Literacy Intervention for Preschool Children at Risk of Literacy Difficulties in Malaysia

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Abstract   The purpose of this study was to evaluate an early literacy intervention programme for preschool children who are at risk for literacy difficulties. This study was designed based on the ADDIE instructional design framework: Analysis of needs, Designing intervention program and test, Developing and validating intervention module, materials, and test, Intervention, and Evaluation of the effectiveness of the intervention. A total of 64 kindergarten children from 10 preschools who were native speakers of Malay children – 32 intervention and 32 control, participated in this experimental study. Pretest and posttest were administered using Malay Early Literacy Skills Test Battery (MELSTB). Paired samples *t*-tests indicated that both groups progressed significantly in phonological awareness, reading, spelling and reading comprehension skills. However, intervention group significantly outperformed the control group in all literacy skill posttests. This study offered a viable intervention alternative within preschool curriculum.

Keywords   Early Literacy, Preschool, Literacy Difficulties, Intervention

1. Introduction

To produce citizens with high literacy rate is the aspiration of every nation, and more so in an era that emphasizes information and communication technologies. Literacy skills help students to gain and create knowledge through reading and writing as well as using media and technology. Early literacy skills refer to the understanding of basic concepts about printed materials, letters and alphabets, letter sounds, letter-sound relationships, and basic vocabulary. In some literature, early literacy skills are referred to as reading readiness (Ren, Hu, Wu, 2019; Anastasi & Urbina, 1997; Downing Thackray, 1975; Yeo & Lu Xi, 2012). As the foundation of literacy begins from young, it is an essential task for all preschool providers to look into their early literacy instructional practices. In Malaysia, the national preschool curriculum (KSKP 2010) for children aged 5-6 years who are attending kindergartens, was implemented in 2010 for all preschools, whether public or private. In this curriculum, one of the six strands underlying pre-school education is communication which includes language skills. Bahasa Malaysia had become a major focus for all preschool education providers. Various efforts were made to help kindergarten children aged 5-6 years, to master the early literacy skills before they enter the formal education. Deficits in early literacy skills at the beginning of preschool tend to remain, or even increase, through elementary school, creating a continuously widening gap between children who have good literacy skills and those who do not (Al Otaiba & Fuchs, 2002; Gettinger & Stoiber, 2007; Good et al., 1998; Juel, 1988; Shamsudin et al., 2010; Stanovich, 1986; Torgesen, 1998). Remedial effort for literacy difficulty has been found to be time-consuming, more costly and less effective than intervention which aims at prevention in early years (Foorman, 2004; Heckman, 2000; Ramey & Ramey, 2006; Snow, Burns & Griffin, 1998). In this light, it is vital to realign the curriculum and instructional approaches in preschools and to equip preschool teachers with pedagogical content knowledge training, resources and appropriate delivery approaches, to ensure efficient and effective instruction and intervention in preschool.

2. Literature Review

In the context of learning Malay language in Malaysia for preschool children (5-6 years old) prior to entering the formal education at the age of 7 years old, they are expected to have acquired basic literacy skills, that is the ability to read, write and understand basic words, simple

and complex sentences (using conjunctions) and apply such knowledge in learning and everyday communication. Learning will be difficult if they fall short in these literacy skills. Studies show that learning to read and write is not a natural ability like learning to speak and understand a language (Sousa, 2011). While some children can learn to read and write effortlessly, there are some who face difficulties due to deficiencies in physical, biological, linguistic, poor socio-economic background, underprivileged environments or even ineffective instructions (Munro, 2009). These are children who are at risk of developing literacy deficiency and who need to be supported with effective and efficient instruction and intervention so that they do not continue to fall behind their peers. Longitudinal studies show that by the end of first grade, children having difficulty in learning to read begin to feel less positive about their abilities. Realizing the importance of children's early literacy acquisition, Malaysian government has implemented the KIA2M programme (Early Intervention for Reading and Writing) which started in 2006 for Year One students who need extra support. The impact of KIA2M was reported to be unsatisfactory (PEMANDU, 2010). Under the Government Transformation Program, the Education National Key Results Area (NKRA), Literacy and Numeracy Programme (LINUS) has been implemented in 2010 to substitute KIA2M. LINUS is a remedial programme developed to ensure that students acquire basic literacy and numeracy skills by the end of 3 years of primary education. It involves 6 strategies for the implementation: screening; material development; teacher training; schools and community awareness; monitoring, supervision & evaluation; and establishment of FasiLINUS (full time literacy and numeracy coaches). Students who are falling behind are grouped together during the relevant classes and taught according to their needs. The initiative of the LINUS Programme is a commendable effort to achieve literacy targets. Apparently, the performance in the literacy rate shows achievement in basic reading and writing skills (knowing letters, blending syllables to form words and simple sentences, and basic comprehension skills). However, as these students progress in the lower primary years, their peers also improve to a higher level of literacy standards in fluency, accuracy and comprehension skills. This again widens the gap between them. In addition, the intervention involves pull-out time within the primary curriculum. How well these students who fell behind during the first years fit into the normal mainstream when they pass the later screening deserves further investigation and research.

3. Problem Statement and Purpose of Study

To address the practical gap of teachers' inadequacy in

planning and preparing early literacy materials and resources, a comprehensive early intervention was developed based on the proposed instructional model. A complete intervention learning kit was developed to demonstrate practical application of the proposed instructional and intervention model. Teacher's guide was also developed to give clear guidance for the implementation. The effectiveness of the approach is examined using Malay early literacy skills assessment batteries (MELSAB). The assumption is that if these children can be supported with quality intervention before entry to primary school, it will not only boost their confidence and self-esteem in literacy but also pave their way towards successful and enjoyable learning. The purpose of this study was to determine the effectiveness of the developed early literacy intervention on enhancing kindergarten children's literacy skills in phonological awareness, decoding, spelling and reading comprehension. The effectiveness was measured before and after a fourteen-week intervention by using Malay Early Literacy Skills Test Battery, MELSTB (2013) which consists of four literacy skills tests: (i) Malay Early Literacy Phonological Awareness Test (MELPAT), (ii) Malay Early Literacy Decoding Test (MELDT), (iii) Malay Early Literacy Spelling Test (MELST), and (iv) Malay Early Literacy Reading Comprehension Test (MELRCT).

4. Method

This study employed the experimental design to investigate the effectiveness of an early literacy intervention on Malay language. Prior to the Early Literacy Intervention (ELI), preliminary study was conducted to determine instructional and learning needs of kindergarten teachers and children in the early literacy instruction, examine the language elements, developing and validating MELSTB. The intervention program module was designed and developed which includes the software, teaching aids and teacher's manual. A total of 10 public-funded KEMAS kindergartens in Johor Bahru District were selected as participants in the intervention based on cluster purposive sampling. From the screening results in each kindergarten, children with special needs or low attendance rate were excluded. Finally, a total of 64 children were randomly selected, with 32 each for experimental and 32 control group by using matched-pairs design. After assigning the participants into experimental and control groups, pretests, MELSTB (O1 & O2) and posttests, MELSTB (O3 & O4) were administered before and after the treatment for 14 weeks.

5. Results and Discussion

MELPAT - Paired-samples t-test (Table 1 showed significant differences in the pre- and posttest of the ELI

groups, t(31)=11.41, p<.001, d=-2.02, 95%CI [6.42, 9.21]. Significant differences were also found in the pre- and posttest of the control group, t(31)=3.95, p<.001, d=0.70, 95%CI [0.98, 3.08]. Independent samples t-test showed no significant differences in the pretest between ELI and control groups, t(62)=0.04, p=.970 .Significant differences were found in the posttest between ELI and control groups, t(62)=5.60, p<.001, d=1.41, 95% CI [3.63-7.62]

MELDT - Paired-samples t-test (Table 2) showed significant differences in the pre- and posttest of the ELI groups, t(31)=8.68, p<.001, d=1.53, 95% CI [7.38-11.91]. Significant differences were also found in the pre- and post-tests of the control group, t(31)=4.13, p<.001, d=0.73, 95%CI [1.49, 4.13]. Independent samples t-test showed no significant differences in the pretest between ELI and control groups, t(62)=0.53, p=.599. Significant differences were found in the posttest between ELI and control groups, t(62)=3.95, p<.001, d=1.00, 95%CI [3.55, 10.80]

MELST - Paired-samples t-test (Table 3) showed significant differences in the pre- and posttests of the ELI

groups, t(31)=11.54, p<.001, d=2.04, 95%CI [3.97, 5.67]. Significant differences were also found in the pre- and posttests of the control group t(31)=4.29, p<.001, d=0.76, 95%CI [1.54, 4.34]. Independent samples t-test showed no significant differences in the pretest between ELI and control groups, t(62)=-0.16, p=.870. Significant differences were found in the posttest between ELI and control groups, t(62)=4.29, p<.001, d=1.08, 95%CI [4.04, 11.09]. MELRCT - Paired-samples t-test (Table 4) showed significant differences in the pre- and posttests of the ELI groups, t(31)=11.46, p<.001, d=2.02, 95%CI [10.62, 15.22]. Significant differences were also found in the pre- and posttests of the control group t(31)=9.40, p<.001, d=1.66, 95%CI [4.95, 7.70]. Independent samples t-test showed no significant differences in the pretest between ELI and control groups, t(62)= -1.02, p=.313. Significant differences were found in the posttest between ELI and control groups, t(62)=5.34, p<.001, d=1.33, 95%CI [5.05, 11.09].

Table 1. Paired-sample t-tests results in MELPAT pretests and posttests

	Group	N	Pretest	Posttest	Mean Difference	95% CI Lower	95% CI Upper	t	Sig. (2-tailed)	Cohen's d
SS	Control	32	4.03 (2.63)	4.91 (3.12)	0.88 (2.92)	0.18	1.93	1.70	.100	-0.30
	ELI	32	4.06 (3.37)	7.06 (2.83)	3.00 (3.36)	1.79	4.21	5.05***	.000	-0.89
ISI	Control	32	3.09 (1.25)	4.00 (1.37)	0.91 (1.57)	0.34	1.47	3.26**	.003	-0.58
	ELI	32	3.25 (1.27)	6.97(1.96)	3.72 (2.25)	2.91	4.53	9.36***	.000	-1.65
ESI	Control	32	3.56(1.76)	4.22(1.90)	0.66 (1.68)	0.52	1.26	2.21*	.034	-0.39
	ELI	32	3.31 (1.60)	5.84 (2.11)	2.53 (2.27)	1.71	3.35	6.30***	.000	-1.11
PA	Control	32	8.91 (3.00)	10.94 (3.54)	2.03 (2.91)	0.98	3.08	3.95***	.000	-0.70
	ELI	32	8.75 (3.73)	16.56 (4.41)	7.81 (3.87)	6.42	9.21	11.41***	.000	-2.02

Note. SS=Syllable Segmentation; ISI=Initial Sound Identification; ESI=Ending Sound Identification; PA=Phonological Awareness Composite Score *p<.05. **p<.01. ***p<.001.

Table 2. Paired-sample t-tests results in MELDT pretests and posttests

	Group	N	Pretest	Posttest	Difference	95% CI Lower	95% CI Upper	t-test	Sig-(2-tailed)	Cohen's d
SD	Control	32	1.59 (1.94)	2.99(2.70)	1.40 (1.65)	0.81	2.00	4.83***	.000	0.85
	ELI	32	2.14 (2.32)	5.91 (2.85)	3.78 (2.31)	2.95	4.61	9.27***	.000	1.64
WD	Control	32	1.36 (1.79)	2.45 (2.86)	1.09 (1.69)	0.48	1.70	3.65**	.001	0.64
	ELI	32	1.42 (1.78)	5.44 (3.38)	4.02 (2.87)	2.99	5.06	7.92***	.000	1.40
STD	Control	32	0.43 (0.76)	1.47 (2.52)	1.04 (2.04)	0.31	1.78	2.89**	.007	0.51
	ELI	32	0.40 (0.72)	4.17 (3.72)	3.77 (3.26)	2.59	4.94	6.52***	.000	1.16
DC	Control	32	2.81 (3.55)	5.76 (6.42)	2.95(4.04)	1.49	4.41	4.13***	.000	0.73
	ELI	32	3.30(3.74)	12.94 (8.00)	9.64 (6.29)	7.38	11.91	8.68***	.000	1.53

Note. SD=Syllable Decoding; WD=Word Decoding; STD=Sentence Decoding; DT=Decoding Composite Score *p<.05. **p<.01. ***p<.001.

Table 3.　Paired-sample t-tests results in MELST pretests and posttests

	Group	N	Pretest	Posttest	Difference	95% CI		t-test	Sig-(2-tailed)	Cohen's d
						Lower	Upper			
SSp	Control	32	1.87 (2.35)	2.87(2.92)	1.00 (1.51)	0.46	1.54	3.77**	.001	0.66
	ELI	32	1.56 (2.32)	6.38 (2.82)	4.82 (2.36)	3.97	5.67	11.54***	.000	2.04
WSp	Control	32	0.41 (0.93)	1.76 (2.44)	1.35 (1.98)	0.63	2.07	3.85**	.001	0.68
	ELI	32	0.58 (1.24)	4.31 (3.36)	3.72 (2.83)	2.70	4.74	7.43***	.000	1.31
Sp	Control	32	2.85 (3.75)	5.79 (6.51)	2.94 (3.88)	1.54	4.34	4.29***	.000	0.76
	ELI	32	2.68 (4.26)	13.35 (7.54)	10.67 (5.97)	8.52	12.82	10.11***	.000	1.79

Note. SSp=Syllable Spelling; WSp=Word Spelling; Sp=Spelling Composite Score *p<.05. **p<.01. ***p<.001.

Table 4: Paired-sample t-tests results in MELRCT pretests and posttests

	Group	N	Pretest	Posttest	Difference	95% CI		t-test	Sig-(2-tailed)	Cohen's d
						Lower	Upper			
WRC	Control	32	1.90 (2.57)	4.40 (2.72)	2.50 (1.97)	1.79	3.21	7.19***	.000	1.27
	ELI	32	2.33 (2.97)	7.48 (2.22)	5.17 (2.64)	4.20	6.10	11.05***	.000	1.96
SRC	Control	32	0.69 (1.57)	3.25 (2.63)	2.56 (1.78)	1.92	3.20	8.16***	.000	1.44
	ELI	32	1.44 (2.75)	6.63 (2.94)	5.19 (3.13)	4.06	6.31	9.39***	.000	1.66
RC	Control	32	3.23 (4.79)	9.56 (6.12)	6.33 (3.81)	4.95	7.70	9.40***	.000	1.66
	ELI	32	4.71 (6.73)	17.63 (5.97)	12.91 (6.38)	10.62	15.22	11.46***	.000	2.02

Note. WRC=Word Reading Comprehension; SRC=Sentence Reading Comprehension; RC=Reading Comprehension Composite Score *p<.05. **p<.01. ***p<.001.
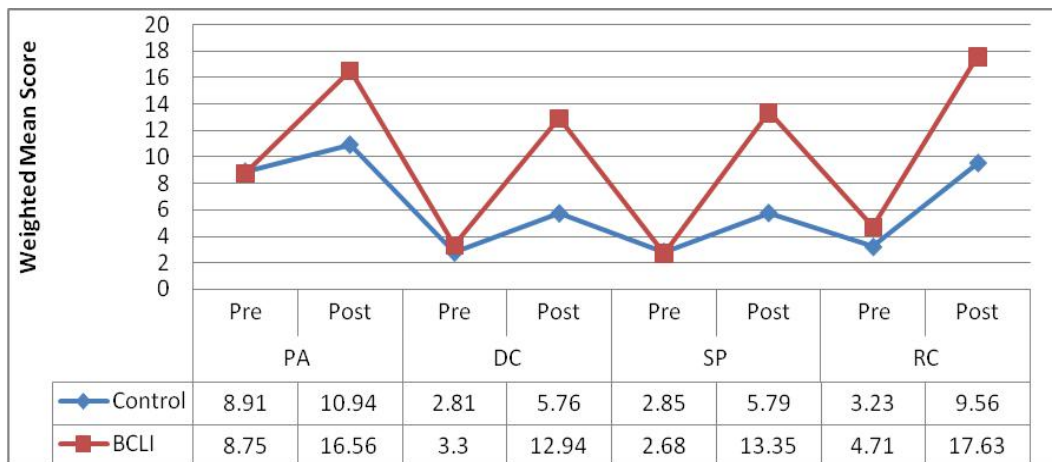

Figure 1.　Line graphs comparison of posttest weighted composite scores in all early literacy skill components of BCLI and control groups

ELI intervention showed significant differences in the overall weighted mean scores for all the components in MELSTB. Although the control group also demonstrated significant differences in most of posttests, the ES values were much smaller as compared to ELI group (Figure 1).

It can be concluded that both interventions, the ECL and the existing conventional intervention in the control group, showed significant improvements after the 14-week intervention with ECL showing large effect size indicating tremendous improvement in posttest. From the results of the four literacy skills, unexpectedly, the control group with no specific instruction on phonological awareness also produced significant results with small to medium effect. This result suggests that children may acquire the phonological skill implicitly in the process of the learning as demonstrated in the control group. This result is consistent with Treiman et al. (1996) study which found that even though children were not explicitly taught phonemic codes, they had learned this implicitly. They explained that children might have learned to connect print to speech via letter name knowledge. The overall findings on the effectiveness of ELI intervention were consistent with other intervention studies which used a balanced, systematic, explicit and multi-componential content focus intervention to improve phonological awareness skills (Fountas & Pinnell, 2009; Fuchs & Fuchs, 2009; Nelson et al., 2005; Stein et al., 2008; Vadasy & Sanders, 2008). As children at risk for literacy difficulties face problem of poor

short term memory (Swanson et al., 2009) and poor working memory (Swanson & O'Connor, 2009), it interferes with their understanding of longer words and sentences. Therefore, a systematic and explicit instruction would help to break down complex skills into small manageable "chunk" of learning so that children with working memory deficiency can be supported by simplified tasks (Fletcher et al., 2007; Vaugh et al, 2012).

The effectiveness of the multi-componental content focus of the intervention was also consistent with other intervention studies which reported effects ranging from +0.53 to +0.84 for phonological awareness and phonics training on primary students' phonological, reading and spelling outcomes (NICHHD, 2000). Similar findings were also reported in intervention studies with training on phonological awareness plus phonics training (+0.57) and phonological awareness plus alphabet training (+0.37) (NELP, 2008).

6. Conclusions

In an effort to achieve zero illiteracy in Malaysia, the challenge is to close the gap between more proficient early literacy learners and those from disadvantaged linguistic and socioeconomic backgrounds. It is therefore essential to provide affordable, quality, efficient and accessible early literacy education to all learners, especially those who are at risk for literacy difficulties at an early age, in line with the aspirations outlined in the Malaysia Education Blueprint 2013-2025. Effective literacy intervention in preschool will not only prevent literacy difficulties among at risk children, it is also the key to create confident and competent literacy learners who enjoy learning. This is vital as the goal of education is to develop effective lifelong learners. Given the positive potential of ELI program from the experimental research, future research is warranted to the refinement and extension of the learning modules and learning resources. The ELI modules developed in this research include 8 modules which cover combination of 6 vowel sounds and 21 consonant sounds for basic reading skills. Further research and development can extend to cover less frequent digraphs, diphthongs and affixes. It can also include graded readers for extended reading and higher level comprehension skills. The modules can also be differentiated to suit the different learning needs of children with diverse linguistic backgrounds and those whose mother tongue is not Malay. Furthermore, a demonstration video of the proposed intervention methods as well as delivery modeling will be a better choice in addition to the printed teacher's guide.

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