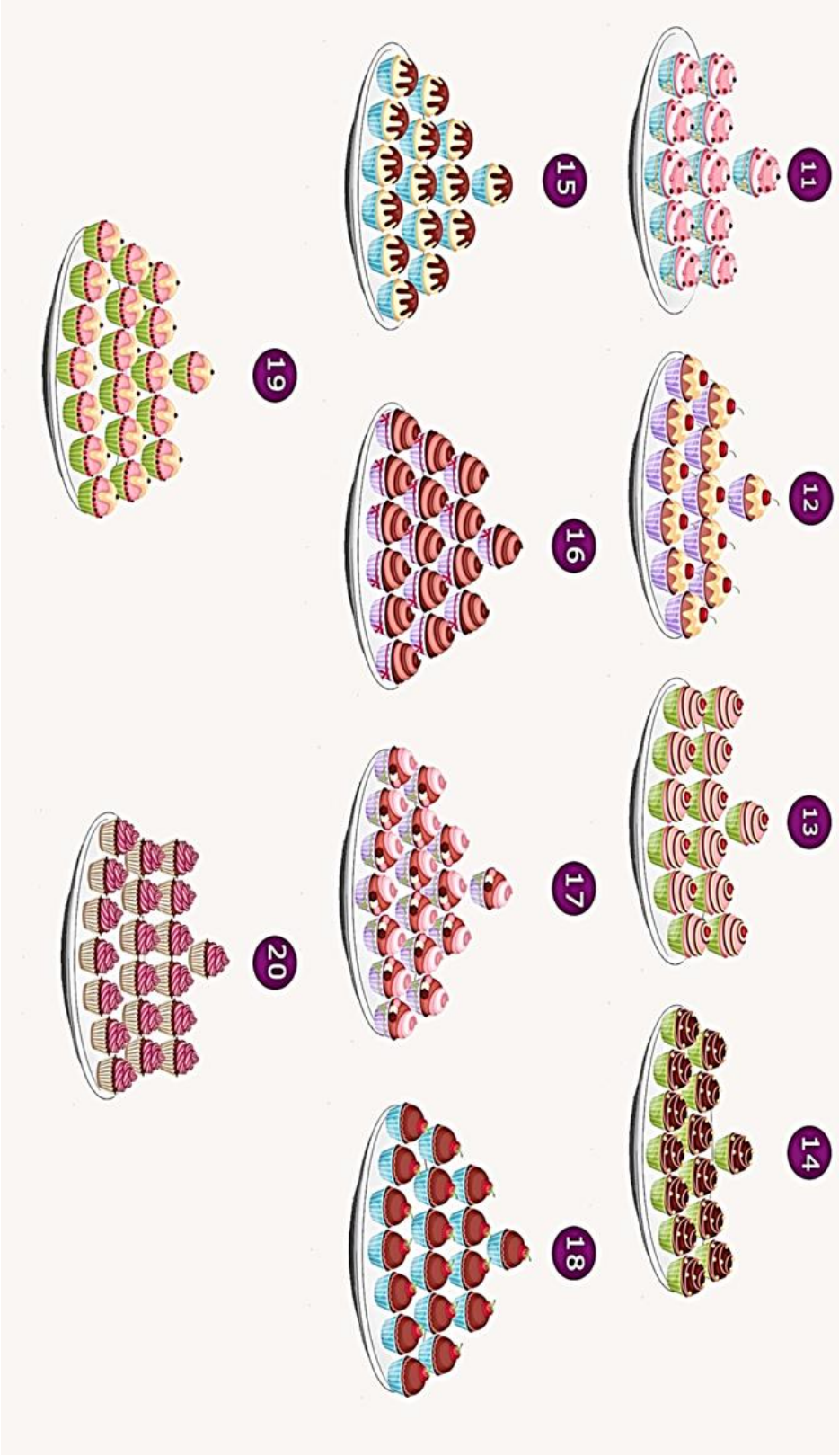
Experimental Group					Control Group			
Subjects (*n*)	Test				Subjects (*n*)	Test		
	Pre-test	Post-test	Delayed Post-test			Pre-test	Post-test	Delayed Post-test
78	4	7	6		78	6	8	6
79	4	6	5		79	3	4	3
80	9	13	12		80	9	11	9
81	5	8	8		81	7	10	7
82	12	16	15		82	10	14	11
83	4	9	8		83	5	7	6
84	5	8	7		84	6	9	8
85	5	9	8		85	5	8	6
86	4	7	7		86	5	9	6
87	3	5	4		87	3	5	3
88	7	10	10		88	7	9	7
89	9	16	12		89	7	11	9
90	5	11	10		90	4	6	5
	510	854	756			509	748	592
Mean	5.67	9.49	8.40		*Mean*	5.66	8.31	6.58

APPENDIX S: Pictures

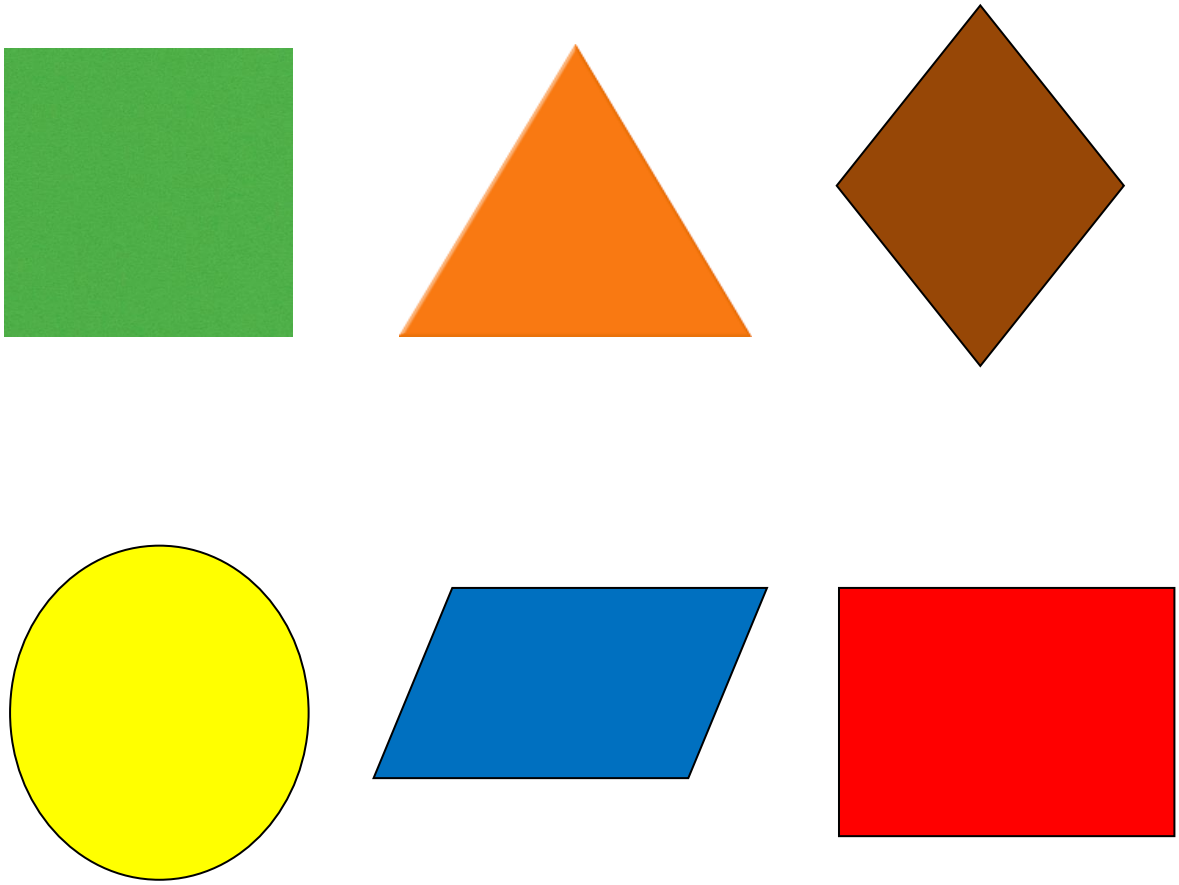
PICTURE A

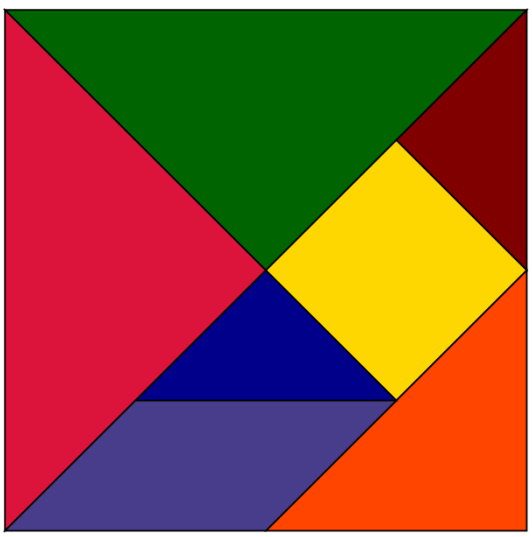


PICTURE B



PICTURE C





Appendix T: List of publications

The publications of the candidate in relation to her thesis are as stated below:

1. **Lee, B. C.,** Pandian, A., & Rethinasamy, S. (2020). Recall and retention of vocabulary depth of young learners via PWIM. *Pertanika Journal of Social Science and Humanities, 28*(S2 (Special Issue)), 297-319. **[SCOPUS]**
2. Tan, D. A. L., **Lee, B. C.,** Adi Kasuma, S.A., & Ganapathy, M. (2020). Picture Superiority Effect: Using Images for Vocabulary Enhancement Among Year One Malaysian ESL Learners. *Pertanika Journal of Social Science and Humanities, 28*(S2 (Special Issue)), 177-196. **[SCOPUS]**
3. **Lee, B. C.,** Pandian, A., Rethinasamy, S., & Tan, D. A. L. (2019). Effects of PWIM in the ESL Classroom: Vocabulary knowledge development among primary Malaysian learners. *3L: The Southeast Asian Journal of English, 25*(4), 179-197. **[SCOPUS]**
4. Tan, D.A.L., **Lee, B. C.,** Ganapathy, M., & Adi Kasuma, S. A. (2019). Language Learning in the 21st Century: Malaysian ESL Students' Perceptions of *Kahoot! International Journal of Virtual & Personal Learning Environments, Special Issue, 9(*2), 55-71. **[SCOPUS]**
5. **Lee, B. C.,** Pandian, A., & Rethinasamy, S. (2019). Pictures revisited: A traditional vehicle in enhancing young learners' vocabulary. *International Journal of Language, Literacy and Translation, 2*(2), 54-74.
6. Tan, D. A. L., **Lee, B. C.,** Adi Kasuma, S. A., & Ganapathy, M. (2018). Like That Lah: Malaysian Undergraduates' Attitudes Towards Localised English. *GEMA Online: Journal of Language Studies, 18*(2), 80-92. **[SCOPUS/WOS/ESCI]**

7. **Lee, B. C.,** Tan, D. A. L., Manjet, K., & Ganapathy, M. (2017). The Significance of the Academic Word List Among ESL Tertiary Students in a Malaysian Public University. *3L: The Southeast Asian Journal of English Language Studies, 23*(4), 56-65. **[SCOPUS]**

8. Adi Kasuma, S. A., Ganapathy, M., Tan, D. A. L., & **Lee, B. C.** (2020). Using Facebook as a social media tool to develop tertiary students' English writing skills through corrective written feedback (CWF). In *ICT use in ELT: Current practices in Southeast Asia* (pp. 176-194). USM Press.