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<td>Agnes Chang Shook Cheong</td>
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Project on the Effectiveness of Learning Strategies and Metacognitive Skills

Agnes Chang Shook Cheong

Background

Teachers should not only be concerned with the products of learning but also with the processes of learning as good teaching involves teaching pupils how to learn effectively. The importance of teaching pupils ‘to learn how to learn’ has gained momentum as recent research provides more and more evidence that substantial variance in learning outcomes can be attributed to learning approaches adopted by pupils (Marton, 1976; Marton and Sayo, 1978; Svenssin and Themann 1983; Marton and Saljo, 1984; Biggs, 1987; Chew 1988; Cheng, 1985).

A number of learning strategies curricula have been developed to investigate intervention with pupils (Dansereau, 1985; McCombs, 1981 and, Weinstein and Underwood, 1985). Most learning strategies instructional programmes have been able to report substantial gains in academic performance in post-intervention assessment.

NIE, being the sole trainer of teachers in Singapore, is conducting on-going research in the area of effective teaching and learning strategies. The project reported here aims at assessing the effectiveness of methods used in fostering learning strategies and metacognitive skills in pupils with varied background characteristics. The findings will then be incorporated into the curriculum for NIE trainees. There are two phases to the project:

Phase 1 (1988-1989)

In Phase 1, members were assigned to five subgroups, according to their cognate area of interest. The five subgroups were Science, Mathematics, Social Studies, Languages and Adult Learners (IE students).

Project Leader

Science Team
Maths Team
Language Team
Social Studies Team
Adult Learners Team

There were two concurrent studies, A and B which were completed in two years, 1988 and 1989.

Study A attempted to find out the learning strategies and metacognitive processes used by IE student teachers and secondary pupils in school. Through the use of questionnaires and interviews, information on the following were gathered: secondary teachers’ views on the teaching of learning strategies and metacognitive processes in their respective subjects; secondary pupils’ learning strategies and metacognitive processes in the different subjects; and IE adult learners’ learning strategies and metacognitive processes and their views on the teaching of these strategies and processes to their pupils. Data for the main study were collected from nine secondary schools, two junior colleges and two Pre-U Centres.
The results revealed that the SAP pupils employed better learning strategies and metacognitive processes than the Express pupils who in turn fared better than the Normal pupils. The teachers teaching the different streams also placed varying emphasis on the importance of learning strategies in effective learning. Teachers teaching the Normal stream believed strongly in the use of learning strategies compared to the other two streams. Older pupils were also more inclined towards the adoption of deep and achieving strategies.

Research has shown that the conscious teaching of learning strategies has helped weak pupils to learn better and experience greater satisfaction from their learning experiences. Study B focused on the evaluation of the effectiveness of some methods used in fostering learning strategies and metacognitive processes in pupils. In the pilot study, participating methods lecturers in different subjects alerted the 1988 batch of Dip Ed trainees to the effectiveness of learning strategies on their respective subjects. Selected Dip Ed trainees were observed during their Teaching Practice in the teaching of these strategies. The effective use of these strategies was evaluated through a pre-post questionnaire on the pupils taught by the Dip Ed students.

The trainee teachers were anxious and inexperienced, and competing demands were made on them during their teaching practice. Hence it was decided that trainee teachers may not be the best experimenters. Nevertheless, the trainees claimed that their pupils had shown improvement in their work. Most participating trainees reacted positively to the teaching of learning strategies to their pupils.

**Phase II (1990 to date)**

After examining the findings of the pilot study on intervention, it was decided that the intervention should be carried out in schools by experienced teachers.

In mid 1989, some principals were invited by the Project Leader to a presentation which introduced the idea of partnership between IE lecturers and teachers in teaching learning strategies to the pupils. Two principals responded positively and the intervention projects were scheduled to start in 1990.

The principal chose the subject, the level for intervention and the experimenting teachers. A common design was used for both interventions. One teacher would teach two Normal classes and another, two Express classes. One of the Normal classes and one of the Express classes formed the experimental classes. The intervention was carried out for 2 terms.

There are currently six intervention projects carried out in five schools. Subjects requested for intervention include Mathematics, Science, English and Management Studies. In schools where principals prefer not to have control classes, the pupils' performance before the intervention is used as a pre-treatment score for comparison.

The Project Leader and the Intervention Leader spent three months preparing the experimenting teachers for the task. Through interviews with the teachers, their strengths, their pupils' weaknesses and their knowledge of strategies were assessed. Suitable strategies were suggested to the teachers who were given the choice of accepting or rejecting them. Further meetings were arranged for the Intervention Leader and the teachers to work out the strategies for the different topics to be covered in the two terms.

The strategies suggested and adopted by the intervention schools show variation between subjects.

**Science**

From the discussions with the science teachers in the two schools, it was concluded that pupils encounter difficulty in comprehending the textbook. So the pupils are taught the skill of analysing the text and extracting the key words from it. Concept mapping is further used to link up the concepts extracted in an organized manner. Observation and inferential skills are also included in the intervention package devised for science.
English

Metalinguistic Awareness is the key approach adopted for language intervention. Strategies comprise semantic mapping, syntactic development and discourse analysis.

Mathematics

Pupils were found to be weak in their Mathematics vocabulary. To build up their Mathematics vocabulary pupils are helped to prepare their own vocabulary and terminology notebook with terms explained in pictures, diagrams or examples. As an extension from the vocabulary/terminology notebooks, pupils are encouraged to write out relational statements and construct their own sentences and examples. To consolidate their understanding of mathematical concepts, pupils are guided to generate their own examples, non-examples and problems. Getting pupils to create problems for their classmates to solve is a great favourite with the pupils and contributes much to building up their confidence and esteem.

Management Studies

For the Pre-University Three students, the immediate task is to help them to comprehend their text, extract the key concepts and perceive the relationships between the concepts. They also need examination skills and practice in answering application questions.

From time to time, the Intervention Leader was present to monitor the experimental classes. Pre-post questionnaires on attitudes were given to the pupils, and pupils’ performance in class tests and examinations was closely monitored. Tasks requiring pupils’ verbalisation of steps taken to solve the problem also formed part of the assessment. The Principal and the Project Leader took part in the post-intervention feedback conference.

The results from the Mathematics Intervention in Serangoon Garden Secondary School and the English intervention in Bendemeer Secondary School were encouraging. The Normal pupils were performing better and showed greater interest in their lessons. The principals observed that the experimenting teachers had grown professionally as a result of their participation in the intervention.

Papers on the interventions presented at the ERA have aroused the interest of other principals in the Project and they have requested for interventions in their schools. The existing projects have been extended to more classes and higher grades.

Future Plans

1. There have been requests by some principals for interventions in Chinese and Physics. This would be considered at a later date.

2. With all the changes announced for the Primary school system, it would be a challenge to extend the interventions to the Primary levels, preferably Primary 4 and above. The SPELT Programme (R. Mulcahy) could probably be adapted for the Primary as well as the Secondary schools.

3. The current interventions concentrate on teacher-generated strategies and getting pupils to be aware of strategies. The long term goal is to develop pupils into independent learners who are able to generate their own strategies and transfer these strategies to different subjects and situations. For this purpose, longer periods of intervention are needed and follow-up studies would be necessary.

4. Existing measures on process skills are few. It is hoped that the studies will generate some good instruments on process skills which can be validated and used by NIE colleagues and school teachers.

5. Research into the professional development of teachers involved in the intervention programmes should also be looked into.
REFERENCES


