

### III. The Analysis of the Grade 3 Pupils' Scholastic Achievement

#### The Data

As has been mentioned previously, this set of data has generously been provided to us by the Office of the National Education Commission. The data were obtained from the national survey in 1973 for the purpose of study of primary schooling in Thailand, a joint project by the Office of the National Education Commission, Ministry of Interior and Ministry of Education.<sup>1</sup>

Our study utilized the set of data that contains detailed information of 1974 pupils from 987 schools. Two pupils were selected randomly from each school for interview on family background and home environment. Each observation contains 127 variables relating the pupil's socioeconomic background, own characteristics, schooling qualities and the scores on the achievement tests. The pupils were given two tests to measure what they knew when they entered and left grade 3. For our analysis, the scores on the second test will be used as the dependent variable.

The data were contained in two magnetic tapes. Due to some technical problem in merging these two tapes, we are able to use only the first tape. There are 804 pupils in three regions, the Bangkok Metropolis, the Central and the North. Some distributions of the pupils under our study are provided in the Appendix. The randomness of the sampling procedure should guarantee the unbiasedness of the sample utilized in our study.

- 
1. There are series of reports on general conditions of primary schooling in Thailand published jointly by these government agencies. For those who are interested in the distributions of sample in this survey, the details are contained in these reports.

### Results of Statistical Estimation

Different Specifications of the statistical model of the scholastic achievement of the grade 3 pupils have been experimented. In an attempt to arrive at more significant estimates, we have eliminated from the regression equations these variables that yielded insignificant coefficients. We realized that by so doing we might introduce some specification error. However, there is very little a priori information on specific input variables or their measurements to be included in the model. We might as well commit similar error by including irrelevant explanatory variables into the regression equation.

Before proceeding to the statistical results, some discussion of variables in our final outcome seems appropriate.

The school inputs : Variables representing the school inputs are as follows :

The type of school : There are four types of schools providing primary education, private schools, Ministry of Education school (MOE), municipal schools and Changwat Authority Organization schools (CAO). These four types of schools are different from each other in characteristics and compositions of pupils. Private schools are urban, cater to relatively wealthy pupils, and have proportionately fewer trained teachers. MOE schools are urban and large, serve mainly middle class families, and have well-qualified teachers. Municipal schools are also urban, large, and reasonably well staffed. Provincial schools (CAO) are small. Pupils are drawn from rural families, and teachers are generally less well qualified. The inclusion of dummy variables for the "type of school" is to catch the effect of being in different types of schools on the academic achievement of pupils. By using the private school as a reference, the coefficient of the dummy variable of any type of school is the estimated difference in the academic performance of pupils in that type of school and the one in private schools.

The teachers' total test scores : This Variable measures the cognitive ability of teachers by their performance in five tests; they are mathematics, reading comprehension, verbal analogy, principle of education and methods of teaching, and education psychology. It could be regarded as a proxy for teachers' qualification and characteristics. The teachers' test scores variable is found

to be significantly determined by their age, degree qualification and formal education. (see table 8)

✓ The teacher's view of the pupil's ability : Teachers as school inputs are usually related to classes or groups of pupils, not individual students. However, this variable pertains to individual pupils. It is represented by a set of dummy variables for the three possibilities; namely good, fair and poor.

Number of Classrooms : This variable is a proxy for the sizes of school. Among variables representing sizes of school; e.g. number of teachers, pupils, areas, the number of classrooms variable is found to have the highest correlation coefficient with the pupils' scholastic achievement.

#### The nonschool inputs

✓ The pupils ages : It is observed that parents in urban areas or better educated parents are more likely to send their children to schools at younger ages than those in rural areas. The age variable reflects not only the maturity of the pupils, but also the parents' socioeconomic status as well.

The pupils' weights : This variable is taken as or proxy for the health condition of the pupils.

The pupils' absence records : This variable could also be used as another proxy for the parents' economic well-being. The children of the farmers or low income families frequently have to help their parents on farm or stay at home to take care of younger relatives.

Having kindergarten education : This is binary variable, coded 1 for pupil who has attended kindergarten and 0 otherwise. Again, this variable reflects the parents or home background similar to the age variable.

Grade repetition : This variable measures directly pupils' cognitive ability. Its negative effect on the pupils' academic achievement is very strong.

Father's occupation-farmer : This variable is a proxy for socioeconomic status of the family. It was found, in the NEC study, to have the strongest negative relationship with scholastic achievement.

Location of home-city municipality : The variable is a dummy coded 1 if the pupil lives in city or municipality and 0 otherwise. The location of home reflects the type of school available to children.

Exposure to television : Among different types of media, exposure to television shows strongest positive association with the academic achievement. This variable should also reflect the modernization of the community where the pupils live as well as their families' economic-well-being.

Distance from home to school : This is a continuous variable to measure the distance in kilometres from the pupil's residence to school. It measures the time cost of travelling. This variable should have negative effect on pupils' achievement.

The means and standard deviations of variables that appear in the final result are shown in table 7.

#### The Effect of School Inputs

Table 5 shows the result of statistical estimation when the school inputs enter the regression equation prior to the home inputs. The school inputs together explain 34 per cent of total variance in the academic achievement of grade 3 pupils. The F statistics indicates that their joint effect is statistically significant. All the estimated coefficients of the school variables have the right signs, and are significant at the .05 level. The difference between the average test scores of the grade 3 pupils in different type of public schools and those in the private schools (the omitted group) are as expected. Pupils in the CAO schools are found to be the poorest group, next are those in the municipal schools and in the MOE schools respectively. However, after other school variables and the pupils' family background are controlled for, the magnitude of the differences are reduced but are still statistically significant. These remaining differences could attribute to the management efficiency of private schools. If academic achievement is to be a goal of educational policy, it is most interesting to find out how private schools manage to come out best despite their relatively poor composition of high qualification teachers.

The teachers' total test score variable exerts a strong positive effect on the pupils' test scores. This should not be surprising since the teachers' tests cover both the teaching and academic ability. Teachers with high qualification do not necessarily possess better teaching ability. This explains why teachers' qualification exerts low influence on pupils' academic achievement.

The number of classrooms in each school is regarded as a variable that measures the sizes of schools. This is a catch-all variable that includes the effect of numbers of students, teachers, teaching areas, and management sizes. It also exerts positive and highly significant effect on pupils' academic achievement.

Teachers are supposed to know their pupils' cognitive ability. As expected, the group of those who are viewed "good" perform significantly better than those who are viewed "fair" which are still better than "poor". The important implication of this variable should be that teachers' personal interest in pupils could help improving the learning condition of the pupils.

In the second step, we enter the set of nonschool variables. All the coefficients of the school variables remain significant and their signs remain unchanged. The variance explained is increased by .07 which is relatively small. This is due to high correlations among variables representing the school and nonschool inputs. However, the opposite result occurs when these variables enter in the first step, as shown in Table 6. All the nonschool inputs in the equation account for about 36 per cent of the variation in the grade 3 pupils' achievement. It should be noted that the father occupation-being farmer, is significant when there is no control for the school inputs. However, its effect turns to be insignificant when the school inputs are controlled for, see table 6. This is not surprising since this variable is highly correlated with the school variables. The correlation coefficients of this variable with the dummy for the CAO school, and with the number of classrooms are 0.642 and - 0.401 respectively.

Almost all coefficients of the nonschool variables, except the pupils' weights, are statistically significant and have the right signs. The general result is in line with the findings of the NEC study.

When the school variables are entered the regression equation in the second step, the increase in the numerical value of  $R^2$  due to addition of these variables is only .008. See table 7. To test the hypothesis of the joint influence of these added variables, we utilize F-statistics. The calculated F statistics is 3.36. From the F-distribution, for the degree of freedom 3, 1205, it is significant at the .05 level. We may, therefore, conclude that despite the high correlations among the two sets of variables, the school variables significantly contribute to the increase in variance explained. This conclusion

deviates somewhat from the NEC findings on the effect of schooling variables.

### Concluding Comments

From our reanalysis of the Grade 3 pupils' achievement, the following conclusions are drawn :

1. Due to high correlations among school and home background variables, the value of  $R^2$  is highly sensitive to the order in which the variables enter the regression equations. Consequently, stepwise regressions could produce a misleading interpretation of the influence of the school inputs on the pupils' achievement.
2. Some standard indices of school quality such as teacher-pupil ratio and space per pupil are too aggregate to exert any direct influence on the achievement of individual pupils.
3. The teachers' credentials or qualification could explain partly their ability. Teachers who have acquired bachelor's degrees for a long time and do not keep up with progress in new teaching technology may contribute less to the pupils' achievement than those who have just completed the High Paw Kaw Saw. This explains why the variation in the teachers' total test scores perform better than teachers' qualification in explaining the variation in the pupils' achievement.
4. The Difference in the types of schools that the pupils attend causes a large difference in the pupils' test scores. Despite lower proportion of teachers with high Paw Kaw Saw and above, the private schools' pupils perform significantly better than pupils in all public schools. At present there is a tendency for the government to provide all the primary education since it is compulsory. A further study on the difference on management efficiency between private and public schools is strongly suggested. Of academic achievement is to be a goal of the education policy and of private schools can do better, the private sector should not be withered by the government expansion. The government should choose to subsidize the poor pupils in private schools instead.

5. Our findings indicate clearly that children in large urban areas have higher achievement level than those in rural areas. The advantage of urban children are due to their accessibility to kindergarten and better-quality primary schools. Moreover, they are more exposed to modern media like television than rural children.

6. Although the fathers' occupation as farmer does not exert significant negative effect on the achievement in the final step, it does not mean that our result is in conflict with the NEC findings. On the contrary, it shows more clearly that the disadvantage of the farmers' children lies in the fact that they go to schools of poorest quality. The findings inevitably lead us to suggest that to lower the gap in the achievement level between rural and urban children, more investment to improve the quality of schooling in the rural area, the CAO schools, is required. Since distance between schools and residences exert negative significant effect on the achievement, either more schools should be built or more transportation should be made available to children who live far from schools. Teachers' quality at the primary level could be improved, not necessary by continuing to higher qualification level, but by exposure to new teaching techniques and improving the internal management efficiency of various schools.