A Study on Singapore Primary Education Streaming System: Impact on Student Motivation

Eng Hai TAN

The word *motivation* originates from the Latin *motus*, meaning *to move*, it indicates a push or drive towards action. In the context of education, learning motivation is a type of movement that penetrates boundaries, cognitive and affective, stimulates interplay between internal and external elements and, thus, initiates and perpetuates mutual impact and interaction between the individuals and their learning environment. Despite its intuitive importance, there is much to be known about student motivation, which is a complex, multidimensional concept as there is a varied of interdependent elements associated with it. Basically, student motivation has to do with the reasons students engage or in some cases choose not to engage in school related academic endeavours. It is related to what provides the impetus for students to participate in the learning process. It concerns also the reasons or goals that underlie their involvement or nonchalant attitude in academic activities. Although students may be equally motivated to perform a task, the sources of their motivation may differ. Apathetic students may be less likely to achieve their full potential than those who manage to retain a sense of excitement and satisfaction about learning for its own sake.

Based on the accumulating research it can be concluded that the quality of student learning, as well as the motivation to continue learning, depends closely on the interaction between the kinds of social and academic goals students bring to the classroom, the perceptions of their academic competence, ability beliefs and the prevailing classroom reward structures. Attribution theory and the notion of self-esteem are also closely interrelated with the concept of motivation. These factors are inevitably affected by the streams in which the pupils are channelled into. That is to say, ability grouping or streaming affects the entire dynamic of the learning atmosphere; it involves the social, cognitive and affective domains which in turn has an influence on the learners' learning behaviour.

The noble purpose of streaming is to maximise learning and raise achievement level of the students. However, along with this noble purpose, are often many criticisms on social and psychological issues. In fact, research into the effects of grouping pupils by ability seems to have something for everybody: some studies lend support to ability grouping, others point in the opposite direction, and many show that there is little difference, if not none, that can be attributed to the type of grouping alone.

Purpose

Streaming according to the academic ability of the pupils was implemented in Singapore primary education system since 1979. Pupils were channelled into various streams based on the results of the streaming examination administered in primary 3, at the age of 9. Years later, pupils were formally streamed according to their learning ability at the end of primary 4. Now, students are placed in one of the three language streams, EM1, EM2, and EM3, according to their academic capabilities. Students in the EM1 and EM2 streams do English, Mother Tongue, Mathematics and Science. EM1 students do an additional Higher Malay, Chinese or Tamil as their Mother Tongue. Pupils in the EM3 stream do Foundation English, basic Mother Tongue and Foundation Mathematics. Streaming has its merits in allowing children to learn and excel at their own capability with teaching materials tailored for their respective needs, nonetheless, it can also be a form of labelling and a stigma for students belonging to the lowest stream, the EM3 stream. Or it may place undue pressure on the EM1 pupils to keep up with the "title" bestowed on them.

There is a myriad of questions on the subject of streaming, however, for the purpose of this paper, three studies were discussed and five aspects of learning were considered: motivation, self-perceptions of academic competence, ability perceptions, attributions and self-esteem. In study 1, the correlations between these five learning aspects and the academic performance in English and mathematics were examined using the data collected before streaming, in phase 1. The correlation between self-esteem and academic performance was not subject specific; the average scores of English and mathematics were used. In study 2, a cross-cultural longitudinal comparison was made in terms of the five aspects of learning between the pupils in Singapore and Japan utilizing the data gathered in phases 1 and 2. As motivation, self-perceptions of academic competence, ability perceptions and attributions were subject specific, the measurement was done with respect to

mathematics only. Study 3 made a longitudinal observation of the fluctuations in the five learning aspects of Singaporean pupils, from two months before the streaming at primary 4 to the eighth month after the streaming with reference to English and mathematics employing the data gathered in the three phases.

Method and procedure

Both qualitative and quantitative data were collected. Qualitative data were obtained through the administration of 3 questionnaires, the *Learning Survey on English, the Learning Survey on Mathematics* and *All About Me* survey on self-esteem. The first two questionnaires consisted of 46 items which were constructed to illicit information on learner's motivational styles, self-perceptions of academic competence and their ability; and the attributions they have in times of success and failure. The third questionnaire consisted of 11 statements which were designed to determine the peer, home and school related self-esteem. Questionnaires were translated into Japanese for the respondents in Japan.

As the nature of this research was longitudinal, pupils were tracked as they proceeded from primary 4 to 5. In Singapore, data were collected in 3 phases with phase 1 done while the pupils were in primary 4, two months before the end of the academic year, and phases 2 and 3 were carried out during the second and eighth month of the academic year when the pupils were in primary 5. In the case of Japanese pupils, the administration of the questionnaires was done in two phases: the first phase was done two months before the end of the academic year for the primary 4 pupils and the second phase of the administration was conducted with the same pupils two months after the beginning of the academic year when the pupils were in primary 5 in the following year.

In addition, quantitative data were collected in Singapore through personal interviews conducted at the primary school involved in the survey during the third phase. Besides personal interviews, open-ended questionnaires were sent via e-mail to ex-students of various primary schools who were previously under the streaming system to find out their opinions and the experiences they had as students while they were under the primary education streaming system.

There were 437 Singaporean pupils and 130 Japanese pupils who participated in the questionnaires. The age of the pupils raged from 9 to 11 years old.

Study 1 - Results and discussion

The focus was on the strength of correlations for the pupils from EM1, EM2 and EM3 before they were streamed, with respect to their academic performance in English and mathematics and the five learning aspects. It was hypothesized that pupils with a lower academic ability had a lower self-esteem, meaning that potential EM3 pupils would have a lower self-esteem due to their inferior academic ability as compared to the rest.

In terms of motivation, pupils who performed well academically in English and mathematics were less motivated through external factors than those who were less inclined academically. Examination by group shows that EM3 pupils who were good at English were more dependent on external motivation than EM1 and EM2 pupils. EM1 pupils who were better academically were the least to be motivated externally among the rest in their learning of English. Among the EM3 pupils who did well in English, they were high in their introjected and identified regulations which were not evident in the other two groups. It was also clear that pupils who were better academically were more autonomous.

There was a relatively stronger correlation between the pupils' performance and their self-perceptions of academic competence in mathematics, $r = .414, p < .01$, than in English, $r = .373, p < .01$. This could be due to the fact that mathematical skills are more definable and explicit as compared to English language skills that involve reading, speaking and listening skills which are seldom graded. In other words, the self-evaluation of competence in English language skills is more difficult, hence there was a weaker correlation as compared to mathematics. There was a relatively stronger significant correlation between self-perceptions of English competence and the performance of EM1 pupils, $r = .459$, $p < .01$, than EM2 pupils, $r = .283, p < .01$. Both EM1 and EM2 pupils who did well in English and mathematics were able to have a high perception of their competence and vice versa, but EM3 pupils were not able to do so as the correlations between their performances in both English, $r = -.004$, *ns*, and mathematics, $r = -.027$, *ns*, and their self-perception of competence were close to naught.

EM1 and EM2 pupils who attributed their success to their effort believed that if they were poor at English, they would improve in it if they put in effort, but the EM3 pupils who also attributed their success to effort did not have a strong conviction in the idea that effort could raise their English ability. During poor mathematics performance, EM1 pupils who attributed it to their lack of ability were likely to have low self-perceptions of their mathematics competence. EM3 pupils who had high self-perceptions of

mathematics competence also tend to view their task as easy when they did well in mathematics.

There was no significant correlation between the academic performance and general self-esteem when considering all the groups at once, $r = .028$, *ns;* and EM1, $r = .151$, *ns,* and EM2 pupils, $r = .058$, *ns,* separately. This shows that those EM1 and EM2 pupils who had good academic performance did not necessarily mean that they had a high self-esteem and vice versa since the correlation coefficients were near to naught. However, among the EM3 pupils, there was a weak negative correlation between their performance and general self-esteem. It means that those EM3 pupils who did well academically had a lower self-esteem. Hence, this not only shows that those pupils who had a high academic performance would not necessarily have a high self-esteem, they might have a lower self-esteem instead, as in the case of EM3 pupils, $r = -.327$, $p < .05$. Home related self-esteem had the strongest correlation with the general self-esteem among all the pupils as a group, $r = .840$, $p < .01$ and as three separate groups, $r > .8$, $p < .01$. This implies that home-esteem has the greatest influence on one's general self-esteem. Indeed during the interviews conducted with the pupils, most of them commented that they were affected most by the remarks made by family members more than their schoolmates or teachers.

Study 2 - Results and discussion

Two comparisons were made between the Japanese cohort and Singaporean cohort as a whole and Singapore cohort as divided into three different streams. This study highlighted the differences in the five learning aspects between the pupils in Singapore and Japan.

In the area of motivation, there were significant differences between Singaporean and Japanese pupils. The former were higher in all the four styles of motivation when compared to the latter. When comparing within the four different groups, EM1, EM2, EM3 and the Japanese group. EM2 and EM3 pupils were more dependent on external regulations than EM1 pupils, and Japanese pupils were the least motivated through external regulation. In terms of introjected motivation, there was no significant difference among the Singaporean groups, but Japanese pupils were significantly lower than the other groups. EM1 and EM2 pupils were more motivated through identified regulations than EM3 and Japanese pupils. Lastly, EM1 and EM2 pupils were significantly higher than Japanese pupils in their intrinsic motivation. Although EM3 pupils were significantly the lowest in the relative autonomy index and were also significantly lower than EM1 and EM2 pupils in their intrinsic motivation, the difference became insignificant after streaming. This could mean that EM3 pupils benefited from the streaming in terms of their intrinsic motivation.

EM1 pupils had the highest self-perceptions of competence among the groups even before streaming. And EM3 pupils were significantly the lowest in the way they perceived their academic competence when compared to all other groups, but after streaming, they were the only group that showed a significant increase in their academic competence perceptions and the difference with the other groups became insignificant.

In terms of ability perceptions, Japanese pupils adhered most to the instrumental-incremental concept of ability and this could be due to the strong cultural conviction that one's effort has a greater influence on one's success than one's innate ability. EM3 pupils were significantly the lowest among the groups that held on to the belief that they could improve in their mathematics ability if they put in effort, however, they made a significant shift away from the belief of entity concept of ability after streaming. This could imply that streaming provided them a greater sense of control over their learning.

In times of good and poor mathematics performance, EM3 pupils attributed it least to their effort but attributed it most to luck, help from others and task difficulty as compared to the rest of the groups. They thought it was due to their inability and they also placed the blame on their teachers most when they did not perform well. EM1 and EM2 pupils attributed it most to effort and teachers' instructions when they did well in mathematics. They also tend not to attribute it to luck no matter what their learning outcomes were. They believed in their ability but attributed less to it in times of failure. Japanese pupils believed that it was due to their lack of effort when they did not perform well, however, they attributed it least to instructions, task and their ability in times of good performance.

As for the self-esteem, Japanese pupils had a lower general self-esteem than their Singaporean counterparts, but there was no significant difference among the Singaporean groups.

Study 3 - Results and discussion

It was hypothesized that the EM3 pupils would suffer in terms of motivation, self-perceptions of academic competence and self-esteem due to the explicit class segregation as compared to EM1 pupils. Study 3 sought to find out if there were significant changes and differences in the five aspects of learning of the

pupils from the three different steams.

Within the four styles of regulation, EM1 pupils generally had a significantly lower external motivation than EM2 and EM3 pupils both in English and mathematics. There was a significant increase among EM3 pupils in their external motivation after streaming. The pupils from various streams did not differ significantly from each other in their introjected motivation towards learning of English and mathematics. Although the rise in the EM3 pupils' English introjected regulation after streaming was insignificant, nonetheless streaming had induced a positive change in this aspect of motivation in them. EM2 and EM3 pupils had a significant climb in their introjected motivation towards learning mathematics after streaming. EM3 pupils were significantly the lowest in identified regulation for English and mathematics. There was a significant decrease in identified regulation for learning English between phases 1 and 3 for EM2 and EM1 pupils had a decrease in the same regulation for mathematics. On the contrary, EM3 pupils seemed to have benefited from the streaming as there was a significant increase in identified regulation in both subjects after streaming. It was evident that the pupils' intrinsic motivation level converged after streaming. Before streaming at phase 1, EM3 pupils was significantly the lowest in intrinsic motivation for learning English and mathematics, but after streaming the difference become insignificant. In terms of intrinsic motivation in learning English, EM1 pupils had a significant fall in both subjects and EM2 pupils had a significant fall in English only.

The EM1 pupils had a significant fall in their relative autonomy index (RAI) in both subjects while EM2 had a significant fall in it for English after streaming. No significant changes in the RAI were found among the EM3 pupils after streaming for both subjects. Although EM1 pupils had a decrease in RAI, they possessed significantly the highest among the other pupils and EM3 pupils were found to be the least autonomous.

EM3 pupils were significantly lower than EM1 and EM2 pupils in their self-perceptions of English and mathematics competence before streaming. It was also clear that EM1 pupils were certain of their academic competence and confident in the way they accessed their capability in both subjects as they were significantly higher in their self-perceptions of academic competence as compared to the pupils of other streams. Although there was a slight insignificant decrease between phases 2 and 3 after streaming, EM3 pupils had a significant climb from phases 1 to 2 and from phases 1 to 3 in their self-perceptions of competence in English and mathematics. It was apparent again that EM3 pupils saw themselves as more capable in their learning after streaming and this would certainly facilitate their academic motivation.

In examining the instrumental-incremental and entity concepts of ability, although EM3 pupils were significantly the least inclined to believe that hard work could help improve their English language and mathematics ability as compared to EM1 and EM2 pupils, they made a significant increase in believing that their effort could make a difference in their mathematics ability after they were streamed. Based on the combined score of ability perceptions, the pupils were significantly different from each other in their belief about the concepts of ability both towards English and mathematics. EM1 pupils believed that hard work could improve their ability both in English and mathematics and on the contrary, EM3 pupils thought otherwise. EM2 pupils adhered more to the instrumental-incremental concept of ability for mathematics and were more inclined towards the entity concept of ability for English. Hence, it could be implied that pupils with a higher academic capability had a greater tendency to subscribe to the instrumental-incremental concept of ability and vice versa.

In the area of attributions, contrary to EM3 pupils, EM1 pupils attributed most to their effort whether in good or poor performance in English and mathematics. They did not put the blame on their luck nor the absence of help when they failed to perform in both subjects as compared to other pupils. EM2 pupils were closer to EM1 pupils in their attributions than EM3 pupils. In was observed that the latter attributed it mostly to luck in both situations for the two subjects and they also put the blame on their teachers' poor instructions and the absence of help when they did not achieve. However, there was a decrease in the tendency of putting the blame on their teachers when they did badly in both of the subjects after streaming. It could imply that as EM3 pupils were placed in the same class after streaming, teachers were better able to cater their teaching instructions for them and they were able to master their learning better. They also had a significant increase in attributing to their ability in times of achievement in both subjects after streaming. In times of poor English performance, only the EM3 pupils had a drop in attributing their failure to their lack of ability. This could mean that they see themselves as more capable in their studies as compared to before they were streamed.

There was significant increase in the pupils'

general self-esteem after streaming but the pupils from different streams did not differ from each other significantly. In terms of peer self-esteem, EM3 pupils were significantly higher than the pupils from the other two streams. As for home self-esteem, the pupils did not differ significantly from each other, but the EM3 pupils showed the lowest in home self-esteem as compared to EM1 pupils. Lastly, in school related self-esteem, the groups differed from each other significantly; EM1 and EM3 pupils were higher than EM2 pupils. EM3 pupils also showed a significant increase in this aspect of self-esteem after streaming.

General discussion

In area of motivation, before streaming was done, among the potential EM3 pupils, those who were better academically were found to be more dependent on external regulations as compared to potential EM1 and EM2 pupils. It implied that pupils who were more inclined academically tend not to employ external regulation than those who were less academically inclined. EM1 pupils were least dependent on external regulation and they possessed the highest intrinsic motivation, they were also the most autonomous. EM2 pupils were also higher than EM3 pupils in their identified and intrinsic regulations. Although, generally EM1 and EM2 pupils were higher in identified and intrinsic motivation, they showed a decrease after streaming. On the contrary, EM3 pupils had an increase in their external, introjected and identified regulations after streaming. They were also the least autonomous among the pupils from other streams. From the interviews and feedbacks from the electronic mails, it was evident that academically inclined students were more extrinsically motivation and less inclined students relied more on extrinsic motivation. The studies showed that EM3 pupils increased in their motivation, and streaming related factors could have played a pivotal role in this spur of increase, nonetheless, they rely too much on extrinsic motivation, which could limit their performance should extrinsic rewards be taken away. Teachers and family could play at great role in raising the intrinsic motivation of the EM3 pupils. Deliberate effort is needed on the part of the teachers by focusing on strategies that enhance autonomy, increase academic competence, a sense of belonging, raise their self-esteem, and stimulate involvement and enjoyment in learning especially for the EM3 pupils.

In the cross-cultural comparison, Singaporean pupils were significantly higher in the four motivational aspects as compared to the Japanese pupils. Japanese pupils showed a decline while Singaporean pupils increased in their motivation between phases 1 and 2. However, by analysing the items in each subscale, Singaporean pupils were more driven by the fear of provoking their parents to anger or disappointing them if they did not perform up to expectation. It is an indication that warrants especially the attention of the parents because no matter how well the children do academically, successful achievement driven by fear can make learning an ordeal for them.

Pupils who were good academically were able to have a better judgement of their academic competence. A closer look at the individual group shows that EM1 and EM2 pupils, except EM3 pupils, were very certain of their competence in handling both subjects in English and mathematics even before they were streamed. It is often assumed that being in an EM3 class would inevitably have a negative influence towards their self-perception of competence but in this case it shows that even before they were streamed into EM3 in primary 5, they were already uncertain of their academic competence when compared to the pupils in the other two groups. Hence, attention is needed in raising the competence perceptions of weaker pupils.

Academic performance was not significantly correlated to general self-esteem except for EM3 pupils, which was negative. It was also found that home esteem was most related to general self-esteem. It agrees with the results of other studies which prove that self-esteem depends largely on things other than school performance, factors like relationships with family and peers could have a greater influence on self-esteem.

Future directions

From the studies, the Singapore streaming system benefits the pupils pertaining to their motivation and self-perceptions of academic competence in general, but it too revealed the necessary remediation required to help change the learning attitude and redirect the undesirable attributions of the academically weaker pupils. This research has also set the directions and focus for future studies on teacher's teaching approach towards pupils from different streams, and the impact of streaming on the pedagogy of teaching, which ultimately also affects the students' motivation in class.