METALEARNING: Can Children Improve the Way They Manage Their Studies?

By

Dr Agnes Chang Shook Cheong, Dr Seng Seok Hoon and Metalearning Project Team Members from the School of Science, School of Arts and School of Education

Eugene Chew found that his students in the pre-university classes were intelligent but did not perform well in examinations. From a survey on study skills, he found that his students had problems with concentration, memorisation, time-management, reading comprehension. note-taking and examination techniques. He was most concerned that they were also low in motivation. This scenario is real and true of many other classrooms at all levels in Singapore.

Can these students be helped to improve in their study skills and hence their grades'! The future looks promising as recent research shows that differences in the outcomes in learning can be attributed in part to the learning strategies adopted by the students.

But what actually constitutes *effective learning'!*

LEARNING TO LEARN

Learners need to know how to learn, how ro use what they have learned and how to communicate whar rhey have learned. They must be able to define the problem, get the facts, analyse the facts, weigh alternative solutions and determine how to evaluate the chosen solution, thus providing feedback fur the future decisions.

Beswick (1981)

To many parents, learning means memorisation of notes and tent and lots of homework. The effectiveness of a school is often evaluated by the amount of homework given! But learning, according to Beswick means more than just committing to memory large amounts of factual information. It involves information skills, self-questioning, memory skills, comprehension skills, analytical skills, monitoring skills and careful decision-making. All these skills are important in making a student an effective and independent learner.. One very important aim in education in a changing world is for students to acquire skills which are transferable to other situations in life, outside the classroom.

METALEARNING

When a student is *aware of himself as an active agent in the process of learning,* Metalearning is said to have. taken place. According to Professor John Biggs, he will be able. to select the learning strategies to suit his motives and purposes. He will no longer be concerned with just what to learu or think in order to achieve his educational goals. Once metalearning skills are part of his knowledge repertoire, he would be able to adopt or adapt and apply them to any problem-solving situation beyond his school years.

What Happens to Students Whu Have Not Acquired Metalearning Skills?

Relative to their successful peers, *underachievers* have been found to be less able to:

- estimate their ability to complete a task
  plan and organise strategies to solve a problem
- select and apply appropriate strategies
- monitor their programmes in completing a task
- identify and correct their mistakes
- evaluate their overall performance on completing a task.

A local survey carried out by Dr Agnes Chang and her associates on 1393 students in 9 secondary schools, 2 junior colleges and 2 Pre-University centres indicate that the lack, or poor choice, of strategies to be one of the problems underlying the lacklustre performance of our students. The data on SECONDARY NORMAL and EXPRESS students showed the following differences in the way they view and manage learning:.

NORMAL STUDENTS

- were motivated by usefulness, rather than interest, in learning a subject.
- preferred subjects where they have to learn only facts and do not have to read much to understand the materials.
- used strategies not very appropriate for English, which is not a content subject. such as:
  (a) doing summaries;
  (b) writing down main points;
  (c) reading ahead of the class.
  approached the learning of Mathematics by:
  (a) trying to memorise everything when the lesson was too difficult to understand;
  (b) believing that there is only one way to solve a problem;
  (c) memorising model answers.

EXPRESS STUDENTS

- showed greater enjoyment in learning a subject.
  preferred subjects which challenge them to read widely and reflect on what they read.
  used strategies such as:
  (a) rephrasing notes and questions;
  (bj using the language at every opportunity;
  (c) finding out what others think of their spoken expressions;
  (d) writing letters or diaries to improve their English.

- used strategies such as:
  (a) trying to solve problems in past examination papers:
  (b) believing in practice and drill in learning mathematics;
  (c) trying to think of different ways to solve problems;
  (d) drawing diagrams to help in solving problems.

Does Maturity Improve Students' Choice of Learning Strategies

In the same study, YOUNGER (i.e. Secondary Two and Secondary Four) students were compared with OLDER (i.e. Junior College Two and Pre-University Three) students. Some differences in their learning strategies are as shown below:.

YOUNGER STUDENTS

- were rnore concerned with achieving immediate goals of passing examinations and getting a well-paid job.
- relied morc on rote memorisation, preferring fact learning and reading and also admitted to heavy dependence to teachers' notes.
- were less awarc of the critical importance of time-management in tests or examinations.

OLDER STUDENTS

- expressed greater intcrcst in their thinking.
- were more confident and favoured strategics which arc morc relevant and effective for different subjects.
- were more awarc of the importance of time-management.

Some Studies on Metalearning in Singapore

Dr Seng Scok Hoon carried out a nurnber of studies on Mediated Learning Experiences (Prof Reuven Feuertein et al). She began with a study of 7 low achievers who were receiving free tuition in a community centre for 2 months; then to a bigger group of about 30 extended and normal primary pupils for one and a half months (every Saturday morning). The third group comprised over 100 young primary school children aged 7 to 13 spread out in tuition classes from 4 community centres. They received free tuition once a week from volunteer tutors who were trained very briefly on the first set of instruments in the Instrumental Enrichment programme. They tried leaching the thinking skills for about 2 to 3 months.

In this approach children are given problem-solving situations from which specific thinking processes which require further development are identified. The exercises are to help develop problem solving and inquiring minds. It was found that children who received the thinking programme improved their thinking abilities and interpersonal behaviour.

In 1990 and 1991, sorne "intervention" programrnes were also carried out in Singapore secondary schools by National Institute of Education (NIE) lecturers in partnership with school personnel. Instead of adopting programmes developed overseas, specially tailored packages were developed through extensive interviews with principals and teachers and observations of students. The NIE team believe in the ***embedded*** approach, i.e., teaching learning strategies through a subject. The academic subject for intervention and the teachers lo implement the intervention were identified by the principal. The selected teachers would then work with the NIE coordinators for at least 3 months to develop the programme before implemenlation.

Dr Philip Wong worked on Mathematics learning strategies at Secondary One level with teachers in the Serangoon Garden Secondary school. Pupils were encouraged to generate elaborations of what they learnt. For example pupils were asked to prepare their own vocabulary and terminology notebook ***with terms explained in their own personal manner through pictures, diagrams or worked examples.*** This was done individually and guided by the teachcr. It is imporlant that pupils create their own symbols, explanations, pictures, etc. as these would be more meaningful to themselves. A few examples of what some pupils wrote are as follows:

Odd nurnbcrs	: "cannot divide by 2" e.g. I am 13 ycars old – cannot divide by 2.
numerator	: 5 —> numerator (Up)
denominator	: 12 —> Denominator (Down)

Another example involves the ***"Play the Examiner"*** game. After the students had worked at a few problems, the teacher would highlight special features of the problems. The teacher would show students how to ***"ser"*** questions by working backwards, using the ***"reverse process".*** For example, instead of finding the value of **x** in the equation, **5x + 10 = 20,** students were asked to work backwards by assigning any value for **x** and then constructing an algebraic equation from it.

For cxamplc:	1. Assign a value to **x:**	Let **x** = 7
	2. Generate an expression involving **x:**	**3x + 10**
	3. Work out the solution of the expression:	**3(7) + 10 = 31**
	4. Re-write it as a problem:	**3x + 10 = 31,** find **x**

After having constructed a problem, pupils would then exchange their problems with their friends or classmates and they would then solve each other's problems. This activity also exposed students to various strategies of checking answers by reversing the mathematical processes.

Bendemcer Secondary School, in the Project led by Dr Vanithamani Saravanan, opted lor intervention in English at the Secondary Three level. One strategy which applied in the vocabulary and reading comprehension and composition is called Concept Mapping, which attempts to represent super-ordinate, co-ordinate and sub-ordinate ideas or concepts within a schematic framework. Concept maps work to make clear to both students and teachers the key ideas they must focus on for any specific learning task. They may be used prior to reading or writing to connect with their previous knowledge about a topic and students in the recall and recognition of text information. After a learning task has been complcted, concept maps provide a schematic summary of what has been learned.

Some examples of the remarks by Normal stream students are as follows:

Positive remarks:

- *"Concept Mapping – helped me understand the passage – increased my knowledge as I learned from linking ideas from the topic."*
- *"gave a chance to share opinions, share ideas – communicate in English."*
- *"enjoyed group work."*

Negative remarks:

- *"not helpful as I don't have enough ideas."*
- *"group members do not help – makes it difficult."*
- *"it's not for exams, so a waste of rime – prefer grammar exercises as exam questions have grammar questions."*

Another project, headed by Dr Goh Ngoh Khang and Dr Chia Lian Sai, involves intervention in Science at the Secondary Two level in St Theresa's Convent. Among the study skills taught in the project are process skills, such as observational and inferential skills. For example, in training students to practise observational skills, opportunities arc provided for them to select the appropriate observations and to write down their own observations and to compare and discuss the outcomes of observations. In training them to practise inferential skills, students are enconraged to look for information and data, usually obtained from experiments, which can support explanations. Results so far have been promising, especially since the teachers have been most enthusiastic.

At the Pre-university level, Mrs Tey Sau Hing worked on the intervention in Management Studies at the Outram Institute. She used a variety of strategies to help students apply management concepts and principles to make informed decision and solve problems. For example, chunking strategies were used to help students to organise the complex mass of information relevant to the discipline. *Spatial chunking* divides the syllabus into a macro- and micro-perspective or into the functional parts of business. *Procedural chunking,* with the help of flow diagrams, was used to learn the stages and steps of management functions. Interviews with students revealed that enthusiasm for the subject distinguished between the achieving and undcrachicving students.

Some Tips for Parents and Teachers

Parents and teachers play a significant role as motivators and facilitators in children's learning. The following are some suggestions from research:

- Encourage children to be *independent* learners and thinkers.
- Try to resist the temptation of telling them *what* to learn and *what* to think.
- Value *effort* rather than *marks.*
- Help children to diagnose and ovcrcomc their learning problems.
- Stand by them at times of setbacks and help them to regain their *self-confidence.*
- Help and encourage them to *plan* and *schedule* their activities.
- Guide them in *decision-making* and create opportunities for them to make choices and decisions.
- Encourage *independent problem-solving.*
- Help children to *focus* their attention on objects and to look for *derails.*
- Encourage them to be *precise* about things by insisting that they describe or say exactly what they want.
- Be generous with *praise.*