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WOODLANDS-ADMIRALTY MIND EXPANDING PROJECT (WAMEP)

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Abstract: *WAMEP* is an on-going experimental study in which NIE lecturers collaborate with two primary schools in the north zone of Singapore. The objectives of the study are to find out: (a) if lower primary pupils can be trained to use mind-mapping and *SCAMPER* in the English Language lessons and, thus, (b) enhance their learning of the language. The project began with two weekend workshops for teachers in Woodlands to familiarise them with Mind mapping and *SCAMPER* as two techniques to “expand” the children’s minds. *Following* the workshop, P1 and P2 teachers at Woodlands practised the use of mind-maps and *SCAMPER* towards the end of 1998 in preparation for the main study. Beginning 1999, they used these as a regular feature in their lessons through the first semester. To evaluate the impacts of the project, specially designed tasks and a common assessment paper were given to P1 and P2 pupils at Woodlands and Admiralty, with the latter serving as a comparison group. A teacher survey was also conducted to gauge the teachers’ receptivity and problems encountered.

Introduction

The concept of *Thinking Schools Learning Nation* (Goh, 1997) signals a new phase of education in Singapore. Schools are encouraged to develop critical and creative thinking. In this context, schools are keen to experiment with approaches, which may foster creativity in their students. The National Institute of Education, being the sole teacher education agent in Singapore, is naturally expected to contribute to this effort through providing professional consultation to and collaboration with the schools. *WAMEP* is an example of such co-operation between school teachers and university staff. The Woodlands Primary School is a neighbourhood school, which is dynamic in that it has several projects of an experimental nature going on. The principal, Mrs. Mary Lim, was convinced that mind-mapping and *SCAMPER* would have positive effect on her students, specifically in the realm of language learning.

The first technique introduced in the *WAMEP* is mind-mapping. Mind-mapping is based on the researches on the brain (Sylwester, 1995). It is a learning strategy, which seeks to maximise the complementary functions of the two hemispheres of the brain. Mind-mapping assumes that two hemispheres works not in a linear fashion but an interactive manner. Buzan (1995), the originator of mind-mapping has developed specific techniques and rules on the use of emphasis, clarity and style. It starts with a central image followed by extensions radiating outward at as many levels as desired. To stimulate both hemispheres of the brain, mind-mapping should embrace the use of colours, key words, and icons. Mind-mapping finds wide applications in the private sector. Increasingly, academics and schools are appreciative of the value of this approach and have engaged in research into the uses and effectiveness of mind-mapping in the context of learning. Leaf (1997) studied the use of mind-mapping as an alternative approach to learning and the results show that although there were significant benefits to the teachers, mind-mapping facilitated thinking, problem solving and innovation among the pupils.

The second set of mind-expanding techniques tried out in the *WAMEP* project is *SCAMPER*, a mnemonic by Eberle (1971) based on the checklist of A. Osborn. *SCAMPER* is a simplified version of an idea-spurring checklist: substitute, combine, adapt, modify, put to other uses, eliminate, and re-arrangement. It is has been found to be useful in generating ideas in engineering and design

sessions and quality circles (Rickards; 1990). It is believed that the same techniques could be applied in language learning to train students in the transfiguration of written materials they encounter or produce, and that through practising such transfiguration the students could become more sophisticated in their written work.

Thus, the purpose of study is to find out a) if lower primary pupils can be trained to use mind-mapping and SCAMPER in their English Language lessons and, thus, b) enhance their learning of the language.

Method

Experimental Design

The study adopted the quasi-experimental post-test-only control group design. It is quasi-experimental in that the researchers were unable to assign randomly the two schools involved to either the experimental or control condition: Woodlands agreed first to be involved and only then the Admiralty Primary School (in the same neighbourhood and receiving comparable new students) was invited to serve as a comparison group.

The inclusion of a post-test-only control group strengthened the design. It permitted the researchers to measure the impact of the influence without sensitising the experimental group through pre-tests. It is readily appreciated that a true random experiment was outside question in the school reality as schools would not re-organise students into experimental and control classes for experimentation. However, the pay-off of this design is the ecological validity of the study in that what happens, if at all, happens in the real and normal classroom context.

Procedure

During the last school term of 1998, the Primary One and Two teachers at Woodlands attended two half-day sessions with emphasis on hands-on experience in the use of mind-mapping and SCAMPER. Having grasped the essentials of these two techniques, they proceeded to teach the techniques to the primary one and two pupils, in preparation for full implementation in the ensuing semester. The teachers later were given training in the use of mind-mapping software. Starting in January 1999, Woodlands teachers introduced mind-mapping and SCAMPER into their English Language lessons as normal teaching-learning activities as and when they saw fit.

Subjects

In consultation with the teachers at Woodlands, it was agreed that four classes at each level would be involved. Two classes, one from each end of the level and the remaining two classes from somewhere in the middle would be selected. This was to ensure a wide range of student ability. The same arrangement was made with Admiralty.

Measures

At the end of the first semester 1999, for post-test measures, the Primary One and Two pupils at Woodlands a) drew a mind-map on a given central idea "Fruits" which was familiar to the students, b) completed a free association test, and c) applied the SCAMPER techniques to a given story "Tony" to *make it more interesting*. On the other, those at Admiralty a) completed a free association test, and b) re-created a given story to "make it more interesting". Admiralty students were not required to produce mind-maps since they were not trained to do so.

The students' responses were rated by teachers, using guidelines provided by the researchers. Specifically, each marker was given a model mind-map prepared by the researchers. This mind map on "Fruits" contained more branches (the first level of association), twigs (the second-level or more remote association) and levels (the number of steps from the core idea to the farthest association) than could be reasonably expected of the Primary One and Two pupils. To simplify the marking of the mind-maps, each branch, twig or level produced by the pupils would be given one mark. This helped to achieve greater uniformity and reduced the discretionary awards made by teachers.

For the free association test, all the pupils were asked to record as many words associated with "Fruits" as they could within five minutes. One mark was given for every such word and this gave the verbal fluency score. In addition, the responses were also scored for verbal flexibility, with one mark for every different category of ideas. The fluency and flexibility scores were summed for a creativity score. Spelling errors were ignored, as the purpose of the free association test was to assess the quantity and complexity of ideas but not spelling ability.

For the "Tony" story, teachers were asked to indicate in the students' answers the particular SCAMPER techniques used. The teachers were asked to use their discretion and award marks for the pupils' attempts and record such marks in the column most appropriate to the SCAMPER techniques. All teachers were also asked to assess the overall quality of the rewritten story in terms of fair, good, excellent.

Care was taken to minimize probably marker bias. Firstly, pupils recorded their personal particulars (i.e., school, class, etc.) at the back of the answer sheets, thus concealing their identities so as to prevent bias in marking. Secondly, the answer sheets were ruffled and randomly allocated to the teachers for marking during the school holidays.

Results

As shown in Table 1, at the Primary One level, Woodlands scored higher than the control school in English language with a small effect size of 0.2 and Creativity with a moderate effect size of 0.5 though not in SCAMPER. At the Primary Two level, Woodlands scored higher than the control school in Creativity with a large effect size of 2.0 and SCAMPER with a large effect size of 0.8 but not in English Language. Since the control classes had no training in mind-mapping, direct comparison with the experimental classes was not possible.

With reference to the effect sizes (Table 1), the training benefits at the Primary One and Primary Two levels were estimated with reference to the normal distribution. These are shown in Table 2. The results suggest that, on the whole, Primary Two were more able to benefit from training. Moreover, the benefit is greatest for *SCAMPER* than mind-mapping.

Table 1: Mean Comparisons

	Admiralty			Woodlands			t	p	Effect size
	N	Mean	SD	N	Mean	SD			
Primary One									
English Language	154	65.4	26.5	156	71.7	20.7	2.34	.02	0.2
Creativity	154	9.3	4.9	156	11.9	6.3	4.07	.00	0.5
SCAMPER	154	3.7	2.7	156	3.6	1.9	.38	.71	0.0
Mind-mapping	Not measured			-	-	-	-	-	-
Primary Two									
English Language	144	67.4	19.5	149	69.9	22.2	1.05	.294	0.1
Creativity	144	16.6	8.6	149	33.5	11.3	14.37	.00	2.0
SCAMPER	144	7.3	3.2	149	9.8	2.0	7.90	.00	0.8
Mind-mapping	Not measured			-	-	-	-	-	-

Table 2: Comparisons of Experimental Benefits

	Primary One		Primary Two		Difference in Benefit
	Effect size	Benefit	Effect size	Benefit	
English Language	0.2	8%	0.1	0%	-
Mind Map (MM)	Not measured for control group				
Creativity	0.5	32%	2.0	48%	16%
SCAMPER	0.0	0%	0.8	29%	29%

Table 3: Inter-correlation by School

	English Language	Mind-mapping	Creativity	SCAMPER
School Admiralty (n=298)				
English Language	1.00	-	.35**	.45**
Mind-mapping		-	-	-
Creativity			1.00	.45**
SCAMPER				1.00
School Woodlands (n=305)				
English Language	1.00	.46**	.39**	.12*
Mind-mapping		1.00	.52**	.30**
Creativity			1.00	.72**
SCAMPER				1.00

**p < 0.01 *p < .05

As can be seen in Table 3, for both schools, English Language, Mind-mapping, Creativity and SCAMPER correlate significantly. For Admiralty (control), English Language correlates significantly with Creativity and SCAMPER. The coefficients are moderate in magnitude, varying between .35 (English Language and Creativity) and .45 (English Language and SCAMPER, and Creativity and SCAMPER). For Woodlands, the coefficients vary from a low 0.12 (between English Language and SCAMPER) to a high 0.72 (between Creativity and SCAMPER).

As can be expected from the inter-correlation reported above, at both levels, English Language, Mind-mapping, Creativity and SCAMPER correlate significantly (Table 4). The coefficients of correlation vary from a low 0.10 (between Mind mapping and SCAMPER for Primary Two) to a

moderate 0.56 (between Mind mapping and Creativity for Primary Two). As shown therein, the sizes of correlation are generally greater for Primary Two than Primary One, suggesting a greater training effect at the Primary Two level. However, significance tests of differences show only the difference for correlation between Mind-mapping and Creativity to be statistically significant ($z=2.61$).

Table 4: Inter-correlation by Level

	English Language	Mind Map	Creativity	SCAMPER
Primary One (N=156 for Mind-mapping and N=310 for other measures)				
English Language	1.00	.43**	.55**	.42**
Mind-mapping		1.00	.40**	.21**
Creativity			1.00	.29**
SCAMPER				1.00
Primary Two (N=149 for Mind-mapping and N=293 for other measures)				
English Language	1.00	.54**	.46**	.41*
Mind-mapping		1.00	.56**	.10*
Creativity			1.00	.41**
SCAMPER				1.00

**p < 0.01 *p < .05

Regression analyses were run for Woodlands, with English Language as the criterion and Mind-mapping and SCAMPER as the predictors. The results show that, at the Primary One level, 23% of the criterion variance can be attributed to the joint influence of the two predictors (Mind-mapping 16% and SCAMPER 7%); and, at the Primary Two level, as much as 34% of the English Language variance is attributable to Mind-mapping 28% and SCAMPER 6%.

Discussion and Conclusion

The study shows that children at the lower primary school level can benefit from the use, through normal classroom teaching, of mind-mapping as a technique for associating and organising ideas and SCAMPER as a set of techniques for language transfiguration. Both these seem to have a positive effect on language achievement in that children who have been exposed to these techniques can write more interestingly and with more ideas.

Nonetheless, the study, being exploratory in nature, has its limitations. For simplicity, the scoring of the students' creative products (i.e., mind-mapping, free association, and story rewriting) was made as simple as possible so as not to impose a heavy load on the teachers who had to mark the tests during the school vacation. This compromise could be justified as the simplicity makes the measurement procedures more relevant to teachers' work. It is hoped that this simplification will increase the chances the teacher will accept mind-mapping and SCAMPER as part of their normal teaching repertoire.

It was also noted that the students tended to use more frequently the simpler SCAMPER techniques (substitute, addition, and modify) than the presumably more complex ones (put to other uses, eliminate, re-arrange, and combine). Understandably, the application of the various SCAMPER techniques depends to some extent to the nature of the topic and the language used in the test-story.

Another limitation is related to the teachers' familiarity and confidence with mind-mapping and SCAMPER as mind-expanding techniques. Although training was provided, a longer lead-time

before the full implementation of the study could have enhanced the teachers with greater familiarity and confidence in their use. Teacher differences in understanding and confidence (and hence, enthusiasm) might have a differential effect in different classes. Such probable differences have not been investigated in this study.

Yet another limitation is that while mind-mapping encourage the generation of creative ideas through synergy and while SCAMPER could shape creative thinking, such mind-expanding skills might not be the criteria sought in the English Language semestral examination taken the end of the experimentation. Thus, the correlation which the mind-expanding skills have with to real-life school examination might well be due to some other factors not investigated here.

Despite these shortcomings, this study has, however, pointed up the possibility of enhancing young children's learning of English Language (and, perhaps, any other language) by having the teachers using mind-expanding techniques such as mind-mapping and SCAMPER as part and parcel of normal classroom teaching, incorporating them into the lessons as and when the topics and materials permit.

References

- Buzan, T. (1995). *The Mindmap Book*. London: British Broadcasting Corporation.
- Eberle, B. (1971). *SCAMPER*. Buffalo, N. Y.: DOK.
- Goh, C. T. (1997). *Shaping Our Future: Thinking Schools*, Learning Nation.
- Speech by Prime Minister Goh Chok Tong at the opening of the 7th International Conference on Thinking, Singapore.
- Leaf, C. M. (1997). *The Mind-mapping Approach: A Model and Framework for Geodesic Learning (Holistic)*. University of Pretoria (South Africa) unpublished DPhil dissertation.
- Osborn, A. F. (1963). *Applied Imagination*. New York: Scribners.
- Rickards, T. (1990). *Creativity and Problem Solving at Work*. Vermont: Gower.
- Sylwester, R. (1995). *A Celebration of Neurone: An Educator's Guide to the Human Brain*. Alexandria, Virginia: ASCD.