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ABSTRACT

A study examined learning strategies used by secondary school students in Singapore who were streamed into special, express, or normal high school curriculum courses according to their ability. The sample was drawn from nine schools, three schools for each stream. Participants were 1,165 eighth and tenth graders. Measures included Biggs' Learning Process Questionnaire items and additional items concerning languages, social studies, mathematics, and sciences. Findings based on responses to English and mathematics questionnaires revealed significant differences in the choice of learning strategies of students in the normal track and those in the other two tracks. Students in the normal track indicated use of inappropriate learning strategies in both language and mathematics courses. Further examination seems to suggest that normal students lacked confidence and security. Strategies used by students in the special and express tracks indicated that they understood the special features of the subjects and had the confidence needed to explore alternative routes in problem solving. It is concluded that if normal track pupils are to achieve satisfactory scores on academic examinations, they may have to revise their learning strategies. However, they may not be able to do so without help from their teachers. English and mathematics learning strategy questionnaires are included in the text. (RH)

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STREAMING AND LEARNING BEHAVIOUR

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In the sixties and seventies, research on the controversial subject of streaming was popular in the West and the findings much debated (Borg, 1964; Goldberg, Passow and Justman, 1966; Barker-Lunn, 1970; Esposito, 1973; Griffin, 1978; Weber, 1978). The premise upon which streaming is adopted is that children perform better at school when they are streamed by ability. The proffered objective of the streaming exercise is always altruistic and humanitarian but many parents and educationists may not agree with this view.

Approaches to learning are used more and more in recent years to account for the qualitative and quantitative outcomes in learning. Studies done in Australia, Singapore and the United Kingdom have concluded that the more able pupils show intrinsic interest in their school subjects and select strategies usually to achieve their objectives of understanding the subject matter (Svensson, 1976, 1977; Watkins, 1983; Van Rossum and Schenk, 1984; Chang, 1989). If differential learning approaches are adopted by children of varied academic ability, then it is most likely that pupils from different ability streams would also show discrepancy in their learning behaviour.

In 1978, the Goh Report* recommended that the high failure rates at the PSLE (Primary School Leaving Examination) and 'O' Level Examination could be reduced by streaming pupils into different courses according to ability. The argument was based on differential pacing for different children. Streaming was implemented in the primary schools in 1979 and takes place after Primary 3 (Grade 3) and in the Secondary Schools in 1980 after Primary 6 (Grade 6). In this paper, we shall only concern ourselves with the secondary pupils. Pupils who passed the Primary School Leaving Examinations (PSLE), would be streamed as follows: the top 10% would be allowed to opt for either the SPECIAL Course or EXPRESS course, each of which leads to the 'O' Level examination in four years. Nine schools with a very strong Chinese tradition have been selected to conduct the Special course which offers pupils the option of doing 2 First Languages, usually English and Chinese. About 60% of the pupils who passed the PSLE enter the Express stream. The remaining 30% of the pupils are streamed into the NORMAL Course. These Normal pupils take their 'N' Level Examination at the end of the fourth year. Successful candidates who have done well at the 'N' Level Examination would be promoted to Secondary 5, at the end of which they would sit for the 'O' Level Examination. In 1985 and 1986, 70% of the Normal pupils were promoted to Secondary 5.

* At the time when the Report was prepared, Dr Goh Keng Swee was former Minister of Education.

The introduction of streaming at the end of Primary 3 and 6 has evoked strong emotions from the public and the parents in particular. The critics put up two compelling arguments against streaming. First, pupils streamed to a lower course would reduce access to higher education, especially those shunted to the Monolingual course in the primary school. Here, the implicit assumption is that opportunity is present in exposure to a particular curriculum. The second fear centres on possible errors in streaming. The chances of error would be higher in the younger age group especially for the slow developers. A child, wrongly placed in a lower course, would be demoralised and suffer from being labelled as a weak pupil. Even weak pupils who are rightfully streamed into the Normal Course are feared to have suffered from loss of self-esteem and self-confidence.

In response to the scepticism and negative reactions to the Streaming policy, the results of the pupils from the different streams are monitored over the years. Before streaming was implemented, 20% of primary pupils left school without any educational qualification and another 20% dropped out of secondary school without attaining any recognised certification too. After streaming , the corresponding dropout rates went down to 10% for primary schools and five percent for secondary schools five years after streaming was introduced (The Straits Times, 29 March 1985). According to Soon (1988), the post-secondary attrition among secondary pupils has gone down satisfactorily from 36% to 6%. There are local studies which examine the psychological effects of streaming on pupils in the Normal and Monolingual Courses. The results debunk the common myth that slow learners and low achievers in the Monolingual Course have low self-concept (Quah, 1988). Similarly, Quek (1988) has also found from a survey of 473 Secondary Three Normal pupils from nine secondary schools that Normal pupils do not necessarily develop a low academic self-concept. These studies have helped to tone down the critical views on the negative effects of streaming.

The present study attempts to examine the learning strategies employed by pupils in the three secondary courses, namely: the Special, Express and Normal pupils. Self-concept has been strongly associated with academic achievement (Wylie, 1979; West, Fish and Stevens, 1980; Hansford and Hattie, 1982). If the Normal pupils do not suffer from a low academic self-concept, what are some of the other plausible reasons for them to be low achievers? It has been found that well-motivated and achieving pupils selected deep and reflective strategies while poor achievers favoured rote learning (Svensson, 1976, 1977; Watkins, 1983; Van Rossum and Schenk, 1984; Chew, 1988; Chang, 1989). The initial choice of learning strategies may have affected pupils' academic performance. The subsequent teaching strategies, influence of school peers and/or lower self-expectations may perpetuate the use of inappropriate or ineffective strategies and compound future performance. Cooper (1979) who had reviewed some major studies on streaming concluded that less gifted children seem to be positively aided to develop intellectually by being educated alongside the more gifted. Probably peer tutoring would allow the better pupils to advise their less able classmates to use more effective learning strategies.

METHODOLOGY

Sample

The sample was drawn from nine secondary schools. Three schools were identified for each stream. Altogether 1165 pupils from Secondary 2 (Grade 8) and Secondary 4 (Grade 10) participated in the study. Grade 8 and 10 are crucial years in the secondary school as they signal important assessment stages for the pupils. At Grade 8, pupils are streamed into Science, Arts, Commerce r Technical classes according to their final examination results. GCE '0' Level Examination takes place at the end of Grade 10. The number of boys and girls in the sample was approximately balanced.

Instrumentation

The instruments comprise Biggs' Learning Process Questionnaire (LPQ) items and writer's item. Three sets of Questionnaire were developed, namely; Languages, Social Studies and, Mathematics and Sciences. Each Questionnaire has three sections A, B and C. Section A lists the 36 items from the Learning Process Questionnaire and Section B contains generic items, identical in all Questionnaires. Section C represents strategies which are specific to the respective subjects in the Questionnaires.

In Singapore, English and Mathematics are two subjects taken by all pupils, irrespective of streams and grades. Hence for this paper, only the responses to these two key subjects will be examined and discussed. Moreover, English and Mathematics would offe· a good contrast in terms of strategies used.

RESULTS AND DISCUSSION

The results are analysed and discussed according to each subject. All items presented have registered significant differences between the Special, Express and Normal Courses.

ENGLISH

From the analysis of the items on English, it is apparent that there is a dichotomy in the pattern of the results (Table 1).

When it comes to items indicating effort and preparation for lessons and examinations, the Normal pupils appeared to have put in higher investment. Hence for items like

i) I write down a summary after reading each chapter

ii) I come prepared for my next lesson by reading ahead of my class lesson or by reading my notes

iii) I plan and keep a strict revision timetable before our exam

iv) I keep notes of mistakes and their corrections so that they will not be repeated

v) I hold group discussions with my friends/classmates

vi) I underline the key words in examination questions

vii) I put down the main points of a topic/chapter and number them on a card for my revision

the Normal pupils recorded higher frequency scores than the Special and Express pupils. The results support an earlier set of findings gathered for the pilot study (Chang, 1989). However, many teachers teaching the Normal classes may dispute the results. Their experiences with the Normal classes indicated that the pupils behaved otherwise. Normal pupils have often been branded as being unmotivated and uninterested in their studies. The burning question which follows would be "Why are the Normal pupils not doing too well if they claim to be working harder than the other two streams?". Normal pupils probably know and realise that they have to work harder to compensate for their assumed lack of ability if they were to make it to N5 to do their 'O' level. A more fundamental cause could be their lack of self-assurance and confidence, usually associated with the better pupils. It is generally believed that the more time invested in learning is rewarded by getting better grades. However, the extra time and effort put in by the Normal pupils may not necessary be in the relevant strategies for doing well in English.

English is not a content subject and cannot be acquired through sheer rote learning. As such, strategies like "doing summaries", "writing down main points" or "reading ahead of class lessons" may not prove to be too useful or relevant.

It is in the frequent practice of good strategies in English learning that one begins to understand why the Special pupils are able to master two languages well. More of the Normal and Express pupils spent most of their time memorizing new words/terms and rules in learning English. Similarly, the Normal and Express pupils tended to find problems in learning English because they did not know the meaning of words. These two streams of pupils also realized that they need a lot of drill and practice in learning the language well. In Singapore, it is not uncommon to find the lower stream pupils more conservant in their mother tongues, ie. Mandarin, Malay or Tamil. For many pupils, the root source of their learning difficulties lies in their poor command of English which is the principal medium of instruction in Singapore schools. Though they know that they should use English more in order to improve in the language, they feel more confident and comfortable using a language which they can express their feelings more vividly.

Ease with the use of any language comes about naturally through constant and conscious usage with confidence. The Special pupils made it a point to ask questions when in doubt more frequently than the Express pupils who in turn did it more often than the Normal pupils. Predictably, the Special pupils also liked to use English at every given opportunity. Once again, the Normal pupils hit the lowest score. The results plainly indicate that the Normal pupils were not doing it right when it comes to selecting the relevant strategies to gain competency in a language. An educated guess would be the lack of fluency in the language and the attendant failed confidence and courage hold the Normal pupils back from practising the language as they know they should. Teachers teaching the Normal pupils need to be more encouraging and supportive in helping them to overcome their reticence and fear in practising their language skills. Frequent corrections accompanied by exaggerated impatience and sarcasms are the surest and most effective means of killing any child's or adult's interest in learning a language, so different from one's own mother tongue.

MATHEMATICS

Like English, Mathematics is a subject which needs practice and drill. In addition, understanding of mathematical concepts and principles is also critical in the successful mastering of mathematics.

Once again, the Normal pupils seemed to score be er than the other two streams when the strategies were either irrelevant or weak (Table 2) like

i) I write down a summary after reading each chapter.

ii) I put down the main points of a topic/chapter.

iii) I come prepared for the next lesson by reading ahead of my class or by reading my notes.

iv) I memorize model answers.

The adoption of weak or inappropriate strategies would probably explain the pupils' unrewarding attempts in their studies.

As for the strategies known to help pupils to have a firm grip on mathematical concepts, the Special and Express pupils claimed to use them more frequently than the Normal pupils. Examples of such enhancing strategies are

i) In studying this subject I feel that I have to work on it every day.

ii) I listen carefully to explanations so that I can remember and use the information later on.

iii) In my revision, it is important to me to be able to solve questions/problems set in past year examination papers.

iv) I need a lot of drill and practice in learning the subject.

v) I try to think of different ways to solve a problem/answer a question.

vi) Organising my work in neat steps helps me to learn/do better.

vii) I find that drawing diagrams helps to solve problems.

viii) I try to think through the difficulties/problems in my lesson first before turning to others.

The strategies used by the better pupils indicate that the users understood the special features of the subject and have the confidence to take some risk in exploring alternative routes in solving problems. This is unlike the Normal pupils who relied on model answers.

Even for examination-related skills, the Normal pupils were lagging behind. In contrast to the Special and Express pupils, they did not often check over the test to avoid making mistakes. They also did not check their answers frequently with their friends or the answers given in the book. Moreover, they also felt that it was unnecessary to time themselves to see how fast they could work on their sums. This could either indicate a lack of interest in their work or a lack of confidence in their own performance.

In making a comparison between the attitudes of the Normal pupils and those of the other two streams, one get the distinct feeling that the Special and Express pupils were equally concerned about English and Mathematics. Conversely, the Normal pupils showed a greater anxiety in passing English. The reason may lie in the criteria set for passing the 'N' Level and 'O' Level Examinations and those set for admission into the Pre-University. A candidate must pass English in both the 'N' Level and 'O' Level Examinations before they are considered to have clear both public examinations. Admission into Pre-University is made more rigorous by the recent introduction of a compulsory pass in Mathematics. For the Normal pupils, passing the examination is top priority while getting admission into Pre-University is considered a bonus. The aspiration of the Special and Express pupils has gone beyond that of scraping through examinations. These better pupils worked towards getting into the best Junior Colleges and so passing well in both English and Mathematics is imperative to them.

CONCLUSION

The studies carried out by Quah (1988) and Quek (1988) yield assuring results that our pupils streamed into the lower courses have developed neither debilitating low self-concept nor negative attitudes towards school. These findings help to assure parents' apprehension over the possible dire consequences of hasty streaming carried out too early in the schooling years of a child. However, the present study has found distinctive and significant differences in the choice of learning strategies between the Normal pupils and the other two streams. It is beyond the scope of this paper to trace the source from which the subjects learn their strategies. Hence it is not possible to deduce whether the pupils have been using these strategies in their primary school days or whether they have picked up/developed these strategies after being streamed into the respective courses.

A careful examination of the strategies employed by the lower course Normal pupils seems to indicate some deep-seated lack of confidence and insecurity. Though they know of the need to practise the English language in order to master it, they were not taking the necessary action to pluck up the courage to ask questions in class or use the language at every given opportunity. Were they afraid of making mistakes and getting jeered at in class? Have they experienced frequent 'put downs' by their teachers? In the learning of Mathematics, they relied heavily and banked all their hopes on commercially prepared model answers. They made few attempts to look for alternative solutions to problems. Were they basically lazy or was it a case of learned helplessness where they dared not risk anything adventurous to avoid failure? Quah's (1988) study has shown that provision of successful experiences was able to counter the negative effects of past failures in school. If the Normal pupils were to achieve satisfactory academic results in examinations they may have to revise their learning strategies. But they may not be able to do it alone without help from their teachers. They need encouragement and guidance on effective learning strategies. Feeding weak pupils with volumes of prepared notes and model answers may not be the best answer to helping the weak pupils. They need to learn how to learn rather than just learn how to pass examinations. Respectable but realistic goals can only be set and achieved when confidence is gained by the learner through mastery of skills and understanding of concepts and principles. This paper is aimed at evoking some compassionate thoughts on helping the weak pupils. Have teachers done enough for them? Can teachers do better? Can the weak and average pupils be elevated to a higher plane of achievement if taught to learn smart?

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TABLE 1: LEARNING BEHAVIOUR OF SIGNIFICANT DIFFERENCE BETWEEN THE DIFFERENT STREAMS IN ENGLISH

	ITEMS	SPECIAL (N=210)	EXPRESS (210)	NORMAL (188)	F	P
1	I write down a summary after reading each chapter.	1.76	1.79	2.09	4.53	0.01
2	I only go over my lessons the night before the test or an exam.	2.42	2.80	2.54	3.73	0.02
3	I come prepared for my next lesson by reading ahead of my class lesson or by reading my notes.	2.38	2.34	2.76	6.68	0.001
4	I plan and keep a strict revision timetable before an exam.	2.93	2.76	3.12	3.05	0.05
5	I check my answers with my friends/the answers given in the book.	3.81	3.99	3.64	4.07	0.02
6	I keep notes of mistakes and their corrections so that they will not be repeated.	2.93	2.95	3.36	5.42	0.005
7	I hold group discussions with my friends/ classmates.	2.03	1.99	2.54	12.14	0.001
8	I turn an explanation/ argument over in my mind a number of times before accepting it.	3.44	3.26	3.04	4.27	0.015
9	I underline the key words in examination questions.	2.55	2.71	3.06	5.77	0.003
10	I make it a point to check my answer to a question/problem before handing in my paper.	4.16	4.02	3.83	3.90	0.02
11	I only read about things/topics I need to learn.	2.78	2.98	3.22	4.79	0.009

	ITEMS	SPECIAL (N=210)	EXPRESS (210)	NORMAL (188)	F	P
12	I put down the main points of a topic/ chapter and number them on a card for my revision.	2.21	2.27	2.74	5.20	0.003
13	Before starting a test, I plan how much time to spend on each section of the test.	2.93	2.53	2.94	4 64	0.01
14	In studying the language, I spent most of my time memorizing new words/terms and rules.	2.61	3.03	3.08	6.31	0.002
15	I find difficulty in learning the language because I do not know the meaning of words.	2.60	3.21	3.18	10.78	0.0001
16	I listen to good radio programmes.	2.42	2.71	3.09	9.52	0.0001
17	I need a lot of drill and practice in learning the language.	3.33	3.80	3.65	5.28	0.005
18	I make it a point to ask questions when in doubt.	3.44	3.27	3.04	4.27	0.015
19	I like to use the language at every given opportunity.	3.93	3.67	3.31	9.76	0.0001

TABLE 2: LEARNING BEHAVIOUR OF SIGNIFICANT DIFFERENCE BETWEEN THE DIFFERENT STREAMS IN MATHEMATICS

	ITEMS	SPECIAL (N=168)	EXPRESS (219)	NORMAL (170)	F	P
1	I write down a summary after reading each chapter.	1.71	1.62	2.01	5.41	0.005
2	I think/reflect and try to understand the important points learned after every lesson.	3.49	3.72	3.39	3.29	0.04
3	I stop to check what I remember after reading each section in a chapter	3.27	3.08	2.92	2.96	0.05
4	I use the questions at the end of a chapter as a guide in my study.	3.38	3.23	2.70	11.24	0.0001
5	In studying this subject, I feel that I have to work on it every day.	3.80	3.55	3.29	5.92	0.003
6	I check over my test to avoid making mistakes.	4.15	4.07	3.78	4.23	0.02
7	I listen carefully to explanations so that I can remember and use the information later on.	4.05	3.95	3.69	4.88	0.008
8	I only go over my lessons the night before a test or an exam.	2.39	2.76	2.72	3.36	0.04
9	I come prepared for the next lesson by reading ahead of my class or by reading my notes.	2.38	2.16	2.51	3.45	0.03
10	I try to think through the difficuties/problems in my lesson first before turning to others for help.	4.11	4.16	3.69	8.89	0.0002
11	I check my answers with my friends/the answers given in the book.	4.40	4.21	3.58	24.19	0.0001

	ITEMS	SPECIAL (N=168)	EXPRESS (219)	NORMAL (170)	F	P
12	I hold group discussions with my friends/ classmates.	2.09	1.97	2.47	8.01	0.0004
13	I enjoy learning this subject.	3.85	3.74	3.44	3.86	0.02
14	I turn an explanation/ argument over a number of times before accepting it.	3.22	3.27	2.81	6.65	0.001
15	In my revision it is important to me to be able to solve questions/ problems set in past year examination papers.	4.11	4.07	3.48	14.66	0.0001
16	I underline the key words in examination questions.	2.54	2.63	2.94	3.29	0.04
17	I make it a point to check my answer to a question/problem before handing in my paper.	4.18	4.24	3.74	9.19	0.0001
18	I put down the main points of a topic/ chapter and number them on a card for my revision.	2.16	2.34	2.81	10.06	0.0001
19	In studying the subject, I feel that I should work on broad ideas/ problems rather than on detail	2.87	3.21	2.89	3.72	0.03
20	When studying the subject, I find it important to understand the meaning of terms to be learned.	3.57	3.83	3.38	5.28	0.005
21	I need a lot of drill and practice in learning the subject.	3.99	4.04	3.67	4.35	0.01
22	It is necessary to time myself to see how fast I can work.	3.17	2.91	2.76	3.24	0.04

	ITEMS	SPECIAL (N=168)	EXPRESS (219)	NORMAL (170)	F	P
23	I need to attend to the instructions carefully in order to get the required results/ observations.	3.83	4.00	3.27	14.21	0.0001
24	It is important for me to understand and analyse the given/ collected information and draw conclusions/ references from the results.	3.58	3.59	3.13	6.23	0.0002
25	I try to use obtained information to prove principles, laws and theories.	3.23	3.17	2.68	7.33	0.0007
26	I try to remember definitions, rules and formulate by repeating them aloud.	3.27	3.01	2.78	4.52	0.01
27	I try to think of different ways to solve a problem/answer a question.	3.33	3.42	3.05	3.42	0.03
28	Organizing my work in neat steps helps me to learn/do better.	3.80	4.05	3.45	9.58	0.0001
29	I find that drawing diagrams helps me to solve problems.	3.42	3.44	3.00	4.94	0.0008
30	I memorize model answers.	2.01	2.57	2.77	13.20	0.0001
31	I pose questions to myself after every chapter to check my understanding and recall.	2.54	2.79	2.96	3.66	0.03