

# **PRACTICE MAKES PERFECT: AUTOMATIC WORD RECOGNITION SKILL BUILDING THROUGH ANIMATED GAMES**

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## **Abstract**

Reading skills need a lot of practice to gain automaticity for fluency and comprehension. This requires repeated skill honing. Nevertheless, it can be painstaking for students, especially those with learning difficulties and short attention span. This paper aimed to report an action research conducted to enhance reading skills and motivation of five Year 1 remedial students who were identified as poor and unmotivated readers. Instead of using only flashcards and worksheets, captivating games were designed and developed using various tools in *Microsoft PowerPoint* software. It fully utilized the multimedia interactive elements in the software combining visual and auditory properties for optimum learning effects. Based on the Malay Early Literacy Instructional Model, the literacy content in the games were systematically arranged and matched with the respective games in a progressive manner from phoneme-grapheme recognition (*Vowel Balloon Popping*), to syllable recognition (*Consonant Star Shooting*) and word recognition (*Kiki's Coconut Collection*, *Wheel of Fortune in Mini Zoo*). These games were played after the introduction of the selected graphemes, syllables and words at the participants' own pace. The intervention was conducted for 6 weeks, 4 days a week and 1 hour per day. Data were gathered through Literacy Motivation Profile (LMP), direct observations as well as decoding and spelling tests. LMP reported an increase of composite scores for all participants after the intervention. Direct observation supported findings in LMP and revealed that participants displayed active participation in learning. In addition, analysis of decoding and spelling assessments showed constant and satisfactory mastery of skills learnt. The results were encouraging and demonstrated a viable alternative to incorporate technology use in the classroom for fun and effective skill drilling. The upcoming action suggested is to further develop the interactive multimedia games to teach subsequent skills such as sentence and short story reading.

**Keywords:** Word recognition, Reading, Interactive multimedia games

## **Introduction**

Literacy rate is an important measure of the value of a nation's human capital. In fact, fluent effortless reading and writing are critical foundational 'life skills' in modern literate societies (Rose, 2009). In line with the importance of literacy, Malaysian government started to implement the KIA2M programme (*Kelas Intervensi Awal Membaca dan Menulis* or Early Intervention Class for Reading and Writing) started in 2006 for Year 1 students who need extra support in literacy learning. However, the impact of KIA2M was reported to be unsatisfactory (Jabatan Perdana Menteri, 2010). Starting 2010, Literacy and Numeracy Programme (LINUS) has been implemented, substituting KIA2M. LINUS is a remedial programme developed to ensure students acquire basic literacy and numeracy skills by the end of 3 years of primary education. Students who are falling behind are grouped together during the relevant classes and taught according to their needs. Those who do not pass the first and second construct in LINUS are considered as *murid LINUS Tegar* or *hardcore* remedial students. These students will be given remedial coaching until they are able to return to mainstream curriculum. These efforts by the government are commendable and the next step will be integrating developmental appropriate pedagogy to help these remedial students to acquire basic literacy skills at a greater speed and efficiency so as to narrow the gap between them and their peers.

## **Teaching and Learning Reflection**

From the reflection of teaching and learning experience, it is found that most of the lower primary remedial students have difficulties to recognize and remember all the letter names their corresponding letter sounds. For students whose mother tongue is not Malay, the challenge is even greater as they need to know the vocabulary of the spoken language prior to understand the writing system and to have meaningful understanding of the written words. Another challenge will be the ability to recognise the graphemes representing the sounds in Malay spoken language. As most of the students have attended preschools or kindergartens, they could identify some letter names, especially those common and easily recognised letters such as 'a', 'o' and 's'. However, some of the students are confused with letters with similar shapes like 'b', 'd', 'p' and 'q'.

The bigger challenge is that these students generally showed lack of interest in literacy learning. They often lack motivation, and are easily distracted. They dislike repetitions and are easily bored and restless in the class. While literacy learning requires skills honing and practice, the deficiencies in interest, patience and perseverance of these students pose a problem for the teachers to support their learning. This disparity must be addressed to ensure teaching and learning efficiency and effectiveness. In light of this, strategies which are compatible to their learning needs are essential.

From the literature on reading research, much of the work relevant to readers' motivation has been framed in terms of attitudes toward reading (Baker & Wigfield, 1999). Constructs associated with literacy motivation are self-concept (Mata, 2011), value of literacy (Baker & Scher, 2002) and enjoyment of literacy (Baker & Scher, 2002; Mata, 2011). Students who find enjoyment in literacy display a high, positive love for books (Byrnes & Wasik, 2009) and persistence in literacy activities (McDevitt & Ormrod, 2007). They believe about their ability and feel confident about learning. They also know the importance of literacy.

Previous studies suggest the possibility that students's reading engagement and literacy motivation are affected by instructional approaches (Guthrie et al., 2009; Wigfield et al., 2004). It is therefore important to place equal or more emphasis on students's motivation in early literacy learning and engagement while planning for literacy intervention programmes (Ng, 2013).

According to Noor Azliza and Lilia Halim (2002), incorporating animation and interactive elements in teaching pedagogy will help students understand concepts that are difficult to explain using text. Students will be enticed by the colourful illustration and thus pay attention to the learning. Teaching aids in the form of electronics or non- electronics are important supportive materials to improve their comprehension skill and maintain their interest in learning process (Charlie, 2008). Research of Ngin (2012) and Irene (2012) indicated that using *PowerPoint* in the teaching and learning process could change students' negative learning behaviours. Another study by Mohd Amirul Hafiz (2013) also showed that learning activities using computer decreased the disruptive behaviour in the classroom. This in turns will ensure students' learning achievement.

### **Research Focus**

Teacher's content knowledge on early literacy skills alone is insufficient without the affective aspects on literacy. Teachers should be aware that possessing the literacy skills is not sufficient to be lifelong literacy learners. They need the "skill" as well as the "will" (Gambrell et al., 1996). In brief, students must be motivated to engage in literacy activities to be proficient readers and writers.

The two pillars for a successful design and development of intervention are the right content focus which is orthography sensitive and right delivery approach which is brain- compatible (Ng, 2013). Therefore, the literacy content for this intervention will be based on the Malay Early Literacy Instructional Model proposed by Ng (2013) while the delivery will incorporate captivating interactive games for reinforcement. The Malay Early Literacy Instructional Model comprises important elements of grapheme-phoneme correspondences, phonological awareness, blending and segmentation, syllable reading and spelling, word reading and spelling, automatic syllable reading and contextual reading. This model advocates orthography-sensitive content focus and brain-compatible learning principles within the curriculum (Ng, 2013).

### **Purpose of Study**

This research intends to enhance the literacy motivation and literacy skills of remedial students using animated games. It aims to improve participants' motivation in literacy learning and build the participants' automatic word reading skills through the incorporation of multimedia elements in designing the intervention.

### **Methodology**

This study applies an action research design which begins with a reflection on the teaching practice and identification of research focus (reflect), followed by planning for the intervention (plan), implementation of the intervention (act), data collection on the responses to the intervention (observe) and evaluation of the intervention (reflect). It follows the cycle of action research commonly used in teaching practice (Young, Rapp & Murphy, 2010).

## Research Participants

The target group comprises five Year 1 (7 years old) remedial students in a National- typed Chinese Primary School in Sabah. The medium used in school is Mandarin. Three of the participants were Chinese while two were Malays. However, one of the Chinese participants (Participant C) spoke Malay in the family. These participants did not pass the literacy screening test held in the beginning of Year 1. They demonstrated low motivation in learning and lack of interest in classroom activities.

*Table 1 – Participants' profiles*

Participants	Ethnic Groups	Mother Tongue
A	Chinese	Mandarin
B	Chinese	Mandarin
C	Chinese	Malay
D	Malay	Malay
E	Malay	Malay

## Data Collection

In order to evaluate the effectiveness of the intervention, a few data sources were used: 1) decoding and spelling test; 2) literacy motivation profile and 3) direct observation.

### *Decoding and Spelling Test*

Participants' decoding and spelling skills were evaluated using a game-like assessment. This test was administered before and after the intervention. The test was designed in a non-threatening form of assessment, whereby participants were required to help Mumu to find his way out from the maze. To do that, they have to complete each part's mission to unlock the clues and save Mum (see Figure 1).



*Figure 1: Story line in the decoding test*

Decoding test contains three parts: Part 1 comprises 20 items of phoneme reading; Part 2 comprises 20 items of syllable reading; while Part 3 comprises 10 items of word reading (Figure 2).

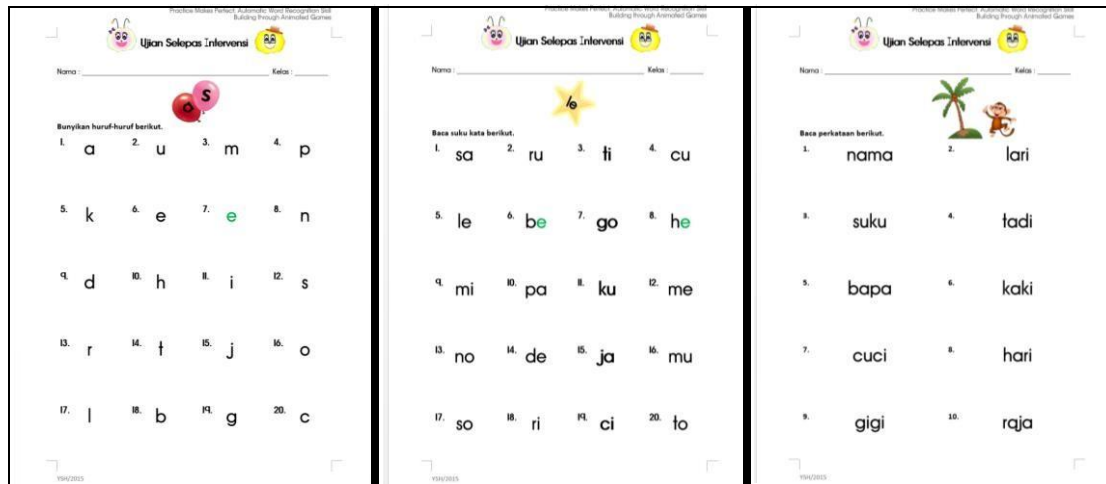


Figure 2 - Three parts of the decoding test

Similarly, spelling test also contains three parts: Part 1 comprises 20 items of grapheme spelling; Part 2 comprises 20 items of syllable spelling; while Part 3 comprises 10 items of word spelling (Figure 3).

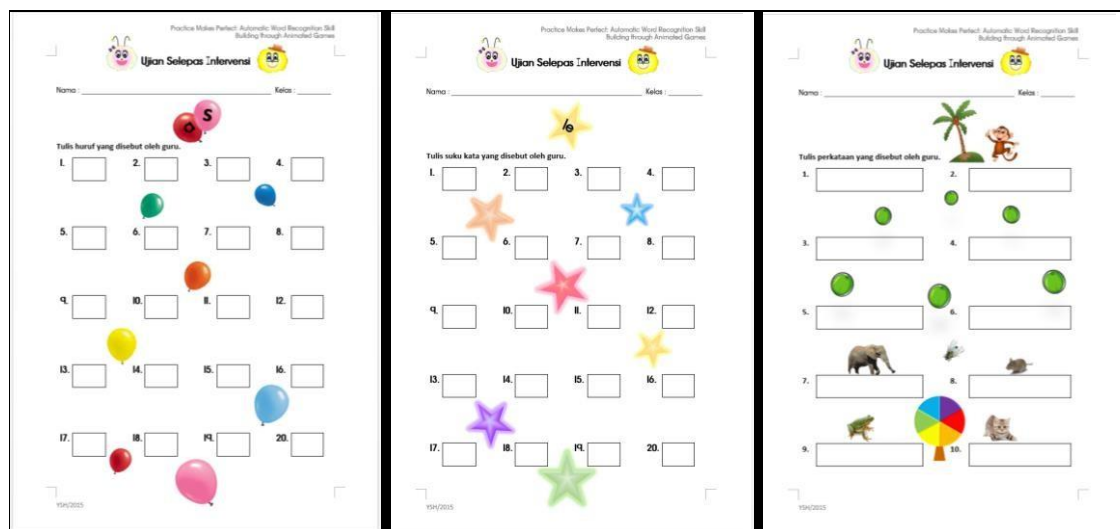


Figure 3 - Three parts of the spelling test

### Literacy Motivation Profile

Data on participants' reading motivation were collected by using the Literacy Motivation Profile (LMP) adapted from Ng (2013) which consisted of 24 items with 8 items of literacy enjoyment, 8 items of literacy self-concept and 8 items of literacy value. Each item was graded on a scale of 1 to 4. The choice of a positive affirmation would be scored as 3 ("a little") or 4 ("a lot") depending on the degree of identification. Likewise, the choice of a negative affirmation would be scored as 1 ("a lot") or 2 ("a little") also depending on the degree of identification. The 4-point scale, a forced-answer type of scaling technique, was used to remove the neutral opinion of neither agree nor disagree (Allen & Seaman, 2007).

### Direct Observation

Besides the questionnaire, unstructured direct observation was recorded in the forms of field notes to triangulate the data obtained from the LMP. According to Taylor-Powell and Steele (1996), observation provides the opportunity to document activities,

behaviour and physical aspects without having to depend upon peoples' willingness and ability to respond to questions. Unstructured observation was applied in this study as the intention was to observe participants and their involvement in activities as they naturally exist.

### Intervention Specification

The animated games were designed using *Microsoft PowerPoint 2013* which is user friendly to teachers, students or even parents. Any devices which have installed with basic *Microsoft PowerPoint* are able to conduct these games.

The software contains 4 games which was designed based on Malay Early Literacy Instructional Model (Ng & Yeo, 2013). The literacy content in the games were systematically arranged and matched with the respective games in a progressive manner from phoneme-grapheme recognition, to syllable recognition and word recognition (Table 2). It applied the multimedia elements of visual, audio and animation to attract participants' interest in learning. It was also designed in a game challenge form so that the participants would want to beat the score to get into higher level. The choice of contents and the time limit could be adjusted to suit the lesson as well as the participants' proficiency levels.

*Table 2 – Respective games with the essentials components of literacy content focus*

Week	Games	Literacy Content
1	Vowel Balloon Popping	phoneme-grapheme recognition
2	Consonant Star Shooting	syllable recognition
3		
4	Kiki's Coconut Collection	word recognition
5		
6	Wheel of Fortune in Mini Zoo	

### Intervention Procedure

The intervention was conducted for 6 weeks, 4 days a week and 1 hour per day. Each intervention session will follow a 5-step sequence as shown in Figure 4.



Figure 4 – Five steps in each intervention session

#### *Step 1 – Revision of previous lesson*

Before starting the lesson of the day, researcher would revise the skills learnt in previous lesson. This step served as a revision practice and warming up activity before building on the next skill. This step was essential as the participants often demonstrated “forgetful” nature in their learning.

#### *Step 2 – Introduction of selected graphemes and phonemes*

Association method was used to introduce the grapheme to represent the corresponding phoneme. Participants were asked to look for words in the surrounding that begin with the phoneme being taught. Minimal pairs such as “b” and “d” were taught together. Participants were trained to discriminate the differences in sounds of the phonemes and shapes of the graphemes using simple interesting stories. Participants were also guided to use the correct articulation system to sound out the phonemes.

#### *Step 3 – Blending and segmentation*

Upon mastering the vowel sounds, participants would be introduced to consonants. After learning each consonant sound, participants would learn the blending skill using flashcards. For segmentation, participants would be asked to listen to the sounds of the syllable which was read at a very slow speed. For example <ssssaaaaa>. Participants were then asked to identify the initial and ending sound of <sa>. It was followed by <sssooo> and so on. When all six vowels were shown, participants were asked to identify the similarities and differences between the sounds. This would help the participants to recognise the sound patterns and the graphemes representing the sounds.

#### *Step 4 – Animated Games*

This is the rehearsal or practice stage. Participants practised the skill learnt in a specially designed computer games. This trained their automatic recognition skill. Games can be played using a laptop individually or projected by LCD to screen for class activity. Although the games were designed for individual player, when it was projected to the screen, those who were not playing were also involved in the learning process by observing.

#### *Step 5 – Continuous Decoding and Spelling Assessments*

The closure of every intervention session was a continuous assessment. The assessment was formative in nature. There were four types of assessments for alternate use: 1) “Sshh, listen!” 2) “Pick me!” 3) “Hurry up, read it!” 4) “Spell it!”

“Sshh, listen!” was an oral assessment to evaluate phonological awareness. Participants were asked to listen carefully to the syllable sound and answer questions

like, “What is the initial sound in <ma>?” or “What is the ending sound of <lu>?” or “What has the same beginning sound with <paku> (nail)? What has the same ending sound with <lari> (run)?

“Pick me” was an activity designed to assess grapheme-phoneme correspondence. Participants were given a few flash cards and were required to pick from the cards after listening to the instruction. “I’m <s>, pick me!” or “I’m <so>, pick me!”

“Hurry up, read it!” was an activity to test automatic decoding skill. Participants were shown a few graphemes/syllables/words on a screen that would disappear in a few seconds. The participants were to decode and read it within the time limit.

“Spell it!” was an “encoding” assessment. Participants were to spell the phoneme/syllable/word recited by researcher.

Participants who managed to clear the activities successfully would be given an extra chance to play the computer game again before they leave the remediation room. Feedback from the continuous assessments enabled the researchers to plan for the next lesson.

## Research Findings

### Decoding Test

Results of the decoding tests before and after the intervention were demonstrated in Figure 5. Apparently all participants improved in all the decoding skills after the 6-week intervention. It was amazing that all participants scored full marks in the grapheme and syllable decoding test after the intervention.

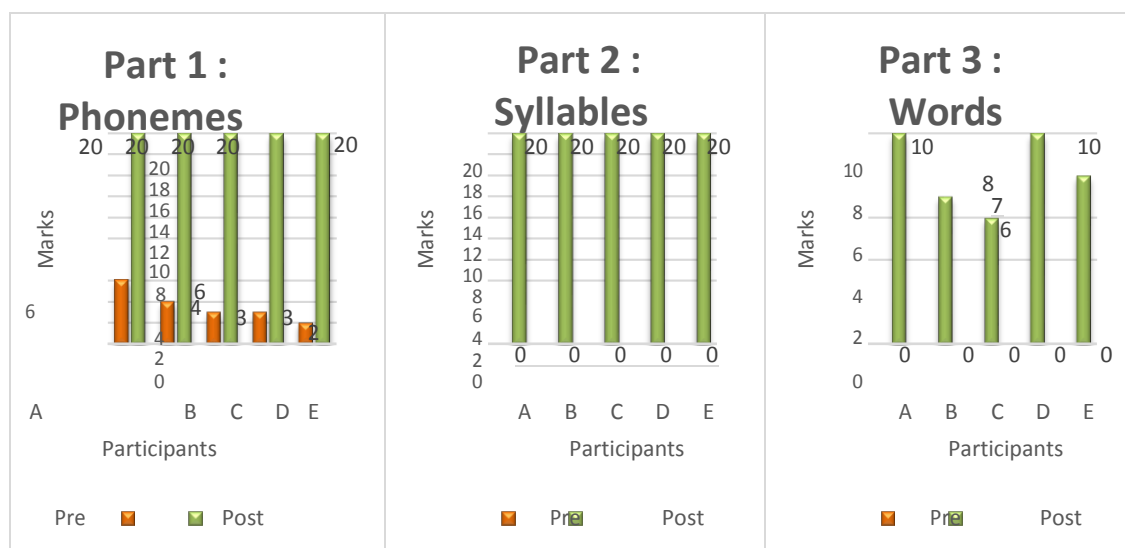


Figure 5 – Participants’ decoding tests (Part 1, 2 and 3) before and after intervention

### Spelling Test

Findings from the spelling test before and after the intervention were shown in Figure 6. Great improvement was demonstrated in all parts of encoding in all participants. It is interesting to note that as compared to word decoding test, participant B, C and E did better in spelling than decoding.



This demonstrates that decoding and spelling task needs are equivalent in Malay and could be taught in parallel.

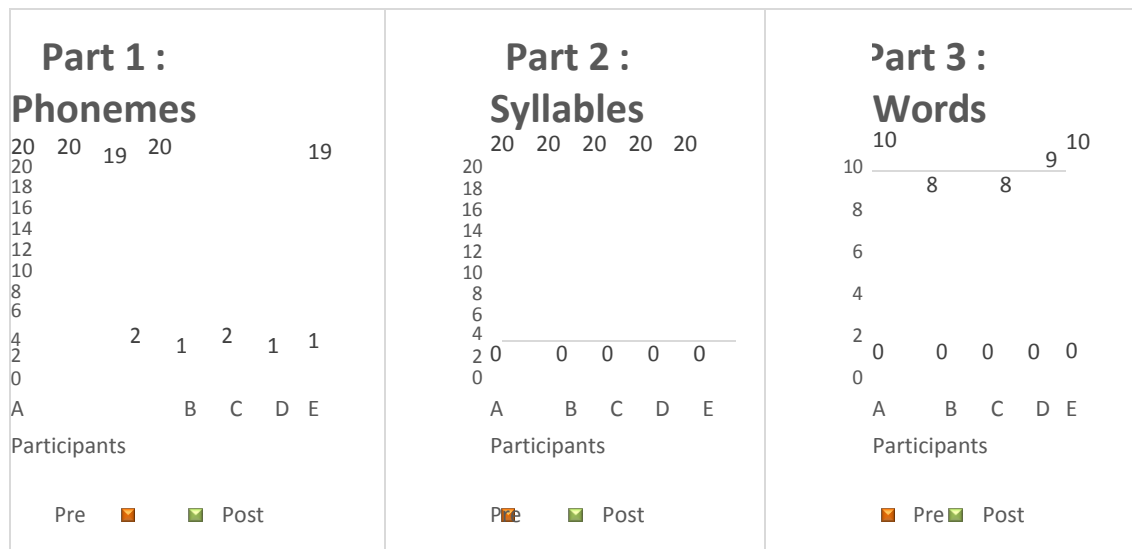


Figure 6 – Participants' spelling tests (Part 1, 2 and 3) before and after intervention

#### Literacy Motivation Profile (LMP)

The maximum scores of the LMP is 96, 32 marks (8 x 4 marks) for each construct. Figure 7 shows the comparison of mean composite scores of the participants in each motivation construct before and after the intervention. There were clear improvement of literacy enjoyment (10.2), literacy self-concept (12.4) and literacy value (12.4). Individual participant's literacy motivation profile was also demonstrated in Figure 8. All participants showed improvement in overall motivation profile, especially participant B (an increase of 41 marks) and participant E (an increase of 48 marks).

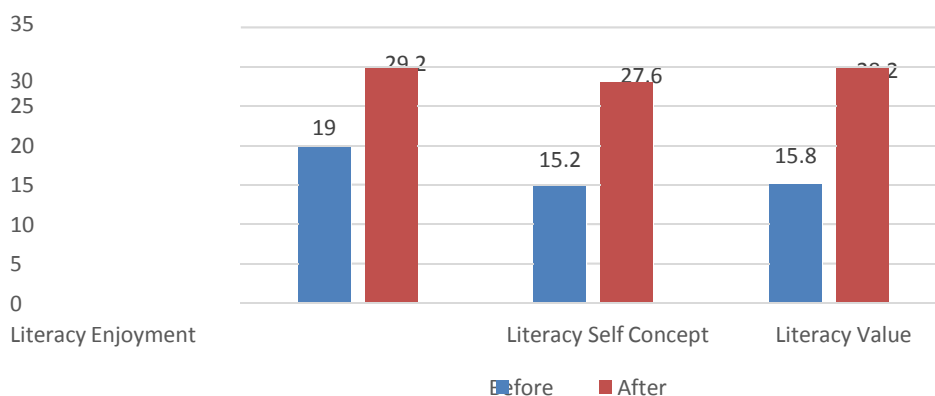
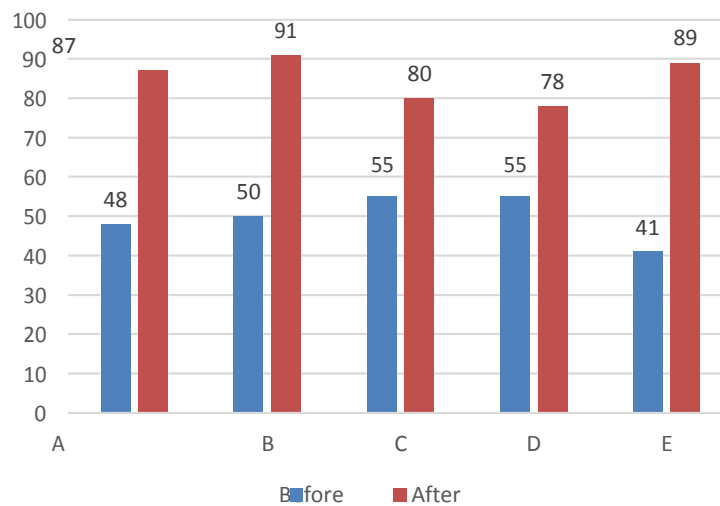


Figure 7 – LMP of participants based on the composite scores before and after intervention



*Figure 8 – LMP of individual participants before and after intervention*

#### *Direct Observation*

Before the intervention, most of the participants looked tired, unenthusiastic and uninterested to participate in activities, especially those that require drilling and practice on worksheets and exercise books. The incorporation of computer games in the lesson changed the normal scenarios in the remedial classroom.

When the games were projected on the screen, participants were excited. They were indeed motivated to learn. This was evident from the time taken for them to come to the remedial room for remedial lesson. It was almost immediate after the ring of the bell for the lesson transition. The participants requested teachers to prepare the games for the next lesson. As the resources were limited, they were willing to wait for their turns to play.

While their friends were playing, they would provide support and cheers to help their friends to get the correct grapheme, syllable or word to achieve higher score (Figure 9).



*Figure 9 – Participants are engaged in playing and waiting patiently for their turns*

Though interested to see their friends playing the games, participants A and E were initially reluctant to try on the games. After a few sessions, they gained confidence to try with the encouragement of their friends. Although a bit slow in hand-eyes coordination, they too enjoyed the games and picked up quickly.

In addition, participants' change of attitude could be seen from the ways they responded to the task. During the first week of intervention, most of the participants seemed demotivated to do the "Spell it!" activity. They could not give the correct answer and easily gave up. They would then start to talk to their friends and disrupt the class. However, with the motivation to score in the game, they began to pay more attention in the learning. As they gained control and built up the skills progressively, they could retain the information more and in turns improved in the spelling assessments. The virtuous circle started to produce favourable results. Subsequently, as they improved, they gained confidence; and as they gained confidence, they were more proficient in the games and learning activities. As they were more proficient in the game, they moved on to a higher level. They then gained more skills and were even more motivated to learn.

To add to the challenge, the researchers set the rules that if they won 2 stars in the closure assessment, they would get an extra chance to play the game. This spurred them on to try harder. It was observed that the time taken for the continuous assessments decreased week by week from 20 minutes in the first week to approximately 10 minutes in the following weeks. This demonstrated that participants have progressively achieved automatic reading and decoding skills through different forms of practices.

### **Research Reflection**

The intervention has successfully engaged the participants in learning. It has transformed the tedious drillings and practice into interesting games and activities which served the same purpose of skill rehearsing and practice. Word recognition skills must be practiced until the skills become automatic and established in long-term memory (Cepede et al., 2006). Nevertheless, it can be done in a more enjoyable and less threatening manner.

There was a clear attitude change among the participants which led to the change in the classroom emotional climate which was optimal for learning. This parallels the concept of “*relaxed alertness*” proposed by Caine et al. (2009) which is one of the brain-based learning principles. In addition, it supports the affective aspects of learning in a manner which is exciting and sustainable. In other words, strategies used in the intervention were able to let participants associate literacy learning with enjoyment, satisfaction, relevance and sense of competence (Ng, 2013).

The continuous assessments were also transformed into a game-like challenge. This again reduced the stress of being tested or examined in a formal, threatening way. Continuous, enjoyable skill perfection enhanced the skill acquisition. Besides, the intervention was organised in a progressive manner from simple to complex. This gave participants confidence to master the skills in small chunks.

### **Conclusion and Recommendation**

In conclusion, the intervention was effective in enhancing students’ literacy learning motivation and reading skill of remedial students. The findings demonstrate that an appropriate intervention must have elements which can engage students in literacy learning, both cognitively and affectively. Besides, it also indicates that teacher’s content knowledge on early literacy skills must go hand in hand with the affective aspects on literacy. Indeed, students need both the “skill” as well as the “will” in literacy learning as they must be motivated to engage in literacy activities to continue to be lifelong readers and writers.

Future action will include the interactive features and elements in the teaching of subsequent skills such as sentence and short story reading. Furthermore, when students have acquired basic decoding and encoding skills, teaching should focus more on meaningful contextual learning rather than isolation skill practice.

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