INFERENCES AND IMPLICATIONS

This chapter offers an integrated analysis of the findings, subsequently drawing logical inferences and underlining the implications.

5.1 : Quality of Educational Products

Kerala State Educational Statistics Reports have it that only 40 per cent of the students manage to struggle their way up to tenth standard. The quality of these students, who are the end products of schooling, needs consideration.

Though development of personality, values, social skills etc. are also considered to be the aims of education, only the achievement of students in different subjects is assessed. The quality of students with respect to the subject-matter achievements can be inferred from the following findings of the study:

1. The majority of the students in the sample fail in the S.S.L.C. public examination. The pass percentage is 44. It has to be noted that the percentage is lower (38) in the population of Palghat district.

2. The average academic achievement is less than the pass mark. While the pass mark is 210, the average score of students in the sample is only 199.
3. In case of mathematics achievement, the results are still lower. While the percentage of the mean score of total academic achievement is 33, that of mathematics achievement is only 26.

What could be the reasons for such a state of affairs? One major reason obtained from the study is that students lack essential prerequisites. It is this aspect which is discussed in the next section.

5.2 : Quality of Cognitive Entry Characteristics

In the study, tenth standard syllabus was analysed for listing down the essential prerequisites. Without these prerequisites, it is almost impossible to learn tenth standard mathematics. A test was developed for assessing the level of prerequisites and 'cognitive entry characteristics' was operationally defined as the score in that test. The maximum possible score is 75 and the mean score obtained is 24. The distribution is positively skewed. The median score is only 19. Approximately 10 per cent of the students obtined more than 60 per cent. Though a mastery- level is

not defined, it is logical to infer that only this 10 per cent of students can be considered to have sufficient mastery of prerequisites.

It is evident from these results that most of the students were not cognitively prepared to learn mathematics. More than 50 per cent of students were ill-equipped to gain anything from the instruction.

As the results came out in this tragic form, the investigator was motivated to test whether the students know at least the basic operations in mathematics. A test consisting of twenty simple questions was developed for this. The obtained distribution was a little positively skewed (rather than vice versa) with a mean of 10.4. The average student knew only half of the basic operations being tested. Students vary drastically even in the basics.

These results imply that failure was almost predetermined for many of the students. It was an inevitable fate for them- irrespective of motivation or quality of instruction.

The learning outcome is none the better when it comes to other subjects which can be substantiated by the

correlation between achievement in mathematics and total achievement : 0.92.

If the Indian education scenario presented in the first chapter is tragic by itself, the quality of prerequisites and the quality of achievement are none the better. Changing the present status of education and creating a condition wherein all students achieve highly are by no means an easy task.

5.3 : Existing Practices of Teaching

It is almost impossible for a tenth standard teacher to teach all the prerequisites to students. For those students who are fairly good with respect to prerequisites, the quality of instruction does matter. Is the instruction optimal for them? Based on the observations and interviews, some generalisations are possible.

1. Instruction is teacher-centered. The traditional 'lecture-cum-demonstration' method is followed by almost all teachers. The role of a student is that of a passive listener.
2. Instruction is directed towards the better equipped among students. Even for those students who have

prerequisites, mastery is not stressed.

3. The pattern of instruction does not seem to suit the needs of gifted students.

4. Teachers are more similar than different. Their approaches are basically the same.

5. One major problem with concept teaching is that teachers do not make use of 'non-examples' which is an essential condition for enhancing discrimination. Even the examples are not very divergent. The general pattern of concept teaching can be summarised as follows:

   a) teach the definition

   b) give some examples

   c) test the definition

   This pattern is highly prone to the three kinds of classification errors in concept teaching: over generalisation, under generalisation, and misconception (Woolley & Tennyson, 1972). Further, a proper cognitive structure is not developed as the teachers do not relate the particular concept with other concepts in the taxonomy/hierarchy. According to the derived principles, the existing practice of teaching concepts is far from satisfactory.

6. Compared to concept teaching, rule teaching seems to be more adequate. Clear rule statement, proper

explanations, demonstrations, divergent practice problems and corrective feedback are the processes which are usually attempted. Derivation/deduction of the rule and the explanations of applicability are the two neglected important areas.

5.4 : Learning in relation to Student Entry Characteristics and Quality of Instruction

Theoretically, cognitive and affective entry characteristics and quality of instruction are the central proximate factors of student learning. The study showed the following empirical results.

Each of the two cognitive entry measures (CEC and KBOM) is found to account for approximately 56 per cent of the variance (r=.74) of mathematics achievement. In combination, they could explain 65 per cent of the variance.

Out of the three affective measures, academic self-concept (ASC) correlates higher (.63) with achievement. The correlations of the other two variables - Affective Characteristics : Academic (ACA) and Affective Characteristics : Mathematics (ACM) - with achievement are in the vicinity of .46. The cognitive variables and academic self-concept in combination could produce an R^2 of .69. Once these three variables are entered, the effects of ACA and ACM are almost nullified.

The quality of instruction presents a different picture. The correlations of 'quality of instruction : interview' and 'quality of instruction : Observation' with achievement are respectively .14 and .045. While the former is highly significant, the latter is significant at p = .068. Whatever meaningfulness these correlations have, it diminishes in the multiple classification analysis. The analysis implies that the relationship of quality of instruction with student learning, if any, is not linear. This variable does not seem to have an independent direct effect on achievement. Several reasons for this trend are discussed including the possible interaction of quality of instruction with entry characteristics. However, it can be concluded that instruction is not at all successful in freeing achievement from the impact of student entry characteristics.

5.5 : Predictors of Achievement

Though fourteen independent variables were entered in the stepwise regression (Table 4-8), it would be meaningful to select the first six variables. The multiple R^2 of these six variables was found to be 0.72. By the addition of the last eight variables, R^2 increased only upto 0.732. The semipartial correlation of each of these eight

variables was observed to be marginal. First six variables seem to represent all the variables under consideration. The suggested six variables are presented below in the order of their importance:

1. Knowledge of basic operations in mathematics (KBOM)
2. Cognitive entry characteristics
3. Academic self-concept
4. Tuition
5. Psycho-social environment of the school
6. School mean KBOM

As hypothesised in the theoretical framework (Chapter one), cognitive and affective entry characteristics of learners and extra facilities are important determinants of achievement. These variables (the first four variables in the list presented before), in combination, could produce an R^2 of 0.706.

The last two are school-related variables. Even after controlling the student entry characteristics and extra facilities the quality of school environment does make a difference in achievement. If the school is academically oriented and properly disciplined, students learn more. The last variable in the list - school mean KBOM - acts as a suppressor variable in the prediction equation and does have significance only for prediction.

The fourteenth variable in the equation is 'quality of instruction : interview'. This means that quality of instruction does have a unique contribution to make - however marginal it is - in determining the level of achievement.

5.6 : Relative Importance of Factors

The study clearly demonstrates that student entry characteristics are the most important determiners of student learning. Among them, cognitive entry measures are more powerful than affective entry measures. Though all the affective measures are found significantly correlated with achievement, the influence of academic self-concept is comparatively more. Further, once the cognitive measures entered the equation, the influence of academic self-concept was still significant; that of 'affective characteristics : academic' was less singificant; and that of 'affective characteristics : mathematics ' was not significant.

The second important set of independent variables is found to be 'extra facilities', especially the variable

tuition. Tuition - not the quality, but the presence or absence - has a unique contribution to make in determining the level of achievement even after controlling the effects of cognitive and affective entry characteristics and SES. The dimension of extra facilities is one of the neglected areas in the studies of school learning. The study stresses the need for it as tuition is observed to be one of the six important predictors of achievement. Even the variable 'use of text-book and guide' is correlated significantly with achievement and has a unique contribution to make though the effect is comparatively less.

Comparing the student body characteristics of the class and that of the school, the former set is found to be a little more influential than the other. Among the student body characteristics, the cognitive measures are more important in determining the level of achievement.

The objective measures of student body characteristics of the class seem to be more meaningful in the explanation of student learning than teacher ratings. Among the teacher ratings, the global rating of the class environment is more powerful.

Of school, two variables seem to be far more influential than other variables : past achievement and psycho-social

environment of the school. Between the two, the latter one is more meaningful theoretically. Empirically also, once the student variables are entered, the psycho-social environment of the school gains prominence. Among other variables, student body characteristics of the school are more powerful in explaining student learning than school locality and school type. However, urban students achieve more compared to rural students ; private schools are more achieving than government schools. The effects of these variables seem to be mediated by the entry characteristics of the children as well as by the psycho-social environment which the schools create and maintain.

Once the student variables and school variables were entered in the regression, class variables did not seem to contribute much. It may be due to the fact that, in a given school, classes do not differ much.

Among class variables,' attention and participation of students' needs special consideration. This variable has a unique .contribution to make even after partialling out the effects of SES, student entry characteristics, tuition and quality of instruction. This finding suggests the need for considering the factors of 'classroom functioning ' rather than student body characteristics in the explanation of student learning. The factors of classroom functioning seem

to be more proximal to student learning compared to the status characteristics. Similarly,with respect to school variables, as suggested by Coleman et al (1982), more concentration is needed in the area of schools' functioning. These process variables are more important than status measures or student body characteristics.

In the present study, it has been observed that both instructional variables and teacher variables contribute less compared with other sets of variables in the explanation of achievement. One basic reason may be that lack of cognitive prerequisites limits the scope of quality of instruction. For a large section of students, quality of instruction seems to be irrelevant. If all the students enter tenth class with proper prerequisites, then quality of instruction will become important. In the present context, as teachers themselves said, they can only feel satisfied with their teaching, but not with the results. This situation is frustrating for most of the teachers. Given this negative situation, teachers have to rationalise that their duty ends with teaching; learning is the responsibility of students. The prevailing system of education has forced them to seek such rationalisations.

5.7 : The Role of Socio-Economic Status

The correlations of SES with achievement and entry

characteristics are in the vicinity of .30. This may be a low estimate of the probable influence of SES because the majority of students in the sample are clustered in the lower sections of SES. Though the scores of SES range from 2 to 33, the median and mean are only 7 and 7.5 respectively. 80 per cent of students scored below 10. When the scores of one variable do not vary substantially, the correlations are bound to be low.

The influence of SES on achievement is mediated by entry characteristics. When the entry characteristics were entered in the regression, SES did not have anything to add significantly to the prediction equation. This finding implies that the differences in entry characteristics are not random, but the social class of students does have an impact on it. These results substantiate the political criticism that our educational system perpetuates the existing class dichotomy in the society.

5.8 : The Logical Story of Schooling

At this point, it is important to consider the crucial question which was raised in the first chapter : What really happens in our schools? The following analysis is based on the findings of this study, results of other related studies

and the theory of Bloom (1976). A more detailed analysis is presented elsewhere (Sailaja and Sasidharan, 1991).

Curriculum of each class assumes a specific set of prerequisites. This is true even in the case of first standard. Due to several reasons, specifically of the nature of home experiences, first standard students differ with respect to these prerequisites. In general, children coming from higher social class, especially urban, are comparatively more tuned to the standardised academic activities. These differences in the entry characteristics should not be interpreted as the simple problem of individual differences, but should be viewed more appropriately as group differences, i.e., some social groups are more advantaged than others with respect to entry characteristics.

It is rarely attempted to bring all the children to the same level of prerequisites. The differences in cognitive prerequisites are either ignored or taken as inevitable. Given that equalising the prerequisites is not attempted, another possibility still remains that instruction be suited to cater to the needs of children who lack the essential prerequisites. Unfortunately, this strategy is also not applied. Although children of a class are at different entry points, instruction is uniform and is focussed on those

students who are fortunate enough to have prerequisites. As a result, instruction is not followed by a large section of students. And, this section is not random, but represents the socially and economically disadvantaged sections of the society. The result of the process of standardised, stereotyped instruction is the formation of two sections in the same classroom, i.e., those who proceed with the expected pace and those who lag behind.

These initial deficiencies have a long-term damaging effect because the content of education is organised in such a way that the learning in each class is dependent on prior learning upto that class. So, the initial inadequacies get cumulated. This picture gets more complicated because of the relatively loose policy of promotion. The prevailing promotion policy gives opportunities to children to attend tenth class even though they cannot perform basic operations in mathematics.

Inability to catch up with the classroom instruction results in failures in learning which influence students in two ways. They make the students ill-equipped to learn the content of higher classes; create a sense of aversion to all further learning activities and make them feel helpless. The students gradually develop a strong, negative selfconcept.

As a result, they either drop out from the school, or attend classes with negative affective characteristics.

To sum up, the deficieincies among students that are initially caused get cumulated gradually through the years, progressively crippling those who lack essential prerequisites, widening the gap between them and others who are successful in coping up with the classroom instruction. These processes end up in a sorry plight, rendering education a cruel exercise where failure is predetermined. The usual practice of accusing the child for his/her failure is nothing but a part of victim-blaming ideology.

5.9 : IMPLICATIONS

There is another side of the stody. It is a system of education in which all students will succeed and all of them will achieve higher levels of learning. In such a system, the initial differences among children will gradually become narrowed rather than widened. Instruction will focus on weaker students rather than brighter ones. Corrective teaching will remedy failures in learning if and when they occur. What is equalised will be the success of children rather than the process of instruction. The success of mastery learning experiments implies that this system of

education is not a baseless dream, but a promising possibility. It is high time the educators realised that students spend their many long years in schools not for repeating the history of failure after failure. We leave the fixation of normal distribution of school learning and accept the responsibility of ensuring success for all students.

The present study has made it clear that the lack of prerequisites limits the scope and explanatory power of motivation and quality of instruction with respect to school learning. It implies that students cannot learn if they lack cognitive prerequisites irrespective of other factors. So, all of the students who attend tenth standard should have the needed prerequisites. This is possible only when mastery is stressed in earlier classes. For this, instruction has to start from the existing level of prerequisites and it has to focus on weaker students. Together with this, if remedial measures are adopted, there are good chances that all, or almost all students will achieve mastery. This method has to start from first standard. Early success will make the students motivated and self-confident.

Ensuring success does not mean that all the students should be promoted without considering their achievement. The existing promotion policy has made a mockery of

education. Neither making promotion a 'free-for-all' in the name of 'ensuring success' nor making it part of a 'weeding out' process will serve the purpose. Instead, we should ensure that the students achieve in order to get promoted.

The present study shows that the existing methods of instruction are far from optimal. This is more true with concept teaching compared with rule teaching. The last two decades have witnessed a large number of concentrated studies on concept teaching. Instead of limiting to the general principles of instruction, teacher-training courses and in-service programmes have to incorporate specific principles for teaching particular types of learning outcomes at a given level of education. In the present study, an attempt has been made to derive principles of teaching concepts and rules to secondary school students. Similarly, principles of teaching other kinds of learning outcomes have to be derived with the specification of level of education. For attempting this, more concentrated empirical studies are needed.

The conceptualisation of quality of instruction in the present study has many implications for research. It presents a method by which instruction can be designed, assessed and compared.

The finding that tuition is an important determiner of achievement stresses the need for more studies in relation to extra facilities. In further studies, it would be meaningful to consider the quality of extra facilities rather than the presence or absence of each one.

In relation to school variables and class variables, the study has shown that process variables - the variables of the functioning - are far more important than either structural variables or student body characteristics. More studies are needed to examine which of the process variables have implications for student learning.

To sum up, the present study has shown that student achievement is largely determined by the entry characteristics of learners, and that the role of instruction is marginal. It appears that the differences in instructional quality do not affect the majority of students - those who lack prerequisites and those who are gifted ones. The study also showed that many of the students (more than 50 per cent) who were attending tenth standard, were not properly prepared cognitively to learn tenth class mathematics. Many of the students were found at their wits' end when given the simplest problems of mathematical

operations. Lack of prerequisites has largely affected the explanatory power of other factors with respect to achievement. Two cognitive entry measures, one affective entry measure, tuition, psycho-social environment of the school, and school mean KBOM could, in combination, explain 72 per cent of the variance in student learning.

In this chapter, results were holistically analysed to draw major inferences. The implications of these inferences were discussed with a perspective of 'success for all'. The concept of universalisation of school education will be meaningful only if success is ensured. This can be achieved only when differential treatment is provided rather than the uniform instruction in vogue today. The generally understood notion of equal treatment to all for realising the goal of equality of educational opportunities should be drastically changed to differential treatment, thereby ensuring success for all.

Based on his survey on Equality of Educational Opportunity, Coleman (1968) observed:

> "The sources of inequality of educational opportunity appear to lie first in the home itself and the cultural influences immediately surrounding the home; then they lie in the schools' ineffectiveness to free

> achievement from the impact of the home, and in the school's cultural homogeneity which perpetuates the social influence of the home and its environments."

The point that emerges from the thesis is:

Schools can be effectively used to reduce inequalities, if only we attempt to do so by ensuring success for all students. If not, the principle of equality of educational opportunity will continue to be a meaningless rule of the game.