A wide spectrum of research literature pointed out socio-cultural deprivation as the dominant explanation for student survival and success in schools. This paper, contending socio-cultural deprivation as inadequate explanation for dropout and detention at secondary level, probed into the role of pupils’ foundation knowledge in their survival and success at secondary school stage. A sample of 3581 pupils were assessed for their foundation knowledge for secondary Mathematics, Science and English at their entry into secondary schools, and were tracked for three years to ascertain their schooling status - whether they completed secondary education. Discriminant function analysis of data on foundation knowledge and schooling status of pupils identified pupils’ entry level foundation knowledge as a strong correlate of schooling success. The mean Discriminant scores for secondary completers and non completers were .936 and -.582 respectively. Foundation in English and Mathematics exerted higher influence (loadings .917 and .914 respectively) than foundation in Science (loading .890) in secondary school success. This paper discusses the results of this study with its implication for educational policy and intervention.

Key words: Socio-cultural deprivation, survival and success at secondary stage, entry level foundation knowledge, educational policy and intervention.

INTRODUCTION

Certain classes of people in a society have been less privileged to enjoy available resources, facilities and opportunities. They are perforce structured to remain divorced from socio-cultural participation in different domains of life. Conventional thought perceives them as inferior/weak; assigns them lower status and holds low expectations from them. Such population is identified as *dalits / disadvantaged / backward*. Indian constitution although assures equity and equality in every spheres of public life, yet people are categorized into socio-culturally advanced and backward categories across the variables like caste, gender, habitation and economic status. In India the scheduled castes, the scheduled tribes, the rural dwellers, the females and the below poverty line families are considered as socio-culturally disadvantaged population. In matters of education, socio-culturally disadvantaged children are characterized with unsupportive study environment, lack of parental support/ involvement, compulsive engagement in household activities and lack of guidance. These situations impede their schooling and learning performance. Hence socio-culturally disadvantaged children can be expected to show higher propensity
for school dropout and grade repetition. This common sense perception has been probed extensively.


A number of studies like Institute for Social and Economic Change (1981), Kumar (1983), Nayantara (1981), Pillai et al. (1980), Raj (1979), Ray (1996), Sarkar (1980), Sharma (1982), Sudharmma (1998), Uniyal and Shah (1979) and Vathsala (1981) found rate of dropout and detention was higher for scheduled caste and scheduled tribe students than that for general caste students. That is, caste is associated with school dropout and detention.


The forerun review of literature shows socio-cultural deprivation has remained the major explanations for school dropout and detention. Current educational policy in India aims at compensating the adverse effects of socio-cultural and familial factors for the students belonging to the backward classes and minority communities. Measures supporting schooling of children of the said groups such as pre-matric scholarships, National Means cum Merit Scholarship, National Scheme of Incentives (Rs 3000/- to SC/ST/OBC girls reading in class ix), Provision of cycles to ST/SC girls, dress for girls up to class VIII, Pre-matric scholarship to minorities students (Rs 100/- pm) to all those whose parental income is less than rupees 1 lakh per year, free books up to class VIII have been implemented. A number of residential schools for children of the socio-culturally backward sections have been running by the welfare ministries of the provincial governments. In spite of this student dropout, detention at secondary school level has remained a standing issue in India and therefore requires re-examination.

During the early years of schooling, the socio-familial factors which have been shown as the dominant explanation, appears to be strong correlate of schooling survival and success. However during secondary-schooling period, children grow up in terms of cognitive capabilities, sense of responsibility, goal-oriented-ness and therefore, can be expected to cope with the impeding socio-familial forces. It does not appeal to reason to accept that a child who completed seven years of primary schooling under disruptive forces of socio-cultural and familial backwardness fails to survive secondary schooling for reasons of socio-cultural and familial backwardness. Also, for children from the socio-culturally advanced classes of society with better economic conditions the rate of dropout and detention is comparatively low, but not too small to be ignored. What best explains dropout and detention of children from socio-culturally advanced categories? The school related factors are a common denominator for children who survive and succeed in secondary schooling and those who do not. Therefore the theory of socio-cultural deprivation seems to inadequately explain the issue of dropout and detention at secondary school stage. Possibility of other variables besides the socio-familial variables as potential correlates of school dropout and grade repetition cannot be ignored. Educational research need to explore other explanatory variables for effective policy and intervention to address the issues of school dropout and detention at secondary stage which is an important agenda of Rashtriya Madhyamik Sikshya Abhiyan (the National Secondary Education Programme of Govt. of India which aim at universalizing secondary education in the country).

In matter of dropout and detention of pupils in secondary classes, secondary school teachers assert that most of the students who are admitted to class VIII (the entry point to secondary stage in the state of Orissa) lack the minimum foundation required for learning in class VIII and most of such pupils fail to survive the pressure of secondary schooling- they either dropout or repeat a class. A recent doctoral research by Choudhury (2009) examined whether pupils admitted to class VIII acquired necessary foundation for learning in class VIII and confirmed foundation deficit among most pupils of
class VIII in Science and Mathematics. Ray (1989) reported that girls faced difficulties in English, Mathematics and Science, and were unable to cope with the heavy syllabus. Alkar (1979) identified that poor educational background stood out as the main reason for dropout and failure in school. Similarly Singh (1988) found weakness in subject as a cause of dropout among girls.

The concept of educational / academic background / foundation knowledge/entry level knowledge for learning a subject area has been emphasized by many learning theories such as Thorndike’s theory of readiness and Gagne’s conditions learning. Foundation deficit in pupils over and above their socio-cultural background although, can be reasonably believed to influence secondary school survival and success, yet has not been examined empirically. How pupils’ foundation knowledge, which is an essential prerequisite to learn the subjects of studies in a particular grade level, influence school survival and performance at secondary level is largely a gray area in educational research studies. On this backdrop an attempt has been made to examine the association of pupil’s foundation knowledge and secondary school survival. The specific research questions underlying the study are:

(i) Does the foundation knowledge of pupils at their entry to secondary stage differentiate them into completers and non-completers of secondary education at the end of the course?

(ii) What is the relative contribution of foundation knowledge of pupils in different subject areas in discriminating them into completers and non-completers of secondary education?

The research questions were delimited to three school subjects: Mathematics, Science and English only in view of their importance in tertiary education and post secondary work employment opportunities in India.

Objectives of the study

(i) To analyze the status of secondary school students (as secondary completers and secondary non-completers) in relation to their foundation knowledge in Mathematics, Science and English at entry into secondary stage.

(ii) To examine the relative contribution of foundation knowledge of pupils in Mathematics, Science and English in discriminating them into completers and non-completers of secondary education.

RESEARCH METHODOLOGY

The study was designed to assess pupils’ foundation knowledge in Mathematics, Science and English at secondary school entry point (class VIII), and track their school continuity throughout the secondary stage of 3 years with view to ascertaining their upward mobility into higher classes till completion of secondary stage - end of class X.

Sample for the study

The study was carried out in four districts of Odisha state with higher density of population in socio-culturally disadvantaged category. A sample of 81 schools which was about 60% of the school population in the said districts, were randomly drawn both from rural and urban locations in proportion to the ratio of population of rural urban schools. The total number of students enrolled in class VIII in the sampled schools varied widely from 45 to 160. Keeping in view the resource constraints the sample of students was delimited to a maximum of 100 per school. Thus all students in smaller schools, excepting a very few absentees on the date of data collection on foundation knowledge, served as the sample of this study. However in bigger schools where the total number of students exceeded 100, only 100 students were selected randomly. The total number of student from all the sample school was 3581.

Data Instruments used in the study

Identification and measurement of the foundation knowledge that was critical requirements for learning secondary school syllabus in Mathematics, Science and English at class VIII was very crucial to examine the research question. Although plenty of literature are available on the construct learning ‘achievement’ very little could be found for ‘foundation knowledge’. Any scientific study of a phenomenon essentially requires both a conceptual and an operational definition of the same. In the present study the investigator conceived and operationalised the term with pragmatic intentions underlying the study. Foundation Knowledge is understood as those critical knowledge/skills that are perquisite to learning of a course in a given grade level. Learners cannot cope with learning the new course without mastery of the foundation knowledge. A set of foundation knowledge in every subject area at any grade level, which the pupils are supposed to have mastered in the previous grades can be easily identified. Thus foundation knowledge for any grade level may be seen as specific achievement attained in the previous grades. However all achievement in a particular grade level may not be the foundation for learning in the latter grade(s). Under-achievement in any grade level is the consequence of cumulative non-acquisition of the foundation knowledge in the previous grade levels which is compounded in different forms. Assessment of foundation knowledge of pupils for the present study is based upon this conceptual understanding.

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tion knowledge tests were ensured through the test development process. The scores pupils on these tests were cross validated against their grades obtained in the 7th class common public examination. The coefficients of correlation (Gamma) were .912, .732, and .911 for Mathematics, Science and English respectively.

A data capturing format on schooling status of pupils throughout secondary stage – secondary completers (who completed secondary school without class repetition in the normal duration of 3 years) and non completers (who left or repeated a class and could not complete in the normal duration of 3 years) was used.

**Data collection procedure**

The foundation knowledge tests in Mathematics, Science and English were administered on the sampled students soon after their admission in class VIII in 2006. Data on upward mobility of the sample students into next higher classes till termination of secondary stage in the year 2009, that is class X, was collected with the data capturing format from schools at the end of every academic session.

**Data analysis procedure**

The study involved a categorical dependent variable, schooling status with two categories - secondary completed (completed secondary school without class repetition in the normal duration of 3 years) and secondary not completed (who left or repeated a class and could not complete in the normal duration of 3 years); three scale independent variables- FKM, FKS and FKE. For this type of data and the second research question stated earlier Discriminant function analysis is the most suitable statistical technique and hence is used in this study.

A descriptive approach was used to analyze data in respect of the first research question and the corresponding objective. To describe the overall position of foundation knowledge of students in the three subjects, a five point graduated foundation knowledge scale is used. The scale is conceived to have the following range of foundation knowledge.

<table>
<thead>
<tr>
<th>Foundation knowledge score</th>
<th>Status of foundation knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% - 100%</td>
<td>Mastery of FK</td>
</tr>
<tr>
<td>60% - 79%</td>
<td>Near mastery</td>
</tr>
<tr>
<td>40% - 59%</td>
<td>Average FK</td>
</tr>
<tr>
<td>20% - 39%</td>
<td>Deficit in FK</td>
</tr>
<tr>
<td>0% - 19%</td>
<td>Severe deficit in FK</td>
</tr>
</tbody>
</table>

Such classification of foundation knowledge scale is pragmatic and for convenience of interpretation. Similar scaling approach is used in classification of pupils’ achievement in studies on national learning achievements surveys of DPEP/SSA intervention in India.

**RESULTS**

**Whether foundation knowledge discriminated pupils**

The distributions of foundation knowledge scores of the two groups of pupils - ‘who could not complete secondary education’ and ‘who completed secondary education’ in Mathematics, Science and English are presented in Figures 1, 2 and 3 respectively. The percentage of pupils at each level of foundation knowledge scale in the non-completer group went in a reverse order with the corresponding figures in the other group in each subject area. Further, the concentration of pupils for non-completers was higher at the lower end of the foundation knowledge scale and that for the completers was higher at the upper end of the foundation scale. Thus it is evident that students possessing lower foundation knowledge in Mathematics, Science and English constituted the group who could not complete secondary school. Students with higher foundation knowledge in the subjects constituted the other group. Thus in respect to the first research question, it was found that pupils’ foundation knowledge at the entry to secondary stage discriminated them into completers and non-completers of secondary education.

**Relative contribution of foundation knowledge to discrimination of pupils**

The result of discriminant function analysis in respect of the second objective is shown in Table 1. Table 1 shows the mean foundation knowledge scores of the two groups of students who completed secondary school and those who did not. It may be seen that 2208 students out of 3581 (61.65%) failed to complete secondary schooling in three years, the normal course duration.

Table 2 shows that students who completed secondary school were significantly different from those who did not complete secondary school in respect of average foundation knowledge in Mathematics, Science and English.

The Eugene value of the canonical Discriminant function (DF) was .545 and explained all the variance. The canonical correlation between the DF and the dependent variables was .594. The DF was significant (Wilks’ lambda = .647, Chi square = 1555.616, df = 3, p = .000). Therefore the null hypothesis of no difference in the mean DF scores of the two groups of students-secondary completed and secondary not completed was rejected. In other words the model stated as below discriminates.

\[ D = b_1 (FKM) + b_2 (FKS) + b_3 (FKE) + C \]

The unstandardized canonical coefficients for FKM, FKS, and FKE were .015, .013, and .019 respectively with constant = 1.890. Thus the model comes out to:

\[ D = .015 (FKM) + .013 (FKS) + .019 (FKE) - 1.890 \]

The loadings for FKM, FKS and FKE found to be .914, .890 and .917 respectively. Thus FKE exerted highest influence in classifying pupils into secondary completed and
Figure 1. Distribution of students at the levels of FKM for secondary completers and non completers.

Figure 2. Distribution of students at the levels of FKS for Secondary completers and non completers.
Table 1. Mean foundation knowledge for secondary completers vs. non-completers.

<table>
<thead>
<tr>
<th>Schooling status</th>
<th>Subject area</th>
<th>Mean foundation knowledge</th>
<th>Std. deviation</th>
<th>Valid N (list wise)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unweighted</td>
</tr>
<tr>
<td>Not completed</td>
<td>Mathematic Foundation</td>
<td>23.6696</td>
<td>16.58435</td>
<td>2208</td>
</tr>
<tr>
<td></td>
<td>Science Foundation</td>
<td>43.0707</td>
<td>24.40427</td>
<td>2208</td>
</tr>
<tr>
<td></td>
<td>English Foundation</td>
<td>21.6302</td>
<td>16.13425</td>
<td>2208</td>
</tr>
<tr>
<td>Completed</td>
<td>Mathematic Foundation</td>
<td>55.0178</td>
<td>29.81490</td>
<td>1373</td>
</tr>
<tr>
<td></td>
<td>Science Foundation</td>
<td>79.3230</td>
<td>30.37136</td>
<td>1373</td>
</tr>
<tr>
<td></td>
<td>English Foundation</td>
<td>52.7325</td>
<td>29.73492</td>
<td>1373</td>
</tr>
<tr>
<td>Total</td>
<td>Mathematic Foundation</td>
<td>35.6889</td>
<td>27.25097</td>
<td>3581</td>
</tr>
<tr>
<td></td>
<td>Science Foundation</td>
<td>56.9703</td>
<td>32.11613</td>
<td>3581</td>
</tr>
<tr>
<td></td>
<td>English Foundation</td>
<td>33.5552</td>
<td>26.98294</td>
<td>3581</td>
</tr>
</tbody>
</table>

secondary not completed and FKS the lowest. The mean Discriminant function scores that is the group centroids were .936 for those who completed and - .582 for those who did not complete. Further 79.85 of the cases were classified correctly.

DISCUSSION

The study attempted to seek answer to whether foundation knowledge of pupils at the entry to secondary stage of education influenced their survival and success.
at secondary stage; that is whether pupils got themselves differentiated into secondary completers and non-completers on the basis of their foundation knowledge. The discriminant function built on the foundation knowledge scores in Mathematics, Science and English well discriminated the pupils into the two levels of the dependent variable, schooling status- secondary completers and non-completers. That is, foundation knowledge of pupils in these subjects was found to influence pupils’ school continuity and success at secondary stage. Thus foundation knowledge of pupils in the three subjects, besides the socio cultural factors like caste, gender, habitation and economic condition remained a powerful determinant of survival at secondary school level. Therefore, the answer to what explains dropout and detention of children from socio culturally advanced categories, the questions raised in the first part of this paper, comes out to pupils’ foundation deficiency. Moreover this study confirmed the viewpoint of secondary school teachers that students with foundation deficit failed to cope with the pressure of secondary school curriculum- either dropout or repeat a grade at secondary stage.

The data analysis revealed that during transition from class VIII to X about 38.34% of students either dropped out or got detained, and thus could not complete secondary education in the normal course period of 3 years. As completion of secondary education has strong impact on availability of future work employment opportunities, dropout/detention to this magnitude will be taxing on country’s economic growth.

The study brings forth two worrisome implications. First, the academic inputs provided in the secondary schools could not bridge the foundation deficit in the pupils accrued during schooling at primary stage, and failed to ensure their upward grade mobility till secondary completion. Second, the supportive measures for the students from the socio-culturally backward classes (described in the sixth paragraph of this paper) which aimed at facilitating school continuity by reducing the impeding forces of socio-cultural deprivation, could not deliver the goods. Therefore educational policies in India need to take care of these two concerns. The primary stage of education must have to guarantee the mastery level acquisition of the minimum foundation required for secondary schooling. The minimum foundation requirements in different subjects of study at secondary school level should be identified. The teaching learning process at primary level must have to focus on such foundation. At secondary school level adequate compensatory inputs or bridge course need to be provided to the children with foundation deficit for their academic mainstreaming. This requires context specific school based remedial intervention programs. Schools themselves could not succeed in this respect. To make it practically happen there should be distinct policy directives enforcing remedial learning programs in schools, at least in the entry year of secondary schooling. Besides this, compensatory learning materials in different areas of foundation deficit should be readily available to the schools. Integration of remedial learning programs with the normal work plans of the schools still is a practical challenge. This can be resolved through teacher orientation programs focusing on collaborative learning in peer groups, self independent learning and special tutoring programs. These interventions along with the current supportive measures would facilitate secondary school survival and success, and fulfill the goals of Rastriya Madhyamik Sikshya Abhiyan in India.

Table 2. Test for equality of mean foundation knowledge of groups.

<table>
<thead>
<tr>
<th></th>
<th>Wilks’ Lambda</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematic Foundation</td>
<td>.687</td>
<td>1630.061</td>
<td>1</td>
<td>3579</td>
<td>.000</td>
</tr>
<tr>
<td>Science Foundation</td>
<td>.699</td>
<td>1543.418</td>
<td>1</td>
<td>3579</td>
<td>.000</td>
</tr>
<tr>
<td>English Foundation</td>
<td>.686</td>
<td>1639.622</td>
<td>1</td>
<td>3579</td>
<td>.000</td>
</tr>
</tbody>
</table>

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