PROJECT NUTRITION HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

An Impact Study

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EDITOR: PRAFUL N.DAVE

A UNICEF ASSISTED PROJECT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH

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NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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DEDICATED TO

those thousands of children, parents, community members, teachers, resource persons and education officers who participated in the implementation of this exciting innovative project during 1975-89 and unknowingly contributed to its success.

"If we take in our hand any volume ... let us ask: Does it contain any abstract reasoning concerning quantity or number? No. Does it contain any experimental reasoning concerning matter of fact and existence? No. Commit it then to the flames: for it can contain nothing but sophistry and illusion!"

—**Hume, David**, *An enquiry concerning human understanding, 1777.*

PREFACE

The project Nutrition, Health Education and Environmental Sanitation (NHEES) was undertaken in the last quarter of 1975 in the context of the Universalisation of Elementary Education (UEE). It was one of the fore-runner projects launched in this country to identify strategies for quality improvement in curriculum, teaching methods, materials and modalities at the stage of primary education. The basic premise for taking up these projects was to develop need-based decentralised curriculum process and content that would help retain a large number of children who would otherwise have dropped out of primary schools.

Further, to provide children with skills and competence to survive in the society and make useful contribution to national development, no other skills are perhaps as important as the basic survival skills to fight the source of malnutrition and disabling childhood diseases, and bring about general improvement in their nutrition and health status. The rationale for taking up the project NHEES was to enable children to develop knowledge, skills and attitudes which could help enhance their quality of life.

This project encompasses a much broader area of concern not normally covered under any conventional curriculum reform project. It addresses itself to the important social problems of malnutrition, diseases and insanitation which are intertwined with the socio-economic conditions of the community in particular and the country in general. The total gamut of this project was quite massive in the sense that the project intervention took into its stride both the primary school children in the formal system and the community members Thus, the beneficiaries were children as well as adults. The broadened scope of the project to include intervention programme with the adults of the community was based on the hypothesis that no meaningful dent can be made in the pupil behaviour towards nutrition, health and environmental sanitation unless the parents and other members of the community are equally aware of the problems associated with it and they also actively take part in the process of community education. Hence, the unique feature of the project was the intensive community intervention programme which assumed a pivotal role in bringing about the desirable change. This aspect of the programme was designed to play its role in the transformation of the health, nutrition and environmental sanitation scenario in the project areas In this respect, the project stands out exclusively as an input for raising the general health status of the community, which in turn implies an over-all improvement in the socio-economic status and productivity of the community in the long run.

It took about 15 years to complete the implementation of the project in two phases· the Pilot Phase (1975-80) and the Expansion Phase (1981-89) A systematic evaluation of the impact of the project intervention on the pupils and members of the community was undertaken in 1987. Though, as a part of the design for implementation of the project, an evaluation mechanism was built in from the very inception, to fully assess the benefits accrued from the project intervention of such a massive dimension, it was necessary to systematically collect hard data/evidence to support the contentions implied in the rationale

for undertaking the project. Therefore, a well designed evaluation study became necessary to help capture the bench mark data as well as the other data in respect of the intervention programme.

Quite often innovative programmes in education take a long time for planning, implementation and final evaluation. By the time the impact of the project is fully assessed, most of the results obtained and benefits accrued become things of the past and thus cannot have much value for future planning and development of education processes. In this project it was decided that the evaluation of the impact should be studied in respect of clear cut parameters such as planning, implementation processes, strengths and weaknesses of curriculum materials and methods, and last but not least, the achievement of the pupils in respect of knowledge, understanding, application of skills in the related areas and also the attainment of the community members with respect to the messages related to nutrition, health and environmental sanitation. This study has been specifically planned so as to enable future curriculum planners to get an insight into the different aspects of implementing innovative programmes of such massive dimensions.

For an impact evaluation study like the one mentioned above, it was imperative that a vast amount of data spread over more than a decade should be collected from seven participating states. The data were, therefore, collected, sorted out and quantified. They were then analysed through appropriate parametric and non-parametric statistical techniques, which yielded results on pupil achievement and behavioural changes of the community members.

It is hoped that the results reported here will benefit curriculum planners and teachers working in health and education sectors. As happens in social sciences research, the results are complex and not always fully definite or consistent. And yet, the patterns that have emerged with respect to a variety of independent and dependent variables are extremely interesting and useful There are indeed lessons to be learned.

I wish to take this opportunity to place on record my appreciation of all those who worked on this project. Special mention should be made of Mrs. Shukla Bhattacharya of our Department of Pre-School and Elementary Education for the efforts put in by her in bringing out this publication.

We would welcome feedback from the concerned researchers and fieldworkers on the issues raised and the conclusions drawn in this report

New Delhi
November 4, 1991

K. Gopalan
Director
National Council of
Educational Research and Training

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The planning, execution and analysis of the impact study like this, no doubt, requires assistance, cooperation and support of many agencies and people. Finally, when this report is being published, nostalgic memories of ups and downs experienced by me during the implementation and evaluation phases come to mind. It is rather difficult to remember one and all who had extended their help; nor is it possible to list them by names. All the same, at this initial stage I would like to confess that while I have been instrumental in documenting, collecting data and preparing this report, it is *truely* an outcome of contributions made by many experts and field workers scattered in the eight participating States, viz., Bihar, Karnataka, Madhya Pradesh (MP), Maharashtra, Mizoram, Orissa, Rajasthan and Uttar Pradesh (UP).

To start with, the contribution of the project teams—Director, Co-ordinator and Junior Project Fellows (JPFs)—located at the State Council of Educational Research & Training (SCERT), the State Institute of Education (SIE) and the State Institute of Science Education (SISE) in these States, needs to be gratefully acknowledged, for it would have been well nigh impossible to complete such an immense task without their sustained help and willing cooperation. In a real sense, they were the NCERT's partners in planning and implementation of the project as well as sharing the responsibilities for carrying out this impact study. Special mention needs to be made of the valuable help rendered by the coordinators in preparing Master Tabulation Sheets (MTSs) I & II once again in 1989, because of the destruction of the previously collected data in the devastating fire that took place in the NCERT in 1988.

The planning and implementation of the Project Nutrition, Health Education and Environmental Sanitation, especially the Expansion Phase, was carried out under the tenure of Prof. P.N. Dave, the then Head of the Department of Pre-School & Elementary Education, NCERT, (1984-91). The initial planning and subsequent execution of the impact study was done under the able guidance of Prof. P.N. Dave. But for his unflinching support and sustained encouragement, this long-drawn study could not have seen the light of the day. I am indeed deeply indebted to him for not only his expert advice at every stage of the preparation of this report but also for continuously motivating me to complete the task as professionally as I could. I would also like to record the contribution of Dr. B.P. Gupta, Professor in Education, DPSEE (Rtd.) in designing this study at the initial stage.

While conducting this study, a large number of JPFs got associated with the mundane but important tasks such as checking MTSs I & II for accuracy and authenticity, checking listed data received from the computer firm, undertaking small analyses of data, proof-reading the manuscript again and again for preparation and printing of the report, etc. I will be failing in my duty if I did not acknowledge their sustained assistance to me. The names of Miss Saloni Chawla (16.8.1990 to 30.11.1991) and Miss Manju Sharma (13 10.86 to 21 6.88) stand out in my mind While Miss Manju Sharma helped me substantially at the initial stage, Miss Saloni Chawla has not only made a substantial contribution to the report but also has been the source of physical and moral strength to me during the last critical months. The following JPFs also made

their individual contribution commensurating with the period they stayed with the Project

1. Ms Sushma Gupta (22.8 89 to 28.9-90)
2. Ms. Sunita Karwal (16.7.90 to 19 11.90)
3. Ms Anita Govil (8 4.87 to 17.8. 88)
4. Ms Shampa Paul (9.10.90 to 14 4 91)
5. Ms Sita Bhatt (8.4.87 to 11.7.88)
6. Ms. Neerja Bhasin (19 9 91 to 30.11 91)

As can be seen from the report, the capturing and analysis of data was a very complex task I want to take this opportunity to express my deep-felt appreciation to Mr. K.S. Yadav and his firm, namely, M/S ARDEE Unitron Computer Ltd , for executing the task of analysing the massive data with precision and care. Similarly the editing of the manuscript also required utmost care and accuracy. I am extremely grateful to Shri Jaipal Nangia (Retired Head, Publication Department, NCERT) for meticulously doing both language and copy editing of the report Shri Siddhartha Majumdar, Artist, has created a fascinating jacket design, for which I am thankful to him So far as the production of this report is concerned the valuable guidance given by Shri C N Rao, Head, Publication Department, NCERT and Shri P Lakshmipathy, Consultant, DPSEE, is gratefully acknowledged. Special mention in this regard needs to be made of the assistance and cooperation extended by Shri H.L. Thakar, Proprietor, CALPS in preparing the press copy. Shri Vijander Singh Rawat not only put his talent and insight in formatting the complex tables but also tolerated the repeated changes made in the proofs. I am indeed thankful to both of them for their patience and assistance.

The UNICEF and the NCERT have been partners in planning, implementing and evaluating this project from the time of its inception in 1975 Since the tenure of the Project has spread over a long period of 13 years, it is but natural that a number of officers in the UNICEF have made their contribution to the nurturance of the Project. I am extremely thankful to all in the UNICEF who have been associated with the planning, implementation and evaluation of this project. But for the liberal funds and support from the UNICEF, this study would not have been completed. In the same vein, I am sincerely grateful to Dr. K Gopalan, Director and Prof. A K. Sharma, Joint Director, NCERT for their kind consideration and encouragement. I am thankful to Prof. (Mrs.) R. Muralidharan, Head, DPSEE, for extending all help and cooperation to me in bringing out this report.

Involvement in an investigation like this demands an awful lot of time, at times compelling one to neglect household duties. My husband has been not only tolerant of my such lapses but also has remained a constant source of inspiration and moral support to me throughout the conduct of the study.

New Delhi
November, 1991

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ACRONYMS

A	:	Application
ACMCL	:	Advanced Curriculum Model of Cognitive Learning
BC	:	Backward Class
CCP	:	Community Contact Programme
CHEB	:	Central Health Education Bureau
CML	:	Children's Media Laboratory
Cre	:	Creativity
DACEP	:	Developmental Activities in Community Education and Participation
DESM	:	Department of Education in Science and Mathematics
DSE	:	Department of Science Education
EBOs	:	Expected Behavioural Outcomes
EE	:	Elementary Education
EVS	:	Environmental Studies
GOI	:	Government of India
GRR	:	Gross Retention Rate
HCL	:	Hindustan Computers Limited
ICDS	:	Integrated Child Development Services
IDS	:	International Development Strategy
IMR	:	Infant Mortality Rate
JPF	:	Junior Project Fellow
K	:	Knowledge
MHRD	:	Ministry of Human Resource Development
MOE	:	Ministry of Education
MPO	:	Master Plan of Operation
MTS	:	Master Tabulation Sheet
NCERT	:	National Council of Educational Research & Training
NFI	:	Nutrition Foundation of India
NHEES	:	Nutrition, Health Education and Environmental Sanitation
NPMN	:	National Programme of Minimum Needs
NT	:	Nomadic Tribe
PECR	:	Primary Education Curriculum Renewal
PHC	:	Primary Health Centre
POA	:	Plan of Action
QCIS	:	Questionnaire-Cum-Interview Schedule
RLOs	:	Real Learning Outcomes
RNC	:	Regional Nutrition Centre
S	:	Skill
SC	:	Scheduled Caste
SCERT	:	State Council of Educational Research and Training
Schls	:	Schools
SHC	:	School Health Committee
SEP	:	Science Education Project
SES	:	Socio-Economic Status
SHEB	:	State Health Education Bureau
SIE	:	State Institute of Education
SISE	:	State Institute of Science Education
SPSSPC	:	Software Package of Social Sciences for Personal Computer
SS	:	Social Status
ST	:	Scheduled Tribe
T	:	Total Score
TTI	:	Teacher Training Institute
U	:	Understanding
U5MR	:	Under Five Mortality Rate
UN	:	United Nations
UNICEF	:	United Nations Children's Fund

HIGHLIGHTS OF THE STUDY

I. THE INTERNATIONAL CONTEXT

The sixtees witnessed a target-oriented development which seemed to have widened the gap between the rich and poor the world over. Concerned at this situation, the United Nations (UN) launched the "International Development Decade" in 1969. Subsequently, in order to make the decade a success, an "International Development Strategy" (IDS) was formulated. This strategy was essentially related to equity and social justice

NATIONAL EFFORTS

India was a signatory to this strategy document Therefore during the Fifth Five Year Plan (1974-78), the Government of India (GOI) launched a *National Programme of Minimum Needs* (NPMN), which aimed at delivering in a complementary fashion "minimum basic services", specially to the disadvantaged or underserved sections of the population. Social welfare measures, such as nutrition, health education and environmental sanitation figured prominently in these efforts. The delivery of basic services to children being the prime objective of UNICEF, the organization came in a big way to support the GOI's efforts both in health and education sectors.

II. PROJECT NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION (NHEES)

PLANNING AND IMPLEMENTATION

The compelling reason for undertaking a project in this area had been the dismal picture of the general health and sanitation status in the country. At the instance of the ers' vhile Ministry of Education (MOE) and the UNICEF, the erstwhile Department of Science Education (DSE) [now named as Department of Education in Science and Mathematics (DESM)] in the NCERT organised a National Conference of eminent experts in the fields of nutrition, health, sanitation and elementary education in August, 1975 Consequently, the Project Nutrition, Health Education and Environmental Sanitation was designed at the NCERT with the help of experts and project activities were initiated in the following five States, namely, Baroda, Gujarat; Calcutta, West Bengal; Coimbatore, Tamil Nadu; Jabalpur, Madhya Pradesh and Ludhiana, Punjab. Five Regional Nutrition Centres (RNCs) were located in the reputed Home Science Colleges in the States, except in Madhya Pradesh, where it was located in the State Institute of Science Education (SISE). While the first or the Pilot Phase of the Project was implemented through these five centres during 1975-80, the Expansion Phase covered the period of 1981-89, when it was extended to 10 more States and Union Territories (UTs), namely, Andhra Pradesh, Assam, Bihar, Haryana, Karnataka, Maharashtra, Mizoram, Rajasthan, Orissa and Uttar Pradesh. In all these States, the Nutrition Centres (NCs) were located in State Councils of Educational Research and Training (SCERTs) or State Institutes of Education (SIEs) or State Institutes of Science Education (SISEs), except in the case of Andhra Pradesh where the project was implemented by the Department of Home Science, Shri Venkateswara University, Tirupati.

Strategies

The original project document, which had been the basis of implementation in the four RNCs (the RNC at Calcutta, West Bengal was dropped), was modified as per the recommendations made in the evaluation report of the Pilot Phase submitted by the Nutrition Foundation of India (NFI, 1983). The strategies for implementation were as follows:

* Establishment of Nutrition Centres in viable institutions;
* Selection of a block which is either a tribal area or is predominantly inhabited by the Scheduled Castes (SC)/Scheduled Tribes (ST) and other Backward Communities (OBCs);
* Review of the work done at the RNCs;

* Conducting a survey of the project area in order to identify the problems related to nutrition, health and sanitation habits;
* Development of relevance-based instructional materials for pupils, teachers and teacher-educators;
* Try-out of the materials; and
* Delivery of important UNICEF messages on nutrition, health and environmental sanitation to the community with the help of teachers and pupils in selected villages.

Monitoring & Evaluation

The monitoring and evaluation components were built in the Project design from the initial stage. An adequate mechanism and a process of obtaining quantitative and qualitative reports on the progress of project were established. The analysis of data indicated that while the average Percentage Utilization Rate (PUR) for the 1980-84 MPO was 47.9, that for the 1985-89 MPO was only 37.63, thereby revealing that India was not able to adequately utilize the funds that were provided to her by UNICEF. Put differently, the participating states were unable to absorb the funds liberally available to them Secondly, the administration and management problems overwhelmed the academically sound programmes, thereby ultimately determining the success or failure of the innovative project.

III. DESIGN OF THE IMPACT STUDY

ASSUMPTIONS

The assumptions underlying the Project were as follows:

1. It is possible to enhance the level of pupil achievement with the help of a curricular intervention programme of nutrition, health education and environmental sanitation (NHEES).
2. It is possible to enhance the perceptions and practices of the community members in respect of NHEES with the help of a community contact programme.
3. The enhancement of perceptions and practices of the parents in the community reinforces the learnings acquired by pupils in the school.

STUDY 1 (PUPIL ACHIEVEMENT)

Hypotheses

In order to test the validity of these assumptions, the following hypotheses were formulated:

— Differences exist among the achievements of pupils belonging to different States.

— Differences exist among the achievements of pupils in the three groups, i.e , Grp 1, Project schools exposed to the special NHEES curriculum; Grp II, Non-Project schools exposed to neither programmes (control); and Grp III, Project schools exposed to the special NHEES curriculum along with the CCP programme

— Difference exists between the achievements of male and female pupils.

— Differences exist among the achievements of pupils in the cells formed in the factorial design by State, group and sex.

STUDY 2 (COMMUNITY CONTACT PROGRAMME)

Hypothesis

Difference exists between the pre- and post-test NHEES status of the community.

Coverage

The study was carried out in the following States: Bihar, Karnataka, Maharashtra, Madhya Pradesh (M.P.), Mizoram, Orissa, Rajasthan and Uttar Pradesh (U P.). One hundred schools in each block of the State were selected for implementing the Project. A random sample of 30 schools was selected from among these 100 schools. Fifteen, i.e , 50% schools were those schools where the community contact programme was conducted, whereas the remaining 50% (15) project schools did not participate in

ii In the States/UTs where the total number of schools were less than 30, all schools were included in the study Since it was extremely important to demonstrate the effectiveness of the intervention as exclusively as possible, a random sample of 10 non-project schools (as the control group) was also selected from among those located in the proximity of the project schools. Thus there were three groups, i e , pupils in project schools (Experimental Group I), pupils in non-project schools (Control Group) and pupils in project schools where the community contact programme was also conducted (Experimental Group II or project schools + CCP) While the schools in Bihar, Orissa, Rajasthan and Uttar Pradesh comprised Classes I-V, those in Karnataka, Maharashtra and Mizoram consisted of Classes I-IV.

Collection of Data

A variety of instruments—tests/tools/blanks/schedules—were prepared for collecting information on independent variables and measuring pupil achievement (dependent/criterion variable). Special Pupil Achievement Tests (PATs) for Classes I-V were constructed to measure the Total achievement (T) of pupils, as also the achievement in terms of Knowledge (K), Understanding (U), Application (A) and Skills (S) relating to nutrition, health and environmental sanitation Information in respect of Sex, Attendance, Duration of stay in the school, Social status (disadvantaged/advantaged), Locale (urban/rural, slum/industrial areas), Religion, Father's education and occupation, Mother's education and occupation, and Income (Family or parental) was collected through pupil information blanks. Information about schools with regard to type of school, facilities available and training of teachers was collected with the help of school information blanks.

A Questionnaire-Cum-Interview Schedule (QCIS) was developed to record the information of households in respect of knowledge, understanding and the practices followed by the community members before and after the intervention of the Community Contact Programme (CCP) The schedule comprised 47 questions on critical points of the 10 UNICEF messages which were delivered to them with the help of school teachers.

Administration of Tests/Schedule

In order to ensure uniformity in the administration of tools by a large number of teachers and Junior Project Fellows (JPFs), to the pupils/community members scattered widely in different States/UTs, detailed guidelines were prepared and circulated to the concerned personnel for facilitating their task. A realistic time-table for the administration of the tools was developed by each State to suit their convenience and yet within the time-frame suggested by the NCERT. While the data on independent variables and dependent variables through achievement tests, blanks and the schedule were gathered by the school teachers, monitoring and supervision of the entire exercise was done by the project teams located at the Nutrition Centres (NCs) in SCERTS/SIEs/SISEs. The QCIS was administered to the community members before and after the intervention.

Scoring and Tabulation

Special Master Tabulation Sheets (MTS I & II) were designed to record the vast amount of information received from the schools The tabulation of this data was done at the State/UT level. The whole exercise was completed within three to four months These MTSs were received by the I/C of Project NHEES, Department of Pre-school and Elementary Education, NCERT where a careful scrutiny of data was made with the help of JPFs.

IV. ANALYSIS OF DATA

Pupil Achievement Test (PAT)

MTS I contained information on 32 independent variables related to both schools and pupils. It also had the information on pupil achievement, i.e., Total score (T), Knowledge (K), Understanding (U), Application (A) and Skills (S). Numerical values to each variable were so assigned that they could be transferred to the computer files with out any difficulty. The entire data on pupil achievement was cap-

tured on relevant files and the listed data sheets were checked and corrected by the NCERT before the statistical analysis was undertaken. The data on some pupils had to be discarded for want of information or reliable information on one or the other variable. In the final count, the data of 31,202 pupils from eight States was available for undertaking statistical analysis.

Questionnaire-cum-Interview Schedule (QCIS)

The questions on 47 critical points related to 10 UNICEF messages were qualitative and hence the responses obtained from the community members needed to be quantified before they were recorded on MTS II. Therefore, a coding scheme in the form of a check-list with a precise value assigned to each of the categories was prepared and provided to the tabulator. The Master Tabulation Sheet II contained the transformed numerical values of responses from the community members. When the listed household sheets were checked, it was found that a large number of records were incomplete and, subsequently, had to be discarded. This had happened due to the fact that the nature of data was complex and it was obtained solely verbally, for the target group comprised mostly illiterate adults. Ultimately, the data for the CCP pertained to 16,061 households of children falling into Group III, i.e., Project Schools + CCP from seven states (excepting M P.)

Statistical Analysis of Data

The raw pupil achievement scores (T, K, U, A and S) were converted into percentage scores for the comparison among classes and tests The entire data were subjected to analysis to obtain descriptive statistical values such as Range, Mean, Median, Mode, Standard Deviation (SD), Skewness and Histogram Frequency Distributions. Having critically examined these values, the Cochran C and Bartlett-Box F tests were run to check the homgeneity of variance between the three groups of schools, which were significant in most of the cases. In view of this, while the analysis was primarily carried out through the Analysis of Covariance (ANCOVA), i.e., State (7) × group (3) × sex (2) = 42 cell factorial design, the results so obtained were also checked with those obtained through the compatible non-parametric tests. Thus the PAT data was subjected to parametric and non-parametric tests, viz., the Step-wise Multiple Regression Analysis (SWMRA), the Analysis of Variance (ANOVA), the Analysis of Covariance (ANCOVA), the Mann-Whitney U-Wilcoxon Rank Sum W test, the Kruskal Wallis One-way ANOVA test and the Friedman Two-way ANOVA test.

The entire data of gain/loss by the community members on the pre and post tests in the QCIS were analysed with the use of 'Distribution Free Test', namely, the Wilcoxon Matched-pairs Signed-ranks test. The means of ranks of gain/loss, i.e., the difference between the values on pre and post tests of the household in the State, were checked with the means of responses on the pre test and post tests before drawing the conclusions.

V. RESULTS OF PUPIL ACHIEVEMENT DATA (PAT)

At the outset, attention needs to be drawn to the fact that the study focuses on the pooled data of all seven states (referred to as All States), except M.P. as the data for Project schools + CCP were not available. Before the classwise results are presented, it is necessary to highlight a few general findings:

GENERAL

Planning and Implementation

* The implementation of the project in participating States/UTs during both the phases was rather tardy and uneven.
* Although the funds were made liberally available to the country by the UNICEF, neither the central agency (NCERT) nor the State agencies (SCERTs, SIEs, SISEs or Home Science Colleges in the universities) were able to adequately utilise or absorb these funds. Simply put, the utilisation rate of the funds was rather poor.
* The problems of administration and management overwhelmed the process of im-

plementation, thereby affecting adversely the success of otherwise an academically sound project.

* In spite of these bottlenecks and impediments, positive behavioural changes occurred in the children and community members (see the results in detail below; *refer* also to Summary Table).

* These changes notwithstanding, the infusion of positive outcomes in the regular system of primary education met with a limited or no success at all, thereby failing to achieve the ultimate objective laid down in the original agreement signed by the competent education authorities in the State/UT with the UNICEF.

Pupil Achievement Test (PAT)

* The concept of achievement is more complex than has been thought of and measured/evaluated in practice in schools so far.

* When defined in terms of Knowledge (K), Understanding (U) and Application (A), as has been done by Bloom *et al* and Dave in their studies, there appears a hierarchical relationship among these three cognitive components, i.e. A > U > K.

* Although correlated, these components seem to have some elements which are uncommon. They seem to influence the achievement of pupils on these components of achievement.

* Sex was not related to any of the dependent variables, i.e., total scores (T) or the scores in Knowledge (K), Understanding (U), Application (A) and Skills (S). In other words, females performed as well as males in all achievement components. Further, the benefits of the project intervention accrued equally well to males and females.

* Socio-economic (SE) related variables, viz , Locale (rural/urban), Income (family/parental), Social status (disadvantaged/advantaged), Father's occupation and education, Mother's occupation and education were significantly related to T, K, U, A & S. However, the magnitute of their relationship with them was rather small, i.e., at no time they together accounted for more than 10% of the total variance in the dependent variables, meaning thereby that about 90% variance in the dependent variables was accounted for by the variables other than the eight included in the Regression equation.

* Attendance was significantly related to all the dependent variables. However, like the SE related variables, the magnitude of the relationship was quite limited since the variance accounted for by it was less than 5%.

* The high level achievement of pupils in Classes I and II decreased gradually in Classes III, IV & V. This finding is of considerable importance, since it corroborates the similar finding reported regarding the level of pupil achievement with respect to language, mathematics, science and social studies as a consequence of the project intervention, i e., Primary Education Curriculum Renewal (Dave, 1988).

* In view of the low relationship of Attendence and SE related variables to the dependent variables, the total pupil achievement and the achievement in components K, U, A and S seemed to be influenced more by the factors of "school ecology" rather than of "home ecology". Differently put, it strongly implies that once the children are in the school environment, the home environmental variables do not seem to influence the acquisition of Knowledge and development of Understanding, Skills and Application of children.

* The overall evidence at hand strongly indicates that the impact of the project intervention was significantly positive in enhancing the achievement level of pupils with respect to T, K, U, A and S. As can be seen in Table Summary of Results, the pupils of project schools and project

schools + CCP performed better than those of non-project schools for 96 and 109 times out 149 times respectively. Further, the pupils of project schools + CCP performed better than those of project schools for 47 times, whereas the pupils of project schools performed better than their counterparts in project schools + CCP for 36 times out of 149 times. For 66 times, they did not differ in their achievements.

The Community Contact Programme (CCP)

* The delivery of the ten messages to the community members enhanced their perceptions and improved their practices related to nutrition, health and environmental sanitation. In other words, the impact of the community-contanct-programme was significantly positive.

SPECIFIC

— The attendance of pupils in Classes I-V was highly satisfactory (Cl-I M = 76.52%, Cl-II M = 79.80%, CL-III M = 80.37%, Cl-IV M = 81.67% and Cl-V M = 79.61%).

— The entire group of pupils of Classes I-V belonged to the economically disadvantaged sections of the society, the monthly parental income being Cl-I M = Rs. 630, Cl-II M = Rs. 636, CL-III M = Rs. 681, Cl-IV M = Rs. 668 and Cl-V M = Rs. 710. This suggests that one of the UNICEF objectives of providing for the basic services to children and disadvantaged communities of the society was fully served by this project intervention.

Pupil Achievement Test (PAT)

Total Scores (T)

— The total achievements of pupils of Classes I & II were quite high (MI = 71.09% & MII = 62.36%), thereby indicating a high level of achievement in Knowledge, Understanding, Application and Skills related to nutrition, health and environmental sanitation. However, the total achievement of pupils of Class III was quite below average (MIII = 45.87%), that of pupils of Class IV was above average (MIV = 55.50%) and that of pupils of Class V was quite below average (MV = 44.94%). Thus there was an obvious drop in the performance of pupils of Classes III to V compared to the achievement of pupils of Classes I & II.

— The total achievements of pupils differed from State to State. While the total achievements of the pupils of U.P., Rajasthan, Mizoram, and Karnataka in Classes I, II, III (except Rajasthan), IV and V were higher than that of the total sample, the total achievements of the pupils of Orissa, Maharashtra and Bihar were lower.

Confirmation of the Major Hypotheses

— Differences existed between the total achievements of the pupils belonging to project schools, non-project schools and project schools + CCP :

However, when the pupil achievements of schools were tested in pairs (see Summary of Results) :

— The pupils of Classes I-V of project schools performed better in the total test than the pupils of Classes I-V of non-projects schools. This hypothesis was further tested separately for each State and for each class, i.e., 4 States × 5 Classes = 20 and 3 States × 4 Classes = 12, i.e., totally for 32 times. It was supported for 22 out of 32 times and rejected for 10 times. This result indicates that the impact of the curricular intervention in project schools was positive, and it helped in enhancing the level of total pupil achievement.

— The pupils of Classes I-V of project schools + CCP performed better than the pupils of Classes I-V of non-projects schools. This hypothesis was further tested separately for each State and for each class. It was supported for 26 out

of 32 times. However, it was rejected for four times and was confirmed in favour of non-project schools for two times. This result strongly indicates that the impact of the curricular intervention in project schools + CCP was positive, and it helped in enhancing the level of total pupil achievement.

— The pupils of Classes I-V of project schools + CCP performed better in the total test than those of Classess I-V of project schools. For the All states data, this hypothesis was confirmed only for Class V, but was rejected for Classes I-IV. The hypothesis was further tested separately for each State and for each class, i.e., totally for 32 times. It was rejected for 15 out of 32 times. However, in 10 instances it was supported in favour of project schools + CCP, and in seven instances in favour of project schools. This mixed result indicates that the benefit of the community intervention programme accrued to some pupils in project schools where the CCP programme was conducted. Thus it partially supports the assumption that the change in perceptions and practices of parents helped in reinforcing the learnings acquired by pupils in schools.

[N.B. It is necessary to clarify that the differences between the results of All States and States × groups are due to the interaction between these variables.]

Knowledge (K)

— Achievement of pupils of Classes I-IV in Knowledge was quite high (Cl-I M = 74.42%, Cl-II M = 81.69%, Cl-III M = 59.29% and Cl-IV M = 67.39%), thereby indicating a high level of pupils achievement in Knowledge related to nutrition, health and environmental sanitation. However, the achievement of pupils of Class V in Knowledge was slightly above average. This suggests rather an average achievement in Knowledge of the subject.

— The achievement of pupils in Knowledge differed from State to State The achievement of the pupils of U.P. in Knowledge was higher than that of the total sample in Classes I, III, IV & V. The achievement of the pupils of Karnataka in Knowledge was higher than that of the total sample in Classes I, II, III and IV. The achievement of the pupils of Mizoram in Knowledge was higher than that of the total sample in Classes I and III. The achievement of the pupils of Rajasthan in Knowledge was higher than that of the total sample in Classes II, III and V. The achievement of the pupils of Bihar in Knowledge was higher than that of the total sample in Class III. The achievements of the pupils of Orissa and Maharashtra in Knowledge were lower than that of the total sample in all classes

Confirmation of the Major Hypotheses

— The pupils of Classes I-V of project schools, non-project schools and project schools + CCP differed in their Knowledge of the subject.

However, when the pupil achievements of schools were tested in pairs:

— The pupils of Classes I-V of project schools acquired more Knowledge of the subject than the pupils of Classes I-V of non-project schools. This hypothesis was further tested separately for each State and for each class, i.e., totally for 32 times. While it was supported for 22 times, it was rejected for 9 times. It was also supported for one time only in favour of non-project schools. Thus the impact of the curricular intervention was positive, and it helped in enhancing the level of Knowledge of pupils of project schools.

— The pupils of Classes I-V of project schools + CCP acquired more Knowledge than the pupils of Classes I-V of non-

project schools. This hypothesis was further tested separately for each State and for each class, i.e., totally for 32 times. It was confirmed for 22 out of 32 times. While it was rejected for nine times, it was confirmed in favour of non-project schools for one time only. Thus it supported the assumption that the impact of the curricular intervention on project schools + CCP was positive, and it helped in enhancing the level of Knowledge of pupils.

— The pupils of Classes I-V of project schools + CCP acquired more Knowledge than those of Classes I-V of project schools. For the All States data, this hypothesis was confirmed for Classes II, IV and V, but was rejected for Classes I and III. The hypothesis was further tested for each State and for each class, i e., totally for 32 times. It was supported for eight out of 32 times However, it was confirmed in favour of project schools for nine times, while it was rejected for 15 times. This result indicates that the benefit of the community intervention programme accrued to some pupils in project schools + CCP. Thus it lends partial support to the assumption that the change in perceptions and practices of parents helped in reinforcing Knowledge acquired by pupils in schools.

Understanding (U)

— The achievement of pupils of Class I in Understanding was quite high (Cl-I M = 68.56%), thereby suggesting a high level of pupil achievement in Understanding related to nutrition, health and environmental sanitation. However, the achievement of pupils of Classes II and IV in Understanding was just average (Cl-II M = 51.09% and CL-III M = 52.83%), whereas that of pupils of Classes III and V was below average. It is obvious that achievement in Understanding of the subject in these classes was not satisfactory.

— The achievements of pupils in Understanding differed from State to State. The achievement of the pupils of U.P. in Understanding was higher than that of the total sample in Classes I, III, IV and V. The achievement of the pupils of Karnataka in Understanding was higher than that of the total sample in Classes I, II, III and IV. The achievement of the pupils of Mizoram in Understanding was higher than that of the total sample in Classes I, III and IV. The achievement of the pupils of Rajasthan in Understanding was higher than that of the total sample in Classes I and II. The achievements of the pupils of Orissa, and Bihar were lower than that of the total sample in Classes I-V

Confirmation of the Major Hypotheses

— The pupils of Classes 1-V of project schools, non-project schools and project schools + CCP differed in their Understanding of the subject.

However, when the pupil achievements of schools were tested in pairs:

— The pupils of Classes I-V of project schools developed better Understanding of the subject than the pupils of Classes I-V of non-project schools. This hypothesis was further tested separately for each State and for each class, i.e., totally for 32 times. While it was supported for 20 times, it was rejected for 12 out of 32 times. This indicates that the impact of the curricular intervention was positive, and it helped in enhancing the level of Understanding of pupils.

— The pupils of Classes I-V of project schools + CCP developed better Understanding of the subject than the pupils of Classes I-V of non-project schools. This hypothesis was further tested separately for each State and for each class, i.e., totally for 32 times. It was confirmed for 24 out of 32 times. While it was rejected for six times, it was supported in favour of non-project schools

for only two times. This supports the assumption that the impact of the curricular intervention on project schools + CCP was positive, and it helped in enhancing the level of Understanding of pupils.

— The pupils of Classes I-V of project schools + CCP developed better Understanding of the subject than those in Classes I-V of project schools. For the All States data, this hypothesis was confirmed for Classes II and V. While it was rejected for Classes I and III, it was supported for Class IV in favour of project schools. The hypothesis was further tested for each State and for each class, i.e., totally for 32 times. It was supported for 10 out of 32 times. However, it was confirmed in favour of project schools for seven times and was rejected for 15 times. Consequently, this result indicates that the benefit of the community intervention programme accrued to some pupils in project schools + CCP. Thus it lends partial support to the assumption that the change in perceptions and practices of parents helped in reinforcing Understanding developed by the pupils in schools.

Application (A)

— The achievements of pupils of Classes I & II in Application was quite high (Cl-I M = 76.57% and Cl-II M = 71.04), thereby indicating a high level of achievement in Application related to nutrition, health and environmental sanitation However, the achievement of pupils of Classes III, IV & V in Application was quite below average. This suggests, like-wise for the total achievement, there was a clear drop in the performance of the pupils of these classes compared to that of pupils of Classes I & II.

— The achievement of pupils in Application differed from State to State. The achievements of the pupils in U.P., Mizoram and Karnataka in Application were higher than that of the total sample in Classes I-IV (in the case of U.P. in Class V also). The achievement of the pupils of Rajasthan in Application was higher than that of the total sample in Classes I & II but was lower in Classes III, IV and V. The achievements of the pupils of Orissa, Maharashtra and Bihar in Application were lower than that of the total sample in Classes I-V (except Class V of Maharashtra)

Confirmation of the Major Hypotheses

— The pupils of Classes I-V of project schools, non-project schools and project schools + CCP differed in their Application of the subject.

However, when the pupil achievements of schools were tested in pairs:

— The pupils of Classes I-V of project schools developed better Application of the subject than the pupils of Classes I-V of non-project schools. This hypothesis was further tested separately for each State and for each class, i.e , totally for 32 times. It was supported for 20 out of 32 times. While it was confirmed in favour of non-project schools for three times, it was rejected for nine times. This result indicates that the impact of curricular intervention was positive, and it helped in enhancing the level of Application of the pupils.

— The pupils of Classes I-V of project schools + CCP developed better Application of the subject than the pupils of the Classes I-V of non-project schools This hypothesis was further tested separately for each State and for each class, i.e., for 32 times. It was supported for 21 out of 32 times. While it was confirmed in favour of non-project schools for three times, it was rejected for eight times Therefore, this result supports the assumption that the impact of curricular intervention on project schools + CCP was positive, and it helped in enhancing the level of Application of pupils.

— The pupils of Classes I-V of project schools + CCP developed better Application of the subject than the pupils of Classes I-V of project schools. For the All States data, while this hypothesis was rejected for Classes I, II, III and V, it was confirmed for Class IV in faovur of project schools. The hypothesis was further tested for each State and for each class, i.e., totally for 32 times. It was established for 10 out of 32 times. While it was confirmed for nine times in favour of project schools, it was rejected for 13 times. Consequently, this result indicates that the benefit of the Community Intervention Programme accrued to a few pupils in project schools + CCP. Thus it partially supports the assumption that the change in perceptions and practices of parents helped in reinforcing the Application developed by the pupils in schools.

Skills (S)

— The achievement of pupils of Classes I & II in Skills was quite high (Cl-I M = 68.69% and Cl-II M = 59.33), thereby indicating a high level of achievement in Skills related to nutrition, health and environmental sanitation. However, the achievement of pupils of Class III in Skills was rather very poor. (The skill component was not measured in Classes IV & V.)

— The achievement of pupils of Classes I-III in Skills differed from State to State. The achievements of the pupils in U.P., Mizoram and Karnataka in Skills were higher than that of the total sample in Classes I-III. The achievement of the pupils of Rajasthan in Skills was higher than that of the total sample in Classes I & II, but was lower in Class III. The achievements of the pupils of Orissa, Maharashtra and Bihar in Skills was lower than that of the total sample in Classes I-II.

Confirmation of the Major Hypotheses

— The pupils of Classes I-III of project schools, non-project schools and project schools + CCP differed in their Skills pertaining to the subject.

However, when the pupil achievements of schools were tested in pairs:

— The pupils of Classes I-III of project schools developed better Skills pertaining to the subject than the pupils of Classes I-III of non-project schools. This hypothesis was further tested separately for each State and for each class (7 States × 3 Classes), i.e., totally for 21 times. While it was confirmed for 12 out of 21 times, the same was rejected for nine times. Thus this result indicates that the impact of the curricular intervention was positive, and it helped in enhancing the level of Skills of pupils of project schools.

— The pupils of Classes I-III of project schools + CCP developed better Skills pertaining to the subject than the pupils of the Classes I-III of non-project schools. This hypothesis was further tested separately for each State and for each class, i.e., for 21 times. It was established for 17 out of 21 times. While it was confirmed in favour of non-project schools for two times, it was rejected for two times. Thus this result lends support to the assumption that the impact of curricular intervention on project schools + CCP was positive, and it helped in enhancing the level of Skills of pupils.

— The pupils of Classes I to III of project schools + CCP developed better Skills pertaining to the subject than the pupils of Classes I-III of project schools. This hypothesis was further tested for each State and for each class, i.e., totally for 21 times While the hyothesis was supported for nine times, it was rejected for eight times out of 32 times. However, it was confirmed in favour of project schools for four times. Consequently,

this result indicates that the benefit of the community intervention programme accrued to some pupils in project schools + CCP. Thus it partially supports the assumption that the change in perceptions and practices of parents helped in reinforcing the Skills developed by the pupils in schools.

Community Contact Programme

The overall data overwhelmingly indicate that the impact of the Community Contact Programme was extremely positive. The delivery of the 10 UNICEF Messages related to nutrition, health and environmental sanitation to the community members of six States viz., Bihar, Karnataka, Maharashtra, Mizoram, Orissa and Rajasthan helped in changing their perceptions and practices. (Due to certain abberations in the data of U.P., they were not included in the final analysis.)

The message-wise findings are as follows:

As a consequence of the intervention of the Community Contact Programme, a significant number of households:

- continued breast feeding of babies as long as possible and avoided bottle feeding (Message 1);
- added supplementay food while feeding the babies from the age of four months onwards (Message 2);
- immunized their children before the end of the first year (Message 3);
- included in the daily diet of their children, a variety of available foods in adequate amount, distributing them in at least three regular meals (Message 4);
- used safe water for cooking and drinking (Message 5);
- used drainage water for raising food plants and made provision for a soak pit (Message 6);
- provided sanitary facilities in the school and community, and also adopted hygienic practices of urination, defecation and spitting (Message 7);
- kept their school home and village surroundings clean and made provision for compost pit (Message 8);
- did not pollute the sources of water (Message 9), and
- kept their bodies clean and paid special attention to the care of their nails and teeth.

SUMMARY OF RESULTS

Frequencies of results showing support in favour of project schools, non-project schools and project schools + CCP with respect to Classes and dependent variables T, K, U, A & S

Class \ Achievement		Total Score (T)			Knowledge (K)			Understanding (U)			Application (A)			Skills (S)			Sum		
		√	×	0	√	×	0	√	×	o	√	×	0	√	×	0	√	×	0
Project Schools	I	4 (√)	0	3	5 (√)	1 (Mizo)	1	4 (√)	0	3	3 (√)	1 (Mizo)	3	4 (√)	0	3	20	2	13
	II	5 (√)	0	2	3 (√)	0	4	4 (√)	0	3	5 (√)	1 (Maha)	1	5 (√)	0	2	22	1	12
versus	III	4 (√)	0	3	5 (√)	0	2	4 (√)	0	3	4 (√)	1 (Mizo)	2	3 (√)	0	4	20	1	14
	IV	6 (√)	0	1	6 (√)	0	1	5 (√)	0	2	5 (√)	0	2	–	–	–	22	0	6*
Non-Project Schools	V	3 (√)	0	1	3 (√)	0	1	3 (√)	0	1	3 (√)	0	1	–	–	–	12	0	4**
	Sum	**22**	**0**	**10**	**22**	**1**	**9**	**20**	**0**	**12**	**20**	**3**	**9**	**12**	**0**	**9**	**96**	**4**	**49**
Project Schools + CCP	I	5 (√)	1 (Oris)	1	5 (√)	1 (Mizo)	1	6 (√)	1 (Oris)	0	4 (√)	1 (Oris)	2	5 (√)	2 (Oris) (Maha)	0	25	6	4
	II	7 (√)	0	0	5 (√)	0	2	6 (√)	0	1	5 (√)	0	2	7 (√)	0	0	30	0	5
versus	III	6 (√)	1 (Maha)	0	4 (√)	0	3	3 (√)	1 (Maha)	3	4 (√)	2 (Maha) (Mizo)	1	5 (√)	0	2	22	4	9
	IV	5 (√)	0	2	5 (√)	0	2	5 (√)	0	2	5 (√)	0	2	–	–	–	20	0	8
Non-Project Schools	V	3 (√)	0	1	3 (√)	0	1	4 (√)	0	0	3 (√)	0	1	–	–	–	12	0	4
	Sum	**26**	**2**	**4**	**22**	**1**	**9**	**24**	**2**	**6**	**21**	**3**	**8**	**17**	**2**	**2**	**109**	**10**	**30**
Project Schools + CCP	I	1	3	3 (√)	1	4 (√)	2	2	3	2 (√)	3	2	2 (√)	3 (√)	1	3	10	13	12
	II	5	0	2 (√)	1 (√)	1	5	4 (√)	0	3	2	2	3 (√)	4 (√)	2	1	16	5	14
versus	III	1	2	4 (√)	4	2	1 (√)	1	2	4 (√)	2	2	3 (√)	2 (√)	1	4	10	9	16
Project Schools	IV	1	2	4 (√)	1 (√)	2	4	1	2 (√)	4	2	2 (√)	3	–	–	–	5	8	15
	V	2 (√)	0	2	1 (√)	0	3	2 (√)	0	2	1	1	2 (√)	–	–	–	6	1	9
	Sum	**10**	**7**	**15**	**8**	**9**	**15**	**10**	**7**	**15**	**10**	**9**	**13**	**9**	**4**	**8**	**47**	**36**	**66**

(√) The tick-mark in brackets indicates confirmation of the hypothesis in favor of the group for All States.

* Skills were not measured in Classes IV & V Hence the total N is 28 (35-7).

** Three States do not have Class V. Hence the total N is 16 (4 States × 4 components)

CONTENTS

ONE

INTRODUCTION

THE INTERNATIONAL SCENARIO

HEALTH is the most important indicator of the progress achieved by an individual and by the society. The health status of a nation is also a yardstick of its economic development and productive capacity. As early as 1969, when the United Nations Development Decade was conceived, it was realized that to make the decade a success, it was imperative to adopt an international development strategy, which could focus attention on the welfare measures such as raising substantially the facilities for education, health, nutrition, housing and social welfare. This development strategy was emphasized in order to bring about qualitative and structured changes in the society. The development strategy was essentially related to equity and social justice. Hence, as a sequel to the launching of the "International Development Strategy (IDS)" by the United Nations (UN), several Member States adopted a National Development Strategy which focussed on social welfare measures.

NATIONAL EFFORTS

During the Fifth Five Year Plan (1974-78), the Government of India (GOI) launched a National Programme of Minimum Needs (NPMN) which aimed at delivering in a complementary fashion "minimum basic services," particularly to cater to the needs of the deprived sections of the population. Some of the services covered under this programme were elementary education (EE), health, nutrition, facilities for drinking-water, roads and electricity to rural areas, slum improvement, etc. Elementary education was given a prime place in the scheme of educational planning in the country, and UNICEF came in a big way to support the GOI in this significant endeavour.

UNICEF SUPPORT

In order to support the GOI's education programmes, a Master Plan of Operations (MPO) (1974-79) was prepared and agreed upon between UNICEF and the GOI. The MPO supported the following education programmes :

1. Continuation of the Science Education Project (SEP), which was initiated in 1962.
2. Primary Education Curriculum Renewal — A long-term activity of education reform.
3. Developmental Activities in Community Education and Participation (DACEP), which may become catalytic in covering services within the GOI's Integrated Child Development Services (ICDS), a high-priority project for the UNICEF assistance.
4. Initiation of the Children's Media Laboratory (CML) to improve the child's learning and growth processes in non-formal ways. (UNICEF-GOI, 1974, pp. 305, 313, 320-324.)

Under the programme of science education, i e., Project SEP, the specific objectives as stated in the MPO were as under:

> "6.1 To complete the preparation of the Primary School Science Curriculum materials with expansion to include health, environmental sanitation, nutrition and child care as parts of the curriculum;
>
> 6.2 To determine the effectiveness of the Science Education Programme (SEP) so that the teaching of science can be improved. Such an assessment will also provide information for use in future curriculum renewal efforts and contribute to effective education programme." (UNICEF-GOI, 1974, p. 304.)

The specific details of the project on Nutrition, Health Education and Environmental Sanitation (NHEES) were, however, not included in this MPO (1974-79) though the project was initiated in 1975.

As an Addendum to the Master Plan of Operations for a Programme of Services for Children in India — 1978-80, a project on Nutrition, Health Education and Environmental Sanitation (NHEES) was included in Chapter 6 under the Primary Curriculum Development Project as a complementary component (UNICEF-GOI, 1978). The new developments in respect of this project as stated in the Addendum were as follows:

> "31.1 Further investigation of nutrition habits and requirements in widely differing geographic and socio-economic environments,
>
> 31.2 Encouraging the introduction of nutrition/health education and environmental education into all schools in the five states in which the Regional Nutrition Centres are situated,
>
> 31 3 Dissemination of the scheme within the states of the regions served by the individual Regional Centres." (UNICEF-GOI, 1978 p 139)

Based on the above, during 1975-76, a detailed project document was prepared and Project Nutrition, Health Education and Environmental Sanitation (NHEES) was launched in the last quarter of 1975 (NCERT, 1975).

NEED FOR PROJECT NHEES

The compelling reason for undertaking this project had been the dismal picture of the general health and sanitation status in the country. In spite of a large-scale expansion of the medical facility, primarily of the curative type, after Independence, there has been hardly any appreciable change that could bring about a drastic reduction in the Infant Mortality Rate (IMR), one of the crucial indicators of the health status of a country.

One of the ways by which a reasonable change can be brought about in this situation would be to empower the school-going children with the knowledge, habits (practices), skills and attitudes related to this area. It would also be desirable to train them to be the users as well as transmitters of health information. It is being increasingly realized that the school-age children are the largest captive audience for this purpose. The rural school system is perhaps the only social organization which could outreach a large number of underprivileged rural and semi-urban families. Keeping all these factors in view, and with the national scenario as reference, an innovative, experimental project in the area of nutrition, health education and environmental sanitation was thought of The National perspective and the planning, implementation and monitoring of the project have been described in the following chapters.

T W O

SCHOOL-AGE CHILDREN AND HEALTH EDUCATION — A NATIONAL PERSPECTIVE

In the developing world the school-age children are a privileged group compared to several millions of their birth-cohorts who have either not survived to attend the school or have had no access to school education due to abject poverty and non-availability of schooling facilities. Survival seems to be the most difficult hurdle to cross for the young child in the underdeveloped and developing countries. The rampant incidence of fatal and disabling childhood diseases has resulted in widespread child mortality and morbidity in India. Though the childhood diseases are easily preventable if proper knowledge is provided and positive health behaviours are developed, even then the school-going children are exposed to a varied range of killer diseases. Most children succumb to their onslaught, while a few survive.

India occupies the forty-third position in the world in the under-five mortality rate, i.e., U5MR (UNICEF, 1991). The Infant Mortality Rate at present, urban-rural combined, is 96 per thousand live births (1986) whereas the target set by 2000 A.D. is 60, surely still a long way to go. Although there has been a substantial reduction in the death rate-from 27.4 to 21.0 (1985) and a considerable rise in life expectancy at birth from 37.7 (1941-51) to over 54 years (1985) — the impact is not perceptible due mainly to the exponential growth in population of the country over the same period (MOH & FW, 1987).

It is now widely acknowledged that positive influences in the early years, when physical and intellectual development are rapid, can have far-reaching consequences in later adult life. The knowledge gained and the health habits and behaviour imbibed in the early years affect adult life and enable an individual to adopt a healthy life-style in future as well. It is hardly debatable that a healthy citizen is an asset and has a positive effect on the socio-economic development and productivity of a country. The health issues are, therefore, intimately intertwined with those of the socio-economic development of the country.

Special note has been taken of this vital fact and therefore commented upon by the WHO-UNICEF International Consultation on Health for School-age Children as under (WHO-UNICEF, 1986:14):

> "In the context of social justice and as an important means of achieving health for all through primary health care strategy the health learning of the school-age children should be enhanced in every possible way so as to promote the exercise of self-reliance, social responsibility and a better quality of life for today's children and tommarow's adults." (Grover and Chatterjee, 1990.)

The National Health Policy (1983) has also emphasized the importance of school health programme. It has recommended:

> "Organized school health services integrally linked with the general preventive and curative services would require to be established within a time-limited programme.
>
> The recommended effort on various fronts would bear marginal result unless a nation-wide health education programme backed by appropriate communication strategy are launched to provide health information in easily understandable form to motivate the development of attitudes for healthful living. The public health education programmes should be supplemented by a health, nutrition and population education programme in all educational institutions at various levels. Simultaneously, effort would require to be made to promote universal education, especially adult and family education, without which the various efforts to

> organize preventive and promotive health activity, family planning and improved maternal and child health cannot bear fruit". (MOH & FW, GOI, 1983.)

In the field of education also school health education has received priority, particularly in the wake of the declaration of the National Policy on Education-1986 (MHRD, GOI; 1986). Although school health services and health education have been the concern of several committees since 1946, yet they have not received the attention they deserve and demand in the school programmes. The first ever concerted effort on school health education was noted in the Report of the School Health Committee (SHC) which is popularly known as the Renuka Ray Committee (MOH, 1961). The Committee in its report scrutinized school health education and recommended inclusion of the school Health Education Programme. It tried to identify the way in which links could be established between primary health care and educational institutions in order to provide a comprehensive health education programme. The Committee had recommended that the Central Health Education Bureau (CHEB) should strengthen its School Health section so as to provide guidance and develop materials such as textbooks with suitable lessons on health. It was also envisaged in the Report that the CHEB would provide effective training to teachers on how to impart health education. The Committee further recommended that the imparting of health education should be so oriented as to provide practical skills to children. One of the recommendations was to set up a school health service within which health education would form one of the recommended components. A systematic modality for coordination between the education and health sectors was also suggested for implementation, but no further action was taken. It is sad commentry that

> "...in the years following publication of this report, the recommendation of the Committee was accorded a backseat in the face of competing emphasis on demands of curative medical service and supplementary feeding and other services...It was perhaps for the first time in India that a meaningful inclusion of health, nutrition and environmental sanitation in the primary school education was attempted under an innovative Project Nutrition, Health Education and Environmental Sanitation (NIHEES) which was initiated by NCERT with the financial assistance of UNICEF in the last quarter of 1975." (Grover and Chatterjee, 1990.)

THREE

PLANNING AND IMPLEMENTATION OF PROJECT NHEES IN THE STATES/UTS IN INDIA

INTRODUCTION

PROJECT NHEES was designed as a total approach to solve social problems of nutrition, health and environmental sanitation existing in the community by keeping intact the system and yet resorting to massive intervention programmes in the school and the community in selected project areas in the participating States/UTs. The major aim was to achieve the project objectives within the situations prevalent in the rural primary schools and also within the constraints of materials and human resources including teacher competence and other related education parameters. The Project comprised the following facts/factors:

* In India, about 42% of the population die in the age-group 0-14 years.
* Fifty per cent of the total deaths occur in this age-group and, out of this 50%, the mortality rate in the age-group 0-5 years is 40%.
* The major cause of infant mortality and morbidity is the vicious circle of malnutrition, susceptibility to infection, insanitation and repeated infection, resulting in further deterioration in the nutrition and health status.
* Other important factors responsible for the occurrence of malnutrition are lack of knowledge about the nutritional value of foods, coupled with undesirable habits, practices and beliefs related to nutrition, health and environmental sanitation.

INTERVENTION PROGRAMMES

The intervention programmes designed by the planners of the Project were addressed to both primary school children and adults in the community at large. Two types of intervention programmes were envisaged:

> Development of a curricular package and methodology which could help develop proper knowledge, habits, practices, skills and attitudes related to this area of science learning for primary school children;

> Introduction of an intervention programme for the members of the community related to different aspects of nutrition, health and environmental sanitation, i.e., generation of awareness about the appropriate choices, proper methods of preparation and conservation of food available for daily use; development of desirable habits and practices regarding general and personal health and those important to keep the environment clean and healthy; acquaintance of the community with breast-feeding, existing health services ad facilities available such as Primary Health Care Centre (PHC), etc., established by the State and local bodies.

It was expected that the learning acquired and habits developed by the children through formal schools would find a receptive ground at home for further reinforcement, thereby enhancing the life-style of the family and contributing to the improved health status of the village community.

IMPLEMENTATION

The project was launched in the last quarter of the year 1975. The implementation was carried out in two phases: The Pilot Phase and the

Expansion Phase. The duration of the first phase was 1975-80, while that of the second phase was 1981/82-89.

THE PILOT PHASE

During this phase project activities were initiated in five States with the help of the Regional Nutrition Centres (RNCs) which were specifically established at Baroda, Gujarat; Calcutta, West Bengal; Coimbatore, Tamil Nadu; Jabalpur, Madhya Pradesh; and Ludhiana, Punjab.The centres were located in the reputed Home Science Colleges in the States, except in Madhya Pradesh, where the centre was located in the State Institute of Science Education (SISE). In each State the Nutrition Centre identified a rural district/block for the purpose of implementing the Project in about 100 selected primary schools. It needs to be mentioned that the Regional Centre at Calcutta was closed down later. In other words this report relates only to the other four Regional Nutrition Centres.

A number of national and international agencies were involved in planning, implementing and monitoring the Project, namely, MOE, GOI; UNICEF; and the National Council of Education Research and Training (NCERT). While the first two agencies played a supervisory and monitoring role, the third, in addition, acted as a technical agency which performed the role of providing guidance for planning and implementation to the concerned State agencies, including the RNCs. The Directors of the RNCs were made responsible for project planning and implementation in their respective States. These agencies collectively undertook the task of preparing the region-specific annual Plan of Operations (POAs) and other activities spelled out in the revised MPO.

Strategies

To initiate the planned project activities the Department of Education in Science and Mathematics (DESM)—The erstwhile Department of Science Education (DSE)—where the project was located in the NCERT, organized a National Conference in August 1975. The deliberations, specially the outcomes of the Conference, were then circulated to the RNCs. Subsequently, a document entitled "*Curriculum Guide on Nutrition, Health Education and Environmental Sanitation for Primary Schools*" was developed. It contained the detailed guidelines for conducting a baseline survey and for the development of a curriculum and teaching-learning materials (NCERT, 1976).

On the basis of the guidelines provided, each RNC conducted a detailed survey of the local conditions and the nutritional, health and environmental sanitation practices and habits prevalent in the selected project area. The findings so obtained became the basis for the preparation of a complete package of curriculum and instructional materials by each RNC. The package comprised syllabi, reading materials for pupils of Classes III. IV and V, teacher's guides, reading and reference materials in the form of manuals for teachers and teacher educators as well as the syllabi for Primary Teacher Training Institutes (TTIs; *see* Appendix A).

These packages were tried out in the selected project schools. The scheme for implementation consisted of the following steps:

— Orientation of teacher educators;

— Training of teachers;

— Introduction and try-out of the instructional materials in the schools;

— Supervision of the transaction and evaluation of the instructional materials;

— Revision of the curricular package.

In each of the RNCs, the teachers of the respective project schools were trained. However, in the Coimbatore RNC, ten additional blocks of the district involving 660 schools, were also taken up. Besides, the scheme was extended to three more ecologically differing areas of Tamil Nadu. These were: the coastal area of Kanyakumari district; the tribal area of Nilgiri district; and one more underprivileged area of Coimbatore district.

A comparative statement of the number of schools, teachers and teacher-educators trained by each of the RNCs is presented in Table 3.1.

The pilot phase of the project was evaluated internally by each RNC with reference to the following aspects:

TABLE 3.1
Number of try-out schools, teachers and supervisors/ teacher educators trained during 1975-80

Centre	Number of Educators/ Supervisors Trained	Number of Teachers	Number of Try-out Schools
Coimbatore	35	5729	946
Jabalpur	40	485	485
Baroda	14	471	471
Calcutta	14	260	260
Ludhiana	15	146	146
Total	118	7091	2308

— Appropriateness and effectiveness of the materials in delivering the messages;

— The impact of the materials and methods on pupils, teachers and teacher educators.

Some highlights of findings of this evaluation reported by the RNCs are given below:

* Teachers showed keen interest in the project.
* Marked improvement was observed in the school lunch programme, wherever it was conducted.
* The health, nutritional and environmental practices of the children showed marked improvement.
* The health status of the children improved. In the Coimbatore study, children from 200 project schools showed significant improvement in some of the deficiency symptoms.
* Some of the messages related to nutrition, health and environmental sanitation had a carry-home effect.

In 1981, when it was decided to extend the project to some more States which were willing to take up the project, the GOI, UNICEF and the NCERT decided to get an objective evaluation of the Project done by an independent, reputed agency in India. After a great deal of deliberation, it was decided to invite the Nutrition Foundation of India (NFI) to conduct an in-depth evaluation of the the total project intervention, i.e., both in the school and the community. The study was carried out during the years 1981-83. Some of the major recommendations made by the NFI were as follows:

* Project NHEES is a well-conceived national programme of practical importance and relevance to the country in the present stage of development.
* The content and strategies adopted for the community contact programme both need modification.
* The departments of food and nutrition of the home science colleges and the departments of preventive and social medicine in selected medical colleges may be commissioned to write a series of lessons on nutrition, health education and environmental sanitation based on the syllabus for incorporation in the textbooks of the different regions.
* The Central Health Education Bureau and the State Health Education Bureaux (SHEB) should cooperate with the NCERT in preparing teaching aids appropriate for and relevant to the rural situation.
* The community contact programme represents a truly unique and imaginative initiative. Every attempt should be made to develop this part of the project, not as the isolated activity of the Department of Education but as the common concern and responsibility of all departments engaged in rural development in the village with the rural school system acting as a focal point and playing a coordinating role.

THE EXPANSION PHASE (1981-89)

Coverage

Project NHEES was extended to 10 more States and Union Territories (UTs), namely, Andhra Pradesh (A.P.), Assam, Bihar, Haryana, Karnataka, Maharashtra, Mizoram, Rajasthan, Orissa and Uttar Pradesh (U.P.) during the period of the Master Plan of Operations (1981-84). Simultaneous to the extention of the Project in these States, an extensive evaluation of the implementation of the Project in the Pilot Phase was also undertaken as mentioned earlier. Based on the recommendations of the evalu-

ation report of the NFI (1983), certain modifications in implementation strategies were made, keeping the overall general scheme of intervention intact. In all States which implemented the Project during the Expansion Phase, the Nutrition Centres were located in SIEs/SISEs except in the case of A.P. where the centre was located in the Department of Home Science, Venkateshwara University, Tirupati (*see* Appendix B).

Strategy

A project document giving details of the rationale, objectives, operational strategies, tasks, nature of the scheme, financial support and implementation machinery was developed for the guidance of and reference by the participating States/UTs. An agreement between the GOI and the respective State government was signed in 1981-82 (1981; Source: Official Files). The operational goals and implementation strategies envisaged in the document were as follows:

* Establishing Nutrition Centres in home science colleges or in related institutions which have the know-how to utilize the guidance of nutritionists and other experts in health and environmental sanitation who are expected to work in close collaboration with SCERTs/SISEs/SIEs;
* Selecting a block in each of the States/UTs, which is either a tribal area or is predominantly inhabitated by the Scheduled Caste (SC)/Schedule Tribes (ST) and backward communities, for implementation of the project;
* Selecting about 100 primary schools in each block;
* Reviewing the work already done in the regional centres under the project, and analysing the existing situation of nutrition/health education and the environmental sanitation components in the State/UT-level curricula;
* Conducting a survey of the project area in order to find out the nutrition, health and sanitation habits, needs and problems of the community.
* Developing a package of instructional materials for pupils and teachers on the basis of the survey data, involving teachers, teacher educators and other experts in the process;
* Testing and trying out these packages in the schools;
* Introducing important messages on nutrition, health and environmental sanitation to the community with the help of teachers and pupils in selected villages.

All the States followed/adopted the above strategies in implementing the project.

In each State a block predominantly inhabitated by the SC/ST or a backward community was selected for implementation. Within the block, 100 primary schools were selected for the try-out of curricular materials. The rhythm of implementation of the project varied from State to State. In each State the project team developed instructional materials on nutrition, health education and environmental sanitation for Classes I to IV/V, including charts, teacher's manuals, etc. The list of the materials developed under the expansion phase by the participating States is appended for reference (*see* Appendix C).

During September 1984, the progress of different Unicef-assisted projects was assessed in the regional meetings of the Education Secretaries of States/UTs, which were attended by officers from the Unicef, the erstwhile MOE and the NCERT. The findings and recommendations of the internal evaluation done by the combined team of the Unicef and the NCERT staff were presented and discussed in the meeting. Important decisions regarding continuation/discontinuation of each of the projects being implemented during the MPO (1980/81-84) were taken. As a consequence, Project NHEES was discontinued in Assam, Haryana, Gujarat and Punjab. During the period of the MPO (1985-89), only eight States participated in the project activities. These were A.P., Bihar, Maharashtra, Karnataka, Mizoram, Orissa and U.P. The data given in Table 3.2 shows the progress in implementation of Project NHEES in each of these eight States during 1981-1984 and Table 3.3 presents the progress attained during the MPO (1985-89). As per the information found in the relevant file, during 1981-84, in all, about 816 primary schools, 1740 teachers and 25 teacher educators were actively involved in conducting the Project activities.

TABLE 3.2

Position of activities under Project NHEES in each State/UT during 1981-84

S No.	State/UT	Month and year of signing of agreement	Month and year of commencement of activities	Names of blocks selected	Total no. of schools	Baseline Survey data of completion of survey	Development of curriculum for classes I-V	Orientation of teacher-educators and supervisors	No. of persons trained	Training courses for the teachers of Project		
										No. of teachers trained	No of courses	Duration of each course
1.	Andhra-Pradesh	March '82	Sept. '82	Chandragiri Ganga Dhara-Nellore	109 1	Oct. '82	Completed	Done	2 Super-visors	240	7	4 Days
2	Bihar	March '82	July '82	Fatwa Mushahri	108 10	Oct. '82	Completed	Not Done	—	109	2	4 Days
3.	Karnataka	July '83	Nov '83	Chitra Durga Hiryur	50 50	Dec '83	Completed	Not Done	—	—	—	—
4.	Maharashtra	May '81	April '82 (SISE, Nagpur) July '82 (Bombay)	Ramtek Tribal Block Greater Bombay	63 67	Feb. '83	Completed	Done	4 ADI's	117	4	4 Days
5.	Mizoram	Sept. '81	July '82	Lunglei	57	—		Done	4 Circle Education Inspecters	161	3	4 Days
6.	Orissa	July '81	July '82	G. Udayagiri Tikabali	22 79	—	Completed (III-V only)	Done	2 Education Officers 3 subject Inspectors	214	2	5 Days
7.	Rajasthan	May '81	July '82	Girwa Salumber	50 50	Dec. '82	Completed	Done	6 Education Extension Officers	146	5	—
8.	Uttar-Pradesh	Jan. '81	June '82	Kaunhar Chail	54 46	Feb. '83	Completed	Done	4 Subject Inspectors of schools	753	10	4 Days
				Total	816				25	1740	33	

TABLE 3.3

Progress report for UNICEF assisted project-NHEES for the years 1985-89

S. No.	State/UT	1985				1986				1987				1988				1989			
		Prog.	Part.	Pub.	PUR	Prog.	Part.	Pub.	PUR	Prog.	Part.	Pub.	PUR	Prog	Part	Pub.	PUR	Prog.	Part.	Pub	PUR
1.	Andhra-Pradesh	2	60	NIL	79.47	2	4		72 5												
2.	Assam					2	351	9	4.0	6	224	8	—	NA	NA	3	67 53				
3	Bihar	2	154	NIL	22 90	5	277	8	57 7	8	191	11	55 60	2	NA	4	22 02	1	11	NIL	31.42
4	Karnataka	6	279	NIL	25 66	1	126	6	34 1	6	206	6	54 37	3	87	NIL	76.72	2	26	NIL	8 32
5.	Madhya Pradesh				—	NIL	NIL	NIL	—	3	119	6	—	2	35	NIL		NA	NA	NA	40.70
6.	Maharashtra	5	183	3	22.13	3	90	6	35.8	6	20	6	67.84	NA	NA	NA		NIL	NIL	NIL	77 82
7.	Mizoram	3	116	2	62 50	6	153	2	72.9	1	40	7	48.85	4	283	2	99.30	2	24	NIL	37.61
8.	Orissa	6	87	NIL	43.10	4	30	1	20.5	5	124	6	16.11	4	126	3	99 60	NIL	NA	NIL	—
9	Rajasthan	2	35	7	11.74	5	384	5	89 9	7	315	6	42 08	4	124	NA	54.21	2	22	NIL	47.06
10.	Uttar Pradesh	6	219	3	47.26	4	211	3	43 5	10	415	6	81 69	5	240	2	75.36	4	130	2	32 30
11.	Head-Quarters	2	42	NIL	48.88	5	50	NIL	30.5	2	25	5	19.80	2	10	NIL	20.10	2	16	2	5.21
	Total	34	1175	15	34.04	37	1676	40	38.49	54	1779	67	35.99	26	905	14	48.64	13	2294	26 64	

THE COMMUNITY CONTACT PROGRAMME — A NEW DIMENSION

As was mentioned earlier, two types of intervention programmes were conceived under the Project; one in the formal primary school and the other in the community. The former was characterized by suitable modifications in the existing curriculum for changing pupil behaviour and the latter was addressed to adults in the community for changing their behaviours and also reinforcing those of the children, the development of which was specifically aimed at during the transaction of the special curriculum in the project schools. It may be recalled that the evaluation of the Pilot Phase suggested that "...the community programme represents a truely unique and imaginative initiative. Every attempt must be made to develop this part of the project, not as an isolated activity of the Department of Education but as the common concern and responsibility of all departments engaged in rural development in village, the rural school system acting as a focal point and playing a coordinating role." (NFI-UNICEF, 1983, p.39.)

Serious attempts were, therefore, made to implement the above recommendation. As a result, in 1985 a common strategy was adopted for executing the community contact programme (CCP) in the 25% of the selected villages under the Project in each State. The following messages relevant to the adult audience, specially to young mothers and women, were identified for intensive delivery with the help of the teachers who were also involved in the transaction of the curriculum to their (the community's) children:

* Breast-feed your child as long as possible.
* Start supplementary food when your child is four to six months old
* Get your child immunized before the first year.
* Give your child a variety of foods in sufficient amounts.
* Feed your young child at least five or six times a day.
* Use safe water for drinking and cooking.
* Use drainage water for raising food plants.
* Make soak-pit to dispose of waste-water.
* Do not urinate, defecate and spit anywhere and everywhere, but only in the places provided for the purpose.
* Do not throw garbage anywhere and everywhere.
* Make compost-pit for disposal of garbage.
* Avoid polluting the sources of water.
* Keep your body clean.

A variety of materials such as charts, posters and pamphlets relevant to the adult's needs and useful for visual communication were developed in the regional language, keeping these messages in focus. They were distributed to 25% of the selected schools which in turn distributed them to households in the villages. The strategies adopted for the delivery of the community contact package were as follows:

— Door-to-door contact by the primary school teachers;

— Monthly meeting with the members of the community;

— Organization of exhibitions, *Melas* (fairs), etc.

FOUR

MONITORING AND EVALUATION OF PROJECT NHEES

THE UNICEF assisted education projects, which have been implemented for the last two to three decades in India, have had the monitoring and evaluation part built in the project design itself. In other words, monitoring and evaluation formed part and parcel of the project from the initial stage, remained concurrent with the implementation process and lasted until evaluation was carried out by a reputed external agency and/or done intensively in the NCERT. Such a built-in mechanism of monitoring and evaluation has been considered essential for obtaining periodic feedbacks that could help in making mid-term corrections, if any, as also in identifying problems/impediments faced during the execution of the project. Another purpose of the built-in mechanism is to help articulate and recommend future directions for the formulation and implementation of new projects.

The monitoring and evaluation components were built in the design of Project NHEES from the initial stage itself. Therefore, a critical review of the Pilot Phase of the Project was carried out, the findings and recommendations of which have already been reported in Chapter 3. One of the findings clearly indicated lack of systematic feedback from the grassroots level as a weakness of the project implementation. Therefore, while planning the Expansion Phase, extra care was taken to establish an adequate mechanism and a process of obtaining quantitative and qualitative reports on the progress of the project from the participating States. Before further discussion on this aspect is undertaken, it is necessary to describe the process of planning adopted for implementation of the UNICEF-assisted projects in India.

PLANNING OF THE PROJECT

Usually, the exercise of planning and implementing a project extend to a period of five years which is called the period of the Master Plan of Operations (MPO). This often coincides with the preparation of the country's Five Year Plan. This planning process comprises the following steps:

* The recommendations of the policy on the subject, e.g., health, education, social welfare, etc., are thoroughly examined by the concerned Ministry and UNICEF. The areas of importance and gaps in resources for meeting the stated objectives are identified. These being mutual concerns of the two agencies, it is agreed upon to include the broad objectives, strategies and availability of funds along with general guidelines in the preparation of the project design for a specific field.
* A national institution of repute is identified and assigned the task of preparing the project in detail.
* The draft project document is circulated to selected States and experts and discussed in a meeting. After incorporating the comments/observations/suggestions, the document is finalized and printed for wider circulation.
* Along with the document, selected institutions or State agencies, which recognize the need for such project intervention, are requested to study the document and sign the agreement through the concerned Ministry for the implementation of the project in their respective States.
* Having signed the agreement, the nodal agency in the State starts the exercise of planning the project for the entire period of the MPO and also a mini annual plan for

implementation during that particular year. This is done with the help of the national agency/institute which acts as a technical agency, looking after planning, implementation, monitoring and evaluation of the project throughout the period of the MPO. Every year a fresh plan of action (POA) is drawn up on the basis of the review of the performance during the previous year.

* The quantitative (mostly in terms of expenditure incurred, i.e. Percentage Utilization Rate (PUR) and qualitative (completion of planned activities and participation) progress of implementation of the project is reviewed every quarter. The technical agency collects the information from the State agency and consolidates it at the headquarters.
* This is further reviewed in the tripartite meeting between the concerned Ministry, the UNICEF and the technical agency.
* Finally, an annual review of all UNICEF-assisted projects in all sectors in the country is done under the chairmanship of the Secretary of the nodal Ministry.

In the context of Project NHEES, a similar planning process was adopted. However, there existed a gap between the "intentions" of the kind stated above and their operational/executional part, both at the national and State levels. However, during the Expansion Phase, continuous and systematic efforts were made to reduce this gap.

IMPLEMENTATION DURING THE MPO (1980-84)

At the end of the MPO (1980-84), the GOI, the UNICEF and the NCERT (the technical agency for the implementation of education projects), decided to review implementation of all UNICEF-assisted projects in the education sector in order to draw the balance sheet of financial inputs and results in terms of benefits accrued to the users. It was essentially undertaken to take stock of the situation before the exercise of planning for the next MPO (1985-89) was undertaken. For the first time it was planned to organize a high-level meeting of Education Secretaries, Directors of Education/ Public Instruction, Directors of SCERTs/SIEs/ SISEs, officers from the erstwhile Ministry of Education (MOE), the NCERT, the UNICEF, the Planning Commission and the National Institute of Educational Planning and Administration (NIEPA) in the four regions, i.e., eastern, western, northern and southern. The meetings were convened in the month of September—on 13 and 14 September in Calcutta, 18 and 19 September in Bhopal, 25 and 26 September in Bangalore and 28 and 29 September in Shimla. Before the meeting, the NCERT and the UNICEF undertook intensive reviews of the projects at headquarters and prepared detailed State-wise progress reports of all the projects that were implemented during the MPO (1980-84). The major items of the agenda for the meetings were as follows:

— Issues and problems related to implementation of UNICEF assisted projects in the education sector;
— Review of the progress of and future action in respect of implementation of the various project;
— General conditions to be fulfilled for implementation of the UNICEF-assisted projects in the education sector.

In these review meeting, progress achieved by the RNCs and the State Nutrition Centres during the period was critically reviewed. One of the criteria used for categorizing the achievement of the State was the PUR or the quantum of funds utilized against the funds allocated for a particular year. Table 4.1 provides information regarding the expenditure incurred by each State in terms of PUR during the years 1980 1981, 1982, 1983 and 1984.

After having deliberated upon the major issues and problems in the four regional meetings, significant academic and administrative decisions were taken; the most far-reaching one was regarding the continuance or discontinuance of the project in the State. The main conditions stipulated for continuation of the Project were as under:

* Wider adoption of the concept evolved and techniques developed for integration of the curriculum and instructional materials prepared under Project NHEES into the existing system of primary education;

TABLE 4.1

Percentage Utilization Rates (PURs) of funds allocated during the period 1980-84 for programmes at the State/Union Territory and Headquarters level for Project NHEES

S No	State/UT	PUR 1980	PUR 1981	PUR 1982	PUR 1983	PUR 1984	Average PUR 1980 - 1984	Category
1	Andhra Pradesh	—	*	25 8	57.5	101.8	61.7	A
2	Assam	—	—	0 0	0.0	10.6	3.5	C
3.	Bihar	—	—	9 7	46 0	40.2	31.9	B
4.	Gujarat	34.3	49.5	21.3	58 4	—	40.8	B+
5.	Haryana	—	—	0.0	2.0	8 5	3 5	C
6.	Karnataka	—	—	0 0	0 0	84.3	28.1	C
7.	Madhya Pradesh	46.0	40 5**	22 2	54 5	—	40 8	B +
8.	Maharashtra	—	—	35.6	28.7	14 8	26.3	C
9.	Mizoram	—	—	77.5	98.8	96 5	90 9	A
10.	Orissa	—	—	4 0	13.6	130.8++	49 4	B
11.	Punjab	42 1	26.2**	21.1	—	—	22 3	C +
12.	Rajasthan	—	—	0.0	86 1	47.0	44.3	B
13.	Tamil Nadu	37.3	26.0**	26.1	12.9	262.2++	52.4	B
14.	Uttar Pradesh	—	—	7.7	12.9	80.7	33.7	B
15.	Kerala	—	—	—	—	—	—	E
16	West Bengal	31.9	—	—	—	—	31.9	B dropped w.e.f. 1981
17.	H.Q	—	—	—	21 5	—	—	
	Grand Total	38.3	28.4	22.7	27.6	122.9	47 9	B

N.B. The percentages have been calculated on the basis of total figures without rounding them off into lakhs.

Reference average PUR : Category A - 60% to 100%, Category B - 30% to 59% and Category C - 0% to 29%.

* The project did not get initiated.

** Regional centres working since 1976

\+ PUR average calculated upto 1983

++ These are inflated because of adjustment of the unplanned expenditure of the previous year against the planned expenditure.

Source- Comprehensive Note on Implementation of UNICEF-assisted Project-1985, (Memeographed), DPSEE, NCERT.

* During the next MPO, Project NHEES might be linked to Project PECR and curricular materials produced under the project NHEES should be integrated with those of PECR;
* Modification of the curriculum of the Elementary Teacher Training Institutes to include activities related to the concepts evolved and techniques developed under Project NHEES;
* Provision of budget for training existing teachers of the in-service courses in components of the new syllabus, both at the school and teacher-training institute levels.

Table 4.2 presents a summary of the major points that emerged as imperatives for continuance of the Project. It may be noted that the Project was discontinued in all RNCs at Baroda, Jabalpur and Ludhiana. During the meeting a number of administrative decisions were also taken for future action. They were as follows:

* Creation of a budget head for each project for meeting the reimbursable expenditure representing the total requirement for (i) organization of meetings, courses, workshops and seminars, (ii) development of and production/printing of training and instructional/learning materials, and (iii) procurement of supply items such as equipment, work materials, reference books, etc., as authorized by the UNICEF and the NCERT for purchase, the cost of which would be reimbursed by the UNICEF via the NCERT on receipt of consolidated reimbursement claims;[1]
* Provision in the State/UT government budget for an adequate fund for meeting non-reimbursible expenditure on items such as (i) TA and DA of project staff at SCERT/SISE/SIE, TTIs, project schools and supervisory personnel, (ii) cost of transportation of imported items such as equipment, printing paper, cover paper, etc., from the port to the consignees/storage points, (iii) cost of transportation of locally procured items from the suppliers to the consignees in the State, such as SCERTs/SISEs/SIEs, TTIs, schools learning centres, community centres, etc.;
* Provision of adequate number of full-time academic staff for the project and appointment of a full-time coordinator to coordinate activities under the different projects. (In addition to the Directors/Principals of SCERTs/SISEs/SIEs who act as the Honorary Directors of the projects and the overall coordinators of UNICEF-assisted projects, the optimum staff and minimum staff recommended for Project NHEES on a full-time basis were two and one respectively);
* Avoiding transfer of project staff at SCERT/SISE/SIE, TTIs and schools, who are trained under different projects;
* Provision of adequate supporting staff/clerical assistance for scrutiny, finalization and submission of the statements of expenditure incurred on activities under different projects;
* Provision of adequate stores facilities for storing printing paper and cover paper supplied under the projects;
* Accelerating printing of training materials/instructional materials/learning materials developed under each project;
* Systematic review and monitoring of activities under each project.

IMPLEMENTATION DURING THE MPO (1985-89)

As a sequel to the meeting of the functionaries working at all levels, follow-up actions were initiated by the respective States regarding compliance with the decisions taken in the meeting. In order to further streamline the monitoring machinery in the States, a well-designed proforma was circulated for obtaining quarterly and annual qualitative reports as the feedback data. These periodical reports also served the purpose of reviewing and monitoring the progress of the States.

The information obtained through the quarterly progress reports consisted of the following items: Title of the Programme, Dates and venue of the programme, Number of participants

[1]Prior to this decision, i.e. reimbursement by UNICEF zone offices, the States were advanced the rolling funds for conducting project activities. Creation of the budget head in the state affected the pace of implementation, although it was intended to be otherwise

TABLE 4.2

Major points that emerged from the discussion and recommendations made in respect of continuation/discontinuation of implementation of the Project "Nutrition, Health Education and Environmental Sanitation (NHEES)"

S.No.	State/ Union Territory	Past performance in terms of attainment of targets envisaged in the plan of Action	Action taken for wider diffusion/integration of the curriculum/syllabus and instructional materials developed under the project into the existing primary school curriculum of the State	Strength of the project team	Position regarding creation of budget head	Recommendation regarding continuation/discontinuation of the project
1	2	3	4	5	6	7
1.	Andhra Pradesh	Satisfactory	Project started in 1982 Action for integration with state curricula to be initiated	Adequate	Not yet created, Action is being initiated	To be continued
2.	Assam	Not Satisfactory	No action initiated	Adequate	Not yet created	To be discontinued
3.	Bihar	Satisfactory	No action initiated Project started in 1982	Adequate	Not yet created but action initiated	To be continued
4.	Haryana	Not Satisfactory	No action initiated	Adequate	Not yet created	To be discontinued
5.	Gujarat	Satisfactory	No action initiated	Adequate	No action taken	To be discontinued. The project was started in 1975-77, and no action has been taken so far for integration/diffusion of the curriculum/syllabus and instructional materials into state system
6.	Karnataka	Satisfactory	Project started in 1982 Action far integration/ diffusion of syllabus/ Texual materials will be initiated soon	Adequate	Not yet created. Action initiated	To be continued
7.	Madhya Pradesh	Satisfactory	Action is being initiated	Adequate	Not yet created	To be continued subject to the fulfillment of the following conditions: *(i) Integration of syllabus/textual material, developed under the project into system of primary education, **(ii)Modification of the curriculum of the Elementary Teacher Training Institute

Contd

Table 4.2 (contd.)

1	2	3	4	5	6	7
8.	Maharashtra	Satisfactory	Project started in 1982. Action for integration/diffusion will be initiated soon	Adequate	Not yet created. Action being initiated	To be continued subject to conditions as indicated at* in 7.
9.	Mizoram	Satisfactory	Action has been initiated	Adequate	Not yet created. Action has been initiated	To be continued.
10.	Orissa	Satisfactory	-do-	-do-	-do-	-do-
11	Punjab	Satisfactory	No action has been taken so far	Adequate	Not yet created	To be discontinued. Project started in 1976 but no action taken for integration
12.	Tamil Nadu	Satisfactory	Action is being initiated	Adequate	Not yet created	To be continued subject to fulfillment of conditions as indicated in * and * * in 7.
13.	Rajasthan	Satisfactory	Project started in 1982. Action for integration/diffusion will be initiated soon	Adequate	Not yet created. Action is being initiated	To be continued subject to conditions as indicated at * in 7.
14.	Uttar Pradesh	Satisfactory	Project started in 1982. Action for integration/ diffusion will be initiated soon	Adequate	Not yet created. Action is being initiated	To be continued

expected and those attended, Number of publications planned and those printed, and remarks. The remarks column was used to indicate the reasons for not being able to conduct the planned activity(ies) and the major constraints/problems faced. These quarterly reports were received at the Headquarters, where they were consolidated and analysed to prepare a country-wide profile of the progress of implementation of the Project. In the same way, quarterly quantitative reports of the utilization of allocated funds for organizing various planned activities were also prepared at the Headquarters on the basis of the expenditure statements submitted by the States to the UNICEF zone offices, a copy of which was endorsed to the NCERT. On the basis of these expenditure statements, i.e., quantitative reports, the Percentage Utilization Rate for each State, including the Headquarters, was calcualted. The States were then categorized as A, B or C on the basis of the PURs, indicating thereby their pace of and capacity for implementation of planned project activities. The qualitative reports were also circulated along with the quantitative reports. This was done with a view to making mid-course corrections and removing of the bottlenecks coming in the way of smooth implementation of the Project in the States. A detailed letter offering advice/suggestions for taking necessary action accompanied these reports. More often than not, replies in the form of explanations, clarifications, rejoinders, lacunae faced, etc., were received, and the pace of implementation was accelerated through attempts at removing the bottlenecks. It is conceded that the success of such follow-up action was limited—in fact, extremely limited. The consolidated reports were also reviewed at the levels of the NCERT, the UNICEF and the MHRD in order that action may be taken at the highest level.

A summary statement of the yearly budget allocations and the expenditure incurred in organizing project activities during the years 1985, 1986, 1987, 1988 and 1989 is presented in Table 4.3. As can be seen from Table 4.3, the combined (total) PURs for programmes and printing increased steadily between 1985-88 which were the crucial years of implementation, for 1989 was a spill over year. In 1985, when the system of reimbursement of financial claims for activities conducted was introduced against the previously followed system of advancing a rolling fund to the State, the pace of implementation was not commensurate with that envisaged in the yearly Plan of Action.

Introduction of the mechanism of reimbursement of the funds first spent by the State from its own allotted funds under the State budget, instead of advancing of the same by the UNICEF, was done with the intention of making the States feel that the UNICEF/NCERT projects were in fact part of their own primary education programmes and, consequently, they were responsible for the success or failure of the implementation of these projects. However, the change in the financial procedure did not yield the desired results. The main hurdles were severe resource constraints and bureaucratic red tape in creating the budget-head of accounts for innovative projects in the State sector. The problem was further confounded as the financial year followed by the GOI and that by the UNICEF differed, i.e., April-March and January-December, respectively. The planning activity for the year had to be initiated sometime in November which fell in the middle of the Indian financial year. It took about two to three months to process and approve the plans for the new year and intimate the approval to the States, i.e. November-January. When the State was ready to embark upon the new POA, the State financial year came to a close. Almost invariably, the activities planned for the first quarter got delayed due to non-availability of funds from the State budget, which was available only in the middle of the second quarter. Thus there was a loss of time and momentum in implementing the UNICEF-assisted projects in the country.

The data presented in Table 4.3 indicates that the highest and lowest total PURs were 48.64 in 1988 and 33.79 in 1989, respectively. The average PUR for the entire period of the MPO (1985-89) was 37.63. It is interesting to refer back to the data in Table 4.1 which reveals that the average PUR for the MPO (1980-84) was 47.9 when the Project was implemented in the 16 States. Thus the PURs over a decade of implementation strongly indicate that India was not able to adequately utilize the funds that were provided to her by the UNICEF. Put differently, the participating

TABLE 4.3

Budget allocation and expenditure incurred on Project activities by the States/Union Territories during the years 1985-1989

S No	Year	Budget Allocation (in lakhs)			Expenditure Incurred (in lakhs)			Percentage Utilization Rates (PUR)		
		Programme	Printing	Total	Programme	Printing	Total	Programme	Printing	Total
1.	1985	12,44,023	5,41,630	17,85,653	4,64,041	1,43,752	6,07,833	37 30	26 54	34 04
2	1986	14,92,654	5,83,500	20,76,154	6,50,770	1,48,443	7,99,213	43 60	25 44	38 49
3.	1987	15,98,327	3,74,286	19,72,613	6,20,450	89,471	7,09,921	40.07	23.90	35.99
4	1988	7,62,713	1,33,840	8,96,553	4,23,047	13,058	4,36,105	56.02	9 75	48 64
5.	1989	—	—	5,29,470*	—	—	1,78,919*	—	—	33.79
6	Total			72,60,443			27,31,991			37 63

*Break-up of programme and printing not done

Source. File of Progress Reports, 1985-89, DPSEE, NCERT.

States were unable to absorb the funds liberally available to them.

The PURs pertaining to the component of printing clearly indicate that the States faced hurdles in getting the instructional and training materials printed in time. They seemed to have faced obstacles in organizing programmes too, though less than those faced in getting the materials printed. The general inference is inescapable that the administrative and management impediments persisted even after the recommendations made in the high-level review meeting of the State and Central level functionaries in 1984 were accepted and agreed upon between the State Secretaries and the UNICEF.

One gathers an impression from the overall data presented in Table 4.1 and 4.3 that the PURs served as a good indicator for assessing and monitoring the progress achieved by the participating States. This data also strongly indicates that administrative and management problems overwhelmed the academically sound programmes, thereby ultimately deciding the success or failure of the innovative intervention.

FIVE

DESIGN OF THE STUDY

THE Project scheme so far discussed clearly indicates that the major purpose of the massive intervention programme was to primarily develop the human resources at the grass roots level. Therefore, the basic design of the Project was quite different from that of other innovative projects supported by the UNICEF in the education sector. The content and messages of the NHEES concepts are so important and vital for survival and also so integrated that they are applicable not only to children but to adults also.

Being a developmental project, its scope and design were very wide, and the time taken for its implementation was quite long. These factors in some way affected the process of monitoring and evaluation of the Project although adequate provision for it was made in the design right from its inception. Available information indicates that this component of the Project design had remained rather weak throughout the period of implementation both at the Headquarters and at the State/UT level.

It is of paramount importance that a project of this dimension should have been subjected to rigorous monitoring and evaluation from the initial stage. It was indeed necessary to conduct a continuous evaluation in order that objective evidence of balance sheet of success and failure, benefits accrued to and risks involved for the target groups and pros and cons of both expansion of the project and integration of the results into the regular system of primary education and other community programmes involving the adult population may be available to the policy makers. This was particularly needed, since, more often than not, the curriculum reform projects, which have been undertaken in this country as pilot studies on a pioneer basis in a selected area or conducted on a small scale, remain as crucible experiments. Unfortunately, the experience gained through such innovative projects does not find its way into the larger system of education of the State/UT. On the contrary, questions of the efficacy of the project(s) are raised and concrete evidence in support of the underlying assumptions of the project demanded before any steps are taken for further infusion of project ideas.

The basic assumption in initiating the Project was that desirable knowledge, understandings, habits, practices and attitudes with regard to nutrition, health and environmental sanitation could be developed and nurtured in primary school children with the help of a need-based curriculum and with support/reinforcement by the parents at home. Therefore, considerable efforts were made during the implementation to develop the curriculum package relevant to the needs of the children and the community, the training materials for teachers for transaction of the special curriculum, and the special curriculum and communication materials for the community members under the community contact programme.

A need was, thus, felt to ascertain the impact of the total intervention programme on the children and on the members of the community who were exposed to the special package of materials and messages. Consequently, a comprehensive investigatory study under the title "Study of Pupil Achievement" was planned in 1985 and carried out during 1987.

THE STUDY

The salient features of the evaluative study are described below:

Objectives

* To determine the magnitude and extent to which the desirable Knowledge, Understandings, Application, Skills, Habits (Practices) and Attitudes towards nutrition, health and environmental sanitation were developed in the pupils who were exposed

to the special curricular package *vis-a-vis* those pupils who were not,

* To determine the effect of messages on nutrition, health and environmental sanitation that were delivered to the community members, as also their reinforcing effect on pupil achievement,

* To determine the effect of certain factors such as Sex, Attendance, Parental income, Advantage and disadvantaged status, Father's occupation and education and Mother's education and occupation on pupil achievement.

Coverage

The study was carried out in the following States: Bihar, Karnataka, Maharashtra, M.P., Mizoram, Orissa, Rajasthan and U.P. As mentioned earlier, 100 schools in each block were selected for implementing the Project. A random selection of 30 schools was made from among these 100 project schools. Mention needs to be made that 50% of these schools, i.e. 15, were those schools where the community contact programme was conducted, whereas the remaining 50% (15) project schools did not participate in it. In the States/UTs where the total number of project schools were less than 30, all schools were included in the study Since it was extremely important to demonstrate the effectiveness of the intervention as exclusively as possible, a random sample of 10 non-project schools (as the control group) was also made from among those located in the proximity of the project schools. Thus there were three groups, i.e. pupils in project schools (Experimental Group I), pupils in non-project schools (Control Group) and pupils in project schools where the community contact programme was also conducted (Experimental Group II).

Collection of Data

A variety of tests and tools for collecting information and measuring pupil achievement were prepared with the help of project teams and other experts from the participating States.

The details regarding the tests/tools/schedules are presented in Table 5.1

TABLE 5.1
Types of data and their source

Types of Data	Test/Tools Used	Source
Attainment of pupils in terms of Knowledge, Understanding Application and Skills	Paper-pencil Tests	Pupils
Information in respect of Sex, Attendance, Duration of stay in the school, Advantaged/ disadvantaged status, Location (i.e., urban/rural, slum/industrial areas), religion, Father's education and occupation, Mother's education and occupation, and Family income	Pupil Information Blanks	School and Teacher Records
Information about school and classes with regard to types of school, facilities available, and training of teachers	School Information Blanks	School Records

Preparation of Tests/Tools

Paper-pencil Tests

Paper-pencil tests were developed keeping in mind the following assumptions:

— Tests should be based on a common curriculum, in terms of content/concepts, and a common core of learning outcomes.

— A criterion reference test aimed at assessing achievement of predetermined concepts and learning outcomes with proper weightages to Knowledge (K), Understanding (U), Application (A) and Skills (S), appropriate for each class level.

— Identification and preparation of illustrations which are common all over India, should be done to provide identical visual stimuli to children belonging to diverese groups.

To identify the common core, the State-level curricula of NHEES were analysed and a core of content/concepts and critical learning outcomes were identified for Classes I-V with the help of the State teams. Needless to mention, these were also reflected in the instructional materials developed and the transactional

strategies adopted in the classroom.

During 1985-86, a training-cum-production workshop was organized to prepare a set of objective-based (criterion reference) tests for Classes I-V. Keeping the entire core curriculum for these classes in view, a blueprint for each test was drawn up, apportioning appropriate weightage to selected content and the objectives, viz., K, U, A and S. It is necessary to point out that other objectives, such as habits, practices, and attitudes, had to be kept out in view of the difficulties in measuring them with the help of paper-pencil tests and also in view of the time constraint. Thereafter, the number of items along with the marks assigned to each item were decided upon. According to these blueprints, the expert groups constructed items, discussed each item in the group, and finalized the set of achievement tests in NHEES for all the classes. In order to maintain a high level of stimulus value, the illustrations for the tests were got prepared at the NCERT and art-pulls of the same were sent to the participating States. The tests were then translated and printed by the States in their own languages for administration to the pupils.

The test for Class I comprised 17 items, having maximum values of 20 (marks); out of which five marks were assigned to K, seven marks to U, six to A and two to S. The test for Class II consisted of 17 items of 25 values (marks); the distribution of marks was as follows: four marks to K, 13 to U, five to A and three to S. The test for Class III contained 32 items with the total of 60 marks, the distribution of which to objectives was as follows: K, 17; U, 24; A, 12 and S, seven. The maximum marks assigned to 27 items of the test of Class IV were 45. They were distributed among the objectives as follows: K, 13; U, 21; and A, 11. In the design of the test for Class V, out of 60 marks for 30 items, 15 marks were assigned to K, 29 marks to U, and the remaining 16 to A (*see* Appendix D).

The Pupil Information Blank

The additional information about the pupils was collected through a specially designed form called the Pupil Information Blank. The required information was collected on the following factors: Name of pupil; Sex; Father's name; Attendance; Class; Religion; Social status, viz., SC/ST/OBC (other backward communities)/ Nomads; Area, viz., rural, urban, slum or industrial; Father's education and occupation; Mother's education and occupation; and Family income. The form was designed at the NCERT and got translated into the regional languages by the respective SIEs/SCERTs. These forms were then sent to the schools with specific instructions regarding the filling in of the required information by the teachers. The forms duly filled up by the respective schools were then collected at the State level for the purpose of analysis.

The School Information Blank

Like the Pupil Information Blank (PIB), the School Information Blank (SIB) was also developed at the Headquarters with the help of the State Project Coordinators. The relevant information gathered through the form was as follows: Name of school; Location in village/block; Type of school, i.e., single/two/multi-teacher; Project or non-Project or Project school with the community contact programme.

The Questionnaire-cum-Interview Schedule

It was mentioned earlier that it was was planned to deliver ten significant NHEES messages to the community from where the children of Project schools were drawn. This community contact programme was time-bound. It was, therefore, organized intensively with the help of school teachers. In order to measure the gains, i.e. the changes in behaviour, if any, that might take place due to the intervention, it was felt necessary to prepare a Questionnaire-cum-Interview Schedule (QCIS) that could help record the information of households in respect of knowledge, understanding and the practices followed by the community. In view of this the messages were critically examined and analysed in terms of the behavioural changes that might be expected to be developed in adults. The in-house expert group was able to identify 47 critical points on which different kind of questions could be framed in order to gather the responses of the community members. Some responses were in the form of 'yes' and 'no', whereas other responses had more than two categories to be tick-marked. The distribution of questions under the ten messages was as

follows: Message 1, 3; Message 2, 5; Message 3, 4; Message 4, 4; Message 5, 5; Message 6, 3; Message 7, 5; Message 8, 4; Message 9, 3; and Message 10, 11. The villages in the vicinity of the school were visited by the teachers of the school both for delivering the messages periodically during the three months specified in advance and for collecting responses of the households through interviews before and after the intervention programme. Thus the schedule was used twice—for gathering status information (as pre-test) and recording the responses (as gains or losses) of the community members after one month of the close of the intervention programme (as post-test). For more details, Appendix E may be referred to.

Administration of Tests/Schedule

Since the administration of tests/tools/schedule by teachers/research assistants (attached to the NCs) was a complex exercise, the project coordinator at the NCERT prepared detailed guidelines for facilitating their task. An orientation programme was also organized to train the teachers of the sample schools who were to be involved in interviewing and administering the tests/schedule. A realistic time-table for administration of the tests/schedule was developed by each State as per their convenience and yet within the time-frame suggested by the NCERT. As per the instruction, the achievement tests were administered to the pupils of all the selected schools mentioned earlier. The information blanks for pupils and for schools were filled up by the teachers of the respective schools. They also conducted the community contact programme and filled up pre-and post data in the schedule. The project teams at SCERTs/SIEs supervised and monitored the administration of the tests/schedule.

Scoring and Tabulation of Data

While developing the project evaluation scheme, and important decision taken was that the analysis of the data obtained from all States would be done at the NCERT with the help of a computer. The reasons for taking such a decision were as follows:

a. It should be possible to obtain a national scenario of the changes that could have taken place due to the project intervention.

b. The results obtained from different States should be comparable and hence they should have been subjected to the same statistical analyses in order to derive reliable conclusions and to draw valid interpretations/inferences.

c. The quantum and magnitude of the data would be such that manual computation of the data would be not only difficult but also extremely time-consuming, if not altogether unwieldy.

d. The kind of expertise required for analysis of the complex data would not be easily available in the States.

e. A comprehensive report covering the entire period — from inception to completion— should emerge from this exercise.

It is important to state that after having administered the tests and schedules, the teachers checked them and sent all proformae, viz., tests booklets, information blanks and schedules, to the State coordinator. As per the guidelines and the marking/scoring scheme, the scripts were assessed and marks assigned to each pupil in terms of K, U, A, S and Total Scores. Similarly, the responses of the community on the QCIS were categorized according to elaborate instructions and the coding scheme provided to the State. Thus, the information which was converted into numerical values as per the predetermined guidelines/instructions was ready for tabulation in the specially prepared data sheets.

The Master Tabulation Sheet (MTS)

In the view of the reasons stated above, Master Tabulation Sheets (MTS) were designed to record the vast amount of information received from the States through the special information blanks and pupil achievement tests in terms of K, U, A, S and Total Scores as well as the responses of community members on pre and post tests pertaining to 47 questions. The whole exercise was completed within three to four months.

The MTSs so filled-up were then dispatched to the NCERT for further checking and analy-

sis. These were received by the DPSEE, NCERT. The Incharge of Project NHEES got the entire data checked sheet by sheet, errors corrected and discrepancies reconciled with the help of the Junior Project Fellows (JPF) for onward transmission to the computer centre contracted to undertake the job of a variety of parametric and non-parametric analyses of the vast data. The methodology of analysis of the data and the selection of appropriate statistical designs are discussed and presented in the following chapters.

SIX

ANALYSIS OF DATA AND STATISTICAL DESIGNS

ANALYSIS OF DATA

The data from all eight States in respect of the achievement of pupils and responses of the members from the community were received at the Headquarters (NCERT) in duly filled-up MTS I and II. Further analysis of the massive data was done as described below.

Assigning Values

Pupil Achievement Test (PAT): The format of MTS I was so designed that the transfer of data from the form to the computer files was accomplished with the least difficulty. Pupil information was recorded in MTS I. In all, information on 32 independent variables related to schools and pupils was filled up in Record I entitled 'Pupil Information'. Record II, entitled 'Pupil Achievement', contained four major objectives, viz. K, U, A and S, which were further divided into 16 behavioural outcomes. Full details on these variables may be referred to in the specimen of MTS 1 at Appendix F. As per the detailed guidelines provided to the States for scoring and assigning values to various items (*see* the Instruction Sheet at Appendix G), SCERT/SISE/SIE staff filled up information in each of the rows and columns in MTS I and II. The columns had the parity with the computer card, i.e., each record had 80 columns. Each variable was given a code and each code was assigned a specific number of columns, e.g. Schools, 1; Income, 5 (as the maximum income touched thousands, one column was assigned to each digit) In order to maintain parity with the computer processing-capturing and analysing data—it was essential to transform all data into numerical values. While many variables, e.g., income in the PAT study, were already in the form of numeral a few qualitative ones required conversion into numerical values, e.g., Sex: Male 1 and Female 2; Social status: Scheduled Caste (SC), 1; Scheduled Tribe (ST), 2; Nomadic Tribe (NT), 3; Backward Classes (BCs), 4; and Others, 5. This was done as per the instructions provided in the Instruction Sheet. In the final count, MTS I forms comprised the data of 31,202 pupils which was used for various parametric and non-parametric statistical analyses.

Questionnaire-cum-Interview Schedule (QCIS): It may be recalled that ten messages relevant to adult members of the community were delivered within a span of three months. Before and after the delivery of these messages, each school teacher had collected responses of each household on 47 questions relevant to the ten messages. Information collected twice through the QCIS was to be transferred to the MTS II. (*see* Appendix H) As can be seen from the QCIS, all questions were qualitative and, therefore, the responses were also qualitative. In view of this, a coding scheme in the form of a check-list with a precise number of each response was provided to the tabulator (*see* Appendix I). MTS II was designed to record the pre and post responses and the difference between them in the case of each household on each of the 47 questions. Thus there were four data records under the title of 'Responses' in MTS II. This sheet was carefully designed so that the transfer of data to the computer may not pose any problem. Because of the complex nature of the data as also the difficulty in obtaining information solely verbally from the target group of mostly illiterate adults, a large number of household data had to be discarded on account of incomplete information. Quite a number of instances of inconsistency in responses, missing responses, absence of responses on the post interviews, etc. came to notice during the checking. Ultimately, the data

TABLE 6.1

State wise break up of data on pupils and households

S.No.	State	Class	No. of Pupils P	NP	P+CCP	Total	No. of House Holds
1.	Uttar Pradesh	I	570	233	614	1417	
		II	460	129	464	1053	
		III	428	108	514	1050	3499
		IV	384	91	493	968	
		V	333	105	393	831	
		Total	2175	666	2478	5319	
2.	Orissa	I	65	36	71	172	
		II	78	35	55	168	
		III	87	31	63	181	822
		IV	74	34	51	159	
		V	68	20	42	130	
		Total	372	156	282	810	
3.	Rajasthan	I	409	278	671	1358	
		II	192	301	280	773	
		III	152	326	323	801	4123
		IV	125	294	270	689	
		V	123	279	261	663	
		Total	1001	1478	1805	4284	
4.	Maharashtra	I	256	289	510	1055	
		II	224	311	524	1059	
		III	223	298	527	1048	2221
		IV	240	230	527	997	
		V	—	—	—	—	
		Total	943	1128	2088	4159	
5.	Bihar	I	140	53	225	418	
		II	208	147	334	689	
		III	223	128	295	646	992
		IV	185	103	261	549	
		V	245	108	292	645	
		Total	1001	539	1407	2947	
6.	Mizoram	I	425	410	485	1320	
		II	385	282	352	1019	
		III	439	280	318	1037	950
		IV	307	260	311	878	
		V	—	—	—	—	
		Total	1556	1232	1466	4254	
7.	Karnataka	I	198	346	976	1520	
		II	173	392	936	1501	
		III	136	324	905	1365	3454
		IV	112	293	806	1211	
		V	—	—	—	—	
		Total	619	1355	3623	5597	
8.	Madhya Pradesh	I	510	159	—	669	
		II	480	124	—	604	
		III	728	183	—	911	
		IV	613	193	—	806	
		V	689	153	—	842	
		Total	3020	812	—	3832	
	Grand Total		7667	6554	13149	27,370	16,061
	G. Total		10687	7366	13149	31,202	16,061

N.B. For purpose of analysis of pupil achievement, data of only 7 states were pooled. M.P. did not have C.C. Programme, hence data from this state was not used. P — Project School, NP — Non Project School and P + CCP — Project Schools + CCP

for the CCP pertained to 16,061 households of children falling into Group III, i.e., Project + CCP Schools from seven States (excepting M.P.) The State-wise, class-wise and project-wise detailed break-up of data on pupils and households is presented in Table 6.1.

Computer Analysis

It was well nigh impossible to analyse the massive and complex data at hand without the help of a computer. Hence, right from the initial stage a decision was taken to process the data with the help of a computer. Consequently, the ARDEE Unitron Computers (P) Ltd., New Delhi, were contracted to undertake the processing of the data. While selecting the firm, the most important consideration was the availability of the SPSSPC+ software package with the firm.

Data Entry: The data on pupil achievement and community responses recorded on MTS I and MTS II proformae were thoroughly checked with the help of the Junior Project Fellows (JPFs). State by State, MTS I and MTS II proformae were handed over to the computer firm. After a few try-outs, the NCERT started receiving the outputs of listing of the data. These listed data sheets were carefully scrutinized, corrected and returned to the firm for further action. Two scrutinies of the computer outputs sufficed and then the entire data was recorded on files in the computer, namely, the Super Mini Computer System with Magnum 68030 based dual processor, HCL, India. After having captured the data, various statistical tests were

conducted to analyse the data. The justification for and appropriateness of the selection of statistical designs are discussed in detail below.

SELECTION OF STATISTICAL DESIGNS

Pupil Achievement Data

Parametric Statistical Designs

The second step after capturing the data was to undertake the statistical analysis of the data State by State as well as all-State pooled data. Since the number of test items under K, U, A and S differred, it was necessary to transform the raw scores under each category into percentages for the purpose of comparison of the data of one variable with that of the other. Having converted the raw data files into percentage data (score) files, the entire data was processed to obtain the class-wise basic statistical values such as Range, Mean, Median, Mode, Percentiles (Quartiles), Standard Deviation (SD), Kurtosis, Skewness, etc.. and the Histogram Frequency Distribution. These values were critically examined to find out as to whether the fundamental conditions for applying the parametric tests were met or not. The theoretical probability curves *vis-a-vis* histogram frequencies in respect of K, U, A and S suggested the need for applying the test for the homogeneity of variance before any parametric test could be conducted. The Cochrans C and Bartlett-Box F tests were conducted to check the homogeneity of variance between Groups I, II and III.

The major objective of the PAT study was to ascertain the effectiveness of the project curriculum intervention in the primary schools. Put operationally, an attempt was made to investigate whether the children in Project schools (Group I) and those in Project schools with the CCP (Group III) did better on the components of Knowledge, Understanding, Application, Skills as also on the Total achievement of the test than the children in non-project schools (the control group, Group II). In order to find out significant differences among these three groups, a simple one-way Analysis of Variance (ANOVA) statistical design would have sufficed. However, a lot of information on the selected independent variables was collected with a view to examining the effectiveness of the project intervention on achievement as exclusively as possible, i.e., free from at least the variables known to affect it. This demanded that the scope of the statistical analysis be broadened in order to maximize the potential for derivation of the results and thereby, conclusions, interpretations and inferences. Since the samples were large enough and therefore the adequacy of the number of subjects in the factorial designs, it was decided to use the Analysis of Covariance (ANCOVA), subject to the availability of an adequate number of subjects in respect of the variables manipulated. Variables of State (7), Group (3), (Project, Non-Project and Project + CCP) and Sex (2), Male/Female, were manipulated in the factorial design comprising 42 cells. The covariates used in these designs were Attendance and Income, which satisfied the assumption of the linearity and continuity of scale in their measurement, besides being known as related to pupil achievement. This provided the benefit of generating additional hypotheses regarding variables of State, Group and Sex, as well as with the opportunity of testing interactions between two or three important variables, whichever was the case.

Non-parametric Statistical Designs

As mentioned above, heterogeneity among the three groups was observed in some cases. Consequently, it was considered advisable to check the results with the help of non-parametric designs so that the reliability of the results could be increased. While these tests were aptly suited for parallel analysis, their weakness of not being able to provide any information on interaction among variables put some constraints on testing the additional hypotheses. Notwithstanding this fact, it is necessary to emphasize the intention that they were conducted as supporting analyses for enhancing the reliability and validity of results obtained through the parametric techniques. The difference between two independent groups was tested through the combined Mann-Whitney U-Wilcoxon Rank Sum W test, e.g., between Male and Female. Similarly, whereas the differences among the means of three or more independent groups were tested through the Kruskal Wallis One-way ANOVA test, e.g. Grp I, II and III, those among the means of the correlated samples were tested through the Friedman

Two-way ANOVA test, e.g., regarding the components K, U, A and S of PAT. Mention also needs to be made of the use of the Scheffe procedure for determining the difference between two means of multiple groups once the F value indicated significant differences among them. This was done for states and for the three major treatment groups, i.e , Grp I, Project schools; Grp II, Non-Project schools; and Grp III, Project schools + CCP.

Multiple Regression Analysis

Since so much valuable data was collected, specially on those variables which have been known to influence pupil achievement, it was decided to determine the predictors of pupil achievement through the Step-wise Multiple Regression Analysis (SWMRA). The following variables were selected for determing their potential for predicting total achievement: K, U, A and S. The independent variables manipulated in the SWMRA design were: Attendance; Income; Social Status—disdvantaged/advantaged i.e , combined group of SC/ST/NT/BC; Locale—Urban/Rural, (dichotomus); Father's occupation and education; and Mother's occupation and education (all four polytomous). To recapitulate, intensive efforts were made to view the available data from various angles so that nothing was missed as also to use different statistical techniques in order to reinforce the findings and enhance their validity and reliability. Thus the difference in the Total achievement of pupils as well as in each of its components K, U, A and S of the three groups was tested through both parametric and non-parametric statistical methods Further, the potential of certain variables for predicting the total pupil achievement and its components was also determined through the Step-wise Multiple Regression Analysis technique (SWMRA)

Community Contact Programme (CCP)

Non-parametric Statistical Designs

Mention has already been made that the nature of responses on the QCIS was qualitative. Unlike the PAT scores, the values assigned to various items of this tool ranged between 1 to 7, which could best be fitted into the Ordinal Scale of measurement. This put a restrictions on the use of parametric statistical techniques in analysing the data at hand. Hence the use of 'Distribution Free Statistics'.

In order to find out whether there were gains/losses from pre to post test situations in the community members, the Wilcoxon Matched-pairs Signed-ranks test was used in analysing each of the 47 questions The analysis followed the same pattern, i.e , first, the data of the States was analysed, followed by the analysis of All-States pooled data.

In the end a variety of powerful parametric and non-parametric tests and their meaningful combination yielding a comprehensive and composite picture of the impact of project intervention of the pupils of seven states and community members in six States, the exception being M.P where the CCP was not implemented, and U.P. the data from which had to be deferred due to some abberations and inconsistencies which required further scrutiny.

HYPOTHESES

In order to test the significance of differences between/among groups in respect of the major variables manipulated in the statistical designs discussed above, the following Null Hypotheses were set up:

Pupil Achievement Test (PAT)

* Differences do not exist among the achievements of pupils belonging to different States.
* Differences do not exist among the achievements of the three groups, namely, Grp I (Project schools), Grp II (Non-Project schools, Control) and Grp. III (Project schools + CCP).
* Difference does not exist between the achievements of males and females
* There is no probability of interactions among State, group and sex

Community Contact Programme (CCP)

In order to test the significance of difference between the pre and post-test NHEES status of households, the following Null Hypothesis was framed:

* Difference does not exist between the pre and post values assigned to the responses obtained from members of the community on the QCIS.

Rejection of the above -mentioned null hypotheses would help lend support to the following alternate hypotheses stated in both the conceptual and operational forms below:

Conceptual Hypotheses

The Pupil Achievement Test (PAT)

* Differences exist among the achievements of pupils belonging to different States.
* Differences exist among the achievements of pupils in the three groups, i.e., Grp I, Project schools exposed to the special NHEES curriculum; Grp II, Non-Project schools exposed to neither programmes (Control); and Grp III, Project schools exposed to the special NHEES curriculum along with the CCP programme.
* Difference exists between the achievements of male and female pupils
* Differences exist among the achievements of pupils in the cells formed in the factorial design by State, group and sex.

Community Contact Programme (CCP)

* Difference exists between the pre- and post-test NHEES status of members of the community.

Operational Hypotheses

Pupil Achievement Tests (PAT)

* Differences exist among the mean — total achievement, K, U, A and S — of the pupils belonging to different States.
* Differences exist among the mean scores—total achievement, K, U, A and S — of the three groups i.e., Grp I, Pupils in Project schools exposed to the special NHEES curriculum; Grp II, Non-Project schools exposed to neither programmes (Control); and Grp III, Pupils in project schools exposed to the special NHEES curriculum along with the CC programme.
* Difference exists between the means—total achievement, K, U, A and S—of male and female pupils.
* Differences exist among the cell mean scores—total achievement, K, U, A and S—in the factorial design by State, group and sex.

The relationships hypothesized above would hold good even when the effect of the covariates Attendance and Income is partialed out.

Community Contact Programme (CCP)

* Difference exists between the pre and post means of values assigned to responses obtained from members of the community on the QCIS.

SEVEN

RESULTS OF THE PUPIL ACHIEVEMENT TEST FOR ALL STATES DATA

THE rationale and justifications for the selection of specific statistical designs for analysis of the PAT data have been elaborated in the previous chapter. To reiterate, four distinct statistical analyses were carried out to obtain the results at hand, namely, (i) Measures of Central Value and Variability (Dispersion) along with the Frequency Distribution (Histogram Frequency), (ii) Analysis of Variance and Covariance (ANOVA and ANCOVA), (iii) Step-wise Multiple Regression Analysis (SWMRA) including Coefficients of Correlation (*rs*); and (iv) Non-parametric tests, viz., the Mann–Whitney U-Wilcoxon Rank Sum W test, the Kruskal Wallis One-way ANOVA test for two or more independent samples and the Friedman Two-way ANOVA test for correlated samples. The purpose of conducting the non-parametric test was twofold: (1) to make an independent check of the results obtained through the parametric test, especially when the test of the homogeneity of variance was significant; and (2) to enhance the validity and reliability of the results, thus performing a sort of supporting role. A variety of statistical analyses were resorted to primarily test the Null Hypothesis of samples drawn from a common population or no differences existing among the means of the three treatment groups with respect to Attendance, Income, Total achievement (now onwards referred to as T scores or T) and its components K, U, A and S. Thus, the potential of data was exploited to the maximum in order to arrive at as pure or as unbiased results as possible. They are presented in and discussed with the help of figures and tables at appropriate places in the chapter.

Before the statistical values are presented and discussed, attention needs to be drawn to the fact that this chapter focusses on the pooled data of all seven States (now onwards this will be referred to as All States) viz., U.P., Orissa, Rajasthan, Maharashtra, Bihar, Mizoram and Karnataka (Madhya Pradesh had to be left out as it did not have the data for Project schools + CCP). It needs to be mentioned that before undertaking a separate analysis for making inferences from the State data, it was necessary that the null hypothesis of random sampling from a common population (or no significant differences among the means of the States) be rejected. Hence the selection of a factorial design of State (7) × Group (3) × Sex (2) = 42 cells for the analysis of the data of All States.

RESULTS OF CLASS 1

VARIABLE : *ATTENDANCE*

Descriptive Statistics

Measures of Central Values and Variability (Dispersion): Before the inferential statistics were computed, it was necessary to study the nature of the data. Therefore, the relevant basic statistics were computed and studied for subsequently undertaking higher-order statistical tests for the purpose of drawing inferences in respect of the hypotheses set up as alternatives to the Null Hypotheses.

While Fig. 7.1 presents the distributions of frequency of percentage attendance—the histogram frequency, Table 7.1 shows the basic statistical values.

At the initial stage, it is important to draw attention to the fact that the figure consists of two curves: the curve in asterisks represents the theoretical frequency distribution against

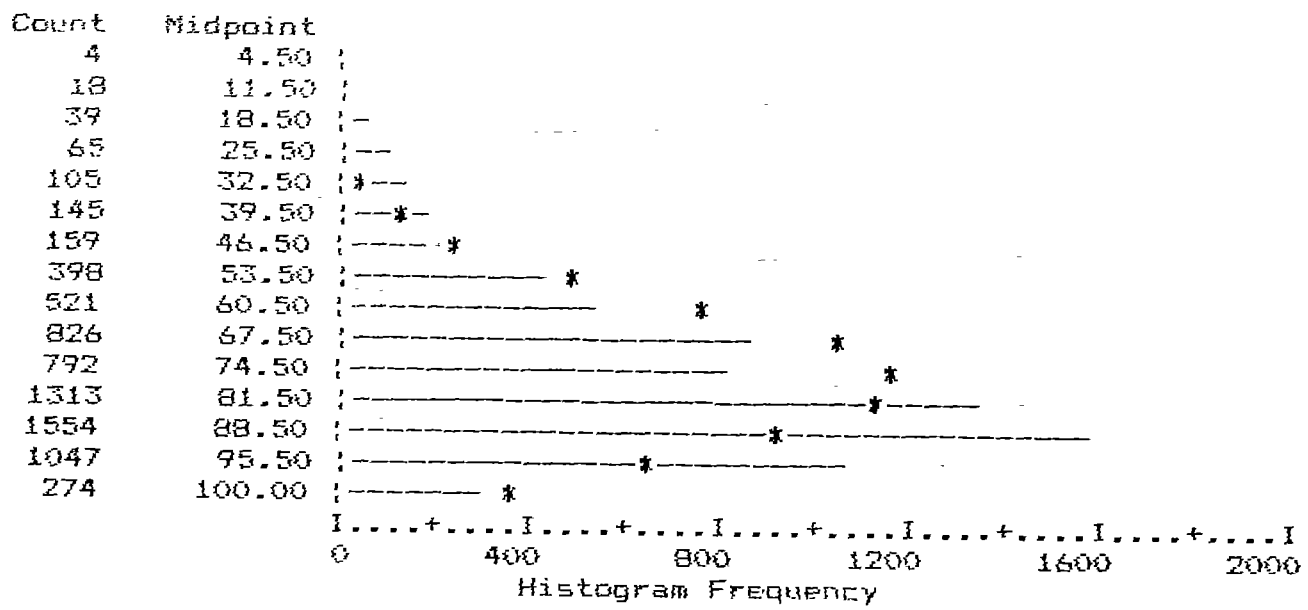


FIG. 7.1
Theoretical (asterisks) and empirical frequency distributions of percentage attendance of pupils of Class I in All States

TABLE 7.1
Measures of central value and variability of percentage attendance of pupils of Class I in All States

A Attendance

Mean	76.519	Median	80.000	Mode	80.000
Std Dev	17.173	Skewness	-1.093	Range	99.000
Percentile	Value	Percentile	Value	Percentile	Value
25.00	68.000	50.000	80.000	75.000	90.000

N 7260

the line curve which represents the empircal or actual frequency distribution of the data at hand. (This significant fact will have to be kept in mind while interpreting the histogram frequency graphs throughout this report.)

The data indicates that the nature of the measurement is fairly normal since the frequency distribution approximates the normal probability curve, with a negative skewness, the median (80) being a little higher than the mean (76.52). The value of SD (17.17) is also just a little higher than what is derived as 1/6 of the range 99, i.e., 16.5. Besides, the values of the mode and median are equal, i.e., 80. Thus there is a negligible dispersion in the percentage attendance of pupils compared to the one that can be predicted on the theoretical basis. This is clearly evident when the asterisk points are seen *vis-a-vis* the relevant points in the line curve.

TABLE 7.2a
Analysis of variance for percentage attendacne of pupils of Class I in All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squares	DF	Mean Square	F	Signi of F
Main Effects	313400 358	9	34822 262	143 170	.000
State	303177 693	6	50529 616	207.751	000
Group	2449.257	2	1224 629	5.035	.007
Sex	152.496	1	152.462	627	.428
2-way Interactions	66830.885	20	3341 544	13.739	.000
State X Group	55795.585	12	4649.632	19.117	000
State X Sex	6689.750	6	1114.958	4.584	.000
Group X Sex	1668 436	2	834 218	3.430	033
3-way Interactions	4972.784	12	414.399	1.704	059
State X Group X Sex	4972.784	12	414.399	1 704	.059
Explained	385204.028	41	9395.220	38.628	000
Residual	1755580 387	7218	243.223		
Total	2140784.415	7259	294.915		

Conclusions and Interpretations

The mean (76.52%) and the 75th percentile value 90% attendance indicate that 75 per cent pupils attended school for 90 per cent of the working days in a year. Therefore, the attendance of pupils was highly satisfactory.

TABLE 7.2b

Cell means of percentage attendance of pupils of Class I in All States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar Pradesh	86.95	84.59	81.23	84.06	86.89	85.53	85.20	85.97	84.53 (1)*
N	419	180	463	1062	151	53	151	355	1417
Orissa	80.37	69.28	56.54	70.32	70.75	60.00	58.49	62.47	66.76 (6)
N	41	25	28	94	24	11	43	78	172
Rajasthan	70.10	77.25	67.78	70.41	65 78	78.04	70.52	70.73	70.49 (5)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	80.24	73.35	74.35	75.35	76.67	68.55	75.02	73.96	74.68 (3)
N	121	171	252	544	135	118	258	511	1055
Bihar	59.77	66.70	61.83	61.73	68.25	72.06	67.75	68.37	64.00 (7)
N	100	37	138	275	40	16	87	143	418
Mizoram	82.18	84.22	85.46	84.01	82.80	84.85	84.21	83.95	83.98
N	221	217	249	687	204	193	236	633	1320
Karnataka	65.39	74.32	75.37	73.84	65.85	74.31	75.07	73.70	73.77 (4)
N	111	194	549	854	87	152	427	666	1520
Total	77.52	78.23	74.81	76.38	77.07	77.60	76.19	76.75	76.52
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 77.36				Non-Project MF = 78.00			Project+ CCP MF = 75.35	
N	2063				1645			3552	

*Figures in the brackets represent RANKS of State means.

The data on attendance of primary school children in India is scant, if at all it is available. The Gross Retention Rate (GRR) until the publication of the Fifth All-India Educational Survey in 1986, steadied around 38% at the end of Class IV/V. The Fifth Survey's figure was 51%. It has been reported that 75% of the children enrolled in Class I in 1978 entered Class II in 1979, a drop of a hefty 25% (Dave, 1990). In view of this, the mean attendance 76.52% (Q3 = 90%) should be considered highly satisfactory, particularly in view of the fact that four out of the seven participating States belong to the category of educationally backward States viz., Bihar, Orissa, Rajasthan and Uttar Pradesh (the others being Karnataka, Maharashtra and Mizoram).

Testing of the Null Hypothesis

The null hypothesis of random sampling from a common population was tested through the analysis of variance for the State (7) × group (3) × sex (2) = 42-cell design. The values of F and their significance levels are presented in Table 7.2a (ANOVA); the cell means for State x group × sex in Table 7.2b; for State × group in Table 7.2c; for State × sex in Table 7.2d; for group × sex in Table 7.2e.

The null hypothesis of random sampling from a common population with respect to State and group for the percentage attendance was rejected as the values presented in the table are as follows: F = 207.75, df = 6, 7218, P = .00 and F = 5.04, df = 2, 7218, P = .007, respectively. However, the F ratio for sex is not significant (P = 0.43). Hence, the null hypothe-

sis of significant difference existing between males and females was not found tenable.

The significant F values for 2-way interactions, i.e., Fs = 19.12, df = 12, 7218 (State × group); F = 4.58, df = 6, 7218, P = .00 (State × sex); and F = 3.43, df = 2, 7218, P = .03 (group × sex) clearly show that the cell means of the respective pairs differed significantly.

The F value recorded for the 3-way interaction is not significant at the 5 per cent level, P = .059, thus suggesting that the null hypothesis is tenable.

Conclusions and Interpretations

Main effects

State: The results indicated that the means of percentage attendance of pupils in seven States differed significantly (Refer table 7.2b). The rank order of the means is as follows: U.P., 84.53; Mizoram, 83.98; Maharahstra, 74.68; Karnataka, 73.77; Rajasthan, 70.49; Orissa; 66.76; and Bihar, 64.00, the range being 20.53%, indicating thereby a substantial difference in the attendance between the two top-ranked and the two bottom-ranked States. The attendance of pupils in U.P., Mizoram and Maharashtra was higher than the attendance of the total sample, i.e., 76.52, while that of pupils of the other five States was lower.

The pairwise difference on this variable was as follows:

* The percentage attendance of the pupils of U.P. and Mizoram in school was higher than that of the pupils of Bihar, Orissa, Rajasthan, Karnataka and Maharashtra.
* The percentage attendance of the pupils of Maharashtra and Karnataka in school was higher than that of the pupils of Bihar, Orissa and Rajasthan.
* The percentage attendance of the pupils of Rajasthan in school was higher than that of the pupils of Bihar and Orissa.
* Pupils of Bihar and Orissa did not differ in their percentage attendance in school. (These differences were checked by the Scheffe procedure).

The results necessitate two actions as a follow-up: (1) State-wise statistical analysis should be carried out to test the null hypothesis of random sampling from a common population, and (2) the effect of attendance should be eliminated before the null hypothesis of random sampling is rejected with respect to dependent variables, viz., T, K, U, A and S scores.

Group: The means of percentage attendance of pupils in project, non-project and project schools + CCP differed significantly. However, examination of group means in Table 7.2b shows that while the means of the Project and non-Project schools, i.e. 77.36 and 78.00, did not differ from each other, they differed from the mean of Project schools + CCP, i.e., 75.35.

This result vindicates the tenability of the alternate hypothesis of significant differences in percentage attendance existing among the groups. However, it is necessary to examine the conceptual assumption whether the percentage attendance of pupils in Project schools + CCP was higher than the attendance of pupils in Project schools and whether the attendance of pupils in both these schools was higher than that of the pupils in non-Project schools. The trend seemed to have been almost reversed. The attendance of pupils in Project schools + CCP was the lowest and that of pupils in non-Project schools was the highest. It is obvious that the project intervention had no positive effect on the attendance of pupils.

Sex: The percentage attendance means of males and females did not differ significantly. Although not directly related to the study, it is of extreme importance to note that the overall ratio of males to females was 4531:2729 (62:38) in Class I. Dave (1990) reported that the ratios of males to females in Class I in 1978 and 1986 (NCERT, 1990) were 60:40 and 58:42, respectively. In comparison with these two ratios, the present ratio from the seven States is disadvantageous to the females. An in-depth examination of the male-female ratio for each State revealed the expected but yet interesting pattern. These ratios are: Bihar: 65:34; Karanataka: 56:44; Maharashtra: 51:49; Mizoram: 52:48; Orissa: 54:45; Rajasthan 75:25; UP: 75:25. As can be seen, the enrolment ratio of females to males in Class I in the educationally backward States was very low compared to that in the educationally advanced States, except in Orissa. The ratios of females to males of the latter are much higher than that reported in the All India Educational Survey of 1986, i.e.,

58:42. One is struck to see the relationship evident between the low educational status of the State and the low female to male ratio in Class I. The interpretation is inescapable: Either the female children were not sent to school due to discrimination against their education, or the mortality rate of the female child under the age of six years was much higher than the mortality rate of males. And yet it is satisfying that the mean percentage of attendance of females was equal to that of males. This may be due to high motivation for schooling on the part of the female child.

2-way Interactions

State X Group In general, significant interactions indicate variations attributable not to either of the two (or more) influences acting alone but to joint effect of the two (or more) acting together Here it suggests that to a considerable extent the interaction variance is attributable to both State and group. In other words, in addition to State and group influencing attendance independently, State and group together also contributed to the differences between the observed means.

Usually, particularly when the demographic factors are manipulated as independent variables such as age, sex, socio-economic status (SES), locale, etc., interpretations of interaction effects become rather difficult. Simply put, it is perhaps not difficult to interpret interaction effects in a controlled experiment where the variables are systematically manipulated and the conditions varied. However, in a study like this, it gets further confounded when the results are not consistent for the same variable with respect to different criterion variables or for different independent variables with respect to the same criterion variable. The author was faced with a similar situation. In order to go beyond stating that the interaction variance was responsible for differences between/among the means, a search was made to find out a simple but effective method for demonstrating the influence of variations in the means of cells formed in a contingency table of two or more variables. The technique used by Ary, Jacobs and Razavieh (1985) was applied to compute the expected mean for each cell. It is conceded that the procedure did not yield perfect and precise indices since the actual cell means were not weighted for unequal number in cells which resulted into having some residual positive or negative differences instead of zero. Yet, they were extremely useful in deriving conclusions and meaningful interpretations of interactions at hand.

The method of computing expected means was as follows:

Step 1: Calculating deviations of the row/column means from the total sample mean;

Step 2. Posting of the row and column deviation in each cell;

Step 3: Adding the posted row and column deviations in each cell to the total sample mean (Sample mean + column difference + row difference);

Step 4: Calculating the difference of the actual cell mean (greater or less) from the expected cell mean.

All tables with the apostrophe (') mark in the chapter present the expected means and the differences between the actual and expected means.

TABLE 7.2c

Cell means of percentage attendance of pupils of Class I in All States for State x group

State \ Group	Proj.	Non-Proj.	Proj. + CCP	Total
UP	86.93 (570)	84 81 (233)	82.21 (614)	84.53 (1417)*
Orissa	76.82 (65)	66.44 (36)	57.72 (71)	66.76 (172)
Rajasthan	69.05 (409)	77.46 (278)	68.48 (671)	70.49 (1358)
Maharashtra	78.36 (256)	71.39 (289)	74.69 (510)	74.68 (1055)
Bihar	62.19 (140)	68.32 (53)	64 12 (225)	64.00 (418)
Mizoram	82.48 (425)	84.52 (410)	84.85 (485)	83.98 (1320)
Karnataka	65.59 (198)	74.32 (346)	75.24 (976)	73.77 (1520)
Total (All States)	77.36 (2063)	78.00 (1645)	75.35 (3552)	76.52 (7260)

*Figures in brackets indicate N.

TABLE 7.2 c'

Expected means and differences between actual and expected means for percentage attendance of pupils of Class I in All States for State x group

State \ Group	Project	Non-Project	Project + CCP	Total
U.P.	85.37 N = 570 D = +1.56	86.01 N = 233 D = −1.2	83.36 N = 614 D = −1.15	84.53 N = 1417
Orissa	67.60 N = 65 D = + 9.22	68.24 N = 36 D = −1.8	65.59 N = 71 D = −7.87	66.76 N = 172
Rajasthan	71.33 N = 409 D = − 2.28	71.97 N = 278 D = + 5.49	69.32 N = 671 D = −0.84	70.49 N = 1358
Maharashtra	75.52 N = 256 D = +2.84	76.16 N = 289 D = −4.77	73.51 N = 510 D = +1.18	74.68 N = 1055
Bihar	64.84 N = 140 D = −2.65	65.48 N = 53 D = +2.84	62.83 N = 225 D = +1.29	64.00 N = 418
Mizoram	84.82 N = 425 D = −2.34	70.54 N = 410 D = +13.98	82.81 N = 485 D = +2.04	83.98 N = 1320
Karnataka	74.61 N = 198 D = −9.02	75.25 N = 346 D = −0.93	72.60 N = 976 D = + 2.64	73.77 N = 1520
Total (All States)	77.36 N = 2063	78.00 N =1645	75.35 N = 3552	76.52 N = 7260

Close examination of cell means and their corresponding means in the tables show the interaction effect attributable to state x group. Positive and negative differences in each cell reflect this combined effect on the variance in the percentage attendance.

What does this conceptually mean ? Had the interaction not taken place, the actual means of cells would not have differed from the expected means. However they did and the State-wise position was as follows: While the attendance of pupils of project schools in U.P., Orissa and Maharashtra was higher than expected, that of pupils in Rajasthan, Bihar, Mizoram and Karanataka was less than expected, the range being +9.22 to −9.02. The attendance of pupils of non-Project schools in Bihar, Rajasthan and Mizoram was higher than expected, whereas that of pupils in UP, Orissa, Maharashtra and Karnataka was less than expected, the range being + 13.98 to −.93. The differences in attendance of pupils of Project schools + CCP was margin-

TABLE 7.2 d

Cell means of percentage attendance of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
UP	84.06 (1062)	85.97 (355)	84.53 (1417)*
Orissa	70.32 (94)	62.47 (78)	66.76 (172)
Rajasthan	70.41 (1015)	70.73 (343)	70.49 (1358)
Maharashtra	75.35 (544)	73.96 (511)	74.68 (1055)
Bihar	61.73 (275)	68.37 (143)	64.00 (418)
Mizoram	84.01 (687)	83.95 (633)	83.98 (1320)
Karnataka	73.84 (854)	73.70 (666)	73.77 (1520)
Total (All States)	76.38 (4531)	76.35 (2729)	76.52 (7260)

*Figures in brackets indicate N.

TABLE 7.2 d'

Expected means and differences between actual and expected means for percentage attendance of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
U.P.	84.16 N = 1062 D = −0.1	84.53 N = 355 D = +1.44	84.53 N = 1417
Orissa	66.62 N = 94 D = +3.7	66.99 N = 78 D = −4.52	66.76 N = 172
Rajasthan	70.35 N = 1015 D = +0.06	70.72 N = 343 D = +0.01	70.49 N = 1358
Maharashtra	74.54 N = 544 D = +0.81	74.91 N = 511 D = −1.15	74.68 N = 1055
Bihar	63.86 N = 275 D = −2.13	64.23 N = 143 D = +4.14	64.00 N = 418
Mizoram	83.84 N = 687 D = +0.17	84.21 N = 633 D = −0.26	83.98 N = 1320
Karnataka	73.63 N = 854 D = +0.21	74.00 N = 666 D = −0.3	73.77 N = 1520
Total (All States)	76.38 N = 4531	76.75 N = 2729	76.52 N = 7260

ally different in all (six) States except in the case of Orissa which was much lower than expected (range: +2.64 to –7.87.) The ranges for the three groups indicate that there was less variation in attendance of pupils of Project schools + CCP than that of pupils in both the other types of schools. The interaction variance helped in surfacing these variations.

State X Sex: Sex was not related to attendance. However State and sex together accounted for significant variance in the percentage attendance. The data in Tables 7.2d and 7.2d' shows that the percentage of attendance of males in Orissa was higher than expected whereas that in Bihar was lower.

·In other States, the same was marginal. The range is +3.7 to 2.13. While the percentage attendance of female pupils in Orissa was much lower than expected, that in Bihar was higher than expected, the range being +4.14 to –4.52. The differences in other States were negligible.

Further scrutiny of the actual means of these two States reveals clearly the interactive nature of variance, i.e., the mean percentage attendance of the males in Orissa and of the females in Bihar was significantly higher than that of their counterparts.

Group X Sex: Positive and negative differences between tha actual and expected means in Tables 7.2e and 7.2e': show the interaction between group and sex.

TABLE 7.2 e

Cell means of percentage attendance of pupils of Class I in All States for group x sex

Group \ Sex	Male	Female	Total
Proj.	77.52 (1323)	77.07 (740)	77.36 (2063)*
Non. Proj.	78.23 (1030)	77.60 (615)	78.00 (1645)
Proj+CCP	74.81 (2178)	76.19 (1374)	75.35 (3552)
Total (All State)	76.38 (4531)	76.75 (2729)	76.52 (7260)

* Figures in brackets indicate N.

The differences among the three groups under the male column were negligible, indicating thereby that the attendance means of the males

TABLE 7.2 e'

Expected means and differences between actual and expected means for percentage attendance of pupils of Class I in All States for group x sex.

State \ Sex	Male	Female	Total
Project	77.22 N = 1323 D = + 0.3	77.59 N = 740 D = -0.59	77.36 N = 2063
Non-Project	77.86 N = 1030 D = + 0.37	78.23 N = 615 D = -0 63	78.00 N = 1645
Project + CCP	75.21 N = 2178 D = –0 4	75.58 N = 1374 D = +0 61	75.35 N = 3552
Total	76.38 N = 4531	76.75 N = 2729	76.52 N = 7260

tallied with the sample means. However, the attendance of females in Project and non-Project schools was less than expected, while that in Project schools + CCP was higher than expected. This has resulted into reducing the differences among the means, making the null hypotheis of no difference of attendance of females in the three groups tenable.

VARIABLE: *INCOME*

Descriptive Statistics

Measures of Central Value and Variability (Dispersion): The frequency distributions of monthly parental incomes--the histogram frequency are depicted in Fig. 7.2, whereas the basic statistical values are presented in Table 7.3.

TABLE 7.3

Measures of central value and variability of monthly income of parents of pupils of Class I in All States

I Income

Mean	629.836	Median	500.000	Mode	400.000
Std Dev	524.783	Skewness	3.121	Range	7996 000
Percentile	Value	Percentile	Value	Percentile	Value
25.00	300.000	50.00	500.000	75.00	800.000
N 7260					

The line curve in the figure shows that the frequency distribution of the monthly parental incomes is highly positively skewed. The value of skewness is 3.121, thereby demonstrating the clustering of parental incomes at the lower

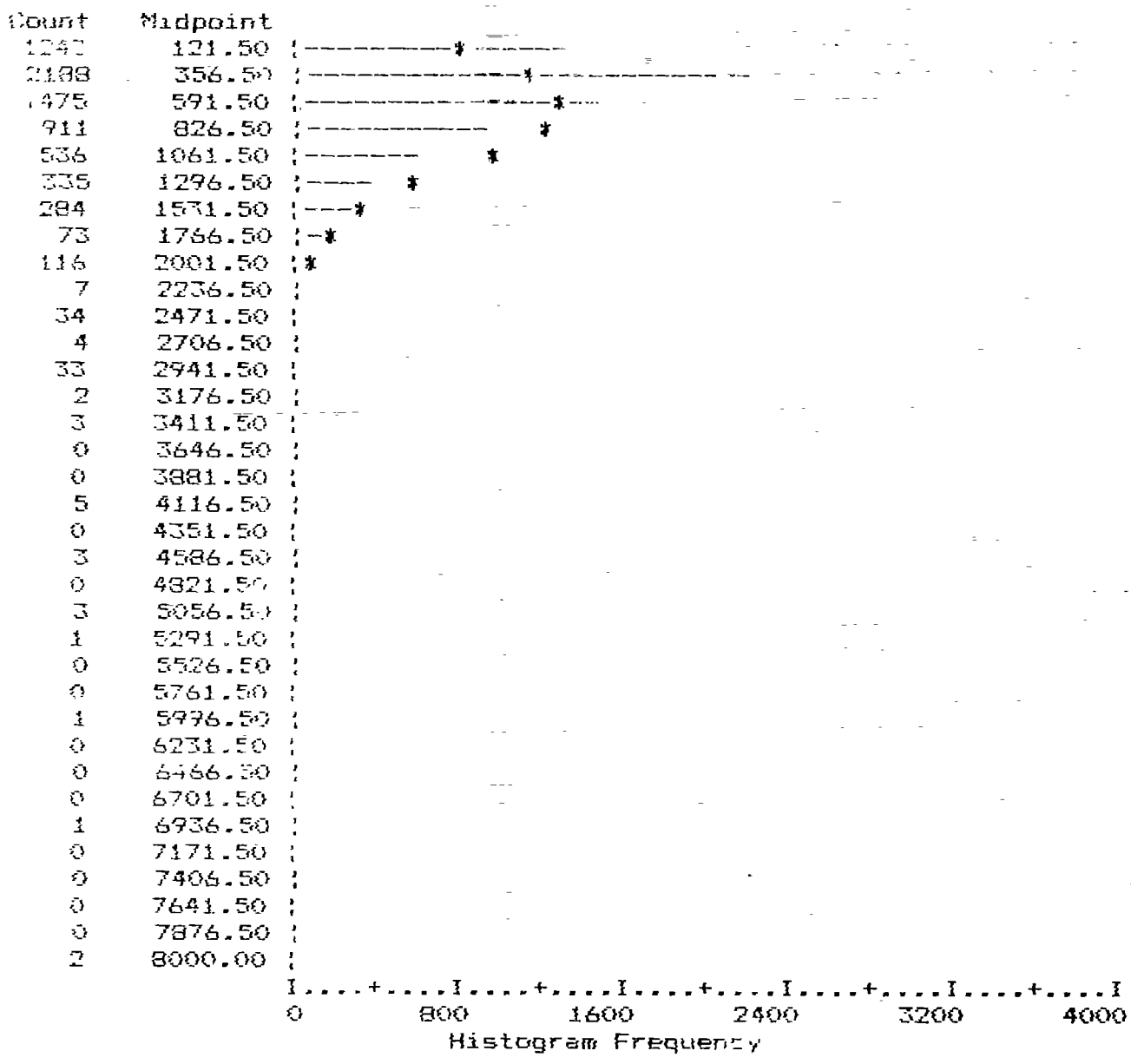


FIG. 7.2

Theoretical (asterisks) and empirical frequency distributions of monthly income of parents of pupils of Class I in All States

end of the axis. The median income is lower than the mean income, i.e., Rs. 500.00 and Rs. 629.84 respectively. The value of SD of income (Rs. 524.78) is also much lower when compared to the value derived as 1/6 of the range of 7996, i.e., Rs. 1333/-. Thus there is a significant variation in the monthly parental incomes.

Conclusions and Interpretations

* The distribution of the monthly parental incomes was closer to the reality that exists in India, i.e., the low income groups substantially outnumber the middle and high income groups.
* Since more than 75 percent pupils belonged

to the families whose monthly income was less than Rs.800/- the pupils should be considered as the economically disadvantaged group of the society. It may be asserted that one of the UNICEF objectives of providing for the service to children and the disadvantaged communities of the society was fully served by this project intervention.

Testing of the Null Hypothesis

The null hypothesis of random sampling from a common population was tested through the analysis of variance for State (7) × group (3) × sex (2) = 42 cell design. The values of F and their probabilities of significance levels are presented in Table 7.4a, (ANOVA) the cell means for State × group × sex in Table 7.4b and those for 2-way interactions in Tables 7.4c, 7.4d and 7.4e.

TABLE 7.4a

Analysis of variance of monthly incomes of parents of pupils of Class I in All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squares	DF	Mean Square	F	Signi of F
Main Effects	454768866.686	9	50529874 076	242 301	000
State	442445405 326	6	73740900 888	353 602	.000
Group	1925577 907	2	962788 953	4 617	.010
Sex	1623736 160	1	1623736 160	7 786	005
2-way Interactions	34922087 052	20	1746104 353	8 373	000
State × Group	25090266 570	12	2090855 548	10 026	000
State × Sex	7288962 739	6	1214827 123	5 825	000
Group × Sex	1275929.489	2	637964 744	3 059	047
3-way Interactions	4159174 120	12	346597 843	1 662	.068
State × Group × Sex	4159174.120	12	346597.843	1.662	068
Explained	493850127.858	41	12045125 070	57 759	000
Residual	1505256379 7	7218	208542.031		
Total	1999106507 60	7259	275396 957		

TABLE 7.4 b

Cell means of monthly incomes of parents of pupils of Class I in All States for States × group × sex

	Male				Female				
Sex / Group	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar Pradesh	536.16	362.14	566.98	520.10	656.87	432.08	613.44	604 84	541 33 (4)
N	419	180	463	1062	151	53	151	355	1417
Orissa	442.07	728.40	353.93	491.97	398.96	609.09	451 98	457.82	476.48 (5)
N	41	25	28	94	24	11	43	78	172
Rajasthan	758.26	498.08	693.14	673.44	842.88	724 72	817.15	805.17	706 71 (2)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	286.36	414.06	458 73	406.35	346.67	542 37	444.19	441.10	423 18 (6)
N	121	171	252	544	135	118	258	511	1055
Bihar	610.55	716.49	574 33	606 63	883.75	775.00	616.40	708.93	641.62 (3)
N	100	37	138	275	40	16	87	143	418
Mizoram	1221.75	1061.52	1097 87	1126.24	1119.31	1130.31	999.28	1077.91	1103.07 (1)
N	221	217	249	687	204	193	236	633	1320
Karnataka	324.68	444.48	393.74	396.30	293.22	397 67	395.29	382.50	390.25 (7)
N	111	194	549	854	87	152	427	666	1520
Total	664.84	582.42	598.11	614.03	713.79	710.20	600.77	656.08	629.84
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 682.40			Non-Project MF = 630.19			Project + CCP MF =599.14		
N	2063			1045			3552		

*Figures in the brackets represent RANKS of the state means.

The F ratio 57.76 (df = 41/7218) for the explained variance among 42 cells for the monthly parental incomes is significant beyond .000 level, thereby rejecting the null hypothesis of random sampling from a common population. This rejection provides definite support to the alternate hypothesis that cell groups (and therefore the cell means) differ significantly. The values for State, group and sex are: F = 353.60, df = 6, 7218, P = .000, F = 4.62, df = 2, 7218, P = .01 and F = 7.79, df = 1, 7218, P = .005 respectively. Their significance strongly indicate that they are independent sources of variation among the means.

The F values for State × group, State × sex and group × sex are 10.13 (df = 12, 7218, P = .000), 5.83 (df = 6, 7218, P = .000) and 3.06 (df = 2, 7218, P = .047) respectively. The 3-way interaction is not significant.

Conclusions and Interpretations

Main Effects

State: The monthly parental incomes differed significantly from State to State. The rank order of mean incomes in the descending order is as follows: Mizoram: Rs. 1103.07, Rajasthan: Rs. 706, Bihar: Rs. 641.62, UP: Rs. 541.33, Orissa: Rs. 476.48, Maharashtra: Rs. 423.18, Karnataka: Rs. 390.25. It is interesting to note that the average monthly parental income in Mizoram was more than three times than that in Karnataka and twice as much as that of the other States except Rajasthan.

The pair-wise difference on this variable was as follows:

* The monthly parental income of pupils of Mizoram was higher than that of pupils of Karnataka, Maharashtra, Orissa, UP, Bihar and Rajasthan.
* The monthly parental income of pupils of Rajasthan and Bihar was higher than that of pupils of Karnataka, Maharashtra, Orissa and UP.
* The monthly parental income of pupils of Up was higher than that of pupils of Karnataka and Maharashtra.
* The monthly parental incomes of pupils of Karnataka and Maharashtra did not differ. (These differences were checked by the Scheffe procedure).

TABLE 7.4c

Cell means of monthly incomes of parents of pupils of Class I in All States for State × group

State \ Group	Project	Non-Project	Project + CCP	Total
UP	568.14 (570)	378.05 (233)	578.40 (614)	541.33 (1417)*
Orissa	426.15 (65)	691.94 (36)	413.31 (71)	476.48 (172)
Rajasthan	778.74 (409)	556.78 (278)	724.93 (671)	706.71 (1358)
Maharashtra	318.16 (256)	466.45 (289)	451.37 (510)	423.18 (1055)
Bihar	688.61 (140)	734.15 (53)	590.60 (225)	641.62 (418)
Mizoram	1172.58 (425)	1093 90 (410)	1049.90 (485)	1103.07 (1320)
Karnataka	310.86 (198)	423.92 (346)	394.42 (976)	390.25 (1520)
Total (All States)	682.40 (2063)	630.19 (1645)	599.14 (3552)	629.84 (7260)

*Figures in brackets indicate N.

TABLE 7.4c'

Expected means and differences between actual and expected means for monthly incomes of parents of pupils of Class I in All States for State × group

State \ Group	Project	Non-Project	Project + CCP	Total
UP	593.89 N = 570 D = −25.75	541 68 N = 233 D = −163 63	510.83 N = 614 D = +67.77	541 33 N = 1417
Orissa	529.04 N = 65 D = −102.89	476.83 N = 36 D = +215 11	445 78 N = 71 D = −32.47	476 48 N = 172
Rajasthan	759 27 N = 409 D = +19 47	707 06 N = 278 D = −150.28	676 01 N = 671 D = +48 92	706 71 N = 1358
Maharashtra	475 74 N = 256 D = −157 58	423.53 N = 289 D = +42.92	392.48 N = 510 D = +58.89	423.18 N = 1055
Bihar	694.18 N = 140 D = −5.57	641.97 N = 53 D = +92.18	610 92 N = 225 D = −20.32	641 62 N = 418
Mizoram	1055.63 N = 425 D = +116 95	1003 43 N = 410 D = + 90.48	972 37 N = 485 D = +77 53	1103 07 N = 1320
Karnataka	442 81 N = 198 D = −131 95	390 60 N = 346 D = +33.32	359.55 N = 976 D = +34 87	390 25 N = 1520
Total (All States)	682 40 N = 2063	630.19 N = 1645	599.14 N = 3552	629.84 N = 7260

One is not sure whether this data reflects the reality of the States. If it may be assumed that it does, then some educationally backward States do not seem to be economically backward. As may be recalled, while the male to female ratios seemed to tally fully with educational backwardness, economic backwardness did not seem to, except in the case of Orissa. If it does not reflect the true picture in the States, then it appears that the project was not located in the disadvantaged areas or that the schools selected from Rajasthan and Bihar did not belong to the areas where the poorest of poor live.

Group: The monthly parental incomes of pupils studying in project, non-project and project schools + CCP varied significantly, their average incomes being Rs. 682.40, Rs. 630 19 and Rs. 599.14, respectively. Obviously, the economically most deprived pupils were studying in project schools where the CCP was conducted. Therefore, they differed from the other two types of schools. The pupils in project schools were the most affluent of the three groups. This finding, which is of the utmost importance, very strongly suggests that before the effectiveness of the project intervention is claimed, the effect of income should be eliminated.

Sex: The mean monthly incomes of parents of male pupils was significantly lower than that of the parents of female pupils, i.e., Rs. 614.03 and Rs. 656.08, respectively. This result suggests that perhaps the girls belonged to relatively more affluent sections of the society than did the males. It is possible that the poorer parents might be withholding female children at home for day-to-day chores or for taking care of siblings for which the male children are neither required nor expected to be engaged. This seems to reinforce the position argued earlier regarding the female to male ratio that the discrimination against the education of the female child, especially by the low-income group, may be the root cause of their poor enrolment in school.

2-way Interactions

State X Group: To a great extent, in addition to State and group influencing the monthly parental incomes of pupils independently, State and group together contributed to the variance

TABLE 7.4 d

Cell means of monthly incomes of parents of pupils of Class I in All States for State X sex

State \ Sex	Male	Female	Total
UP	520 10 (1062)	604.84 (355)	541.33 (1417)*
Orissa	491.97 (94)	457.82 (78)	476.48 (172)
Rajasthan	673.44 (1015)	805.17 (343)	706.71 (1358)
Maharashtra	406.35 (544)	441.10 (511)	423.18 (1055)
Bihar	606.63 (275)	708.93 (143)	641.62 (418)
Mizoram	1126 24 (687)	1077.91 (633)	1103.07 (1320)
Karnataka	396.30 (854)	382.50 (666)	390.25 (1520)
Total (All States)	614.03 (4531)	656.08 (2729)	629.84 (7260)

*Figures in bracket indicate N.

TABLE 7.4d'

Expected means and differences between actual and expected means for monthly incomes of parents of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
U P.	525.52 N = 1062 D = -5.42	567.57 N = 355 D = +37.27	541.33 N = 1417
Orissa	460.67 N = 94 D = +31.3	502.72 N = 78 D = -44 9	476.48 N = 172
Rajasthan	690.90 N = 1015 D = -17 46	732.95 N = 343 D = +72.22	706.71 N = 1358
Maharashtra	407.37 N = 544 D = -1.02	449.42 N = 511 -8.32	423.18 N = 1055
Bihar	625.81 N = 275 D = -19.18	667.86 N = 143 D = +41.07	641.62 N = 418
Mizoram	987.26 N = 687 D = +138.98	1029.31 N = 633 D = +48.6	1103.07 N = 1320
Karnataka	374.44 N = 854 D = +21.86	416.49 N = 666 D = -33.99	390.25 N = 1520
Total (All States)	614.03 N = 4531	656 08 N = 2729	629.84 N = 7260

and, therefore, to differences between the observed means in cells.

Comparison between the cell means and their corresponding expected means along with positive negative deviations in Table 7.4c' reveal the variation in the means due to the interaction between State × group. The fact that there are positive differences under the 'project school' column indicates that the monthly parental incomes of pupils in Rajasthan and Mizoram were more than expected (+19.47 and +116.95), whereas those of pupils in U.P. Maharashtra, Orissa, Bihar and Karnataka were lower than expected (–5.57 to –157.58). While the monthly parental incomes of pupils studying in non-project schools in Orissa, Maharashtra, Bihar, Mizoram and Karnataka were higher than expected (+33.32 to +215.11), those of pupils in U.P. and Rajasthan were much lower than expected (–163.63 and –215.11). In contrast to these, the positive and negative fluctuations of the parental incomes among States for project schools + CCP were much less than expected, the range being +77.43 to –20.32. Thus, the trend for rejecting the null hypothesis will differ from one State to another.

Needless to mention, the probable influence of income on pupil achievement will have to be partialled out.

State X Sex: Here also State and sex together accounted for the differences found between the means of cells as shown in table 7.4d & 7.4d'.

Here the range of positive and negative differences is larger than the one observed for the females, indicating thereby trends for sex in States different from the trend for the total sample. The parental incomes of females of all other States except Karnataka and Orissa are higher than those of males. While no difference existed between the parental incomes of male and females of Karnataka, that of males in Orissa was higher that that of females—a sort of reversal of the general trend.

Group X Sex: Cell means, expected means and their differences for group × sex are presented in Tables 7.4e and 7.4e'.

The positive and negative differences for males and females in project schools show that the actual monthly parental incomes differed marginally from the expected monthly parental incomes. However, while the monthly parental income was less for males and more for females in non-project schools, it was more for males and less for females than expected in project schools + CCP. The differences are quite substantial. Hence the significant interaction influence on the monthly parental incomes.

At the end, attention needs to be drawn to the fact that, as has been indicated by the values of interactions for the pairs of variables under consideration here, State and group accounted for more for the differences among the cell means than State and sex, and State and Sex accounted more than group × sex. During the examination of cell means formed by these pairs, the decrease in variation among between cell means was quite evident.

TABLE 7.4e

Cell means of monthly incomes of parents of pupils of Class I in All States for group × sex

Group \ Sex	Male	Female	Total
Proj.	664.84 (1323)	713.79 (740)	682.40 (2063)*
Non-Proj	582.42 (1030)	710.20 (615)	630.19 (1645)
Proj + CCP	598.11 (2178)	600.77 (1374)	599.14 (3552)
Total (All States)	614.03 (4531)	656.08 (2729)	629.84 (7260)

*Figures in brackets indicate N.

TABLE 7.4e'

Expected means and differences between actual and expected means for monthly incomes of parents of pupils of Class I in All States for group × sex

State \ Sex	Male	Female	Total
Project	666.53 N = 1323 D = –1.69	708.58 N = 740 D = +65.21	682.40 N = 2063
Non-Project	614.38 N = 1030 D = –31.96	656.43 N = 615 D = +53 77	630.19 N = 1645
Project + CCP	583.33 N = 2178 D = +14.78	625.38 N = 1374 D = –24.61	599.14 3552
Total (All States)	614.03 N = 4531	656.08 N = 2729	629.84 N = 7260

* Mention has been made earlier of the lower male-female ratio in this sample. Since the entire sample of pupils belonged to economically deprived homes, it seems plausible that both mortality and discrimination against females' education might have contributed to this lower ratio between the sexes.
* This result further suggests that before drawing any conclusion about the relationship between the groups and pupil achievement, the effect of parental income should also be ruled out.

VARIABLE: *TOTAL PUPIL ACHIEVEMENT — T SCORES*

Descriptive Statistics

Coefficients of Correlation: At the very beginning it is necessary to clarify a few points regarding the pupil achievement score. The PAT was developed as a single test on the basis of a blueprint of evaluation prepared with the help of the project coordinators of the participating States. The test-design of the PAT included four different objectives, viz. K, U, A and S. Thus, it was essentially an objective-based test or a criterion-reference test comprising these four components with appropriate weightages assigned to each one of them along with the related contents (*see* the detailed discussion under 'Preparation of Tests/Tools—Paper Pencil Tests' in Chapter Five). There were five different tests for five different classes, i.e., Classes I-V. Therefore, while the test was given as a single-achievement test, its analysis was done in terms of four different sub-tests, as if a battery of four tests had been given to measure four clusters of different abilities. This necessitated first ascertaining whether the four sub-tests measured different abilities or similar abilities. In order to answer this question, correlation values (*r*) were computed, which have been presented in Table 7.5.

The *r* values showing the relationship between Total achievement score and the scores on the other four sub-tests are quite high, viz. between 0.656 and 0.870, indicating thereby that there were more common or similar factors present rather than different ones, in the tests. However, Sub-test S seems to have less commonality with the PAT than the other three

TABLE 7.5

Coefficients of correlation among total pupil achievement scores (T) and scores for components K, U, A and S of pupils of Class I in All States.

N = 7260

	K	U	A	S	T
K		.562	.547	.406	.783
U			.612	.493	.870
A				.481	.838
S					.656
T					1.000

components. This is supported by the values of *r* among K, U, A and S. the values of *r* of S with the other three sub-tests are lower than those among the three sub-tests themselves. These results strongly suggest that Sub-test S, although a part of the PAT, measured different abilities than did the other tests, as well as the PAT. It is obvious that the overall test (PAT) had a loading of cognitive factors. Similarly, the other three tests had also the loading of the same or similar factors. Reference to the PAT revealed that two factors seemed to have contributed to these coefficients: (1) Sub-test S consisted of only one item, and (2) the item measured the skill of 'observation' which, though very vital to science, cannot be bracketed with manipulative skill. It can easily be classified as part of the cognitive processes. And yet, it has been found to have lower correlations with K, U and A than those found among these three.

Close examination of the values of *r* reveals that the correlation between Sub-tests K and U is slightly higher than that between Sub-tests K and A. This indicates that the former pair is more alike than the latter. In the same vein, Sub-tests U and A are less alike than Sub-tests K-A and K-U. In general they seem to measure rather similar abilities than different ones. This finding is commensurate with the assumptions implied in the *Advanced Curriculum Model of Cognitive Learning*, propounded by Dave (1976). According to this model, the higher-level objective subsumes all the lower-level objectives, e.g., K = 1; U = K + U = 1 + 2; A = K + U + A = 1 + 2 + 3. Hence the higher correlations among them.

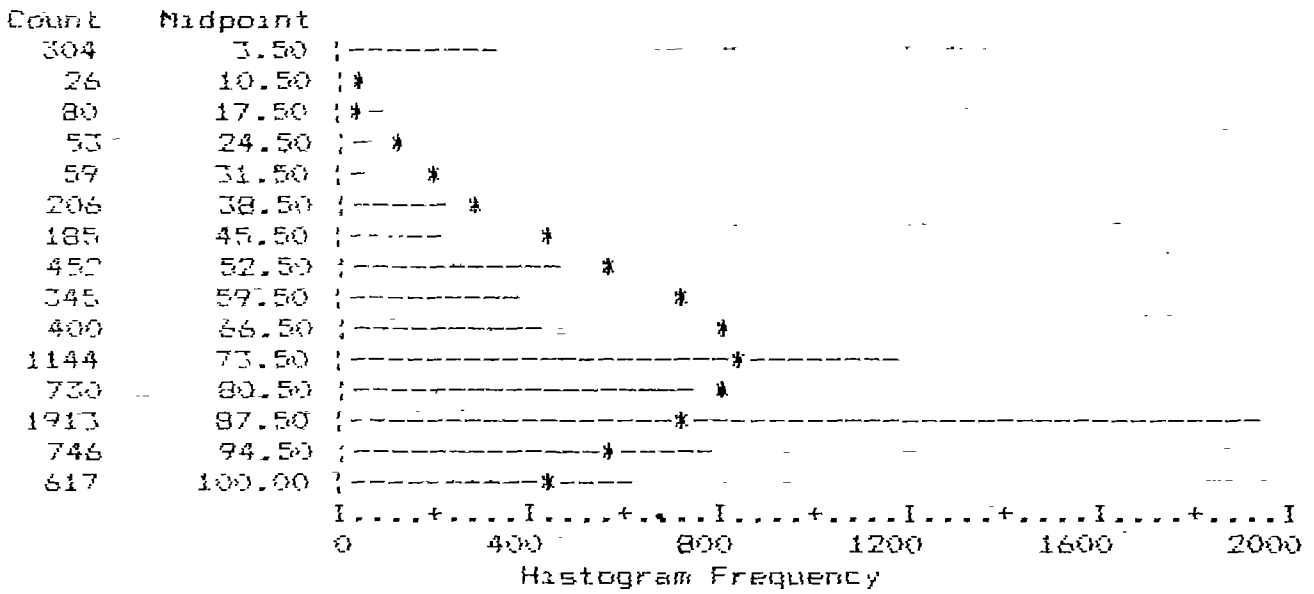


FIG. 7.3
Theoretical (asterisks) and empirical frequency distributions of T scores of pupils of Class I in All States

TABLE 7.6
Measures of central value and variability of T scores of pupils of Class I in All States

T Total Score

Mean	71.092	Median	80.000	Mode	80.000
Std Dev	23.755	Skewness	-1.367	Range	100 000
Percentile	Value	Percentile	Value	Percentile	Value
25 00	60.000	50.00	80.000	75.00	90.000
N 7260					

Measures of Central Value and Variability (Dispersion): While Fig. 7.3 presents the distributions of frequencies of T scores—the histogram frequency—Table 7.6 shows the basic statistical values.

The data indicates that the frequency distribution of Total achievement scores is slightly skewed, with the median (80) being a little higher than the mean value (73.42). This is clearly evident when the asterisk points are matched with the relevant points on the line curve. Further, the value SD (23.80) is higher than the value that is derived as 1/6 of the range 100, i.e., 16.67, indicating a little more variation in the achievement scores. In spite of these slight deviations from the theoretical predictions, the distribution can be considered close to the normal probability curve.

Conclusions and Interpretations

* The total achievement of pupils of Class I could be considered quite high as the total sample mean was 73.42%. The 75th percentile value of 90% indicates that a large majority of pupils of Class I developed concepts and skills related to nutrition, health and environmental sanitation. Equally important is the 25th percentile value of 65%. In the context of the country's efforts to help all children to achieve at least a minimum level of learning, it is indeed heartening to note that less than 25 per cent pupils were below the T score 65%. This indicates that a majority of children developed concepts and skills related to the subject.

Predictors of Pupil Achievement — T Scores

Step-wise Multiple Regression Analysis (SWMRA): A decision was taken to use a variety of statistical procedures in order to measure the impact of the project intervention. Before the results derived through ANOVA and ANCOVA are discussed, it is felt that it would be proper to examine which independent variables were significantly related to pupil achievement and how

TABLE 7.7

Step-wise multiple regression analysis for T scores of pupils of Class I in All States

Equation Number 1 Dependent Variable TOTAL SCORE

Beginning Block Number 1 Method Stepwise

Variable(s) Entered on Step Number
1. ATTENDANCE

Multiple R	.22875
R Square	.05233
Adjusted R Square	.05219
Standard Error	23.62790

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	221450.89020	221450.89020
Residual	7184	4010667 83287	558.27782

F = 396.66790 Signif F = 0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.28373	.01425	.22875	19 917	.000
(Constant)	51.71808	1.12786		45.855	.0000

Variable(s) Entered on Step Number
2. LOCALE: URBAN/RURAL

Multiple R	.25067
Square	.06284
Adjusted R Square	.06257
Standard Error	23.49817

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	265925 28244	132962.64122
Residual	7183	3966193 44063	552.16392

F = 240 80284 Signif F = 0 0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.26461	.01433	.21334	18.470	.0000
Locale	-7.84217	.87381	- 10366	-8.975	.0000
(Constant)	67.95542	2.12872		31.923	.0000

Variable (s) Entered on Step Number
3. INCOME

Multiple R	.25575
R Square	.06541
Adjusted R Square	.06502
Standard Error	23.46755

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	276805.50534	92268.50178
Residual	7182	3955313.21774	550.72587

F = 167.53980 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.25909	.01436	.20888	18.040	.0000
Locale	-6 35939	.93426	- 08406	-6.807	.0000
Income	2.524857E-03	5.68049E-04	.05478	4.445	.0000
(Constant)	63.99271	2.30532		27.759	.0000

Variable(s) Entered on Step Number
4. FATHER'S OCCUPATION

Multiple R	.25770
R Square	.06641
Adjusted R Square	.06589
Standard Error	23.45661

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	281043.06743	70260.76686
Residual	7181	3951075.65564	550.21246

F = 127.69752 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T	VAf
Attendance	.24891	.01482	.20068	16.800	.0000	4.595
Locale	-6.54433	.93620	- 08651	-6.990	.0000	1.167
Income	2.076292E-03	5.90342E-04	.04505	3.517	.004	0.513
Father's Occu.	.42698	.15385	.03416	2.775	.0055	0.365
(Constant)	63.91537	2.30441		27.736	.0000	—
						T = 6.640

5. Coefficients of Correlation

	Attendance	Locale	Income	Father's Occu.	Total Score
Attendance	—	-.149	.134	.268	.229*
Locale		—	-.370	-.076	-.135
Income			—	.291	.114
Father's Occu.				—	.107
Total Score					—

*Values significant beyond .05 level.

much contribution they made to the criterion variables, i.e., T, K, U, A and S scores. Consequently, the following variables were manipulated as independent variables in order to identify the predictors, i.e., Coefficients of Multiple Determination (R Square), and determine their potential for predicting the achievement of pupils on the PAT and Sub-tests: Attendance; Income; Social status—Disadvantaged/Advantaged; Locale—Urban/Rural; Mother's education; Father's education; Father's occupation and Mother's occupation. The analysis was carried out through the step-wise multiple regression analysis (SWMRA). The test yielded various values, viz., Multiple R, R Square, F (ANOVA) and *t* along with their significance levels. These are presented in Table 7.7.

The independent variables, e.g., Attendance, Locale, Income and Father's occupation, were serially entered into the regression equations step by step, depending upon the magnitude of their correlations with the dependent variable. Although the values of all the steps have been reproduced in the table, only the values related to the last step have been discussed here.

The value of F is 127.70 with df = 4, 7181 at P = .0000. Therefore the null hypothesis that the combined variables and T scores are not

associated in the population and they differ from zero only by chance is rejected.

The beta values and VAf values clearly indicate that the contribution of attendance to the variance in T scores is the highest of the four variables entered step-wise into the regression equation, thereby highlighting its importance in predicting pupil achievement.

Conclusions and Interpretations

* The overall result establishes the fact that joint action by Attendance, Locale, Income and Father's occupation acquires a higher predictive value than what their individual correlations with T scores indicate. Although small in degree (R = .25770), the relationship of the combined variables with pupil achievement (T) is significant. As expected, since the relationship is low, they accounted for only 6.64 per cent variance in the T score, leaving 1 – 0.0664 = 0.9336, i.e., 93.36 per cent variance to be accounted for by the factors not included in the regression equations. All the same, their combined effect being significant, their contribution to T scores indicates that the pupils whose attendance was higher, who belonged to rural areas and whose parents' occupation were better and the income higher, seemed to have scored higher than those pupils who were lower on the three variables and belonged to urban areas. However, when the combined variance of 6.640 is broken into parts, their separate variance accounted for (VAf) suggests that the major contributor to the criterion variable is Attendance, followed by Locale, Income and Father's occupation, in that order. It may then be inferred that pupils who attended more days developed better concepts and understanding of desirable practices than those who attended a lesser number of days. However their joint effect on the learnings of pupils in nutrition, health and environmental sanitation needs to be recognized.

  It is important to highlight the fact that the variables which are usually clubbed under SES, e.g., Locale, Income and Father's occupation, here are not associated with T scores as strongly as Attendance has been. Besides, Locale is negatively related to the T score, indicating thereby the trend of T scores in favour of rural pupils. This finding at once takes utmost importance, for it is at variance with the conclusion drawn by Alexander and Simmon (1975) from their Education Production Function studies conducted in selected developed and developing countries, in which India was included. They reported "a strong effect of home background or parental socio-economic status on student performance at primary and lower secondary grades in all academic subjects tested". As will be seen later, consistently these so called SES variables seem to play a less important role than Attendance. As a matter of fact, it is the project intervention which seems to relate more strongly to pupil achievement than SES variables, as the ANCOVA results with attendance and income covariates would show.

It is equally important to state that this result does not support the view so strongly held by scholars and public alike in India that these are the real hurdles coming in the way of pupil attendance and achievement. The link between SES and pupil achievement is weak so far as this study is concerned.

Testing of the Null Hypothesis

Homogeneity of Variance: Two separate tests were conducted to check the homogeneity of variance of Total scores in the three treatment groups, the values of which are presented below:

Cochrans C = 0.4766, P = 0.005
Bartlett-Box F = 125.41, P = 0.0001

The above values and their significance show that the variances of three major groups differ greatly and, therefore, considerable caution needs to be exercised before any conclusions are drawn on the basis of only parametric tests. Having made this observation, it is also necessary to report that some statisticians take a position that the F test is quite robust and, with large samples, one need not worry too much about the dispersion of scores and the heterogeneity of variance within the samples. To quote Garrett:

TABLE 7.8a

Analysis of variance of T scores of pupils of Class I in All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	1126227.126	9	125136 347	342.010	.000
State	894399.498	6	149066.583	407.414	.000
Group	251836.992	2	125918.496	344.148	.000
Sex	377.370	1	377.370	1.031	.310
2-way Interactions	312668.784	20	15633.439	42.728	.000
State × Group	292218.973	12	24351.581	66.555	.000
State × Sex	8006.386	6	1334.398	3.647	.001
Group × Sex	3885.014	2	1942.507	5.309	.005
3-way Interactions	16383.148	12	1365.262	3.73	.000
State × Group × Sex	16383.148	12	1365.262	3.731	.000
Explained	1455279.058	41	35494.611	97.010	.000
Residual	2640959.110	7218	365.885		
Total	4096238.168	7259	564.298		

TABLE 7.8b

Analysis of covariance of T scores of pupils of Class I in All States showing F values for State, group, sex and interactions after partialling out the effect of attendance and income

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Covariates	135471.236	2	67735 618	187.279	.000
Attendance	92666.445	1	92666.445	256.209	.000
Income	29653.247	1	29653.247	81.987	.000
Main Effects	1014503.246	9	112722.583	311.661	.000
State	767849.687	6	127974.948	353.832	.000
Group	256168.232	2	128084.116	354.134	.000
Sex	450.475	1	450.475	1.245	.264
2-way Interactions	320841.244	20	16042.062	44.354	.000
State × Group	300659.921	12	25054.993	69.273	.000
State × Sex	7963.822	6	1327.304	3.670	.001
Group × Sex	3226.927	2	1613.464	4.461	.012
3-way Interactions	15518.908	12	1293.242	3.576	.000
State × Group × Sex	15518.908	12	1293.242	3.576	.000
Explained	1486334.634	43	34565.922	95.570	.000
Residual	2609903.534	7216	361.683		
Total	4096238.168	7259	564.298		

Covariate	Raw Regression Coefficient
Attendance	.209
Income	.004

"This second assumption of equal variance can be tested by means of Bartlett's test for homogeneity of variance. Unless the samples are quite small, however, the experimental evidence shows that variances in samples may differ considerably and the F test still be valid." (Garret, 1981, p. 286.)

This opinion is strongly corroborated by a citation from Lindquist by Guilford:

"Some extensive studies by Norton on sampling problems in analysis of variance have thrown considerable light upon what happens to F when distributions of populations are not normal and variances are not equal. With artificial populations of 10,000 cases, Norton varied the shape of distribution in various ways, making it leptokurtic, rectangular, markedly skewed, and even J-shaped. Other populations were normally distributed, but variances were 25, 100, 225 in different cases—in other words markedly differing—the standard deviations being 5, 10, and 15, respectively.

TABLE 7.8c

Cell means of T scores of pupils of Class I in All States for State × group × sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar Pradesh	83.03	45.17	81.19	75.81	77.02	48.68	87.28	77.15	76.15 (3)*
N	419	180	463	1062	151	53	151	355	1417
Orissa	66.34	64.00	52.86	61.70	60.42	61.82	56.98	58.72	60.35 (5)
N	41	25	28	94	24	11	43	78	172
Rajasthan	74.13	48.98	79.22	71.53	76.77	49.58	82.62	73.99	72.15 (4)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	60.50	46.26	51.03	51.64	53.78	44.66	52.44	51.00	51.33 (6)
N	121	171	252	544	135	118	258	511	1055
Bihar	59 40	20.00	50.94	49 85	69.25	7.50	44.48	47.27	48.97 (7)
N	100	37	138	275	40	16	87	143	418
Mizoram	79.50	80.46	81.66	80 57	80.83	81.97	82.33	81.74	81.13 (1)
N	221	217	249	687	204	193	236	633	1320
Karnataka	80.63	75.62	79.93	79.04	72.76	73.68	77.59	76.07	77.74 (2)
N	111	194	549	854	87	152	427	666	1520
Total	75.79	58.83	74.70	71.41	72.34	63.80	72.63	70.56	71.09
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 74.55			Non-Project MF = 60.69			Project + CCP MF = 73.90		
N	2063			1645			3552		

*Figures in the brackets represent RANKS of the State means.

"One general finding was that F is rather insensitive to variations in shape of population distribution. This is consistent with the known principle that distributions of means (sampling distributions) approach normality even though populations are not normally distributed. Another general finding was that F is somewhat sensitive to variations in variances of populations, but that only marked differences in variance are serious." (Guilford, 1956, pp. 300-301.)

Since the tests of homogeneity of variance are highly significant, the author has thought it advisable to use F tests with caution and also to verify the results with the help of the appropriate non-parametric tests. The conclusions and interpretations in this report have, therefore, been drawn in keeping with the parity between the results obtained through both parametric and non-parametric techniques. The thrust of the investigator has been to search for the 'true' difference between independent and dependent variables as far as possible.

The null hypothesis of random sampling from a common population even when the effect of the covariates attendance and income is ruled out, was tested through the analysis of variance and covariance for the State (7) × group (3) × sex (2) = 42-cell design. While the values F and their significance levels are presented in Table 7.8a (ANOVA) and 7.8b (ANCOVA), the cell means for State × group × sex are presented in Table 7.8c, for State × group in 7.8d, for State × sex in 7.8e, and for group × sex in 7.8f. The values of various non-parametric tests for State, group and sex are presented separately in Tables 7.9a, 7.9b 7.9c.

The F values for main effects (except for sex) and 2-and 3-way interactions obtained through both ANOVA and ANCOVA are significant be-

yond .01 level, there by rejecting the null hypothesis of random sampling from a common population even when the effect of covariates is partialled out. Although the results remain unchanged through the ANCOVA test, it is interesting to note that there are some changes in the values of F for the main effects and interactions as a result of elimination of the effect of Attendance and Income. Since there is a complete parity between the results of ANOVA and ANCOVA, the discussion has been carried out keeping the results of ANCOVA in view.

The values of F for State and group are 353.83 (df = 6,7216) and 354.13 (df = 2, 7216), respectively, which are significant beyond. 01 level, thereby supporting the alternate hypothesis of significant differences existing among the means of State and groups. The F ratios for 2-way interactions between all the three pairs are significant at less than the 1 per cent level, indicating thereby the significant contribution of each pair to the variance in T scores. Further, the 3-way interaction is also found to be significant at less than the 1 per cent level, showing the contribution of this higher order interaction to T scores.

Conclusions and Interpretations

Main Effects

State: The null hypothesis of no differences existing among the means of T scores for States was rejected. Further examination of the means in Table 7.8c shows that they varied from the highest mean 81.13 (Mizoram) to the lowest mean 48.97 obtained by pupils in Bihar, showing a range 32.16 (*see* the ranks also).

While the means of Mizoram, Karnataka, U.P. and Rajasthan were above the total sample mean of 71.09, those of Orissa, Maharashtra and Bihar were below it. This result was checked with that obtained through the Kruskal Wallis One-way ANOVA. The values and other relevant details are presented in Table 7.9a.

The Chi-square value, 1295.29, is significant beyond .0000 level, thereby rejecting the null hypothesis of no differences among the average T scores of pupils belonging to different States. Comparison of the rank order of the means (Table 7.8c) and that of the mean ranks in Table 7.9a shows that except a nominal change in the 2nd and 3rd ranks of U.P. and Karnataka, there is a complete parity.

TABLE 7.9a

Kruskal Wallis One-way ANOVA of T scores of pupils of Class I in All States showing Chi-square value for States

Ranks	Mean Rank	Cases	
2	3834 33	1291	ST = UP
5	1971.34	148	ST = Orissa
4	3275.62	1212	ST = Rajasthan
6	1802.81	945	ST = Maharashtra
7	1700.11	377	ST = Bihar
1	3995.68	1192	ST = Mizoram
3	3649.31	1357	ST = Karnataka
		N = 6522	

Corrected for Ties	Chi-Square	Significance
	1295.2850	.0000

What does the result indicate ? First of all it is conceded that the purpose of running the F test for States was to confirm whether the States differed in their total pupil achievement or whether they were drawn from a common population. Had they not differed the author would not have carried out further State-wise analysis. They did differ, and hence the prima facie case for treating each State as an independent sample.

As expected, the State samples differed. Therefore, the alternate hypothesis was found tenable: Mizoram M > Karnataka M > U.P. M > Rajasthan M > Orissa M > Maharashtra M > Bihar M. The Scheffe procedure, however, showed which of the pairs of seven States were different from each other. It is surprising to note that Maharashtra's rank was lower than that of U.P., Rajasthan and Orissa, and the differences were significant at the 5 per cent level.

The pair-wise difference on this variable was as follows:

* The total achievement of the pupils of Mizoram was higher than that of the pupils of Bihar, Maharashtra, Orissa, Rajasthan, U.P. and Karnataka.
* The total achievement of the pupils of Karnataka and U.P. was higher than that of the pupils of Bihar, Maharashtra, Orissa and Rajasthan.
* The total achievement of the pupils of Rajasthan was higher than that of the pupils of Bihar, Maharashtra, and Orissa.
* The total achievement of the pupils of

TABLE 7.Cl-I-States

Results of Scheffe procedure showing significant differences between pairs of means of States for T, K, U, A and S scores

Variable	Total Score							Knowledge Score						
State	U.P.	Oris	Rāja	Maha	Bihar	Mizo	Kar	U.P.	Oris	Raja	Maha	Bihar	Mizo	Kar
U.P.		*	*	*	*	0			*	*	*	*	*	
Orissa	0		0	*	*	0	0	0			*	*	0	0
Rajasthan	0	*		*	*	0	0	0			*	*	0	0
Maharashtra	0	0	0			0	0	0	0	0			0	0
Bihar	0	0	0			0	0	0	0	0			0	0
Mizoram	*	*	*	*	*		*	0	*	*	*	*		*
Karnataka		*	*	*	*	0			*	*	*	*	0	

Variable	Understanding Score							Application Score						
U.P.		*		*	*	0			*		*	*	0	0
Orissa	0			*	*		0	0		0	*	*	0	0
Rajasthan		*		*	*	0	0		*		*	*	0	0
Maharashtra	0	0	0			0	0	0	0	0			0	0
Bihar	0	0	0			0	0	0	0	0			0	0
Mizoram	*	*	*	*	*			*	*	*	*	*		
Karnataka		*	*	*	*			*	*	*	*	*		

Variable	Skill Score						
U.P.		*		*	*		0
Orissa	0		0			0	0
Rajasthan		*		*	*	0	0
Maharashtra	0		0		*	0	0
Bihar	0		0	0		0	0
Mizoram		*	*	*	*		
Karnataka	*	*	*	*	*		

* & 0 indicate significant difference between the pair of States at the .05 level.

Orissa was higher than that of the pupils of Bihar and Maharashtra.

* The pupils of Bihar and Maharashtra did not differ in their total pupil achievement, (*see* Table 7.Cl-I States).

Group: The result for groups establishes the fact that the means of pupil achievement differed significantly. The means of the groups in Table 7.8c indicate that while the difference between the means of project schools and project schools + CCP was negligible (74.55 and 73.90), that of non-project schools (60.69) differed significantly from both of them. This was supported by the Scheffe procedure at the 5 per cent level of significance. This result was then confirmed with that obtained through the Kruskal Wallis One-way AVOVA. The Chi-square value and other relevant details have been presented in Table 7.9b.

TABLE 7.9b

Kruskal Wallis One-way ANOVA of T scores of pupils of Class I in All States showing Chi-square value for group

Rank	Mean Rank	Cases	
1	3487.37	1865	Grp = Project Schools
3	2548.13	1479	Grp = Non-Project Schools
2	3460.94	3178	Grp = Project Schools + CCP

N = 6522

Corrected for Ties	Chi-Square	Significance
	283.5869	00001

The Chi-square value of 283.59 is significant at less than .0000 level, thereby enabling us to reject the null hypothesis of no differences existing among the average T scores of pupils belonging to different groups. Besides, the rank order of means (refer to Table 7.8c) and that of the mean ranks (Table 7.9b) matches com-

pletely. Thus, the achievement of pupils belonging to non-project schools was significantly lower than the achievements of the pupils of the other two treatment groups. Conceptually, this corroborates only partially the prediction implied in the alternate hypothesis. The benefit of the intervention should have accrued most to the pupils belonging to project school + CCP. That has not happened. Therefore the community contact programme did not act as a reinfocement to the learnings of pupils in school.

Sex: The result for sex suggests that the means of males and females did not differ significantly (71.41 and 70.56). This was confirmed by the Mann-Whitney U-Wilcoxon Rank Sum W test. The Z value of −1.885 denotes that both the U and W shown in Table 7.9c are not significant at the 5 per cent level.

TABLE 7.9c

Mann-Whitney U-Wilcoxon Rank Sum W test of T scores of pupils of Class I in All States showing U-W and Z values for sex

Rank	Mean Rank	Cases	
1	3295.05	4072	Sex = Male
2	3205.64	2450	Sex = Female
	N = 6522		
Corrected for Ties			
U	W	Z	2-tailed P
4851600.0	7853815.0	−1.8850	.0594

Thus, the null hypothesis of no difference between the average T scores of males and females was supported. It appears that the benefit of intervention accrued equally to males and females. This finding is valuable in the sense that given the opportunity, girls can do equally well, in spite of the fact that they are more burdened with routine chores at home. Discrimination against their education does not seem to have dampened the spirit of the young female child in Class I.

2-way Interactions

State X Group: To a considerable extent the interaction variance with respect to T scores is attributable to both State and group. In other words, in addition to State and group affecting the criterion scores independently, they together contributed to the differences between the observed means.

How do these positive and negative differences affect the rejection of the null hypothesis regarding the groups in each State? The ranges of the positive and negative deviations in the

TABLE 7.8d

Cell means of T scores of pupils of Class I in All States for State x group

State \ Group	Proj.	Non-Proj	Proj. + CCP	Total
UP	81.44	45.97	82.69	76.15
	(570)	(233)	(614)	(1417)*
Orissa	64.15	63.33	55.35	60.35
	(65)	(36)	(71)	(172)
Rajasthan	74.77	49.14	80.09	72.15
	(409)	(278)	(671)	(1358)
Maharashtra	56.95	45.61	51.75	51.33
	(256)	(289)	(510)	(1055)
Bihar	62.21	16.23	48.44	48 97
	(140)	(53)	(225)	(418)
Mizoram	80.14	81.17	81.96	81.13
	(426)	(410)	(485)	(1320)
Karnataka	77.17	74.77	78.90	77 74
	(198)	(346)	(976)	(1520)
Total	74 55	60.69	73 90	71 09
(All States)	(2063)	(1645)	(3552)	(7260)

*Figures in brackets indicate N.

TABLE 7.8d'

Expected means and differences between actual and expected means for T scores of pupils of Class I in All States for State x group

State \ Group	Project	Non-Project	Project + CCP	Total
UP	79.61	65.75	73 34	76.15
	N = 570	N = 233	N = 614	N = 1417
	D = +1.83	D = −19.78	D = +9.35	
Orissa	63.81	49.95	57 54	60.35
	N = 65	N = 36	N = 71	N = 172
	D = +0.34	D = +13.38	D = −2.19	
Rajasthan	75 61	61 75	69.34	72.15
	N = 409	N = 278	N = 671	N = 1358
	D = −0.84	D = −12 61	D = +10.75	
Maharashtra	54.79	40 93	48.52	51.33
	N = 256	N = 289	N = 510	N = 1055
	D = +21.6	D = +4.68	D = +3.23	
Bihar	52.43	38.57	46.16	48.97
	N = 140	N = 53	N = 225	N = 418
	D = +9.78	D = −22.34	D = +2.28	
Mizoram	84.59	70.73	78.32	81.13
	N = 425	N = 410	N = 485	N = 1320
	D = −4.45	D = +10.44	D = +3.64	
Karnataka	81 20	67 34	74.93	77.74
	N = 198	N = 346	N = 976	N = 1520
	D = −4.03	D = +7.43	D = +3.97	
Total	74 55	60.69	73.90	71.09
(All States)	N = 2063	N = 1645	N = 3552	N = 7260

three columns in Table 7.8d' clearly show that while there are wide differences in non-project schools (+13.38 to –22.34), the ranges are more or less similar in project schools and project schools + CCP, i.e., +9.78 to –4.45 and +10.75 to –2.19. Therefore, the contribution of non-project schools to the interaction variance seems more than that of the other two groups. Further, positive and negative differences in each of the groups, i.e., doing better or less well, have also had their effect in rejecting a null hypothesis or lending support to the alternate hypothesis within each State.

In Mizoram, non-project schools did better than expected, while the other two groups did less well than expected. The result is that the performance of pupils on the PAT did not differ in the three groups. Table 7. CI-I-Grp shows the significant difference at the 5 per cent level between the pairs of groups for each State. Similarly, the non-project schools and project schools + CCP in Karnataka did better than expected, which resulted in making them differ from only those project schools which did less well than expected. In the same vein, non-project schools in Orissa did much better than expected but with project schools + CCP showing a decline from what was expected. This resulted in project schools doing better than project schools + CCP but not better than non-project schools. So the trend among the groups in these States are different from the trend found for the total sample. Non-project schools in Rajasthan and Bihar performed much below the expected level. However, non-project schools in Rajasthan and project schools in Bihar did better than expected, and the pairs of groups differed accordingly. All the three groups in Maharashtra did better than expected and thus followed the pattern evident with respect to Bihar Thus the fluctuations in the cell means of State × group have affected the rejection of the null hypothesis in the States, thereby causing same patterns of results unlike the ones found for the total sample.

State X Sex: It is important to underline the point that sex was not found as the source of variation in T scores Males and females in All-State pooled data did not differ significantly. However, the interaction between State × sex indicated some fluctuations in the cell

TABLE 7.8e

Cell means of T scores of pupils of Class I in all States for State and sex

State \ Sex	Male	Female	Total
UP	75 81 (1062)	77.15 (355)	76.15 (1417)*
Orissa	61.70) (94)	58 72 (78)	60.35 (172)
Rajasthan	71 53 (1015)	73.99 (343)	72.15 (1358)
Maharashtra	51 64 (544)	51.00 (511)	51 33 (1055)
Bihar	49.85 (275)	47 27 (143)	48.97 (418)
Mizoram	80.57 (687)	81.74 (633)	81.13 (1320)
Karnataka	79 04 (854)	76 07 (666)	77.74 (1520)
Total (All States)	71.41 (4531)	70.56 (2729)	71 09 (7260)

*Figures in brackets indicates N.

TABLE 7.8e'

Cell means of T scores of pupils of Class I in All States for State and sex

State \ Sex	Male	Female	Total
U.P.	76.47 N = 1062 D = -0.66	75 62 N = 355 D = +1.53	76.15 N = 1417
Orissa	60 67 N = 94 D = +1.03	59 82 N = 78 D = -1.1	60.35 N = 172
Rajasthan	72 47 N = 1015 D = -0.94	71 62 N = 343 D = +2.37	72.15 N = 1358
Maharashtra	51 65 N = 544 D = -0.01	50.8 N = 511 D = +0.2	51.33 N = 1055
Bihar	49.29 N = 275 D = +0.56	48.44 N = 143 D = -1.17	48.97 N = 418
Mizoram	81.45 N = 687 D = -0.88	80.6 N = 633 D = +1 14	81.13 N = 1320
Karnataka	78 06 N = 854 D = +0.98	77.21 N = 666 D = 1 14	77 74 N = 1520
Total (All States)	71 41 N = 4531	70 56 N = 2729	71 09 N = 7260

TABLE 7.CI-I-Grp

Results of Scheffe procedure showing significant differences between pairs of groups for T, K, U, A and S scores of pupils of Class I in All-States and States

State	Variable	T			K			U			A			S		
	Group	1	2	M	1	2	M	1	2	M	1	2	M	1	2	M
	1			81.43			85.33			80.96			84.01			78.22
Uttar Pradesh	2	*		45.96	*		46.95	*		40.90	*		53.30	*		44.20
	3		*	82.68	*	*	80.45		*	80.87		*	87.49	*	*	85.99
	1			64.15						68.46			68.92			40.00
Orissa	2			68.33						63.06			72.78			43.06
	3	*	*	55.35				*	*	50.56	*	*	60.28	*	*	35.21
	1			74.76.			70.41			71.88			44.71			74.32
Rajasthan	2	*		49.13	*		48 12	*		47.26	*		56.22	*		42.66
	3	*	*	80.08	*	*	77.85	*	*	78.71		*	85.84	*	*	81.52
	1			56.95			58.20			61.48						44.92
Maharashtra	2	*		45.60	*		50.38	*		34.49						51.55
	3	*	*	51.74	*		50.23	*	*	52.13					*	39.11
	1			62.21			74 00			59.35			65.39			41.07
Bihar	2	*		16 22	*		21.88	*		11.13	*		20.75	*		12.26
	3	*	*	48.44	*	*	50.22	*	*	45.15	*	*	54.66		*	38.66
	1						86.54			76.71			81.65			76.35
Mizoram	2				*		89.90			74.12	*		86.95			74.39
	3				*	*	80 04	*	*	81.03	*		86.75	*	*	80.68
	1			77 17						74.64			80.05			83.58
Karnataka	2			74.76						70.11			82.34	*		75.43
	3		*	78 90					*	75.90	*	*	86.50		*	83.40
	1			74.55			76.98			73.40			78.01			69.17
All States	2	*		60.69	*		63.64	*		54.80	*		67.57	*		58.27
	3		*	73.90	*	*	71 81		*	72.12		*	79.90	*	*	73.24

M indicates means of groups.

means, which are reflected in Tables 7.8e and 7.8e'.

The tables show that positive and negative differences recorded for males are wider than those for females, i.e. + 1.03 to −.94 and +2.37 to −1.17, respectively Except in Orissa and Rajasthan, positive and negative differences of males and females in other States appear marginal. While the females in Orissa did better than expected and the males did less, in Rajasthan, the females performed much better than expected and the males did less well. These changes seem to have yielded a significant interaction between State × sex.

Group X Sex: Cell means for group × sex along with the expected means and their differences are presented in Tables 7.8f and 7.8f'.

Inspection of the positive and negative differences between actual and expected means in cells demonstrate clearly the combined effect of these two variables on T scores.

As was evident in the State × group result, positive and negative differences in non-project schools are larger than in the other two groups, thereby indicating the contribution of non-projects schools to the interaction variance. The females in non-project schools performed significantly better than the males, a trend different from that showing no difference between males and females for the total sample. It is obvious that the trend of groups for males and females has not been significantly different from that of the sample.

State X Group X Sex: To some extent, the 3-

TABLE 7.8f

Cell means of T scores of pupils of Class I in All States for group × sex

Group \ Sex	Male	Female	Total
Proj.	75.79	72.34	74.55
	(1323)	(740)	(20.63)*
Non-Proj.	58.83	63.80	60.69
	(1030)	(615)	(1645)
Proj.+CCP	74 70	72.63	73.90
	(2178)	(1374)	(3552)
Total	71.41	70.56	71.09
(All States)	(4531)	(2729)	(7260)

*Figures in brackets indicate N

TABLE 7.8f'

Expected means and differences between actual means and expected means for T scores of pupils of Class I in All States for group × sex

Group \ Sex	Male	Female	Total
	74.87	74 02	74.55
Project	N = 1323	N = 740	N = 2063
	D = +0.92	D = −1.68	
	61.01	60.16	60.69
Non-Project	N = 1030	N = 615	N = 1645
	D = −2.18	D = +3.64	
	74.22	73.37	73.90
Project + CCP	N = 2178	N = 1374	N = 3552
	D = +0.48	D = −0.74	
(All States)	71.41	70.56	71.09
Total	N = 4531	N = 2729	N = 7260

way interaction variance in addition to the variance of the main effects and of 2-way interactions, is influencing the T scores, thereby causing the differences between some cell means. It may be recalled that the F value for sex was not significant. During the discussion on the positive and negative differences between the actual means and expected means with respect to State × group, State × sex and group × sex, it was observed that marked fluctuations were evident in non-project schools and, specially in the States of U.P. (negative), Rajasthan (negative), Bihar (negative) and Mizoram (positive), (see Table 7.8d') as well as for females. A probe into the cell means of these States in Table 7.8c clearly shows the emerging patterns caused by the 3-way interactions. The pupils in the six cells of Mizoram do not seem to differ, whereas those in the other three States do.

This is not the appropriate place for a detailed discussion on the phenomenon of higher order interactions, except highlighting the fact that the nature of achievement, even if it is related to a selected portion of a single curricular subject like this, is indeed quite complex. The researcher should recognize the dangers of over-simplifying the results obtained through statistical designs which have not taken into consideration the interactive nature of the variables under study. The more complex an event, the more care needs to be taken before conclusions are drawn.

VARIABLE: *KNOWLEDGE—K SCORES*

Descriptive Statistics

Measures of Central Value and Variability (Dispersion): While Fig. 7.4 presents the distributions of frequencies of K scores—the histogram frequency, Table 7.10 shows the basic statistical values.

TABLE 7.10

Measures of central value and variability of K scores of pupils of Class I in All States

K Knowledge Score

Mean	71.424	Median	80 000	Mode
Std Dev	27 234	Skewness	−.969	Range
Percentile	Value	Percentile	Value	Percentile
25.00	60.000	50.00	80 000	75 00
N 7260				

The line graph indicates that the frequency distribution of K scores has a slight negative skewness (−.969), with the median (80) being higher than the mean value (71.42). This is clearly evident when the asterisk points are matched with the relevant points on the line curve. Further, the value SD (27.23) is much higher than what is derived as 1/6 of the range 100, i.e., 16.67, indicating variation in the K scores. In spite of these deviations, the distribution can be considered close to the normal probability curve for the purpose of subjecting the K scores to the parametric analysis.

Conclusions and Interpretations

* The achievement of pupils of Class I in knowledge (objective) could be considered quite high as the total mean was 71.42. The 75th percentile value, 100, indicates that

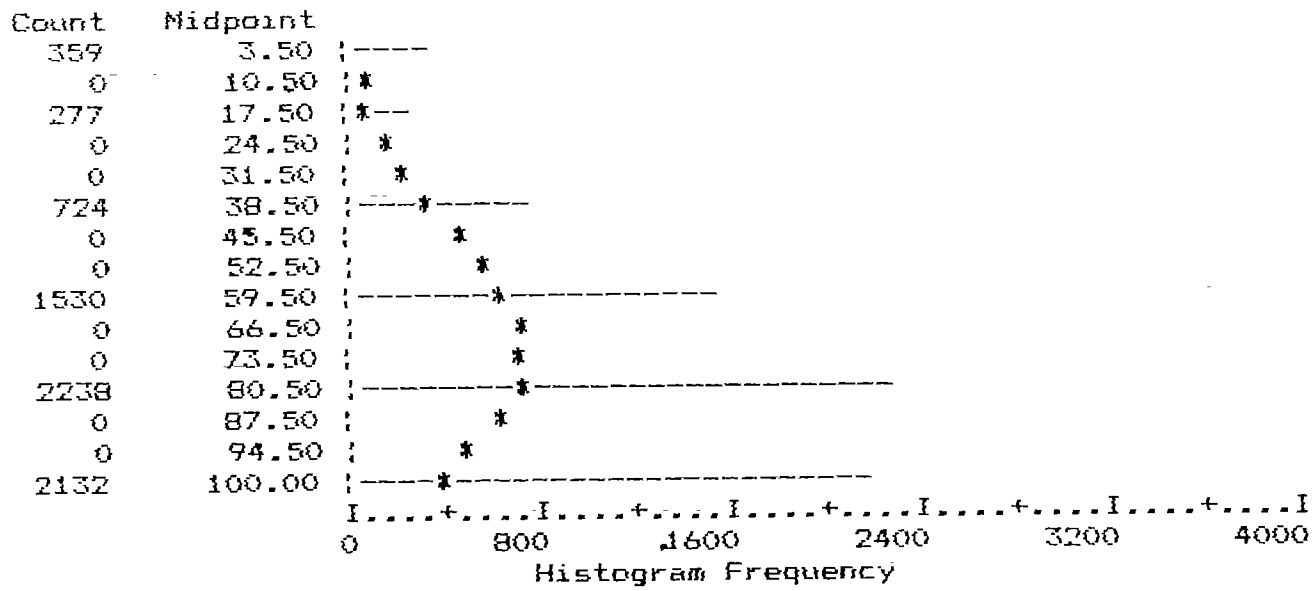


FIG. 7.4

Theoretical (asterisks) and empirical frequency distributions of K scores of pupils of Class I in All States

the entire group of pupils of Class I was able to recall and recognize facts, figures, practices, principles, etc., relating to nutrition, health and environmental sanitation. Equally important is the 25th percentile value, 60. In the context of the country's efforts to help all children to achieve at least a minimum level of learning, it is indeed heartening to note that only 25 per cent or less pupils were below K score 60.

One may consider the skewness as evidence of the sub-test being a little easy. This needs clarification. It may be argued that the achievement of pupils was not high but, as already discussed with respect to T scores, this sub-test was perhaps easy. The author had argued at length, and again would like to put on the record, that since Sub-test K also contained criterion-reference learning outcomes, the inference of the high attainment on the part of pupils made here cannot be considered improper. Simply put, the test had an adquate coverage of samples of the behaviours listed under K and, if the pupils had performed high on the test, one cannot ignore it as good attainment on their part. Psychometric restrictions apart, pupils at all stages of school education in India are assigned different divisions (grades) on the basis of far less reliable and valid tests (papers) used in the school/public examinations. (The practice of assigning divisions at the school stage is being abondoned gradually. Yet, the cut-off point of 35 per cent marks for promotion to the next class and higher percentages, i.e., 60 per cent +, are engraved as references in the public mind and, therefore, cannot be altogether ignored in a discussion like this.) Lest this argument be misconstrued, it is clarified that the achievement of pupils—T and K—does not seem to be low, as has been made out in public in India, if the prevalent yardstick of judging the performance of pupils in school is made the reference.

Predictors of Knowledge—K Scores

Coefficients of Determination: The step-wise multiple regression analysis (SWMRA) was carried out to identify the predictors of K scores of the PAT. The values of multiple correlations (R), coefficient of determination (R square), F and *t*, along with dfs and levels of significance, are presented in Table 7.11.

For the sake of reference, the sub-tables for all the four variables are serially presented here. However, only the values of the last and the fourth

steps, which show the combined effect of all variables, are discussed. The values obtained are. R =.21189, R square = .04490 (adjusted = .04436, a slightly lower value), and F = 84.35, df = 4, 7178, P = .0000. It is clear that the null hypothesis of no association between Locale, Attendance, Income and Mother's education together and K scores is rejected and the R value, not being equal to zero, is not obtained by chance. Just the same, a small size of R suggests a

TABLE 7.11

Step-wise multiple regression analysis of K scores of pupils of class I in All states

Equation Number 1 Dependent Variable. K KNOWLEDGE SCORE

Beginning Block Number 1. Method: Step-wise

Variable(s) Entered on Step Number
1. LOCALE : URBAN/RURAL

Multiple R	.16278
R Square	.02650
Adjusted R Square	.02636
Standard Error	26.88768

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	141309.52071	141309.52071
Residual	7181	5191483.23997	722.94712

F = 195.46315 Signif F = .0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Locale	-13.82375	.98877	-.16278	-13.981	.000
(Constant)	97.40798	1.88914		51.562	.0000

Variable(s) Entered on Step Number
2. ATTENDANCE

Multiple R	.19192
R Square	.03683
Adjusted R Square	.03657
Standard Error	26.74642

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	196429.13319	98214.56659
Residual	7180	5136363.62750	715.37098

F = 137.29180 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Locale	-12.30411	.99869	-.14489	- 12.320	.0000
Attendance	.16374	.01865	.10323	8.778	.0000
(Constant)	82.01560	2.57029		31.909	.0000

Variable(s) Entered on Step Number
3. INCOME

Multiple R	.20838
R Square	.04342
Adjusted R Square	.04302
Standard Error	26.65668

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	231550.65129	77183 55043
Residual	7179	5101242.10939	710.57837

F = 108.62074 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Locale	-9.60069	1.06704	-.11305	-8.998	0000
Attendance	.15724	.01861	.09913	8.447	.0000
Income	4.545189E-03	6.46504E-04	.08753	7.030	.0000
(Constant)	74.55608	2.77271		26.889	.0000

Vanable(s) Entered on Step Number
4 MOTHER'S EDUCATION

Multiple R	.21189
R Square	.04490
Adjusted R Square	.04436
Standard Error	26.63797

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	239418.32369	59854.58092
Residual	7178	5093374.43700	709 58128

F = 84.35197 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T	VAf
Locale	-8.78484	1.09407	-.10345	-8.029	.0000	1 6862
Attendance	.15163	.01868	.09560	8.119	0000	1.2247
Income	3.879969E-03	6.76233E-04	.07472	5.738	.0000	1.0461
Mother's Edu.	1.57944	.47433	.04310	3.330	.0009	0.53301
(Constant)	71.61810	2.90786		24 629	.0000	—
						T = 4.4861

5. Coefficients of Correlation

	Locale	Attendance	Income	Mother's Edu	K Score
Locale	—				
Attendance	-.173	—			
Income	-.372	.110	—		
Mother's Edu.	-.348	.153	.127	—	
K Score	-.163	.128	.140	.123	

rather low relationship between the joint four variables and K scores in the popoulation, meaning thereby that to a small extent these possess the potential for predicting K scores.

Out of the total percentage of 4.4861 variance, the SES-related variables, Locale, Income and Mother's education, account for 3.2614 per cent, indicating a small but significant, contribution to K scores. But the association of Attendance with K score is also equally important. Lastly, it is interesting to note that the correlations of Locale with the other three variables are negative. At least in this sample, the rural children seemed to have a higher Attendance, Income and Mother's education than their urban couterparts. There may be many reasons for this unusual finding. It may reflect a new emerging trend of the rural area viz., catching up with the nearby urban (not large city type) areas. Or, the difference between the urban and the rural populations may be negligible in this sample.

Testing of the Null Hypothesis

The null hypthesis of random sampling from a common population, even after the effect of Attendance and Income is partialled out, was tested through the analysis of variance and analysis of covariance for State (7) × group (3) × sex (2) = 42 cell-design. The values of F and their probability of significance levels are presented in Tables 7.12a (ANOVA), 7.12b (ANCOVA); the cell means for State × group × sex in Table 7.12c; for State × group in Table 7.12d; for State × sex in Table 7.12e; and for group × sex in Table 7.12f. The values and their significance levels computed through the non-parametric tests for State, group and sex are presented separately in Tables 7.13a, 7.13b and 7.13c.

There is a high-order parity between the values of F with respect to the main effects and interactions, except for some minor variations in ANOVA and ANCOVA, indicating an adjustment in the covariance table after having par-

TABLE 7.12a

Analysis of variance of K scores of pupils of Class I in All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	1010545.401	9	112282.822	205.977	.000
State	846636.380	6	141106.063	258.852	.000
Group	172885.152	2	86442.576	158.575	.000
Sex	21.388	1	21.388	.039	.843
2-way Interactions	418702.438	20	20935.122	38.404	.000
State × Group	392081.964	12	32673.497	59.938	.000
State × Sex	4999.892	6	833.315	1.529	.164
Group × Sex	5659.848	2	2829.924	5.191	.006
3-way Interactions	20134.127	12	1677.844	3.078	.000
State × Group × Sex	20134.127	12	1677.844	3.078	.000
Explained	1449381.966	41	35350.780	64.849	
Residual	3934691.367	7218	545.122		
Total	5384073.333	7259	741.710		

TABLE 7.12b

Analysis of covariance of K scores of pupils of Class I in All States showing F values for State, group, sex and interactions after partialling out the effect of attendance and income

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Covariates	175532.103	2	87766.051	161.548	.000
Attendance	70361.684	1	70361.684	129.512	.000
Income	85965.322	1	85965.322	158.234	.000
Main Effects	848124.783	9	94236.087	173.457	.000
State	686009.492	6	114334.915	210.453	.000
Group	172257.513	2	86128.757	158.534	.000
Sex	1.980	1	1.980	.004	.952
3-way Interactions	420475.075	20	21023.754	38.698	.000
State × Group	394877.538	12	32906.461	60.570	.000
State × Sex	4678.036	6	779.673	1.435	.197
Group × Sex	5210.089	2	2605.495	4.796	.008
3-way Interactions	19625.064	12	1635.422	3.010	.000
State × Group × Sex	19625.064	12	1635.422	3.010	.000
Explained	1463757.024	43	34040.861	62.658	.000
Residual	3920316.309	7216	543.281		
Total	5384073.333	7259	741.710		
Covariate Raw Regression Coefficient					
Attendance	.182				
Income	.007				

tialled out the effects of attendance and income. The ANOVA table is, therefore, reproduced more for reference; the presentation and discussion has been done keeping the ANCOVA values in view.

To start with, the F values (129.51, df = 1, 7216 and 158.23, df = 1, 7216) for Attendance and Income are significant beyond .000 levels, thereby indicating their significant contribution to the variance, though their raw regression coefficients are rather small in size. However, the results presented below are free from their effects on the K scores, since they stand partialled out.

From among the significant F values of main effects, while sex is not significant, State, with the larget F value 210.45, df = 6, 7216, is significant at P = .0000, thereby establishing that State samples are not drawn from the same population. In other words, the means of States vary significantly. Similarly, groups are found to differ significantly since their F value is the second largest, i.e., 158.53, df = 2, 7216 at P = .000 and, therefore, the means of the different types of project schools differ. Further inspection of the table indicates that significant two-way interactions exist between State × group (F = 60.57, df = 12, 7216, P = .000) and between group × sex (F = 4.80, df = 2, 7216, P = .008), while no significant interaction exists between State and sex. The value of F between State and group suggests that the variation due to them is greater than due to the interaction between group and sex.

The three-way interaction among State × group × sex is also significant (F = 3.11, df =

TABLE 7.12c

Cell means of K scores of pupils of Class I in All States for State × group × sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	86.49	45.33	79.40	76 42	82 12	52.45	83.71	78.37	76.91 (2)*
N	419	180	463	1062	151	53	151	355	1417
Orissa	63.41	57.60	58.57	60.43	60.83	63.64	69.30	65.90	62.91 (5)
N	41	25	28	94	24	11	43	78	172
Rajasthan	69.81	47.67	76.99	68.85	72 32	49 44	80.35	71.55	69.53 (4)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	63.14	49.24	49.44	52.43	53.78	52.03	51.01	51.98	52.21 (7)
N	121	171	252	544	135	118	258	511	1055
Bihar	70.60	24.86	61.59	54.91	82.50	15.00	48.05	53.99	54.59 (6)
N	100	37	138	275	40	16	87	143	418
Mizoram	86.88	89.86	81.69	85.94	86.18	89.95	78.31	84.39	85.20 (1)
N	221	217	249	687	204	193	236	633	1320
Karnataka	81.26	74.95	74.06	75.20	71 72	73.03	75.88	74.68	74.97 (3)
N	111	194	549	854	87	152	427	666	1520
Total	78.16	60.97	72.27	71.42	74 86	68.10	71.08	71.43	71.42
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 76.98				Non-Project MF = 63 64			Project + CCP MF = 71.81	
N	2063				1045			3552	

*Figures in the brackets represent RANKS of the State means.

12, 7216, P = .000), indicating the combined contribution of these variables to the total variance in K scores.

Conclusions and Interpretations

State: Reference is Table 7.12c which presents the cell means.

The means of the K scores of pupils differed significantly from one State to another, Mizoram obtaining the highest mean i.e., 85.20, and Maharashtra the lowest, i.e., 52.21, the range bein 32.99. The means of three States, viz., Mizoram, U.P. and Karnataka were above, whereas those of Rajasthan, Orissa, Bihar and Maharashtra were below the mean, 71.42, of the total sample. A check was made to confirm the result with the one computed through the Kruskal Wallis One-way ANOVA, i.e., the Chi-square and its significance: 952.80, P = 0000.

TABLE 7.13a

Kruskal Wallis One-way ANOVA of K scores of pupils of Class I in All States showing Chi-square value for States

K by ST	Knowledge Score STATE CODE		
Ranks	Mean Rank	Cases	
2	3721.40	1291	ST = UP
5	2537.85	148	ST = Orissa
4	3059.83	1212	ST = Rajasthan
7	2070.49	945	ST = Maharashtra
6	2269.46	377	ST = Bihar
1	4189.45	1192	ST = Mizoram
3	3372.91	1357	ST = Karnatak
		N = 6522	

Corrected for Ties	
Chi-Square	Significance
952.8085	.0000

In view of these values, the null hypothesis of no differences existing among the average K scores of pupils belonging to different States stands rejected. There is a perfect parity between the ranks of means (Table 7.12c) and means of mean ranks shown in Table 7.13a

In conceptual terms, the results support the following trend for the States Mean K score of Mizoram > U.P. > Karnataka > Rajasthan > Orissa > Bihar > Maharashtra. The significance between the pairs of States was tested through the Scheffe procedure. The results are shown below: Here again the lowest achievement of Maharashtra is not commensurate with its position as an educationally advanced State.

The pair-wise difference on this variable was as follows (*see* Table 7.Cl-I-States):

* The pupils of Mizoram acquired better knowledge in the subject than the pupils of Maharashtra, Bihar, Orissa, Rajasthan, Karnataka and U.P.
* The pupils of U.P. and Karnataka acquired better knowledge in the subject than the pupils of Maharashtra, Bihar, Orissa and Rajasthan.
* The pupils of Rajasthan and Orissa acquired better knowledge in the subject than the pupils of Maharashtra and Bihar.
* The pupils of Maharashtra and Bihar did not differ in the acquisition of knowledge in the subject.

Group: The result for groups clearly demonstrates that the means of pupils in the K scores in three types of schools differed significantly. Inspection of the means of groups in Table 7.12c indicates that all the pairs of means differed significantly, i.e., proj. schls. M = 76.98, non-proj. schls. M = 63.64 and proj. schls. + CCP M = 71.81. This was verified by the Scheffe procedure at the 5 per cent level of significance.

Since the major hypothesis relates to finding out the differences existing among the groups, it was felt necessary to check the homogeneity of variance of the groups. The test results for K scores are given below:

Cochrans C = .4420 P = .000
Barlett-Box F = 71.53, P = .000

Since the values are quite large and highly significant, the parametric result was checked through the Kruskal Wallis One-way AVOVA. The Chi-square value and other relevant details have been presented in Table 7.13b.

TABLE 7.13b

Kruskal-Wallis One-way ANOVA of K scores of pupils of Class I in All States showing Chi-squre value for groups

Rank	Mean Rank	Cases	
1	3639.46	1865	Grp = Project Schools
3	2855.35	1479	Grp = Non-Project Schools
2	3228.71	3178	Grp = Project Schools + CCP
		N = 6522	

Corrected for Ties	
Chi-Square	Significance
155.0123	.0000

The Chi-squre value of 155.01 is significant at .0000 level, thereby rejecting the null hypothesis of no differences existing among the average K scores of pupils belonging to the three groups. Besides, the rank order of means (refer to Table 7.12c) and that of the mean ranks (Table 7.13b) matches perfectly. Thus, the alternative hypothesis of differences existing among the three type of schools is found tenable. The question that needs serious consideration is whether, conceptually, this finding corroborates the prediction implied in the alternate hypothesis. The answer is that it does so only partially. According to the basic assumption, the benefit of the intervention should have accrued most to the pupils belonging to project schools + CCP. That has not happened. While the pupils of project schools + CCP did better than those belonging to non-project schools, they have not done as well as their counterparts in project schools. Therefore, the community contact programme did not seem to act as a reinforcemnt to the knowledge of the pupils in project schools + CCP.

Sex: The result for sex suggests that the means of males and females did not differ significantly (71.42 and 71.42). This was also confirmed by the Mann-Whitney U-Wilcoxon Rank Sum W test.

TABLE 7.13c

Mann-Whitney U - Wilcoxon Rank Sum W Test of K scores of pupils Class I in All States showing U-W and Z values for sex

Mean	Rank	Cases	
1	3266.82	4072	Sex = Male
2	3252.65	2450	Sex = Female
		N = 6522	

Corrected for Ties

U	W	Z	2-tailed P
4966524.0	7968999.0	-.3044	.7608

The Z value of –.3044 denotes that both the values of U and W shown in Table 7.13c are not significant at the 5 per cent level.

Thus, the null hypothesis of no difference between the average K scores of males and females is supported. It appears that the benefit of intervention accrued equally to males and females. The interpretation made with regard to T scores earlier applies equally to K scores, i.e., "... given the opportunity girls can do equally well in acquiring knowledge in school, in spite of the fact that they are more burdened with routine chores at home".

2-way Interactions

State X Group: To a considerable extent the interaction variance with respect to K scores is attributable to both State and group. In other words, in addition to State and group affecting the criterion scores independently, they together contributed to the differences between the observed means.

TABLE 7.12d

Cell means of K scores of pupils of Class I in All States for State x group

State \ Group	Proj.	Non-Proj.	Proj.+CCP	Total
UP	85.33 (570)	46.95 (233)	80.46 (614)	76.91 (1417)*
Orissa	62.46 (65)	59.44 (36)	65.07 (71)	62.91 (172)
Rajasthan	70.42 (409)	48.13 (278)	77.85 (671)	69.53 (1358)
Maharashtra	58.20 (256)	50.38 (289)	50.24 (510)	52.21 (1055)
Bihar	74.00 (140)	21.89 (53)	50.22 (225)	54.59 (418)
Mizoram	86.54 (425)	89.90 (410)	80.04 (485)	85.20 (1320)
Karnataka	77.07 (198)	74.10 (346)	74.86 (976)	74.97 (1520)
Total (All States)	76.98 (2063)	63.64 (1645)	71.81 (3552)	71.42 (7260)

*Figures in brackets indicate N.

How do these positive and negative differences affect the rejection of the null hypothesis regarding the groups in each State ? The ranges of the positive and negative deviations in the columns in the table clearly show that while there are wide differences in non-project schools (+12.48 to –24.92), they are more or less similar in project schools and project schools + CCP, i.e., + 13.85 to –6.01 and +7.93 to –5.55. Therefore, the contribution of non-project schools to the interaction variance is more than that of the other two groups.

The ranges of difference are small with respect to Orissa and Karnataka which indicates

TABLE 7.12d'

Expected means and differences between actual and expected means for K scores of pupils of Class I in All States for State x group

State \ Group	Proj.	Non-Proj.	Proj.+CCP	Total
U.P.	82.47 N = 570 D = +2.86	69.13 N = 233 D = -22.78	77.30 N = 614 D = +3.16	76.91 N = 1417
Orissa	68.47 N = 65 D = -6.01	55.13 N = 36 D = +4.31	63.30 N = 71 D = + 1.77	62.91 N = 172
Rajasthan	75.09 N = 409 D = -4.67	61.75 N = 278 D = -13.62	69.92 N = 671 D = +7.93	69.53 N = 1358
Maharashtra	57.77 N = 256 D = +0.43	44.43 N = 289 D = +5.95	52.70 N = 510 D = -2.46	52.21 N = 1055
Bihar	60.15 N = 140 D = +13.85	46 81 N = 53 D = -24.92	54.98 N = 225 D = -4.76	54.59 N = 418
Mizoram	90.76 N = 425 D = -4.22	77.42 N = 410 D = +12.48	85.59 N = 485 D = -5.55	85.20 N = 1320
Karnataka	80.53 N = 198 D = -3.46	67.19 N = 346 D = +6.91	75.36 N = 976 D = -0.05	74.97 N = 1520
Total (All States)	76.98 N = 2063	63.64 N = 1645	71.81 N = 3552	71.42 N = 7260

that the performance of pupils on Sub-test K did not differ in the three groups. So the trend in these two States is different from the one found for the total sample. However, the differences are negative and much larger than expected in the States of U.P., Rajasthan and Bihar for non-project schools, supporting the trend of rejecting the null hypothesis of no differences existing among the means of K scores of the groups. But the patterns differed; while in U.P. and Bihar the pupils of project schools performed better than the other two groups, it was the project schools + CCP in Rajasthan which did significantly better than the other two groups. The groups in Maharashtra and Mizoram differed in their K achievement. Just the same, it is the higher mean of K achievement of pupils of project schools + CCP in Mizoram and that of pupils of project schools in Maharashtra which differed from the other two groups.

State X Sex: It is important to underline the point that sex was not found as the source of the variation in K scores. Males and females in All-States pooled data did not differ significantly. Nor was there any interaction between State and sex, implying that there were negligible differences, if any, between the State-wise actual means of males and females.

TABLE 7.12e

Cell means of K scores of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
UP	76.42 (1062)	78.37 (355)	76.91 (1417)*
Orissa	60.43 (94)	65.90 (78)	62.91 (172)
Rajasthan	68.85 (1015)	71.55 (343)	69.53 (1358)
Maharashtra	52.43 (544)	51.98 (511)	52.21 (1055)
Bihar	54.91 (275)	53.99 (143)	54.59 (418)
Mizoram	85.94 (687)	84.39 (633)	85.20 (1320)
Karnataka	75.20 (854)	74.68 (666)	74.97 (1520)
Total (All States)	71.42 (4531)	71.43 (2729)	71.42 (7260)

*Figures in brackets indicate N.

Note. No expected means are calculated since the interaction value is insignificant.

The tables confirm the position stated above. Except in the case of Orissa, the positive and negative differences of males and females in other States are not large enough to be significant. And the differences between males and females in Orissa (-2.48 and +2.98) as part of All-States data are not large enough to yield a significant interaction between State x sex. Differently put, males and females did not differ significantly in their knowledge achievement, except in Orissa. The female pupils here outshone their counterparts in the acquisition of knowledge.

Group X Sex: Cell means for group x sex along with expected means and their differences are presented in Table 7.12f and 7.12f.

Table 7.12e'

Expected means and differences of actual means and expected means for K scores of pupils of Class I in All State for group × sex

Sex / State	Male	Female	Total
U.P.	76.91 N = 1062 D = –0.49	76.92 N = 355 D = +1.45	76.91 N = 1417
Orissa	62.91 N = 94 D = –2.48	62.92 N = 78 D = +2.98	62.91 N = 172
Rajasthan	69.53 N = 1015 D = –0 68	69.54 N = 343 D = +2.01	69.53 N = 1358
Maharashtra	52.21 N = 544 D +0.22	52.22 N = 511 D = –0.24	52.21 N = 1055
Bihar	54.59 N = 275 D = +0.32	54.6 N = 143 D = –0.61	54.59 N = 418
Mizoram	85.2 N = 687 D = +0.74	85.21 N = 633 D = –0.82	85.20 N = 1320
Karnataka	74.97 N = 854 D = +0.23	74.98 N = 666 D = –0.3	74.97 N = 1520
Total (All States)	71.42 N = 4531	71.43 N = 2729	71.42 N = 7260

Inspection of the positive and negative differences between actual and expected means in cells demontrates clearly the combined effect of these two variables on the K scores.

Here again the positive and negative differences of males and females in non-project schools are larger than in the other four cells, thereby indicating their contribution to the interaction variance. The females in non-project schools performed significantly better than the males. So far as support for the alternate hypothesis of differences among groups is concerned, it is evident that the trend for the males is in line with that of the total sample, but it is not so for the females, i.e., the females in project schools performed better than those in non-project schools.

In the overall context, one cannot help noticing that not only did non-project schools differ from the other two types of schools but there was also significant variation in their K scores. One plausible interpretation can be that though

TABLE 7.12f

Cell means of K scores of pupils of Class I in All States for group × sex

Sex / Group	Male	Female	Total
Proj.	78.16 (1323)	74.86 (740)	76.98 (2063)*
Non-Proj.	60.97 (1030)	68.10 (615)	63.64 (1645)
Proj+CCP	72.27 (2178)	71.08 (1374)	71.81 (3552)
Total (All States)	71.42 (4531)	71.43 (2729)	71.42 (7260)

*Figures in brackets indicate N.

TABLE 7.12f'

Expected means and differences between actual means and expected means for K scores of pupils of Class I in All States for group × sex

Sex / Group	Male	Female	Total
Project	76 98 N = 1323 D = +1.18	76.99 N = 740 D = –2.13	76 98 N = 2063
Non-Project	63.64 N = 1030 D = –2.67	63.65 N = 615 D = +4.45	63.64 N = 1645
Project + CCP	71.81 N = 2178 D = +0.46	71.81 N = 1374 D = –0.73	71.81 N = 3552
Total (All States)	71.42 N = 4531	71.43 N = 2729	71.42 N = 7260

no systematic and concerted efforts were made to impart objective-based instruction in these schools, the possibility of exposure to a good quality of such instruction in some schools could not be ruled out. Hence, while most of the time pupils of non-project schools performed more poorly, at times they did better than their counterparts in the other two types of schools, e.g., whereas the pupils of non-project schools in Mizoram obtained the highest mean score, 89.90, in the entire group, registering a difference of +12.92 between the actual and expected means, those in Bihar obtained the lowest mean score, 21.89, registering a difference of –24.92, the highest difference among both positive and negative deviations from the expected means (*see* Tables 7.12d and 7.12d')

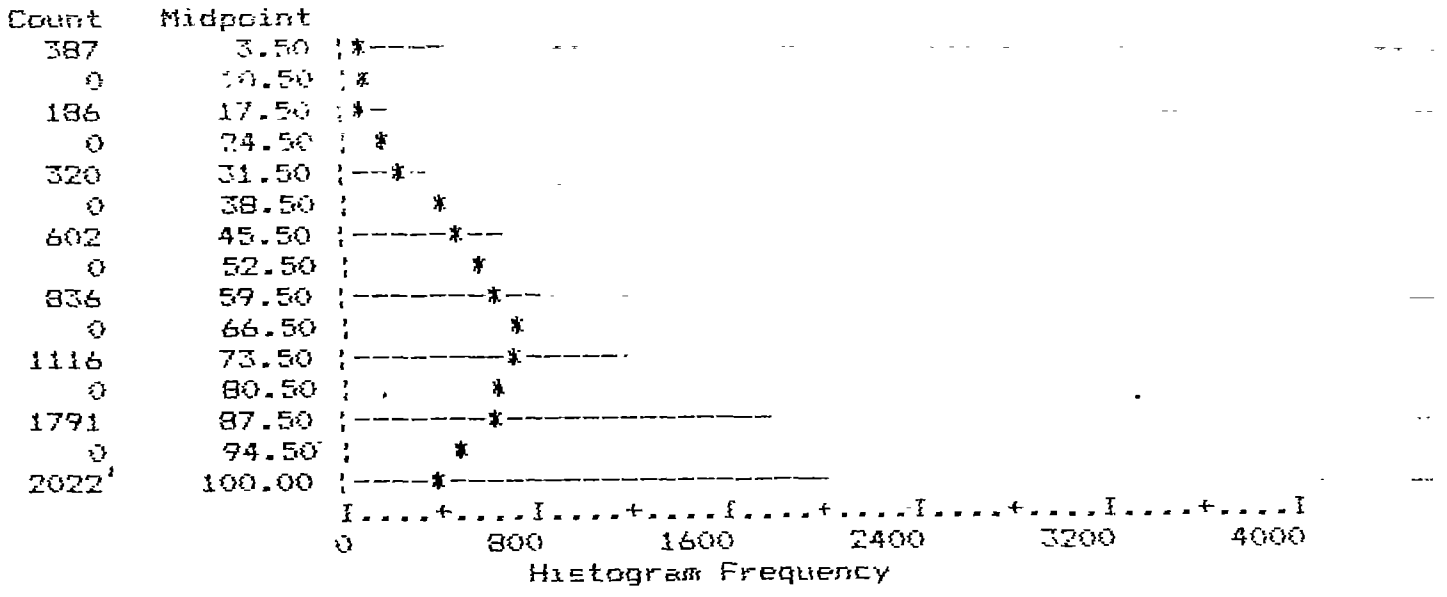


FIG. 7.5

Theoretical (asterisks) and empirical frequency distributions of U scores of pupils of Class I in All States

It is important to draw attention to the fact that, though high correlation existed between Total achievement and K scores, the few deviations discussed above justify the need for separate analyses of the components of the Total achievement scores. The interrelationships among various results will be discussed later.

VARIABLE: *UNDERSTANDING—U SCORES*

Descriptive Statistics

Measures of Central Value and Variability (Dispersion): While Fig. 7.5 presents the distributions of frequencies of U scores—the histogram frequency—Table 7.14 shows the basic statistical values.

TABLE 7.14

Measures of central value and variability of U scores of pupils of Class I in All States

Understanding Score

Mean	68.559	Median	80.000	Mode	100.000
Std Dev	29.286	Skewness	-.837	Range	100.000
Percentile	Value	Percentile	Value	Percentile	Value
25.00	50.000	50.00	80.000	75.00	100.000

N 7260

The line graph indicates that the frequency distribution of U scores is negatively skewed (–.837), with the median (80) being much higher than the mean value (68.56). Further, the SD (29.29) is also much higher than what is derived as 1/6 of the range 100, i.e., 16.67, indicating considerable variation in the U scores. This is clearly evident when the asterisk points are matched with the relevant points on the line curve. In spite of these deviations, the distribution can be considered close to the normal probability curve for the purpose of subjecting U scores to the parametric statistical analysis.

Conclusion and Interpretations

* The achievement of pupils of Class I in understanding could be considered fairly high as the total mean was 68.56, nearing the cut-off score for the grade of distinction in the Indian system. The 75th percentile value of 100 indicates that the entire group of pupils of Class I was able to understand the concepts, principles, etc., relating to nutrition, health and environmental sanitation. Equally important is the the 25th percentile value, 50. In the context of the country's efforts to help all children to achieve at least a minimum level of learning, it is indeed heartening to note that only

25 per cent or less pupils were below U score of 60.

One point needs clarification. It may be argued that the achievement of pupils cannot be interpreted as high. On the contrary, perhaps the PAT, K and U sub-tests were easy. As argued earlier with respect to both Total and K scores, as a criterion reference component of the well-designed achievement test, it is not inappropriate to claim that the pupils developed two important learning outcomes related to U, viz., identification and discrimination. The logical arguments made in the discussion of T and K scores are applicable here also.

Although a detailed discussion will be presented later on the theoretical aspect of achievement, especially the hierarchical nature of achievement (Bloom, *et al.*, 1963; and Dave, 1976), it is necessary to note that the total mean U score is lower than the total K score. This means that the component (objective) Understanding is more complex and difficult than the K component.

Predictors of Understanding

The value obtained through the step-wise multiple regression Analysis (SWMRA) are presented in Table 7.15, viz., Multiple R, R Square, F with dfs in ANOVA and *t* with their significance levels.

Step-wise entry of the following four variables was made into the regression equation. While the table presents the insertion of Attendance, Locale, Father's occupation and Father's education serially, only the last result, which shows the combined predictive association of these four variables with U scores, is referred to for discussion. The values are: Multiple R = .15102, R Square = .02281 (adjusted = .02226), F = 41.90, df = 4, 7181, P = .0000. On the basis of the F ratio, the null hypothesis that there is no association between the combined variables and U scores in the population and that the observed value of multiple R differs from zero by chance is rejected. However the size of the R is not substantial since it accounts for only 2.281 per cent of the total variance in U scores, leaving thereby 1 – .02281 = .97719, i.e., 97.72 variance unaccounted for by variables not included in the equation. Besides, the major portion of this variance, i.e., 1.334, is determined by Attendance alone.

TABLE 7.15

Step-wise multiple regression analysis for U scores of pupils of Class I in All States

Equation Number 1 Dependent Variable. U UNDERSTANDING SCORE

Beginning Block Number 1.Method: Step-wise

Variable(s) Entered on Step Number
1. ATTENDANCE

Multiple R	.11585
R Square	.01342
Adjusted R Square	.01328
Standard Error	28.29264

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	78227.54738	78227.54738
Residual	7184	5750603.06060	800.47370
	F = 97.72657	Signif F = .0000	

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.16863	.01706	.11585	9.886	.000
(Constant)	58.35901	1.35052		43.212	.0000

Variable(s) Entered on Step Number

2. LOCALE: URBAN/RURAL

Multiple R	.14027
R Square	.01968
Adjusted R Square	.01940
Standard Error	28.20478

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	114686 28421	57343.14211
Residual	7183	5714144 32378	795.50944

F = 72.08355 Signif F = 0.0

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.15133	.01720	.10396	8.800	.0000
Locale	-7.10039	1.04883	-.07998	-6.770	.0000
(Constant)	73.06048	2.55509		28.594	.0000

Variables not in the Equation

Variable (s) Entered on Step Number

3. FATHER'S OCCUPATION

Multiple R	.14852
R Square	.02206
Adjusted R Square	.02165
Standard Error	28.17243

Analysis of Variance

	DF	Sum of Squares	Mean Square
RRegression	3	128577.86674	42859.28891
Residual	7182	5700252.74125	793.68598

F = 54.00031 Signif F = 0.0

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.17076	.01779	.11731	9.597	.0000
Locale	-7.23707	1.04813	-.08152	-6.905	.0000
Father's Occu.	-.74353	.17773	- 05069	-4.184	.0000
(Constant)	74.42112	2.57280		28.926	.0000

Variables not in the Equation

Variable(s) Entered on Step Number

4. FATHER'S OCCUPATION

Multiple R	.15102
R Square	.02281
Adjusted R Square	.02226
Standard Error	28.16363

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	132931 94907	33232.98727
Residual	7181	5695898.65892	793.19018
F = 41.89788		Signif F = 0.0000	

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T	VAf
Attendance	.16743	.01784	.11502	9.383	.0000	1.3342
Locale	-6.67245	1.07516	-.07516	-6.206	.0000	.7140
Father's Occu.	-.82464	.18101	-.05622	-4.556	.0000	.0787
Father's Edu.	.75707	.32313	.02897	2.343	.0192	.1535
(Constant)	72.19838	2.74139		26.336	.0000	—
						T = 2.2804

5. Coefficients of Correlation

	Attendance	Locale	Father's Occu.	Father's Edu.	U Score
Attendance	—	-.149	.268	.163	.116
Locale		—	-.070	-.245	-.095
Father's Occu.			—	.227	-.014
Father's Edu.				—	.053
U Score					—

Conclusions and Interpretations

* To a very small extent, the U score is determined by Attendance, Locale (rural), Father's occupation (lower ones) and Father's education.

* Since Attenance accounts for the bigger chunk of U variance, the effect of so-called socio-economic variables seems to be rather negligible. As was highlighted earlier, the understanding of the concepts, functions, principles, etc., relating to the subject under consideration does not seem to depend much on the socio-economic factors. Put differently, pupils belonging to low socio-economic homes may not suffer from disadvantage so far as the development of understanding of the subject is concerned. At the risk of being repetitious, the author would like to assert that the effect of SES on pupil achievement seems to have been magnified out of proportion in this country. Attention needs to be drawn to the fact that the Parentai income of this sample, which is quite large, was very low, and therefore the result at once acquires a greater significance that it would otherwise have. As has been seen with Total scores and K scores, once in school, pupil achievement seems to be influented more by the factors of school- ecology than what we like to term as home-ecology.

Testing the Null Hypothesis

The null hypothesis of random sampling from a common population, even after the effect of Attendance and Income is partialled out, was tested through the analysis of variance and analysis of covariance for State (7) × group (3) × sex (2) = 42-cell design. The values of F and the significance levels are presented in Tables 7.16a (ANOVA), 7.16b (ANCOVA); the cell means for State × group × sex in Tables 7.16c, for State × group in Tables 7.16d & 7.16d', for State × sex in Table 7.16e and 7.16e' and for group × sex in Tables 7.16f & 7.16f'. The values obtained through the non-parametric techniques showing differences among States, groups and males and females are presented in Table 7.17a, 7.17b and 7.17c respectively.

There is high-order parity between the values of F with respect to the main effects and interactions, except for some minor variations, indicating an adjustment in the covariance table after having partialled out the effect of attendance and income. The ANOVA table is, therefore, reproduced more for reference, and the presentation and discussion will be done keeping the ANCOVA values in view.

To start with, the F values (229.73, df = 1, 7216 and 14.59, df = 1, 7216) for attendance and income are significant beyond .000 level thereby indicating their significant contribution to the variance, though their raw regression coefficients are rather small in size. However, the results presented below are free from their effects on the U scores, since they stand partialled out.

TABLE 7.16a

Analysis of variance of U scores of pupils of Class I in All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squres	DF	Mean Square	F	Signif of F
Main Effects	1250258 340	9	138917.593	216.887	.000
State	844509 646	6	140751 608	219.750	.000
Group	428601.537	2	214300.768	334.580	.000
Sex	160.051	1	160 051	.250	.617
2-way Interactions	319667.204	20	15983.360	24.954	.000
State × Group	295399.469	12	24616.622	38.433	.000
State × Sex	11841.158	6	1973.526	3.081	.005
Group × Sex	5423.353	2	2711.676	4.234	.015
3-way Interactions	32821.136	12	2735.095	4.270	.000
State × Group × Sex	32821.136	12	2735.095	4.270	.000
Explained	1602746.680	41	39091.382	61.032	.000
Residual	4623182 852	7218	640.507		
Total	6225929.532	7259	857.684		

Table 7.16b

Analysis of covariance of U scores of pupils of Class I in All States showing F values for State, group, sex and interactions after partialling out the effect of attendance and income

Source of Variation	Sum of Squres	DF	Mean Square	F	Signif of F
Covariates	164382.323	2	82191.161	130.096	.000
Attendance	145138.853	1	145138.833	229.733	.000
Income	9222.009	1	9222 009	14.597	.000
Main Effect	1145317.738	9	127257.526	201.430	.000
State	716762.854	6	119460.476	189.088	.000
Group	441040.153	2	220520 076	349.051	.000
Sex	167.872	1	167 872	.266	.606
2-way Interactions	324939.498	20	16246.975	25.717	.000
State × Group	301390 599	12	25115.883	39.755	.000
State × sex	11262.545	6	1877.091	2.971	.007
Group × Sex	4276.329	2	2138.164	3.384	.034
3-way Interactions	32429.199	12	2702.433	4.278	.000
State × Group × Sex	32429.199	12	2702.433	4.278	.000
Explained	1667068.758	43	38769.041	61.366	.000
Residual	4558860.774	7216	631.771		
Total	6225929.532	7259	857.684		

Covariate	Raw Regression Coefficient
Attendance	.262
Income	.002

From among the significant F values of main effects, while sex is not significant, States and groups with the F ratios 189.09 (df = 7, 7216, P = .000) and 349.05 (df = 2, 7216, P = .000) establish that these samples are not drawn from the same population. In other words, the means of States and groups vary greatly. Therefore, the means of states and different types of schools differ. Further inspection of the table indicates that significant two-way interactions exist between State × group (F = 39.76, df = 12, 7216, P = .000); between State × Sex (F = 2.97, df = 6, 7216, P = .077); and between group × sex (F = 3.38, df = 2, 7216,

TABLE 7.16c

Cell means of U scores of pupils of Class I in All States for State × group × sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	83.68	41.06	78.10	74 02	73.44	40.38	89.14	75.18	74.31 (3)*
N	419	180	463	1062	151	53	151	355	1417
Orissa	70.49	65.60	55.71	64.79	65.00	57.27	47.21	54.10	59.94 (5)
N	41	25	28	94	24	11	43	78	172
Rajasthan	71.10	48.11	77.80	69.72	74.34	44.86	81.40	71.69	70.22 (4)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	62.73	33.74	52 62	48 93	60.37	35.59	51.67	50.25	49.57 (6)
N	121	171	252	544	135	118	258	511	1055
Bihar	55 40	13.78	47.54	45.85	69.25	5.00	41.38	45.10	45.60 (7)
N	100	37	138	275	40	16	87	143	418
Mizoram	76 70	72.90	78.92	76.30	76.72	75.49	83.26	78.78	77.49 (1)
N	221	217	249	687	204	193	236	633	1320
Karnataka	77.57	70.93	77.40	75.95	70.92	69.08	73.98	72.46	74.42 (2)
N	111	194	549	854	87	152	427	666	1520
Total	74.59	53.20	72.77	68.85	71.28	57 48	71.08	68.07	68.56
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 73.40 2063			Non-Project MF = 54.80 1645			Project + CCP MF = 72.12 3552		

*Figures in brackets represent the RANKS of State means.

P = .034). The three-way interaction among State × group × sex is also significant (F = 4.28, df = 12, 7216, P = .000), indicating their combined contribution to the total variance in U scores.

Conclusions and Interpretations

State: The means of the U scores of pupils differed significantly from one State to another, Mizoram obtaining the highest mean, i.e., 77.49, and Bihar the lowest, i.e., 45.60, the range being 31.89. The means of three States, viz., Mizoram, Karnataka and U.P. were above, whereas those of Rajasthan, Orissa, Maharashtra and Bihar were below the mean, 71.42, of the total sample. A check was made to confirm the result through the Kruskal Wallis One-way ANOVA, i.e., the Chi-square and its significance: 762.89, P = .0000 (Table 7.17a).

The null hypothesis of no difference existing among the average U scores of pupils belonging to different States stands rejected through this test also. There is a parity (except in the order of the 2nd and 3rd ranks) between the ranks of means (Table 7.16c) and the means of mean ranks shown in Table 7.17a. The Scheffe procedure yielded the following significant results between the pairs of States (*see* Table 7.CI-I-State for details):

* The pupils of Mizoram developed better understanding in the subject than did the pupils of Bihar, Maharashtra, Orissa, Rajasthan and U.P.
* The pupils of Karnataka developed better understanding in the subject than did the

TABLE 7.17a

Kruskal Wallis One-way ANOVA of U scores of pupils of Class I in All States showing Chi-square value for states

Ranks	Mean Rank	Cases	
2	3738.90	1291	ST = U.P.
5	2587.41	148	ST = Orissa
4	3337.70	1212	ST = Rajasthan
6	2133.80	945	ST = Maharashtra
7	1963.42	377	ST = Bihar
1	3754.58	1192	ST = Mizoram
3	3525.60	1357	ST = Karnatak
		6522	Total

Corrected for Ties Chi-Square	Significance
762.8888	0000

pupils of Bihar, Maharashtra, Orissa and Rajasthan.

* The pupils of U.P. and Rajasthan developed better understanding in the subject than did the pupils of Bihar, Maharashtra, and Orissa.
* The pupils of Orissa developed better understanding in the subject than did the pupils of Bihar and Maharashtra.
* The pupils of Bihar and Maharashtra did not differ in their understanding of the subject.

Group: The result for groups clearly demonstrates that the means of understanding differed in the three types of schools. This was verified by the Scheffe procedure at the 5 per cent level of significance. It showed that while the pupils of project schools and project schools + CCP did not differ significantly in their understanding of the subject, they both developed better understanding than their counterparts in non-project schools. Since the major hypothesis relates to finding out the differences existing among the groups, it was felt necessary to check the homogeneity of variance of the groups. The test results for the U scores are given below:

Cochrans C = .4401, P = .000
Barlett-Box F = 80.45, P = .000

Since the values are quite large and highly significant, the parametric result was checked through the Kruskal Wallis One-way AVOVA. The Chi-square value and other relevant details have been presented in Table 7.17b.

TABLE 7.17b

Kruskal Wallis One-way ANOVA of U scores of pupils of Class I in All States showing Chi-square value for groups

Rank	Mean Rank	Cases	
1	3561.91	1865	Grp = Project Schools
3	2487.72	1479	Grp = Non-Project Schools
2	3445.39	3178	Grp = Project School + CCP
		N = 6522	

Corrected for Ties	Chi-Square	Significance
	342.1289	.0000

The Chi-square value of 342.13 is significant at .0000 level, thereby rejecting the null hypothesis of no differences existing among the average U scores of pupils belonging to the three groups. Besides, the rank order of means (refer to Table 7.16c) and that of mean ranks (Table 7.17b) matches perfectly. Thus, the alternative hypothesis of differences existing among the three types of schools is found tenable.

The question that needs serious consideration is whether, conceptually, this finding agrees with the prediction implied in the alternate hypothesis. The answer is that it does so only partially. According to the basic assumption, the benefit of the intervention should have accrued most to the pupils belonging to project schools + CCP. That has not happened. While the pupils of project schools + CCP did better than those belonging to non-project schools, they did not do as well as their counterparts in project schools. Therefore, the community contact programme did not seem to act as a reinfocement to the learnings of pupils in schools.

Sex: The result for sex suggests that the means of males and females did not differ significantly (71.42 and 71.42). This was corroborated by the Mann-Whitney U – Wilcoxon Rank Sum W test. The Z value of –.3044 denotes that both the values of U and W shown in Table 7.17c are not significant at the 5 per cent level.

Thus, the null hypothesis of no difference between thea verage U scores of males and females is supported. It appears that the benefit of intervention accrued eaually to males and females. The interpretation made in regard to the T scores earlier applies equally to the U socres, i.e., "given the opportunity, girls can do equally well in school, in spite of the fact that they are more burdened with routine chores at home".

TABLE 7.17c

Mann-Whitney U-Wilcoxn Rank Sum W test of U scores of pupils of Class I in All States showing U-W values for sex

Rank	Mean Rank	Cases	
1	3288.82	4072	Sex = 1
2	3216.09	2450	Sex = 2
		N = 6522	

Corrected for Ties

U	W	Z	2-tailed P
4876943.0	7879418.0	-1.5444	.1225

2-way Interactions

State X Group: To a considerable extent the interaction variance with respect to U scores is attributable to both State and group.

TABLE 7.16d

Cell means of U scores of pupils of Class I in All States for State and group

State \ Group	Proj	Non-Proj.	Proj. + CCP	Total
UP	80.96 (570)	40.90 (233)	80.81 (614)	74.31 (1417)*
Orissa	68.46 (65)	63.06 (36)	50.56 (71)	59.94 (172)
Rajasthan	71.88 (409)	47.27 (278)	78.72 (671)	70.22 (1358)
Maharashtra	61.48 (256)	34.50 (289)	52.14 (510)	49.57 (1055)
Bihar	59.36 (140)	11.13 (53)	45.16 (225)	45.60 (418)
Mizoram	76.71 (425)	74.12 (410)	81.03 (485)	77 49 (1320)
Karnataka	74.65 (198)	70.12 (346)	75.90 (976)	74.42 (1520)
Total (All States)	73.40 (2063)	54.80 (1645)	72.12 (3552)	68.56 (7260)

* Figures in brackets indicate N.

Scrutiny of the positive and negative differences between the actual means and expected means in the cells shows that the differences for non-project schools are much larger than those observed for the other types of schools in the various States, the ranges being +8.92 to –6.00, for project schools, +9.46 to –20.71 for non-project schools, +4.94 to –2.94 for project schools + CCP. How do these positive and negative differences influence the rejection of

TABLE 7.16d'

Expected means and differences between actual and expected means for U scores of pupils of Class I in All States for State x group

State \ Group	Proj	Non-Proj.	Proj. + CCP	Total
U.P.	79.15 N = 570 D = +1.81	60.55 N = 233 D = –19.65	77.87 N = 614 D = +2.94	74.31 N = 1417
Orissa	64.78 N = 65 D = +3.68	46.18 N = 36 D = +16.88	63.50 N = 71 D = –12.94	59.94 N = 172
Rajasthan	75.06 N = 409 D = –3.18	56.46 N = 278 D = –19.19	73.78 N = 671 D = +4.94	70.22 N = 1358
Maharashtra	54.41 N = 256 D = +7.07	35.81 N = 289 D = –1.31	53.14 N = 510 D = –1.00	49.57 N = 1055
Bihar	50.44 N = 140 D = +8.92	31.84 N = 53 D = –20.71	49.16 N = 225 D = –4.00	45.60 N = 418
Mizoram	82 33 N = 425 D = –6.00	63.73 N = 410 D = +10.37	81.05 N = 485 D = –.02	77.49 N = 1320
Karnataka	79.26 N = 198 D = –4.51	60.66 N = 346 D = +9.46	77.98 N = 976 D = –2.08	74.42 N = 1520
Total (All States)	73.40 N = 2063	54.80 N = 1645	72.12 N = 3552	68.56 N = 7260

the null hypothesis with respect to the groups in each State ? The contribution of non-project schools to the interaction variance seems more than that of the other two groups. Further, the positive and negative differences in each of the groups, i.e., doing better or less well, also have had their effect in rejecting the null hypothesis or lending support to the alternate hypothesis within each State (*see* also Table 7.C1-I-Grp for differences among groups in States).

In Mizoram, non-project schools did much better than expected, while project schools did less well than expected. As the losses in project schools + CCP were marginal, they did better than both project schools and non-project schools. Similarly, non-project schools in Karnataka did better than expected, whereas the other two did less well than expected, which resulted in making them differ from project schools + CCP. In the same vein, non-project schools in Orissa did much better than expected but project schools + CCP showed a

deeper decline in performance than expected, thereby resulting in project schools doing better than project schools + CCP but not better than non-project schools. So the trends among the group in these States are different from the trend found for the total sample. Non-project schools in Maharashtra and Bihar performed much below the expected level. However, non-project schools in Rajasthan and project schools in Bihar did better than expected, and the pairs of groups differed accordingly. Project schools in Maharashtra did better than expected, whereas the the other two types of schools suffered marginal losses. And yet, all the three pairs of schools differed in these three States. The pattern of U.P. followed the one evident with respect to the total sample. Thus the fluctuations in the cell means of State × group have affected the rejection of the null hypothesis in the States, thereby causing same pattern of results unlike the ones found for the total sample. At the end it is interesting to note that the trends of differences between the pairs of groups in States for the U score were similar to the one observed for the T scores, except for the States of Mizoram and Orissa.

State × Sex: It may be recalled that sex was not found to be the source of variation in the U scores. However, sex combined with State has contributed significantly to the variation among the related cell means. Reference may be made to Tables 7.16e and 7.16e'.

The cell means and their matched expected means show that all cells have registered positive and negative differences. However, except in the case of Orissa and Karnataka, the differences in the attainments of males sand females in U scores were more or less as expected.

What do the results of Orissa and Karnataka indicate ? The performance of males was much better than expected, whereas that of females was much lower than expected. Therefore, while the males and females of the total sample did not differ in their achievements, the male pupils did much better in the U sub-test (64.79) than did the female pupils, i.e., 54.10. Though not as substantial, in Karnataka also, males did better than females.

Group X Sex: Group was found to be a source of significant variation. The significant result suggests that some variance is contrib-

TABLE 7.16e
Cell means of U scores of pupils of Class I of all States for State × sex

Sex / State	Male	Female	Total
U.P.	74.02 (1062)	75.18 (355)	74.31* (1417)
Orissa	64.79 (94)	54.10 (78)	59.94 (172)
Rajasthan	69.72 (1015)	71.69 (343)	70.22 (1358)
Maharashtra	48.93 (544)	50.25 (511)	49.57 (1055)
Bihar	45.85 (275)	45.10 (143)	45.60 (418)
Mizoram	76.30 (687)	78.78 (633)	77.49 (1320)
Karnataka	75.95 (854)	72.46 (666)	74.42 (1520)
Total (All State)	68.85 (4531)	68.07 (2729)	68.56 (7260)

*Figures in brackets indicate N.

TABLE 7.16e'
Cell means and differences between actual and expected means for U scores of pupils of Class I of All States for State × sex

Sex / State	Male	Female	Total
U.P.	74.60 N = 1062 D = -0.58	73.82 N = 355 D = +1 36	74.31 N = 1417
Orissa	60.23 N = 94 D = +4.56	59.45 N =78 D = -5.35	59.94 N = 172
Rajasthan	70.51 N = 1015 D = -0.79	69.73 N = 343 D = +1096	70.22 N = 1358
Maharashtra	49 86 N = 544 D = -0.93	49.08 N = 511 D = + 1.17	49.57 N = 1055
Bihar	45.89 N = 275 D = -0.04	45.14 N = 143 D = -0 01	45.60 N = 418
Mizroam	77.78 N = 687 D = -1.48	77.00 N = 633 D = +1.78	77.49 N = 1320
Karnataka	74 71 N = 854 D = +1.24	73.81 N = 666 D = -1.35	74.42 N = 1520
Total (All States)	68 85 N = 4531	68 07 N = 2729	68.56 7260

uted to U score by both group × sex Cell means and their corresponding expected means along with their differences are presented in Tables 7 16f and 7.16f

TABLE 7.16f

Cell means of U scores of pupils of Class I of All States for group × sex

Group \ Sex	Male	Female	Total
Proj	74.59 (1323)	71.28 (740)	73.40 (2063)*
Non-Proj	53.20 (1030)	57.48 (615)	54 80 (1645)
Proj +CCP	72.77 (2178)	71 08 (1374)	72 12 (3552)
Total (All States)	68.85 (4531)	68.07 (2729)	68.57 (7260)

*Figures in brackets indicate N

TABLE 7.16f'

Expected means and differences between actual and expected means for U scores of pupils of Class I of All States for group × sex

Group \ Sex	Male	Female	Total
Proj	73.69 N = 1323 D = +0.9	72.91 N = 740 D = −1.63	73.40 N = 2063
Non Proj	55 09 N = 1030 D = −1 89	54.31 N = 615 D = +3 17	54.80 N = 1645
Proj +CCP	72.41 N = 2178 D = +0.36	71.63 N = 1374 D = −0.55	72.12 N = 3552
Total (All States)	68.85 N = 4531	68.07 N = 2729	68.56 N = 7260

It was observed earlier that non-project schools registered more positive and negative differences than did the other two types of schools in the States. Here also it may be seen that while the females in project schools did less well than expected, those in non-project schools did much better than expected, thereby causing a significant interaction variance. The mean difference between males and females for project schools + CCP was marginal In spite of these differences, the trend of the three groups for males and females tallied with that of the total sample.

VARIABLE: *APPLICATION—A SCORES*

Descriptive Statistics

Measures of Central Value and Variability (Dispersion): Fig. 7.6 and Table 7.18 present the distributions of frequencies of A scores—the histogram frequency—and the basic statistical values.

TABLE 7,18

Measures of central value and variability of A scores of pupils of Class I in All States

A Application score

Mean	76 567	Median	80 000	Mode	100.000
Std Dev	28 389	Skewness	−1.318	Range	100 000
Percentile	Value	Percentile	Value	Percentile	Value
25.00	60.00	50 00	80 000	75 00	100 000
N 7260					

The line graph indicates that the frequency distribution of A scores is highly negatively skewed (−1.318), with the median (80) being higher than the mean value (76.56). Further, the value SD (28.39) is also much higher than what is derived as 1/6 of the range 100, i.e., 16.67, indicating considerable variation in the A scores. Comparison of the asterisk points and points on the line curve clearly demonstrates the tilted distribution. Inspite of these deviations, the distribution has been taken as close to the normal probability curve for the purpose of subjecting the A scores to the parametric statistical analysis.

Conclusions and Interpretations

* The achievement of pupils of Class I in application could be considered high as the total mean was 76.57 The 75th percentile value of 100 indicates that the entire group of pupils of Class I was able to make use of the knowledge acquired and concepts developed in solving unfamiliar problems put to them in the form of questions. It may be recalled that Sub-test A consisted of the following learning outcome: inferring, relating to nutrition, health and environmental sanitation. Equally important is the 25th percentile value 60. In the context of the country's efforts to help all children in achieving at least a minimum level of learning, it is indeed heartening to note that only

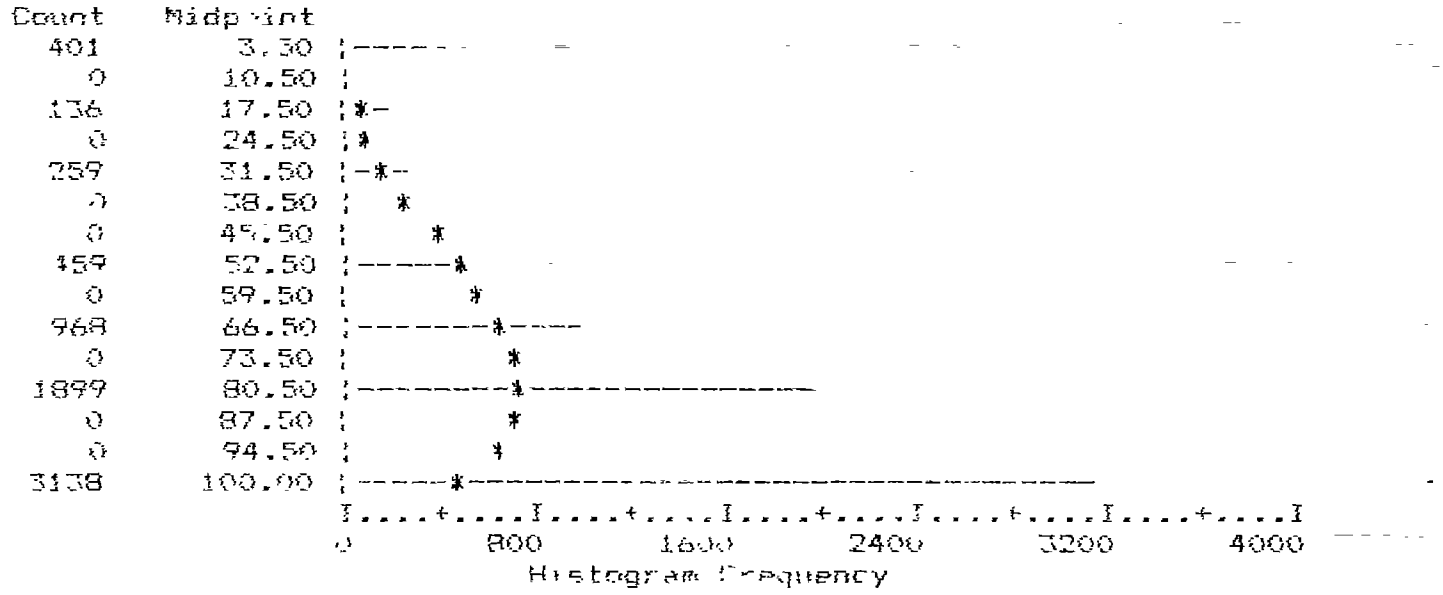


FIG. 7.6

Theoretical (asterisks) and empirical frequency distributions of A scores of pupils of Class I in all States

25 per cent or less pupils were below the A score of 60.

* However, the consistency with which the negative skewness is persisting suggests that, like the total test, Sub-test A can also be considered easy and, therefore, one can refute the claim of high attainment of pupils made here. However, the author has already explained the position regarding this point also in the discussion of T, K and U scores.

Predictors of Application

The values obtained through the step-wise multiple regression analysis (SWMRA) are presented in Table 7.19, viz., Multiple R, R Square, F with dfs in ANOVA and *t* with their significance levels.

Step-wise entry of the following three variables was made into the regression equation. While the table presents the insertion of Attendance, Father's occupation and Locale serially, only the last result, which shows the combined predictive association of these three variables with the A scores, is discussed here. The values are: Multiple R = .26920, R Square = .07247 (adjusted = .07208), F = 187.05, Df = 4, 7182, P = .0000. In other words, the observed value of multiple R helps in rejecting the null hypothesis that the combined variables and A scores are not associated in the population and that they differ from zero only by chance.

Though small, i.e., .26920, Attendance, Father's occupation and Locale possess significant power to predict the ability of pupils to apply knowledge in solving problems. Together, these account for only 7.247% variance of A scores, for R Square being .07247, thereby leaving 92.75% variance accounted for by the variables not included in the regression equation. Even in this small variance, Attendance accounts for the highest percentage (4.78), thereby again supporting the finding obtained for both T, K (except Locale) and U scores: that is, the SES-related variables, viz., Father's occupation and Locale, have only a marginal association with the A scores.

Testing of the Null Hypothesis

The null hypothesis of random sampling from a common population, even after the effect of attendance and income is partialled out, was tested through the analysis of variance and covariance for State (7) × group (3) × sex (2) = 42-cell design. The F ratios and their level of significance are presented in Tables 7.20a (ANOVA), 7.20b (ANCOVA); the cell means for

TABLE 7.19

Step-wise multiple regression analysis for A scores of pupils of Class I of All States

Equation Number 1 Dependent Variable. A APPLICATION SCORE

Beginning Block Number 1. Method: Step-wise

Variable(s) Entered on Step Number
1. ATTENDANCE

Multiple R	.23883
R Square	.05704
Adjusted R Square	.05691
Standard Error	28.26592

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	347204.13974	347204.13974
Residual	7184	5739746.35066	798.96247

F = 434.56877 Signif F = .0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.35527	.01704	.23883	20.846	.000
(Constant)	51.32564	1.34925		38.040	.0000

Variable(s) Entered on Step Number
2. FATHER'S OCCUPATION

Multiple R	.26185
R Square	.06856
Adjusted R Square	.06830
Standard Error	28.09465

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	417341.89930	208670.94965
Residual	7183	5669608.59110	789.30928

F = 264.37159 Signif F = 0.0

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.31088	.01758	.20899	17.683	.0000
Father's Occu.	1.66990	.17715	.11141	9.427	.0000
(Constant)	48.90537	1.36543		35.817	.0000

Variable (s) Entered on Step Number
3.. LOCALE: URBAN/RURAL

Multiple R	.26920
R Square	.07247
Adjusted R Square	.07208
Standard Error	28.03761

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	441127.19826	147042.39942
Residual	7182	5645823.29214	786.10739

F = 187.05129 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T	VAF
Attendance	.29770	.01771	.20013	16.811	.0000	4.7831
Father's Occu.	1 63957	.17687	.10939	9.270	.0000	1.82268
Locale	-5.73782	1.04312	-.06324	-5.501	.0000	0.6387
(Constant)	60.82957	2.56049		23.757	.0000	—
						T = 7.2486

4. Coefficients of Correlation

	Attendance	Father's ccu.	Locale	A scores
Attendance	—	.268	- 149	239
Father's Occu.		—	-.070	.167
Locale			—	-.101
A Scores				—

State × group × sex in Table 7.20c for State × group in Table 7.20d, for State × sex in Table 7.20e and for group × sex in Table 7.20f. The values of their significance levels computed through the non-parametric tests for state, group and sex are presented in Tables 7.21a, 7.21b and 7.21c.

As expected, except very minor differences the F ratios and their significance levels in ANOVA and ANCOVA match. Hence the ANOVA table is reproduced for reference only. The presentation and discussion have been done keeping in view the values obtained through ANCOVA.

The F values (109.25, df = 1, 7216 and 41.80, df = 1, 7216) for attendance and income are significant beyond .000 level, thereby indicating their contribution to the variance, though their raw regression coefficients are rather small in size (.177 and .004). However, the results presented below are free from their effects on A scores, since they stand partialled out.

The F value for sex is not significant. Those for State and group are significant beyond .000 level, i.e., 229.46, df = 6,7216 and 160.71, df = 2, 7216, thereby rejecting the null hypothesis that the means of States × groups do not differ significantly. Further inspection of the table indicates that significant two-way interactions exist between States × group (F = 28.09, df = 12, 7216, P = .000), and between State × sex (F = 5.82, df = 6, 7216, P = .000), but not between State × sex. The three-way interaction among State × group × sex is also significant (F = 2.45, df = 12, 7216, P = .003), indicating the combined contribution of these variables to the total variance in A scores.

TABLE 7.20a

Analysis of variance of A scores of pupils of Class I of All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squares	A	Mean Square	F	Signif of F
Main Effects	1113464.718	9	123718.302	203.570	.000
State	932073.051	6	155345 508	255.611	.000
Group	191095.193	2	95547.596	157.217	.000
Sex	1756.503	1	1756.503	2.890	.089
2-way Interactions	331193.661	20	16559 683	27.248	.000
State × Group	295970.940	12	24664.245	40.583	.000
State × Sex	20469.904	6	3411.651	5.614	.000
Group × Sex	2501.638	2	1250.819	2 058	.128
3-way Interactions	18917.212	12	1576.434	2.594	.002
State × Group × Sex	18917.212	12	1576.434	2.594	.002
Explained	1463575.592	41	35696.966	58.737	.000
Residual	4386686.337	7218	607.743		
Total	5850261.928	7259	805.932		

TABLE 7.20b

Analysis of covariance of A scores of pupils of Class I of 7 States showing F values for State, group, sex and interactions after partialling out the effect of attendance and income

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Covariates	101505 822	2	50752 911	83.964	.000
Attendance	66037.969	1	66037 969	109.252	.000
Income	25268 288	1	25268.288	41.803	000
Main Effects	1029611 893	9	114401 321	189 263	.000
State	832197 101	6	138699.517	229.461	.000
Group	194279 159	2	97139.579	160.706	000
Sex	1909 764	1	1909 764	3.159	.076
2-way Interactions	339612.414	20	16980.621	28 092	000
State × Group	304255 652	12	25354.638	41.946	.000
State × Sex	21100.698	6	3516.783	5.818	.000
Group × Sex	2032.067	2	1016.034	1.681	.186
3-way Interactions	17770 251	12	1480 854	2.450	003
State × Group × Sex	17770.251	12	1480.854	2.450	.003
Explained	1488500.379	43	34616.288	57.268	.000
Residual	4361761.549	7216	604 457		
Total	5850261.928	7259	805.932		

Covariate	Raw Regression Coefficient
Attendance	.177
Income	.004

TABLE 7.20c

Cell means of A scores of pupils of Class I in All States for State, group and sex

Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	85.13	52.17	86.39	80.09	80.93	57.17	90.86	81.61	80.47 (3)*
N	419	180	463	1062	151	53	151	355	1417
Orissa	71.22	72.80	57.86	67.66	65.00	72.73	61.86	64.36	66.16 (5)
N	41	25	28	94	24	11	43	78	172
Rajasthan	83.97	55.39	84.93	78 64	87.07	58.61	88.49	81.81	79.44 (4)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	60.17	54.56	55.87	56.42	51.19	50.08	59.34	55.05	55.75 (6)
N	121	171	252	544	135	118	258	511	1055
Bihar	64.70	26.49	59.20	56 80	67.00	7.50	47.47	48.46	53.95 (7)
N	100	37	138	275	40	16	87	143	418
Mizoram	79.77	86.82	86.10	84.29	83.77	87.10	87 46	86.16	85.19 (1)
N	221	217	249	687	204	193	236	633	1320
Karnataka	84.14	82.73	88.76	86.79	74.83	81.84	83 61	82.06	84.72 (2)
N	111	194	549	854	87	152	427	666	1520
Total	79.62	65.84	81.00	77.15	75.12	70.46	78.15	75.60	76.57
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 78.01			Non-Project MF = 67.57			Project + CCP MF =	79.90	
N	2063			1645				3552	

*Figures in brackets represent RANKS State means.

Conclusions and Interpretations

State: Table 7.20c presents the cell means. The means of the A scores of pupils differed significantly from one State to another, Mizoram obtaining the highest mean, i.e. 85.19, and Bihar, the lowest, i.e., 53.95, the range being 31.24. The means of four States, viz., Mizoram, Karnataka, U.P. and Rajasthan were above, whereas those of Orissa, Maharashtra and Bihar were below the mean 76.57 of the total sample. The result was confirmed through the Kruskal Wallis One-way ANOVA. The Chi-square and its significance are as follows: 892.09, P = 0000 (Table 7.21a).

TABLE 7.21a

Kruskal-Wallis One-way ANOVA of A scores of pupils of Class I in All States showing Chi-square value for States

Rank	Mean Rank		Cases
3	3573.75	1291	ST = U.P.
5	2278.43	148	ST = Orissa
4	3382.77	1212	ST = Rajasthan
6	2109.81	945	ST = Maharashtra
7	1875.81	377	ST = Bihar
2	3683.72	1192	ST = Mizoram
1	3779.46	1357	ST = Karnataka
		N = 6522	

Corrected for Ties	Chi-Square	Significance
	892.0963	.0000

The null hypothesis of no differences existing among the average A scores of pupils belonging to different States is rejected. There is a complete parity between the ranks assigned to the means and mean ranks (Table 7.20c & 7.21a). The means of the pairs of states were tested through the Scheffe procedure. The results obtained are presented below (*see* Table 7.CI-I States):

* The pupils of Mizoram and Karnataka developed better abilities to apply knowledge and understanding in the subject than did the pupils of Bihar, Maharashtra, Orissa, Rajasthan and U.P.
* The pupils of U.P. and Rajasthan developed better abilities to apply knowledge and understanding in the subject than did the pupils of Bihar, Maharashtra and Orissa.
* The pupils of Orissa developed better abilities to apply knowledge and understanding in the subject than did the pupils of Bihar and Maharashtra.
* The pupils of Bihar and Maharashtra did not differ in their abilities to apply knowledge and understanding in the subject.

Group: The means of pupils' A scores in the three types of schools differed significantly. The means of groups in Table 7.20c indicates that while the means of non-project schools differed from the means of both project and project schools + CCP, there was no significant difference between the means of project schools and project schools + CCP, i.e. proj. schools. M = 78.000 Non-Proj. schools. M = 67.56 and proj. schools. + CCP = 80.00. The Scheffe procedure confirmed the finding at the 5 per cent level of significance (*refer* to Table 7.CI-I-Grp. also).

Since the major hypothesis relates to ascertaining the differences existing among the groups, it was felt necessary to check the homogeneity of variance of the groups. The test results for A scores are given below;

Cochrans C = .4640 P = .000
Barlett-Box F = 103.17, P = .000

Since the values are quite large and highly significant, the parametric result was checked through the Kruskal Wallis One-way ANOVA. The Chi-square value and other relevant details are presented in Table 7.21b.

TABLE 7.21b

Kruskal-Wallis One-way ANOVA of A scores of pupils of Class I in All States showing the Chi-square value for groups

Rank	Mean Rank	Cases	
22	3275 30	1865	Grp = Proj
33	2812.37	1479	Grp = Non-Proj.
11	3462.42	3178	Proj.+CCP
		N = 6522	

Corrected for Ties	Chi-Square	Significance
	134.0059	.0000

The Chi-square value, 134.00, is significant at .0000 level. Therefore the null hypothesis of no differences existing among the average A scores of pupils belonging to the three groups is rejected. Besides, the rank order of means (*refer* to Table 7.20c) and the mean ranks (Table 7.21b) matches perfectly. Thus, the conclusion drawn from the parametric test above is vindicated.

The question that needs serious consideration is whether, conceptually, this finding corroborates the prediction implied in the alternate hypothesis. The answer is that it does, though the higher mean of the pupils studying in project schools + CCP was not significant from that of the pupils of project schools. This finding is of importance since it breaks away from the other three previous results related to the T, K and U scores. It was observed that the pupils of project schools consistently obtained higher mean scores than the pupils of project schools + CCP, suggesting thereby that the learnings of pupils did not receive needed reinforcement at home. Concretely put, the benefit of the community contact programme did not accrue to the pupils belonging to project schools+CCP.

As will be seen later in the chapter on the impact of the intervention in the community, the programme on the whole effected a significant change in the whole range of behaviours of the community members relating to nutrition, health and environmental sanitation. One would call that programme more practice-oriented than information (knowledge)-oriented. Simply put, the major objective of the programme was to help people adopt better practices for improving the quality of life. The most plausible interpretation seems to be as follows: The parents were not in a position to promote better acquisition of basic facts or development of understanding of the content in their wards; these are essentially academic aspects of the subject. However, they had received and perhaps internalised the messages delivered to them. Probably, attempts must have been made by them to make the children also adopt better practices and habits. This kind of meaningful interaction could have reinforced the perception of the applied part of the learning which seems to have been reflected in these pupils gaining an edge in the A scores over their counterparts in project schools. It is quite interesting to note that the T scores included the components of K, U, A and S. And yet, the trend of analysis of A scores differs from the T score in spite of the fact that it is as much a part of the Total score as are K and U scores. The significant *rs* of the K-T pair (.783) and the A-T pair (.838, *see* Table 7.5) substantiate the point raised here. There are more common elements between the PAT and Sub-test A than between the PAT and K. On this basis one would have anticipated a trend in A scores similar to the trend in the Total scores. But this has not happened. In view of this fact, the trend for A scores, though non-significant, needs careful consideration.

Sex: So far as sex is concerned, the samples of males and females belong to a common population. Hence there is no significant difference in the means of males and females (77.15 and 75.60). When this result was checked with the Chi-square value obtained through the Mann-Whitney U-Wilcoxon Rank Sum W test, it was found that males and females differed significantly.

TABLE 7.21c

Mann-Whitney U-Wilcoxon Rank Sum W test of A scores of pupils of Class I in All States showing U-W and Z values for sex

Mean Rank	Cases	
3296.50	4072	Sex = Male
3203 32	2450	Sex = Female
	N = 6522	

Corrected for Ties

U	W	Z	2-tailed P
4845668.0	7848143.0	-2.0434	.0410

The Z value, –2.0434, is significant at the .041 level, thereby rejecting the null hypothesis of no difference between the average A scores of males and females. This is the first finding which raises a small doubt about the result derived from the parametric test. According to this finding, males developed better application abilities than did females. It is believed that the non-paramtric test has been more sensitive as percentage scores in the sub-tests registered rather unequal jumps, depending upon the small or large number of items in each subtest. The smaller the number, the larger were the jumps. This may be one reason for the difference. The ordinal marking has been obviously more accurate in sensing the difference between the two sets of scores than the continuous or interval scaling. If this a lone finding, it will be ignored. Otherwise, an in-depth inspection will be carried out before any conclusion is drawn.

2-way Interactions

State X Group: To a considerable extent the interaction variance with respect to A scores is

attributable to both State and group.

The cell means and their corresponding expected means in Tables 7.20d and 7.20d' show the interaction effect apportioned to State × group. There are positive and negative differences in each of the cells showing the combined effect of these two variables on the variance in A scores.

What are the conceptual implications of these differences ? The trend of wide differences occurring in non-project schools is continuing here also. That means, the variance of A scores is affected by these fluctuations. In Orissa, while non-project schools did much better than expected, project schools + CCP registered a deeper slump than expected, which resulted in the former performing significantly better than the latter, but not better than project schools. Non-project schools in Maharashtra also did better than expected whereas the other two did a little less well than expected. Consequently, the three schools did not differ. Non-project schools in U.P. did far less well than expected, while the other two did better, resulting in U.P. following the trend of the sample. In contrast to this, non-project schools in Bihar did far less well than expected, whereas project schools did much better than expected. As a result all the three pairs of schools differed. In Karnataka, equal losses and gains by project schools and non-project schools, respectively, effected a change in favour of project schools + CCP which, with their better performance, differed from the other two types of schools. Lastly, non-project schools in Mizoram did substantially better than expected, while project schools did less well than expected. Thus, the performance of project schools differed from the other two types of school. Although the interactive nature of variables does pose a problem of drawing straightforward conclusions, a clear trend is emerging that, more often than not, the performance of non-project schools was poorer than that of the other two types of schools which were exposed to two different treatments.

State × Sex: Sex was not found to be an independent source of variation in the A scores. However, sex combined with State has contributed significantly to the variation among the related cell means. Reference may be made to Tables 7.20e and 7.20e':

TABLE 7.20d

Cell means of A scores of pupils of Class I in All States for State × group

State \ Group	Proj:	Non-Proj.	Proj.+CCP	Total
U.P.	84.02 (570)	53.30 (233)	87.49 (614)	80.47 (1417)*
Orissa	68.92 (65)	72.78 (36)	60.28 (71)	66.16 (172)
Rajasthan	84.72 (409)	56.22 (278)	85.84 (671)	76.44 (1358)
Maharashtra	55.43 (256)	52.73 (289)	57.63 (510)	55.75 (1055)
Bihar	65.36 (140)	20.75 (53)	54.67 (225)	53.95 (418)
Mizoram	81.69 (425)	86 95 (410)	86.76 (485)	85.19 (1320)
Karnataka	80.05 (198)	82.34 (346)	86.51 (976)	84.72 (1520)
Total (All States)	78.01 (2063)	67.57 (1645)	79.90 (3552)	76.57 (7260)

*Figures in brackets indicate N.

TABLE 7.20d'

Expected means and differences between actual and expected means for A scores of pupils of Class I in All States for State × group

State \ Group	Project	Non Proj.	Proj.+CCP	Total
U.P.	81.91 N = 570 D = +2.11	71.47 N = 233 D = −18.17	83.80 N = 614 D = +3.69	80.47 N = 1417
Orissa	67.60 N = 65 D = +1.32	57.16 N = 36 D = +15 62	69.49 N = 71.0 D = −9.21	66.16 N = 172
Rajasthan	80.88 N = 409 D = +3.84	70.44 N = 278 D = −1422	82.77 N = 671 D = +3.07	79.44 N = 1358
Maharashtra	57.19 N = 256 D = −1.76	46.75 N = 289 D = +5 98	59.08 N = 510 D = −1.45	55.75 N 1055
Bihar	55.39 N = 140 D = +9 97	44.95 N = 53 D = −24.20	57 28 N = 225 D = −2.61	53.95 N = 418
Mizoram	86.63 N = 425 D = −4.94	76.19 N = 410 D = +10.76	88.52 N = 485 D = −1.76	85 19 N = 1320
Karnataka	86.16 N = 198 D = −6.11	75.72 N = 346 D = +6.62	88.05 N = 976 D = −1.54	84.72 N = 1520
Total (All States)	78.01 N = 2063	67.57 N = 1645	79.90 N = 3552	76.57 N = 7260

TABLE 7.20e

Cell means of A scores of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
U.P.	80.09 (1062)	81.61 (355)	80.47 (1417)*
Orissa	67.66 (94)	64.36 (78)	66.16 (172)
Rajasthan	78.64 (1015)	81.81 (343)	76.44 (1358)
Maharashtra	56.42 (544)	55.05 (511)	55.75 (1055)
Bihar	56.80 (275)	48.46 (143)	53.95 (418)
Mizoram	84.29 (687)	86.16 (633)	85.19 (1320)
Karnataka	86.79 (854)	82.06 (666)	84.72 (1520)
Total (All States)	77.15 (4531)	75.60 (2729)	76.57 (7260)

*Figures in brackets indicate N.

The examination of cell means and their corresponding expected means shows that there are large and small positive and negative differencess, indicating thereby the variance difference attributable to this interaction.

What do these differences indicate? While males and females of the total sample did not differ, they did so in the States. In Bihar for example, the male pupils obtained a much higher mean A score (56.80, as they performed better than expected) than the female pupils (mean A score 48.10) who did much less well than expected. All other States, except U.P., Rajasthan and Mizoram, followed the trend evident in the total sample.

The magnitude of differences in the columns of males and females are in the following ranges: +2.27 to −1.48 and +3.34 to −4.52, respectively. Clearly, the scores of females vary more than those of males. Thus it appears that the data for Bihar and some small positive and negative deviations in other States have contributed to the interaction variance in the A scores to yield a significant F ratio.

Group x Sex: The interaction of group and sex is not significant.

The cell means and their corresponding expected means along with their differecnes are presented in Tables 7.20f and 7.20f for reference.

It is quite clear from the tables that the differences between actual and expected means are marginal.

TABLE 7.20e'

Expected means and differences between actual and expected means for A scores of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
U.P.	81.05 N = 1062 D = −0.96	79.50 N = 355 D = +2.11	80.47 N = 1417
Orissa	66.74 N = 94 D = +0.92	65.19 N = 78 D = −0.83	66.16 N = 172
Rajasthan	80.02 N = 1015 D = −1.38	78.47 N = 343 D = +3.34	79.44 N = 1358
Maharastra	56.33 N = 544 D = +0.09	54.78 N = 511 D = +0.27	55.75 N = 1055
Bihar	54.53 N = 275 D = +2.27	52.98 N = 143 D = −4.52	53.95 N = 418
Mizoram	85.77 N = 687 D = −1.48	84.22 N = 633 D = +1.94	85.19 N = 1320
Karnataka	85.30 N = 854 D = +1.49	83.75 N = 666 D = −1.69	84.72 N = 1520
Total (All States)	77.15 N = 4531	75.60 N = 2729	76.57 N = 7260

TABLES 7.20f

Cell means of A scores of pupils of Class I in All States for group x sex

Group \ Sex	Male	Female	Total
Proj.	79.62 (1323)	75.12 (740)	78.01 (2063)*
Non-Proj.	65.84 (1030)	70.46 (615)	67.57 (1645)
Proj. + CCP	81.00 (2178)	78.15 (1374)	79.90 (3552)
Total (All States)	77.15 (4531)	75.60 (2729)	76.57 (7260)

*Figures in brackets indicate N.

TABLES 7.20f
Expected means and differences between actual and expected means for A scores of pupils of Class I in All States for group × sex

State \ Sex	Male	Female	Total
Proj.	78.59 N = 1323 D = + 1.03	78.01 N = 740 D = -2 89	78.01 N = 2063
Non-Proj.	68.15 N = 1030 D = -2.31	67.57 N = 615 D = + 2.89	67.57 N = 1645
Proj. + CCP	80.48 N = 217.8 D = 0.52	79.90 N = 1374 D = -1.75	79.90 N = 3552
Total (All States)	77.15 N = 4531	75.60 N = 2729	76.57 N -7260

VARIABLE: *SKILL—S SCORES*

Descriptive Statistics

Measures of Central Value and Variability (Dispersion): The distributions of frequencies of S scores—the histogram frequency is presented in Fig. 7.7, whereas the basic statistical values are presented in Table 7.22.

TABLE 7.22
Measures of central value and variability of S scores of pupils of Class I in All States

S. Skill Score

Mean	68.691	Median	100.000	Mode	100.000
Std Dev	38.837	Skewness	-.758	Range	100.000
Percentile	Value	Percentile	Value	Percentile	Value
25.00	50.000	50.00	100.000	75.00	100.000

N 7260

The line graph indicates that the frequency distribution of S scores is negatively skewed (-.758). However, the value does not completely depict the true picture. Earlier it was mentioned that part of the variance fluctuation is due to the fact that the items in the sub-tests vary and, consequently, the smaller the number of items, the greater is the percentage variation. This supposition finds empirical support from the data of S scores presented here. There are only three mid-points around which the frequencies have clustered, showing clear jumps of scores from one mid-point to the second and third higher ones. Comparison of the asterisk points and points on the line curve clearly demonstrate a somewhat unusual distribution. The median (100%) is not only much higher than the mean, i.e. 68.69, but is equal to the mode. Further, the value of SD (38.83) is double the one that is derived as 1/6 of the range 100, i.e., 16.67, indicating a substantial dispersion of the S scores. Although it has been argued that the F ratio, being a robust test, is insensitive to such skewed distributions, the author would consider that distribution-free statistical tests are more appropriate. It would not be out of place to state that it is precisely for this reason that the data have been subjected to both types of statistical techniques.

Conclusions and Interpretations

* The achievement of pupils of Class I in Skill could be considered very high as the median was 100. Sub-test S consisted of only one learning outcome: observation. In terms of development of a minimum level of learning also, this finding supports those drawn earlier with respect to T, K, U and A.
* The question of easiness of the sub-test again needs consideration. The arguments offered earlier are relevant here also.

Special attention needs to be drawn to the coefficients of correlation among the PAT and the four components (*see* Table 7.5). The *rs* between S and T, K, U and A are moderate, i.e., .656, .406, .493 and .481. Thus the sub-test comprises more elements which are different from, than are similar to Sub-tests K, U and A.

Predictors of Skill — S Scores

Coefficients of Determination: The values obtained through the step-wise multiple regression analysis (SWMRA) are presented in Table 7.23, viz., Multiple R, R Square, F with dfs in ANOVA and *t* with their significance levels.

Attendance, Locale and Social status were entered into the regression analysis in that order. While each step has been presented in the table, only the last step has been discussed here, as it shows the combined predictive association of these three variables with the S scores. The values are: Multiple R = .16784, R Square = .02817 (adjusted = .02776), F =

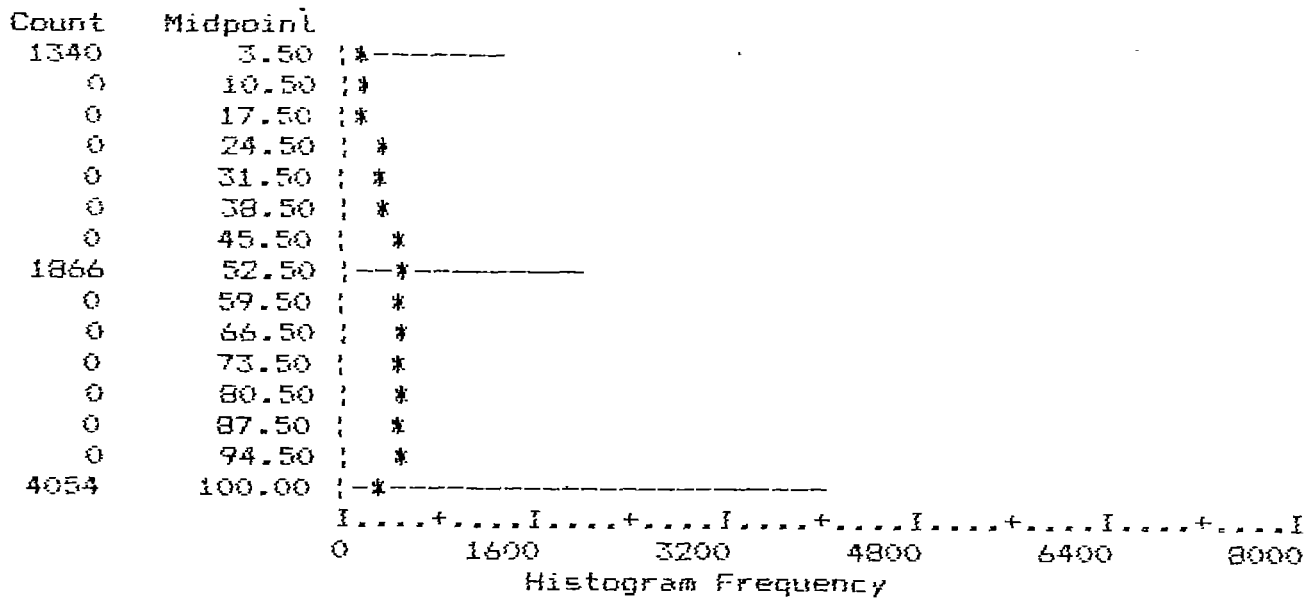


FIG. 7.7

Theoretical (asterisks) and empirical frequency distributions of S scores of pupils of Class I in All States

TABLE 7.23

Step-wise multiple regression analysts for S scores of pupils of Class I in All States

Equation Number 1 Dependent Variable S SKILL SCORE

Beginning Block Number 1.Method: Stepwise

Variable(s) Entered on Step Number

1. ATTENDANCE

Multiple R	.14312
R Square	.02048
Adjusted R Square	.02035
Standard Error	38.56026

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	223367.75284	223367.75284
Residual	7184	10681843.20583	1486.89354
	F = 150.22444	Signif F = .0000	

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.28495	.02325	.14312	12.257	.000
(Constant)	46.82238	1.84064		25.438	.0000

Variable(s) Entered on Step Number

2. LOCALE: URBAN/RURAL

Multiple R	.15551
R Square	.02418
Adjusted R Square	.02391
Standard Error	38.49003

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	263720.20391	131860.10195
Residual	7183	10641490.75476	1481.48277

F = 89.00549 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
Attendance	.26674	.02347	.13397	11.367	.0000
Locale	-7.46993	1.43130	-.06151	-5.219	.0000
(Constant)	62.28898	3.48684		17.864	.0000

Variable (s) Entered on Step Number

3. SOCIAL STATUS· DISADVANTAGE/ADVANTAGE

Multiple R	.16784
R Square	.02817
Adjusted R Square	.02776
Standard Error	38.41398

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	307206.32659	102402.10886
Residual	7182	10598004.63208	1475.63417

F = 69.39532 Signif F = 0.0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T	VAf
Attendance	.26966	.02343	.13544	11.510	.0000	1.9368
Locale	-9.39248	1.47172	-.07735	-6.382	.0000	0.6265
Social Status	1.71024	.31504	-.06517	5.429	.0000	0.2476
(Constant)	60.51364	3.49529		17.313	.0000	—
						T = 2.811

5. Coefficients of Correlation

	Attendance	Locale	Social Status	S Score
Attendance	—	-.149	-.059	.143
Locale		—	.246	.081
Social Status			—	.038
S Scores				—

69.40, df = 3, 7182, P = .0000. In view of the significant value of F, the null hypothesis that the combined variables and S scores are not associated in the population and that they differ from zero only by chance stands rejected.

Though quite small, i.e., .16784, Attendance, Locale and Social status possess significant power to predict the skill of the pupils in the subject under the study. They together account for only 2.817% variance of S scores, for R Square being .02817. This leaves 97.18% variance accounted for by the variables not included in the regression equation. Even in this small amount of variance, Attendance accounts for the highest percentage (1.93%), thereby again supporting the finding obtained for all dependent variables namely Total achievement score, K, U and A scores. It means that SES-related variables, viz. Locale and Social status have only marginal association with S scores.

Testing of the Null Hypothesis

The null hypothesis of random sampling from a

common population for S scores, even after the effect of attendance and income is partialled out, was tested through the analysis of variance and covariance for State (7) × group (3) × sex (2) = 42-cell design. The F ratios and their level of significance are presented in Table 7.24a (ANOVA) and 7.24b (ANCOVA); the cell means for State × group × sex in Table 7.24c, for State × group in Table 7.24d, for State × sex in Table 7.24e and group × sex in Table 7.24f. The values of their significance levels computed through the non-parametric tests for State, group and sex are presented in Tables 7.25a, 7.25b and 7.25c.

Except for very minor differences, the F ratios and their significance levels in ANOVA and ANCOVA match. Hence the ANOVA table is reproduced for reference only. The presentation

TABLE 7.24a

Analysis of variance of S scores of pupils of Class I in All States showing F values for State, group, sex and interactions

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main Effects	1950685.239	9	216742.804	184.221	.000
State	1693981.880	6	282330.313	239.867	.000
Group	265796.753	2	132898.376	112.957	.000
Sex	723.793	1	723.793	.615	.433
2-way Interactions	458753.543	20	22937.677	19.496	.000
State × Group	434538.017	12	36211.501	30.778	.000
State × Sex	17346.184	6	2891.031	2.457	.022
Group × Sex	10541.900	2	5270.950	4.480	.011
3-way Interactions	46882.588	12	3906.882	3.321	.000
State × Group × Sex	46882.588	12	3906.882	3.321	.000
Explained	2456321.370	41	59910.277	50.921	.000
Residual	8492247.500	7218	1176.537		
Total	10948568.871	7259	1508.275		

TABLE 7.24b

Analysis of covariance of S scores of pupils of Class I in All States showing F values for State, group, sex and interactions after partialling out the effect of attendance and income

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif of F
Covariates	193198.803	2	96599.401	82.666	.000
Attendance	156064.869	1	156064.869	133.554	.000
Income	21945.101	1	21945,101	18.780	.000
Main Effects	1798636.371	9	199848.486	171.023	.000
State	1511415.458	6	251902.576	215.568	.000
Group	271984.543	2	135992.272	116.377	.000
Sex	873.123	1	873.123	.747	.387
2-way Interactions	481686.932	20	24084.347	20.610	.000
State × Group	459583.356	12	38298.613	32.774	.000
State × Sex	15377.628	6	2562.938	2.193	.041
Group × Sex	9093.137	2	4546.569	3.891	.021
3-way Interactions	42788.226	12	3565 686	3.051	.000
State × Group × Sex	42788.226	12	3565.686	3.051	.000
Explained	251610.332	43	58518 845	50.078	.000
Residual	8432258.539	7216	1168.550		
Total	10948568.871	7259	1508.275		

Covariate Raw Regression Coefficient
Attendance .272
Income .003

and discussion have been done keeping in view the values obtained through ANCOVA.

The F values (133 55, df = 1, 7216 and 18.78, df = 1, 7216) for Attendance and Income are significant beyond 000 level, thereby indicating their contribution to the variance, though their raw regression coefficients are rather small in size (.272 and .003) However, the results presented below are free from their effects on the S scores, since they stand partialled out

The F value for sex is not significant. Those for State and group are significant beyond .000 level, i.e., 215.57, df = 6, 7216 and 160.71, df = 2, 7216, thereby rejecting the null hypothesis of no differences among the means of States and groups. Further inspection of the table indicates that significant two-way interactions exist between State × group (F = 32.77, df = 12, 7216, P = 000), between State × sex (F = 2.19, df = 6, 7216, P = .0000), and between group × sex (F = 3.89, df = 2, 7216, P = .021. The F ratio between State × group indicates that the variance due to the interaction between them is greater than that due to the interaction either between State × sex or between group × sex

The three-way interaction among State × group × sex is also significant (F = 3.05, df = 12, 7216, P = 000), indicating their combined contribution to the total variance in the S Scores.

Conclusions and Interpretations

State: Table 7.24c presents the cell means. The means of S scores of pupils differed significantly from one State to another, Karnataka obtaining the highest mean, i.e., 81.61, and

TABLE 7.24c

Cell means of S scores of pupils of Class I in All States for State, group and sex

	Male				Female				
State \ Group	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	77 45	43.61	84.77	74.91	72.85	46.23	89.74	76.06	75 19 (3)*
N	419	180	463	1062	151	53	151	355	1417
Orissa	45 12	44 00	21 43	37 77	31 25	40.91	44 29	39.74	38 66 (6)
N	41	25	28	94	24	11	43	78	172
Rajasthan	74 68	42 48	80.46	70 99	73 23	43 06	84 59	72.59	71.39 (4)
N	310	206	499	1015	99	72	172	343	1358
Maharashtra	47.93	60.53	37 50	47 06	42 22	38.56	40.70	40.61	43 93 (5)
N	121	171	252	544	135	118	258	511	1055
Bihar	35.50	13 51	39.13	34 36	55.00	9.38	37 93	39.51	36.12 (7)
N	100	37	138	275	40	16	87	143	418
Mizoram	75.11	72 35	82 53	76.93	77 70	76.68	82 84	79.30	78 07 (2)
N	221	217	249	687	204	193	236	633	1320
Karnataka	85.14	77 58	83 97	82.67	81.61	72.70	82.67	80 26	81.61 (1)
N	111	194	549	854	87	152	427	666	1520
Total	70 18	57.57	74.15	69.22	67.36	59.43	71 80	67 81	68 69
N	1323	1030	2178	4531	740	615	1374	2729	7260
Grp M+F	Project MF = 69.17 2063		Non-Project MF = 58.27 1645				Project + CCP MF = 73 24 3552		

*Figures in brackets represent the RANKS of State means

Bihar, the lowest, i.e., 36.12, the range being 45.49. The means of four States, viz., Mizoram, Karnataka, U.P. and Rajasthan were above, whereas those of Orissa, Maharashtra and Bihar were below the mean, 68.69, of the total sample. The result was confirmed through the Kruskal Wallis One-way ANOVA. The Chi-square value and its significance are as follows: 942.32, P = .0000 (Table 7.25a).

TABLE 7.25a

Kruskal- Wallis One-way ANOVA of S scores of pupils of Class I in All States showing Chi-squre value for States

Rank	Mean Rank	Cases	
3	3591.70	1291	ST = U.P.
6	1966.68	148	ST = Orissa
4	3315.70	1212	ST = Rajasthan
5	2227.39	945	ST = Maharashtra
7	1892.12	377	ST = Bihar
2	3642.95	1192	ST = Mizoram
1	3805.69	1357	ST = Karnataka
		N = 6522	

Corrected for Ties	Chi-Square	Significance
	942.3199	.0000

The null hypthesis of no differences existing among the average S scores of pupils belonging to different States is rejected. There is a complete match between the ranks assigned to the means and the mean ranks (Table 7.24c & 7.25a). Further analysis of the pairs of States yielded the following findings (*see* 7.Cl-I-State):

* The pupils of Karnataka developed better observation skill related to the subject than did the pupils of Bihar, Orissa, Maharashtra, Rajasthan and UP.
* The pupils of Mizoram developed better observation skill related to the subject than did the pupils of Bihar, Orissa, Maharashtra, Rajasthan.
* The pupils of UP and Rajasthan developed better observation skill related to the subject than did the pupils of Bihar, Orissa and Maharashtra.
* The pupils of Bihar and Orissa did not differ in observation skill related to the subject.

Group: The means of pupils for S scores in the three type of schools differed significantly. The means of groups in Table 7.20c indicate that the mean of project schools + CCP was significantly higher than the mean of project schools; the mean of project schools was higher than that of non-project schools, i.e., proj. schools. + CCP M = 73.24 > proj. schls. M = 69.16 > non-proj. schls. M = 58.27. The significant differences between all the three pairs of means was confirmed by the Scheffe procedure at the 5 per cent level of significance (*see* Table 7.Cl-I-Grp).

Since the major hypothesis relates to finding out differences existing among the groups, it was felt necessary to check the homogeneity of variance of the groups. The test results for S scores are given below:

Cochrans C = .3690 P = .000
Bartlett-Box F = 13.23, P = .000

Since the values are fairly large and highly significant, the parametric result was checked through the Kruskal Wallis One-way ANOVA. The Chi-square value and other relevant details are presented in Table 7.25b.

TABLE 7.25b

Kruskal-Wallis One-way ANOVA of S scores of pupils of Class I in all States showing Chi-square value for groups

Rank	Mean Rank	Cases	
2	3304 64	1865	Grp = Project schools
3	2783.19	1479	Grp = Non-Project schools
1	3458.78	3178	Grp = Project School + CCP
		N = 6522	

Corrected for Ties	Chi-Square	Significance
	163.2490	.0000

The Chi-square value, 163.25, is significant at .0000 level. Therefore, the null hypothesis of no differences existing among the average S scores of pupils belonging to the three groups is rejected. Besides, the rank orders of means (Table 7.20c) and the mean ranks (Table 7.25b) match perfectly. Thus, the conclusion drawn from the parametric test above is vindicated.

This is the right time to take a look at the entire set of results. The alternate hypothesis in conceptual terms is fully vindicated with respect to the S component of the PAT. This is not all. While the result for T scores showed no differences existing between project schools and project schools + CCP, the first glimpse of the

effectiveness of the community programme as a reinforcer to pupils' learning was discernible in respect of the A score (though not significant), which ultimately seems to have culminated in a clear significant difference in favour of pupils belonging to project schools + CCP. It is a very interesting result. As can be seen from Appendix D, Sub-test S comprises only one item. While a single-item test puts a severe restriction on the conclusion that can be drawn from it, an equally important question that needs to be answered is, why the three groups differed significantly in this simple observation skill, and that too, in favour of the group of pupils who were exposed to the project intervention both in the school and the community. Further, as the nature of the hierarchy among the four components is revealed by the Friedman Two-way ANOVA (*see* Table 7.26), Sub-test A was easier than the single-item Sub-test S. Thus, technically, there is no other alternative to considering the alternative hypothesis as tenable. The significant findings and trends, which have been found with respect to the data for Class I, will be confirmed by the results for Classes II, III, IV and V later, in the following sector before the final conclusions are drawn.

Sex: Sex is not related to S scores and, therefore, it is concluded that the samples of male and female are drawn from a common population. The Chi-square obtained through the Mann-Whitney U-Wilcoxon Rank Sum Test confirmed the result. The values are presented in Table 7.25c.

TABLE 7.25c

Mann-Whitney U Wilcoxon Rank Sum test of pupils of Class I in All States showing Chi-square value for sex

Mean Rank	Cases	
3280.16	4072	Sex = Male
3230.27	2450	Sex = Female
	N = 6522	

Corrected for Ties

U	W	Z	2-tailed P
4912208.0	7914155.0	-1.1528	.2490

2-way Interactions

State X Group: Positive and negative differences between actual and expected means are clearly evident in Tables 7.24d and 7.24d'.

As has been noticed earlier, substantial differences in positive and negative directions are evident in non-project schools, accounting for

TABLE 7.24d

Cell means of S scores of pupils of Class I in All States for State x group

State \ Group	Proj.	Non-Proj.	Proj.+CCP	Total
U P	76.23 (570)	44.21 (233)	85.99 (614)	75.19 (1417)*
[illegible]	40.00 (65)	43.06 (36)	35.21 (71)	38.66 (172)
Rajasthan	74.33 (409)	42.63 (278)	81.52 (671)	71.39 (1358)
Maharashtra	44.92 (256)	51.56 (289)	39.12 (510)	43.93 (1055)
Bihar	41.07 (140)	12.26 (53)	38.67 (225)	36.12 (418)
Mizoram	76.35 (425)	74.39 (410)	82 68 (485)	78.07 (1320)
Karnataka	83.59 (198)	75.43 (346)	83.40 (976)	81 61 (1520)
Total (All States)	69.17 (2063)	58.27 (1645)	73.24 (3552)	68.69 (7260)

*Figures in the brackets indicate N.

TABLE 7.24d'

Expected means and differences between actual and expected means for S scores of pupils of Class I in All States for State x group

State \ Group	Proj.	Non-Proj.	Proj.+CCP	Total
U.P.	75.67 N = 570 D = + 0.56	64.77 N = 233 D = -20 56	79.74 N = 614 D = +6.25	75.19 N = 1417
Orissa	39.14 N = 65 D = +0.86	28.24 N = 36 D = +14.82	43.21 N = 71 D = -8.0	38.66 N = 172
Rajasthan	71.87 N = 409 D = +2.43	60.97 N = 278 D = +18 34	75.94 N = 671 D = +5.58	71.39 N = 1358
Maharastra	44 41 N = 256 D = +0.51	33.51 N = 289 D = +18.05	48.48 N = 510 D = -9.36	43.93 N = 1055
Bihar	36.60 N = 140 D = +4.47	25.70 N = 53 D = -13.44	40.67 N = 225 D = -2.0	36.12 N = 418
Mizoram	78.55 N = 425 D = -2.20	67.65 N = 410 D = +6.74	82.62 N = 485 D = +0.06	78.07 N = 1320
Karnataka	82.09 N = 198 D = +1.50	71.19 N = 346 D = +4.24	86.16 N = 976 D =-2.76	81.61 N = 1520
Total (All States)	69.17 N = 2063	58.27 N = 1645	73.24 N = 3552	68.69 N = 7260

more interactive variance than do the differences in the case of the other two types of schools. U.P. and Rajasthan followed the trend observed in the total sample, i.e., the groups differed significantly (*see* Table 7.Cl-I-Grp). This has happened since non-project schools in U.P. did far less well than expected, while those in Rajasthan did much better. The gains of project schools in Orissa equalised the gains of project schools + CCP and the marginal loss of project schools and, hence, no differences among the groups. In Bihar and Karnataka, non-project schools differed from the other two types of schools, although the former did far less well than expected, and the latter did better than expected. In Maharashtra, while non-project schools did much better than expected, project schools did less well, the former thus showing a significantly higher mean than the latter. In Mizoram, the gains by non-project schools brought them at par with project schools and, consequently, they both differed from project schools + CCP, which registered a nominal loss.

State X Sex: Sex was not related to the variations in the S scores. However, sex combined with State has contributed significantly to the variation among the related cell means. Reference may be made to Tables 7.24e and 7.24e'.

TABLE 7.24e

Cell means of S scores of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
U.P.	74.91 (1062)	76.06 (355)	75.19 (1417)*
Orissa	37.77 (94)	39.74 (78)	38.66 (172)
Rajasthan	70.99 (1015)	72.59 (343)	71.39 (1358)
Maharashtra	47.06 (544)	40.61 (511)	43.93 (1055)
Bihar	34.36 (275)	39.51 (143)	36.12 (418)
Mizoram	76.93 (687)	79.30 (633)	78.07 (1320)
Karnataka	82.67 (854)	80.26 (666)	81.61 (1520)
Total (All States)	69.22 (4531)	67.81 (2729)	68.69 (7260)

*Figures in the brackets indicate N.

TABLE 7.24e'

Expected means and differences between actual and expected means for S scores of pupils of Class I in All States for State x sex

State \ Sex	Male	Female	Total
U.P.	75.72 N = 1062 D = –0.81	74.31 N = 355 D = +1.75	75.19 N = 1417
Orissa	39.19 N = 94 D = –1.42	37.78 N = 78 D = +1.96	38.66 N = 172
Rajasthan	72.32 N = 1015 D = –1.33	70.91 N = 343 D = +1.68	71.39 N = 1358
Maharashtra	44.46 N = 544 D = + 2.6	43.05 N = 511 D = –2.44	43.93 N = 1055
Bihar	36.65 N = 275 D = –2.29	35.24 N = 143 D = +4.27	36.12 N = 418
Mizoram	78.6 N = 687 D = –1.67	77.19 N = 633 D = +2.11	78.07 N = 1320
Karnataka	82.14 N = 854 D = +0.53	80.73 N = 666 D = –0.47	81.61 N = 1520
Total (All States)	69.22 N = 4531	67.81 N = 2729	68.69 N = 7260

Comparison between cell means and their corresponding expected means show that there are large and small positive and negative differences, indicating thereby that this interaction variance is responsible for differences among the cell means.

What do they indicate ? While the males and females of the total sample did not differ, they did so in the States. The larger differences are recorded for Maharashtra and Bihar, but in a reverse order. While the males in Maharashtra obtained 47.06 as the mean in contrast to the mean 40.61, for females, the females in Bihar registered the mean, 39.51, against the mean, 34.36, obtained by males. While the pairs of means of the other States were not significantly different, like the total sample means for sex, in some States the males did marginally better than expected, and in some others the females.

The differences in the columns of males and females are in the following ranges: +2.27 to –1.48 and +3.34 to –4.52 respectively. Clearly,

the deviations of females vary more than those of males.

Group X Sex: The interaction between group and sex is was not found to be independent source of variation in the S scores.

Cell means and their corresponding expected means along with their differences are presented in Tables 7.24f and 7.24f' for reference.

TABLE 7.24f

Cell means of S scores of pupils of Class I in All States for group × sex

Group \ Sex	Male	Female	Total
Proj.	70.18 (1323)	67.36 (740)	69.17 (1645)*
Non-Proj.	57.57 (1030)	59 43 (615)	58.27 (1645)
Proj+CCP	74.15 (2178)	71.80 (1374)	73.24 (3552
Total (All States)	69.22 (4531)	67.81 (2729)	68.69 (7260)

*Figures in brackets indicate N.

TABLE 7.24f'

Expected means and differences between actual and expected means for S scores of pupils of Class I in All State for group × sex

Group \ Sex	Male	Female	Total
Proj.	68.74 N = 1323 D = +1.44	67.33 N = 740 D = +0.03	69.17 N = 2063
Non-Proj.	58.80 N = 1030 D = −1.23	57.39 N = 615 D = +2.04	58.27 N = 1645
Proj.+CCP	73.77 N = 2178 D = +0.38	72.36 N = 1374 D = −0.56	73.24 N = 3552
Total (All States)	69.22 N = 4531	67.81 N = 2729	68 69 N = 7260

The different patterns of interaction are evident for males and females in the three types of schools. The trend for males and females in non-project schools is different from the trends observed for the other two types of schools, which is in line with the trend for the total sample, i.e., the females did better than the males. Inspite of the above differences, the patterns of difference among the three types of schools for males and females tally with the significant trend observed for the total sample, i.e., the pupils of non-project schools did less well than the pupils of project schools, and the pupils of these two schools performed less well than those of project schools + CCP.

State X Group X Sex: The interpretation of significance of the interaction among three variables is rather complex and difficult. Even in a carefully designed laboratory experiment, it is at times difficult to comprehend the complexity of the result. The problem is confounded here as the patterns among States with respect to different dependent variables are not consistent. It suffices to say here that the S scores of the pupils depended upon which State the pupil belonged to and within the State to which group, and within the group whether the pupil was male or female.

Hierarchy of Learning Objectives

The Taxonomy of Educational Objectives (Bloom *et al*, 1963) has ever since its publication, evoked interest in testing its underlying theoretical assumptions. Some researchers have made attempts to verify the assumption of the hierarchical structure of learning especially related to the cognitive domain. In India, one such attempt has been made by Dave (1976). He investigated empirically the feasibility of the hierarchy of objectives K, U and A with respect to the content of physics for Classes VIII, IX and X. On the basis of empirical evidence he propounded the Advanced Curriculum Model of Congnitive Learning (ACMCL), which comprised four hierarchically arranged objectives K > U > A > Cre (creativity). A total of 17 process-product oriented learning outcomes were also spelt out under these four main objectives. The hierarchy of specific learning outcomes [labled as Expected Behavioural Outcomes (EBOs) and Real Learning Outcomes (RLOs) under each of them] was also assumed as indicated below: K: (recognition < recall) < U: (seeing relationship < citing examples < discrimination < classification < interpretation < verification < generalization) < A: (reasoning < formulating hypothesis < establishing hypothesis < inference < prediction) < Cre: (analysis < synthesis < judgment). The Pupil Achievement Test (PAT) in the present

study was designed using the rationale propounded in the ACMCL. Hence the theoretical discussion on the subject.

The data was analysed through the Friedman Two-way ANOVA in order to test the null hypothesis that the average scores of K, U, A and S do not differ significantly. The alternative theoretical hypothesis is K < U < S < A. Table 7.26 presents the Chi-square value and its significance.

TABLE 7.26
Friedman Two-way ANOVA showing Chi-square value for K, U, A and S scores

Rank	Mean Rank	Variable	
2	2.42	K	Knowledge Score
3	2.29	U	Understanding Score
1	2.74	A	Application Score
2	2.55	S	Skill Score
	N	Chi-Square	D.F. Significance
	7260	471.9968	3 .0000

As can be seen, the alternate hypothesis of differences existing among four criterion components of the PAT test is supported by the test of significance (Chi-square = 471.99, df = 3, P = .0000). It lends support to the assumption that the nature of achievement is hierarchical. However, the empirical structure is not commensurate with the theoretical one, i.e., K < U < A. The hierarchical order is as follows: A < S < K < U. In the Bloom theory, S is not part of the cognitive domain. Further, the PAT was a single-item test. If it is removed, the structure is: A < K < U. If the conclusion that Sub-test A was easier than Sub-tests K and U were accepted, one is faced with the problem of explaining why the pupils of project schools, who did significantly better on the more difficult tests than the pupils of project schools + CCP, did not do as well as the latter. Simply put, if a pupil does better on a harder test, he/she should perform even better on an easier test. That has not happened, and this tempts the author to claim that the test was found easier by the pupils of project schools + CCP due to the fact that their cognitive learnings were reinforced by the parents who had the benefit of the CCP intervention (*refer* to the findings and discussion in Chapter 8).

RESULTS OF CLASS II

The results of Class I were discussed in great detail. A number of conceptual, theoretical and empirical issues connected with the independent variables were raised for clarification. Now, as regards the results pertaining to Classes II, III, IV and V, it is felt that these are, more or less, likely to follow a pattern similar to the one found with respect to Class I. With this assumption in mind, as also to avoid repetition and duplication, it has been decided to focus attention on the crucial and critical aspects of the results related to the major objectives or hypotheses of the impact study. In order to make the remaining presentation precise and compact, the statistical data have been compressed into summary tables, thereby simultaneously covering all the relevant variables and their results.

The following important points may be noted as reference:

* Graphs have not been presented.
* Only means, SDs, values of skewness, and coefficients of correlation have been summarised from the descriptive data.
* Critical values of statistical tests (ANCOVA and SWMRA) along with df and level of significance are succinctly presented.
* The need for checking the parametric results was felt due to the heterogeneity of variance among the groups. Since all the parametric results for Class I supported through the Distribution Free Statistics (except a lone result for sex and two small changes in the order of the 2nd and 3rd ranks of States), the results of non-parametric and homogeneity of variance tests have not been reproduced here as was done in the case of Class I. However, checks have been made to ascertain the parity of results between the two techniques.
* The major thrust has been on presenting the evidence for or against the rejection of the null hypothesis and, thereafter, its conceptual implications.

Descriptive Data

The values of descriptive statistics are presented in Table 7.CI-II Sum-1.

TABLE 7.Cl-II-Sum-1

Measures of central value, variability and coefficients of correlation for attendance, parental income, T, K, U, A and S scores of pupils of Class II in All States

	Att	Inc	T	K	U	A	S
Mean	79.80	635 92	62.36	81.69	51.09	71.04	59.35
SD	15.37	498.55	23.14	28 66	24.41	26.96	44.13
Skewness	−1.121	2.363	−.853	−1.557	−.012	−1.035	−.357
Correlations (rs)*							
T				690	.868	.785	.662
K					.419	.540	.337
U						.573	.441
A							.426
S							—

* All *r* values significant beyond 0.1 level. N = 6262.

The statistical values presented in the table show that the nature of data continues to tally with the one found for Class I. To begin with the skewness, while the parental income is positively skewed, all the other pupil related variables are negatively skewed. The highest skewness is evident in the K scores whereas the U score are the least skewed. The SD for the Attendance score is the lowest and that for the S score is the highest, indicating thereby the lower and higher spread of scores in these distributions.

Conclusions and Interpretations

* The attendance and achievements of pupils in T, K, U, A and S scores were quite satisfactory. However, the achievement in U score was average.
* The coefficients of correlation between T on the one hand and K, U, A and S on the other are high, i.e., above .662. The S subtest is lowly correlated with T (PAT) and other components. This strongly suggests that Sub-test S, although a part of the PAT, measured different abilities than did the other sub-tests and the total test, although to a lesser extent. It is necessary to point out that K-U-A tests had a loading of cognitive factors. Unlike the S sub-test for Class I, again a single item test, the S sub-test here measured the manipulative skill, i.e., labeling. While a small range of three marks for the item might have influenced the correlations, the factor remains that it had been able to discriminate between the high and low performances of pupils.

Predictors of Pupil Achievement

The values obtained through the Step-wise multiple regression analysis (SWMRA) are presented in Table 7.Cl-II-Sum-2, viz., the variables, Multiple R, R-square, df, F, *t*, Variance Accounted for (VAf) and Level of Significance (LS).

Conclusions and Interpretations

* Father's occupation and education were not associated with T, K, U, A and S score in the population.
* Mother's education was a determinant factor (the third in the order of magnitude, raw *r* = .09) for S scores but not for the other four variables.
* The highest percentage of variance was accounted for by a set of six variables in the S scores, i.e., 10.91, whereas the lowest was accounted for by a set of five variables for the K scores. Although significant, their predictive association was low, for more than 90% variance in the dependent scores was accounted for by the variables other than the eight included in the regression equation.
* Notwithstanding the small magnitude of the relationship, SES-related variables, i.e., Mother's occupation (in favour of lower occupation), Social status (advantaged and disadvantaged), and Locale (in favour of rural) were related as determinants to all

TABLE CI-II-Sum-2

Step-wise multiple regression analysis for T, K, U, A and S scores of pupils of Class II in All States

Variable	T		K		U		A		S	
Variable	t-value	Rank	t-value	Rank	t-value	Rank	t-value	Rank	t-value*	Rank
Attendance	5.72	4	6.03	3	5.22	4	4.51	4	3.38	4
Income			2.39	5	2.04	5			-3.22	5
Rural/Urban	-12.75	2	-3.65	4	-10.00	2	-14.04	1	-17.47	1
Disadv/Adv	6.89	3	8.02	2	5.45	3	5.72	3	2.998	6
Father's occupation										
Father's education										
Mother's occupation	-14.81	1	-9.42	1	-13.74	1	-11.68	2	-17.76	2
Mother's education									5.14	3
R Square	0.01622		0.02935		0.05220		0.05259		0.10912	
Variance Accounted for	6.122		2.94		5.220		5.259		10.912	
Adjusted R Square	0.06059		0.02854		0.05140		0.05196		0.10823	
Standard Error	22.69199		25 57342		25.20404		24.68622		30.42472	
Multiple R	0.24742		0.17133		0.22847		0.22932		0.33034	
F	97.46908		36.15790		65.84376		82.97135		122.01913	
df_1	4		5		5		4		6	
df_2	5979		5978		5978		5979		5977	
L.S.	0.0004		0.0004		0.0004		0.0004		0.0004	

*All *t*-values significant beyond the 0.05 level.

Correlations

	Total Score				
Variables	H	R	D	C	T
Mother occupation (H)	1.000	-.076	.011	.127	-.163 (.000)*
Rural/Urban (R)	- 076	1.000	-.100	.268	-.136 (.000)
Attendance (D)	.011	-.100	1.000	-.047	.082 (.000)
Disadv/adv (C)	.127	.268	- 047	1.000	019 (.075)
T	-.163 (.000)	-.136 (000)	082 (.000)	.019 (075)	1.000 (999)

	Knowledge Score							Understanding Score					
Variables	H	C	D	R	I	K	Variables	H	R	C	D	I	U
Mother's occupation (H)	1 000	.127	.011	-.076	075	-.101 (000)	Mother's occupation (H)	1 000	-.076	127	011	075	-.153 (000)
Disadv/Adv (C)	.127	1.000	_ 047	.268	-.041	0 73 (.000)	Rural/Urban (R)	- 076	1.000	.268	-.100	- 366	-.126 000
Attendance (D)	011	-.047	1 000	-.100	.053	.078 (.000)	Disadv/Adv (C)	127	.268	1 000	-.047	-.041	.008 (.274)
Rural/Urban (R)	- 076	.268	-.100	1 000	- 366	-.034 (0004)	Attendance (D)	011	-.100	-.047	1 000	053	.076 (.000)
Income (I)	.075	- 041	053	- 366	1.000	043 (001)	Income (I)	075	- 366	-.641	.053	1.000	067 (000)
K	-.101 (.000)	073 (.000)	078 (000)	-.034 (004)	.043 (.001)	1 000 (.999)	U	-.153 (.000)	-.126 (.000)	.008 (.274)	.076 (060)	.067 (.000)	1.000 (.999)

Application Score					
Varibales	R	H	C	D	R
Rural/Urban (R)	1 000	- 076	268	- 100	-.160 (.000)
Mother occu (H)	- 076	1 000	127	011	-.125 (000)
Disadv/Adv (C)	.268	127	1 000	-.047	004 (368)
Attendance (D)	- 100	-.076	-.047	1.000	.070 (000)
A	-.160 (.000)	-.125 (.000)	004 (368)	070 (.000)	1.000 (999)

Skill Score							
Variables	R	H	F	D	I	C	S
Rural/Urban (R)	1.000	- 076	- 305	- 100	- 366	.268	- 227 (000)
Mother occu (H)	-.076	1 000	- 053	011	.075	127	-.205 (.000)
Mothers Edu (F)	-.305	- 053	1.000	.090	.344	- 032	.143 (.000)
Attendance (D)	- 100	011	.090	1.000	053	-.047	.066 (000)
Income (I)	-.366	075	344	053	1 000	-.041	.053 (.000)
Disadv/Adv (C)	.268	127	- 032	-.047	-.041	1.000	- 058
S	-.227 (.000)	-.205 (.000)	.143 (000)	.066 (.000)	053 (.000)	-.058 (.000)	1.000 (.999)

*Figures in brackets indicate significance of rs.

criterion scores in the population. Attention needs to be drawn to the fact that Attendance of pupils of Class I was more strongly associated with pupil achievement than SES-related variables.

Testing of the Null Hypothesis

ANCOVA

The F ratios and other values related to pupil achievement are presented in Table 7.Cl-II-Sum-3 below.

Conclusions and Interpretations

Covariates

* As the F ratios for attendance and income are significant beyond the .05 level, the null hypothesis of no association between these two, on the one hand, and T, K, U, A and S scores, on the other, in the population was rejected. However, the results for the three main manipulated variables are free from their influence.

Main Effects

State: The null hypothesis of the State samples being drawn from a common population for all achievement scores is rejected, since the F values for all five variables are significant at less than .01 level.

Further examination of the means of the pairs of States indicates the following significant results at the 5 per cent level (the Scheffe procedure; *see* Table 7.Cl-II-Sum-4) .

TABLE 7.Cl-II-Sum-3

Analysis of covariance of T, K, U, A and S scores of pupils of Class II in All States showing F values for State, group, sex and interactions

Source of variation	Dependent Variables				
Covariates					
Attendance	T	K	U	A	S
F	102.25	4 57	161.07	67.76	64.12
df	1	1	1	1	1
LS	.000	.032	.000	.000	.000
Income	15.36	9.63	21.08	67 91	65.07
df	1	1	1	1	1
LS	.000	.002	.000	.000	.000
Main effects					
State					
F	384.00	255.07	460 57	264.09	295.12
df	6	6	6	6	6
LS	.000	.000	.000	.000	.000
Group					
F	275.72	90.27	200.68	125.67	216.14
df	2	2	2	2	2
LS	.000	.000	.000	.000	.000
Sex					
F	.002	.446	.074	.075	.400
df	1	1	1	1	
LS	.966	.504	.785	.784	.527
Interactions					
Sta x Grp	49.49	22.41	55.27	42.28	50.42
F	12	12	12	12	12
LS	.000	.000	.000	.000	.000
Sta x Sex					
F	1.94	3.07	1.58	3.52	2.05
df	6	6	6	6	6
LS	.070	.006	.149	.002	.055
Grp x Sex					
F	074	.071	.149	.028	.603
df	2	2	2	2	2
LS	.928	.931	.862	.973	.547
Sta x Grp x Sex					
F	2.30	3.03	2.18	2.02	1.15
df	12	12	12	12	12
LS	.006	.000	.01	.02	.312

* df for residual (within subjects) variance = 6218.

TABLE 7.CI-II-Sum-4

Results of the Scheffe procedure showing significant differences between pairs of means of States for T, K, U, A and S scores

Variable	Total Score							Knowledge Score						
State	U.P.	Oris	Raja	Maha	Bih	Mizo	Karn	U.P	Oris	Raja	Maha	Bih	Mizo	Karn
U.P.		*		*	*	*			*	0				0
Orissa	0		0			0	0	0		0	0	0	0	0
Rajasthan		*		*	*	*	0	*	*		*	*	*	
Maharashtra	0		0			0	0		*	0		0		0
Bihar	0		0			0	0		*	0	*			0
Mizoram	0	*	0	*	*		0		*	0				0
Karnataka		*	*	*	*	*		*	*		*	*	*	

Variable	Understanding Score							Application Score						
U P.		*	*	*	*	*	*		*	0	*	*	0	0
Orissa	0			*	*	0		0		0			0	0
Rajasthan	0			*	*	0		*	*		*	*		
Maharashtra	0	0	0			0	0	0		0			0	0
Bihar	0	0	0			0	0	0		0			0	0
Mizoram	0	*	*	*	*		*	*	*		*	*		
Karnataka	0			*	*	0		*	*		*	*		

Variable	Skill Score						
U P		*		*	*	0	0
Orissa	0		0			0	0
Rajasthan		*		*	*	0	0
Maharashtra	0		0		0	0	0
Bihar	0		0	*		0	0
Mizoram	*	*	*	*	*		0
Karnataka	*	*	*	*	*	*	

* & 0 indicate significant difference between the pair of states beyond .05 level.

T Scores

* These scores represent the sum of the scores of all cognitive components and, therefore, need to be given more weightage and consideration.
* The total achievement of the pupils of Karanataka in Class II was better than the total achievements of the pupils of Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The total achievements of the pupils of U.P. and Rajasthan in Class II were better than the total achievements of the pupils of Orissa, Maharashtra, Bihar and Mizoram.
* The total achievement of the pupils of Mizoram in Class II was better than the total achievements of the pupils of Orissa, Maharashtra and Bihar.
* The total achievements of the pupils of Orissa Maharashtra and Bihar in Class II did not differ.

K scores

* The pupils of Karanataka and Rajasthan in Class II acquired more knowledge in the subject than did the pupils of U.P. Orissa, Maharashtra, Bihar and Mizoram.
* The pupils of Bihar in Class II acquired better knowledge than did the pupils of Orissa and Maharashtra.
* The pupils of Mizoram, U.P. and Maharashtra in Class II acquired more knowledge in

the subject than did the pupils of Orissa.

U Scores

* The pupils of U.P. in Class II developed better understanding in the subject than did the pupils of Orissa, Rajasthan, Maharashtra, Bihar, Mizoram and Karnataka.
* The pupils of Mizoram in Class II developed better understanding in the subject than did the pupils of Orissa, Rajasthan, Maharashtra, Bihar and Karnataka.
* The pupils of Orissa, Rajasthan, and Karnataka in Class II developed better understanding than did the pupils of Maharashtra and Bihar.
* The pupils of Maharashtra and Bihar in Class II did not differ in their understanding of the subject.

A Scores

* The pupils of Mizoram, Karnataka and Rajasthan in Class II developed better application abilities in the subject than did the pupils of U.P, Orissa, Maharashtra and Bihar.
* The pupils of U.P. in Class II developed better application abilities in the subject than did the pupils of Orissa, Maharashtra and Bihar.
* The pupils of Orissa, Maharashtra and Bihar in Class II did not differ in their application abilities in the subject.

S Scores

* The pupils of Karnataka in Class II developed better skill in the subject than did the pupils of U.P., Orissa, Rajasthan, Maharashtra, Bihar, and Mizoram.
* The pupils of Mizoram in Class II developed better skill in the subject than did the pupils of U.P., Orissa, Rajasthan, Maharashtra and Bihar.
* The pupils of U.P. and Rajasthan in Class II developed better skill in the subject than did the pupils of Orissa, Maharashtra and Bihar.
* The pupils of Bihar in Class II developed better skill in the subject than did the pupils of Orissa and Maharashtra.
* The pupils of Maharashtra and Orissa in Class II did not differ in their skill in the subject.

In the end, the combined results for the criterion variables strongly indicate that the achievements of the pupils of Orissa, Maharashtra and Bihar in Class II were significantly lower than the achievements of the pupils of Karnataka, Mizoram, Rajasthan and U.P.

Group: The F values of all dependent scores for group indicate that they are not drawn from a common population and hence their means differ significantly.

• Further examination of Table 7.CI-II-Sum-5 reveals the following significance results at the 5 per cent level (The Scheffe procedure).

* The achievements of the pupils of non-project schools in the T, K, U, A and S tests were lower than those of the pupils of project schools and project schools + CCP.
* The pupils of project schools and project schools + CCP did not differ in their total and application achievements.
* While the pupils of project schools + CCP developed better knowledge and skill in the subject than did the pupils of project schools, the pupils of project schools developed better understanding in the subject than did the pupils of project schools + CCP.

Thus, the results lend partial support to the conceptual assumptions hypothesised regarding the impact of the project intervention. It is clear that the benefits have accrued to the pupils of both types of project schools, but the assumption of more benefits accruing to the pupils of project schools + CCP has received partial support. As was the case in the data for Class I, here again, pupils exposed to the CCP developed slightly better application abilities, though not significantly, and developed significantly better skill (labelling) than did pupils of project schools.

TABLE 7.CI-II-Sum-5

Results of the Scheffe procedure showing significant differences between pairs of groups for T, K, U, A and S scores of pupils of Class II in All States and States

State	Variable	T			K			U			A			S		
	Group	1	2	M	1	2	M	1	2	M	1	2	M	1	2	M
	1			76.46			83.24			82.00			78.91			59.67
Uttar Pradesh	2	*		33.18	*		46.90	*		34 42	*		37.67	*		12.09
	3		*	74 40	*	*	71 36		*	77.05		*	77.07	*	*	74 14
	1			46 15	—	—	38.08			52.56			60.77			13.33
Orissa	2	*		38.00	—	—	44 57	*		37 14	*		50.86			18.00
	3		*	42.27	—	—	43 64		*	49.64	*		41.09	*	*	60 91
	1			71.15			96.35			54 17	—	—	82.19			71 30
Rajasthan	2	*		60.10			93.85	*		41.10	—	—	80.73	*		36.74
	3	*	*	77.39		*	98.36	*	*	59.18	—	—	81.86	*	*	89.71
	1			40.85	—	—	70.58			27.90			43.57			38.48
Maharashtra	2			39.71	—	—	71.41			29.65	*		50.42	*		19.13
	3	*	*	48.28	—	—	75.17	*	*	37.12	*	*	60.69	*	*	28.85
	1			59.52			82 98			40 72			66.35			71 35
Bihar	2	*		25.85	*		57 14	*		18 10	*		30.75	*		9 52
	3	*	*	49.67		*	85.60		*	36.98	*	*	55.87	*	*	30.72
	1			64 99			80.44			53.06			84 21			69 22
Mizoram	2	*		60.11	*		66.63			53.65	*		73.97			64.79
	3	*	*	70.68	*	*	79 03	*	*	62.30		*	82.61	*	*	82.90
	1			70.17			93 12			49.48			73.53			87 92
Karnataka	2			70.61			93.75			52.04			76.99	*		78 09
	3	*	*	74.10	*	*	97 01	*		53.08	*	*	81.92		*	82 54
	1			64.60			81.34			55.77			72.98			62.50
All States	2	*		52.90	*		76.40	*		41.03	*		63 98	*		43.51
	3		*	66.19	*	*	84.77	*	*	53.81		*	73 74	*	*	66.11

M indicates means of groups

Sex: The F ratios for sex clearly indicate that the samples of males and females are drawn from a common population. In other words, sex was not related to any of the criterion scores and, therefore, males and females neither differed in their total achievement nor in knowledge, understanding, application or skill in the subject.

Interactions

State X Group: In order to understand and explain the effect of the interaction between two/three variables on the variances of the dependent variables, expected means were calculated and the difference in each of the cells formed was studied It was found that, though not perfectly accurate, the positive and negative differences were quite helpful when the significant results were examined. It was found the Scheffe procedure among groups reflected accurately the effect of such positive and negative differences. Hence the presentation of significant results only.

The number and position of asteriks in the rows and columns of each of the States in Table 7.CI-II-Sum-5 clearly demonstrate the interaction effect. In some respects, there are similarities between the results for All States and for each State, whereas in other respects there are differences among the groups.

* Rejection of the null hypothesis, i.e., the three groups did not differ:

In All States for all five dependent scores, except with respect to K scores in Orissa and Maharashtra and A scores in Rajasthan.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools performed better than non-project schools:

  For T scores: in U.P., Orissa, Rajasthan, Bihar and Mizoram;
  For K scores: in U.P., Bihar and Mizoram;
  For U scores: in U.P., Orissa, Rajasthan and Bihar;
  For A scores: in U.P., Orissa, Bihar and Mizoram; and
  For S scores: U.P. Rajasthan, Maharashtra, Bihar and Karnataka.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools + CCP performed better than non-project schools:

  For T scores: in U.P., Orissa, Rajasthan, Maharashtra, Bihar, Mizoram and Karanataka;
  For K scores: in U.P., Rajasthan, Bihar, Mizoram and Karnataka;
  For U scores: in U.P., Orissa, Rajasthan, Maharashtra, Bihar and Mizoram;
  For A scores: in U.P., Maharashtra, Bihar, Mizoram and Karanataka; and
  For S scores: in U.P., Orissa, Rajasthan, Maharashtra, Bihar, Mizoram and Karanataka.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools + CCP performed better than project schools:

  For T scores; in Rajasthan, Maharashtra, Mizoram and Karanataka:
  For K scores; in Karanataka;
  For U scores; in Rajasthan, Maharashtra, Mizoram and Karnataka;
  For A scores: in Maharashtra and Karanataka; and
  For S scores: in U.P., Orissa, Rajasthan and Mizoram.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools performed better than project schools + CCP:

  For T scores: in Bihar;
  For K scores: in U.P.;
  For U scores: in none;
  For A scores: in Orissa and Bihar; and
  For S scores: in Bihar.

State X Sex: The F ratios of interaction between these two variables for T, U and S scores are not significant and hence the tenability of the null assumption of these samples drawn from a common population is sustained. However, the F values for K and A scores are significant beyond the .01 level.

The means of males and females were examined for K and A scores. The null hypothesis was rejected for K scores in Orissa as the difference between the means of males and females was 37.45 – 46.57 = 9.12, and for A scores in Bihar since the difference between males and females was 52.07 – 56.48 = 4.41 — in both cases, in favour of females. Needless to mention, males and females did not differ in these two scores in other States. It is extremely important to note two points at this juncture: (1) It may be recalled that the achievements of the pupils of Orissa, Bihar and Maharashtra were significantly lower than the achievements of the pupils of other States; (2) sex was not the source of variation in any of the criterion scores. But in Bihar and Orissa, sex was significantly related to two criterion scores.

Group X Sex: The F ratios of interaction between these two variables for all dependent variables are not significant, and hence the null hypothesis of samples (in the interactive cells) drawn from a common population is found tenable.

State X Group X Sex: The F ratios for the 3-way interactions are significant at less than the 5 per cent level for all dependent scores except for S scores. During the discussion on the 2-way interactions, it was explained that, by and large, positive or negative differences from the expected means in low-achieving States, in non-project schools and among females seemed to be responsible for the interaction variance. This interaction suggests that in some cases the performance depended upon whether a pupil: (a) belonged to a low-achieving State, (b) studied in a non-project school), and (c) was a female (all doing less well than expected. Therefore, the overall generalisations will have some

exceptions which, in turn will have to be studied within the data of the State. The cell means for the total 42 cells for T, K, U, A and S have been posted in Tables 7.Cl-II-Sum-6T, K, U, A and S for reference.

To illustrate the point, the cell means of the T scores in Orissa show that while males and females did not differ, the largest mean difference between males and females was found in non-project schools, i.e., 42.11-33.13 = 8.98 (in favour of females). In respect of K scores, though the overall difference was in favour of females, the mean of females was much lower than that of males in non-project schools, i.e., 35.00 – 52.63 = 17.63. All the same, the emerging pattern is not necessarily consistent, since the phenomenon of pupil achievement seems to be a rather complex phenomenon and, therefore, drawing a straight-jacket conclusion about the effectiveness of the experiment would perhaps be too simplistic.

RESULTS OF CLASS III

Descriptive Statistics

The values of descriptive statistics are presented in Table 7.Cl-III-Sum-7.

The statistical values presented in the table show that the nature of the data continues to tally with that of the data for Classes I and II. However, there are some changes as compared to the values for Class II. the positive skewness for the parental income has increased. The A and S scores have also shown a slight positive skewness. All the other pupil-related variables are negatively skewed but to a lesser extent. The SD for the Attendance score is the lowest and that for the the S score is the highest, indicating thereby the lower and higher spread of scores in these distributions. And yet, these are not such as to pose a problem for using the parametric analysis.

Conclusions and Interpretations

* While the attendance of pupils was highly satisfactory, the total achievement of pupils

TABLE 7.Cl-II-Sum-6T Cell

Means of T scores of pupils of Class II in All States for State x group x sex

	Male					Female			
Project + CCP	Sub-Total	Group Total	State	GroupProject	Non-Project	Project + CCP	Sub-Total	Project	Non-Project
Uttar pradesh	76.61	34.72	74.43	70.93	75.94	29.75	74.29	68.23	70.25
N	354	89	345	788	106	40	119	265	1053
Orissa	44.77	42.11	49.14	45.82	47.94	33.13	44.00	43.43	44.87
N	44	19	35	98	34	16	20	70	168
Rajasthan	70.99	60.55	77.21	69.12	71.75	58.46	78.00	69.06	69.11
N	152	236	215	603	40	65	65	170	773
Maharashtra	42.87	40.88	47.46	44.36	38.11	37.78	49.22	43.97	44.19
N	129	194	280	603	95	117	244	456	1059
Bihar	58.12	24.88	47.81	46.77	62.29	27.08	53.22	48.96	47.56
N	138	82	219	439	70	65	115	250	689
Mizoram	65.20	58.74	69.37	64.96	64.75	61.51	72.24	66.31	65.60
N	202	143	191	536	183	139	161	483	1019
Karnataka	66.36	69.01	75.14	72.42	74.12	73.50	72.84	73.15	72.74
N	88	252	514	854	85	140	422	647	1501
Total	65.44	53.14	66.50	62.74	63.10	52.47	65.70	61.73	62.36
N	1107	1015	1799	3912	613	582	1146	2341	6262
Grp M+F	Project M+F = 64.60 1720			Non-Project M + F = 52.90 1597			Project + CCP M + F= 66.19 2945		

TABLE 7.CI-II-Sum-6K

Cell means of K scores of pupils of Class II in All States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	82.77	46.07	71.57	73.72	84.81	48.75	70.76	73.06	73.55
N	354	89	345	788	106	40	119	265	1053
Orissa	30.00	52.63	38.57	45.82	48.53	35.00	52.50	46.57	41.25
N	44	19	35	98	34	16	20	70	168
Rajasthan	70.99	94.83	98.00	69.12	98.00	90.31	99.54	95.65	96.11
N	152	236	215	603	40	65	65	170	773
Maharashtra	95.92	73.04	74.36	44.36	64.21	68.72	76.11	71.73	73.10
N	129	194	280	603	95	117	244	456	1059
Bihar	82.25	50.85	83.84	46.77	83.43	65 08	88.96	81.48	78.74
N	138	82	219	439	70	65	115	250	689
Mizoram	79.16	67.76	79.69	64.96	81.86	65.47	78.26	75.94	76.13
N	202	143	191	536	183	139	161	483	1019
Karnataka	91.02	91.59	97.39	72.42	95.29	87.64	96 54	96.62	95.71
N	88	252	514	854	85	140	422	647	1501
Total	81.54	77.43	84.25	62.74	81.00	74.60	85.58	81.65	81.69
N	1107	1015	1799	3912	613	582	1146	2341	6262
Grp M+F	Project M+F= 81.34			Non-Project M+F = 76.40			Project + CCP M+F= 84.77		
N	1720			1597			2945		

TABLE 7.CI-II-Sum-6U

Cell means of U scores of pupils of Class II in All States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	81.92	36.07	76.46	74.35	82.26	30.75	78.74	72.91	73.99
N	354	89	345	788	106	40	119	265	1053
Orissa	53.41	40.53	53.71	51.02	51.47	33.13	42.50	44.71	48.39
N	44	19	35	98	34	16	20	70	168
Rajasthan	53.82	40 93	58.93	50.60	55.50	41.69	60.00	51 94	50.89
N	152	236	215	603	40	65	65	170	773
Maharashtra	28.45	30.62	35.89	32.60	27.16	28.03	38.52	33.46	32.97
N	129	194	280	603	95	117	244	456	1059
Bihar	39.86	18.78	35.62	33.80	42.43	17.23	39.57	34.56	34.08
N	138	82	219	439	70	65	115	250	689
Mizoram	53.56	51.33	60.37	55.39	52.51	56.04	64.60	57.56	56.42
N	202	143	191	536	183	139	161	483	1019
Karnataka	46.36	51.15	54.20	52.49	52.71	53.64	51.71	52.26	52.39
N	88	252	514	854	85	140	422	647	1501
Total	57.45	40.74	54.57	51.80	52.74	41.53	52.61	49.89	51.09
N	1107	1015	1799	3912	613	582	1146	2341	6262
Grp M+F	Project M+F = 55.77			Non-Project M+F 41.03			Project+CCP M+F= 53.81		
N	1720			1597			2945		

TABLE 7.CI-II-Sum-6A

Cell means of A scores of pupils of Class II in All States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	78.59	40.45	77.33	73.73	80.00	31.50	76.30	71.02	73.05
N	354	89	345	788	106	40	119	265	1053
Orissa	61.36	48.42	44 57	52.86	60.00	53.75	35.00	51.43	52.26
N	44	19	35	98	34	16	20	70	168
Rajasthan	82.37	81.19	82.42	81.92	81.50	79.08	80.00	80.00	81.50
N	152	236	215	603	40	65	65	170	773
Maharashtra	46.36	50.62	61.50	54.76	38.79	50.09	59.75	53.11	54 05
N	129	194	280	603	95	117	244	456	1059
Bihar	65.07	32.24	52.05	52.07	68.86	31.38	63.13	56.48	53.67
N	138	82	219	439	70	65	115	250	689
Mizoram	84.85	74.27	81.15	80.71	83.50	73.67	84.35	80.95	80.82
N	202	143	191	536	183	139	161	483	1019
Karnataka	69.77	74.44	82.06	78.55	77.41	81.57	81.75	81.14	79.67
N	88	252	514	854	85	140	422	647	1501
Total	73.42	64.39	73 52	71.13	72.17	63.26	74.08	70.89	71.04
N	1107	1015	1799	3912	613	582	1146	2341	6262
Grp M+F	Project M+F = 72.98				Non Project M+F = 63.98			Project + CCP M+F= 73 74	
N	1720				1597			2945	

TABLE 7.CI-II-Sum-6S

Cell means of S scores of pupils of Class II in All States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	61.92	12.13	75.80	62.37	52.17	12.00	69.33	53.81	60.22
N	354	89	345	788	106	40	119	265	1053
Orissa	10.00	27.89	56.86	30.20	17.65	6.25	68.00	29.43	29.88
N	44	19	35	98	34	16	20	70	168
Rajasthan	70.79	36.99	88.84	64.00	73.25	35.85	92.62	66.35	64.51
N	152	236	215	603	40	65	65	170	773
Maharashtra	40.16	18.97	25.93	26.73	36.21	19.40	32.21	29.76	28.04
N	129	194	280	603	95	117	244	456	1059
Bihar	70.51	9.76	32.47	40.18	73.00	9.23	27.39	35.44	38.46
N	138	82	219	439	70	65	115	250	689
Mizoram	68.76	63.22	82.04	72.01	69.73	66.40	83.91	73.50	72.72
N	202	143	191	536	183	139	161	483	1019
Karnataka	83.41	79.25	81.96	81.31	92.59	76.00	83.25	82.91	82.00
N	88	252	514	854	85	140	422	647	1501
Total	62.57	43.18	66.38	59.30	62.38	44.07	65.69	59 45	59.35
N	1107	1015	1799	3912	613	582	1146	2341	6262
Grp M+F	Project M+F = 62.50				Non Project M+F = 43.51			Project + CCP M+F = 66.11	
N	1720				1597			2945	

TABLE 7. Cl-III-Sum-7

Measures of central value, variability and coefficients of correlation for attendance, parental income, T, K, U, A and S scores of pupils of class III in All States

	Att	Inc	T	K	U	A	S
Mean	80.37	680.62	45.87	59.29	45.42	35.02	31.48
SD	15.21	602.84	23.30	26.62	25.61	25.28	31.48
Skewness	−1.280	3.449	−.228	−.322	−.187	.196	.627
Correlations (rs)*							
T				.882	.930	.850	.719
K				—	.744	.663	.531
U					—	.716	.557
A						—	.624
S							—

* All *r* values significant beyond .01 level. N = 6128

could be considered below average. Since the PAT for each class was different (and therefore not comparable in psychometric terms), one is hesitant to label this total achievement as lower than the previous classes. And yet, this drop in the percentage of total achievement requires serious consideration. To elaborate the point, these tests were constructed with reference to a previously prepared framework. As was explained earlier, the project intervention was aimed at a total curriculum change for the entire primary stage. The objectives and the content were selected and arranged systematically in a cyclic order for Classes I to V. Attempts were made during the implementation to follow, more or less, the same curriculum design. Finally, the achievement tests were designed keeping the same objectives and contents in view. The team of experts and field workers involved in implementing the project designed all the PATs again with reference to the total curriculum, both selecting the objectives and apportioning the content as was relevant to the different classes. In view of such a linkage among the classes, and the exposure of pupils to the project for a longer duration in the same school, one needs to at least raise the question why the performance of children in Classes III-V has not been as good as that of the pupils of Classes I and II. This result acquires greater significance, for exactly a similar phenomenon was evident in an evaluation of Project Primary Education Curriculum Renewal conducted by Dave *et al* (1989). The research design of the study was akin to the one of this project. The data in language, mathematics and environmental studies for Classes I, II, III and IV were collected from selected samples of project and non-project schools (N about 8200) from 22 States of India, which included these seven States also. It was found that the pooled data for all States clearly showed that while the achievements of pupils in all the three subjects were quite high, i.e., more than 60% in Classes I and II, there was a sudden slump from Class III onwards. After conceding the fact that technically the tests across the classes could not be considered as having parity, all results point out to the fact that the pupils from Class III onwards have some difficulty in acquiring knowledge of facts and developing understanding of concepts and application abilities in different curricular areas included at the primary stage. The fact that a similar slump persists in the performance of pupils in the present study also demands that this phenomenon should not be brushed aside as an artifact of test construction. On the contrary, it should be seriously investigated in order to identify the gaps in the curriculum design or the specific learning difficulties experienced by the pupils entering Class III.

* The coefficients of correlation between T on the one hand and K, U, A and S on the other, are high, i.e., above .719. the correlations of Sub-test S with T (PAT) and other components are lower than those of the

other sub-tests with the PAT and among themselves. This strongly suggests that Sub-test S, although a part of the PAT, measured different abilities than did the other sub-tests and the total test, although to a lesser, extent. It is necessary to point out that the K-U-A tests had a loading of cognitive factors. Unlike the sub-test S for Class I, the sub-test S for Class III measured manipulative skill, i.e., drawing and labeling. While a range of seven marks for the two items might have influenced the size of the correlations, the fact remains that Sub-test S had been able to discriminate between the high and low performers in the large sample.

Predictors of Pupil Achievement

The values obtained through the Step-wise multiple regression analysis (SWMRA) are presented in Table 7.Cl-III-Sum-8, viz., the variables, Multiple R, R-square, df, F, *t* Variance Accounted for (VAf) and Level of Significance (LS).

Conclusions and Interpretations

* Father's occupation and education were not associated with the T, K, U, A and S scores in the population.
* Locale (in favour of rural) was the first-order determinant factor for all but K scores, i.e., raw rs = −.117 (with T), −.141 (with U), −.144 and −.190 (with S) (*see* Table 7.Cl-III-Sum-8).
* The highest percentage of variance was accounted for by a set of three variables in the S scores, i.e., 4.28, whereas the lowest was accounted for by a set of four variables for the U scores. Although significant, their predictive association was low, for more than 95 per cent variance in the dependent scores was accounted for by variables other than the eight included in the regression equation.
* Notwithstanding the small magnitude of the relationship, the SES-related variables, i.e., Locale, (in favour of rural), Social status (advantaged/disadvantaged) and Mother's occupation were related as determinants to the T scores; these three with Parental income to the U scores; and these three with Income to the A scores in the population. This trend confirms the trend found for

TABLE 7. Cl-III-Sum-8

Step-wise multiple regression analysis for T, K, U, A and S scores of pupils of Class II in All States

Variable	T		K		U		A		S	
Variable	t-value	Rank	t-value	Rank	t-value	Rank	t-value	Rank	t-value*	Rank
Attendance	7.13	2	2.37	4	8.74	2	6.22	3	5.61	2
Income			-2.69	3			2.35	5		
Rural/urban	-8.52	1			-10.16	1	-8.09	1	-14.44	1
Disadv/ad	6.201	3	7.40	1	4.14	3	3.74	4	3.48	3
Father's occupation										
Father's Education										
Mother's Occupation	5.19	4	5.68	2	3.36	4	5.89	2		
Mother's Education					-2.52	5				
R Square	.03343		.01711		.03790		.03760		.04289	
Variance Accounted for	3.34		1.711		3.79		3 764.28			
Adjusted R Square	.03277		.01644		.03708		.03678		.04239	
Standard Error	23.05327		28.09261		24.22111		26.73911		43.36150	
Multiple R	.18284		.13082		.19468		.19390		.20709	
F	50.62736		25.48664		46.11932		45.74002		87.46296	
df_1	4		4		5		5		3	
df_2	5855		5855		5854		5854		5856	
L S	0.0004		0.0004		0.0004		0.0004		0.0004	

*All *t* values significant beyond 0.05 level.

Correlations

Total Score

Variables	R	D	C	H	T
Rural/Urban (R)		- 133	.230	-.129	- 177 (000)
Attendance (D)	-.133		- 098	.025	.102 (000)
Disadv/Adv (C)	.230	-.098		.087	.053 (000)
Mother's occ. (H)	- 129	025	.087		(092)
T	-.117 (000)	.102 (000)	.053 (.000)	092 (.000)	1.000 (.999)

Knowledge Score

Variables	C	H	I	D	K
Disadv/Adv (C)	1 000	087	- 019	- 098	101 (.000)*
Mother's occu (H)	087	1 000	.155	025	079 (.000)
Income (I)	- 019	155	1 000	084	-.023 (039)
Attendance (D)	- 098	.025	.084	1 000	.020 (.060)
K	101 (000)	079 (000)	-.023 (039)	.020 (060)	1 000 (.999)

Understanding Score

Variables	R	D	C	H	F	U
Rural/Urban (R)	1.000	- 133	230	-.129	-.354	- 141 (000)
Attendance (D)	- 133	1.000	- 098	.025	.104	.125 (000)
Disadv/Adv (C)	.230	-.098	1.000	.087	- 114	.019 (078)
Mother's occ. (H)	- 129	0 25	087	1 000	-.008	070 (000)
Mother's edu. (F)	- 354	104	-.114	- 008	1.000	(022)
U	- 141 (000)	.125 (000)	.019 (078)	070 (000)	.022 (.049)	1 000 (999)

Application Score

Variables	R	H	D	C	I	A
Rural/Urban (R)		-.129	- 133	230	-.434	-.144 (.000)
Mother's occu (H)	- 129		025	0 87	155	.104 (000)
Attendance (D)	-.133	.025		-.098	.084	.097 (000)
Disadv/Adv (C)	.230	.087	- o98		-.019	.021 (.058)
Income (I)	-.434	.155	.084	- 019		.104 (.000)
A	- 144 (000)	.104 (000)	.097 (.000)	.021 (.058)	.104 (000)	1.000 (.999)

Skill Score

Variables	R	D	C	S
Rural/Urban (R)		- 133	230	- 190 (.000)
Attendance (D)	-.133		-.098	094 (000)
Disadv/Adv (C)	230	-.098		-.005 (345)
S	- 190 (.000)	094 (000)	- 005 (.345)	1 000 (999)

*Figures in brackets indicate the level of significance of rs

Class II. However, attention needs to be drawn to the fact that the Attendance of pupils of Class I which was more strongly associated with pupil achievement than SES-related variables in Class I, showed a little stronger association than it did for Class II.

Testing of the Null Hypothesis

ANCOVA

The F ratios and other values related to pupil achievement, after the elimination of the effect of attendance and income, are presented in Table 7.CI-III-Sum-9 below.

Conclusions and Interpretations

Covariates

* As the F ratios for Attendance and Income are significant beyond .01 level, the null hypothesis of no association between the two on the one hand and T, K, U, A and S, on the other, in the population is rejected.

TABLE 7.Cl-III-Sum-9

Analysis of covariance of T, K, U, A and S scores of pupils of Class III in All States showing F values for State, group, sex and interactions

Source of variation Covariates	Dependent Variables				
Attendance	T	K	U	A	S
F	78.55	61.71	55.44	48.18	46.98
df	1	1	1	1	1
LS	.000	.000	.000	.000	.000
Income					
F	24 67	7.51	35.36	11.20	12.71
df	1	1	1	1	1
LS	000	.006	.000	.001	.000
Main effects					
State					
F	624.76	448.90	426.83	311.99	518.35
df	6	6	6	6	6
LS	.000	.000	.000	.000	.000
Group					
F	210.68	172.03	178.25	79.48	91.06
df	2	2	2	2	2
LS	.000	.000	000	.000	.000
Sex					
F	.105	.100	.050	.331	.077
df	1	1	1	1	1
LS	.746	.752	.823	.565	.781
Interactions					
Sta × Grp					
F	69.37	69.85	45.92	45.21	26.89
df	12	12	12	12	12
LS	.000	.000	.000	.000	.000
Sta × Sex					
F	4.79	4.05	3.39	4.45	2.43
df	6	6	6	6	6
LS	.000	.000	.002	.000	.024
Grp × Sex					
F	3 12	3.94	4.58	2.26	3.11
df	2	2	2	2	2
LS	.045	.02	.01	.105	.045
Sta × Grp × Sex					
F	1.67	1.81	1.30	1 86	3.29
df	12	12	12	12	12
LS	.066	.04	.212	.034	.000

* df for residual (within subjects) variance = 6084.

However, the results for the three main effects and interactions are free from their influence.

Main Effects

The null hypothesis of the State samples being drawn from a common population for all achievement score is rejected since the F values for all five variables are significant at less than .01 level.

Further examination of the means of the pairs of States indicates the following significant results at the 5 per cent level (the Scheffe's procedure; in Table 7.Cl-III-Sum-10).

T scores

* The total achievement of the pupils of Karnataka in Class III was better than the total achievements of the pupils of U.P., Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The total achievements of the pupils of Mizoram and U.P. in Class III were better than the total achievements of the pupils of Orissa, Rajasthan, Maharashtra and Bihar.
* The total achievement of the pupils of Rajasthan in Class III was better than the total achievements of the pupils of Maharashtra and Bihar.
* The total achievements of the pupils of Orissa and Bihar in Class III were better than the total achievement of the pupils of Maharashtra.

K Scores

* The pupils of Karnataka in Class III acquired more knowledge in the subject than did the pupils of U.P., Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The pupils of Mizoram, Rajasthan and U.P. in Class III acquired more knowledge in the subject than did the pupils of Orissa, Maharashtra and Bihar.
* The pupils of Bihar and Orissa in Class III acquired more knowledge of the subject than did the pupils of Maharashtra.

U Scores

* The pupils of Karnataka in Class III developed better understanding of the subject than did the pupils of UP, Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The pupils of Mizoram and UP in Class III developed better understanding of the

TABLE 7.Cl-III Sum-10

Results of the Scheffe procedure showing significant difference between pairs of means of States for T, K, U, A and S scores

Variable	Total Score							Knowledge Score						
State	U.P	Oris	Raja	Maha	Bih	Mizo	Kar	U P	Oris	Raja	Maha	Bih	Mizo	Kar
U P.		*	*	*	*		0		*		*	*		0
Orissa	0			*		0	0	0		0	*		0	0
Rajasthan	0			*	*	0	0		*		*	*		0
Maharashtra	0	0	0		0	0	0	0	0	0		0	0	0
Bihar	0		0	*		0	0	0		0	*		0	0
Mizoram		*	*	*	*		0		*		*	*		0
Karnataka	*	*	*	*	*	*		*	*	*	*	*	*	

Variable	Understanding Score							Application Socre						
U P		*	*	*	*		0		*	*	*	*	0	0
Orissa	0			*	*	0	0	0			*		0	0
Rajasthan	0			*	*	0	0	0			*	*	0	0
Maharashtra	0	0	0		0	0	0	0	0	0		0	0	0
Bihar	0			*		0	0	0		0	*		0	0
Mizoram		*	*	*	*		0	*	*	*	*	*		
Karnataka	*	*	*	*	*	*		*	*	*	*	*		

Variable	Skill Score						
U P.		*	*	*	*	0	0
Orissa	0			*		0	0
Rajasthan	0			*		0	0
Maharashtra	0	0	0		0	0	0
Bihar	0			*		0	0
Mizoram	*	*	*	*	*		0
Karnataka	*	*	*	*	*	*	

* & 0 indicate significant difference between the pair of states beyond 05 level

subject than did the pupils of Orissa, Rajasthan, Maharashtra and Bihar.

* The pupils of Orissa and Rajasthan in Class III developed better understanding of the subject than did the pupils of Maharashtra and Bihar.

* The pupils of Bihar in Class III developed better understanding of the subject than did the pupils of Maharashtra.

A Scores

* The pupils of Mizoram and Karnataka in Class III developed better application abilities in the subject than did the pupils of U.P., Orissa, Rajasthan, Maharashtra and Bihar.

* The pupils of U.P in Class III developed better application abilities in the subject than did the pupils of Orissa, Rajasthan, Maharashtra and Bihar.

* The pupils of Orissa and Bihar in Class III developed better application abilities in the subject than did the pupils of Maharashtra.

S Scores

* The pupils of Karnataka in Class III developed better skill in the subject than did the pupils of U.P., Orissa, Rajasthan, Maharashtra, Bihar, and Mizoram.

* The pupils of Mizoram in Class III developed better skill in the subject than did the pupils of U.P , Orissa, Rajasthan, Maharashtra and Bihar.

* The pupils of U.P. in Class III developed better skill in the subject than did the pupils of Orissa, Rajasthan, Maharashtra and Bihar.
* The pupils of Orissa, Rajasthan and Bihar in Class III developed better skill in the subject than did the pupils of Maharashtra.

In the end, the combined results for the criterion variables strongly indicate that the achievements of the pupils of Orissa, Maharashtra and Bihar in Class III were significantly lower than the achievements of the pupils of Karnataka, Mizoram, Rajasthan and U.P. With some up and down fluctuations, there is a divide between these two sets of States.

Group: The F values of all dependent scores for group indicate that they are not drawn from a common population and hence their means differ significantly.

Further examination of the table reveals the following significant results at the 5 per cent level.

* The achievements of the pupils of non-project schools in T, K, U, A and S tests were lower than those of the pupils of project schools and project schools + CCP.
* The pupils of project schools and project schools + CCP did not differ in their T, K, U and A scores; but there was a significant difference between these with respect to S scores.

Thus, the results lent partial support to the conceptual assumptions hypothesised regarding the impact of the project intervention. It is clear that the benefits have accrued to the pupils of both types of project schools, but the assumption of more benefits accruing to the pupils of project schools + CCP has not received support, except for the S scores. As in Classes I and II, here again pupils exposed to the CCP developed significantly better skills (drawing and labeling) than did the pupils of project schools.

Sex: The F ratios for sex clearly indicate that the samples of males and females are drawn from a common population. In other words, sex was not related to any of the criterion scores and, therefore, males and females neither differed in their total achievement nor in knowledge, understanding, application or skill in the subject.

Interactions

State X Group: The number and position of asterisks in each of the states clearly demonstrate the interaction effect. In some respects, there are similarities between the results of All States and States, whereas in other respects there are differences among groups (Refer to Table 7.CI-III-Sum-11).

* Rejection of the null hypothesis, i.e., the three groups did not differ:

In all States for all five dependent scores, except for T and U scores in Mizoram; for S scores in Karanataka; for U and S scores in Orissa; and K scores in Maharashtra.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e. project schools performed better than non-project schools:

  For T scores: in U.P., Rajasthan, Bihar and Karnataka;
  For K scores: in U.P., Rajasthan, Bihar, Mizoram and Karanataka;
  For U scores: in U.P., Rajasthan Bihar and Karnataka;
  For A scores; in U.P., Rajasthan, Bihar and Karnataka; and
  For S scores: in U.P., Rajasthan and Bihar.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools + CCP performed better than non-project schools:

  For T scores: in U.P., Orissa, Rajasthan. (In Maharashtra, non-project schools performed better than project schools + CCP);
  For K scores: in U.P., Orissa Rajasthan and Bihar;
  For U scores: in U.P., Orissa, Rajasthan and Bihar (In Maharashtra, non-project schools performed better than project schools + CCP); and
  For A scores: in U.P., Orissa, and Bihar. (In Maharashtra and Mizoram, non-proj-

TABLE 7.Cl-III-Sum-11

Results of the Scheffe procedure showing significant differences between pairs of groups for T, K, U, A and S scores of pupils of Class III in All States and States

State	Variable	T			K			U			A			S		
	Group	1	2	M	1	2	M	1	2	M	1	2	M	1	2	M
	1			53.74			64.14			60.65	*		39 81			28.88
Uttar Pradesh	2	*		25.65	*		36.57	*		27 41			21.94	*		4.35
	3		*	55.84	*	*	67.92		*	56 71	*	*	46.75	*	*	41.50
	1			39 43			46.55			45.98			21.49			21 38
Orissa	2			33 55			45.81			35.16			21 94			14 52
	3		*	43.81	*	*	56.35			43.97	*	*	35.40			25.40
	1			54.14			74.21			51.18			45.92			30.59
Rajasthan	2	*		21.66	*		36.63	*		19.26	*		11.69	*		6.47
	3	*	*	58 64	*	*	82.82	*	*	56.63		*	43.56		*	29.01
	1			23.33			33.00			23.27			14 35			3.36
Maharashtra	2			23.26			37.11			22.05			17.01			2.58
	3		*	19.77			33.66	*	*	18.24		*	11.90		*	4 91
	1			43 32			57.67			41.12			33.90			27.62
Bihar	2	*		24 69	*		37 50	*		25.63	*		15.23	*		5.31
	3	*	*	34 81	*	*	46.71		*	37.22	*	*	24 41	*	*	15 93
	1			53.42			63.23			53.26			43.71			46.40
Mizoram	2			52.68	*		59.61			50.96	*		46.93			45.64
	3			53.68	*		60.31			53 84		*	43.27	*	*	52.45
	1			70.15			87.72			65.00			54.34			57.21
Karnataka	2	*		60.90	*		77.69	*		57.31	*		46.33			52.96
	3	*		60.97	*		75.20	*		58.63	*		46.15			53.36
	1			48 75			60.84			49.95			37 46			31.95
All States	2	*		37.08	*		50.19	*		35.46	*		28.11	*		23.02
	3		*	48.67		*	62.47		*	47.87		*	37.12	*	*	35.50

M indicates means of groups.

ect schools performed better than project schools + CCP); and
For S scores: in U.P., Rajasthan, Bihar and Mizoram.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e. project schools + CCP performed better than project schools·

For T scores. in Rajasthan;
For K scores. in U.P., Orissa and Rajasthan;
For U scores: in Rajasthan;
For A scores: in U.P. and Orissa; and
For S scores. in U.P. and Mizoram.

* Rejection of the null hypothesis and support to the alternate hypothesis, i..e project schools performed better than project schools + CCP:

For T scores: in Bihar and Karnataka;
For K scores: in Bihar Mizoram and Karnataka;
For U scores: in Maharashtra and Karnataka;
For A scores: in Bihar and Karnataka; and
For S scores: in Bihar.

State X Sex: The F ratios of interaction between these two variables were significant for the T, K, U, A and S scores; and hence the rejection of the null assumption of these samples drawn from a common population.

The means of males and females were examined for dependent variables. The null hypothesis was rejected for Rajasthan only as the dif-

TABLE 7.Cl-III-Sum-12T

Cell means of T scores of pupils of Class III in All States for State x group x sex

Group / State	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	52.84	25.24	54.95	51.11	56 39	26.92	59.25	54.46	51.88
N	320	82	408	810	108	26	106	240	1050
Orissa	39.46	27.78	45 90	39.82	39.35	41.54	40 42	40.15	39.94
N	56	18	39	113	31	13	24	68	181
Rajasthan	54.27	20.94	58.10	40.80	53 81	24.92	59.80	48.42	42.73
N	110	267	221	598	42	59	102	203	801
Maharashtra	25.37	23.56	21.35	22 86	17.75	22.81	17.62	19.10	21.31
N	134	177	304	615	89	121	223	433	1048
Bihar	42.94	25.49	37 28	36.78	43.91	23.26	31.31	34.16	35.74
N	136	82	173	391	87	46	122	255	646
Mizoram	53 61	52.65	53.44	53.32	53.12	52.71	53.90	53.28	53.30
N	266	147	154	567	173	133	164	470	1037
Karnataka	68.77	60.34	62.55	62.41	72 18	61.85	58.94	60.99	61.87
N	81	205	555	841	55	119	350	524	1365
Total	49.10	35.31	50.04	46.11	48.09	40.44	46.35	45.42	45.87
N	1103	978	1854	395	585	517	1091	2193	6128
Grp M+F	Project M+F = 48.75			Non-Project M+F = 37 08			Project + CCP M + F = 48 67		
N	1688			1495			2945		

TABLE Cl-III-Sum-12K

Cell means of K scores of pupils of Class III in All States for State x group x sex

Group / State	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	63.16	36.71	66.79	62 31	67.04	36.15	72.26	66.00	63.15
N	320	82	408	810	108	26	106	240	1050
Orissa	45.00	41.11	58.46	49.03	49.35	52.31	52.92	51.18	49.83
N	56	18	39	113	31	13	24	68	181
Rajasthan	74.82	35.43	81.54	59.72	72.62	42.03	85.59	70.25	62.38
N	110	267	221	598	42	59	102	203	801
Maharashtra	35.90	36.21	35.53	35.80	28.65	38.43	31.12	32.66	34.50
N	134	177	304	615	89	121	223	433	1048
Bihar	57.28	39.88	48 15	49.59	58.28	33.26	44.67	47.25	48.67
N	136	82	173	391	87	46	122	255	646
Mizoram	65.00	58.84	60.00	62.05	60.52	60.45	60.61	60.53	61.36
N	266	147	154	567	173	133	164	470	1037
Karnataka	86.54	76.44	76.45	77.42	89.45	79.83	73.23	76.43	77.04
N	81	205	555	841	55	119	350	524	1365
Total	61.52	48 27	63.83	59.32	59.54	53.81	60.15	58.49	59.02
N	1103	978	1854	3935	585	517	1091	2193	6128
Grp M+F	Project M+F = 60.84			Non-Project = M+F 50.19			Project + CCP M+F= 62.47		
N	1688			1495			2945		

TABLE Cl-III-Sum-12U

Cell means of U scores of pupils of Class III in all States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	59 81	26.95	55.59	54.36	63.15	28.85	61.04	58.50	55.30
N	320	82	408	810	108	26	106	240	1050
Orissa	44.82	29 44	45 64	42.65	48.06	43.08	41.25	44.71	43.43
N	56	18	39	113	31	13	24	68	181
Rajasthan	51 64	18 69	57.15	38.96	50.00	21.86	55.49	44.58	40.39
N	110	267	221	598	42	59	102	203	801
Maharashtra	26 57	22 26	19.87	22.02	18 31	21.74	16.01	18.08	20.39
N	134	177	304	615	89	121	223	433	1048
Bihar	40.07	26.10	39.25	36.78	42.76	24.78	34.34	35.49	36 27
N	136	82	173	391	87	46	122	255	646
Mizoram	53.23	50.88	54.09	52.86	53.29	51.05	53.60	52.77	52.82
N	266	147	154	567	173	133	164	470	1037
Karnataka	65.56	55.61	59 98	59.45	64.18	60.25	56.49	58.15	58.95
N	81	205	555	841	55	119	350	524	1365
Total	50.60	33.43	49.37	45.75	48.74	39 32	45.32	44.82	45 42
N	1103	978	1854	3935	585	517	1091	2193	6128
Grp M+F	Project M+F = 49.95			Non-Project M+F = 35 46			Project + CCPM+F= 47 87		
N	1688			1495			2945		

TABLE Cl-III-Sum-12A

Cell means of A scores of pupils of Class III in All States for State x group x sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	38.53	21.34	46.18	40.64	43.61	23 85	48 96	43.83	41 37
N	320	82	408	810	108	26	106	240	1050
Orissa	23.04	13.89	37.69	26.64	18.71	33 08	31.67	26.03	26.41
N	56	18	39	113	31	13	24	68	181
Rajasthan	45.64	11.27	42.31	29.06	46 67	13.56	46.27	36.85	31.04
N	110	267	221	598	42	59	102	203	801
Maharashtra	16.94	18.93	13.55	15.84	10.45	14.21	9.64	11.09	13 87
N	134	177	304	615	89	121	223	433	1048
Bihar	33.97	14.88	28.09	27.37	33.79	15.87	19.18	23.57	25 87
N	136	82	173	391	87	46	122	255	646
Mizoram	43.91	45.99	43 57	44.36	43.41	47.97	42.99	44.55	44.45
N	266	147	154	567	173	133	164	470	1037
Karnataka	51.23	46 44	47.37	47.51	58.91	46.13	44.23	46.20	47.01
N	81	205	555	841	55	119	350	524	1365
Total	37.50	26.44	38.64	35.29	37.38	31.28	34.55	34.53	35.02
N	1103	978	1854	3935	585	517	1091	21.93	6128
Grp M+F	Project M+F = 37.46			Non Project M+F = 28 11			Project + CCP M + F = 37.12		
N	1688			1495			2945		

TABLE Cl-III-Sum-12S

Cell means of S scores of pupils of Class III in All States for State × group × sex

State \ Group	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	28.34	3.05	40.00	31.65	30.46	8.46	47.26	35.50	32.53
N	320	82	408	810	108	26	106	240	1050
Orissa	21.96	6.11	28.46	21.68	20.32	26.15	20.42	21.47	21.60
N	56	18	39	113	31	13	24	68	181
Rajasthan	30.36	6.22	28.37	18.85	31.19	7.63	30.39	23.94	20.14
N	110	267	221	598	42	59	102	203	801
Maharashtra	4.78	2.60	6 35	4.93	11.24	2.56	2.96	2.49	3.92
N	134	177	304	615	89	121	223	433	1048
Bihar	29.26	4.63	18.09	19 16	25.06	6.52	12.87	15.88	17.86
N	, 136	82	173	391	87	46	122	255	646
Mizoram	44.14	49.73	50.78	47.39	49.88	41.13	54.02	48.85	48.05
N	266	147	154	567	173	133	164	470	1037
Karnataka	53.83	56.83	53.24	54.17	62.18	46.30	53.54	52.81	53.65
N	81	205	555	841	55	119	350	524	1365
Total	31.15	22.31	35.67	31.08	33.45	24.37	35.22	32.19	31.48
N	1103	978	1854	3935	585	517	1091	21.93	6128
Grp M+F	Project M+F = 31.95			Non Project M+F = 23.02			Project + CCP M + F= 35.50		
N	1688			1495					2945

ferences between means of males and females were:

For T scores, 40.80 – 48.42 = –7.60;
For K scores, 59.72 – 70.25 = –10.53
For U scores, 38.96 – 44.58 = –5.62;
For A scores, 29.06 – 36.85 = –7.79; and
For S scores, 18.85 – 23.94 = –5.09.

Needless to mention, males and females did not differ in these scores in other States.

Group X Sex: The F ratios of interaction between these two variables for all dependent scores except A scores are significant and hence the null hypothesis of samples (in the interactive cells) drawn from a common population is rejected.

Further examination of the relevant cell means in Table 7.Cl-III-Sum-12T, K, U A & S shows the following patterns of differences between means of males and females. For T scores, males in non-project schools performed less well than did females (35.31 versus 40.55), while in project schools + CCP, females did less well than males (46.35 versus 50.04)

For K scores, the trend is the same as above, i.e., the mean of males in non-project schools was lower than that of females (48.27 < 53.81) and the mean of males in project schools + CCP was higher than that of males (63.83 > 60.15).

For U scores, the trend is the same as for T and K scores i.e., the mean of males in non-project schools was lower than that of females (33.43 < 39.32) and the mean of males in project schools + CCP was higher than that of females (49.37 > 45.32).

For A scores, the trend is the same as for T, K and U scores i.e., the mean of males in non-project schools was lower than that of females (26.44 < 31.28) and the mean of males in project schools + CCP as higher than that of females (38.64 > 34.55).

State X Group X Sex: The F ratios for the 3-way interactions are significant at less than the 5 per cent level for all dependent scores except for T scores. The elaborate explanation given during the discussion on the 3-way interaction for scores in Class II may be referred to. The same more or less holds good here also.

To illustrate the point, the cell means of K

scores in Orissa show that while males and females did not differ, the largest mean difference between males and females was found in non-project schools, i.e., 42.11 – 33.13 = 8.98 (in favour of females). But in Bihar, the largest mean differences between males and females for K scores was indeed in non-project schools, but favouring the males i e., 39.88 > 33.26. Even within the two low-achieving States, the pattern is not consistent but certainly interactive in nature. thus the interpretation made with reference to Class II fits this result also

RESULTS OF CLASS IV

Descriptive Data

The values of descriptive statistics are presented in Table 7.Cl-IV-Sum-13.

The statistical values presented in the table show that the nature of the data continues to tally with that found for Classes I, II and III. Starting with the skewness, while the parental income is highly positively skewed, the A scores showed a negligible positive skewness. All the other pupil-related variables are slightly negatively skewed. In fact, these distributions seem to approximate the normal probability curve more than the distributions of the other classes. The highest skewness is evident in the attendance scores whereas the A scores are the least skewed. The SDs are also slightly higher than those which can be derived as 1/6 of the ranges, indicating thereby almost a similar dispersion of scores in their respective distributions.

Conclusions and Interpretations

* The attendance of pupils was quite satisfactory. However the total achievement of pupils was slightly above average. The performance of the pupils in Class IV was lower than that of the pupils in Classes I and II but slightly higher than that of the pupils of Class III. The sudden slump in the achievement in Class III has been discussed and explained earlier. Though there has been a little improvement, the slump in the achievement in Class IV has continued. The point regarding the achievement being satisfactory or otherwise has also been discussed at length in the discussion on the previous class. That discussion holds good for Class IV also.

The hierarchical structure of achievement objectives (as per the taxonomical models of Bloom and Dave) has clearly emerged here. The Friedman test (Chi-square = 2548.81; df = 2; P = .000) indicates that the mean ranks of these scores are significantly different, thereby establishing that K (67.39) < U (52.83) < A (46.02). As mentioned before, in absolute terms, the achievements of pupils in K was quite satisfactory, that in U slightly above average, and in A, below average. However, one must hasten to add that the empirical patterns matched with the theoretical ones and, consequently, they have to be viewed within the set of T scores. This pattern tallies with the one observed for Class III.

TABLE 7.Cl-IV-Sum-13

Measures of central value, variability and coefficients of correlation for attendance, parental income, T, K, U and A scores of pupils of Class IV in All States

	Att	Inc	T	K	U	A
Mean	81 67	667 57	55.50	67.39	52.83	46 03
SD	14.78	584 23	21.21	24.54	23.61	28.47
Skewness	–1.500	3.491	–.692	–.642	–.482	.031
Correlations (rs)*						
T			—	.817	.907	.817
K				—	.624	560
U					—	.649
A						—

* All *r* values significant beyond .01 level N = 5451

* The coefficients of correlation between T on the one hand K, U, and A, on the other, are high i.e, above .817. It is necessary to point out that the K-U-A tests had a loading of cognitive factors. It is interesting to note the *r* value of the pairs K-A is the lowest among the three. This suggests that there are more uncommon elements between these two sub-tests than between the other two pairs, i.e., K-U and U-A. In the same vein, U and A have more common elements than do K-U. The values of rs on the whole seem to suggest that while answering application questions, the pupils required better understanding of the subject than greater acquisition of knowledge, i.e., recall and recognition of facts. More interesting is the fact that the pupils needed less knowledge while answering understanding questions than they did the ability to understand while answering application questions. The phenomenon of the pupils of project schools + CCP performing better on the A sub-test than their counterparts in project schools who did better on the K and U sub-tests can be explained with the help of this finding. There is hardly any doubt that the the total achievement does not truely reflect the complex nature of achievement concept. The interpretation may be referred to under the same heading in the previous class.

Predictors of pupils Achievement

The values obtained through the stepwise multiple regression analysis (SWMRA) are presented in Table 7.Cl-IV-Sum-14, viz., variables – Multiple R, R-square, df, F, *t*, Variance Accounted for (VAf) and Level of Significance (LS).

Conclusions and Interpretations

* Father's occupation was not associated with the T, K, U and A scores in the population.
* The highest percentage of variance was accounted for by a set of six variables in the K scores, i.e., 5.1491, whereas the lowest of variance 3.62, was accounted for by a set of six variables for the U scores. Although significant, the predictive association of these variables was low, for more than 94% variance in the dependent scores was accounted for by the variables other than the eight included in the regression equation.
* Notwithstanding the small magnitude of the relationship, the SES-related variables Mother's occupation (i.e., in favour of lower occupation), Mother's education, Social

TABLE Cl-IV-Sum-14

Step-wise multiple regression analysis for T, K, U and A of pupils of Class IV in All States

Variable	T		K		U		A		S	
Variable	t-value	Rank	t-value	Rank	t-value	Rank	t-value	Rank	t-value	Rank
Attendance	5.16	4			6.59	1	6.33	4		
Income			-3.68	4						
Rural/urban	-4.05	5	2.47	6	-5.76	5	-8 18	1		
Disadv/Adv	7.96	2	8.13	2	6 63	4	6.54	3		
Father's Occupation										
Father's Education	3.085	6	3.41	3	2.41	6	3.25	5		
Mother's Occupation	-9.94	1	-11.50	1	-6.604	3	-8 35	2		
Mother's Education	2.83	3	3.70	5	2 07	2	2.38	6		
R Square	0.4526		.05140		.03629		.05005			
Variance Acc. for	4.52		5.141		3.62		5.015			
Adjusted R Square	.04419		.05033		.03520		.04898			
Standard Error	20.88374		23.17522		22.49448		26.10097			
Multiple R	.21275		.22671		.19049		.22373			
F	42.09219		48.10575		33.42956		46.78213			
df_1	6		6		6		6			
df_2	5327		5327		5327		5327			
L.S	0.0004		0.0004		0.0004		0.0004			

*All *t* values significant beyond 0.05.

Correlations

Total Score

Variables	H	C	F	D	R	E	T
Mother's occu. (H)	127	-069	-013	-052	-051	-124	(000)
Disadv/Adv (C)	127		.022	-.019	.260	.112	.086 (000)
Mother's edu (F)	-069	.022		.119	-.304	.457	104 (.000)
Attendance (D)	-013	-019	.119		-.113	080	(.000) (000)
Rural/ Urban (R)	-062	260	-304	-.113		-189	-.053 (000)
Father's edu. (E)	-.051	112	.457	080	-.189		104 (000)
T	-124 (.000)	086 (000)	-104 (000)	.085 (.000)	-.053 (000)	.104 (000)	1 000 (.999)

Knowledge Score

Variables	H	C	E	I	F	R	K
Mother's occu (H)		127	-051	107	-069	-.062	-.159 (.000)*
Disadv/Adv (C)	127		.112	002	022	260	.113 (.000)
Father's Edu. (E)	-051	112		354	457	-189	073 (.000)
Income (I)	107	.002	354		387	-401	-049 (000)
Mother's Education (F)	-069	.022	457	387		-304	062 (000)
Rural/ Urban (R)	-062	260	-.189	-401	-304		074 (000)
K	-.159 (000)	.113 (.000)	073 (000)	-049 (.000)	062 (000)	074 (.000)	1 000 (999)

Understanding Score

Variables	D	F	H	C	R	E	U
Attendance (D)		.119	-013	-019	-.113	.080	.105 (.000)
Mother's edu. (F)	119		-.069	.022	-.304	.457	.095 (000)
Mother's occu (H)	-013	-069	127	-062	-051	-078	(.000)
Disadv/Adv (C)	-019	.022	127		260	112	.064 (000)
Rural/ Urban (R)	-113	-304	-062	260		-.189	-083 (.000)
Father's Edu. (E)	.080	457	-051	112	-189		091 (.000)
U	.105 (.000)	095 (000)	-.078 (000)	064 (.000)	-.083 (.000)	.091 (.000)	1.000 (999)

Application Score

Variables	R	H	C	D	E	F	A
Rural/Urban (R)		-013	260	-.113	-189	-304	-.121 (000)
Mother's occu (H)	-062		127	-013	-051	-069	-101 (000)
Disadv/Adv (C)	260	.127		-019	.112	.022	052 (000)
Attendance (D)	-113	-013	-.019		080	.119	107 (000)
Father's Edu. (E)	-189	-051	112	080		-.457	.113 (000)
Mother's Education	-304	-.069	.022	.119	457		117 (000)
A	-121 (000)	-.101 (000)	.052 (000)	107 (000)	113 (000)	117 (000)	1 000 (999)

*Figures in brackets indicate the level of significance of rs

status (advantaged, disadvantaged), and Locale (i.e., in favour of rural) and Father's education—were related as determinants to all criterion scores in the population. Attention needs to be drawn to the fact that Attendance of the pupils of Class I was more strongly associated with pupil achievement than the SES-related variables in Class I. However, this result is in consonance with those obtained for Classes II and III.

Testing the Null Hypothesis

ANCOVA

The F ratios and other values related to pupil achievement are presented in Table 7.CI-IV-Sum-15 below.

Conclusions and Interpretations

Covariates

* The F ratios for Attendance and Income are significant beyond 0.05 level, except for K

TABLE 7.CI-IV-Sum-15

Analysis of covariance of T, K, U and A scores of pupils of Class IV in All States showing F values for State, group, sex and interactions

Source of variation	Dependent Variables			
Covariates				
Attendance	T	K	U	A
F	62.11	.177	83.15	83.61
df	1	1	1	1
LS	.000	.674	000	.000
Income				
F	5.17	26 78	16.03	36.06
df	1	1	1	1
LS	023	000	.000	.000
Main effects				
State				
F	462.32	363.93	364 74	324.26
df	6	6	6	6
LS	.000	.000	.000	.000
Grp				
F	202.27	151.80	142.48	120.57
df	2	2	2	2
LS	.000	.000	.000	.000
Sex				
F	148	2.69	1.17	1.24
df	1	1	1	1
LS	.701	.101	.280	.265
Interactions				
Sta × Grp				
F	26 68	19.11	23.48	21.65
df	12	12	12	12
LS	.000	000	.000	.000
Sta × Sex				
F	4.98	2.39	4 49	5.13
df	6	6	6	6
LS	.000	.026	.000	.000
Grp × Sex				
F	7 38	2.00	7.03	6.50
df	2	2	2	2
LS	.001	135	.001	.002
Sta × Grp × Sex				
F	2.26	2 69	1.51	1.74
df	12	12	12	12
LS	.007	.001	.114	.052

* df for residual (within subjects) variance = 5407.

scores in the case of Attendance, the null hypothesis of no association between these two variables on the one hand and T, K, U and A scores, on the other, in the population was rejected. However, the results for the three main manipulated variables are free from their influence.

Main Effects

State: The null hypothesis of the State samples being drawn from a common population for all achievement scores is rejected, since the F values for all five variables are significant at less than .01 level.

Further examination of the means of the pairs of States indicates the following significant results at the 5 per cent level (the Scheffe procedure; in Table 7.CI-IV-Sum 16).

T Scores

* The total achievement of the pupils of Karanataka in Class IV was better than the total achievements of the pupils of U.P., Rajasthan, Maharashtra, Bihar and Mizoram.
* The total achievement of the pupils of U.P. in Class IV was better than the total achievements of the pupils of Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The total achievements of the pupils of Mizoram and Rajasthan in Class IV were better than the total achievements of the pupils of Orissa, Maharashtra and Bihar.
* The total achievements of the pupils of Orissa and Bihar in Class IV was better than the total achievement of the pupils of Maharashtra.

K scores

* The pupils of Karanataka in Class IV acquired more knowledge in the subject than did the pupils of U.P., Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The pupils of U.P. in Class IV acquired more knowledge than did the pupils of Orissa, Rajasthan, Maharashtra, Bihar and Mizoram.
* The pupils of Bihar in Class IV acquired more knowledge in the subject than did the pupils of Orissa, Maharashtra and Mizoram.
* The pupils of Mizoram and Rajasthan in Class IV acquired more knowledge than did the pupils of Orissa and Maharashtra.

U Scores

* The pupil of U.P. in Class IV developed better understanding in the subject than did the pupils of Orissa, Rajasthan, Maharashtra, Bihar, Karnataka and Mizoram.

TABLE 7.CI-IV-Sum-16

Results of the Scheffe procedure showing significant differences between pairs of means of States for T, K, U and A scores

Variable	Total Score							Knowledge Score						
State	U.P.	Oris	Raja	Maha	Bih	Mizo	Kar	U.P	Oris	Raja	Maha	Bih	Mizo	Kar
U P		*	*	*	*	*	0		*	*	*	*	*	0
Orissa	0		0	*		0	0	0		0		0	0	0
Rajasthan	0	*		*	*		0	0	*		*			0
Maharashtra	0	0	0		0	0	0	0		0		0	0	0
Bihar	0		0	*		0	0	0	*		*		*	0
Mizoram	0	*		*	*		0	0	*		*			0
Karnataka	*	*	*	*	*	*		*	*	*	*	*	*	

Variable	Understanding Score							Application Score						
State	U P.	Oris	Raj	Mah	Bih	Mizo	Kar	U.P.	Oris	Raj	Maha	Big	Mizo	Kar
U.P.		*	*	*	*	*			*	*	*	*		
Orissa	0		0	*	*	0	0	0			*		0	0
Rajasthan	0	*		*	*		0	0			*	*	0	0
Maharashtra	0	0	0		0	0	0	0	0	0		0	0	0
Bihar	0			*			0	0		0	*		0	0
Mizoram	0	*		*	*				*	*	*	*		
Karnataka		*	*	*	*				*	*	*	*		

* & 0 indicate significance of difference between the pair of States at .05 level.

* The pupils of Karnataka in Class IV developed better understanding than did the pupils of Orissa, Rajasthan, Maharashtra, Mizoram and Bihar.

* The pupils of Mizoram and Rajasthan in Class IV developed better understanding of the subject than did the pupils of Orissa, Maharashtra and Bihar.

* The pupils of Orissa in Class IV developed better understanding of the subject than did the pupils of Maharashtra and Bihar.

* The pupils of Bihar in Class IV developed better understanding of the subject than did the pupils of Maharashtra.

A Scores

* The Pupils of Karnataka, Mizoram and U.P. in Class IV developed better application abilities than did the pupils of Orissa, Rajasthan Maharashtra and Bihar.

* The Pupils of Rajasthan in Class IV developed better application abilities than did the pupils of Maharashtra and Bihar.

* The pupils of Orissa and Bihar in Class IV developed better application abilities than did the pupils of Maharashtra.

In the end, the combined results for the criterion variables strongly indicate that the achievements of the pupils of Orissa, Maharashtra and Bihar in Class IV were significantly lower than the achievement of the pupils of Karnataka, Mizoram, Rajasthan and U.P.

Group: The F values of all dependent variables for groups indicate that they are not drawn from a common population, and hence their means differ significantly (*see* Table 7.CI-IV-sum-17).

Further examination of the table reveals the following significant results at the 5 per cent level:

* The achievements of the pupils of non-project schools in the T, K, U and A tests were lower than those of the pupils of project schools and project schools + CCP.

* The pupils of project schools and project schools + CCP differed in K, U and A scores but not in T scores.

* However, while project schools + CCP ac-

TABLE 7.CI-IV-Sum-17

Results of the Scheffe procedure showing significant differences between pairs of groups for T, K, U and A scores of pupils of Class IV in All State and States

State	Variable	T			K			U			A		
	Group	1	2	M	1	2	M	1	2	M	1	2	M
Uttar Pradesh	1			68.41			76.12			68.36			60.78
	2	*		38 57	*		44.84	*		37.80	*		31 32
	3		*	65.33		*	73.39		*	65.19		*	58 11
Orissa	1			44.73			50.81			45 27			32.43
	2			48.24			57.94			43.82			42.06
	3	*		54 51			58.43	*	*	56.27	*		47 84
Rajasthan	1			62.88			67.60			57.20			50.88
	2	*		45 41	*		50 85	*		45.37	*		36.39
	3		*	64.78	*	*	73.81		*	64.19	*	*	56.33
Maharashtra	1			40 79			54 75			38.08			24.54
	2	*		32.13	*		47.00	*		27.39			21 70
	3	*		31 27	*		47.67	*		28.08	*	*	13 89
Bihar	1			56.11			75.14			47.68			51 68
	2	*		36.80	*		55.24	*		32.04	*		20.97
	3	*	*	47.62	*	*	67.62	*	*	39.96	*	*	37.82
Mizoram	1			59.87			62.35			58.18			59.58
	2	*		56.50	*		57.69			60.19	*		47 85
	3		*	59.94	*	*	63.25			59.04		*	58.23
Karnataka	1			70 00			88.30			62.32			63.57
	2	*		61 40	*		81.16	*		54 30	*		51.57
	3		*	69 89		*	89.38		*	64.31		*	57.88
All States	1			58.75			68 33			56.62			51.13
	2	*		47.79	*		58.45	*		45.54	*		38.07
	3		*	57.51	*	*	71 19	*	*	54.34	*	*	47.17

M indicates means of groups.

quired more knowledge than did project schools, the latter developed better understanding and application in the subject than did the former.

Thus, the results again lent partial support to the conceptual assumptions hypothesised regarding the impact of the project intervention. It is clear that the benefits have accrued to the pupils of both types of project schools, but the assumption of more benefits accruing to the pupils of project schools + CCP has not been fully supported, although there was a trend to that effect in K scores.

Sex: The F ratio for sex clearly indicate that the samples of males and females are drawn from a common population. In other words, sex was not related to any of the criterion scores and, therefore, males and females neither differed in their total achievement nor in Knowledge, Understanding and Application in the subject.

Interactions

State X Group: The number and position of asteriks in each of the States clearly demonstrate the interaction effect (*see* Table 7.CI-IV-Sum-17). In some respects, there are similarities between the results of All States and for States, whereas in other respects there are differences among groups.

* Rejection of the null hypothesis, i.e., the three groups did not differ.

In All States for all four dependent variables, except with respect to the K scores in Orissa and U scores in Mizoram.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools

performed better than non-project schools:

For T scores: in U.P., Rajasthan, Maharashtra, Bihar, Mizoram and Karnataka;
For K scores: in U.P., Rajasthan Maharashtra, Bihar Mizoram and Karanataka;
For U scores: in U.P., Rajasthan, Maharashtra, Bihar and Karanataka; and
For A scores; in U.P, Rajasthan, Bihar, Mizoram and Karanataka

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools + CCP performed better than non-project schools:

For T scores: in U.P, Rajasthan, and Bihar,
For K scores: in U.P., Rajasthan, Bihar, Mizoram and Karnataka;
For U scores: in U.P, Orissa, Rajasthan, Bihar and Karnataka and
For A scores: in U.P., Rajasthan, Bihar, Mizoram and Karnataka.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools + CCP performed better than project schools

For T scores: in Orissa;
For K scores in Rajasthan;
For U scores: in Orissa; and
For A scores: in Orissa.

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e. project schools performed better than project schools + CCP:

For T scores: in Maharashtra;
For K scores: in Maharashtra and Bihar;
For U scores: in Maharashtra and Bihar; and
For A scores: in Maharashtra and Bihar.

State X Sex: The F ratios of interaction between these two variables are significant for all four dependent variables, and hence the rejection of the null assumption of these samples being drawn from a common population. Although there existed no differences between males and females in the All States data, some States did differ, showing the interaction effect. Inspection of the means revealed the following results:

* In Orissa, the males developed better application abilities than did the females (M of males = 41.92 and M of females = 34.73).
* In Rajasthan, on the other hand, the females developed better application abilities than did the males (M of males = 45.64 and M of females = 51.05).
* In Bihar, the males did better on all four variables than did the females (Means of males and females were 50.57 and 44.11 in T, 70.00 and 63.39 in K, 43.77 and 35.56 in U, and 40.65 and 36.61 in A, respectively).

Group X Sex: The F ratios of interaction between these two variables are significant for all dependent variables, except in the case of the K scores, and hence the null hypothesis of samples (in the interactive cells) drawn from a common population is rejected for all but K scores.

While the males and females did not differ in project schools and project schools + CCP in any of the three scores, they did in non-project schools, the females not doing as well as their male counterparts.

State X Group X Sex: The F ratios for the 3-way interactions are significant at less than the 5 per cent level for all dependent variables except U scores. During the discussion on the 2-way interactions, it was explained that, by and large, positive or negative differences from the expected means in low-achieving States were largely found in non-project schools. However, the difference between males and females did not seem to follow any particular trend, i.e., in some States, the males seemed to do better than expected; in others, the females. This interaction suggests that to some extent the performance depended upon whether a pupil (a) belonged to a low-achieving State, (b) studied in a non-project school, and (c) was a female (most of the time doing less well than the males). Therefore, the overall generalisations will have some exceptions which, in turn, will have to be studied within the data of the State. The cell means for the total 42 cells for T, K, U and A have been posted in Tables 7.C1-IV-Sum-18 T, K, U & A for reference.

To illustrate this point, the examination of cell means of the T score in Orissa showed no difference between that achievement of males

TABLE 7.CI-IV-Sum-18T

Cell means of T scores of pupils of Class IV in All States for State x group x sex

	Male				Female				
State \ Group	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	68 52	39.74	64.08	63.34	68.02	31.54	70.75	66.88	64.04
N	298	78	400	776	86	13	93	192	968
Orissa	44.63	57.50	52.94	49.33	45.00	40.00	57.65	47 27	48 62
N	54	16	34	104	20	18	17	55	159
Rajasthan	62.45	44 89	64.12	55.40	64.44	47 46	66.82	58 88	56 17
N	98	235	204	537	27	59	66	152	689
Maharashtra	43 45	33.97	32.05	35.42	36.52	29.70	30 26	31.50	33.76
N	148	131	297	576	92	99	230	421	997
Bihar	56.50	41 93	48.74	50.57	55.00	30.43	45.35	44 11	48 45
N	137	57	175	369	48	46	86	180	549
Mizoram	57.16	57.42	59.43	58.03	62.17	55.71	60 35	59.62	58.90
N	141	120	140	401	166	140	171	477	878
Karnataka	69 23	62 32	69.37	67 36	70.67	59.33	70 58	68.54	67.84
N	52	203	462	717	60	90	344	494	1211
Total	59.03	48.75	57 79	55.94	58.22	46 04	57 03	54 74	55 50
N	928	840	1712	3480	499	465	1007	1971	5451
Grp M+F	Project M+F = 58.75		Non-Project M+F = 47 79		Project + CCP M+F = 57.51				
N	1427		1305		2719				

TABLE 7.CI-IV-Sum-18K

Cell means of K scores of pupils of Class IV in All States for State x group x sex

	Male				Female				
State \ Group	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	76.14	45.90	72.10	71 02	76.05	38.46	78.92	74 90	71.79
N	298	78	400	776	86	13	93	192	968
Orissa	48.15	68.13	55.59	53 65	58.00	48.89	64 12	56.91	54 78
N	54	16	34	104	20	18	17	55	159
Rajasthan	67 96	50.89	74 31	62.91	66.30	50 68	72.27	62 83	62 89
N	98	235	204	537	27	59	66	152	689
Maharashtra	57 70	48 47	48 38	50.80	50.00	45 05	46 74	47 05	49.22
N	148	131	297	576	92	99	230	421	997
Bihar	75.84	60.88	68 40	70.00	73.13	48.26	66 05	63.39	87 83
N	137	57	175	369	48	46	86	180	549
Mizoram	60.14	59 50	63.64	61 17	64.22	56.14	62 92	61 38	61 29
N	141	120	140	401	166	140	171	477	878
Karnataka	87.88	80.89	90.09	87.32	88.67	81.78	88.43	87 25	87.29
N	52	203	462	717	60	90	344	494	1211
Total	68.89	59.54	71.71	68.02	67.29	56.49	70.32	66.29	67.39
N	928	840	1712	3480	499	465	1007	1971	5451
Grp M+F	Project M+F = 68 33		Non-Project M + F = 58.45		Project + CCPM + F = 71.19				
N	1427		1305		2719				

TABLE 7.Cl-IV-Sum-18U

Cell means of U scores of pupils of Class IV in all States for State x group x sex

Group / State	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	68.56	38.72	64 05	63.23	67.67	32.31	70 11	66.46	63 87
N	298	78	400	776	86	13	93	192	968
Orissa	45 56	51.25	54.41	49 33	44.50	37.22	60 00	46 91	48 49
N	54	16	34	104	20	18	17	55	159
Rajasthan	66.84	44 94	63.19	55 87	68.52	47.12	67.27	59 67	56.71
N	98	235	204	537	27	59	66	152	689
Maharashtra	41.08	29.08	28.55	31.89	33.26	25.15	27 48	28 19	30 33
N	148	131	297	576	92	99	230	421	997
Bihar	48 32	38.42	41.94	43.77	45 83	21.13	35.93	35.56	41.07
N	137	57	175	369	48	46	86	180	549
Mizoram	56.45	61.58	58.43	58 68	59 64	5 [illegible] 00	59.53	59.41	59.08
N	141	120	140	401	166	[illegible]	171	477	878
Karnataka	60.96	55.76	63 94	61 41	63.50	5 [illegible] 00	64 80	62.13	61 70
N	52	203	462	717	60	[illegible]	344	494	1211
Total	57.40	46 56	54.85	53.53	55.17	[illegible] 70	53.49	51.60	52 83
N	928	840	1712	3480	499	[illegible] 65	1007	1971	5451
Grp M+F	Project M+F = 56.62			Non-Project M + F = 45 54			Project + CCP M + F= 54.34		
N	1427			1305			2719		

TABLE 7.Cl-IV-Sum-18A

Cell means of A scores of pupils of Class IV in All States for St [illegible] x group x sex

Group / State	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Group Total
Uttar pradesh	60.81	32 82	56 65	55 85	60.70	22 31	64 41	59.90	56.65
N	298	78	400	776	86	13	93	192	968
Orissa	35.19	53.13	47.35	41.92	25.00	32.22	48 82	34.73	39.43
N	54	16	34	104	20	18	17	55	159
Rajasthan	49.29	35.96	55.05	45.64	56.67	38 14	60 30	51.05	46 84
N	98	235	204	537	27	59	66	152	689
Maharashtra	26 55	25 04	[illegible]	20.59	21.30	17.27	11 61	15.06	18.25
N	148	131	297	576	92	99	230	421	997
Bihar	51 61	22.11	38.11	40.65	51.88	19.57	37 21	36.61	39.33
N	137	57	175	369	48	46	86	180	549
Mizoram	54.68	46 75	57.71	53.37	63.73	48.79	58.65	57.53	55.63
N	141	120	140	401	166	140	171	477	878
Karnataka	65.00	53.55	55 69	55.76	62.33	47.11	60 81	58.50	56.88
N	52	203	462	717	60	90	344	494	1211
Total	50.58	39 14	47.10	46.11	52 14	36 13	47 29	45.89	46.03
N	928	840	1712	3480	499	465	1007	1971	5451
Grp M+F	Project M+F = 51.13			Non-Project M + F = 38.07			Project + CCP M + F= 47 17		
N	1427			1305			2719		

and females in the project and project schools + CCP while a large mean difference in the achievement of males and females was found in the non-project schools, i.e., 57.50 – 40.00 = 17.50 (in favour of males). The same trend is evident in Bihar also. On the other hand, marginal differences between male-female pairs existed in the three types of schools in Mizoram. All the same, the emerging pattern is not necessarily consistent, since the phenomenon of pupil achievement seems to be rather complex. Therefore, a number of factors which are beyond the experimental control may have contributed to the results discussed above. It is, therefore, not advisable to draw a straight-jacket conclusion about the effectiveness of the experiment.

RESULTS OF CLASS V

Descriptive Data

Before the results are discussed, attention needs to be drawn to the fact that Class V is not part of the primary stage in the States of Maharashtra, Mizoram and Karnataka, and hence their exclusion from this report. This has resulted in the reduction of the total number of subjects.

The values of descriptive statistics are presented in Table 7.Cl-V-Sum-19

The statistical values show that the nature of data is the same as that found for Classes I, II, III and IV. The Parental income is positively skewed but not as markedly as in Classes II, III and IV. All the other pupil-related variables are slightly negatively skewed. The highest skewness is in Attendance scores (–1.657) and the least skewness is evident in T scores. In fact, these distributions seem to approximate the normal probability curve more than the distributions of the other classes. The SDs are also slightly higher than those which can be drived as 1/6 of the ranges, indicating thereby almost a similar dispersion of scores in their respective distributions.

Conclusions and Interpretations

* While the attendance of the pupils was quite satisfactory, the total achievement of the pupils was rather below average. As discussed with reference to the results of Class IV, even when the tests were different, the performance of the pupils in Class V was lower than that of the pupils in previous classes. The sudden slump in the achievement observed in Class III has been discussed and explained earlier. The slump in the achievement has continued in Class V also. The point regarding the achievement being satisfactory or otherwise has been also discussed at length in the previous part. That discussion holds good for Class V too.

The hierarchical structure of the achievement objectives (as per the taxonomical model of Bloom and Dave) has clearly emerged for this data also. The Friedman test (Chi-square = 895.53; df = 2; P = .000) indicates that the mean ranks of these scores are significantly different, thereby establishing that MK (53.90) < MU (43.00) < MA (39.14). In other words, Sub-test K is easier than Sub-test U, and both these tests are easier than Sub-test A. As has been stated before, in absolute terms, the

TABLE 7.Cl-V-Sum-19

Measures of central value, variability and coefficients of correlation for attendance, parental income, T, K, U and A scores of pupils of Class V in All States

	Att	Inc	T	K	U	A
Mean	79 61	709 65	44 94	53.90	43 00	39.13
SD	17 15	446.52	22.21	25.23	22.06	26.49
Skewness	-1.657	1.680	- 057	-.148	-.010	.273
Correlations (rs)*						
T			—	.885	.932	.856
K				—	.776	.680
U					—	.709
A						—

* All r values significant beyond 01 level N = 5451.

achievements of pupils in K was above average, that in U below average, and in A, much below average. However, one must hasten to add that the empirical patterns matched with the theoretical ones and, consequently, they have to be viewed within the set of T scores. This pattern tallies with the ones observed for Classes III and IV.

* The coefficients of correlation between T on the one hand and K, U and A, on the other, are high, i.e., above .709. Sub-tests K-U-A had a loading of cognitive factors. It is interesting to note the *r* value of the pairs K-A is the lowest among the three. This suggests that there are more uncommon elements between these two sub-tests than between the other two pairs, i.e., K-U and U-A. On the other hand, K-U have more common elements than the pair U-A. The values of *rs*, on the whole seem to suggest that while answering application questions, pupils required better understanding in the subject than greater acquisition of knowledge, i.e., recall and recognition of facts. Pupils needed more knowledge while answering understanding questions, than they did understanding while answering application question. There is hardly any doubt that the total achievement does not truly reflect the complex nature of achievement concept. It is remarkable that even at this very early stage of education and this young age, and even with a small portion of this subject like this one, an unambiguous picture of this kind starts emerging.

Predictors of Pupil Achievement

The values obtained through the step-wise multiple regression analysis (SWMRA) are presented in Table 7.Cl-V-Sum-20, viz., variables-Multiple R, R-square, df, F, *t*, Variance Accounted for (VAf) and Level of Significance (LS).

Conclusion and Interpretations

* Father's occupation was not associated with T, K, U and A scores in the population.
* The highest percentage of variance was accounted for by a set of five variables in the U scores, i.e., 8.78, whereas the lowest, 2.46 was accounted for by a set of six variables for the U scores. Although significant, their predictive association was low, for more than 91% variance in the dependent

TABLE 7.Cl-V-Sum-20

Step-wise multiple regression analysis for T, K, U and A of pupils of Class V in All States

Variable	T		K		U		A	
Variable	t-value	Rank	t-value	Rank	t-value*	Rank	t-value	Rank
Attendance	8 08	1	4 45	2	8.85	1	8 10	2
Income					2.05	6		
Rural/urban	6 36	2	4 96	1	6.78	2	4.35	4
Disadv/Adv			3.38	3			2.09	5
Father's Occupation								
Father's Education	4 44	3			2.80	3	4.00	3
Mother's Occupation	-3.89	4			-2.55	5	-11 12	1
Mother's Education	-2 03	5			-3.02	4	-2.019	1
R squre	.05826		.01466		.06239		.08780	
Variance Accounted for	5 826		2.46		6.23		8.78	
Adjusted R square	.05611		.02332		.05982		.08571	
Standard Error	21.75220		27.72385		22.47968		25.56327	
Multiple R	.24138		.15703		.24977		.29631	
F	27 08572		18 46321		24.26419		42.13748	
df_1	5		3		6		5	
df_2	2189		2191		2188		2189	
L.S	0.0004		0.0004		.0004		0.0004	

*All *t* valves significant beyond the 0 05 level

Correlations

Total Score							Knowledge Score				
Variables	D	R	E	H	F	T	Variables	R	D	C	K
Attendance (D)		-.010	-.008	.189	-.017	.154 (.000)*	Urban/Rural (R)		-.010	-.017	103 (.000)
Rural/Urban (R)	-.010		.006	-.085	002	.138 (.000)	Attendance (D)	-.010		016	094 (.000)
Father's Edu. (E)	-.008	006		-.004	.378	.082 (.000)	Disd/Ad (C)	-.017	016		071 (.000)
Mother's Occu (H)	189	-.085	-.004		-.011	-.061 (.002)	K	103 (.000)	.094 (.000)	071 (.000)	1.000 (.999)
Mother Edu. (F)	-.017	.002	378	-.011		-.010 (.325)					
T	154 (.000)	138 (.000)	082 (.000)	-.061 (.002)	-.010 (.325)	1.000 (.999)					

Application Score							Understanding Score							
Variable	H	D	E	R	C	A	Variable	D	R	E	F	H	I	U
Mother's Occupation (H)		189	-.004	-.085	139	-.204 (.000)	Attendance (D)		-.010	-.008	-.017	189	-.040	174 (.000)
Attendance (D)	-.010		-.008	-.010	016	123 (.000)	Rural/ Urban (R)	-.010		.006	002	-.085	.028	145 (.000)
Father's Edu (E)	-.004	-.008		.006	.249	.096 (.000)	Father's Education (E)	-.008	006		.378	-.004	382	.058 (.003)
Rural/ Urban (R)	-.085	-.010	.006		-.017	.107 (.000)	Mother 's Education (F)	-.017	.002	378		-.011	265	-.033 (.060)
Disad/Adv (C)	139	.016	.249	-.017		.034 (.054)	Mother's occupation (H)	.189	-.085	-.004	-.011		.119	-.025 (.122)
A	-.204 (.000)	.123 (.000)	.096 (.000)	.107 (.000)	034 (.054)	1.000 (.999)	Income (I)	-.040	0 28	.382	265	119		.044 (.020)
							U	.174 (.000)	145 (.000)	058 (.003)	-.033 (.060)	-.025 (.122)	.044 (.020)	1.000 (.999)

*Figures in brackets indicate the level of significance of rs

scores was accounted for by the variables other than the eight included in the regression equation.

* Notwithstanding the small magnitude of the relationship, it is interesting to note that, as happened in Class I, Attendance has again emerged as the variable having more association in the population than the SES-related variables. Further, for the first time, the relationship of Locale to all criterion variables is in favour of urban children. Mother's occupation and education are related to criterion variables (i.e., in favour of lower occupation and education). Thus, this result is in consonance with those obtained for Class I.

Testing of the null Hypothesis

ANCOVA

The F ratios and other values related to pupil achievement are presented in Table 7.Cl-V-Sum-21 below.

Conclusions and Interpretations

Covariates

* Since the F ratios for Attendance and Income are significant beyond the .05 level, except in the case of Attendance for A scores, the null hypthesis of no association between these two and T, K and U in the population was rejected. For A scores, while for Attendance the null assumption of association was rejected, it was found tenable

TABLE 7.CI-V-Sum-21

Analysis of covariance of T, K, U and A scores of pupils of Class V in All states showing F values for State, group, sex and interactions

Source of variation Covariates	Dependent Variables			
Attendance	T	K	U	A
F	83.97	36.53	123.43	53.10
df	1	1	1	1
LS	.000	.000	.000	.000
Income				
F	7.90	14.08	10.87	.003
df	1	1	1	1
LS	.005	.000	.001	.957
Main effects				
State				
F	101.94	90.71	114 35	132.86
df	3	3	3	3
LS	.000	000	.000	.000
Group				
F	403 60	287.97	393.82	231 84
df	2	2	2	2
LS	.000	.000	.000	.000
Sex				
F	12.22	5.66	7.75	13.20
df	1	1	1	1
LS	.000	.017	.005	.000
Interactions				
Sta × Grp				
F	21.19	18 69	23.32	12.72
df	6	6	6	6
LS	.000	000	.000	.000
Sta × Sex				
F	10 37	5.26	6.41	14.66
df	3	3	3	3
LS	.000	.000	.000	.000
Grp × Sex				
F	5.35	3.58	10.72	.764
df	2	2	2	2
LS	.005	.028	.000	.466
Sta × Grp × Sex				
F	1 53	.830	3.27	3.02
df	6	6	6	6
LS	.166	547	003	.006

* df for residual (within subjects) variance = 2243.

for Income. However, the results for the three main manipulated variables are free from their influence.

Main Effects

State: The null hypothesis of the State samples being drawn from a common population for all achievement scores is rejected, since the F values for all four dependent variables are significant at less than the .01 level.

Further examination of the means of the pairs of State indicates the following significant results at the 5 per cent level (the Scheffe's procedure; in Table 7.CL-V-Sum-22).

T Scores

* The total achievement of the pupils of U.P. in Class V was better than the total achievements of the pupils of Orissa, Rajasthan and Bihar.
* The total achievement of the pupils of Rajasthan in Class V was better than the total achievements of pupils of Orissa and Bihar.
* The pupils of Orissa and Bihar did not differ in their total achievements.

K Scores

* The pupils of U.P. and Rajasthan in Class V acquired more knowledge of the subject than did the pupils of Orissa and Bihar.
* The pupils of Orissa and Rajasthan did not differ in their knowledge of the subject

U Scores

* The pupils of U.P. in Class V developed better understanding of the subject than did the pupils of Orissa, Rajasthan, and Bihar.
* The pupils of Rajasthan in Class V developed better understanding than did the pupils of Bihar.
* The pupils of Orissa and Bihar in Class V in the subject did not differ in their understanding of the subject.

A Scores

* The pupils of U.P. in Class V developed better application abilities in the subject than did the pupils of Orissa, Rajasthan, and Bihar.
* The pupils of Bihar in Class V developed better application abilities than did the pupils of Orissa and Rajasthan.

TABLE 7.Cl-V-Sum-22

Results of Scheffe procedure showing significant differences between pairs of means of states for T, K, U and A. scores

Variable	Total Score							Knowledge Score						
State	U.P.	Oris	Raja	Maha	Bih	Mizo	Kar	U.P	Oris	Raja	Maha	Bih	Mizo	Kar
U.P.		*	*		*				*			*		
Orissa	0		0					0		0				
Rajasthan	0	*			*				*			*		
Maharashtra														
Bihar	0		0					0		0				
Mizoram														
Karnataka														

Variable	Understanding Score							Application Score						
U.P.		*	*		*				*	*		*		
Orissa	0							0				0		
Rajasthan	0				*			0				0		
Maharashtra														
Bihar	0		0					0	*	*				
Mizoram														
Karnataka														

* & 0 indicate significant difference between the pair of States at .05 level.

* The pupils of Orissa and Rajasthan in Class V did not differ in their application abilities in the subject.

* In the end, the combined results for the criterion variables strongly indicate that the achievements of pupils of Orissa, and Bihar in Class V were significantly lower than the achievements of the pupils of U.P. and Rajasthan. It needs to be highlighted that in spite of the exclusion of the data of the other three States, the trend regarding the achievements in the States, which was discernible from Class I, has persisted through all classes, i.e., a divide between the high-achieving States of Karnataka, Mizoram, U.P. and Rajasthan, on the one hand, and the low-achieving States of Orissa, Maharashtra and Bihar, on the other.

Group: The F values of all dependent variables for groups indicate that they are not drawn from a common population and hence their means differ significantly.

Further examination of Table 7 Cl-V-Sum-23 reveals the following significant results at the 5 per cent level:

* The achievements of pupils of non-project schools in T, K, U and A tests were lower than those of the pupils of project schools and project schools + CCP.

* The pupils of project schools and project schools + CCP differed in T, K and U but did not differ in A scores.

* The pupils of project schools + CCP obtained higher mean scores in T, K and U than did the pupils of project schools, thereby supporting fully the assumptions implied in the alternate hypothesis, i.e., the benefits accrued to the pupils who had the exposure to both curricular intervention in the school and the community contact programme.

Sex: The F ratios for sex clearly indicate that the samples of males and females are not drawn from a common population and hence they differ in all criterion scores:

T Scores: The females obtained a higher mean score than did the males;
K Scores: The males acquired more knowledge than did the females;
U Scores: The females developed better understanding of the subject than did the males;
A Scores: The females developed better application abilities in the subject than did the males.

TABLE 7.Cl-V-Sum-23

Results of the Scheffe procedure showing significant differences between pairs of groups for T, K, U and A scores of pupils of Class V in All States and State

State	Variable	T			K			U			A		
	Group	1	2	M	1	2	M	1	2	M	1	2	M
Uttar Pradesh	1			58 62			64 17			56.10			57 96
	2	*		24 76	*		27 14	*		23.62	*		25 14
	3		*	60 71		*	64.25		*	59.26		*	58 68
Orissa	1			31 62	-	-	37 50			33.53			22.21
	2			33 50	-	-	40 50			34.00			29.50
	3	*		39.52	-	-	43.57	*	*	40.24	*		31 19
Rajasthan	1			51 54			68.29			50.81			35.77
	2	*		23.55	*		38 49	*		22.87	*		11 76
	3	*	*	56 13	*	*	73 52	*	*	55.10		*	39.58
Maharashtra	1												
	2												
	3												
Bihar	1			39.27			47.76			34.00			39 59
	2	*		28.15	*		37.13	*		25 93	*		23.43
	3		*	38 73		*	46 58		*	35.38	*	*	34 71
Mizoram	1												
	2												
	3												
Karnataka	1												
	2												
	3												
All-States	1			48.93			57 24			46 22			45.40
	2	*		25 16	*		35 96	*		24.10	*		17 66
	3	*	*	52.11	*	*	60.60	*	*	50.29		*	45 39

M indicates means of groups

Interactions

State X Group: The number and position of asterisks in each of the States clearly demonstrate the interaction effect (*see* Table 7.Cl-V-Sum-23).

Similarities and differences between the results of all State and States regarding the groups are clearly visible.

* Rejection of the null hypothesis, i.e., the three groups did not differ:
In all States for all four dependent variables.

* Rejection of the null hypothesis and support to the alternate hypothesis, i e project schools performed better than non-project schools.

For T, K, U and A scores: in U P , Rajasthan and Bihar

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., project schools + CCP performed better than project schools:

For T scores: in Rajasthan and Orissa;
For K scores: in Rajasthan;
For U scores: in Rajasthan and Orissa, and
For A scores: in Rajasthan and Orissa.

* Rejection of the null hypothesis and support to the alternate hypothesis, i e , project schools performed better than project schools + CCP:
Only for A scores: in Bihar.

State X Sex: The F ratios of interaction between these two variables are significant for all four dependent variables, and hence the rejection of the null assumption of these samples

being drawn from a common population. Inspection of the means revealed the following results (*see* Table 7.Cl-V-Sum-24T, K, U & A for means of males and females).

* Rejection of the null hypothesis and support to the alternate hypothesis, i.e., males performed better than females:

For T scores, Bihar;
For K scores; in U.P., Orissa and Rajasthan;
For U scores; in U.P. and Rajasthan; and
For A scores; in U.P. and Rajasthan.

Group X Sex: The F ratios of interaction between these two variables are significant for all dependent variables except in the case of the A scores, and hence the null hypothesis of samples (in the interactive cells) drawn from a common population is rejected for all but A scores. The results indicated the following patterns:

For T scores: The males and females in project schools did not differ. However, the males in project schools + CCP and females in non-project schools performed better than their counterparts.

For K scores: The females in project schools and the males in non-project schools did better than their counterparts; however they did not differ in non-project schools;

For U scores: While the females in project schools and non-project schools performed better than the males, the males in project schools + CCP performed much better than the females, and

For A scores' While the females in project schools and non-project schools performed better than the males, the males in project schools + CCP performed better than the females. Although there is a repetition of females in project schools doing well but those in non-project schools not doing well, the trend is not consistent, indicating thereby a differing interactive effect in different States and different project schools as well as in different classes.

State X Group × Sex: The F ratios for the 3-way interaction are significant at less than the 5 per cent level for only U and A scores. Since the F ratio is not significant for the T scores, the relevance of the findings is limited.

All through it has been underlined that enough evidence is being accumulated to suggest that low-achieving States, non-project schools and females in non-project schools seem to influence the interaction variances. The effect to a certain extent differs from one dependent score to another. The cell means for the total 42 cells for T, K, U and A have been posted in Tables 7.Cl-V-Sum-24T, K, U and A for reference.

Since there are only four States, the cell means posted against each state can be easily compared. It may be recalled that within these four, there was a divide. The pair of U.P. and Rajasthan was superior to the pair of Orissa and Bihar in the U scores (see the grand means). The males and females of U.P. in project schools and non-project schools differed the most in understanding (52.87 versus 67.20). In Rajasthan, the females in non-project schools demonstrated better understanding than the males in project schools (21.48 versus 30.71). The differences in the low-achieving pair are rather marginal. The pattern in A scores for the high- and low-achieving pairs is different.

In conclusion, it is maintained that there emerges a very complex secenario of achievement when interaction among States, experimental conditions and demographic variables is assumed and empirically investigated. The relationship can perhaps be clearer when the investigation is carried further into the State data. All the same, the overall results have provided enough hard facts to arrive at some useful conclusions which have implications for the curricular aspects at the primary stage of education and for the simultaneous intervention of the health, nutrition and sanitation programme in the community. One can philosophically ask. What is the use of research which does not raise many more questions than those that have been investigated ? To a great extent, this comment applies to this impact study also.

TABLE 7.Cl-V-Sum-24T

Cell means of T scores of pupils of Class V in All States for State × group × sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	55.81	23.29	60.22	53.70	68.27	31.00	62 63	61.43	55.33
N	258	85	313	656	75	20	80	175	831
Orissa	32.04	36 00	36.21	33.86	30.53	31.00	46.92	35.71	34.46
N	49	10	29	88	19	10	13	42	130
Rajasthan	50.48	22.36	55.62	40.17	57.78	30.24	57.93	48.05	41 57
N	105	237	203	545	18	42	58	118	663
Maharashtra									
N									
Bihar	39.36	39.00	41 29	38.94	39.03	26.61	35 84	34.66	37.16
N	173	49	155	377	72	59	137	268	645
Mizoram									
N									
Karnataka									
N									
Total	48 00	23.91	53.70	44.89	51.90	28.78	48.23	45.12	44.95
N	585	381	700	1666	184	131	288	603	2269
Grp M+F	Project M+F = 48.93			Non-Project M + F = 25.16			Project + CCPM + F = 52.11		
N	769			512			988		

TABLE 7.Cl-V-Sum-24K

Cell means of K scores of pupils of Class V in All States for State × group × sex

	Male				Female				
Group / State	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	62.17	26.82	63.80	58.37	71.07	28.50	66.00	63.89	59.53
N	258	85	313	656	75	20	80	175	831
Orissa	36.94	40 00	39.31	38.07	38 95	41.00	53.08	43.81	39.92
N	49	10	29	88	19	10	13	42	130
Rajasthan	66.76	37.64	73.15	56.48	77.22	43.33	74.83	63.98	57.81
N	105	237	203	545	18	42	58	118	663
Maharashtra									
N									
Bihar	47 57	38 57	49 87	47.35	48 19	35.93	42.85	42 76	45.44
N	173	49	155	377	72	59	137	268	645
Mizoram									
N									
Karnataka									
N									
Total	56.56	35.41	62.41	54.18	59.40	37.56	56.18	53.12	53 90
N	585	381	700	1666	184	131	288	603	2269
Grp M+F	Project M+F = 57.24			Non-Project M + F = 35.96			Project + CCPM + F = 60.60		
N	769			512			988		

TABLE 7.CI-V-Sum-24U

Cell means of U scores of pupils of Class V in All States for State x group x sex

Group / State	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	52.87	23.65	59 87	52 42	67.20'	23.50	56.88	57.49	53 49
N	258	85	313	656	75	20	80	175	831
Orissa	32.86	36.00	38.62	35.11	35.26	32.00	43.85	37.14	35.77
N	49	10	29	88	19	10	13	42	130
Rajasthan	50 19	21.48	54.63	39 36	54.44	30.71	56.72	47.12	40.74
N	105	237	203	545	18	42	58	118	663
Maharashtra									
N									
Bihar	33.93	29.39	36.84	34 54	34 17	23.05	33.72	31.49	33.27
N	173	49	155	377	72	59	137	268	645
Mizoram									
N									
Karnataka									
N									
Total	45.11	23 36	52.37	43.19	49.73	26.26	45.24	42.49	43.00
N	585	381	700	1666	184	131	288	603	2269
Grp M+F	Project M+F = 46 22			Non-Project M + F = 24.10			Project + CCPM + F = 50.29		
N	769			512			988		

TABLE 7.CI-V-Sum-24A

Cell means of A scores of pupils of Class V in All States for State x group x sex

Group / State	Male				Female				
	Project	Non-Project	Project + CCP	Sub-Total	Project	Non-Project	Project + CCP	Sub-Total	Grand Total
Uttar pradesh	55 66	20.35	56.52	51.49	65 87	45.50	67.13	64.11	54.15
N	258	85	313	656	75	20	80	175	831
Orissa	23.88	34.00	25.86	25.68	17.89	25.00	43.08	27.38	26.23
N	49	10	29	88	19	10	13	42	130
Rajasthan	34 10	11 56	39.06	26.15	45.56	12.86	41 38	31.86	27.16
N	105	237	203	545	18	42	58	118	663
Maharashtra									
N									
Bihar	40.06	23.88	37.87	37 06	38.47	23.05	31.24	31.38	34.70
N	173	49	155	377	72	59	137	268	645
Mizoram									
N									
Karnataka									
N									
Total	44.51	15.70	46.06	38.57	48.21	23.36	43 78	40 70	39.14
N	585	381	700	1666	184	131	288	603	2269
Grp M+F	Project M+F = 45.40			Non Project M + F = 17.66			Project + CCP M + F = 45.39		
N	769			512			988		

EIGHT

RESULTS OF THE COMMUNITY CONTACT PROGRAMME

THE data on the impact of the Community Contact Programme (CCP) was collected through the Questionnaire-cum-Interview Schedule (QCIS). As explained earlier in Chapter 6, the nature of the data was qualitative. Therefore, the items under each question were codified and specific values (marks) were assigned to each of the responses in the various categories. The values ranged from 1-7, the negative practices/habits getting lower values and the positive ones getting higher values, forming a sort of hierarchical scale. The data being qualitative and the lowest range of values being only two, it was decided to use the 'Distribution Free Statistics' or non-parametric tests in order to test the null hypothesis. The Wilcoxon Matched-pairs Signed-ranks test was applied to find out the differences existing between the responses on the pre and post tests obtained on each of the 47 questions from the community members. The statistical values of the All-State pooled data and the data pertaining to the six States, viz., Bihar, Karnataka, Maharashtra, Mizoram, Orissa and Rajasthan, computed through this test are presented in Tables 8.Q-1 to 8.Q-47 for reference.

At this juncture, it is necessary to clarify some points regarding the statistical values presented in the tables, lest some confusion be created between the use of the terms 'mean difference' and 'mean of differences'. Columns 3 and 4 present the means of the responses on the pre and post tests separately. In other words, they are the independent means of the pre and post test responses. Although useful, they are neither directly related to the Z values nor can they be a major basis for drawing conclusions, owing to the reasons discussed above. It is the mean of differences, which is based on the pre-post differences of each household, the ranks of which were used to compute the Z values, that sensitively reflect the significant difference existing between the responses on the pre and post tests. The mean of differences, therefore, represent the true difference (the sum of the positive and negative ranks of differences) supported by the significant value beyond the 5 or 1 per cent level

The difference between the means of pre and post tests for each State is shown in brackets below Columns 3 and 4 labled 'Pre' and 'Post'. As was done with respect to the PAT data, the separate means of the pre and post test responses and their differences have been presented as supporting data, and also for comparison with the mean of differences. It may be observed that there exists a high parity between the means of the pre and post test responses and the means of differences. Another point relates to N. There is a discrepancy in N under the column 'Number' and the number indicated under the column 'Z Value'. This has happened because the core memory on the board of the computer (PC) was not adequate enough to analyse the data of 13435 households at a time and, consequently, according to the build-in command it has randomly selected 10123 households for computing the Z values.

Further, the aggregate of the positive and negative ranks for the entire State-wise data was done for each of the ten message. The message-wise data is presented in Tables 8.MI to 8.MX for reference. These results are discussed, question by question, below.

Testing of the Null Hypothesis

The following are the Null Hypotheses set up to test the significance of difference between the pre and post test responses:

* Difference does not exist between the responses on the pre and post tests obtained from the community members on the 47 questions.
* No difference exists between the responses on the pre and post tests obtained from the community members on each the ten messages.

Message I: **Continue breast-feeding as long as possible. Avoid bottle-feeding.**

Q.1: *If you have a small baby in the house how does the mother feed him/her ?*

TABLE 8. Q-1

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-1 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	13435	3.693	3.945	0.294	-28.17	.0001	-132	+1299
			(0.254)					
Bihar	00990	3.462	3 968	0 506	-14 91	.0001	-000	+0296
			(0.506)					
Karnataka	03452	3.937	3.893	-0.094	-06.14	.0001	-143	+0060
			(-0.004)					
Maharashtra	02216	3.983	3.986	0.003	-01.60	NS	-000	+0003
			(0.003)					
Mizoram	00950	3.981	3.981	0.000	00.00	NS	-000	+0000
			(0.000)					
Orissa	00819	3.939	3.990	0.059	-03.08	.05	-001	+0015
			(0.051)					
Rajasthan	03160	3.371	3.956	0.631	-21.68	.0001	-026	+0706
			(0 585)					

The data presented in Table 8. Q-1 show that the Z value of the All-State pooled data and those of the States, except Mizoram and Maharashtra, are significant at less than the 1 per cent level. In Orissa the Z value is significant at the 5 per cent level. Thus the null hypothesis is rejected and the alternate hypothesis of difference existing between the pre and post test responses of the community members is found tenable except in the cases referred to above. The data further indicates that a large number of mothers who received the message changed over to breast-feeding from the alternate mode of feeding their babies.

The mean of differences in the All-State pooled data, i.e., +0.294, and the difference between the means of the pre and post test responses (+0.260) also support the above findings. In the State-wise data, the highest mean of differences is observed in the case of Rajasthan (+0.631), followed by Bihar (+0.506), and then Orissa (+0.059). Karnataka shows significant loss In addition, there is parity between the means of differences and the differences between the means of the pre and post test responses These data, in conjunction with the 1299 positive ranks as against the 132 negative ranks, reconfirm the results indicated by the Z values thereby indicating a desirable change-over to breast-feeding by a significant number of mothers in most States.

A scrutiny of the frequency distribution of responses of the households to each category of responses in the All State pooled data revealed interesting findings. In the pre test, 85.6% mothers responded to Category 4, i.e., 'breast-feeding', whereas in the post test the figure improved to 96.7%. Thus there was a gain of 11.1%. The response to 'mixed feeding', i.e., Category 3, dropped from 35% in the pre test response to 1.9% in the post test response, a substantial fall of 33.1%. It is worth noting that even prior to the intervention programme, 85.6% mothers were breast-feeding their babies but quite a substantial number, i.e , 35% mothers were practising 'mixed feeding'. As the results have shown, the message was well received and those mothers who were not following breast-feeding adopted the same as a result of the intervention programme.

The State-wise frequency distribution indicated that in Karnataka which registered a significant loss (-0.094) the responses of mothers to Category 3 (mixed feeding) and Category 4

(breast-feeding) were 2.8% and 96%, respectively, in the pre test. In the post test response these were 3.7% and 93.4% respectively. Since this change-over cannot be attributed to chance the conclusion is inescapable that a significant number of mothers in this State reverted to the mode of mixed feeding from the age-old practice of breast-feeding the young ones. It is quite possible that they did not receive the message properly and consequently switched back to the mixed-feeding mode. In Rajasthan, 76.8% mothers responded to Category 4 in the pre test compared to 98.2% in the post test—a gain of 24 1% In Bihar, the responses of mothers to Categories 1 (bottle-feeding), 3 (mixed feeding) and 4 (breast-feeding) were 7.7%, 16.5% and 68.7%, respectively, in the pre test, whereas in the post test these were 4%, 1.2% and 98%, respectively Thus it can be seen that there was a shift away from the alternate mode by a significant number of mothers. To be precise there was a drop of 7.3% and 15.3% for Categories 1 and 3 respectively, and a gain of 29.3% in favour of Category 4 In Orissa, Maharashtra and Mizoram, 97 9%, 99.4% and 98.3% mothers, respectively, responded to breast-feeding in the pre test. Hence, already the traditional practice of breast-feeding was in vogue in these States.

All the above data indicate that the correct and healthy practice of breast-feeding the baby is being practised by mothers; the significant gains in the All-State pooled data and in those of Bihar, Rajasthan and Orissa showed that the intervention programme further reinforced this practice. Thus it can be assumed that it did help to provide better nutrition to the babies along with the other accompanying benefits of breast-feedings.

Message 1:

Q.2: *Upto what age do the mothers breast-feed her baby ?*

The Z value of the All-State pooled data and those of the States, except those for Maharashtra, presented in Table 8.Q-2 are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post responses on this aspect of the message.

The mean of differences in the All-State pooled data, i e., +0 606, and the difference between the means of the pre and post test responses i.e , +0.506, suggest that a large number of mothers adopted longer duration of breast-feeding their babies as a result of the intervention programme In the State-wise data the highest mean of differences is observed in the case of Rajasthan (+1.464), followed by Orissa (+0.931), Bihar (+0 653) and Mizoram (+0 252). The least mean of differences is observed in Maharashtra (+0.052), where the Z value is not significant There is also a parity between the means of differences and the difference between the means of the pre and post tests, except in Karnataka These data coupled with 2532 positive ranks as against the 489 negative ranks in the All-State pooled data

TABLE 8. Q-2

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 2 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	13445	6.015 (0.506)	6 521	0.606	-35.600	.0001	-489	+2532
Bihar	00991	5 931 (0 653)	6 584	0 653	-17.525	.0001	-000	+0409
Karnataka	03453	5 964 (0 074)	6.038	0.220	-08.742	.0001	-164	+0456
Maharashtra	02212	6 879 (0 004)	6.883	0.015	-00.936	NS	-008	+0010
Mizoram	00949	6 439 (0.178)	6 617	0.252	-08.583	0001	-016	+0165
Orissa	00822	5 860 (0 911)	6.771	0.931	-16.752	.0001	-0005	+0384
Rajasthan	03173	5 335 (1.026)	6.361	1 464	-23.108	.0001	-457	+1282

strongly support the trend shown by the results of the Z values.

Examination of the frequency distribution of households responding to the various categories in the pre and post test responses in the All-State pooled data reveals interesting findings. The cumulative percentage of responses on the pre test for Categories 2-5, i.e., 'up to two months' and 'upto eight months' of the All-State pooled data was 18.5%, which was reduced to 7.7% after the delivery of the message. There was a gain of 15.7% in the Category 7, i.e., 'breast-feeding for more than one year'. This reflects two positions: (1) the traditional practice has been to prolong the breast-feeding beyond one year; and (2) a small number of mothers having young babies, who were not following the practice, accepted the message and were ready to adopt it. The State-wise frequency distribution showed that in Rajasthan, 26.9% and 42.5% households, respectively, responded to Categories 6 and 7 ('up to one year' and 'more than one year', respectively) in the pre test. In the post test these figures were 37% and 54.4%—a gain of 10.1% and 11.9%, respectively. Close examination of the frequency distribution of pre and post responses in Maharashtra demonstrated that there was virtually no scope for positive gains since 94.6% mothers were already following the right practice by traditions, and hence no significant gain.

In Orissa the gain for Category 7 was 39%; in Bihar, 31.1%; and in Mizoram, 15.3%. An in-depth study of the frequency distribution of Karnataka showed that the message had only marginal impact. The pre test data showed 21.1% households responding to Category 7 as compared to 30.5% in the post test, thus registering a gain of a mere 9.4%.

The data presented clearly indicate that the educationally backward states of Rajasthan, Orissa, and Bihar showed substantially higher gains as compared to Karnataka and Maharashtra. As revealed by the pre test data in Maharashtra, 24.6% mothers had been 'breast-feeding' their babies beyond one year—which is a healthy practice traditionally followed in this country.

Message 1:
Q. 3: *How often do you feed milk to your baby?*

The data presented in Table 8. Q-3, show that the Z values of the All-State data, Bihar, Mizoram, Orissa and Rajasthan are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post responses of the community members in these states. The Z values for Maharashtra and Karnataka are not significant.

The significant mean of differences i.e., +0.295, and the difference between the means of the pre and post tests, i.e., +0.236, of the All-State pooled data, strongly indicate that a significant number of mothers, who used to feed their babies three or four times a day,

TABLE 8. Q-3

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-3 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	13395	2.621 (0.236)	2.857	0.295	-33.677	.0001	-294	+2244
Bihar	00989	2.364 (0.472)	2.836	0.472	-18.031	.0001	-000	+0433
Karnataka	03450	2.860 (0 004)	2.864	0.077	-00.246	NS	-085	+0135
Maharashtra	02220	2.855 (0.002)	2.857	0.009	-00.784	NS	-008	+0012
Mizoram	00949	2.671 (0.163)	2.834	0.250	-08.561	.0001	-040	+0193
Orissa	00818	2.506 (0.334)	2.840	0.361	-13.426	.0001	-011	+0269
Rajasthan	03134	2.318 (0.433)	2.751	0.620	-23.304	.0001	-264	+1159

have started feeding their babies as frequently as the baby demanded, after the delivery of the message. Significant means of differences in varying degrees are evident in the State-wise data. The highest mean of difference is seen in Rajasthan (+0.629), followed by Bihar (+0.472), Orissa (+0.361) and Mizoram (+0.250). The values for Maharashtra and Karnataka are not significant. In addition to these data, the 2244 positive ranks versus the 294 negative ranks indicate a change-over to the practice of feeding as per the demands of the baby by a significant number of mothers.

The frequency distribution of households responding to the various categories of responses in the All-State pooled data was quite revealing. In the pre test, 25.3% households responded to Category 2, i.e., 'feeding the baby three to four times a day', whereas in the post test this dropped to 12.3%. Similarly, 68.8% households responded to Category 3,i.e., 'feeding the baby as frequently as it demand' in the pre test, which improved to 86.7% in the post test. Thus there is a shift away from Category 2 by 13% and a move towards Category 3 by 17.9%. This data compels one to conclude that though quite a large number of mothers (68.8%) were feeding their babies as per demand, still the message did make a significant dent in the feeding practices and a significantly large number of mothers started feeding their babies as per the baby's demand.

In the State-wise frequency distribution, data from Rajasthan showed 53.5% households responding to Category 3 in the pre test compared to 76.6% in the post test—a gain of 23 1%. In Bihar, 44.3% households responded to Category 3 in the pre test as against 84.1% in the post test showing a gain of 39.8%. In Orissa, 53.1% households responded to Category 3 in the pre test and 84% in the post test, registering a gain of 30.9%; in Mizoram the gain for the same category was 16.1%. Thus it can be seen that Rajasthan Bihar and Orissa had substantial gain and in these States a large number of mothers started following the desirable feeding practice for their babies.

Close examination of data from Karnataka and Maharashtra revealed that 86.9% and 85.9% of mothers in these States, respectively, had been following this right kind of practice, and therefore the post test data did not differ from the pre test data.

In conclusion, the mean rank values of +2025 versus -305 on the first message (see Table 8.M-1) definitely show that, by and large, the right kind of practices of breast-feeding have been followed in India, and a significant number of households, which did not follow these practices, absorbed the message fairly well and thereafter modified their behaviour for the better. The mean rank order showed perfect parity with the mean of differences. The highest positive mean rank order is shown in Rajasthan, followed by Bihar, Orissa, Mizoram, Karnataka and Maharashtra, in that order.

TABLE 8.M-1

Positive and negative ranks and mean ranks pertaining to message I for All-States and States

	Message I (Q. 1, 2 & 3)				
State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank order
All States	915	6075	305	2025	
Bihar	0	1138	0	379.333	2
Karnataka	392	651	130.667	217	3
Maharashtra	16	25	5.333	8.333	5
Mizoram	56	358	18.667	119.333	4
Orissa	17	668	5.667	222.667	3
Rajasthan	747	3147	249	1049	1

Message II: **Add supplementary food from the age of four months onwards.**

Q. 4: *When do you start giving supplementary food to your baby ?*

The Z value of All-State and those of the other six States, as shown in Table 8. Q-4, are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post responses of the community members.

The significant mean of differences, i.e., +0.885, and the difference between the means of pre and post test, +0.752, of the All-State pooled data strongly indicate that a significant number of mothers who used to give supplementary food to their babies only after ten months started giving it earlier as a result of the intervention programme. Significant differences in the means of differences in varying degrees were found with regard to Bihar (+1.342), Karnataka (+0.240), Maharashtra

TABLE 8. Q-4

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-4 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	13572	4.094	4.846	0.885	-49.646	0001	-480	+4314
		(0.752)						
Bihar	00990	3.854	5 192	1.342	-22 809	.0001	-002	+0694
		(1.338)						
Karnataka	03454	4 280	4 422	0 240	-13.508	.0001	-113	+0561
		(0.142)						
Maharashtra	02220	4 332	4 357	0.027	-04.693	.0001	-001	+0033
		(0.025)						
Mizoram	00950	4.607	5.047	0.543	-12.271	.0001	-016	+0269
		(0.440)						
Orissa	00820	4.455	4.926	0.983	-08.384	0001	-106	+0339
		(0.471)						
Rajasthan	03284	3.583	4 727	1.586	-30.983	0001	-408	+2006
		(1 144)						

(+0.027), Mizoram (+0.543), Orissa (+0.943) and Rajasthan (+1 586) The highest mean of differences is observed in Rajasthan, and the least in Maharashtra In addition, the differences between the means of the pre and post tests are also proportional except in the case of Rajasthan. These data, coupled with the 4314 positive ranks as against the 480 negative ranks in the All-State data, indicate a change-over to very desirable practice of giving supplementary food to babies earlier than it used to be given in the community While the message has been well received in all States, it has been very well received in the educationally less developed States of Bihar and Rajasthan, since their means of differences were much higher than that of the All-State data, i e., 0 885.

In the All-State pooled data the percentage frequencies of households responding to Categories 1, 2, 3, 4, 5 and 6 in the pre test were 3.4%, 1.5%, 33.4%, 19 4%, 25.0% and 16.7%, as compared to the post test responses of 9%, 5%, 18 4%, 12.9%, 27.4% and 39.8% respectively. As can be seen from the data there was a substantial gain of 23.1% in Category 6, i e., 'giving supplementary food after 4 months'. The data revealed that a significant number of mothers who were giving supplementary food to the babies after six months to one year or more started giving it after four months.

Scrutiny of the State-wise frequency distribution showed that in Rajasthan, 32.4% households responded to Category 3, i e., 'giving supplementary food after one year' in the pre test; this dropped to 13.5% in the post test. The responses to Categories 4, 5 and 6 in the pre test were 21.1%, 21.3% and 9% as compared to 17.9%, 37.7% and 28.3%, respectively, in the post test, thus registering a gain of 19.3% for Category 6 and 16.4% for Category 5. It can, therefore, be said that the mothers in Rajasthan responded well to the message and modified their behaviour. In Bihar, the gains for Categories 5 and 6 in the post test were 23.9% and 29.9%, respectively. In Orissa the gain in favour of Category 6 was 20.6%. Mizoram showed a gain of 22.5%, whereas in Maharashtra the impact was the least—the mothers did not receive the message well. As revealed by the data, 35.6% mothers responded to Category 6 in the pre test as compared to 36.1% in the post test. The reason for this needs to be probed further.

Message II:

Q. 5: *What kind of solid food do you give to your baby ?*

The data presented in Table 8.Q-5 show that the Z value of the All-State pooled data and those for the States, except Maharashtra, are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members for all States except Maharashtra.

The significant mean of differences for the All-State pooled data, i.e., +0.161 and the dif-

TABLE 8. Q-5

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-5 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	13419	1 729 (0 076)	1.805	0.161	-16 49	.0001	-422	+1171
Bihar	00989	1.794 (0.178)	1.972	0.178	-11.50	.0001	-000	+0176
Karnataka	03342	1 749 (0.057)	1.806	0.062	-11.39	0001	-009	+0198
Maharashtra	02219	1 984 (0.003)	1 987	0 004	-01.89	NS	-001	+0007
Mizoram	00875	1 354 (0 291)	1.645	0 295	-13 71	0001	-002	+0256
Orissa	00807	1 653 (0 268)	1.921	0.292	-12.19	.0001	-010	+0226
Rajasthan	03289	1.345 (0.097)	1.442	0.430	-07 34	0001	-544	+0843

ference between the means of pre and post tests, i.e., +0 076, indicate that a significant number of mothers who included only one type of food in the daily diet of their babies started including a variety of foods as a result of the intervention programme. Further, in the State-wise data the highest mean of differences is seen in Rajasthan (+0 430), followed by Mizoram (+0 295), Orissa (+0.292), Bihar (+0.178) and Karnataka (+0.062). Maharashtra shows the least mean of differences, i.e., +0.004; hence the Z value was not significant. The data also shows a high-order parity between the means of differences and difference between the means of the pre and post test responses In addition, the 1171 positive ranks as against the 422 negative ranks in the All-State pooled data reconfirm the results and support the trend shown by the Z values.

Scrutiny of the frequency distribution of responses of the households to various categories of responses in the All-State pooled data shows that in the pre test, 26.2% and 73.3%. households responded, respectively, to Category 1, i.e., giving only rice or only chapati and Category 2, i.e., including more than one variety of food, for example, dal and chapati or vegetable, etc. In the the post test, the responses to Category 1 dropped to 19.2% and those to Category 2 increased to 80.6%. Thus there was a fall of 7.3% and a gain of 6.8%, respectively. As revealed by the data, though a substantial percentage of the mothers were giving more than one type of solid food to their babies yet a significant number of mothers who were not following the practice started giving a variety of solid food to their babies after the delivery of the message.

The State-wise frequency distribution showed that in Rajasthan, 62.4% mothers responded to Category 1 in the pre test as compared to 55.3% in the post test. For Category 2, 36% mothers responded in the pre test as against 44.5% in the post test. The gain for Category 2 was 8.5% in the post test Responses in the pre test for Mizoram showed 64.6% and 35.4% households responding to Categories 1 and 2, respectively. The drop noted in the post test for Category 1 was 29.1% and the gain for Category 2 was also 29.1%. This gain as well drop is even greater than that for the All-State data and for Rajasthan, thus indicating that message was very well received in Mizoram. In Orissa and Bihar the drop observed for Category 1 in the post test was 26 8% and 17.8%, respectively, while the gain in the post test for Category 2 was 26.3% and 17 8%, respectively

The trend in these two States is similar to that of Mizoram. The frequency distribution of Karnataka showed a gain of 5 7% for Category 2 in the post test, whereas the data for Maharashtra revealed a gain of merely 0.3% for Category 2 in the post test, an equal drop in value was observed for Category 1 This indicates an already existing awareness among the mothers in this State of the need to use a variety of food stuffs in the daily diet of their children.

In conclusion, it can be said that the majority

of households responded very favourably to this message. As revealed by the pre test data there was an existing awareness among the community of the need to include a variety of food items in the daily diet. The intervention programme further reinforced this and motivated the mothers to change over from the undesirable practice of including only one kind of food in the daily diet; it also improved significantly the practice of including a variety of foods items in the daily diet of the children, which is one of the major incentives in improving the appetite of children and thus their nutritional status.

Message II:

Q. 6: *While cooking vegetables when do you wash them ?*

As can be seen from Table 8. Q-6 the Z value of the All-States pooled data and those of the other State are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and the post responses of the community members. The mean of differences (+0.420) and the difference between the means of the pre and post tests in the All-State pooled data, i.e , +0.398, strongly indicate that a large number of households, which had been washing vegetables after cutting, changed their behaviour to washing vegetables before cutting. Similarly, significant differences in the means of differences in varying degrees are evident in respect of various States. The highest mean of differences is observed in the case of Orissa. (+0.680), followed by Bihar (+0.596), Maharashtra (+0.424), Mizoram (+0.380) and Rajasthan (+0.334). The least mean of differences is seen in Karnataka (+0.154). The State-wise data further show a strong parity between the means of differences and difference between the means of the pre and post test responses. These data support the trend shown by the Z values. In addition, the 4191 positive ranks as against the 198 negative ranks in the All-State pooled data reconfirm the results.

Examination of the frequency distribution of households for various categories of responses in the All-State pooled data show that 54.4% and 45.6% households responded to Categories 1 and 2 respectively, in the pre test. In the post test, there was a drop in Category 1 and only 14.7% responded to this Category, whereas there was an increase in the response to Category 2 to 85.3%. Thus there was a gain of 39.7% in Category 2.

The data strongly indicate that as a consequence of the message delivered a substantial number of households adopted the desirable practice of washing vegetables before cutting and, thus, preserving the water-soluble vitamins.

The examination of the State-wise frequency distribution revealed that in Orissa 69.6% and 30.4% households responded to Categories 1 and 2, respectively, in the pre test as compared to 3.8% and 96.2% households responding to these categories in the post test. These data

TABLE 8. Q-6

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-6 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14965	1 455 (0.398)	1.853	0.420	-52.130	.0001	-198	+4191
Bihar	00991	1.361 (0.597)	1 958	0.596	-21.062	0001	-000	+0591
Karnataka	03449	1.543 (0.106)	1.694	0.154	-13.749	.0001	-083	+0449
Maharashtra	02221	1.367 (0.399)	1.766	0.424	-25 022	.0001	-028	+0915
Mizoram	00950	1.515 (0.358)	1.873	0.380	-15 487	.0001	-011	+0351
Orissa	00813	1.304 (0.658)	1.962	0.680	-19.711	.0001	-009	+0544
Rajasthan	03996	1.664 (0.448)	1.912	0.334	-23.340	.0001	-170	+1153

indicate that there was a substantial drop of 64.8% in Category 1 and a gain of 65.8% in Category 2. It can therefore be concluded that the message was very well received. In Rajasthan, 33 1% and 8.7% households responded to Category 1 in the pre and post tests, respectively. For Category 2, the pre and post test responses were 66.6% and 91.2%, respectively. Thus, there was a gain of 34.6% for Category 2. In Bihar, 63.9% and 36 1% households responded to the Categories 1 and 2, respectively, in the pre test whereas .2% and 95.8% households responded, respectively, to these categories in the post test. Thus there was a massive gain of 59.7% in Category 2. In Mizoram, 48 5% and 51.5% households responded to Categories 1 and 2, respectively, in the pre test as compared to 12.7% and 87.3%, respectively, in the post test, thus registering a gain of 35.8%. In Karnataka and Maharashtra the gains in respect of Categories 1 and 2 were 10.6% and 3 9%, respectively.

The data presented proves conclusively that as a result of the intervention programme a large number of households started the desirable traditional practice of washing vegetables before cutting thus preserving the valuable water-soluble vitamins

Message II:

Q. 7. *After cooking vegetables do you throw away the excess water ?*

The data presented in Table 8.Q-7 show that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses.

The mean of differences in the All-State pooled data, i.e., +0.456, and the difference between the means of the pre and post tests, i.e., 0.383, are quite significant and indicate that a change towards desirable practice of using water in which the vegetables have been cooked was effected in the community. The State-wise data show the highest mean of differences, i.e., 1.003, in case of Bihar, followed by Rajasthan (+0.962), Orissa (+0.947) and Mizoram (+0.761). It is interesting to note that all values for the State-wise data are higher than the value for the the All-state pooled data. The least mean of differences is observed in Karnataka. In addition, there is also a parity between mean of differences and difference between the means of the pre and post test responses except in Rajasthan. Further, the All-State positive ranks of 2334 as against the 163 negative ranks reconfirm the result of the Z values and support the trend.

Examination of the frequency distribution in the All-State pooled data showed 33% households responding to Category 1, i.e., 'Yes' (negative practice), in the pre test. In the post test it dropped to 13.7%. For Category 3, i.e., 'No' (positive practice), 61.4% households responded in the pre test as compared to 80.1% in the post test. Thus there was a gain of 18.7%. The

TABLE 8. Q-7

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-7 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14299	2.281 (0.383)	2.664	0.456	-36.934	.0001	-163	+2234
Bihar	00739	1.403 (0 979)	2.382	1.003	-17.041	0001	-005	+0401
Karnataka	03383	2.472 (0.092)	2 564	0.115	-11 160	0001	-025	+0238
Maharashtra	02146	2 539 (0.192)	2.731	0.194	-12.984	.0001	-001	+0228
Mizoram	00713	1 621 (0 738)	2.359	0.761	-13.872	.0001	-004	+0268
Orissa	00816	1.734 (0.947)	2.681	0.947	-16.709	.0001	-116	+0423
Rajasthan	03721	1 785 (0.784)	2 569	0.962	-30.507	.0001	-177	+1648

data support the view that a significantly large number of households started the practice of preserving and making use of the excess water in which the vegetables have been cooked. It may be pointed out further that though the pre test response was quite substantial (61.4%), even then there was a quite significant movement of the community towards the positive practice.

The State-wise frequency distribution further revealed that in Bihar, which showed the highest mean of differences, 76.9% households have been throwing away the excess water as revealed by the pre test response of the households As a result of the intervention, this figure dropped to 25.2% in the post test response. For Category 3, 17.2% households responded in the pre test as compared to 63.6% in the post test Thus there is a shift away from the negative practice by 51.7%, and a move towards the positive practice by 46.4%. Thus the message was extremely well received in Bihar. In Orissa, the gain for Category 3 was 47 2%, and in Rajasthan it was 38.8%. Thus it can be seen that all educationally backward States had higher gains as compared to Mizoram, Maharashtra and Karnataka.

Message II

Q. 8. *How do you make use of excess cooking water?*

The data presented in Table 8. Q-8, show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and the post test responses of the community members.

The mean of differences in All-State pooled data, i e., +0.405, and the difference between the means of the pre and post test responses, i.e., +0.352, further support this trend In the State-wise data, the highest mean of differences is observed in the case of Orissa, (+1.0098), followed by Bihar (+1.002), Rajasthan (+0.943) and Mizoram +0.657. These values are higher than the value for the All-State. In addition, there is a parity between the mean of differences and difference between the means of the pre and post tests. The highest value of difference between the means of pre and post test responses is seen in Orissa +1.009 and the least in Karnataka +0.086. Further, the 2184 positive as against the 152 negative ranks reconfirm the results shown by the Z values. Thus it can well be concluded that intervention did make a positive impact on the community, and a significantly large number of households started utilizing the excess water in which vegetables had been boiled, for making soup or dal

A close scrutiny of the frequency distribution of households for various categories of responses in the All-State pooled data revealed that 28.4% and 65% households responded to Categories 1 and 3, respectively, in the pre test. The responses in the post test to these two categories were 10.6% and 82.20%, respectively. Thus it can be seen that there was a

TABLE 8. Q-8

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-8 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	13075	2 364 (0 352)	2.716	0.405	-37.192	.0001	-152	+2184
Bihar	00632	1.470 (0.995)	2 465	1.002	-18.104	0001	-002	+0439
Karnataka	03203	2 519 (0.086)	2.605	0.111	-10.744	0001	-030	+0224
Maharashtra	02078	2 544 (0 175)	2.719	0.175	-12.078	0001	-000	+0194
Mizoram	00435	1.745 (0 655)	2.400	0.657	-11.107	0001	-000	+0164
Orissa	00691	1 751 (1 093)	2.844	1.098	-16.978	.0001	-001	+0387
Rajasthan	03165	1.773 (0.784)	2.557	0.943	-30.065	.0001	-157	+1534

shift away from Category 1 (a negative practice) by 17.8% and a gain in Category 2 (a positive practice) by 17 2%. This result also supports the trend discussed above.

The State-wise frequency distribution showed that in Orissa, 60.9% households responded to Category 1 in the pre test as compared to 7.1% in the post test. Thus there was a substantial drop of 53.8% in the post test. In respect of Category 3, 36.3% households responded in the pre test as against 91.5% in the post test Thus there was a gain of 55.2%. It can, therefore, be concluded that the message was extremely well received in Orissa. In Bihar, the frequencies for Categories 1 and 3 in the pre test were 66% and 13%, respectively, which changed to 11.7% and 58.2%, respectively, showing a gain of 45.2% in favour of Category 3 Therefore, as compared to Orissa the impact of the message was slightly less in Bihar, in spite of the fact that a significant percentage of households (36.6%) were already utilizing the excess cooking water in Orissa as compared to only 13% in Bihar. The gain for Category 3 in Rajasthan was 37.5%, followed by Mizoram 35.4%. In Maharashtra, 75.9% households responded to Category 3 in the pre test as compared to 84.1% in the post test. Thus the data showed that in Maharashtra and Karnataka a large number of households were practising the desirable habit of utilizing cooking water for making soup or dal even before the intervention programme, but messages imparted *did* make a positive marginal difference in the community to this aspect.

In conclusion, the positive mean rank values of 28189.80 as against the negative 283 on the second message (see Table 8-M-II) in the All-State pooled data definitely show that, by and large, in respect of providing the right kind of supplementary food to young children, positive nutritional practices were followed by the six participating States. In the States of Orissa, Bihar and Rajasthan, the gains were more as compared to Maharashtra and Karnataka. The intervention programme made a significant dent in improving the nutritional practices of the members of the community. The data clearly show that it is possible to infuse positive practices related to nutritional awareness if sustained efforts and time are spent in providing effective communication method and materials to the community.

TABLE 8.M-II

Positive and negative ranks and mean ranks pertaining to message II for All-States and States

Message II (Q 4, 5, 6, 7 & 8)

State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank Order
All States	1415	14094	283	2818 8	
Bihar	9	2301	1.8	460.2	2
Karnataka	260	1670	52	334	4
Maharashtra	31	1377	6 2	275.4	5
Mizoram	33	1308	6.6	261.6	6
Orissa	142	1919	28.4	383.8	3
Rajasthan	1456	7184	291.2	1436 8	1

Message III: **Immunize your child before the first year as early as possible.**

Q. 9: *Have you got your baby immunised before one year ?*

The data presented in the Table 8. Q-9, show that the Z value of All-State and those of the States are significant at less than the 1 per cent level except in the case of Maharashtra where it is not significant. Thus the null hypothesis regarding these States between the pre and post test responses is rejected. The alternate hypothesis of difference existing between the pre and post responses is considered tenable, except for Maharashtra. The result strongly indicates that the message has been received well by all the States except Maharashtra.

The mean of differences in the All-State pooled data, i.e., +0.114, and the difference between the mean of the pre and post test responses, i e. 0.123, support the above findings. In the State-wise data the highest mean of differences is seen in Rajasthan (+0.305), followed by Orissa (+0.224), Bihar (+0.109), Mizoram (+0.039) and Karnataka +0.010. Maharashtra shows least mean of differences (+0.001) and hence the Z value is not significant. There is also a parity between the mean of differences and the difference between the means of the pre and post test responses. Coupled with this, the 1332 positive ranks as against the 142 negative ranks support the result of the Z values.

Examination of the frequency distribution of responses of the households for each category in the All-State pooled data, showed that in the pre-test, 26.33% households responded to Category 1, i.e., 'No' or that didn't get their baby immunised before one year, and 73.3%

TABLE 8. 9-9

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-9 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	13941	1 729 (0.123)	1 852	0 144	-26.778	0001	-142	+1332
Bihar	00992	1 720 (0.109)	1.829	C.109	-09.021	.0001	-000	+0108
Karnataka	03430	1.914 (0.009)	1.923	0.010	-05 012	0001	-000	+0033
Maharashtra	02217	1 969 (0 001)	1.970	0.001	-01.342	NS	-000	+0002
Mizoram	00948	1 863 (0 039)	1 902	0 039	-05.303	.0001	-000	+0037
Orissa	00821	1 642 (0 224)	1.866	0.224	-11 763	.0001	-000	+0184
Rajasthan	03587	1.675 (0 193)	1.868	0 305	-17 701	.0001	-192	+0846

responded to Category 2, i.e., 'Yes'. In the post test these responses were 14.6% and 85.3% for Categories 1 and 2, respectively, thus registering a drop of 11.7%, and a gain of 12.0% for Categories 1 and 2, respectively. It is evident from the data that the majority of the households were practising the habit of getting their baby immunised during the first year before the intervention. The intervention did influence in cessation of the negative practice and boosted the positive practice of getting the children immunised before one year.

The in-depth study of the State-wise frequency distribution revealed that in case of Rajasthan, 29.7% and 68.9% households responded to Categories 1 and 2, respectively, in the pre test. In the post test these figures changed to 12.3% and 87.2% for Categories 1 and 2, respectively. The gain of 18.3% for Category 2 is substantially higher than the gain in the All-State pooled data. In Orissa, the responses for the pre-test were 35.8% and 64.2% for Categories 1 and 2, respectively. In the post test a significant gain of 22.4% was noted for Category 2, and a corresponding drop in value was found for Category 1, i.e., 22 4%. It is very interesting to note that for Bihar, Karnataka and Mizoram also, an equal gain and an equal drop in the frequency distribution was observed. For example in Bihar, a gain of 10.9% in Category 1 was noted in the post test. Examination of the data of Maharashtra indicated that most households had already adopted the practice of immunising children in the first year, and hence the pre-post difference was not significant. In Maharashtra, the percentage of negative responses, i.e , Category 1, decreased from 3.1% for the pre test to 3.0% in the post test response. For Category 2, the gain was 0.1%. This can be interpreted as an already prevailing positive awareness, created amongst the general mass towards the immunisation programme.

The status of immunisation of children in the first year in the States which participated in this intervention programme seems to reinforce the government's commitment of reaching cent percent immunisation of children against childhood diseases as a part of the National Programme of Immunisation which is supported by the Health Department, the Education Department, and by the mass media as well

Thus it can be safely concluded that though a mere 12% gain was registered between the pre and post responses in the All-State pooled data, States like Orissa, Rajasthan and Bihar gained appreciably more through this message than did Karnataka, Maharashtra and Mizoram.

Message III:

Q. 10: *If yes, what are the diseases against which you got your baby immunised?*

The data presented in the above table show that the Z value of the All-State pooled data as well as those of the States are significant at less than the 1 per cent level. The null hypothesis of no difference is therefore rejected and the alternate hypothesis of difference existing between the pre and post test responses of

TABLE 8. Q-10

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 10 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S	-Ranks	+Ranks
All States	11662	2 516 (0 998)	3 514	0 996	-52.517	0001	-190	+3831
Bihar	00723	2.332 (1.708)	4 040	1.725	-19.784	.0001	-004	+0526
Karnataka	03152	5.589 (0 106)	2.695	0.107	-12.872	.0001	-001	+0222
Maharashtra	02147	3.907 (0.052)	3.959	0.052	-06.955	.0001	-000	+0064
Mizoram	00803	2.946 (0.152)	3 098	0.214	-07.731	.0001	-014	+0120
Orissa	00695	1 823 (0.476)	2.299	0.476	-11.731	0001	-000	+0183
Rajasthan	03167	1.702 (1.227)	2.929	1 412	-36.683	.0001	-211	+2071

the community members is found tenable. The results show that the community as a whole adopted the positive practice of immunising their babies against childhood diseases

The mean of differences in the All-State pooled data, i.e., 0.996, is equivalent to the difference between the means of the pre and post tests, i.e., +0.998. Further, the State-wise data show the highest mean of differences in the case of Bihar, i.e., +1 725, followed by Rajasthan (+1 412), Orissa (+0.476), Mizoram (+0.214) and Karnataka (+0.107). The least mean of differences is seen in Maharashtra (+0.052). It is worth noting that the values for mean of differences in Bihar and Rajasthan are far higher than in the All-State data. There is also a parity between the mean of differences and difference between the means of the pre and post tests and in the case of Maharashtra, Karnataka and Orissa, they are identical In addition to these data, the 3831 positive ranks as against the 190 negative ranks support the trend shown by the Z values

Examination of the frequency distribution of the responses of the households to the pre and post tests shows that in the All-State pooled data, 26.9% 22 3%, 17.0%, 14%, 8.3% and 5.2% households responded to Categories 1, 2, 3, 4, 5 and 6, respectively, in the pre test. In the post test, the responses to these categories were 13.8%, 14.8%, 21 4%, 22.1%, 11.2% and 16.6%, respectively.

Since 1 mark was assigned to each disease against which the child was immunised, the households responding to Category 6 were those who got their babies immunised against all six diseases as per the immunisation schedule. The data on the frequency distribution provide an insight into the status of the households prior to the intervention programme. It is worth noting that a sizeable proportion (26.9%) households got their babies immunised against only one disease (may be at birth) and a mere 5 2% households got their babies immunised against all six diseases and may have followed the complete immunisation schedule. Thus the gains of 8%, 2.9% and 11.4% for Categories 4, 5 and 6, respectively, in the post test is of great significance and calls for further scrutiny of the State-wise data

The frequency distribution in the State-wise data revealed that in the case of Bihar, which showed the maximum mean of differences, 36.8% households responded to Category 1 in the pre test which dropped to .7% in the post test. The responses of the households to Categories 2, 3, 4, 5 and 6 in the pre test were 26.0%, 15.2%, 12.4%, 7.5% and 1.9%, respectively, as compared to the post data of 3.3%, 24.1%, 41.5%, 24.1% and 6.4%, respectively. Thus it can be seen that the gains for Categories 4, 5 and 6 were 29.1%, 16.6%, 4 5% respectively. In Rajasthan, 49.2%, 26.9%, 10.6%, 5.5%, 1.5% and .1% households, respectively, responded to Categories 1, 2, 3, 4, 5 and 6 in the pre test. In the post test, 16 6%, 15.1%, 33.6%, 27.9%, 4 6% and 1 7% households, respectively responded to Categories 1, 2, 3, 4, 5 and 6. Thus the gains for Categories 3, 4, 5

and 6 in Rajasthan were 23%, 22.4%, 3.1% and 1.6% respectively. An in-depth study of frequency for the other States showed that the gains of the pre and post test responses were of various degrees, but gains were more for Categories 4 and 5 than for Category 6. Very few households had their babies immunised against all six childhood diseases in spite of the message delivered to them. This result needs further probing In conclusion, it can be said that the majority of households responded very favourably to this message. But as revealed by the data, it seems that the complete schedule of immunisation was not followed. The reasons for this could be many. The most probable, one may be that the time at which the data was collected, was not quite appropriate.

Further investigation is needed as to whether the booster doses were given to the children and the complete schedule of immunisation followed as per the recommendation of National Programme of Immunisation

Message III:

Q. 11: *If no, when did you get your baby immunized ?*

The data presented in Table 8.Q-11 show that the Z value of the All-State pooled data is significant at less than the 1 per cent level. While the Z values for Orissa and Rajasthan are significant at less than the 1 per cent level, those for Bihar, Karnataka, Maharashtra and Mizoram are not significant. Therefore, the null hypothesis of no difference between the pre-post responses for these States is found tenable. The alternate hypothesis of difference existing between the pre-post responses is considered tenable for Orissa and Rajasthan. This strongly indicates that this message was well received and households did decide to get their children immunised during the first year

The All-State pooled data indicate that the mean of differences i e., +0 831 is quite significant and compares favourably with the data on the differences between the means of the pre and post tests, which is +0 582. The 795 positive ranks as against the 173 negative ranks further support this trend. Examination of the State-wise data shows the highest mean of differences in the case of Rajasthan (+1.077), followed by Orissa (+0.569) and Karnataka (–0.147). There is a parity between the mean of differences and difference between the means of the pre and post test responses in the case of all the the States. These values are proportional to the mean of differences. For example, the highest difference between the means of the pre and post tests is observed in the case of Rajasthan (+0.773), and the least in the case of Karnataka (–0 010). All these data reconfirm the results obtained above

Examination of the frequency distribution of the responses of the households to each category in the All-State pooled data showed that 36.5%, 9.6%, 6.0%, 14.5% and 29% households responded to Categories 1, 2, 3, 4 and 5

TABLE 8. Q-11

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-11 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	03256	2.751 (0.582)	3.333	0 831	-18 842	.0001	-173	+0795
Bihar	00167	3.461 (0 066)	3 527	0.090	-01.680	NS	-002	+0006
Karnataka	00103	3 262 (-0.010)	3.252	-0.147	-0.105	NS	-004	+0002
Maharashtra	00069	4 203 (-0.029)	4.174	-0.059	-00.802	NS	-002	+0001
Mizoram	00037	4.027 (0.108)	4.135	0.111	-1.826	NS	-000	+0004
Orissa	00378	3.714 (0.278)	3 992	0.569	-04 414	.0001	-028	+0092
Rajasthan	02189	2.465 (0.773)	3.238	1 077	-17.438	.0001	-131	+0637

respectively, in the pre test. In the post test these figures changed to 26.0%, 5.3%, 6.0%, 16.4% and 42.8% for Categories 1, 2, 3, 4 and 5, respectively. The data strongly indicate that there was a substantial gain of 14% in the response to Category 5, i.e., 'immunising the new-born baby during the first year'.

The in-depth study of the State-wise frequency distribution revealed that in case of Rajasthan, 50.4%, 3.9%, 7.3% and 30.1% households responded in the pre test to Categories 1, 2, 3, 4 and 5, respectively. The response to the [illegible] were 35.2%, 1.6%, 3.4% 8.1% and 18.8% respectively. The gain of 18.7% in Category 5 is substantially higher than the gain in the All-State pooled data. In Orissa, 41.3% households responded to Category 5 in the pre test as against 53.2% in the post test. Thus, there was a gain of 9.9%. The data from Rajasthan and Orissa clearly show that the message was well received in these two States, and those households which did not get their new-born baby immunised before, took to this as a result of the intervention programme. It can, therefore, be concluded that the intervention did help in bringing about this desirable change, but it is difficult to predict whether the trend will be continued and sustained even after the intervention programme is withdrawn.

Message III:

Q 12 *If you have not got your child immunised at all, what were your reasons for not getting him/her immunised ?*

As can be seen from Table 8, Q-12, the Z values of all the States are not significant, except in the case of Bihar and Rajasthan. In Bihar, it is significant at the 5 per cent level, and in Rajasthan, at the 1 per cent level. The null hypothesis of difference in the pre-post test responses is accepted except for the two States mentioned above.

The mean of differences in the All-State pooled data is +0.290, whereas the difference between the means of the pre and post tests is +0.020. In Bihar, these values are identical, i.e., 0.084, in both cases. In Rajasthan the mean of differences is 0.315 and the difference between means of the pre and post tests is +0.081. All these data confirm the results shown by the Z values. Further, the 521 positive ranks as against the 370 negative ranks support this trend.

Examination of the frequency distribution of households for each category of responses in the All-State pooled data showed that 55.2% households responded to Category 1, i.e., 'reasons other than non-availability of medical facilities', which changed to 40.3% in the post [illegible]. There was a drop of 13.1% (in the negative response). The percentage frequency for Category 2, i.e., 'due to non-availability of medical facilities', also increased from 41.1% in the pre test response to 49.6% in the post test response.

The State-wise frequency distribution of households showed the in Rajasthan, 67.9% households responded to Category 1 in the pre

TABLE 8. Q-12

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-12 for All States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	03386	1.373 (0.020)	1.393	0.290	-01.460	NS	-370	+0521
Bihar	00190	1.532 (0.084)	1.616	0.084	-03.516	.05	-000	+0016
Karnataka	00269	1.814 (0.000)	1.814	0.007	00.000	NS	-001	+0001
Maharashtra	00058	1.845 (0.000)	1.845	0.000	00.000	NS	-000	+0000
Mizoram	00043	1.512 (0.000)	1.512	0.000	00.000	NS	-000	+0000
Orissa	00183	1.153 (-0.016)	1.137	0.45	-00.285	NS	-041	+0040
Rajasthan	02068	1.206 (0.081)	1.287	0.315	-05.674	.0001	-237	+0399

test as against 50.3% in the post test. In Category 2, 26.3% households responded in the pre test and 39.2% in the post test. Thus there was a drop of 17.6% for Category 1 and a gain of 12.9% for Category 2. It can, therefore, be concluded that the message was well received in Rajasthan. In the case of Bihar, too, there was a drop of 8.4% in Category 1 and a gain of 8.4% in Category 2. In Orissa, 78.1% households responded to Category 1 and 18.6% to Category 2 in the pre test. In the post test these figures were 42.6% and 35.5% respectively. Thus there was a gain of 16.9%. It can, therefore, be concluded that although this aspect of the message was not significant, thus lending support to the null hypothesis of no difference between the pre and post test responses, yet the message was well received to the extent that the responses of the households, which did not get their children immunised due to reasons such as 'fear' 'advice from elders', and 'religious/traditional beliefs and practices', decreased from 55.2% in the pre test response to 40.3% in the post test response in the all-State pooled data. the responses for Category 2, i.e., 'due to non-availability of medical facilities', increased from 41.1% in the pre test response to 49.6% in the post test response.

In conclusion, it may be seen that the positive mean ranks it may be seen that the positive mean ranks of 1619.75 as against the negative mean ranks of 218.75 (see Table-8-M-VII) of the third message positively show that, by and large, the households got their children immunised in the first year. The maximum positive ranks were in case of Rajasthan (+988.25), followed by Bihar (164) and Orissa (124.75). Though a significantly small percentage of the households did not get their children immunized in the first year, the reasons for these were non-availability of medical facilities. However, the delivery of the message improved the position in the post test response. As mentioned before, this message as a whole appears to positively reinforce the campaign for the awareness of immunisation of children against childhood diseases launched in the country.

Message IV: **Include in the daily diet of your child a variety of available foods in adequate amount, distributing them at least among three regular meals.**

TABLE 8.M-III

Positive and negative ranks and mean ranks pertaining to message III for All-States and States

Message III (Q.9, 10, 11 & 12)					
State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank Order
All States	875	6479	218.75	1619.75	
Bihar	6	656	1.5	164	2
Karnataka	6	258	1.5	64 5	4
Maharashtra	2	67	0.5	16.75	6
Mizoram	14	161	3.5	40.25	5
Orissa	69	499	17.25	124.75	3
Rajasthan	771	3953	192.75	988 25	1

Q. 13: *Do you include enough green leafy vegetables in the daily diet of your child and other members of your family ?*

The data presented in table 8. Q-13 show that the Z values of all the States are significant at less than the 1 per cent level thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and the post test responses of the community members. The data show that the community as a whole followed the positive practice of providing green leafy vegetables in the daily diet of their family as a result of the intervention programme.

In the All-State pooled data the mean of differences is +0.348, and the difference between the means of the pre and post tests is +0.329. The highest mean of differences is observed in the case of Orissa (+0.400) and the least in Maharashtra (+0.061). The values for the mean of differences in Rajasthan (+0.398) and Bihar (+0.361) are higher than those for the All-State pooled data. All these results indicate that a large number of households followed the positive practice of including green leafy vegetables in their daily diet. However, the educationally backward States of Rajasthan, Orissa and Bihar showed higher gains than Mizoram (+.092), Maharashtra (+0.061) and Karnataka (+0 092). There is also a parity between the means of differences and the difference between the means of the pre and post tests in the State-wise results. The highest difference between the means of pre and post tests is observed in the case of Orissa (+0.398) and the least in Maharashtra +0 062 further 3511, the positive ranks and 175 negative ranks in the

TABLE 8. Q-13

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-13 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14962	1.478 (0 329)	1.807	0 348	-47.565	.0001	-175	+3511
Bihar	00974	1.548 (0.362)	1 910	0.361	-16.237	.0001	-000	+0351
Karnataka	03451	1 632 (0.078)	1.710	0.092	-13.082	.0001	-025	+0295
Maharashtra	02221	1.708 (0.062)	1.770	0.061	-10.155	.0001	-000	+0137
Mizoram	00950	1 832 (0.091)	1.923	0.092	-08.101	.0001	-000	+0087
Orissa	00822	1.496 (0.398)	1.894	0.400	-15 625	.0001	-001	+0328
Rajasthan	03998	1 475 (0.278)	1.753	0.398	-23.890	.0001	-238	+1324

All-State pooled data also confirm the above results.

Examination of the frequency distribution of the All-state pooled data showed that the negative practice, i e., Category 1 i.e 'not including green leafy vegetables in the daily diet', was 51.7% in the pre test response; it was reduced to 19.2% in the post test response. The positive practice, i.e. Category 2 i.e., 'including green leafy vegetables in the daily diet', was 48% in the pre test response as compared to 80.7% in the post response, thus registering a gain of 32.7%. It can, therefore, be concluded that this message was extremely well received by the community members.

The State-wise frequency distribution of households further revealed some interesting findings. In Orissa, 50.1% households responded to Category 1 in the pre test as compared to 10.6% in the post test. For Category 2, the responses were 49.8% in the pre test, and 89.4% in the post test—a gain of 39.6% In Bihar, 45% and 54.9% households, respectively, responded to Categories 1 and 2 in the pre test, whereas in post test these figures were 9% and 91%, respectively Thus there was a gain of 36.1% in Category 2. In Rajasthan, there was a gain of 27 2% in Category 2.

The data presented above is highly encouraging as a large number of households in each State took to the practice of including green leafy vegetables in their daily diet—and this, not withstanding the fact that a change in dietary habits is fairly difficult to achieve and requires both will and money. Further, it is heartening to note that the educationally backward States of Orissa, Rajasthan and Bihar gained more as a result of this intervention programme.

Message IV:

Q. 14: *Do you include seasonal vegetables in your daily diet ?*

The data presented in the above table show that the Z values of all the States are significant at less than the 1 per cen level, except in the case of Mizoram where it is significant at the 5 per cent level. The null hypothesis of no difference is therefore rejected and the alternate hypothesis of difference existing between the pre and the post test responses is found tenable.

The mean of differences in the All-State pooled data is +0.238, and the difference between the means of pre and post tests is +0.222. The State-wise data show the highest mean of differences in the case of Bihar (0.373), followed by Rajasthan (+0.244) and Orissa (+0.207). The least mean of differences is observed in the case of Maharashtra (+0 029). There is also a parity between the mean of differences and the difference between the means of the pre and post tests. These figures are proportional except in the case of Rajasthan, the highest being in the case of Bihar (+0.373) and the least for Maharashtra (+0.029). In addition to these data, the positive ranks of 2344 as against the negative ranks of

TABLE 8. Q-14

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-14 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14980	1.676 (0 222)	1.898	0.238	-38.620	0001	-127	+2344
Bihar	00975	1.548 (0 373)	1.921	0.373	-16.511	0001	-000	+0363
Karnataka	03453	1.772 (0.056)	1 828	0.080	-10.122	0001	-041	+0235
Maharashtra	02221	1 856 (0 029)	1.885	0.029	-07 009	.0001	-000	+0065
Mizoram	00950	1 357 (0.035)	1.392	0 079	-03.311	.05	-021	+0054
Orissa	00822	1.776 (0.207)	1.983	0.207	-11.308	.0001	-000	+0170
Rajasthan	04011	1.734 (0 168)	1.902	0.244	-18.416	.0001	-153	+0808

127 further confirm the result shown by the Z values.

Examination of the frequency distribution of the responses of the households to each category in the All-State pooled data, showed that 32 1% households responded to Category 1, i.e., 'non-inclusion of seasonal vegetables in the daily diet' in the pre test. In the post test this dropped to 10.1%. For Category 2, i.e., the pre test as compared to 89.9% in the post test. Thus there was a gain of 22% for this Category. The data strongly suggest that the community members by and large followed the practice of including seasonal vegetables in the daily diet as a result of the intervention programme.

The State-wise frequency distribution of responses to various categories in the pre and post tests showed that 45% households in Bihar responded to Category 1 in the pre test, which dropped to 7.9% households in the post test For Category 2, 54.9% households responded in the pre test as compared to 92.1% in the post test. Thus there was a gain of 37.2% for this category. In Orissa 22.4% households responded to Category 1 in the pre test, and 1.7% households in the post test. For Category 2, 77.6% households responded in the pre test as compared to 98.3% in the post test. Thus there was a gain of 20.7%. In the case of Rajasthan there was a gain of 16.4% for Category 2 in the post test Thus it can be seen that in all these States substantial improvement in dietary practice was brought about by encouraging the households to include seasonal vegetables in their daily diet. In the case of Karnataka and Maharashtra the pre test data showed that most households already followed the traditional practice of including seasonal vegetables in their daily diet; hence not much gain was registered. In Mizoram, the message did not make much impact as revealed by the data in 64.3% and 35.7% households responded to Categories 1 and 2, respectively, in the pre test. In the post test these figures changed to 60.8% and 39.2%, respectively—a mere gain of 3.5% for Category 2. It would be interesting to probe into this result. It may be due to traditional practices or due to non-availability of seasonal vegetables in sufficient amount, and/or they were not within the purchasing power of the community. It can therefore be safely concluded that the socio-economic factors do affect reasonably the dietary habits of the community.

Message IV:

Q. 15: *Do you include seasonal vegetables in your daily diet ?*

The data presented in Table 8. Q-15 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis of no difference existing between the pre and post test responses of the community members.

The data presented above show that in the All-State pooled data the mean of differences, that is +0.315, compares favourably with the

TABLE 8. Q-15

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 15 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	14879	1.427 (0.299)	1.726	0.315	-45 674	.0001	-125	+3135
Bihar	00979	1.333 (0 396)	1.729	0.398	-17.026	.0001	-001	+0389
Karnataka	03452	1.498 (0.070)	1.568	0.089	-11,922	.0001	-033	+0274
Maharashtra	02221	1 460 (0.089)	1.549	0.089	-12.201	.0001	-000	+0198
Mizoram	00946	1.693 (0.16)	1.853	0.160	-10 660	.0001	-000	+0151
Orissa	00822	1 634 (0.356)	1.990	0.356	-14.837	.0001	-000	+0293
Rajasthan	03909	1.501 (0 283)	1.784	0.367	-25.122	.0001	-161	+1252

difference between the means of the pre and post tests, that is +0.299. The State-wise data show the highest mean of differences in case of Bihar, (+0.398), followed by Rajasthan (+0.367), Orissa (+0.356) and Mizoram (+0.160). The least mean of differences is observed in case of Karnataka and Maharashtra, both being +0.089. There is also a parity between the mean of differences and the difference between the means of the pre and post tests in the case of each of these States. Bihar shows highest difference of means between the pre and post tests, i e., +0.396 and Karnataka the least, i.e., 0.070. It is interesting to note that the means of differences in the case of Bihar, Rajasthan and Orissa are above that of the All-State pooled data. Further, the positive ranks of 3135 as against the negative ranks of 125 reconfirm the trend shown by the Z values. All these data point to the fact that the message was very well received by a large number of the community members as a result of the intervention programme.

Examination of the frequency distribution of the All-State pooled data showed that the households responding to the Category 1 i.e., 'non-inclusion of seasonal fruits', was 57.01% in the pre response, which changed to 27 3% in the post response. The percentage frequency of the Category 2, i.e., 'inclusion of seasonal fruits in daily diet' improved from 42 8% in the pre test response to 72.6% in the post test response, thus registering a gain of 30%.

An indepth study of the State-wise frequency distribution showed that in Bihar, 66.7% households responded to Category 1 in the pre test; this dropped to 27.1% in the post test. For Category 2, 33.33% households responded in the pre test and it improved to 72.9% in the post test, thus registering a gain of 39.6%. In the case of Rajasthan, 48.7% households responded to Category 1 in the pre test as against 21.2% in the post test. For Category 2, 50.7% responded in the pre test compared to 78.6% in the post test, thus registering a gain of 27.9%. In Orissa, 36.6% households responded to Category 1 in the pre test as compared to the 1.0% in the post test, whereas for Category 2, 63.4% households responded in the pre test and 99% in the post test. Karnataka and Maharashtra did not show any appreciable gain in respect of this message. The responses to Categories 1 and 2 in the pre test were 54% and 46% respectively, in the case of Maharashtra, and 50.2% and 49.8%, respectively in the case of Karnataka. The post test scenario did not change very much. For example in the case of Mahrashtra, 45.1% and 54.9% households responded to 'Categories 1 and 2, respectively, in the post test, whereas 43.2% and 56.8%, respectively, responded in the State of Karnataka for these categories. It can, therefore, be concluded that the message did not make much impact on these two State.

All these data point to the fact that the intervention programme helped to carry home this aspect of the message to the members of the community, and to modify their behavior. It is

interesting to note that there is a substantial and consistent gain in the States of Bihar Orissa and Rajasthan, but not much change in the States of Karnataka, Mizoram and Maharashtra. Those States which are educationally backward gained much more through the intervention programme than did the other States. Further, it is needless to mention that though the message is linked to the purchasing power and budget available to the households for procuring food items, a substantial gain in the educationally backward States confirms the belief that it is possible to change food habits even within the existing socio-economic reality of the community through interpersonal contact, sustained communication and an effective delivery system.

Message IV:

Q. 16: What kind of food do you include in the daily diet of your child ?

The data presented in table 8. Q-16 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level. Thus the null hypothesis is rejected and the alternate hypothesis of difference existing between the pre and post test responses of the community members is found tenable

The mean of differences in the All-State pooled data, i.e., +1.026, and the difference between the means of the pre and post tests, i.e., +0.905, strongly indicate that the community members benefited from the intervention programme. The State-wise data show that the highest mean of differences is observed in the case of Bihar (+1.895), followed by Rajasthan (+1.494) and Orissa (+0.624). The least mean of differences is observed in the case of Maharashtra (+0.159). The difference between the means of the pre and post tests is also at par with and proportional to the values of the means of differences. In addition, the 4287 positive ranks as against the 411 negative ranks in the All-State pooled data reaffirm the results of the Z values and help to conclude that a large number of households gave a variety of food in the daily diet of their children. This particular question had as response, a variety of food items, and a unit value (1 mark) was assigned to each food item, i.e., 'cereals', 'dals and pulses', 'green leafy vegetables', 'other vegetables', 'seasonal fruits', 'milk and milk products', and 'meat and fish'. The maximum value of 6 marks was given in cases where the households ticked for each of these food items.

Examination of the frequency distribution of households responding to the various categories in the All-State pooled data for pre and post tests revealed that only 17.1% households responded to all the six categories in the pre test, which improved to 36% in the post test. Thus, there was a gain of 8.9%. The data in respect to other responses in the pre test showed that 7.1%, 16.8%, 22.9%, 22%, and 14% households included 1, 2, 3, 4, and 5 food items in their diet, respectively. These figures in the post tests were 3.7%, 5%, 12.3%, 20.9%

TABLE 8. Q-16

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-16 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14941	3.702 (0.905)	4.607	1 026	-50.829	.0001	-411	+4287
Bihar	00972	2.917 (1.895)	4.812	1 895	-25.152	.0001	-000	+0843
Karnataka	03452	3.994 (0 133)	4.127	0.173	-13.560	.0001	-045	+0386
Maharashtra	02221	4.602 (0.161)	4 763	0.159	-11.763	.0001	-000	+0184
Mizoram	00943	2.444 (0.517)	2.961	0.521	-15.070	.0001	-002	+0304
Orissa	00821	3.361 (0 616)	3.977	0 624	-14.696	.0001	-003	+0290
Rajasthan	03977	2 958 (0.957)	3.915	1.494	-29.762	.0001	-559	+2272

and 22%, respectively. Thus it can be seen that maximum gain was in Category 6.

An in-depth study of the State-wise frequency distribution showed that in Bihar only 5.3% households responded to Category 5 in the pre test as compared to 41.2% in the post test. Thus there was a substantial gain of 35.9%. For Category 6, the increase between the pre and post test responses was 2.3%. It can, therefore, be concluded that the message was well received in this State. In Rajasthan, 18.1%, 23.0%, 22.2%, 19.2%, 13.4% and 3.6% households responded to Categories 1, 2, 3, 4, 5 and 6, respectively, in the pre test. In the post test, these figures were 10.9%, 9.2%, 10.5%, 34.9% and 9.4%, respectively. In Orissa, 12.7%, 19.4%, 19.2%, 25.6%, 14.3% and 8.9% households responded in the pre test to Categories 1, 2, 3, 4, 5 and 6, respectively. These figures in the post tests were 9.5%, 8.9%, 14.6%, 28.9%, 17.7% and 20.5%, respectively, Thus there was maximum gain in Category 6. In the case of Maharashtra and Karnataka, the frequencies of the pre and post tests were not high. In Mizoram, 31.7% households responded to Category 1 in the pre test, which dropped to 10.6% in the post test. In Category 3, 28.1% households responded in the pre test as compared to 40.6% in the post test, thus registering a gain of 12.5%. The gain for Category 4 was 7.2% whereas there was a very small gain of 1 4% for Category 5, and no gain for Category 6 (in both pre and post tests). These data strongly point to the fact that though the community members responded positively to the message and a substantial number of households discontinued giving only one kind of food to their children and tried to include a variety of food items from different food groups in the daily diet, yet *only* an insignificant percentage of households i.e., .7% included food items from all the major food groups. Therefore, it can be concluded that though the message was well received, it had a partial impact.

In conclusion it may be seen that the positive mean ranks of 3319.25 as against the negative mean ranks of 209.5 (see Table 8-M-IV) of the fourth message positively indicate that by and large the community members became aware of the need to include a variety of food items in the daily diet of their children. In some States the message had far greater impact in changing the dietary habits, than in others. The highest positive mean rank was in the case of Rajasthan (+1414), followed by Bihar (+486.5), Karnataka (+297.5), Orissa (+270.25), Mizoram (+149) and Maharashtra (+146). However, caution has to be exercised before any conclusion is drawn on the basis of the ranking order of the States as stated above. This is particularly true when we refer to the State-wise frequencies in respect of questions 13, 14, 15 and 16.

This message is closely related to the dietary habits, the traditional food habits and practices and also the socio-economic conditions/purchasing power of the community members. In spite of this fact, the substantial gains in all the four sub-items of the message found in all States and in the All-State pooled data, re-establish the belief that the intervention programme and communication to the community through various means and modes did bring about a change in the dietary habits.

TABLE 8-M-IV

Positive and negative ranks and mean ranks pertaining to message IV for All-States and States

Message IV (Q 13, 14, 15 & 16)

State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank order
All States	838	13277	209.5	3319.25	
Bihar	1	1946	0.25	486.5	2
Karnataka	144	1190	36	297.5	3
Maharashtra	0	584	0	146	6
Mizoram	23	596	5.75	149	5
Orissa	4	1081	1	270.25	4
Rajasthan	1111	5656	277.75	1414	1

Message V: **Use safe water for cooking and drinking.**

Q. 17: *From where do you get water for drinking and cooking ?*

As can be seen from the data presented in Table 8. Q-17, the Z value for All-State and those for the States, except Maharashtra, are significant at less than the 1 per cent level, thereby, rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the members of the community.

The All-State pooled data show +0.261 as the mean of differences as against +0.165 as the

TABLE 8. Q-17

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 17 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	15041	5.689 (0.165)	5.854	0.261	-22.728	.0001	-407	+1491
Bihar	00972	5 374 (0.421)	5 795	0 421	-13 897	0001	-000	+0257
Karnataka	03454	6.206 (0 024)	6.230	0 127	-03.610	0005	-080	+0225
Maharashtra	02221	5.806 (0 004)	5.810	0.006	-01.784	NS	-001	+0009
Mizoram	00950	2.706 (0 046)	2.752	0.047	-05 520	.0001	-001	+0043
Orissa	00822	4 729 (0.756)	5.485	0.759	-16 163	0001	-001	+0349
Rajasthan	04076	5 805 (0.235)	6.040	0.549	-14.756	.0001	-499	+1130

difference between the pre and post test means. The highest mean of differences is observed in the case of Orissa +0 759, followed by Rajasthan (+0.549), Bihar (+0.421) and Karnataka (+0.127). It is significant to note that the means of differences in all the educationally backward States are higher than the mean of differences of the All-State pooled data. The least mean of differences is observed in the case of Maharashtra, i.e . +0.006, hence the Z value in this case is not significant There is also a parity between the means of differences and the difference between the means of the pre and post tests in respect of all the States. The highest difference between the means of the pre and post tests is observed in the case of Orissa i.e., +0.756, and the least in the case of Maharashtra, i e., +0 0004. All these data further confirm the results of the Z values and compel one to accept that the message was well received by a large number of the community members. Further, the 1491 positive ranks as against the 407 negative ranks in the All-State pooled reaffirm the results obtained through the Z values.

Examination of the frequency distribution of households responding to the various categories of the pre and post test responses in the All-State pooled data showed that most households had 'well' (Category 5) as a source of drinking water. The households responding to this Category were 44.5% in the pre test and 37.5% in the post test. A close examination of responses to the various categories showed that there was a gain of 5.5% for Category 6, i.e., 'households obtaining their water from the "tubewell/handpump", and a gain of merely 3% for Category 7, i e., 'those who used tap-water for drinking and cooking'.

Examination of the State-wise frequency distribution revealed interesting finding. In Orissa, 1.5%, .4%, 16 9%, 5.8%, 56.1%, 19.2% and .1% households responded in the pre test to Categories 1, 2, 3, 4, 5, 6 and 7, respectively. In the post test these figures were, 0.0% .2%, 2.3%, 0.7%, 42.3%, 54.1% and 2% for Categories 1, 2, 3, 4, 5, 6, and 7, respectively It is worth noting that there was a drop of 14.6% in the Category 3, i.e., 'stream' as source of drinking water in the post response There was also a gain of 34.9% in favour of Category 6, i.e., 'tubewell/handpump as source of water'. It can, therefore, be concluded that most households in this State resorted to obtaining drinking water from more a hygienic source as a result of the intervention programme. In the case of Rajasthan, only 2.1% households used 'river' (Category 4) as the source of water in the pre test which dropped is only .9% in the post test. For Category 6 (tubewell/handpump) and Category 7 (tap-water), 34 5% and 26.2% households, respectively, responded in the pre test. These figures changed in the post test to 46.2% and 30.0%, respectively. Thus there was a fall of 13.3% in Category 5; a gain of 11.7% for Category 6; and a mere 3.8% gain in Category 7. In Bihar the responses to Categories 5, 6, and 7 were by 58.4%, 20.1% and 15.4% house-

holds, respectively, in the pre test, whereas in the post test the responses to these categories were 39 7%, 37.2% and 22.2%, respectively. Thus, there was a fall of 18 7% for Category 5, a gain of 17.1% for Category 6; and a gain of a mere 6 8% for Category 7 The data from Mizoram was extremely important. Compared to the other States, the chief source of water in the case of Mizoram was 'pond', 'stream' and 'canal', i.e., Categories 1, 2 and 3. There was no response to Categories 4 and 6, while only 3% households responded to Category 5, and .7% to Category 7. However, it is interesting to note that 68.3% households responded to Category 3 i e., 'stream', in the pre test, which changed to 71.9% in the post test. In Karnataka and Maharashtra, too, there was no appreciable difference between the responses of the households between the pre and post tests.

The results of the data from Mizoram and Orissa suggest that the increased use of the stream, canal and pond as the source of drinking water in the pre test, may be due to easy accessibility of these sources of drinking water; however, the intervention programme made a significant dent in this practice as indicated by the post test responses.

Message V·

Q. 18: *If you get your water from well, river, pond, canal, do you clean (purify) this water before using it for drinking and cooking ?*

The data presented in Table 8.Q-18 show that the Z values of all the States are significant at less than the 1 per cent level thus rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members.

The mean of differences in the All-State pooled data is +0.238 as compared with the difference between the means of the pre and post tests, i.e., +0.205. The All-State positive ranks of 2194 as against the negative ranks of 121 also support the trend shown by the Z values. The mean of the differences varied from State to State. The highest mean of differences is observed in the case of Orissa (+0.528), followed by Bihar (+0.419) and then Mizoram (+0 330). In both Karnataka and Maharashtra, the value is +0.041. There is also a parity between the means of differences and the difference between the means of the pre and post tests. The highest difference of means of pre and post tests is observed in the case of Orissa (+0.521), and the least in Karnataka (+0.035). All these data confirm the results shown by the Z values and reaffirm that a large number of the community members benefited by the intervention programme and followed the practice of cleaning water for drinking and cooking.

Examination of the All-State frequency distribution of households responding to different categories of responses showed that 33 1% households responded to Category 1 (in negative practice) in the pre test as compared to 12.6% in the post test. For Category 2, 66.7%

TABLE 8. Q-18

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-18 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	14330	1 666 (0 205)	1.871	0 238	-36.807	.0001	-121	+2194
Bihar	00975	1 374 (0 419)	1.793	0 419	-17 482	0001	-000	+0407
Karnataka	03444	1 800 (0 035)	1.835	0.041	-08.945	0001	-009	+0131
Maharashtra	02131	1.889 (0 040)	1.929	0.041	-07.777	.0001	-002	+0086
Mizoram	00916	1.391 (0 327)	1 718	0.330	-14.963	.0001	-001	+0301
Orissa	00771	1 399 (0.521)	1.920	0.528	-17 224	0001	-003	+0404
Rajasthan	03545	1.882 (0.042)	1 924	0.142	-05.481	0001	-158	+0303

households responded in the pre-test, and 87.2% in the post test Thus there was a significant gain in Category 2, i.e., 20.5%, and a drop of 20 5% in the Category 1 This strongly indicates that a large number of households followed the practice of purifying water before using it for drinking and cooking, as a result of the intervention programme.

An in-depth study of the State-wise frequency of responses revealed interesting results. In Orissa, 60.1% households responded to Category 1 in the pre test as compared to 8% in the post test For Category 2, 39.9% households responded in the pre test, and 92% in the post test. These data strongly indicate that there was a substantial gain of 52% for Category 2 i e , 'cleaning water before using it for cooking and drinking'. In Bihar, there was a gain of 41 8% in Category 2. In Mizoram, 60.9% and 39.1% households responded to Categories 1 and 2, respectively, in the pre-test. In the post test these figures changed to 28% and 71.8%. Thus there was a substantial drop in negative behaviour, i e., Category 1 (32.7%) and a gain of 32.7% in Category 2. It may be recalled that the prime source of drinking water in Mizoram is stream, as revealed by Q.17; as a result of the intervention programme the community started purifying the drinking water though most of the households did not follow such a practice prior to the intervention programme.

In Karnataka and Maharashtra there was not much gain. Detailed examination of the data from these States showed that the community members had already been cleaning/purifying the water even before the intervention programme.

It can, therefore, be concluded that the message was well received by the community members. Mizoram as well as the educationally backward States of Orissa and Bihar gained substantially through this message and started purifying the drinking water to make it safe.

Message V:

Q. 19: *How do you clean this water ?*

The data presented in Table 8.Q-19 show that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members.

The significant mean of differences in the All-State pooled data, i.e. +0.446, and the difference between the means of the pre and post tests, i.e., +0.433, strongly indicate that a large number of households which obtain water from a well, pond or stream for drinking and cooking, clean it before use as a result of the intervention programme. Examination of the State-wise data revealed that the highest mean of differences is obtained in the case of Bihar (+0 849), followed by Orissa (+0.760) and Mizoram (+0.201) The least mean of differences is observed in the case of Maharashtra. There is also a parity between the mean of differences and the difference between the means of the

TABLE 8. Q-19

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-19 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	11639	2 670 (0.433)	3 103	0 446	-36 019	.0001	-067	+1762
Bihar	00489	2 564 (0.845)	3 409	0.849	-11.992	0001	-001	+0191
Karnataka	02759	3 051 (0.129)	3 180	0.137	-12.908	.0001	-009	+0239
Maharashtra	01943	3.044 (0 030)	3.074	0 030	-04 860	.0001	-000	+0031
Mizoram	00384	3.924 (0 196)	4.120	0.201	-04.941	.0001	-001	+0032
Orissa	00341	2.871 (0 713)	3.584	0.760	-08.840	.0001	-007	+0108
Rajasthan	03814	2.926 (0.044)	2.970	0.099	-06.053	.0001	-062	+0148

pre and post tests, the highest being in the case of Bihar (+0.845) and the least in Maharashtra (+0.030). In addition, the 1762 positive ranks as against the 67 negative ranks in the All-state pooled data confirm the result shown by the Z values. Thus, it can be surely concluded that the message was well received.

Examination of the responses of the households in respect to the various categories of responses in the All-State pooled data showed that 2.9%, 3.4%, 78.5%, 2.0% and 2.8% households responded to Categories 1, 2, 3, 4 and 5, respectively, in the pre test. In the post test, 1.4%, 2.6%, 86.2%, 3.9% and 3.9% households responsded to Categories 1, 2, 3, 4 and 5, respectively. The data indicate that the most popular method of purifying the water was by filtering, i e., Category 3. The most desirable method, i.e., by boiling (Category 5) was the least common practice, and there was gain of a mere 10% between the pre and post test responses for this category.

Examination of the State-wise frequency distribution of the responses revealed interesting findings. In Bihar, 47 6% households responded to Category 3 in the pre test, which dropped to 44.2% in the post test. For Category 5, there was a substantial gain of 21 4%; the pre test response to this category was by 12.1% households as compared to 33.5% in the post test. This showed that the message was very well received in the State In Orissa, 9.7% households responded to Category 5 in the pre test as compared to 30.2% households in the post test, thus registering a gain of 20.5%. In Mizoram, 37.8% households responded to Category 3, and 48.4% to Category 5 in the pre test. In the post test, 34.1% and 55.7% households responded to Categories 3 and 5, respectively. The data indicate that the gain was not appreciable, that is because a large number of households had already been practising the habit of boiling water before use. In Karnataka, 77.4% households had been cleaning water 'by filtering' (Category 3) and 6.8% 'by boiling' (Category 5); there was gain of a mere 3.9% in the post test for this category an in-depth study of the State-wise data also showed 'filtering' as the most popular method of purifying the water. It may be due to the convenience and the economical nature of filteration. Boiling may lead to an increase in the expenditure on fuel, but when the intervention highlighted the advantages of using boiled water for cooking and drinking, this message was well received, as revealed by the statistical finding.

Thus, the data presented above show that the majority of households resorted to clean water for drinking and cooking. The data presented in Question 17 showed the 'well' to be the most popular source of water. The educationally backward States of Bihar and Orissa showed substantial gains. Since this part of the message is related to Q.17 and Q.18, i.e., 'source of water' and 'whether the community members clean this water or not', the conclusion for Q.19 cannot be drawn on its own. The fact that the Z values of Q.19 were found

TABLE 8. Q-20

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-1 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	15054	5.592 (0.240)	5.832	0.299	-31.539	0001	-166	+1693
Bihar	00978	5.324 (0.491)	5 815	0.495	-14 520	.0001	-001	+0285
Karnataka	03451	5 399 (0.126)	5.525	0.177	-14.602	.0001	-078	+0481
Maharashtra	02221	5.765 (0 094)	5 859	0 095	-11.260	.0001	-002	+0173
Mizoram	00950	4 164 (0 555)	4.719	0 614	-13.566	.0001	-025	+0267
Orissa	00822	5.145 (0.781)	5.926	0.781	-15.285	.0001	-000	+0311
Rajasthan	04084	5.820 (0.105)	5.925	0.205	-09.991	.0001	-159	+0420

significant at less than the 1 per cent level, strongly indicates that the intervention *did* make an impact on the community.

Message V:

Q 20. *How often do you clean the vessel in which you store water ?*

The data presented in Table 8.Q-20 show that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis of no significant difference and lending support to the alternate hypothesis of significant difference existing between the pre and post test responses of the community members.

The significant value of the mean of differences, i e. +0.299, and of the difference between the pre and post tests, i.e., +0.240 for the All-State pooled data strongly indicate that a large number of households followed the practice of cleaning daily the vessel in which the drinking water is stored The mean of differences varies from State to State. In Orissa, the mean of differences is the maximum (+0 781), followed by Mizoram (+0.614) and Bihar (+0 495). The mean of differences is the least in Maharashtra (+0.095) as against the All-State data of +0 299.

There is a parity between the mean of differences and the difference between the means of the pre and post tests in the State-wise data except in the case of Rajasthan Further, the 1693 positive ranks as against the 166 negative ranks support the result of the Z values.

Since the maximum value assigned to different categories under this question is six, the All-State pre test mean of 5.592 is indicative of the fact that healthy practice of cleaning the water-vessel daily is already prevalent in the community.

Examination of the frequency distribution of the households in the various categories of responses in the All-State pooled data showed that the cummulative frequency of Categories 4 to 6 (i.e., twice a week, alternate days and daily) was 96.2% households, 73.9% of this accounting for Category 6 in the pre test. The cummulative frequency improved in the post test to 99.3%. Category 6 accounted for 87.7% in the post test. Thus there was a gain of 13.8% in Category 6. The data indicates that in spite of the fact that the majority of the households practised the habit of cleaning the water-vessel daily the intervention programme further improved the practices of the community.

An in-depth study of the State-wise frequency distribution yielded interesting findings. In Orissa, 16.9% households responded to Category 3, i.e., 'once a week', in the pre test, which dropped to .6% in the post test. The pre test responses for Categories 4, 5 and 6 were 9.1%, 14.6% and 58.9%, respectively. The post test responses were .6%, 4.4% and 94.4%, respectively. Thus, for Category 6 there was a substantial gain of 35.5%. Therefore, it can be safely concluded that the message was very well received in Orissa. In Bihar 67.1% households responded to Category 6 in the pre test as compared to 87.6% in the post test, thus registering a gain of 20.5%. In Maharashtra, 83.1% households responded to Category 6 in the pre test, and 89.4% in the post test. Thus this positive practice was already prevalent as a part of tradition. However in Karnataka the message had marginal effects as revealed by the pre and post test responses. In the pre test, 12.2%, 29.8% and 56.1% households responded to Categories 4, 5 and 6 respectively. In the post test, these were 9.0%, 24.2% and 65.1%, respectively—a gain of 9% for Category 6. The most interesting data was from Mizoram The responses of the households in the pre test to Categories 2, 3, 4, 5 and 6 were 9.4%, 17.7%, 32.5%, 25 1% and 14.5%, respectively. The post test responses to these categories were 3.8%, 12%, 26.9%, 22.2% and 35%, respectively. As can be clearly seen from the data the message had only a marginal effect. Though a substantial gain of 20.6% was registered for Category 6, still only 35% households resorted to cleaning the water-vessel daily. As revealed by the pre test data, the most common practice was to clear the water-vessel once a week. This may be due to the fact that water is a scarce commodity in Mizoram, and therefore, storage must be a problem. However, this needs further probing.

In conclusion it may be said that the message did bring home the importance of cleaning the vessel in which the water is stored.

Message V:

Q. 21: *How do you take out water from the vessel ?*

TABLE 8. Q-21

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-21 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14996	2.645 (0.339)	2.984	0.425	-38.610	.0001	-325	+2959
Bihar	00982	2.882 (0.578)	3.460	0.591	-19.225	.0001	-006	+0507
Karnataka	03448	2.906 (0.116)	3.022	0.182	-12.341	.0001	-109	+0375
Maharashtra	02221	2.418 (0.126)	2 544	0 141	-11.809	.0001	-016	+0211
Mizoram	00946	3.156 (0 330)	3.486	0.356	-11 680	.0001	-011	+0193
Orissa	00819	2 678 (0.495)	3.173	0 503	-16.496	0001	-003	+0370
Rajasthan	04028	2.304 (0.277)	2.581	0.540	-16.462	.0001	-328	+0939

The data presented in the above table show that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level. Thus the null hypothesis is rejected and the alternate hypothesis of difference existing between the pre and post test responses of the community members is found tenable.

The mean of differences in the All-State pooled data, i.e., +0.425, and difference between the means of the pre and post tests, i.e., 0.339, further confirm the results of the Z values. In the State-wise data the highest mean of differences is found in the case of Bihar (+0.591), followed by Rajasthan (+0.540), Orissa (+.503) and Mizoram (+0.356). The least mean of differences is seen in the case of Maharashtra There is also a parity between the mean of differences and the difference between the means of the pre and post tests, except in Maharashtra. The highest value is seen in Bihar (0.578) and least in the case of Karnataka (0 116). Further, the 2959 positive ranks as against the 325 negative ranks in the All-State pooled data reaffirm the above result and conclusively prove that the message was well received by the community members

The examination of the frequency distribution of households to the various categories of responses in the All-State pooled data showed that 47.6% responded to Category 1, i.e., 'dipping any container inside the vessel' (a negative response). In the post test, 35.5% households responded to this category. The most desirable response, Category 4, i.e., 'using a small vessel—the "pawa"—to take out water' (the *pawa* is a small vessel with a long handle) was given by 14% households in the pre test and by 36% households in the post test. Thus there was a gain of 21% in favour of this category.

The State-wise frequency distribution showed that in Bihar 0.4%, 23.9%, 62.7% and 12.9% households responded to Categories 1, 2, 3 and 4, respectively, in the pre test, whereas in the post test these values changed to 0.0%, 6.3%, 41.3% and 52.3% for categories 1, 2, 3, and 4, respectively. Thus there was a shift away from the negative practice for Categories 2 and 3 by 14.6% and 21.4%, respectively, and a gain of 39.4% for Category 4 i.e. the desirable practice. This implies that this message made a significant impact and a large number of households followed the practice of taking out water from the vessel by using *pawa*. In Rajasthan, the pre test responses revealed 0.7%, 81.4%, 4.3% and 13.5% households responding to Categories 1, 2, 3 and 4, respectively. In the post test 0.2%, 67.7%, 5.7% and 26.3% households responded to Categories 1, 2, 3 and 4, respectively. Thus a substantial drop of 13.7% was seen in Category 2, and a gain of 12.8% for Category 4, again supporting the view that the message was well received. In Orissa, 39.4% and 7.2% households responded to Categories 2 and 4, respectively in the pre test. In the post test, a drop of 23.6% and an appreciable gain of 25.9% for Categories 2 and 4, respectively, was observed. Maharashtra which showed the least

mean of differences indicated interesting results. The data showed 14.6% households responding to Category 4 in the pre test, which improved to 22.2% in the post test. This data when compared with that for Karnataka, showed that the response to Category 4 in pre and post tests were 31.5% and 36.6%, respectively. It can, therefore, be concluded that in Karnataka the status of the households did not change appreciably, i.e., the extent of gain as a result of the intervention programme

In conclusion, the mean rank values of 2019.8 positive ranks as against the 217.2 negative ranks for the fifth message (see Table 8-M-V) provide sufficient evidence to infer that the right technique of using safe water for drinking and cooking was practised by a number of households as a result of the intervention programme. The majority of the households realised the importance of obtaining water (for drinking and cooking purposes) from a hygienic source, purifying it, then finally storing it in a clean vessel; they also realised the importance of cleaning the vessel regularly. However, the highest positive mean rank was in the case of Rajasthan (588), followed by Bihar (329.4), Orissa (308.4), Karnataka (290.2) and Maharashtra (102). In this message, too, the educationally backward States of Rajasthan, Bihar and Orissa showed higher gains than Mizoram, Maharashtra and Karnataka.

TABLE 8.M-V

Positive and negative ranks and mean ranks pertaining to message V for All-States and States

Message V (Q. 17, 18, 19, 20 & 21)

State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank Order
All States	1086	10099	217.2	2019.8	
Bihar	8	1647	1.6	329.4	2
Karnataka	285	1451	57	290 2	4
Maharashtra	21	510	4.2	102	6
Mizoram	39	836	7.8	167.2	5
Orissa	14	1542	2.8	30.84	3
Rajasthan	1206	2940	241.2	588	1

Message VI: **Use drainage water for raising food plants. Make provision for a soak pit.**

Q. 22: *How do you dispose of the drainage water from your house ?*

The data presented in the Table 8.Q-22 show that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members. The mean of differences in the All-State pooled data, i.e., +0.444, and the difference between the means of the pre and post test responses, i.e., +0.326 indicate that a large number of households started practising safe methods for disposal of wastewater as a result of the intervention. A further

TABLE 8. Q-22

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-22 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14543	2 851 (0.326)	3.177	0.444	-33.888	.0001	-389	+2533
Bihar	00977	2 812 (0.706)	3.518	0.706	-18.984	.0001	-000	+0480
Karnataka	03451	3 168 (0.062)	3.230	0.081	-09.726	.0001	-030	+0193
Maharashtra	02071	3.132 (0 051)	3.171	0.040	-07.139	.0001	-001	+0070
Mizoram	00950	3.225 (0 281)	3.506	0.345	-11.240	.0001	-030	+0219
Orissa	00812	2.967 (0.753)	3.720	0.791	-15.508	.0001	-010	+0340
Rajasthan	03738	2.524 (0.407)	2.931	0 862	-17.743	.0001	-525	+1249

in-depth study of the State-wise means of difference show that Rajasthan is the highest (+0.862), followed by Orissa (+0.791), Bihar (+ 0.706) and Mizoram (0.345). The least mean of differences is observed in the case of Maharashtra (0.040). The State-wise data also showed a parity between the means of differences and the difference between the means of the pre and post tests except in the case of Rajasthan. The highest value is in Orissa (+0.753), and then Bihar (+0.706) and Rajasthan (+0.407) . In addition, the +2533 positive ranks as against the 387 negative ranks further affirm the results indicated by the Z values.

Examination of the frequency distribution of the responses of the households to the various categories in the pre and post tests in the All-State pooled data revealed that in the pre test, 23% households responded to Category 2, i.e., 'allowing waste water to collect inside the house as a puddle'. This dropped to 13 5% in the post test. The response to Categories 3, 4 and 5, in the pre test were 46.4%, 15% and 6% households, respectively. The corresponding post test percentage frequencies were 49.5, 22.7 and 9.3. It can be concluded from the data that there was a shift from the negative practice (Category 2) by 18.6% and movement towards the safer disposal of waste-water. The gain for Categories 3, 4 and 5 were 7.6%, 3.1% and 3.3%, respectively. The All-State pooled data thus support the view that there was a general improvement in practices by the households for disposing of waste-water.

An in-depth study of the State-wise frequency distribution showed that in Orissa, 20.7%, 29.4%, 36.5% and 2.0% households responded to Categories 2, 3, 4 and 5 in the pre test, while in the post test these figures were 10.9%, 21.2%, 44% and 21.9%, respectively. Thus it can be seen that there was a move away from Category 2 by 10.6%, and a gain of 7.5% and 19.9% in favour of Categories 4 and 5, respectively. It is heartening to note that a substantial number of households in Orissa made use of soak-pits for disposal of waste-water, and a sizeable percentage of the households also used this water for the kitchen garden as a result of the contact programme. In Bihar, 23%, 66.3%, 6.0% and 1.8% households, responded to Categories 2, 3, 4 and 5, respectively, in the pre test as against 10%, 43.2%, 30.1% and 16.3%, respectively, in the post test. As can be seen, Bihar registered a substantial gain of 24.1% and a gain of 14.5% in Categories 4 and 5 (soak pit). In comparison to the data of these two State, the pattern of disposal of waste-water in Mizoram showed that as a result of the intervention, 5.3% households responded to Category 4 ('to backyard for kitchen garden'). In Rajasthan, there was a gain of 8.7% and 7% for Categories 4 and 5, respectively. This again points to the fact that the educationally backward states of Rajasthan, Bihar and Orissa gained substantially in respect of this message. It is also interesting to note that in the case of Karnataka and Maharashtra, the message did not make a large impact as revealed by the pre and post data for Categories 4 and 5. (Maharashtra : Category 4 – pre data 35.2% and post data 37.6%; Category 5 – pre data 4.3% and post data 4.3%.)

All the above data indicate that as a result of the intervention programme a large number of the community members took to a safer and more hygienic mode for the disposal of waste-water.

Message VI

Q. 23: *Do you grow some seasonal fruits and vegetables in your plot or kitchen garden ?*

The data presented in Table 8. Q-23 show that the Z value of the All-state pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis of no difference and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members.

The mean of differences in the All-State pooled data, i.e., +0.439, and the difference between the means of the pre and post tests, i.e., +0.348, also support the trend shown by the result of the Z values. In the State-wise data, the highest mean of differences was observed in the case of Bihar (+0.984), followed by Orissa (+0.695), Rajasthan (+.529) and Mizoram (+0.438). The least mean of differences is seen in the case of Maharashtra (+0.037). In addition, there is a parity between the means of differences and difference between the means of the pre and post tests. These two values are

TABLE 8. Q-23

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-23 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14606	1 549 (0.348)	1.897	0.439	-33.668	.0001	-266	+2141
Bihar	00988	1.403 (0 984)	2 387	0.984	-19.258	.0001	-000	+0494
Karnataka	03435	1.753 (0 062)	1.815	0 081	-08.442	.0001	-019	+0138
Maharashtra	02206	2.101 (0 036)	2.137	0.037	-05.485	.0001	-001	+0043
Mizoram	00950	1.945 (0.430)	2.375	0.438	-12.601	.0001	-002	+0218
Orissa	00821	1.873 (0.696)	2.569	0.695	-15.309	.0001	-000	+0312
Rajasthan	03706	1 404 (0.184)	1 588	0.529	-10.084	.0001	-358	+0725

proportional to each other in the State-wise data except for Rajasthan in the case of which the mean of differences (+0.529) is quite disproportionate to the value for difference between the means of the pre and post tests (+0.184). All these data point to the fact that a large number of the community members took to the desirable practice of growing seasonal vegetables/fruits as a result of the intervention programme. This fact is further supported by the 2141 positive ranks as against the 266 negative ranks.

Examination of frequency distribution of households responding to the various categories of responses in the pre and post tests revealed interesting results. In the All-State pooled data, 70.5% households responded to Category 1, i.e , 'No' (Negative practice) in the pre test as compared to 52.5% in the post test—a shift away by 18.1%. for Category 3, the pre and post test responses were 26.3% and 42 1%, respectively Thus there was a move towards the positive practice by 15.8%. The data on frequency distribution also confirms the trend indicated above.

An in-depth study of the State-wise frequency distribution further yielded interesting information. In Bihar, Categories 1, 2 and 3 were responded to by 78.9%, 1.8% and 19.2% households in the pre test respectively In the post test data, the corresponding figures were 29 3%, 2 8% and 67.9%. As the data would reveal, there is a shift away from the negative practice by 49.6% households (Category 1), and movement towards the positive practice (Category 3) by 48.7% households. The data for Rajasthan for Categories 1, 2 and 3 showed 54.6%, 3.5% and 41.9% households, respectively, responding in the pre test as compared to 16.9%, 4.3% and 75.8%, respectively, in the post test. Thus there was a gain of 33.7% for Category 3, and a drop in Category 1 by 37.7%. In Mizoram, 51.3% and 31.1% households responded to Category 1 in pre and post tests, respectively. Similarly, the values for Category 3 were 45.8% and 68.5%. In this State, too, there was substantial gain in respect of Category 3. The data from Karnataka and Maharashtra did not show such substantial difference between the pre and post test responses. In fact, there was gain of a mere 1.8% in Maharashtra and 2 9% in Karnataka for Category 3. Thus it can be concluded that the States of Bihar, Rajasthan, Orissa and Mizoram gained substantially as a result of this message, in comparison to Maharashtra and Karnataka

Message VI:

Q. 24: *If yes, do you use the drainage water for watering plants ?*

The data presented in the above table shows that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level; thus the null hypothesis is rejected and alternate hypothesis of difference existing between the pre and post test responses of the community members is found tenable.

TABLE 8. Q-24

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-24 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	10479	1 624 (0.412)	2 036	0 492	-37.888	.0001	-275	+2551
Bihar	00357	1.739 (0 74)	2.479	0 784	-09.952	.0001	-004	+0145
Karnataka	02540	1 893 (0.063)	1.956	0.078	-08.302	.0001	-015	+0127
Maharashtra	01383	2 587 (0 063)	2.650	0.063	-05.937	.0001	-001	+0046
Mizoram	00699	1.933 (0.299)	2 232	0.299	-08.979	.0001	-000	+0107
Orissa	00674	1 829 (0 928)	2 757	0.927	-15.407	.0001	-000	+0316
Rajasthan	03295	1.276 (0 195)	1 471	0.473	-10 722	.0001	-265	+0627

The All-State mean of differences is +0.492, and it compares favourably with the difference between the means of the pre and post tests (+0.412). In the State-wise data, the highest mean of differences is observed in Orissa (+0.927), followed by Bihar (+0.784), Rajasthan (+0.473) and Mizoram (0 299). The least mean of differences is observed in the case of Maharashtra. In addition, there is a parity between the means of differences and the difference between the means of the pre and post tests, except in the case Rajasthan (+0.473, +0 135). All these data support the trend shown by the Z values. Further, the 2551 positive ranks against the 275 negative ranks in the All-State pooled data reaffirm the above and conclusively prove that the message was well received by the community members.

Examination of the frequency distribution of the households to the various categories of responses showed that 66.1% households responded to Category 1 (negative practice) in the pre test, while in the post test, 44.9% households responded to this Category. For Category 3, 30 5% households responded in the pre test as compared to 49.1% in the post test, thus registering a gain of 18.6%. All these data strongly support the fact that the message was well received by the majority of the community members

The State-wise frequency distribution showed that in Orissa 49.1% households responded to Category 1 in the pre test; this dropped to 7.6% in the post test. Thus there was a shift away by 41.5%. Similarly, 43.9% households responded to Category 3, i.e., 'Yes', in the pre test as compared to 85.6% in the post test. Thus there was a gain of 41.7%. It is indeed worth pointing out that a fairly large number of households (43.9%) were already following the practice of using waste-water for watering the plants in their kitchen garden but intervention *did* make an impact and a substantially large number of households started this practice as a result of the intervention programme. In Bihar, the pre and post test responses of the households for Category 1 were 58.5% and 21.8%, respectively. For Category 3, the corresponding figures were 33.1% and 69.7%. Thus it can be seen that in Bihar, too, there was a gain of 36.6% in favour of Category 3. In Rajasthan, the pre and post test frequencies for Category 3 were 12.8% and 21.6%, respectively. Thus there was a gain of 8.5%. Maharashtra, which had the least mean of differences, showed interesting results. There 77.77% households responded to Category 3 in the pre test, which improved to 80.9% in the post test. When this data was compared with the data from Karnataka, it showed that the responses to Category 3 in the pre and post tests were 43.8% and 45.7%, respectively. It can, therefore, be concluded that in Karnataka the status of the households did not change appreciably.

In conclusion, the mean rank values of 2408.33 positive ranks as against the 310 negative ranks for the sixth message (refer to Table 8-M-VI) provide sufficient evidence to infer that

the right kind of practice for disposal of waste-water has been adopted by a large number of households as a result of the intervention programme. The majority of households also grew seasonal vegetables in the kitchen garden/plot and used the waste-water for watering the plants. However, the highest positive mean rank was in the case of Rajasthan (867), followed by Bihar (373), Orissa (322.68), Karnataka (152.66) and Maharashtra (53). In this message also, the educationally backward States of Rajasthan, Bihar and Orissa showed higher gains than Mizoram, Maharashtra and Karnataka.

TABLE 8-M-VI

Positive and negative ranks and mean ranks pertaining to message VI for All-State and States

	Message VI (Q. 22, 23 & 24)				
State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank Order
All States	930	7225	310	2408.333	
Bihar	4	1119	1.333	373	2
Karnataka	64	458	21.333	152 667	5
Maharashtra	3	159	1	53	6
Mizoram	32	544	10,667	181.333	4
Orissa	10	968	3 333	322.667	3
Rajasthan	1148	2601	382.667	867	1

Message VII: **Provide sanitary facilities in the school and in the community; do not urinate, defecate or spit anywhere but at the place provided.**

Q. 25: *Do you have a latrine and a urinal in your home ?*

The Z value of the All-State pooled data and those of Bihar, Karnataka, Orissa and Rajasthan, presented in Table 8. Q-25 are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members. The Z value of Mizoram is significant at the 5 per cent level. The Z value of Maharashtra is not significant, thus rejecting the alternate hypothesis for this particular State.

The mean of differences, i.e., 0.53, and the difference between the means of pre and post test responses of the All-State pooled data, i.e., +0.037, indicate that the gains are minimal but significant and that a large number of households which did not have a latrine or a urinal continued not to have a latrine or a urinal. In the State-wise data, the means of differences are found to vary in the different States. The highest mean of difference is observed in the case of Rajasthan (+0.145), followed by Bihar (+0.130), Orissa (+0.090), Karnataka (+0.145), followed by Bihar (+0.130), Orissa (+0.090), Karnataka (+0.017) and Mizoram (+0.008). The least mean of difference was observed in Maharashtra. In addition, there is also a parity between the means of differences and the difference between the means of the pre and post tests. All these data confirm the result of the Z values. Further, the 454 positive ranks as against the 101 negative ranks in the All-State pooled data strengthen the assumption that though the Z values are significant at less than

TABLE 8. Q-25

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-25 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14692	1.118 (0 037)	1.155	0.053	-13.049	.0001	-101	+0454
Bihar	00982	1.562 (0.13)	1.692	0.130	-09.817	.0001	-000	+0128
Karnataka	03448	1.108 (0.017)	1.125	0.017	-06.567	.0001	-000	+0057
Maharashtra	02216	1.060 (0 000)	1.060	0.001	-00.535	NS	-001	+0002
Mizoram	00948	1.932 (0.009)	1.941	0.008	-02.521	.05	-000	+0008
Orissa	00820	1.049 (0.088)	1.137	0.090	-07.273	.0001	-001	+0073
Rajasthan	03738	1.051 (0 073)	1.124	0.145	-10.087	.0001	-135	+0401

the 1 per cent level, the status of the community in respect to this message is not as evident as in other cases

When the frequency distribution of the responses to various categories by the households in the All-State pooled data was closely examined it was found that 87.3% households did not possess a latrine or a urinal, as revealed by the pre test responses. Only 12.2% households possessed such a facility The post test result showed that 84.4% households responded to Category 1 and 15.5% responded to Category 2. Thus there was a gain of a mere 3 3% in the post test response for Category 2

Examination of the data from the various States showed that in Bihar, which showed the maximum mean of differences, 43.8% households responded to Category 1 in the pre test as compared to 30.8% in the post test. The response to Category 2 in the pre test showed that 56.2% households had a latrine or urinal facility; this improved to 69.2% in the post test In Rajasthan 91.4% and 6.8% households responded, respectively, to Categories 1 and 2 in the pre test. In the post test, the corresponding figures were 87% and 12.7%

In Mizoram, 6.8% households responded to Category 1, i.e., 'not having a latrine or urinal' in the pre test, this changed to 5.9% in the post test. 93.2%, households responded to Category 2, i.e., 'having a latrine or a urinal in the pre test, and 94.1% in the post test. Thus, it can be clearly seen that practically 93.2% households already had urinals or latrines and therefore, the pre-post mean differences were not large. The post test data differs only slightly from the pre test data; hence the 5 per cent level of significance. The data from Maharashtra showed that in the pre test, 94% households responded to Category 1, i.e , 'not having a latrine or a urinal', and 6% responded to Category 2. The post test data did not alter the position; hence the Z values were not significant. It is interesting to note that the message contained in Q. 25, did not make any difference in the States where 94% households did not possess the facility for latrine or urinal. Therefore, a point to be noted is that, intervention or no intervention sanitary facilities did not change at all. In the case of Orissa, 95.1% households responded to Category 1, and 4.9% to Category 2, on the pre test In the post test response, this figure changed to 86.3% for Category 1 and 13.7% for the Category 2, thus registering a gain of 8 8%. Thus it can be seen that as compared to Orissa, Rajasthan and Maharashtra, Bihar had better provision of latrine and urinal facilities in the households.

The data presented above very clearly indicate that though the message was received, it did not have the same kind of impact as in the case of the other messages. It had just a marginal effect on the behaviour of the community members.

Message VII :

Q. 26: *If yes, mention the type of latrine ?*

TABLE 8. Q-26

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-26 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	01864	2.502 (0 122)	2.624	0.102	-09.367	0001	-006	+0137
Bihar	00553	2 993 (0.168)	3.161	0 168	-07.475	0001	-000	+0074
Karnataka	00292	3.034 (0.004)	3.038	0 017	-00.405	NS	-002	+0003
Maharashtra	00123	3 171 (0.000)	3.171	0.000	-00.000	NS	-000	+0000
Mizoram	00883	3 272 (0.027)	3.299	.029	-03.584	0001	-001	+0019
Orissa	00069	1.362 (1 392)	2.754	1 391	-05 086	0001	-000	+0034
Rajasthan	00400	0.920 (0.073)	0.993	0.128	-02.474	.05	-004	+0021

The data presented in Table 8.Q -26 show that the Z value of the All-State pooled data and those for Bihar, Orissa and Mizoram are significant at less than the 1 per cent level; in the case of Rajasthan the significance level is 5 per cent. These data indicate that the null hypothesis of no difference existing between pre and post test responses of the community members is not tenable in respect of All-State, Bihar, Mizoram, Orissa and Rajasthan. In the case of Karnataka and Maharashtra, the null hypothesis is found tenable.

The All-State pooled data also shows 137 positive ranks as against 6 negative ranks. Further, the mean of differences in the All-State pooled data is +0.102, and the difference between the means of the pre and the post tests is +0.122. These figures indicate that the message was well received and the community as a whole realised the importance of using desirable types of latrines. However, a close examination of the State-wise data reveals that the highest mean of differences is in the case of Orissa (+1.391), followed by Bihar (+0.168) and Rajasthan (+ 0 128). The least mean of differences is observed in the case of Maharashtra. It is worth noting that the mean of differences in Orissa is substantially higher than the figure for the All-State pooled data as well as for all other States. The differences between the means of pre and the post tests were proportional to the value for the means of differences indicated above. All these data further strengthen and support the result indicated by the Z values.

In the frequency distribution of the All-State pooled data, the percentage of households responding to Categories 1, 2, 3 and 4 in the pre test were 1.2%, 9.4%, 53.3% and 15%, respectively In the post test responses, this picture changed to 9.7%, 9.0% 54% and 18% in Categories 1. 2, 3 and 4, respectively. The data showed that the pit-type latrine was most popular, and only 15% households had the facility for a sanitary latrine. In the post test response, there was a gain of merely 3% in this category.

Examination of the State-wise frequency distribution of the pre-post test responses revealed interesting findings. In Orissa, 50.7% did not respond; 13.3% responded to Category 2 i.e., trench-latrine; 34.8% for Category 3, i.e., pit-latrine; and 1.4% to Category 4, i.e., sanitary latrine in the pre test. In the post test, this picture changed to 4 1% not responding, 21.7% for Category 2; 75.4% for Category 3; and 1 4% for Category 4 These data clearly indicate that the households using the trench-latrine resorted to using the pit-latrine as a result of the intervention programme. (It may be also due to the overall provision of the sanitary latrine in the community due to other programmes during the period when the data was gathered.) The fact that almost 40.6% gain was achieved for Category 3, i.e , 'provision of pit-latrine', strongly indicated that the message had a carry-home effect and that a large number of households adopted better ways of disposing of the solid waste (excreta), i.e., by providing a pit-latrine in the absence of a sanitary latrine. The provision in respect of the sanitary latrine did not change at all.

The data from Mizoram showed that 2%, 66% and 31% households responded in the pre-test to Categories 2, 3 and 4, respectively. In the post test this position changed to 2%, 64.3% and 33.1% in respect to the same categories.

It is quite revealing that an educationally backward State such as Rajasthan showed the maximum pre-post test mean difference as compared to a more advanced State like Mizoram It may not be out of place to mention that the general socio-economic conditions of the community seemed to have a direct influence on the type of sanitary facilities available in the households.

Message VII.

Q. 27: *If you do not have a latrine in your house, where do you urinate and defecate ?*

The data presented in Table 8 Q-27 shows that the Z value of the All-State pooled data and those for Bihar, Karnataka, Orissa and Rajasthan are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and extending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members of these States. Maharashtra and Mizoram showed no significant difference. hence, the null hypothesis of no difference between the pre and post test responses was

TABLE 8. Q-27

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-27 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S	-Ranks	+Ranks
All States	12828	2 809 (0109)	2.918	0 144	-20.441	0001	-121	+0755
Bihar	00306	2 477 (0 379)	2.856	0.379	-06.680	.0001	-000	+0059
Karnataka	03009	2.788 (0.043)	2.831	0 066	-05.679	.0001	-017	+0099
Maharashtra	02081	2.960 (0.001)	2.961	0 005	-00.315	NS	-002	+0004
Mizoram	00021	3.000 (0.000)	3.000	0 000	-00.000	NS	-000	+0000
Orissa	00754	2.866 (0 05)	2.916	0.117	-03 454	.001	-019	+0032
Rajasthan	03648	2.611 (0 294)	2.905	0.380	-20.622	0001	-123	+0745

found tenable for these two States.

The mean of differences in the All-State pooled data, i.e , +0 144, compared to the difference between the means of the pre and post tests, i.e , +0.144, further confirms the results obtained In the State-wise data, highest mean of differences is observed in the case of Rajasthan (+0.380), followed by Bihar (+ 379) The least means of differences is observed in the case of Maharashtra (+0.005). There is also a parity between the data on means of differences and difference between the means of the pre and post tests in all these States. These data strongly suggest that the message was well received by the members of the community. The 755 positive ranks as against the 121 negative ranks for the All-State pooled data further support the trend

Examination of the frequency distribution of the responses of households to each category in the All-State pooled data showed that 7.4% households responded to Category 1 in the pre test as compared to 2.6% households in the post test. For Category 3, 85.5% households responded in the pre test and 94 7% in the post test. Thus there was a gain of 6.2%.

Examination of the frequency distribution of the pre and the post test responses for each households in the State-wise data revealed interesting findings. In Bihar, 25.8% households responded to Category 1, i.e , 'defecating near pond/river/stream or other sources of water', and 73% households responded to Category 3 in the pre test This picture changed in the post test response to 6 5% in Category 1 and 92.2% in Category 3. This indicates that, as a result of the message delivered to them, a large number of community members modified their practice and refrained from defecating near a source of water.

In Rajasthan, 14.7% households responded to Category 1 in the pre test, which changed to 2.3% in the post test. For Category 3, the pre test response was 76.3%, and the post test response was 92.9%. Thus there was a gain of 16.6%.

In Orissa, 6.6% households responded to Category 1 in the pre test, which changed to .9% in the post test. For Category 3, 93.2% households responded in the pre test while the frequency in the post test was 96.8%, thus registering a gain of 3.2%.

In Mizoram, cent percent (100%) households responded to Category 3 in both pre and post tests; hence the Z value was not significant for this State. When this result is compared with the responses on Q.25, the data revealed that 94% of the households in Mizoram had latrines, and that is why the result for Mizoram was not significant in respect of Q.26.

In Karnataka, 8.4% households responded in the pre test to Category 1, and 87 2% to Category 3. In the post test, 6.6% responded to Category 1, and 89.9% to Category 3. Thus there was a gain of merely 2.7% in this Category. When this data was compared to the data for Qs. 25 and 26, some interesting facts were revealed. The data showed that 89 2% house-

TABLE 8. Q-28

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-28 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14820	1.967 (0.023)	1.990	0.051	-10.372	0001	-059	+0278
Bihar	00976	1.908 (0.081)	1.989	0.081	-07.722	.0001	-000	+0079
Karnataka	03421	1.996 (-0.006)	1.990	0.007	-03.673	.001	-023	+0002
Maharashtra	02217	1.984 (0.007)	1.991	0.007	-03.408	.001	-000	+0015
Mizoram	00949	1.475 (0.302)	1.777	0.310	-14.457	.0001	-004	+0290
Orissa	00816	1.928 (0.061)	1.989	0.069	-05.812	.0001	-003	+0053
Rajasthan	03894	1.946 (0.035)	1 981	0.068	-07.267	.0001	-062	+0197

holds did not have a latrine or a urinal, as revealed in the pre test response to Q.25. Only 10.8% households had such a facility. In the post test, these frequencies changed to 87.5% (Category 1) and 12.5% (Category 2). Thus no substantial change was observed Regarding the types of latrines, as per the pre test data on Q-26, 70.9% of the households had pit-latrines, 11.3% had trench latrines and 16.8% had sanitary latrines. The results revealed for Q 27, therefore, carried more weight, giving the authors ground to assert that consequent upon the intervention, the members of the community developed the desirable habits of not defecating near a source of water but away from it. This is in spite of the fact that community did not have facility for sanitary latrines.

Message VII:

Q. 28: *Do you wash your hands well after defecation ?*

The Z value of the All-State pooled data and those for the States presented in Table 8.Q-28 are significant at less than 1 per cent level, thereby rejecting the null hypothesis and extending support to the alternate hypothesis of difference existing between pre and post test response.

The mean of differences of the All-State pooled data, i.e., +0.050 compares favourably with the difference between the means of the pre and post tests, i.e., +0.023 This strongly indicates that the members of the community in most States already followed the traditional practice of washing hands after defecation. The positive ranks of 2141 as against the negative ranks of 266 further support this trend. The highest mean of differences is observed in the case of Mizoram (+0.310) while the least mean of differences (–0 007) is found in the case of Karnataka. The means of differences varied from State to State—Bihar (+0.081), Orissa (+0.069), Rajasthan (+0.068) and Maharashtra (+0.007). There is also a parity between the means of differences and the difference between the means of the pre and post tests in all these States. It is the highest in the case of Mizoram (+0.302) and lowest in the case of Karnataka (–0.007).

Close examination of the frequency distribution of households for each category of responses in the All-State pooled data showed that 3.2% households responded to Category 1 (negative practice) and 97.2% to Category 2 (positive practice) in the pre test. In the post test, 1% households responded to Category 1 and 99% households to Category 2. The State-wise frequency distribution of responses to the various categories showed interesting trends. In Mizoram, 52.5% of the households responded to Category 1 in the pre test. In the post test, this dropped to 22.3%. The percentage frequency for Category 2 was 47.5 in the pre test, and 77.7 in the post test. Therefore, there was a gain of 30 2% in Category 2. When the data from Mizoram were compared with those from the other States, it showed that in all other States only a small percentage of households

responded to Category 1 (negative practice of not washing hands *well* after defecation) For example, the majority of households in Bihar, Orissa, Karnataka, Maharashtra and Rajasthan responded to the positive practice of washing hands well after defecation as revealed in the pre test Therefore, the majority of households followed the traditional practice of washing hands after defecation

The results discussed above strongly indicate that most of the households practised the traditional habit of washing hands well after defecation, and yet a large number of households in Mizoram and a significant percentage of households in the educationally backward States of Rajasthan, Bihar and Orissa, improved their behaviour towards the hygienic practice of washing hands well after defecation, as a result of the message.

Message VII:

Q. 29: *What happens when you defecate in the open and do not cover the stool with soil ?*

The data presented in Table 8 Q-29 shows that Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members. The 3022 positive ranks as against the 362 negative ranks in the All-State pooled data further support the trend. In addition, the mean of differences, i.e., +0.362, compares favourably with the difference between the means of the pre and post tests The State-wise data also show that there is a parity between the means of differences and the difference between the means of the pre and post tests. The highest mean of differences is observed in the case of Bihar (+0.611) followed by Rajasthan (0 511) and Orissa (+0.501). The least mean of differences is observed in the case of Maharashtra. Similarly, the highest difference between the means of the pre and post tests is observed in the case of Bihar (+0.609) and the least (+0.062) in the case of Maharashtra. All these data indicate that the message was well received and, by and large, the community followed the desirable sanitary practice of covering the excreta.

Examination of the frequencies in each category of responses given by the households in the All-State pooled data revealed that in the pre test, Category 2, i.e., 'foul smell as the only reason for covering stool,' was responded to by 47.7% households Category 3, i.e., reason for covering the stool is to 'prevent disease carrying organisms from breeding and spreading disease germs' was responded to by 38 3% households. The percentage of households responding to the post test dramatically changed the position, as 35.1% households responded to Category 2, whereas 63.8% responded to Category 3. Therefore, there was a gain of 15% in Category 3 and a drop of 22.6% in the responses to Category 2, which is substantial. It strongly indicates that

TABLE 8. Q-29

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-29 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14821	2.343 (0.283)	2.626	0.362	-40 059	0001	-362	+3022
Bihar	00982	2.105 (0.609)	2.714	0.611	-19.447	0001	-001	+0506
Karnataka	03450	2.464 (0.079)	2.543	0 092	-13.241	.0001	-021	+0294
Maharashtra	02160	2.348 (0 062)	2.410	0.065	-09.828	.0001	-003	+0137
Mizoram	00944	2.301 (0 334)	2 635	.446	-10.905	.0001	-030	+0269
Orissa	00785	2.140 (0 493)	2.633	0.501	-15.879	.0001	-003	+0343
Rajasthan	04017	2.334 (0 253)	2.587	0.511	-18.995	.0001	-514	+1434

the message was very well received by the members of the community.

The data from Bihar revealed that 56.9% households responded to Category 2 in the pre test, which dropped to 26.6% in the post test. The response to Category 3 was 26.8% in the pre test as compared to 72 4% in the post test. Thus, there was a gain of 45.8% in Category 3. This strongly indicated that the message was extremely well received in Bihar and the households realised the importance of covering the stool to avoid breeding of flies and other disease-carrying germs.

A detailed examination of the data from Orissa revealed that 67 4% households responded to Category 2 in the pre test, which dropped to 34.6% in the post test. 23.3% households responded to Category 3 in the pre test, which improved to 64.3% in the post test. Thus, there was a gain of 41%.

In Rajasthan, the percentage response from households to Category 2 was 54.4 in the pre test, which dropped to 33.9 in the post test. 39.5% households responded to Category 3 in the pre test, which increased to 59.9% in the post test Thus there was a gain of 20.4%.

In Mizoram, the figures were 41.7% for Category 2 in the pre test, and 23.6% in the post test 44 2% households responded to Category 3 in the pre test, and 69.9% in the post test Therefore, there was a gain of 25.7%.

It may be noted that in each of these educationally backward States the message was well received and the community members realised that the exposed stool could be a breeding ground for germs carrying dangerous diseases—which might help spread communicable diseases. It may be pointed out that in these States the provision of sanitary facilities was not up to the desirable level, except in Mizoram. It may be noted that when the households had no choice but to defecate in the open fields, the message regarding the importance of covering the excreta to prevent breeding of flies and other disease-causing organisms became more important in the interest of the health of the community members and thus helped prevent the spread of communicable diseases. It is of paramount importance to note that within the socio-economic realities of the community, the educational message imparted through personal contact and various other means (as discussed earlier) by the teachers had a tremendous impact on the community members Even when the socio-economic constraint compelled the poor households from not making use of a sanitary latrine, the mere fact that the import of the sub-message contained in Message VII could be so fully realised is indeed a very healthy sign and also an encouraging aspect of the community participation programme.

In conclusion, the positive mean rank values of 929.20 as against the negative 129.80 pertaining to Message VII strongly indicate that by and large, the right kind of sanitary habits and sanitary practices were followed in the six participating States. The mean rank values varied from State to State. Rajasthan showed the highest mean rank (+559.6), followed by Bihar (+169.2) and Mizoram (117.2). This shows that a significant number of households, which did not follow these practices earlier, modified and improved their behaviour as a result of the intervention programme. It may, however, be noted that the educationally backward States of Bihar, Rajasthan and Orissa showed significantly more gains as compared to Maharashtra, Karnataka and Mizoram. (In Mizoram, except question 28 and 29, which are related to the traditional practices, the gains in all other questions were not very significant.)

TABLE 8-M-VII

Positive and negative ranks and mean ranks pertaining to message VII for All-States and States

Message VII (Q 25, 26, 27, 28 & 29)					
State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank Order
All States	649	4646	129.8	929.2	
Bihar	1	846	02	169.2	2
Karnataka	63	455	12.6	91	5
Maharashtra	6	158	1.2	31 6	6
Mizoram	35	586	7	117 2	3
Orissa	26	535	5 2	107	4
Rajasthan	838	2798	167.6	559.6	1

Message VIII. **Keep your school, home and village surroundings clean. Make provision for compost pit.**

Q. 30: *How do you dispose of solid wastes like vegetable peels, waste paper, packages, stale food and other organic wastes ?*

TABLE 8. Q-30

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-30 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	14959	1.850 (0.078)	1 928	0.088	-23 534	.0001	-035	+0837
Bihar	00977	1.489 (0 410)	1.899	0.409	-17.331	.0001	-000	+0400
Karnataka	03432	1.954 (0.008)	1 962	0 015	-03.552	.001	-012	+0042
Maharashtra	02204	1 859 (0 007)	1 866	0.013	-02.433	.05	-007	+0022
Mizoram	00934	1.318 (0.153)	1.471	0 153	-10.374	0001	-000	+0143
Orissa	00773	1.774 (0 170)	1.944	0 173	-09 857	.0001	-001	+0132
Rajasthan	04089	1.951 (0.040)	1.991	0 053	-09.469	0001	-027	+0185

The data presented in Table 8.Q-30 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level (except in the case of Maharashtra where it is significant at the 5 per cent level) thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members.

The All-State pooled data show 837 as positive ranks as against 35 as negative ranks. These data further indicate that the community as a whole moved significantly towards the more positive practice in respect of the disposal of solid wastes as a result of the intervention programme.

The result indicated by the Z value is also strengthened when the mean of differences is examined *vis-a-vis* the difference between the means of the pre and post tests. The All-State pooled data show that the mean of differences, i e., +0.088, compares favourably with the difference between the means of the pre and post tests Examination of the State-wise data also shows a parity between these two data. The highest mean of differences is observed in the case of Bihar (+0.409) followed by Orissa (+0.173) and Mizoram (+0.153), the least being in the case of Maharashtra (+0.013). The difference between the means of the pre and post tests in the States are also proportional, the highest being in Bihar (+0.410), and the least in Maharashtra (+0.007).

The percentage frequencies of each category of responses given by the households in the All-State pooled data revealed that the pre test responses for Category 1 were 14.9% as compared to 7.2% in the post test responses. In the case of Category 2, i.e , 'making disposal of solid organic waste by making compost pit', 85.1% households responded in the pre test, which changed to 92.8% in the post test, thus registering a gain of 7.7%.

Examination of the frequency distribution of Karnataka showed that only 4.6% households responded to Category 1 in the pre test as compared to 3.8% in the post test. For Category 2, 95.4% households responded in the pre test and 96.2% in the post test. The data clearly indicated that in Karnataka most of the households have already been practising the disposal of solid organic waste by making a compost pit.

The data from Maharashtra showed that 14.1% households responsed to Category 1, and 85.9% to Category 2, in the pre test, and 13.4% and 86.6%, respectively, in the post test. Thus, there was not much change in the practice resorted to by the members of the community in these two States. This is supported by the Z value which, in the case of Maharashtra is significant at the 5 per cent level (*see* the table)

In Bihar, 51.1% households responded to Category 1, and 48.9% to Category 2, in the pre test, which changed to 10% to Category 1, and 89.9% to Category 2, in the post test Thus, there was a gain of 41% in Category 2, which was substantial

In Orissa, 22 4% households responded to Category 1, and 77.5% to Category 2, in the pre test. In the post test, 5 6% responded to Category 1 and 94.4% to Category 2. Hence, there was a gain of 16 9% in Category 2.

In Mizoram, 68.2% households responded to Category 1 and 31 8% to Category 2 in the pre test as compared to 52.9% and 47.1%, respectively in the post test. Thus the gain in Category 2 was 15.3%. The State-wise data also support the conclusion that the message delivered to the community was well received and, as a result, a significantly large number of the community members started the practice of disposing of solid organic waste by making a compost pit

Message VIII.

Q 31. *How do you dispose of faecal matter ?*

The data presented in Table 8.Q-31 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between pre and the post test responses of the community members In the All-State pooled data, the negative ranks were 437 and the positive ranks were 3129, thereby extending support to the result obtained through the Z values

The mean of differences in the All-State pooled data is +0.768, which compares favourably with the difference, between the pre and post test means, i.e., +0.613. A detailed study of State-wise data shows that there is a parity between the means of differences and the differences between the pre and post test means except in the case of Rajasthan (+0.858), followed by Bihar (+0.809) and Orissa (+0.776). It may be noted that the values are higher than the mean of differences in the All-State pooled data The difference between the means of the pre and post tests is the highest in the case of Bihar and the least in the case of Karnataka (+0 071). All these data point to the fact that the message was well received by the community members

Examination of the frequencies in each category of responses of the households in the All-State pooled data revealed that in the pre test, the responses to Categories 1, 2, 3, 4 and 5 were 43.9%, 8 9%, 10.4%, 29 0% and 7.8%, respectively This picture was altered in the post test, for 22.5%, 6 3%, 15.0%, 44 9% and 10.3% households responded to Categories 1, 2, 3, 4 and 5, respectively. The data clearly indicate that there was a significant fall of 21.4% in the response to Category 1 i e , 'indiscriminate littering of the feacal matter', from 43.9% households responding to it in the pre test to 23.5% in the post test. The most positive sanitary practice of making a compost pit showed a gain of 2.5% only whereas Category 4, i.e., 'dumping the excreta at a specific point outside the house', showed the highest gain in the pre and post difference in responses, i.e., 21.9%.

This clearly shows that there was a definite

TABLE 8. Q-31

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 31 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	14850	2 478 (0 613)	3.121	0 768	-43.767	0001	-437	+3129
Bihar	00982	2.458 (0 809)	3.267	0 809	-18.685	0001	-001	+0465
Karnataka	03452	3.600 (0.015)	3.615	0.071	-07 544	0001	-034	+0162
Maharashtra	02219	2.711 (0.254)	2.965	0.264	-12.776	0001	-013	+0209
Mizoram	00949	3.183 (0.551)	3 734	588	-12 968	0001	-014	+0237
Orissa	00818	2.751 (0 751)	3 502	0.776	-15.316	.0001	-008	+0321
Rajasthan	03895	1 570 (0.377)	1.947	0.858	-16.754	0001	-569	+1242

TABLE 8. Q-32

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-32 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14919	1.578 (0.177)	1 755	0 213	-33.153	.0001	-185	+1959
Bihar	00984	1 521 (0.280)	1.801	0 279	-14.374	.0001	-000	+0275
Karnataka	03452	1.799 (0.016)	1.815	0 030	-04.642	.0001	-024	+0078
Maharashtra	02220	1 381 (0.033)	1.414	0.032	-07.424	.0001	-000	+0073
Mizoram	00949	1.550 (0.233)	1.783	0 237	-12.745	.0001	-001	+0223
Orissa	00819	1 249 (0 353)	1.602	0.355	-14.684	0001	-001	+0290
Rajasthan	03956	1.505 (0.234)	1.739	0.351	-21 459	.0001	-231	+1154

improvement towards the positive practice of disposal of excreta, but making a compost pit for the disposal of excreta did not find favour This may be due to the traditional attitude or stigma attached to the handling of excreta by the community.

Examination of State-wise frequency distribution revealed the following results. The educationally backward States like Bihar, Orissa and Rajasthan registered significant pre and post mean differences as shown in the table. The State-wise negative and positive ranks—Bihar (+465), Orissa (-8 and +321), Mizoram (-14 and +237), Rajasthan (-569) and +1242)—clearly indicated that these States modified their behaviour towards a better practice of disposal of excreta as a result of this part of the message

Message VIII:

Q 32: *Do you have the required facility for collection and disposal of solid wastes ?*

The data presented in Table 8.Q-32 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members

The rank values of the All-State pooled data, i.e., 1959 positive as against 135 negative ranks, strongly indicate that the message was well received. The mean of differences in the All-State pooled data, i.e., +0.213, compares favourably with the difference between the pre and the post test means, i e., +0.177. In the State-wise data, the highest mean of differences is registered in the case of Orissa (+0.355), followed by Rajasthan (+0.351), Bihar (+0 279) and Mizoram (+0.237). The least mean of difference is observed in the case of Karnataka, (+0.030) There is a parity between the means of differences and the difference between the means of the pre and post tests in each of the States. The data further support the trend shown by the significant Z values. The lowest difference between the pre and post means is observed in case of Karnataka (0.016), and the highest in the case of Orissa (0.353). All these data indicate that the members of the community, by and large, adopted a more hygienic method of collection and disposal of solid wastes.

Examination of the frequency in each category of responses of the households in the All-State pooled data indicated that the pre test responses for Category 1 were 42 2%, and for Category 2, 57 8%. In the post test, these figures dropped to 24.5% for Category 1, i.e., 'no facility for collection and disposal of solid wastes', and increased to 75.4%, for Category 2, thus registering a gain of 17.6% The above data strongly suggest that the members of the community were able to provide for themselves the required facilities for collection and disposal of solid waste as a result of the message imparted to them through this programme. An

in-depth examination of the State-wise data of the frequency distribution of the pre and post responses indicated that each State had a greater percentage of households responding to Category 2 in the post test as compared to the pre test.

In Bihar, 52.1% households responded to Category 2 in the post test as compared to 80.1% in the post test Thus there was a gain of 28%. In Karnataka, 79 8% households responded to Category 2 in the pre test as compared to 81 4% in the post test, thus registering a gain of 1 6%. In the case of Mizoram, Maharashtra, Orissa and Rajasthan, gains of 23.4%, 3.3%, 35.3% and 23.3%, respectively, were observed for Category 2.

The data presented above strongly indicate that though the pre and post responses to Category 2 varied from State to State, the majority of the households opted for the practice of proper collection and disposal of solid wastes as a result of the delivery of this message. This can be construed as a positive step for any kind of community intervention programme which can give a filip to the cleanliness and sanitation campaign in general

Message VIII:

Q 33. *Do you think garbage can be of any use to you ?*

The data presented in the Table 8.Q-33 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members. The All-State pooled data also show 1196 positive ranks as against the 121 negative ranks which confirm the results indicated by the Z values. The mean of differences varies from State to State. The highest mean of difference is found in the case of Bihar (0.410), followed by Orissa (0 299), while the lowest is in the case of Karnataka (0.037).

There is a parity between the means of differences and the difference between the means of the pre and post tests. The pre and post test mean difference of the All-State pooled data is +0.105. The pre-post mean difference also varies from State to State. It is again the highest in Bihar (+0.410), followed by Orissa (0.286). The least difference between the two means is observed in the case of Karnataka (+0.021). These data lend further support to the results indicated by the mean of differences values.

Examination of the frequency distribution of each category of responses of the households in the All-State pooled data revealed that in the pre test, 19% households responded to Category 1, i.e., 'No' as compared to 8.6% in the post test. In the pre test, 80.9% households responded to Category 2, compared to 91.4% households in the post test, thus registering a gain of 10.5% All these results strongly indicate that the message regarding making use of waste materials (refuse) was well received by a large number of the community members.

TABLE 8. Q-33

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 33 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	15023	1 809 (0.105)	1.914	0.129	-25 663	.0001	-121	+1196
Bihar	00983	1.481 (0 410)	1.891	0 410	-17.396	0001	-000	+0403
Karnataka	03453	1.880 (0 021)	1.901	0 037	-05.676	.0001	-027	+0101
Maharashtra	02220	1.742 (0 042)	1.784	0.043	-08 153	.0001	-002	+0294
Mizoram	00946	1.254 (0 081)	1.335	0.103	-06.788	.0001	-010	+0087
Orissa	00820	1 610 (0.286)	1 896	0.299	-13 015	.0001	-005	+0240
Rajasthan	04050	1 886 (0.057)	1 943	0.135	-08.632	.0001	-156	+0387

In conclusion, it may be seen that the positive mean rank values of all questions of 1780.25 as against the negative 129.8 for the eighth message definitely imply that the overall environmental sanitation messages were by and large, accepted by the community when delivered through these intervention programmes. In the educationally backward States of Rajasthan, Bihar, and Orissa, the movement towards positive practices was more pronounced as a result of intensive personal contact and communication through door-to-door contact, meeting with the community leaders, exhibitions, etc., which were utilised as a part of the programme. It can, therefore, be concluded that if an intensive campaign is launched and sustained over a period of time, it can help to improve the general sanitation scenario of the country and bring about a long-term effect. Hence, such programme can be an asset for preserving the health of the community.

Generally, quite a number of health messages, such as the one being discussed, do not require any extra financial inputs. These are more a kind of motivation drive and awareness programme that can lead to a healthier and cleaner environment. The implication of this message, therefore, can have a far-reaching effect. The data presented in Tables 8.Q-32 and Q-33 confirm the oft-repeated belief that it is possible to bring about a substantial change in environmental sanitation and prevent pollution of water and air, and the spread of communicable diseases, within the existing socio-economic milieu of the society. If an intensive inter-personal mode of communication with the community is adopted as a part and parcel of one's own social environment it can bear fruitful results

TABLE-8-M-VIII

Positive and negative ranks and mean ranks pertaining to message VIII for All-States and States

Message VIII (Q 30, 31, 32 & 33)					
State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank Order
All States	778	7121	194.5	1780 25	
Bihar	0	1543	0	385.75	2
Karnataka	97	383	24 25	95.75	6
Maharashtra	22	398	5.5	99.5	5
Mizoram	25	690	6.25	172.5	4
Orissa	15	983	3.75	247 75	3
Rajasthan	983	2968	245.75	742	1

Message IX. **Do not pollute sources of water**

Q. 34 *Do you wash clothes, utensils near the well, pond, river or other source of water ?*

The data presented in Table 8 Q-34 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post responses of the community members. As can be seen, the number of positive ranks are significantly greater than the number of negative ranks in the All-State pooled data as well as for each of the States. The pre-post test mean of differences in All-State pooled data, i e., 0.296, is the significant indicator of gains. Thus, all results indicate that most households followed the desirable practice of keeping the source of water clean and took steps to avoid pollution of water.

The largest mean of differences is noticed in the case of Bihar (.558), followed by Orissa (0.517), and Rajasthan (0.490). Similarly, the lowest mean of differences (0.070) and also the pre and post test mean difference are obtained in the case of Maharashtra (0.062). The next is Karnataka (0.095), followed by Mizoram (0.109). These data compare well with the mean difference of the pre and post responses for these States.

Examination of the frequency distribution of responses of each category in the All-State pooled data revealed that the pre test response for Category 1 is 49 0% and 50.9% households responded to Category 2, i.e., 'not washing clothes, utensils etc., near the source of water'. In the post test the responses dropped to 22.8% for Category 1, and increased to 77.2% for Category 2. Thus, there was a gain of 54.4% for the positive behaviour (Category 2). It can, therefore, be concluded that this message was also well received by the members of the community.

The State-wise frequency distribution shows that in Bihar, 70.7% households responded to Category 1 in the pre test, which dropped to 14.7% in the post test. For Category 2, the response was 29.6% in the pre test, which improved to 85.3% in the post test. This clearly shows that there was a gain of 55.7%—indeed a movement towards the positive practice. This

TABLE 8. Q-34

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-34 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14886	1.509 (0 263)	1.772	0.296	-40.833	.0001	-236	+2858
Bihar	00985	1.296 (0 557)	1 853	0.558	-20.245	.0001	-001	+0549
Karnataka	03452	1 520 (0 085)	1 605	0.095	-14.139	.0001	-016	+0311
Maharashtra	02220	1.739 (0 062)	1 801	0 070	-09.584	.0001	-009	+0147
Mizoram	00950	1 314 (0 093)	1 407	0 109	-07.613	.0001	-007	+0096
Orissa	00820	1.248 (0.512)	1 760	0.517	-17 675	.0001	-002	+0422
Rajasthan	03912	1 359 (0 336)	1 695	0 490	-26.013	.0001	-300	+1612

substantial gain clearly indicates that the message was extremely well received in Bihar. The data for Rajasthan shows figures of 63.5% and 36.2% in Categories 1 and 2, respectively, in the pre test. In the post test responses, these figures were 30.4% (Category 1) and 69.5% (Category 2). Thus there was a gain of 39.1%. In Maharashtra, which shows the least mean of differences, the positive practice (Category 2) was responded to by 73.9% households in the pre test, and by 80 1% in the post test, thereby registering a gain of 6.2% Thus, even when the majority of households followed the positive practice of not polluting the source of water, the States registered gains as a result of the intervention programmes.

The result reaffirms the belief that direct personal contact does help in improving the community's awareness and in motivating action for proper care of the sources of water.

Message IX:

Q. 35. *Do you wash yourself after defecating near the source of water ?*

The data presented in Table 8.Q-35 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, except in the case of Mizoram where it is not significant. Thus the null hypothesis is rejected in all cases and the alternate hypothesis of difference existing between the pre and post test responses of the community members is found tenable. The number of positive ranks as shown in the table is significantly greater than the number of negative ranks in the case of all the States. This is quite evident in the mean of differences of the All-State pooled data, i.e., 0.291 Thus the data indicate that in most households the members followed desirable sanitary habits as a result of the intervention programme and avoided washing themselves after defecation near the source of water.

Orissa shows the highest value for mean of differences (0.526), followed by Rajasthan (0.521), and Bihar (0.494).

Examination of the frequencies in each category of responses given by the households in the All-State pooled data revealed that Category 1 in the pre test, i e , 'Yes' (an undesirable practice), was responded to by 48.6% households. Category 2, i e., 'No' (a positive item), was responded to by 51.4% in the pre test In the post test, 21% households responded to Category 1, and 78.4% to Category 2. Thus, there was a gain of 27% in Category 2 and an equal drop in the responses to Category 1. This substantial gain in responses to the positive item and an equal fall in the negative item very strongly indicate that the message was extremely well received by the members of the community.

The State-wise frequency distribution in Orissa, (which has the highest mean of differences, i e., +0.526) showed that 74.3% households responded to Category 1 in the pre test, which dropped substantially to 22.8% in the post test. For Category 2, the response was

TABLE 8. Q-35

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-35 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14869	1.514 (0 270)	1 784	0.291	-41.695	.0001	-214	+2904
Bihar	00980	1.380 (0.493)	1.873	0.494	-19.062	.0001	-000	+0484
Karnataka	03452	1.503 (0.080)	1.583	0.088	-13.820	.0001	-013	+0291
Maharashtra	02220	1 723 (0 059)	1.782	0.071	-09.109	.0001	-013	+0145
Mizoram	00950	1.983 (0.000)	1.983	0.002	-00.000	NS	-001	+0001
Orissa	00818	1.257 (0.521)	1.778	0.526	-17.802	.0001	-002	+0428
Rajasthan	03901	1.395 (0 365)	1.760	0.501	-27.895	.0001	-264	+1689

25.7% in the pre test, 77.8% in the post test. Thus there was a substantial gain of 52.1%. This strongly indicates that the message was extremely well received and the community members realised the importance of not polluting the source of water. In Bihar, 62% households responded to Category 1 in the pre test, and 12.7% in the post test—a substantial drop of 49.3% for Category 1. For Category 2, the pre test response was 38% as compared to the post test response of 87.3%. Here again, the gain was substantial, i e, 49.3% The data clearly indicate that in Bihar, the community as a whole moved towards the positive practice of not polluting the source of water and adopting a better practice of community hygiene. In Rajasthan, 60 5% households responded to Category 1 in the pre test, and in the post test, only 23.9%. 39 5% households responded to Category 2 in the pre test, whereas the post test response was 76.1%. It can, therefore, be seen that there was a 36.6% drop in the response to Category 1, and a gain of 36 6% for Category 2. In Maharashtra, 27 7% households favoured Category 1 in the pre test as compared to 21.8% in the post test, whereas in Category 2 the pre test response was 72.3%, and the post test response, 78 2%. The data further indicated that in the case of Maharashtra the message was well received, but no substantial change in the members of the community from negative to positive behaviour was recorded due to the fact that the traditional healthy practice was already prevalent in the community.

The State-wise data of the frequency of responses by the households for each of the categories also supported the fact that the message delivered to the community was well received and the community members adopted the healthier practice of not washing near the source of water after defecation. It is interesting to note that significant gains were achieved in the case of Bihar, Rajasthan and Orissa as compared to States like Maharashtra and Karnataka. Mizoram did not show any significant difference in this part of the message.

Message IX:

Q. 36: *Do you bathe yourself and wash/bathe your domestic animals near the source of water ?*

The data presented in Table 8.Q-36 show that the Z value of the All-State pooled data and those of the States are significant at leas than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the members of the community. As can be seen from the All-State data, the mean of differences, i.e., 0.287, is quite significant. In addition, the pre and post test mean difference of group data is also 0.260. Thus, all results indicate that the majority of households did not pollute the source of water by either bathing themselves or bathing their domestic animals near the source of water, as a result of the

TABLE 8. Q-36

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-36 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14804	1.569 (0.260)	1.829	0.287	-40 946	.0001	-207	+2799
Bihar	00984	1.432 (0.454)	1.886	0.456	-18 279	.0001	-001	+0448
Karnataka	03451	1.548 (0.078)	1.626	0.092	-13.123	.0001	-024	+0294
Maharashtra	02221	1.866 (0.044)	1.910	0.057	-07.576	.0001	-014	+0112
Mizoram	00940	1.868 (0.081)	1.949	0.083	-07.476	.0001	-001	+0077
Orissa	00809	1.358 (0.557)	1.915	0.561	-18.300	.0001	-002	+0452
Rajasthan	03842	1.458 (0.334)	1.792	0.469	-26.199	.0001	-257	+1541

message delivered to them.

The highest mean of differences is observed in the case of Orissa (0.561), followed by Rajasthan (0.469) and Bihar (0.456). These values are almost the same as shown by the pre and post mean differences. All these results confirm that the community as a whole changed their behaviour. In addition, the 2799 positive ranks as against the 207 negative ranks confirm the above results.

Examination of the frequency distribution of the All-State pooled data of responses for each of the categories in the pre and post tests revealed some interesting results. In the pre test, 43.1% households responded to Category 1 (negative practice), whereas, in the post test, 17.1% responded to this category; 56.9% households responded to Category 2 in the pre test as compared to 82.9% in the post test. Therefore, there was a gain of 26%. The data clearly indicate that as a result of the intervention, the community by and large moved away from the negative practice of washing and bathing near the source of water, thus preventing pollution of the water source.

In conclusion, it may be noted that the mean of positive ranks values of +2853.66 as against the negative 219 presented in Table 36-M clearly indicate that the overall environmental sanitation message, particularly in respect of prevention of pollution of the source of water, was by and large followed by the community. The State-wise gains were more in the educationally backward states of Rajasthan, Bihar and Orissa. The results obtained in respect of this particular message prove that environmental awareness and steps for prevention of pollution of water can be very effectively conveyed to the members of the community through interpersonal contact without any great input in terms of money.

TABLE 8-M-IX

Positive and negative ranks and mean ranks pertaining to message IX for All-States and States

	Message IX (Q 34, 35 & 36)				
State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	Rank order
All States	657	8561	219	2853.667	
Bihar	2	1481	.667	493 667	2
Karnataka	53	896	17.667	298.667	4
Maharashtra	36	414	12	138	5
Mizoram	9	174	3	58	6
Orissa	6	1302	2	434	3
Rajasthan	821	4842	273.667	1614	1

Message X: **Keep your body clean, pay special attention to nails and teeth.**

Q. 37: *How often do you take bath ?*

The data presented in Table 8. Q-37 show that the Z value of the All-State pooled data and those of the States, except Orissa, are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the community members. The

All-State pooled data shows 2258 positive ranks as compared to the 414 negative ranks. This clearly indicates that the message was well received by the members of the community. The mean of differences for All-State pooled data, i.e., 0.403, supports the results indicated by the significant Z values. However, the pre and post mean difference (0.291) differs from the mean of difference values. The highest mean of differences is observed in the case of Rajasthan (+0.833), followed by Mizoram (+0.568) and Bihar (+0 554). The least mean of differences is observed in the case of Orissa where the value is not significant. In addition, the pre and post mean differences in some cases do not follow the same trend the value in Rajasthan being +0.495 and in Orissa +0.011. The results, therefore, indicate that households, by and large, moved towards desirable habits of personal cleanliness.

Examination of the frequency distribution of responses for each of the categories in the All-State pooled data revealed that the pre test responses for Categories 1, 2, 3, 4 and 5 were 0.1%, 5.4%, 13.2%, 20.0% and 60.4%, respectively, which subsequently changed to 0.1%, 2.1%, 7.6%, 15 8% and 74.4%, respectively, in the post test. The frequency distribution clearly indicated that Category 5, i.e., 'taking bath daily', was the most popular response in both the pre and the post test, and only a small percentage of households responded to 'taking bath only once a week'. The State-wise frequency distribution showed that in the case of Mizoram, there was a significant movement from the pre test response to the post test response. 9 3% households responded to Category 2, i.e., 'taking bath once a week', in the pre test, which dropped substantially to 3.9% in the post test. Similarly, 37.6% households responded to Category 3, i.e., 'taking bath twice a week', in the pre test, which dropped to 21.3% in the post test. 34% households responded to Category 4 in the pre test compared to 26.4% in the post test. There was a substantial gain in Category 5 wherein 19.2% households responded in the pre test, which improved to 48.4% in the post test. Thus, there was a gain of 29.2%. The data strongly indicated that the households in this State gained substantially through this message to improve their habits of personal hygiene. This is notwithstanding the fact that water is a scarce commodity in this far-flung North Eastern State and the community members have to undergo hardship for obtaining water for their daily use. Examination of the data from Maharashtra shows that 98% households responded to Category 5 in the pre test, and 91% in the post test. Thus, already, the positive practice of taking bath every day was in vogue prior to the intervention programme. In Orissa, 97.7% households responded to Category 5 in the pre test as compared to 98.8% in the post test; thus the results were not significant. The practice of taking bath daily is a part of the traditional behaviour of the community members all over

TABLE 8. Q-37

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-37 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	15031	4 332 (0.291)	4.623	0.403	-32 720	.0001	-414	+2258
Bihar	00990	4.290 (0.553)	4.843	0.554	-15.358	.0001	-000	+0314
Karnataka	03448	3 992 (0.212)	4 204	0.248	-20.204	0001	-052	+0693
Maharashtra	02173	4 974 (0 010)	4 984	0 010	-03 823	.0001	-000	+0019
Mizoram	00950	3.631 (0.563)	4 194	0.568	-15.959	.0001	-002	+0341
Orissa	00820	4.962 (0 011)	4 973	0.023	-01 562	NS	-005	+0010
Rajasthan	04103	3.849 (0 495)	4.344	0.833	-24.648	.0001	-550	+1694

TABLE 8. Q-38

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-38 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	15011	1.984 (0.007)	1.991	0.017	-03.434	.001	-066	+0120
Bihar	00975	1 930 (0 061)	1.991	0 061	-06.680	.0001	-000	+0059
Karnataka	03442	1.996 (0.000)	1.996	0.002	-00 734	NS	-004	+0002
Maharashtra	02200	1.999 (0.001)	2.000	0 000	-01.000	NS	-000	+0001
Mizoram	00950	1.998 (0 002)	2.000	0.002	-01.000	NS	-000	+0001
Orissa	00820	2.000 (0.000)	2.000	0.000	-00 000	NS	-000	+0000
Rajasthan	04078	1.966 (0.007)	1 973	0.047	-01 677	NS	-083	+0108

India. And yet, considerable gains were registered in some States.

Message X:

Q. 38: *What do you use to clean your body ?*

The data presented in Table 8.Q-38 show that the Z values of the All-State pooled data and of Bihar are significant at less than the 1 per cent level. the Z values of all other State, viz., Karnataka, Maharashtra, Mizoram, Orissa and Rajasthan, are not significant. Thus the null hypothesis is rejected for All-State and for Bihar, but is accepted for all the other States mentioned above.

The significant mean of differences for the All-state pooled data, i.e., +0.017, and the difference between the means of the pre and post test responses of the community members definitely indicate that there was change in the behaviour of the community Further, the 120 positive ranks as against the 66 negative ranks in the All-State data also support this. The positive ranks in Bihar (59) and Rajasthan (108) may have contributed to this result

The frequency distribution for the All-State pooled data shows 1.5% households responding to Category 1, i.e., 'any other response', and 98.5% households responding to Category, 2, i e., using 'soap' or '*chiknimitti*' or '*Besan*'/'*Atta*' or 'soapstone' for cleaning the body. Since Category 2 mentions almost all the alternative cleansing agents, Category 1 can be regarded as a negative response, meaning thereby that a certain percentage (1.5%) of households in the total population were not using any form of cleansing agent Seen in this perspective, the post test responses of .9% for Category 1 and 99.1% for Category 2 definitely point to the fact that the community did change over to the better habit of cleaning their bodies by using any of the alternative cleansing agents mentioned earlier. Scrutiny of the frequency distribution of Bihar showed that 7% households responded to Category 1 in the pre test as compared to a mere 9% in the post test—a drop of 6.1%. Similarly, 93% households responded to Category 2 in the pre test and 99% in the post test, thus registering a gain of 6.9%. This data is very interesting, it shows that in Bihar a large number of households changed over to a healthier personal sanitation practice as a result of the intervention programme. In all other States, the positive practice was already prevalent as shown by the data presented above

Message X:

Q. 39: *What do you use to wipe your body ?*

The data presented in Table 8. Q-39, show that the Z values of the All-State pooled data and of Bihar and Rajasthan are significant at less than 1 per cent level, whereas the Z values of Karnataka, Maharashtra, Mizoram, Orissa are not significant The results obtained enable us to reject the null hypothesis of no difference existing between the pre and post responses of the community members of All-State, Bihar and Rajasthan. the alternate hypothesis is, there-

TABLE 8. Q-39

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-39 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S	-Ranks	+Ranks
All States	14897	1 974 (0 021)	1.995	0.026	-11.384	.0001	-028	+0245
Bihar	00977	1.803 (0 190)	1.993	0.189	-11.795	.0001	-000	+0185
Karnataka	03417	1 998 (0 000)	1.998	0 002	-00.734	NS	-002	+0004
Maharashtra	02212	1.999 (0.001)	2.000	0.000	-01.000	NS	-000	+0001
Mizoram	00948	2.000 (0.000)	2.000	0.000	-00.000	NS	-000	+0000
Orissa	00720	1 982 (0.014)	1 996	0.014	-02.803	05	-000	+0010
Rajasthan	04073	1.962 (0 025)	1.987	0.045	-06.695	.0001	-040	+0145

fore, found tenable in these cases, and rejected in the case of the other States.

In the All-State pooled data, the significant mean of differences, i.e., +0.026, and the difference between the means of pre and post tests, i.e., +0.021, coupled with the 245 positive ranks as against the 28 negative ranks clearly indicate that the differences between the pre and post responses are not due to chance. Thus it can be concluded that a significant number of community members in the total sample took to healthier practice of using towel/clean cloth to wipe their bodies after bath as a result of the message delivered to them.

In the State-wise data, the highest mean of differences, i.e., +0 189, is seen in the case of Bihar, followed by +0.045 in Rajasthan. Further, the 185 positive ranks in Bihar and the 145 positive ranks in Rajasthan as against the 40 negative ranks also support the result obtained through the Z values.

The frequency distribution of the households to various categories of responses in the All-State pooled data showed that 2.7% households responded to Category 1 (negative practice) and 97.3% to Category 2 (positive practice) in the pre test. In the post test, .5% responded to Category 1 and 99 5% to Category 2. Thus there is a drop of 2.2% for Category 1, and a gain of the same percentage for Category 2.

Scrutiny of the State-wise frequency distribution showed that in Bihar, 19.7% households responded to Category 1 in the pre test as against .9% in the post test. Thus, there was a drop of 19%. For Category 2, 80.3% households responded in the pre test as compared to 99.3% in the post test, thus registering a gain of 19.3%. The data strongly indicate that the message was very well received in Bihar. The data from Rajasthan showed a gain of 2.5% for Category 2, and a drop of 2.5% for Category 1. Though a large percentage (96.2%) of the households were already practising the desirable habit, yet the intervention programme did make an impact and more members adopted the desirable practice.

Message X:

Q. 40: *How often do you wash the cloth/towel with which you wipe your body ?*

The data presented in Table 8.Q-40 show that the value of the All-State pooled data and those of the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and the post test responses of the community members. In the All-State pooled data, the difference between the pre and post test means, i.e., +.387, compares favourably with the mean of differences, i.e., +0.461. The 3511 positive ranks and 336 the negative ranks for the All-State pooled data further support the trend.

The mean of differences varied from State to State. The highest mean of differences is observed in the case of Bihar (+0.662) and the

TABLE 8. Q-40

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-40 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	14992	3 242 (0.387)	3.629	0.461	-44 743	.0001	-336	+3511
Bihar	00980	3.259 (0.662)	3 921	0.662	-18.785	.0001	-000	+0470
Karnataka	03404	3.187 (0.178)	3.365	0.206	-19.496	.0001	-039	+0634
Maharashtra	02221	3.485 (0.155)	3.640	0.176	-14.854	.0001	-021	+0361
Mizoram	00948	2.647 (0 393)	3 040	0.417	-14.709	.0001	-011	+0310
Orissa	00816	3.373 (0.437)	3.810	0.442	-15.781	.0001	-002	+0337
Rajasthan	04073	3.055 (0.390)	3.445	0.640	-23.352	.0001	-435	+1512

lowest in the case of Maharashtra (+0.206). For Orissa, this value is +0.442, followed by Rajasthan (+0.640) and Mizoram (+0.417). The data shows that the educationally backward States of Orissa, Bihar and Rajasthan registered higher mean of differences than Karnataka and Maharashtra.

There is a parity between the mean of differences and the difference between the means of the pre and post tests. The overall pattern of State-wise gains indicated by the means of differences is supported by the difference between the means of the pre and post tests in the same proportion, thus further strengthening the assumption that the message was well received and, by and large, the community members gained through the intervention programme.

Examination of the frequency distribution of responses for each category of responses by the households in the All-State pooled data indicated that 0%, 3.1%, 10.2% and 40.5% households responded to Category 1, 2, 3 and 4, respectively, in the pre test. The position in the post test was changed to 7% households responding to Category 1, i.e., 'any other response' 7.33% responding to Category 2, i e., 'washing clothes/towels once in a fortnight', 28.4% responding to Category 3, i.e., 'once a week', and 67.6% responding to Category 4, i.e., 'daily'. The frequency distribution showed that there was a substantial gain in the post test responses in the case of Categories 3 (18.2%) 4 (27.1%).

The State-wise frequency distribution of households responding to the various categories revealed interesting findings. In Bihar, 5.7%, 9.8%, 33.3% and 47.1% households responded to Categories 1, 2, 3 and 4, respectively, in the pre test. In the post test, these figures were 0%, .7%, 6.4% and 92.9% for Categories 1, 2, 3 and 4, respectively. It can be seen that there was a substantial gain of 45.8% in favour of Category 4, i.e., 'washing daily the cloth/towel used for wiping body after taking bath'. It can, therefore, be safely concluded that the message was extremely well taken in Bihar and, by and large, the community adopted the healthy practice of washing the cloth/towel daily.

In Orissa, 4.7%, 53.1% and 42.2% households responded to Categories 2, 3 and 4, respectively in the pre test. The figures for the post test were 1.3% for Category 2, 15.9% for Category 3, and 82 6% for Category 4. Therefore, in the case of Orissa also, there was a gain (40.4%) in Category 4. In Mizoram, 40.7% households responded to Category 2, 45 4% to Category 3 and 11.1% to Category 4 in the pre test, whereas in the post test, 18.7%, 58.3% and 22.9% responded to Category 2, 3 and 4 respectively. As can be seen from the data presented above, there was a move in the positive direction but not as pronounced as in the case of Bihar and Orissa. Maharashtra, which registered the least mean of differences showed 53.7% households responding to Category 4, i.e., 'washing daily cloth/towel' in the pre test,

which improved to 67.1% in the post test, thus registering a gain of 13.4% It is important to note that this was the first and only significant gain registered by Maharashtra

All the above results indicate that this part of the message was very well received by a majority of the community members in most of the States Though the practice of taking bath daily may be prevalent in most of these States, keeping clean the cloth/towel used for cleaning and wiping the body dry was not a common practice as shown by the varied response. It will not doubt be realised that a simple but effective message like this one can help people to adopt better practices of personal hygiene.

Message X:

Q. 41 *Do you clean your eyes, ears, teeth, nose and face as you get up in the morning ?*

The data presented in Table 8 Q-41 show that the Z value of the All-State pooled data and those of the States are significant at less than the 1 per cent level, except in the case of Rajasthan where the Z value is significant at the 5 per cent level. Thus the null hypothesis is rejected and the alternate hypothesis of difference existing between the pre and post test response of the community members is found tenable

The mean of differences of the All-State pooled data is +0.050, but the difference between the pre and the post test means is +0 025 The positive ranks (+337) outnumber significantly the negative ones, i.e., 96 All these data point to the fact that this part of the message was well received. Examination of the State-wise data shows that the highest mean gain of differences is observed in the case of Mizoram (+0.177), followed by Orissa (+0.70) and Bihar +0 069 In addition, a similar trend is also noted in respect of the difference between means of the pre and post test responses. The least mean gain difference is observed in the case of Maharashtra , i.e., 0 007. Thus there is a parity between the mean of differences and differences of means of the pre and post tests.

Examination of the frequency distribution of households responding to each category of responses in the All-State pooled data showed that 3.6% households responded to the Category 1, i.e., 'No', in the pre test, and 96.8% responded to Category 2, i.e. 'Yes'. In the post test, 1.4% households responded to Category 1 and 98.6% to Category 2. The data indicate that most of the community members were following positive habits of personal cleanliness and, as a result of the intervention programme, those members who were not practising the cleaning of eyes, teeth and nose in the morning started practising the same.

Examination of the State-wise frequency distributions showed a varied response pattern The data from Mizoram showed that only 74.1% households followed the positive practice, i e., Category 2, in the pre test, and 91.8% in the post test Thus there was a significant gain of 17.7%. In Orissa, 92.9% households

TABLE 8. Q-41

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-41 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	15048	1.961 (0.025)	1 986	0 050	-09.971	0001	-096	+0337
Bihar	00983	1 918 (0 069)	1.987	0.069	-07.167	0001	-000	+0068
Karnataka	03448	1 968 (0.015)	1 983	0.026	-04.943	.0001	-018	+0072
Maharashtra	02219	1 986 (0 007)	1 993	0 007	-03.408	.001	-000	+0015
Mizoram	00947	1 741 (0.177)	1 918	0 177	-11.208	0001	-000	+0167
Orissa	00819	1 929 (0 070)	1.999	0 070	-06 567	0001	-000	+0057
Rajasthan	04083	1 958 (0.011)	1.969	0 067	-02.352	.05	-112	+0159

responded to Category 2 in the pre test as compared to 99.9% in the post test In Bihar, 91.8% households responded to Category 2 in the pre test, and 98.7% in the post test, resulting in a gain of 6.9%. In Maharashtra and Karnataka, 98.6% and 96 8% households, respectively, responded to Category 2 in the pre test, which improved to 99.3% and 98.3%, respectively, in the post test. All these data clearly point to the fact that in most of the States the community members, by and large were following desirable habits of personal cleanliness. Yet, as the significant Z values show, the intervention *did* make a difference and helped to improve the habits of personal cleanliness.

Message X:

Q. 42. *Do you brush your teeth daily, especially after taking meals ?*

The data presented in Table 8.Q-42 show that the Z value of the All-State pooled data and these of the States are significant at less than 1 per cent level, except in the case of Orissa where it is not significant. Therefore, the null hypothesis is rejected for All-State, except Orissa, and the alternate hypothesis of difference existing between the pre and the post test responses of the community members is considered tenable.

The All-State data show 627 positive ranks as against the 39 negative ranks The mean of differences is +0.075, and the difference between the pre and the post test means is +.058, which is less than the former All these results support the alternate hypothesis as indicated above and point to the fact that this part of the message was well received by the members of the community. The highest mean gain difference is observed in the case of Mizoram (+0.232), and the least value is observed in the case of Orissa (+0.009) where the result is not significant

There is a parity between the mean of differences and the difference between the means of the pre and post tests in all the States. It is the highest in Bihar (+0 160) and the least in Orissa (0.004). These data further support the results indicated by the means of difference values and the Z values

Examination of the frequency distribution of households responding to each category of responses in the All-State pooled data showed that 11.2% households responded to Category 1 in the pre test as compared to 5.4% in the post test. The response for Category 2 was 88.8% in the pre test, which improved to 94.6% in the post test. Thus there was a gain of 5.8%.

The State-wise frequency distribution of responses showed that in Mizoram, 25.9% households responded to Category 1, i e., 'No' and 74.1% to Category 2, i e., 'Yes', in the pre test, whereas in the post test, 8.2% responded to Category 1 and 91.8% to Category 2. These data clearly indicate that in the post test, a large majority of households responded to the positive behaviour of brushing teeth daily, especially after taking food. The gain in the case of

TABLE 8. Q-42

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 42 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	15050	1 888 (0.058)	1.946	0.075	-19.743	.0001	-39	+0627
Bihar	00978	1.785 (0.160)	1 945	0 160	-10.834	.0001	-000	+0156
Karnataka	03448	1.797 (0 055)	1.852	0 063	-11 209	.0001	-013	+0203
Maharashtra	02221	1.882 (0 041)	1.923	0.041	-08.329	0001	-000	+0092
Mizoram	00948	1 664 (0 232)	1 896	0.232	-12.860	.0001	-000	+0220
Orissa	00817	1 994 (0 004)	1 998	0 009	-01.014	NS	-002	+0005
Rajasthan	04090	1.960 (0.030)	1 990	0.048	-07.759	.0001	-032	+0156

TABLE 8. Q-43

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-43 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	14021	2 487 (0 192)	2 679	0.286	-24.885	0001	-389	+1438
Bihar	00976	2.905 (0 078)	2 983	0.078	-06.791	.0001	-000	+0061
Karnataka	03452	2.402 (0.225)	2.627	0.234	-18.148	0001	-011	+0464
Maharashtra	02220	2.177 (0.088)	2.265	0.088	-08.810	.0001	-000	+0103
Mizoram	00947	2 602 (0.177)	2.779	0.186	-07 777	0001	-002	+0086
Orissa	00819	2 996 (0.000)	2.996	0.000	-00 000	NS	-000	+0000
Rajasthan	04058	2.337 (0 201)	2.538	0.564	-12.913	.0001	-533	+1005

Mizoram for Category 2 was 17 7%. Orissa, which showed the least mean gain difference, had only 7% households responding to Category 1, i.e., 'No', and 99.1% to Category 2, i.e., 'Yes', in the pre test, whereas in the post test, 99.5% responded to Category 2 Thus there was no significant difference in the pre and the post test responses because the positive behaviour seemed to have been already prevalent in the community even before the intervention programme was undertaken. However, it was further strengthened as a result of the intervention.

In Bihar, 21.5% households responded to Category 1 in the pre test, which dropped to 5.5% in the post test. For Category 2, 78.5% households responded in the pre test, and 91 5% in the post test Thus, there was a gain of 13%. The frequency distribution for pre and post test responses varied in the case of all other States but, by and large, the picture presented shows that the community members gained substantially as a result of intervention programme.

Message X:

Q 43: *What do you use for brushing your teeth?*

The data presented in Table 8.Q-43 show that the Z value of the All-State pooled data as well as those of the States except Orissa, are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the members of the community.

The All-State pooled data show +0.286 as the mean of differences and +0.192 as the difference between the means of the pre and post test responses. In the State-wise results, Rajasthan shows the highest mean of differences (+0.564), followed by Karnataka (+0.234). The pre and post test mean difference also tallies favourably with the mean gain of differences. The least mean of differences is in the case of Bihar, i.e., .078, the means of the pre and post tests being the same. No difference is observed in the case of Orissa In All-State polled data, 1438 positive ranks as against the 389 negative ranks further support the trend show above.

Examination of the frequency distribution of each category of responses in the pre and post tests for the All-State pooled data revealed that only 21.8% households responded to Category 1 in the pre test as compared to 12.2% in the post test. As regards Category 2, 7.7% households responded in the pre test and 7.6% in the post test The maximum gain was observed in the case of Category 3 where the households responding to this category in the pre test was 70.5% as compared to those responding to the post test, i.e., 80.2%. Thus, there was a gain of 9.7% showing that a significant number of households benefited from this message.

However, a detailed examination of the data from Orissa showed that 99 6% households responded to Category 3 both in the pre and post tests. Thus, the results were not significant in

the case of Orissa. In Mizoram, 19 9% of the households responded to Category 1, i e., 'using charcoal for cleaning teeth', in the pre test, which dropped to 11.0% in the post test. As regards Category 3, i.e , 'use of *datoon*/tooth-paste/tooth-powder', the response was 80.0% in the pre test and 88.9% in the post test. In Karnataka, 27.7% responded to Category 1 in the pre test as compared to 16% in the post test. As regards Category 2, 65.9% households responded in the pre test as compared to 78.7% in the post test. Thus there was the considerable gain of 12 8% towards the positive behaviour of using proper material for cleaning teeth as also a trend away from using charcoal for cleaning teeth In Rajasthan, 23 9% households responded to Category 1 in the pre test which dropped to 12.3% in the post test 57 8% households responded to Category 3 in the pre test, while the post test responses were 66 2%. Thus there was a gain of 8.4% for Category 3. In Bihar, only 2% households responded to Category 1 in the pre test In the post test, 98 3% households responded to Category 3 in comparison to 92 5% in the pre test Thus, their was a gain of 5 8%. In Maharashtra, 39.6% households responded to Category 1 in the pre test and 35.4% in the post test. In Category 3, 57.3% households responded in the pre test, but 61 8% in the post test.

These results clearly indicate that a large number of households significantly improved their habit of dental care as a result of the message delivered to them. In the case of Orissa and Bihar, the status before the intervention was already positive.

Message X.

Q. 44: *Do you wash your hands before and after taking meals ?*

The data presented in Table 8. Q-44 above show that the Z value of the All State pooled data and those of all other States, except Karnataka, are significant at less than the 1 per cent level. In the case of Karnataka. the Z value is not significant. Therefore, the null hypothesis is rejected for the All-State pooled data and for Bihar, Maharashtra, Mizoram, Orissa and Rajasthan, and the alternate hypothesis of difference existing between the pre and post test responses of the members of the community is found tenable. The mean of differences for the All-State pooled data is + 054, and the pre and post mean difference is +.033, which is considerably lower than the former. The 445 positive ranks as against the 108 negative ranks also support the trend observed through the values of significance All the data indicate that a large number of households achieved significant positive gains, and that this part of the message was delivered effectively and well received.

The State-wise detailed analyses of the results show that maximum mean of differences is observed in the case of Rajasthan (.141), followed by Orissa (.066) and Bihar (.061). It is interesting to note that these mean gain differences are higher than that of the All-State

TABLE 8. Q-44

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-44 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14417	1 942 (0 033)	1 975	0.054	-12.357	.0001	-108	+0445
Bihar	00971	1 931 (0 061)	1.992	0.061	-06.680	.0001	-000	+0059
Karnataka	03444	1.980 (0 003)	1 983	0 015	-01 207	NS	-021	+0031
Maharashtra	02219	1.965 (0.021)	1.986	0.021	-05 968	.0001	-000	+0047
Mizoram	00948	1 968 (0.028)	1 996	0.032	-04 076	.0001	-001	+0028
Orissa	00817	1 933 (0 066)	1.999	0.066	-06 393	.0001	-000	+0054
Rajasthan	03469	1.869 (0.058)	1.927	0.141	-07 993	.0001	-141	+0346

pooled data The least mean of differences is observed in the case of Karnataka where the results were not significant. There is a parity between the mean of differences and the difference between the pre and post test means in all the States It is again the highest in Rajasthan and the least in Karnataka

Examination of the frequency distribution of responses of households in the All-State pooled data indicated that 5 8% households responded to Category 1 in the pre test as compared to 2.5% in the post test. As regard, Category 2, 94 2% households responded in the pre test while 97.5% responded in the post test. Thus, there was a gain of 3.5% Though the gain was not very high in the All-State pooled data, a detailed examination of the State-wise frequencies revealed interesting results In Rajasthan, which showed the highest mean of differences, the frequency of households in Category 1 was 13 1% in the pre test and 7 2% in the post test. Similarly, in the pre test, 86.9% households responded to Category 2, i.e , 'Yes', which increased to 92.7% in the post test. Thus, there was a gain of 12 8%. In Maharashtra, 3.5% households responded to Category 1 in pre test in comparison to 1.4% in the post test. As regards Category 2, 96 5% households responded in the pre test and 98 6% in the post test, which shows a mean gain difference of 2 1% In Orissa, 6.7% households responded to Category 1 in the pre test, which dropped to .1% in the post test As regards Category 2, 93.3% households responded in the pre test and 99.9% in the post test. These results clearly indicate that the members of the community received the message well though the extent of its acceptability, as shown by improvement in the post test response for positive behaviour, varied from State to State.

The data presented above strongly support the assumption that the message which require change of behaviour can be effectively conveyed to the community members even if these are not accompanied by any monetary or material rewards, provided there is sustained interpersonal communication and contact between the motivators and the members of the community.

Message X:

Q 45: *Do you wash your mouth thoroughly after every meal ?*

The data presented in Table 8.Q-45 show that the Z value of the All-State pooled data as well as those of the States are significant at less than the 1 percent level thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and post test responses of the members of the community

The All-State pooled data shows +0.122 as the mean of differences and +0.100 as the difference between the means of the pre and post tests. In the State-wise results, these values vary from State to State, the highest mean of differences being observed in the case of Rajasthan (+0.236), followed by Bihar (+0 088) and Orissa (+0 083) The least mean of differences is observed in the case of Mizoram

TABLE 8. Q-45

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q 45 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L.S.	-Ranks	+Ranks
All States	14879	1 810 (0 100)	1 910	0.122	-24.379	.0001	-140	+1150
Bihar	00987	1 898 (0.088)	1.986	0.088	-08.101	0001	-000	+0087
Karnataka	03430	1 739 (0 074)	1 813	0 081	-13.025	.0001	-014	+0265
Maharashtra	02221	1.871 (0.073)	1.944	0 079	-10.590	0001	-007	+0169
Mizoram	00948	1.965 (0 023)	1 988	0.036	-03.291	.001	-006	+0028
Orissa	00818	1 907 (0 081)	1.988	0.083	-06.957	0001	-001	+0067
Rajasthan	03948	1.724 (0 143)	1 867	0.236	-15.913	.0001	-185	+0743

(+0.036) The mean of differences in Rajasthan is significantly higher than that of the All-State pooled data. In addition to the above, there is a parity between the values of the means of differences and the difference between the means of pre and post tests. The difference between the means of the pre and post tests for all these States are proportionately similar to the mean gains mentioned earlier The 1150 positive ranks of the All-State pooled data as against the 140 negative ranks reaffirm these results Thus, the data indicate that the message was well received by the members of the community.

Examination of the frequency distribution of the responses of households in the pre and post tests of the All-State pooled data revealed that only 18 9% households responded to Category 1, i e , 'No', and 81 9% households responded to Category 2, i e., 'Yes'. In the post test the households responding to Category 1 was 9%, and those responding to Category 2, 91%. Thus, there was a significant drop in Category 1 the (the negative response) by 9 9%, and a movement towards the positive response of Category 2 by 10 1%. The data strongly suggests that, by and large, the members of community followed the healthier practice of cleaning the mouth after every meal as a result of the message delivered to them

However, a detailed examination of the Statewise frequency distribution indicated that in Rajasthan, 27.3% households responded to Category 1 in the pre test as compared to 13 2% in the post test. As regards Category 2, 72.6% households responded in the pre test and 86 7% responded in the post test. Thus, there was a gain of 14.1% towards the positive behaviour. Examination of the frequency distribution of the other States also indicated that though the percentage responses varied, yet a large number of households started practising the desirable habit of washing the mouth thoroughly after every meal, thus observing oral hygiene. It can, therefore, be concluded that the message was well received.

Message X·

Q 46: *How often do you cut your nails ?*

The data presented in Table 8.Q-46 show that the Z value of the All-State pooled data as well as those of the States are significant at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between the pre and the post test responses of the members of community

The All-State pooled data show +0.488 as the mean of differences (mean gain) and +0.425 as the pre and post mean difference, which strongly indicates that the message was very well received by the members of the community. The mean of differences vary from State to State. The highest mean of differences is observed in the case of Bihar (+0.901), followed by Rajasthan (732) and Mizoram (.288). The least mean of difference is observed in the case of Maharashtra (0 189).

TABLE 8. Q-46

Means of pre and post tests, their differences, means of differences, Z values, positive and negative ranks pertaining to Q-46 for All-States and for States

State	Number	Pre	Post	Diff	Z Value	L S.	-Ranks	+Ranks
All States	15095	3 164 (0 425)	3.589	0.488	-45.834	.0001	-310	+3587
Bihar	00981	2 576 (0.887)	3.463	0.907	-21 256	.0001	-006	+0615
Karnataka	03453	2.953 (0 222)	3.175	0.245	-21 367	.0001	-035	+0705
Maharashtra	02221	3 502 (0 183)	3.685	0.189	-15 876	.0001	-006	+0349
Mizoram	00941	2.738 (0 180)	2.918	0 288	-08.578	.0001	-051	+0197
Orissa	00820	3 483 (0 387)	3.870	0.396	-14 880	.0001	-003	+0307
Rajasthan	04123	3 053 (0.482)	3.535	0.732	-26.294	.0001	-427	+1693

The overall position of the 3587 positive ranks as against the 310 negative ranks in the All-State pooled data also confirms the results obtained through the Z values, supporting the assumption that the community, by and large, resorted to the more hygienic practice of cutting their nails once a week.

Examination of the frequency distribution of the responses of households in the pre and post tests of the All-State pooled data revealed that only 4.1% households responded to Category 1; 16.3% responded to Category 2, i.e., cutting nails only once in a month, 36.5% to Category 3, i.e., 'cutting nails once in a fortnight', and 42.4% to Category 4, i e , 'cutting nails once a week' in the pre test response. In the post test, 7%, 21.2% and 69.8% responded to Categories 2, 3 and 4, respectively. The data strongly suggest that the community, by and large, moved towards the positive behaviour of cutting nails once a week since the gain for Category 4 was 27 4%.

An in-depth examination of the State-wise frequency distribution of responses indicated that in Bihar, 39.8% households responded to Category 2 in the pre test, which dropped to 1! 4% in the post test, 33 1% responded to Category 3 in the pre test as against 28.2% in the post test, and 18.6% responded to Category 4 in the pre test as against 59.2% in the post test In Rajasthan, these figures were 16.6%, 37.1% and 38.2% for Categories 2, 3 and 4, respectively, in the pre test as against 6.5%, 29 5% and 62 7%, respectively, in the post test Thus, for Category 4, there was an appreciable gain of 23.5%. In Orissa, the pre test responses of 6.1%, 38.8% and 54 9% for Categories 2, 3 and 4, respectively, changed to 4.3%, 4.1% and 91.5%, respectively, in the post test. There was thus a gain of 36.6%. In Maharashtra, 9.6%, 21.4% and 65.8% households, respectively, responded to Categories 2, 3 and 4 in the pre test as compared to 5 6%, 11.8% and 79.8% in the post test. Thus, there was a gain of 14% for Category 4. The All-State pooled data as well as State-wise data clearly indicated that as a result of the intervention programme the community as a whole moved towards the more positive practice of cutting their nails once in a week.

Message X:

Q. 47: *When you wash your hands do you clean your nails ?*

The data presented in Table 8.Q-47 show that the Z value of the All-State pooled data and those for the States are significant at less than the 1 per cent level, thereby rejecting at less than the 1 per cent level, thereby rejecting the null hypothesis and lending support to the alternate hypothesis of difference existing between pre and the post test responses of the community members. The All-State pooled data also show 2790 positive ranks as against the 210 negative ranks, which confirms the result indicated by the Z values. The mean of differences in the All-State pooled data, i.e., +0.280, and the difference of +0.251 between the pre

TABLE 8. Q-47

Means of pre and post tests, their differences (mean of differences), Z values, positive and negative ranks pertaining to Q-47 for All States and for States

State	Number	Pre	Post	Diff	Z Value	L.S	-Ranks	+Ranks
All States	14939	1 640 (0 251)	1.891	0.280	-40.770	.0001	-210	+2790
Bihar	00953	1.498 (0 445)	1 943	0.445	-17 843	.0001	-000	+0424
Karnataka	03427	1 894 (0 025)	1 919	0 041	-06.356	0001	-027	+0114
Maharashtra	02221	1.777 (0 115)	1 892	0 116	-13.816	.0001	-001	+0257
Mizoram	00947	1.851 (0 075)	1.926	0 096	-06.463	0001	-010	+0081
Orissa	00820	1.299 (0 445)	1 744	0.450	-16.467	0001	-002	+0367
Rajasthan	04044	1 609 (0.210)	1.819	0.347	-19 665	0001	-273	+1124

and post test means indicate that there is a parity between these two values. Examination of the State-wise data shows that the means of differences vary from State to State. The highest mean of differences is found in the case of Orissa (+0.450), followed by Bihar (+0.445) and Rajasthan (+0.345). The least mean of differences is observed in the case of Karnataka (+0 041) In the case of these States the means of differences and the difference between the pre and post test means vary from State to State. Orissa shows the highest mean of differences (0 450), and Karnataka, the least. The same is true of the differences between the pre and post test means.

Examination of the frequency distribution of the All-State pooled data revealed that 36% households responded to Category 1, i.e, 'No' in the pre test, which dropped to 10.9% in the post test. In Category 2, i e., 'Yes', 64% households responded in the pre test and 89 1% in the post test. Thus there was a gain of 25% in favour of Category 2. The data indicates that a large number of households responded to the negative practice of not cleaning the nails while washing hands. As a result of the intervention programme, there was an overall shift from this negative behaviour to the positive behaviour. The State-wise frequency distributions showed that in the case of Orissa, 70.1% households responded to Category 1, which dropped to 25.6% in the post test. As regards Category 2 (positive behaviour), only 29.9% responded in the pre test. This was improved to 74.5% in the post test. Thus, there was a substantial gain of 44.5%. In Bihar, 50.2% households responded to Category 1 in the pre test, which dropped significantly to 5.7% in the post test. As regards Category 2, 49.9% households responded in the pre test, and 94.3% in the post test, thus registering a gain of 44.4%. In Rajasthan, 39% responded to Category 1 in the pre test as compared to 18% in the post test, whereas 60.9% responded to Category 2 in the pre test as compared to 82% in the post test. Consequently, there was a substantial gain of 21% in the post test for both the Categories.

All these figures clearly indicate that the educationally backward States such as Bihar, Orissa and Rajasthan showed significantly higher gains in respect of this part of the message in comparison with States such as Karnataka, Mizoram and Maharashtra. It may be noted that the means of differences for Bihar, Rajasthan and Orissa are much higher than the mean of differences for the All-State pooled data. This further proves that the message was very well received by a large number of the community members, particularly in the educationally backward States.

In conclusion, it may be noted that Table 8.M-X shows 1500.72 as the mean positive rank as against the mean negative rank of 194.18, thus clearly indicating that the overall practices related to cleanliness and care of the sense organs and oral hygiene as well as other habits of personal cleanliness were adopted by a large number of community members as a result of the intervention programme. The community as a whole moved away from the negative practices towards the positive practices of maintaining

TABLE 8.M-X

Positive and negative ranks and mean ranks pertaining to message X for All-States and States

Message X (Q. 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 & 47)

State	-Ranks	+Ranks	Mean -Ranks	Mean +Ranks	-Rank Order
All States	2136	16508	194 182	1500.727	
Bihar	6	2498	0 545	227 091	3
Karnataka	236	3187	21.455	289.727	2
Maharashtra	35	1414	3.182	128.545	4
Mizoram	83	1378	7 545	125.273	5
Orissa	15	1214	1 364	110 364	6
Rajasthan	2811	8685	255 545	789 545	1

TABLE 8.MI-8.MX

Number of questions under each message, message-wise positive and negative ranks and their mean ranks

Message	Question No.	-Rank	+Rank	Mean -Rank	Mean +Rank
I	1, 2, 3	915	6075	305	2025
II	4, 5, 6, 7, 8	1415	14094	283	2818 8
III	9, 10, 11, 12	875	6479	218.75	1619.75
IV	13, 14, 15, 16	838	13277	209.5	3319 25
V	17, 18, 19, 20, 21	1086	10099	217 20	2019 80
VI	22, 23, 24	930	7225	310	2408.333
VII	25, 26, 27, 28, 29	649	4646	129.8	929.20
VIII	30, 31, 32, 33	778	7121	194 5	1780 25
IX	34, 35, 36	657	8561	219	2853 667
X	37, 38, 39, 40, 41 42, 43, 44, 45, 46, 47	2136	16508	194.182	1500 727
Total				2280 93	21274.78
Mean				228.093	2127.478

cleanliness of the body, including the nails and the teeth.

The results of the Message X bring out the importance of interpersonal contact and proper communication skills which were resorted to under this programme. There is no gainsaying that it enhances the possibility of conveying to the community the importance of good habits of personal cleanliness.

In order to have a holistic view of the results of all 10 messages, a concise summary of the entire quantitative data related to number of messages, number of questions, positive and negative ranks and their mean ranks, are presented in Table 8.MI-MX for reference.

The data strongly indicate that the impact of the CCP was positive, suggesting thereby that it is possible to change the perceptions and practices related to nutrition, health and environmental sanitation of the disadvantaged sections of the society with the help of such intervention programmes.

APPENDICES

APPENDIX A

Intructional Materials Developed Under the Pilot Phase

Name and Address of Regional Centre	Sl No	Nature of Material	Title	Age-group Class/Target	Languae
1 Sri Avinashilingam Home Science College for women, Coimbatore-II Tamil Nadu (Southern Region)	1.	Syllabus	NIEES-oriented Syllabus for Primary Schools for Classes I-V	Classes I-V	Enlish
	2	Guide Book	Guide Book for Nutrition and Health Education for Primary School Teachers	Teachers	-do-
2 Biharilal College of Home and Social Sciences, Calcutta University, Calcutta, West Bengal (Eastern Region)	1.	Teachers' Guide	Teachers' Guide Book on Nutrition and Health Education	Teachers	-do-
3. Department of Food and Nutrition, Punjab Agricultural University, Ludhiana, Punjab (Northern Region)	1.	**Textbook**	Secret for Health	Class III	English
	2	-do-	-do-	-do-	Punjabi
	3.	-do-	Food for Health	Class IV	English
	4.	-do-	-do-	-do-	Punjabi
	5	-do-	Nutrition, Health and Hygiene	Class V	English
	6.	-do-	-do-	-do-	Punjabi
	7.	Teachers' Guide	Teachers' Guide	-do-	English
	8.	Reference Manual	Health, Nutrition and Environmental Sanitation. A Reference Manual for Teachers	Teachers	English
	9	-do-	-do-	-do-	Punjabi
4 Department of Food and Nutrition, Faculty of Home Science, M S. University, Baroda, Gujarat (Western Region)	1.	Teachers' Guide	Teachers' Guide for Health	Teachers	Gujarati
	2.	Supplementary material	Science Supplementary Teachers' Guide	Teachers	English
5 State Institute of Science Education, Jabalpur, Madhya Pradesh (Central Region)	1.	Textbook	NIEES Textbook	Class III	Hindi
	2.	Textbook	-do-	Class IV	HIndi
	3	Textbook	-do-	Class V	HIndi
	4	Teachers' Guide	Teachers' Guide	Class III	Hindi
	5	Teachers' Guide	-do-	Class IV	HIndi
	6.	Teachers' Guide	-do-	Class V	HIndi
	7.	Teachers' Reference Manual for BTIs	-do-	Teachers	English
	8	-do-	-do-	-do-	-do-
	9.	General Publication	Child Care	Teachers/ Community	Hindi/
	10.	-do-	Summary Report of NIEES project		Hindi/ English
	11	Evaluation Tools	Questionnaire to study the impact of C C.P.	Teachers/ Curriculum framers	Hindi

APPENDIX B

Addresses of Directors of States/UTs Implementing the Project NHEES During Expansion Phase

1 Professor of Home Science
Sri Venkateswara University
Tirupati
Andhra Pradesh

2. Director
State Council of Educational
Research and Training
Patna 800 006
Bihar

3. Director
State Institute of Science Education
Ravinagar
Nagpur
Maharashtra

4 Director
Deptt of State Educational
Research and Training
BP Wadia Road
Basavanagudi
Bangalore 560 004
Karnataka

5. Director
State Council of Educational
Research and Training
Chatlang
Aizawal
Mizoram

6. Director
State Institute of Educational
Research and Training
111, Saheli Marg
Udaipur
Rajasthan

7. Director
State Council of Educational
Research and Training
Gandhi Bhawan Annexe
Library Building
Kharvela Nagar
Bhubaneswar
Orissa

8. Director
State Institute of Education
Allahabad
Uttar Pradesh

9. Director
State Institute of Science Education
Jabalpur
Madhya Pradesh

APPENDIX C

Instructional Materials Developed During the Expansion Phase

ANDHRA PRADESH

Sl No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No of copies
1	Textbook	Primer	Combined for Classes I and II	Telugu	Nov. 1984	4,000
2	Textbook	Primer	Combined for Classes III and IV	—do—	Nov. 1984	—
3	Textbook	Primer	Class V	—do—	Nov 1984	—
4	Teachers' Manual	NIEES Manual for Teachers	Teachers of Classes I-V	Telugu	Nov 1984	150
5	Song Booklet	NIEES Song Booklet	Classes I-V	Telugu	Dec. 1983	4,000
6	Audio-visual Aids	A Set of Flip Charts-6 A Set of Posters-6	Children/ Community	Telugu		
7	Evaluation Tools	Tools for collection of evaluation data (i) Teachers (ii) children of Class I (iii) —do— II (iv) —do— III (v) —do— IV	Pry. School Teachers/ Children	Telugu	1985	

BIHAR

Sl No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No. of copies
1	Textbook	Padhen Aur Samjhen	Class I	Hindi	1985	
2	Textbook	—do—	Class II	Hindi	1985	
3	Textbook	—do—	Class III	Hindi	1985	
4	Teachers' Guide	Padhen Aur Karen	Classes I-III	Hindi	—	11,000
5.	Teachers' Guide	Swasth Rahen Sahen	Class IV	Hindi	—	—
6	Curriculum	Curriculum	Classes I-V	Hindi	—	—
7.	Handbook for Community	Padhen Aur Sikhen	Community members	Hindi	—	—
8.	A-V Aids	A set of 12 charts containing NIEES messages	Community members	Hindi	1985	2,000
9.	Evaluation Tools	Questionnaire to study the impact of CCP	Community members	Hindi	1985	2,000

MAHARASHTRA

Sl No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No of copies
1	Textbook	NHEES textbook	Class III	Marathi	1984	15,00
2	Textbook	NHEES textbook	Class IV	—do—	—do—	15,00
3.	Teachers' Guide	Handbook for teachers	Classes I-IV	—do—	—do—	5,00
4	Audio-visual Aids	A set of 10 folders containing NHEES messages	School/ Community	—do—	—do—	—
5	—do—	A set of 8 posters containing NHEES messages	—do—	—do—	—do—	—
6.	Syllabus	Syllabus in NHEES	Class I-IV	—do—	—do—	—
7	Report	Project report	Teachers/ Project team	—do—	—do—	—
8.	Report	Project report	Teachers/ Project team	—do—	—do—	—

MIZORAM

Sl No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No. of copies
1	Textbook	NHEES Textbook	Class III	Mizo	1984	—
2	Textbook	—do—	Class IV	—do—	—do—	—
3.	Teachers' Guide	NHEES	Classes I-II	—do—	—do—	—
4.	Teachers' Guide	—do—	Classes III-IV	—do—	—do—	—
5.	A-V Aids	A set of 10 Charts containing NHEES messages	Children community	—do—	1985	—
6	—do—	A set of 10 folders containing NHEES messages	—do—	—do—	1985	—
7	General publication	A set of 12 brochures containing NHEES messages	—do—	—do—	1984	—

ORISSA

Sl No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No of copies
1	Textbook	Swasthya Raksha	Class III	Oriya	1984	6,000
2	Textbook	—do—	Class IV	—do—	—do—	6,000
3	Textbook	—do—	Class V	—do—	—do—	6,000
4	Teachers' Guide	Swasthya Raksha Shikshak Sahayak Pustika	Class III	—do—	—do—	5,00
5	Teachers' Guide	—do—	Class IV	—do—	—do—	5,00
6.	Teachers' Guide	—do—	Class V	—do—	—do—	5,00
7	General Publication	Classes I-V	Classes I-V	—do—	—do—	—
8.	General Publication	Syllabus for community	Community	—do—	—do—	—
9.	Textbook	Textbook for community	Community	—do—	—do—	—
10	Teachers' Guide	Teachers' guide for community	Community	—do—	—do—	—
11	Supplementary Reader	Supplementary Reader for community	Community	—do—	—do—	—
12	Audio-visual Aids	A set of 26 posters containing messages	School/ Community	—do—	—do—	—
13	—do—	A set of 8 folders/pamphlets containing NHEES messages	School/ Community	—do—	—do—	—

UTTAR PRADESH

Sl. No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No of copies
1	Supplementary Reader	Aao Swasth Rahen	Class I	Hindi	1984	5000
2.	—do—	—do—	Class II	—do—	—do—	—do—
3	—do—	—do—	Class III	—do—	—do—	—do—
4	—do—	—do—	Class IV	—do—	1985	—do—
5	—do—	—do—	Class V	—do—	—do—	—
6.	Teacher's Guide	Aao Swasth Rahen shikshak Darshika	Class I	—do—	1984	500
7	Teachers' Guide	—do—	Class II	—do—	—do—	500
8	Teachers' Guide	—do—	Class II	—do—	—do—	—
9	Curriculum	Poshan swasth shiksha Avam Parivashiya Swachhat Shikshakram	Classes I-V	—do—	—do—	—
10	—do—	—do—	Classes I-V	English	—do—	—
11	Audio-visual Aids	A set of 10 folders containing NHEES messages	School/ Community	Hindi	—do—	—
12	—do—	A set of 10 charts	School/Community	—do—	1985	—

RAJASTHAN

Sl. No	Nature of Material	Title	Age-group Class	Language	Year of Publication	No. of copies
1	Textbook	NHEES Textbook	Class III	Hindi	1984	—
2	Textbook	—do—	Class IV	—do—	—do—	—
3.	Textbook	—do—	Class V	—do—	—do—	—
4	Teachers' Guide	NHEES Teachers' Guide	Classes III-V	—do—	—do—	—
5	Report	Base-line survey report		—do—	—do—	—
6.	Textbook	Textbook for teachers and community	Teachers/ Community	—do—	—do—	—
7.	Syllabus		Classes I-V	—do—	—do—	—
8.	A-V Aids	A set of 18 charts containing NHEES messages	School/ community	—do—	1985	—
9	—do—	A set of 10 folders containing NHEES messages	—do—	—do—	—do—	—

APPENDIX D

Pupil Achievement Test for Classes I to V

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour & 30 Mts. Class I Max. Marks : 20

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Offices Use Only)

S. No.	Objective	Behavioural Objective	Item No.	Max. Marks	Marks obtained
1.	K	Recall	1, 2	2	
2.	K	Recognise	3, 4, 5	3	
3.	U	Identify	6	3	
4.	U	Discriminate	7, 8,9, & 10	4	
5.	A	Infer	11, 12, 13 14, 15 & 16	6	
6	S	Observe	17	2	
		Grand Total	17	20	

Signature of the Evaluator

Name & Address of the Evaluator

Roll No as given in the Register _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour & 30 Mts. Class I Max. Marks 20

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Teacher's Use Only)

S. No.	Form of Q	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks Obtained
1.	O	K	Recall	1	1	
2.	O	K	Recall	2	1	
3	O	K	Recognise	3	1	
4	O	K	Recognise	4	1	
5.	O	K	Recognise	5	1	
6.	O	U	Identify	6	3	
7.	O	U	Discriminace	7	1	
8.	O	U	Discriminate	8	1	
9.	O	U	Discriminate	9	1	
10	O	U	Discriminate	10	1	
11	O	A	Infer	11	1	
12.	O	A	Infer	12	1	
13.	O	A	Infer	13	1	
14	O	A	Infer	14	1	
15.	O	A	Infer	15	1	
16	O	A	Infer	16	1	
17.	O	S	Observe	17	2	
			G. Total	17	20	

Signature of the Evaluator

Name & Address of the Evaluator

ACHIEVEMENT TEST — NHEES

Time : 1 hour 30 minutes Class-I Max. Marks . 20

1. Given below are pictures of two shops. Put a tick (√) mark on the shop from which one should buy eatables 1

1	2
A shop with uncovered containers and flies around. A child vomitting nearby.	Clean shop with covered container

2. Look at the following pictures. Put a tick (√) mark on the picture showing a good and hyghienic habit. 1

Picture 1	Picture 2
(i) (ii) (iii)	(i) (ii) (iii)
i) Child playing in the ground	i) Child playing in the ground
ii) Washing his hands and food kept ready in the room	ii) Child entering the room and rushing towards food
iii) Eating	iii) Eating

3. Given below are two pictures. Put a tick (√) mark on the right practice while sneezing 1

A child covering his mouth and nose using a clean piece of cloth while sneezing	A child coughing and sneezing openly
Picture 1	Picture 2

4. Look at the following pictures. Put a tick (√) mark against the wrong practice that affects the environmental sanitation. 1

A Village Scene

A lady throwing garbage in open near the house	A lady throwing garbage in the garbage pit

5. Given below are the pictures showing sources of water. Put a tick (√) mark on the healthy source of water 1

A well where people are bathing, washing clothes and cleaning utensils and dirty water seeping into the well.	A well with a platform, clothes being washed away from the well and waste water draining away from it.

6 Match the body parts given in picture (1) to their functions in picture (2) 1

1. Picture of parts		2. Fucntions	
i)	Hand	i)	A boy listening to a transistor
ii)	Mouth	ii)	Boy writing
iii)	Nose	iii)	Boy smelling a rose
		iv)	Boy eating an apple

7. Look at the pictures given below & put a tick (√) mark on the non-food item. 3

Banana	chalk (Khariya)	Roti	Mango
(i)	(ii)	(iii)	(iv)

8 Look at the pictures given below. Put a tick (√) mark on the picture that does not belong to the group. 1

Brinjal	Potato	Carrot	Fish
(i)	(ii)	(iii)	(iv)

9. Look at the pictures given below. Put a tick (√) mark on the picture that does not belong to the group 1

Fish	Guava	Egg	Chicken
(i)	(ii)	(iii)	(iv)

10. Look at the pictures given below. Put a tick (√) mark on the picture that does not belong to the group.

Mango	Guava	Spinach	Banana

11. Look at the pictures given below. Put a tick (√) mark on the picture showing food combination for better health

1 Food Plate

Roti, dal, veg, curd, raw vegetable salad

2 Food Plate

Roti, dal, curd

12. Look at the pictures given below. Put a tick (√) mark on the picture showing the correct method of trimming the nails. 1

Child biting the nails

Picture 1

Child trimming the nails with a pair of scissors

Picture 2

13. Given below are two pictures related to handling of water. Put a tick (√) mark on the picture showing the right way of handling water 1

Child taking water by dipping the glass

Picture 1

Child taking water with a ladel

Picture 2

14. Given below are two pictures related to the practices of brushing teeth. Put a tick (√) mark on the correct one. 1

Child using a datoon

Smiling—
Has sparkling healthy teeth
Brushing with datoon.

Picture 1

Child breaking brick/ coal

Smiling—
Has unhealthy dirty teeth
Brushing using brick powder

Picture 2

15. Given below are pictures of two houses Put a tick (√) mark on the house which will have healthy children. 1

A house with clean surroundings; (no flies, hens kept in a Durba, Cattle kept in a shed with a boundary)	A house with unclean surroundings; (Garbage heap very near to the house, flies every where, hens and cattle moving around)
Picture 1	Picture 2

16. Observe two pictures (1) and (2) given below. Put a tick (√) mark on the picture showing good habit. 1

getting up leaving Child an empty plate eating	getting up Child leaving an empty eating plate but food spilled all around.
Picture 1	Picture 2

17. Picture (1) is showing a human body with some of its parts missing and picture (2) is showing some parts, Observe picture (1) and tick (√) mark the missing parts of picture (1) in picture (2). 3

A picture of a body with one eye and one ear missing	eye	lip
	ear	leg
Picture 1	Picture 2	

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour & 30 Mts. Class II Max. Marks : 25

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE CARD
(For Office Use Only)

S. No.	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks obtained
1.	K	Recall	9, 10, 12	3	
2.	K	Recognise	3	1	
3.	U	Interpret	1,2,6,15	6	
4.	U	Discriminate	7,11	4	
5.	U	Classify	13	3	
6.	A	Analyse	4,16	2	
7.	A	Suggest	5	1	
8.	A	Infer	8,14	2	
9.	S	Label	17	3	
		Grand Total :	17	25	

Signature of the Evaluator

Name & Address of the Evaluator

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour & 30 Mts. Class II Max. Marks : 25

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE CARD
(For Teacher's Use only)

S. No.	Form of Q	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks Obtained
1	O – T/F	U	Interpret	1	1	
2.	O – T/F	U	Interpret	2	1	
3.	O – T/F	K	Recognise	3	1	
4.	O – M/C	A	Analyse	4	1	
5.	O – M/C	A	Suggest	5	1	
6.	O – M/C	U	Interpret	6	1	
7.	O – M/C	U	Discriminate	7	1	
8.	O – M/C	A	Inter	8	1	
9.	O – M/C	K	Recall	9	1	
10.	O – M/C	K	Recall	10	1	
11.	O – M/C	U	Discriminate	11	3	
12.	O – M/C	K	Recall	12	1	
13.	O – Matching	U	Classify	13	3	
14.	O – Matching	A	Infer	14	1	
15.	V.S.A.	U	Interpret	15	3	
16.	O-Matching	A	Analyze	16	1	
17.	V.S.A.	S	Label	17	3	
			GRANT TOTAL :	17	25	

ACHIEVEMENT TEST NHEES

Time · 1 hour & 30 Mts. Class II Max. Marks : 25

In the question numbers 1,2 and 3 some statements are given. Put a tick (√) mark onthe correct statement and cross (X) mark on the wrong statement in the box provided

1. Play kills appetite ☐ 1

2. Children should swallow whatever pills they get. ☐

3. We should always wash our eyes with hot water ☐ 1

4. Given below are pictures of three houses. Put a tick (√) mark against the picture of house which shows the best lighting and ventilation facilities among the three 1

A house with 1 door, no window showing interior of the house with poor light.	A house with 2 doors, 2 big window-showing the interior well small lighted & cross ventilated.	A house with 1 door and with 1 small window.
Picture 1	Picture 2	Picture 3

5. Ram and his friends want to play with a ball. Suggest the best place for the play with a tick (√) mark against the picture. 1

i) road ( )

ii) open ground near the canal or pond. ( )

iii) open ground away from the well or the canal. ( )

iv) the open terrace ( )

6. Given below are some pictures related to sewage water disposal. Put a tick (√) mark against the proper way of sewage water disposal. 1

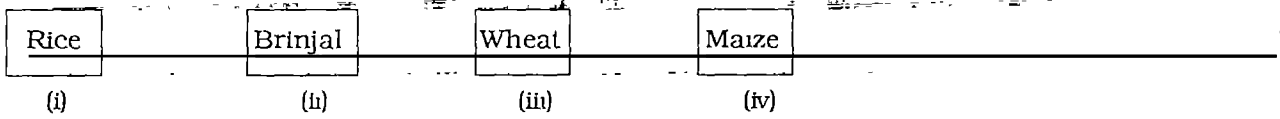
i) disposal into an open pit ( )

ii) disposal into the open drain ( )

iii) utilizing for the kitchen garden ( )

iv) utilizing as drinking water for animals ( )

7. Look at the pictures given below. Put a tick (√) mark against the picture that does not belong to the group. 1



8. Given below are two pictures related to body posture. Put a tick (√) mark against the picture showing the correct posture while writing.

bending posture while writing	Sitting straight and erect while writing
Picture 1	Picture 2

9. Put a tick (√) mark against the right answer.

What happens if the waste water is kept stagnated and uncovered ?

i) Acts as a breeding place for mosquitoes. ( )

ii) Nothing happens ( )

iii) Nice to look at ( )

iv) Gives pleasant smell ( )

10. Given below are some pictures showing different ways of garbage disposal. Put a tick ( ) against the most proper way of garbage disposal 1

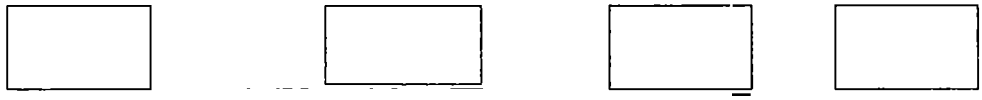
i) Throwing garbage on the garbage heap in the playground. ( )

ii) throwing garbage into the covered pits. ( )

iii) throwing garbage on the road. ( )

iv) throwing garbage in one corner of the court yard of house. ( )

11. Given below are pictures of some food items. Put a tick (√) mark against the food items which can be eaten raw. 3



Carrot Cucumber Brinjal Mango

12. Look at the following pictures. Put a tick (√) mark against foodstuff which mainly provides you with energy. 1

Mango Apple Butter Spinach

13. Match each of the food groups in No. 1 with its function in No. 2 by joining them with a line. 3

1. Food Groups	2. Functions
i) Rice, wheat, oils and sugar	Protection
ii) Egg, Meat, Fist, Milk & Pulse	Providing energy
iii) Spinach, carrot, orange	Body building & Maintenance.

14. Macthing the picture given in column A with one of the two pictures of column B showing the correct way of disposing off the waste.

Column A	Column B	Column C
A group of children eating in a garden.	Throwing the wastes all over the place.	Throwing the wastes into a dustbin.
Picture 1	Picture 2	Picture 3

15. Pictures below show the daily routine of a child. Rearrange the pictures in the proper sequence by putting No. 1,2,3. 3

Bathing	Eating Food	Brushing teeth
(i)	(ii)	(iii)

16. Analyse the pictures given below. Put a tick (√) mark on the conditions in picture (2) which will result from the habit depicted in picture (1).

Picture I		Picture 2
Boy brushing the teeth.	i) ii)	A child with dental caries A child smiling showing healthy teeth.

17 Given below are two picture (1) Human body (2) parts of human body. Label the parts of the human body in picture (1) by putting the number as shown in picture (2).

Picture 1		Picture 2.
Picture of a child	i)	Hand
	ii)	Ear
	iii)	Mouth

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour Class III Max. Marks : 60

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Office Use Only)

S. No.	Objective	Behavioural Objective	Item No.	Max. Marks	Marks obtained
1.	K	Recall	1, 2, 3, 15, 17, 18, 29	15	
2.	K	Recognise	16, 19	2	
3.	U	Identify relationship	4, 5, 6, 20, 22	10	
4	U	Classify	7, 8, 9, 10	9	
5.	U	Discriminate	11, 12	4	
6.	U	Interpret	21	1	
7.	A	Analyse	13	1	
8.	A	Infer	14, 23	2	
9.	A	Suggest	26, 28	5	
10.	A	Reason	24, 25, 27	4	
11.	S	Draw	30, 31	4	
12.	S	Label	32	3	
		Grand Total	32	60	

Signature of the Evaluator

Name & Address of the evaluator

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour Class III Max. Marks : 60

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Teachers's Use Only)

S. No.	Form of Q	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks Obtained
1	O	K	Recall	1	3	
2.	O	K	Recall	2	5	
3	VSA	K	Recall	3	2	
4.	O	U	Identify relationship	4	1	
5.	O	U	Identify relationship	5	3	
6.	O	U	Identify relationship	6	4	
7.	VSA	U	Classify	7	2	
8.	VSA	U	Classify	8	2	
9.	VSA	U	Classify	9	2	
10.	VSA	U	Classify	10	3	
11	VSA	U	Discriminate	11	2	
12	VSA	U	Discriminate	12	2	
13.	O	A	Analyse	13	1	
14.	O	A	Infer	14	1	
15.	O	A	Recall	15	1	
16.	O	A	Recognise	16	1	
17	O	K	Recall	17	1	
18.	O	K	Recall	18	1	
19.	O	K	Recognise	19	1	
20.	O	U	Identify relationship	20	1	
21.	O	U	Interpret	21	1	
22.	O	U	Identify relationship	22	1	
23.	O	A	Infer	23	1	
24.	SA	A	Reason	24	1	
25.	SA	A	Reason	25	1	
26.	SA	A	Suggest	26	3	
27.	SA	K	Reason	27	2	
28.	SA	A	Suggest	28	2	

S. No.	Form of Q	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks Obtained
29.	VSA	K	Recall	29	2	
30.	VSA	S	Draw	30	2	
31.	VSA	S	Draw	31	2	
32.	VSA	S	Label	32	3	

Signature of the Evaluator

Name & Address of the Evaluator

Achievements Test

Nurtition, Health Education and Environmental Sanitation

Time : 1 hour | Class : III | Max. Marks : 60

In the question nos. 1 and 2 some spacements are given. Put a tick (√) mark on the correct statement and cross (X) mark on the wrong statement in the box provided. 3

1. a) Stale food is not injurious to health. ☐

   b) Household wastes should be just thrown out. ☐

   c) Food should be ketp covered. ☐

2. A) Immunization protects our body from diseases ☐ 5

   b) Covering mouth/nose while coughing/sneezing is bad for health. ☐

   c) Defecating in the open is a good health practice ☐

   d) Regular bath keeps the body clean. ☐

   e) Sleep is not good for health ☐

3 Fill in the blanks with appropriate words. The two important functions of teeth are _____ and _____ 2

4. Look at the pictures given. Relate the picture on right hand side to the picture on the left hand side. 1

Food exposed to dirt and flies	Food covered with net	A child suffering from diarrhoea

5 Given in column I are the kinds of teeth and in Column II are their functions Match each kind of teeth with its function by joining them with a line. 3

Column A	Column B
i) Incisors	A. Breaking the food
ii) Canines	B. Grinding the food
iii) Molars	C. Cutting the food

6. Match the item of Column I with that of Column II 4

Column I	Column II
i) Food rich in carbohydrates	A. Fruits & Vegetables
ii) Foods rich in proteins	B. Cereals, pototoes & Jaggery
iii) Foods rich in vitamins & minerals	C. Pulses, milk & meat
iv) Foods rich in fats.	D. Oil seeds & nuts

7. Given below are names of some diseases. Group them into communicable diseases and Deficiency diseases. 2

Night blindness, Malaria, Scurvy, Ring worm

Communicable Diseases	Deficiency Diseases
i)	i)
ii)	ii)

6. Given below are names of communicable diseases. Group them into Air Transmitted diseases and contact diseases. Whooping cough, Common cold, Ring Worm, Scabies 2

Air transmitted diseases	Contact diseases
i)	i)
ii)	ii)

9. Given below are name of some communicable diseases. Group them into water borne diseases and Insect brone diseases. 2

Malaria, Typhoid, Filaria, Dysentry

Water borne diseases	Insect borne diseases
i)	i)
ii)	ii)

10 The namess of some food items are given below. Classify them into Energy giving, Body building and Prctective foods in Columns provided. 3

Ghee, Eggs, Potato, Dal, Leafy vegetables, Mango

I. Energy giving	II. Body Building	III. Protective
i)	i)	i)
ii)	ii)	ii)

11. Names of some diseases are given below. Select the one that does not belong to the group and write it in the space provided. 2

1. Cholera, Diarrhoea, Dysentry, Malaria

   _____

2. Rickets, Scurvey, Polio, Anaemia.

   _____

12. Some food items are given below. Select the one that does not belong to the group and write it in the space provided. 2

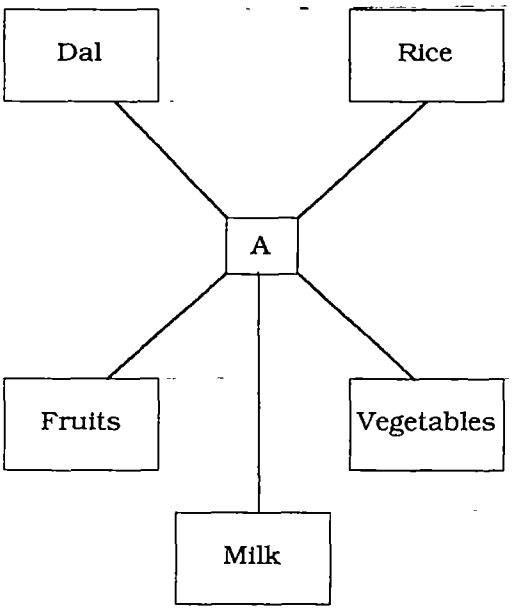
a) Milk, Bengalgram, Banana, Egg. Fish

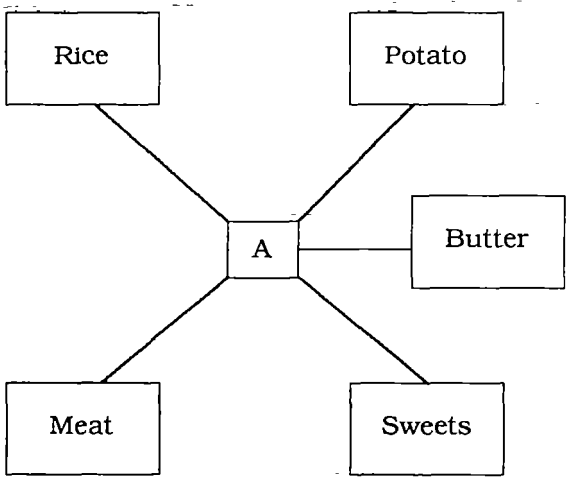
_____

b) Cucumber, Tomato, Amla, Mango, Potato

_____

13. The daily food charts of the two boys A and B are given below. Which one will have healthy ? 1





Put a tick (√) mark against the correct answer.

14. Your friend has fallen while he was playing and has hurt his leg. The wound is bleeding. What should you do in this situation ? 1
i) Cry
ii) Put soil on the wound
iii) Inform the elders
iv) Scold and slap him

15. Decaying of teeth cause. 1
i) Foul small
ii) Toothache
iii) Indigesion
iv) All the above

16. To avoid tooth decay one should brush teeth 1
i) before breakfast
ii) after lunch
iii) before dinner
iv) after each meal

17 Environment is mainly polluted due to :
i) Open defecation
ii) Lack of drainage facilities
iii) Improper disposal of dead bodies.
iv) All the above

18. Vegetables & fruits should be washed before cooking and eating to 1
1) remove dust and germs
ii) improve the taste
iii) make it look nice
iv) All the above

19. Roughage is available more in . 1
i) Cereals
ii) eggs
iii) leafy vegetables
iv) pulses

20 To prevent infection, hands should be washed after defecation with 1
i) only water
ii) water and soap
iii) water and mud
iv) mud

21. Animals and plant wastes can be made useful if . 1
i) converted into compost
ii) thrown here and there
iii) burnt immediately
iv) all the above

22. The safest source of drinking water is .
i) open well
ii) pond
iii) stream
iv) tube well

23. Cholera can be prevented by : 1
i) visiting religious places
ii) visiting the village quack
iii) visiting the doctor for vaccination
iv) visiting the fortune teller

Complete the Statements given in Question Nos 24 and 25

24 We should eat some vegetables and fruits in raw form because 1

_____

_____

25 We should not keep cut fruits exposed because 1

_____

_____

26. The names of different food items are given below. Select three necessary food items for a nutritious diet and write these in space given below
Rice, Wheat, Dal, Potato, Meat, Leafy vegetables, Egg, Brinjal, and Banana. 3

_____

_____

27. Given two reasons for the formation of cavities in teetch. 2

1 _____

2. _____

28 What do you suggest your younger brother/sister to keep the gums healthy ? Give two suggestion. 2

1. _____

2. _____

29. Name any two food items which can provide your teeth good exercise. 2

1. _____

2. _____

30. Draw and name any two protective foods. 2.

31. Draw and name the two food items which can be eaten raw. 2

32 Lable the different types of tooth given below. 3

Canine Incisor Molar

Roll No as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour Class IV Max Marks . 45

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Offices Use Only)

S No	Objective	Behavioural Objective	Item No.	Max Marks	Marks obtained
1.	K	Recall	1, 2, 3, 4, 5, 6, 17, 18, 20, 21, 23	12	
2.	K	Recognise	14	1	
3.	U	Identify	7, 8, 13, 16	6	
4	U	Detect	10	3	
5.	U	Compare	11	2	
6.	U	Classify	12	5	
7.	U	Classify	15	5	
8	A	Infer	9,22	3	
9	A	Reason	19,24,27	4	
10	A	Analyse	25,26	4	
		Grand Total	27	45	

Signature of the Evaluator

Name & Address of the Evaluator

Roll No as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour Class IV Max. Marks · 45

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Offices Use Only)

S No.	Form of Q	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks Obtained
1	O	K	Recall	1	1	
2	O	K	Recall	2	1	
3	O	K	Recall	3	1	
4.	O	K	Recall	4	1	
5.	O	K	Recall	5	1	
6.	O	K	Recall	6	1	
7	V S A	U	Identify	7	1	
8.	V.S.A.	U	Identify	8	1	
9	O	A	Infer	9	2	
10	O	U	Detect	10	3	
11	O	U	Compare	11	2	
12.	O	U	Correlate	12	5	
13	O	U	Identify	13	3	
14.	V.S.A	K	Recognise	14	1	
15.	V.S A	U	Classify	15	5	
16	O	U	Identify	16	1	
17	O	K	Recall	17	1	
18.	O	K	Recall	18	1	

19.	O	A	Reason	19	1
20.	O	K	Recall	20	1
21.	O	K	Recall	21	1
22.	O	A	Infer	22	1
23	S A.	K	Recall	28	2
24.	S.A.	A	Reason	24	1
25.	S.A.	A	Analyse	25	2
26.	S.A.	A	Analyse	26	2
27.	S.A.	A	Reason	27	2
			Grand Total	27	45

Signature of the Evaluator

Name and Address of the Evaluator

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENT SANITATION

Time . 1 hour Class IV ___ Max. Marks : 45

In the question Nos. 1 to 6 some statements are given. Put a tick (√) mark on the correct statement and cross (X) mark on the wrong statement in the box provided.

1. Overcooking of food should be avoided. 1

2. Excess water of cooked vegetables should always be thrown away. 1

3 Cooking helps in growth of harmful bacteria 1

4. Food is cooked to make it more digestible. 1

5. Overcooking of food results in protein loss. 1

6 We should clean our house daily. 1

In the question nos. 7 & 8 fill in the blanks with a suitable word chosen from those given in brackets.

7 Grains should be stored at _____ place. 1
(dry/wet)

8 Sprouted grains should be included in the diet to get more _____. (proteins/vitamins) 1

9. Tick ( ) the correct word from the two given in brackets. 2
   a) Combination of different pulses (increase/decrease) the nutritive value.
   b) Products like Dosa, Idli have increased food value because they are (fermented/sprouted) in the process of preparation.

10. Tick ( ) mark the form of foodstuff which will have more nutritive value. 3
   i) Fried green gram/sprouted green gram.
   ii) Raw carrot/boiled carrot.
   iii) Raw fruits/cooked fruits.

11 Which way do you think is proper to preserve food nutrients:- 2

Put a tick (√) mark on the right one out of the pair.

1 (a) Washing the vegetables and then cutting.
(b) Cutting the vegetables and then washing.

2 (a) Cooking rice in excess water and throwing the extra water.
(b) Cooking rice in excess water and using the extra water in the preparation of dal or vegetable

12 Given below are some organs of human body in column I and their functions in column II Match these organs of the body with their respective functions by drawing lines.

Column I Organs of Body	Column II Functions
1 Ear	i) Seeing
2. Eye	ii) Hearing
3. Tongue	iii) Feeling
4. Nose	iv) Tasting
5 Skin	v) Smelling

13 Complete the sentences of column A with the help of statements given in column B. 3

Column A	Column B
1. The food we eat	i) Helps in the digestion of food.
2. The water we drink	ii) Meets our body needs.
3. Digestive juice	iii) Converts complex food particles into simpler form.

14. Given below are the organs of alimentary canal of human body. Arrange these organs in the correct order 1
Introduce Stomach, Mouth, Large intestine, Small intestine, Rectum.

15 Given below are a few food stuffs, Arrange them into the basic five food groups. 5
i) Groundnut oil, ii) Egg, iii) Rice, iv) Dal, v) Jaggery, vi) Palak, vii) Brinjal, viii) Wheat, ix) Mango, x) Beans

In the question Nos 16 to 21 put a tick (√) mark against the right answer

16. Throat cancer may be caused by : 1
1) Cane sugar
2) Tea and Coffee
3) Tobacco and Betal Leaves
4) Alcohol

17 Kidneys help in the process of . 1
1) Respiration
2) Circulation
3) Excretion
4) Digestion

18 The water which we drink facilitates most the process of
1) Digestion
2) Respiration
3) Movement
4) All the above

19 A drives can easily meet with an accident if 1
1) he chews tobacco
2) he smokes tobacco
3) he takes excess of tea & coffee
4) he takes alcohol.

20 The pair of organs which helps in repiration are : 1
1) Lungs and Stomach
2) Nose and lungs
3) Lungs and heart

4) Stomach and heart

21. In our body food gets digested in 1
1) Lungs
2) Heart
3) Stomach
4) Kidneys.

22 Raju is having stomachache and vomitting after taking uncovered sweets Give one reason for it. 1

23 How the grains are sprouted at home ? Give answer in two/three lines. 2

24 Observe carefully at the pictures given below. People in house I are unhealthy whereas people in house 2 are healthy Give one reason for this in the space given below. 1

A dirty house, files everywhere, things scattered, cooked food kept uncovered.

House 1

Clean, Well kept house.

House 2

25 Mohan and Sohan went to buy food items for lunch. Mohan bought beans, rice palak, oil, curd and sugar. Sohan bought milk, meat, sugar, curd and rice :

i) Which of the two bought the items for an adequate diet ? Why ? 2

26. A day's menu of two families is as follows .

Family 1	Family 2
Breakfast . Roti, butcer, milk	Sprouted gram, milk, guava
Lunch : Chapati, reat	Chapati, dal, palak, salad
Dinner : Rice, dal, curd	Rice, dal, beans, curd.

(i) Which family in your opinion takes a better diet ? (ii) Why ? 2

27. Lalita cooked rice in excess of water, strained the rice and threw away the water. Sheela cooked rice in just enough water

(i) Which of the two followed a better method of cooking rice ? ii) Why ? 2

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time : 1 hour & 30 Mts Class V Max. Marks : 60

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School : _____

_____

SCORE-CARD
(For Office Use Only)

S. No.	Objective	Behavioural Objective	Item No.	Max. Marks	Marks obtained
1	K	Recall	6, 11, 26, 28, 29	9	
2.	K	Recognise	2, 7, 8	6	
3.	U	Identify relationship	1, 3, 4, 10, 12, 13, 14, 15, 16, 25, 27	25	
4	U	Classify	5	3	
5	U	Discriminate	9	1	
6	A	Infer	17, 19	3	
7	A	Reason	18, 23, 24	3	
8	A	Suggest	20, 21	4	
9.	A	Analyse	22, 30	6	
		Grand Total	30	60	

Signature of the Evaluator

Name & Address of the Evaluator

Roll No. as given in the Register: _____

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION AND ENVIRONMENTAL SANITATION

Time 1 hour & 30 Mts. Class V Max. Marks . 60

Name of the State/UT : _____

Student's Name : _____

Father's Name : _____

Name of the School . _____

_____

SCORE-CARD
(For Teacher's Use Only)

S. No.	Form of Q	Objective	Behavioural Objectives	Item No.	Max. Marks	Marks Obtained
1.	O	U	Identify relations	1	4	
2	O	K	Recognise	2	4	
3.	O	U	Identify relationship	3	3	
4	O	U	Identify relationship	4	4	
5	V S.A.	U	Classify	5	3	
6.	O	K	Recall	6	1	Recognise
7	O	K	Recognise	7	1	
8.	O	K	Recognise	8	1	
9.	O	U	Discriminate	9	1	Recognise
10	O	U	Identify relationship	10	1	"
11.	O	K	Recall	11	1	Recognise
12	O	U	Identify relationship	12	1	"
13	V.S.A.	U	Identify relationship	13	2	
14	V.S.A.	U	Identify relationship	14	3	

15	V S.A.	U	Identify relationship	15	4	
16	V.S A.	U	Identify relationship	16	1	
17	V S.A.	A	Infer	17	2	Recall/infer
18	S A.	A	Reason	18	1	
19	V S.A.	A	Infer	19	1	
20.	S A.	A	Suggest	20	2	
21	S A	A	Suggest	21	2	
22.	S.A.	A	Analyse	22	1	
23.	S.A.	A	Reason	23	1	
24	S.A.	A	Reason	24	1	
25.	S.A.	U	Identify relationship	25	1	
26.	S.A.	K	Recall	26	1	
27	S.A.	U	Identify relationship	27	1	
28.	S.A.	K	Recall	28	2	
29	S.A.	K	Recall	29	4	
30.	S.A.	A	Analyse	30	5	
			Grand Total :	30	60	

Signature of the Evaluator

Name and Address of the Evaluator

ACHIEVEMENT TEST

NUTRITION, HEALTH EDUCATION & ENVIRONMENTAL SANITATION

Time · 1 hour & 30 Mts. Class V Max. Marks : 60

1. Given below are some food beliefs. Put a tick (√) mark on the beliefs which are correct in your opinion and cross (X) mark on those which are wrong in your opinion. 4
   a) Eating curd, raddish and orange in the evening in winter cause cold.
   b) Skimmed milk does not provide any nutrient.
   c) Mixed pulses and vegetables have more nutritive value.
   d) Lack of carbohydrates in young children lead to physical weakness.

2. Given below are some statements regarding immunization. Put a tick (√) mark on the correct statements and cross (X) mark on the wrong statements. 4
   a) Anticholera inocculation is essential to prevent cholera epidemic.
   b) Triple antigen should be administered to the children between the age of 3 – 9 months.
   c) Only one dose of vaccine is required to prevent Diptheria, Tetanes and whooping cough.
   d) Polio drops are given orally to children.

3. Match the deficiency of food stuff given in column I with the resultant diseases given in colum II by drawing lines between them. 3

Column I Deficiency		Column II Disease
a) Cereals	i)	Defect in eye sight.
b) Green leafy vegetables	ii)	Stunted growth
c) Fleshy foods, pulses	iii)	Weakness

4. Complete the sentences by matching the statements given in column I with those in column II.

Column I		Column II
a) Smoke, dust & gases	i)	Can be killed by boiling.
b) Human excreta	ii)	by bathing animals in the water sources.
c) Disease causing germs.	iii)	is responsible for many preventable diseases.
d) Water gets polluted	iv)	pollute the air.

5 Given below are the names of some diseases. Classify them into water borne, air-borne and insect borne diseases. 3

Typhoid, Malaria, Cholera, Diarrhoea, Whooping Cough, Dengu fever, Common cold, Filaria, Tuberculosis.

Water Borne	Air borne	Insect borne
1)	1)	1)
2)	2)	2)

Put a tick (√) mark on the correct answer.

6. On the outbreak of cholera epidemic one should immediately 1
   a) Village Ojha
   b) Village Panchayat
   c) Health Centre
   d) Temple authority

7. The arrangement of sanitation in fairs is looked after by 1
   a) Food department
   b) Education department
   c) Police department
   d) Medical & Health department.

8. Which of the following will need maximum calorie intake ? 1
   a) A teacher
   b) A labourer
   c) A scientist
   d) A clerk

9. Which of the following groups of diseases are caused by bacteria. 1
   a) Polio, influenza, measles.
   b) Diarrhoea, typhoid, malraia
   c) Cholera, tuberculosis, diphteria
   d) Paralysis, scabies, ringworm

10. Inadequate consumption of green leafy vegetables will result in the loss of :
   a) Appetite
   b) Hearing
   c) Seeing
   d) Smelling

11. The chemical substance that generally added for the purification of water in well is 1
   a) Talcum powder
   b) Bleaching powder
   c) Tooth powder
   d) Chalk powder

12. The suitable diet for kwashiorkar child should include 1
   a) Milk, Khichri, porridge
   b) Mango, carrot, papaya
   c) Sugar, jaggery, honey
   d) Tea, Coffee, buttermilk.

13. Observe the relationship between the first two words, then fill up the suitable word at the fourth place 2

	I		II		III	IV
a)	Fresh Air	:	Breathing	:	Safe water	:
b)	Fats	:	Energy yielding	:	Protein	:

14. Given below are the pictures o three children suffering from dificiency diseases. Write the name of deficient nutrient whic is responsible for each disease. 3

Fig 1 Marasmus	Fig. 2 Rickets	Fig 3 Bitot spot.
Child with Marasmus	Child with Rickets.	An Eye showing Bitot spot.
1 _____	2 _____	3 _____

15. Observe the following pictures. Identify and write the mode of transmission of diseases under each picture.

Man drinking polluted water of a pond.

1

Bare footed man showing hookworm entering between toe and finger

2

Eatables exposed to flies and dust, A body is eating some of the items.

3

Mosquito sucking the blood sitting on the hand of a man

4

16. Rama ate cutfruits exposed to air, dust and flies. Soon she felt sick Which one of the following diseases she is likely to get ? 1

Rabies, Itching, cholera, tuberculesis, chicken pox, Ringworm.

_____

17. Munni can neither see nor read at night. Doctor advised her to have vitamin capsules and told her to eat more green vegetables.

a) Give the name of the disease she was suffering from ?

_____

b) Lack of which vitamin caused the disease ?

_____

18 Ramu's family is using water for drinking after decanting and filtering. Inspite of this precaution, Ramu and his younger brother suffer from diarrhoea What may be the possible cause of this suffering ? 1

_____

_____

19. We are very small and present almost everywhere. Some of us can cause disease and some help you in many ways. Who are we ? 1

_____

20. Cchicken pox broke out in Sheela's village. Suggest two ways which will help to prevent further spread of the disease. 2

1) _____

2) _____

21. A farmer had a large harvest of tomatoes. Even after selling them he is left with an excess. Suggest two methods to preserve the surplus tomatoes. 2

1) _____

2) _____

22. What will happen to you, if after washing your hands you pat your pet and then eat your food ? 1

_____

23. What food gets spoilt quickly during rainy season than winter ? 1

_____

24 Why do we put sufficient oil in a pickle bottle ? 1

_____

25. Why should oral Rehydration solution be prepared fresh and kept only for a day ? 1

_____

26. How will you prepae oral Rehydration solution for a patient of diarrhoea ? 1

1) _____

2) _____

3) _____

4) _____

27. What is the disadvantage of open defecation for our health ? 1

_____

_____

28. List any two important functions of the primary Health Centre. 2

1) _____

2) _____

29. Write one source and one deficiency disease of each vitamin given in the table below :

S.No.	Vitamin	Source	Deficiency disease
1.	A		
2.	B		
3.	C		
4.	D		

30. Given below is the daily diet of children of age group 6-12 years.

Breakfast	Lunch	Dinner
Roti	Roti	Khichri
Milk	Rice	Curd
	Potato curry	Papad
	Pickle	

Study the menu and answer the following questions :

1) Does the diet supply enough protein ? Yes _____ No _____

2) Does it supply enough carbony drates ? Yes _____ No _____

3) Does it supply enough vitamin A ? Yes _____ No _____

4) Does it supply enough calcium ? Yes _____ No _____

5) Does it supply enough iron ? YYes _____ No _____

APPENDIX E

Questionnaire for Evaluating the Impact of Community Contact Programme

This questionanaire is to be filled in by the teachers of children of classes I, II, III, IV and V during the community contact programme. The programme envisages door to door visit by the classroom teacher spread over a period of six months.

In the questionnaire the aspects and subaspects of the NHEES messages are given in the left hand column. In the right hand side the possible responses have been given. Against each response there are two boxes. First one is for have been given. Against each response there are two boxes. First one is for pretest response and the second one is for posttest response. During the first contact with the household members the teacher may note the response of the members of the household in the pretest box by putting tick (√) against the response. If the response is different from those given in the questionnaire, it may be noted against the remark any other response.

At the end of the community contact programme (i.e. during the last visit of the teacher to the particular household) he/she may again note the response of the member against each and every question. Thus it may be possible to see if there is any gain in learning and change in habits and practices as a result of the community contact programme.

QUESTIONNAIRE

Name of the village _____

Name of the school _____

Name of the teacher _____

Name of the head of the house hold _____

Number of members in the household _____

Date Time

Instructions

1. Questionnaire to be filled in through personal interviews and observation.
2. Use the same questionnaire for the particular household both for the pre test and post-test.
3. Read all questions carefully before filling up the questionnaire
4. Please put a tick mark (√) against the response as provided by the household

Sl. No.	Aspects of the NHEES Message	Response	Pre-test	Post Test
MI	*Continue breast-feeding as long as possible. Avoid bottle-feeding*			
1.	If you have a small baby in the house how does the mother feed him/her?	Breast Feeding	❑	❑
		Bottle Feeding	❑	❑
		Any other response		
2.	Up to what age the mother breast-feed her baby?	Up to 2 months	❑	❑
		Up to 4 months	❑	❑
		Up to 6 months	❑	❑
		Up to 8 months	❑	❑
		Up to 1 year	❑	❑
		Any other response		
3.	How often do you feed milk to your baby ?	Three or four times a day	❑	❑
		As frequently as the baby demands	❑	❑
		Any other response		
M II	*Add supplementary food from the age of four months onwards*			
4.	When do you start giving supplementary food (in addition to milk) to your baby?	Before 4 months	❑	❑
		After 4 months	❑	❑
		After 6 months	❑	❑
		After 10 months	❑	❑
		After one year	❑	❑
		Any other response		
5.	What kind of solid food do you give to your baby ?	Rice	❑	❑
		Rice and Dal	❑	❑
		Smashed Chappatis only	❑	❑
		Boiled smashed vegetables	❑	❑
		Any other response		
6.	While cooking vegetables when do you wash them?	Before cutting	❑	❑
		After cutting	❑	❑
7.	After cooking vegetable do you throw away excess waste water ?	Yes	❑	❑
		No	❑	❑
		Any other response		
8.	How do you make use of excess cooking water ?	Throw it	❑	❑
		Make it into soup	❑	❑
		Any other response		

Sl. No.	Aspects of the NHEES Message	Response	Pre-test	Post Test
M III	*Immunise your child before first year, as early as possible*			
9.	Have you got your baby immunised before one year?	Yes No	❑ ❑	❑ ❑
10.	If Yes, what are the diseases against which you have got your baby immunised	Small box Cholera Whooping Cough Diptheria Polio Any other disease	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑
11.	If no, when did you get the baby immunised	During the first year During the second year During the third year After 5 years Any other response	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑
12.	If you have not got your child immunized at all, what are your reasons for not getting him/her immunized ?	Due to non-availability of medical facility Due to fear that the child will get sick Due to advice from elders against immunization Due to religious or traditional beliefs Any other response	❑ ❑ ❑ ❑	❑ ❑ ❑ ❑
M IV	*Include in daily diet of the child a variety of available foods in adequate amount distributing them in at least three regular meals*			
13.	Do you include enough green leafy vegetables in daily diet of your child and other members of your family?	Yes No	❑ ❑	❑ ❑
14.	Do you include seasonal vegetables in your daily diet?	Yes No	❑ ❑	❑ ❑
15.	Do you include seasonal fruits in your daily diet?	Yes No	❑ ❑	❑ ❑
16.	What kind of food do you include in the daily diet of your children?	Cereals Dals or pulses Green leafy vegetables Other vegetables	❑ ❑ ❑ ❑	❑ ❑ ❑ ❑

Sl No.	Aspects of the NHEES Message	Response	Pre-test	Post Test
		Seasonal fruit	❑	❑
		Milk and Milk products	❑	❑
		Meat or fish or egg	❑	❑
M V	*Use safe water for cooking and drinking*			
17.	From where do you get water for drinking and cooking?	Well	❑	❑
		River	❑	❑
		Stream	❑	❑
		Pond	❑	❑
		Canal	❑	❑
		Tap	❑	❑
		Tubewell/hand-pump	❑	❑
18.	If you get your water from well, river, pond or canal, do your clean (purify) this water before using it for drinking and cooking?	Yes	❑	❑
		No	❑	❑
19.	How do you clean (Purify) this water?	By filtering	❑	❑
		By boiling	❑	❑
		By decanting	❑	❑
		By adding alum/pottasium permanganate (lal dawa)	❑	❑
		Any other response		
20.	How often do you clean the vessel in which you store water?	Daily	❑	❑
		On alternate day	❑	❑
		Twice a week	❑	❑
		Once a week	❑	❑
		Once in two weeks	❑	❑
		Any other response		
21.	How do you take out water from the vessel?	By pouring	❑	❑
		By using a 'pawa' (a small vessel with long handle)	❑	❑
		By dipping any container inside the vessel	❑	❑
		Any other response		
M VI	*Use drainage water for raising food plant/make provision for a soak-pit*			
22.	How do you dispose off drinage water (waste water) from your house?	Inside the house to collect as puddle	❑	❑
		Outside the house by digging a nallah to collect as puddle around house	❑	❑
		To the backyard for kitchen gardan	❑	❑
		To the soak-put	❑	❑

Sl. No.	Aspects of the NHEES Message	Response	Pre-test	Post Test
		Any other response		
23.	Do you grow some seasonal vegetables in your plot or kitchen garden?	Yes No Any other response	❑ ❑	❑ ❑
24.	If yes, do you use drainage water for watering the plants?	Yes No Any other response	❑ ❑	❑ ❑
M VII	*Provide sanitary facilities in the school and community. Do not urinate, defecate or spit any where but on the places provided*			
25.	Do you, have latrine & urinal in your home?	Yes No	❑ ❑	❑ ❑
26.	If yes, mention the type of latrine	Pit Latrine Trench latrine Sanitary latrine Any other type	❑ ❑ ❑	❑ ❑ ❑
27.	If you do not have latrine in your house, where do you urinate and defecate?	In the open field Near pond/river/stream or other sources of water Any other response	❑ ❑	❑ ❑
28.	Do you wash your hands well after defecation?	Yes No	❑ ❑	❑ ❑
29.	What happens when you defecate in the open and do not cover the stool with soil?	Foul smell will pollute the air Disease carrying organisms will breed and spread germs. Any other response	❑ ❑	❑ ❑
M VIII	*Keep your school, home and village surrounding clean. Make provision for pit*			
30.	How do you dispose off solid waste like vegetable peels, waste papers, packages, stale food and other organic wastes	By making a compost heap or soak pit Any other response	❑	❑
31.	How do you dispose off the faecal matter	By indiscriminate littering Dumping it in a specific point out side the house	❑ ❑	❑ ❑

Sl. No.	Aspects of the NHEES Message	Response	Pre-test	Post Test
		Covering it with soil	❑	❑
		By making a soak pit	❑	❑
		Any other response		
32.	Do you have regular facility for collection and disposal of solid waste?	Yes	❑	❑
		No	❑	❑
	If yes, is there specific dumping site in the village?	Yes	❑	❑
		No	❑	❑
33.	Do you think that garbage can be of any use to you?	Yes	❑	❑
		No	❑	❑
M IX	*Do not pollute sources of water*			
34.	Do you wash your dirty clothes, utensils near the well, pond, river or other sources of water ?	Yes	❑	❑
		No	❑	❑
35.	Do you wash yourself after defecating near the source of water ?	Yes	❑	❑
		No	❑	❑
36.	Do you bathe yourself and wash your domestic animals near the source of water ?	Yes	❑	❑
		No	❑	❑
M X	*Keep your body clean, Pay special attention to nails and teeth*			
37.	How often do you take bath ?	Daily	❑	❑
		On alternate day	❑	❑
		Twice a week	❑	❑
		Once a week	❑	❑
		Any other response		
38.	What do you use to clean your body?	Soap	❑	❑
		Chiknimitti'	❑	❑
		Basan/Atta	❑	❑
		Soap stone	❑	❑
		Any other response		
39.	What do you use to wipe your body?	'Towel/Anguchha'	❑	❑
		A piece of cloth	❑	❑
		Any other response		
40.	How often do you wash the cloth/ towel with which you get up in the morning?	Daily	❑	❑
		No	❑	❑

Sl No.	Aspects of the NHEES Message	Response	Pre-test	Post Test
41.	Do you clean your eyes, ears, teeth, nose and face as you get up in the morning?	Yes No	❑ ❑	❑ ❑
42.	Do you brush your teeth daily? Specially after taking meals?	Yes No	❑ ❑	❑ ❑
43.	What do you use for brushing your teeth?	'Datun Tooth paste Tooth Power Char coal Any other response	❑ ❑ ❑ ❑	❑ ❑ ❑ ❑
44.	Do you wash your hands before and after taking meals?	Yes No	❑ ❑	❑ ❑
45	Do you wash your mouth and after taking meals?	Yes	❑	❑
46.	How often do you cut your nails?	Once a week Once in a fornight Once a month Any other response	❑ ❑	❑ ❑
47.	When you wash your hands do you clean your nails?	Yes No	❑ ❑	❑ ❑

APPENDIX F

Study Under Project NHEES

MASTER TABULATION SHEET — I

(P U P I L I N F O R M A T I O N)

State/UT.....Village/Town..... Block.....Name of the School.....

Type of School : Single Teacher..... Project/Non-Project Project Classes (During 1986) I/II/III/IV/V

Two Teachers/More Teachers .....

Project Date of Tabulation..... . ..... Project + CCP

Sl. No.	Name of Pupil	Father's/ Guardian's Name	Sex M/F	Year of admission to school	Class for which tested	Class and Section (Present)	Roll No. (Present)	Percentage of attendance in 1986
1	2	3	4	5	6	7	8	9

Sl. No.	No. of times for which failed till 1986	Is he/she physically handicapped ? (Yes/No)	Religion	Is he/she a slum/ jhuggi dweller ? (Yes/No)	Is he/she a resident of Industrial Area ? (Yes/No)	Does he/she belong to Rural or urban Area (R/U)
	10	11	12	13	14	15

Sl. No.	Does he/she belong to SC/ST/ Nomadic Tribe/Backward Classes/ Others (SC/ST/NT/BC/others)	Father's education	Mother's education	Guardian's education	Father's occupation	Mother's occupation	Guardian's occupation	Total monthly income of the Family (in Rupees)
	16	17	18	19	20	21	22	23

Study Under Project NHEES

MASTER TABULATION SHEET — I

(P U P I L A C H I E V E M E N T)

School.....Class ..... No. of Sections .....

State/UT ..... Village/Town .....

B E H A V I O U R S

Sl.	Names ↓ Max. Marks →	K			U						
		Recall	Recognise	TOTAL	Classify	Compare	Detect	Discriminate	Identify	Interpret	See Relationship
		M	A	R	K	S	O	B	T	A	I N E D

			A					S				
Sl.	Names ↓ Max Marks →	TOTAL	Analyse	Infer	Reason	Suggest	TOTAL	Draw	Label	Observe	TOTAL	Overall Grand Total

APPENDIX G

Instruction Sheet and Codification Scheme for the PAT

These two sheets should be treated as one set. In each sheet there is provision for tabulating information for twenty students. The data should be tabulated classwise. Separate Master Tabulation Sheets set should be used for each class. Hence, when entry for data for a particular class is over, use fresh set for next class. When the tabulator happens to commit an error in entering data about a pupil, he should cancel the particular line and pass on to the next line on the same sheet instead of cancelling whole of the sheet. (No over writing)

A. INSTRUCTIONS FOR FILLING UP MASTER TABULATION SHEET NO. I (PUPIL INFORMATION)

Fill in the general information given on the top. Please indicate whether the school is a project + CCP, or project – CCP, or a non-project school. Also indicate whether the village is a CCP village, i.e., where extensive Community Contact Programme was conducted.

N.B. Earlier Instruction is to be treated as cancelled Columns 4 to 23 have to be filled up in quantitative terms as per the coding scheme given below:

CODING SCHEME

Item No.		Response	Code No.
4.	Sex	M (Male) F (Female)	1 2
5.	Year of Admission to School (Actual figures to be entered, e.g. 1983, 1984, 1985, etc.)		
6.	Class for which tested (Actual figures in international forms of numerals and not roman, e.g., 1, 2, 3, 4, 5)		
7.	Class and section (Present) Not to be filled		
8.	Roll Number (Present)	Not to be filled	
9.	Percentage of attendance in 1986 (Actual figure to be entered, e.g., 100, 99, 98, 75, 65, etc.)		
10.	Number of times for which failed in the same class (Give actual number of years)		

Item No.	Response	Code No.
11. Is he/she physically handicapped ?	Yes	2
	No	1
12. Religion	Hindu	1
	Muslim	2
	Christian	3
	Jain	4
	Sikh	5
	Others	6
13. Is he/she a slum/jhuggi dweller ?	Yes	2
	No	1
14. Is he/she a resident of industrial area ?	Yes	2
	No	1
15. Does he/she belong to Rural or Urban area ?	R (Rural)	2
	U (Urban)	1
16. Does he/she belong to SC/ST/Nomadic Tribe/ Backward classes/others ?	SC	1
	ST	2
	NT	3
	BC	4
	Others	5
17. Father's Education	Illiterate	1
	Primary	2
	Middle	3
	HS/Hr. Sec.	4
	Higher Edu.	5
18. Mother's Education	Do	Do
19. Guardian's Education	Do	Do
20. Father's Occupation	Unemployed	1
	Labourer	2
	Farmer	3
	Service	4
	Teaching	5
	Business	6
	Professionals (Doctor, lawyer, Engineer, etc.)	7

Item No.	Response	Code No.
	Industrialist	8
	Self employed (Blacksmith, tailor, carpenter, toymaker, Potter, etc.)	9
	Other	10
21. Mother's Occupation	Do	Do
22. Guardian's Occupation	Do	Do
23. Total monthly income of the family	Write the actual income of the the family.	

After completing tabulation of data of all the section of a particular class, start on a new sheet for the next class even if there is enough space left in the earlier sheet.

Evaluation of the Impact of the Community Contact Programme (CCP)

APPENDIX H

MASTER TABULATION SHEET — II

State/UT..... Name of School .....

Name(s) of Village(s) under CCP ..... No. of Teachers involved.....

R E S P O N S E S

Sl. No.	Name of head of household	No. of members	Messages → / Items with area → / village ↓	I														
				1 (N)			2 (N)			3 (N)			4 (N)			5 (N)		
				Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

	II												III										
Sl. No.	6 (N)			7 (N)			8 (N)			9 (H)			10 (H)			11 (H)			12 (H)			13 (N)		
	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff.
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43

	IV															V								
Sl. No.	14 (N)			15 (N)			16 (N)			17 (H)			18 (H)			19 (H)			20 (H)			21 (H)		
	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff
	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67

				VI						VII												
Sl. No.	22 (S)			23 (S)			24 (S)			25 (S)			26 (S)			27 (S)			28 (H)			29 (S)		
	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff
	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91

				VIII															IX					
Sl No.	30 (S)			31 (S)			32A (S)			32B (S)			33			34 (S)			35 (S)			36 (S)		
	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff
	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115

	X																							
Sl No	37 (H)			38 (H)			39 (H)			40 (H)			41 (H)			42 (H)			43 (H)			44 (H)		
	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff
	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139

Sl. No	AREAS																		
	45 (H)			46 (H)			47 (H)			HEALTH			NUTRITION			SANITATION			
	Pre	Post	Diff.	Pre	Post	Diff	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	
	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	

APPENDIX I

Codification Scheme for Filling up Household Responses in MTS II (CCP)

Coding Scheme for Filling up Questionaire for Evaluating the Impact of Community Contact Programme

The responses of all the items given in the questionnaire are to be quantified in accordance with the coding scheme given below:

S.No.	Aspects of the NHEES Message	Area	Response	Code No.	Remarks
i	ii	iii	iv	v	vi
M.I.	Continue Breast feeding as long as possible. Avoid bottle feeding.				
1.	If you have a small baby in the house, how does the mother feed him/her ?	N	Breast feeding Bottle feeding Mixed Any other response	4 1 3 2	
2.	Upto what age the mother breast feed her baby ?	N	Upto 2 months Upto 4 months Upto 6 months Upto to 8 months Upto 1 year More than 1 year Any other response	2 3 4 5 6 7 1	
3.	How often do you feed milk to your baby ?	N	Three or four times a day. As frequently as baby demands Any other response	2 3 1	
M II.	Add Supplementary food from the age of 4 months onwards				
4.	When do you start giving supplementary food to your baby ?	N	Before 4 months After 4 months After 6 months After 10 months After 1 year Any other response	1 6 5 4 3 2	
5	What kind of solid food do you give to your baby ?	N	Rice Rice and dal Smashed Chappatis only Boiled smashed vegetables Any other response	1 2 1 2 2	If more than one responses are ticked maximum marks would remain 2 only.
6.	While cooking vegetables when do you wash them ?	N	Before cutting After cutting	2 1	

S.No.	Aspects of the NHEES Message	Area	Response	Code No	Remarks
i	ii	iii	iv	v	vi
7.	After cooking vegetables do you throw away excess water ?	N	Yes No Any other responses	1 3 2	
8.	How do you make use of excess cooking water ?	N	Throw it Make it into soup Any other response	1 3 2	
M III.	Immunize your child before first year, as early as possible				
9	Have you got your baby immunized before one year ?	HE	Yes No	2 1	
10	If yes, what are the diseases against which you have got your baby immunized ?	HE	Small pox/measles Cholera Whooping cough Diphtheria Polio Any other response	1 1 1 1 1 1	If more than one responses are ticked, assign 1 mark for each response. Maximum will be 6.
11.	If no, when did you get your baby immunized ?	HE	During the first year During the second year During the third year After five years Any other response	5 4 3 2 1	
12.	If you have not got your child immunized at all what are your reasons for not getting him/her immunized ?	HE	Due to non-availability of medical facility Due to fear that the child will get sick. Due to advice from elders against immunization Due to religious or traditional beliefs. Any other response	2 1 1 1 1	
M.IV	Include in daily diet of the child a variety of available foods in adequate amount distributing them in atleast three regular meals				
13.	Do you include enough green leafy vegetables in daily diet of your child and other members of your family ?	N	Yes No	2 1	

S.No.	Aspects of the NHEES Message	Area	Response	Code No.	Remarks
i	ii	iii	iv	v	vi
14	Do you include seasonal vegetables in your daily diet ?	N	Yes No	2 1	
15.	Do you include seasonal fruits in your daily diet ?	N	Yes No	2	
16	What kind of food do you include in the daily diet of your children ?	N	Cereals Dals or Pulses Green leafy vegtables Other vegetables seasonal fruit Milk and milk products Meat or fish or egg	1 1 1 1 1 1 1 1	One mark for each response but if all the 7 response are ticked, maximum marks would remain 6
M.V	Use Safe water for Cooking and drinking				
17	From where do you get water for drinking and cooking ?	HE	Well River Stream Pond Canal Tap Tubewell/Handpump	5 4 3 1 2 7 6	If more than one responses are ticked assign the marks of the response which is best of them
18	If you get your water from well, river, pond or canal, do you clean (purify) this water before using it for drinking and cooking ?	HE	Yes No	2 1	
19	How do you clean this water	HE	By Tiltering By boiling By decanting By addin, alum/pottasium permanganate (laldawa) Any other response	3 5 2 4 1	
20	How often do you clean the vessel in which you store water ?	HE	Daily On alternate day twice a week Once a week Once in two weeks Any other response	6 5 4 3 2 1	

S.No.	Aspects of the NHEES Message	Area	Response	Code No.	Remarks
i	ii	iii	iv	v	vi
21	How do you take out Water from the vessel ?	HE	By pouring By using a pawa (a small vessel with long handle) By diping any container inside the vessel	3 4 2	
M VI.	Use drainage water for raising food plants/make provision for a Soak pit				
22	How do you dispose of drainage water from your house ?	HE	Inside the house to collect the puddle Outside the house by digging a nallah to collect as puddle around house To the backyard for kitchen garden To the soak pit Any other response	2 3 4 5 1	
23.	Do you grow some seasonal vegetables in your plot or kitchen garden ?	ES	Yes No Any other response	3 1 2	
24.	If yes, do you use drainage water for watering the plants	ES	Yes No Any other response	3 1 2	
M VII	Provide sanitary facilities in the school and community, do not urinate, defecate or spit anywhere but on the places provide				
25	Do you have latrine and urinal in your home ?	ES	Yes No	2 1	
26.	If yes, mention the type of latrine	ES	Pit latrine Trench latrine Sanitary latrine Any other type	3 2 4 1	
27	If you do not have latrine in your house, where do you urinate and defecate ?	ES	In the open field Near pond/river/ stream or other sources of water Any other response	3 1 2	

S.No.	Aspects of the NHEES Message	Area	Response	Code No.	Remarks
i	ii	iii	iv	v	vi
28	Do you wash your hand well after defecation ?	HE	Yes No	2 1	
29	What happens when you defecate in the open and do not cover the stool with soil ?	ES	Foul smell will pollute the air Disease carrying organisation will breed and spread germs Any other response	2 3 1	
M.VIII.	Keep your school, home and village surrounding clean. Make provision for compost pit.				
30.	How do you dispose of solid wastes like vegetable peels, waste papers, packages, stale food and other organic wastes	ES	By making a compost heap Any other response	2 1	
31.	How do you dispose of the faecal matter ?	ES	By indiscriminate lettering Dumping it in a specific point out-side the house Covering it with soil By making a compost pit Any other response	1 4 3 5 2	
32.	Do you have regular facility for collection and disposal of solid waste ?	ES	Yes No	2 1	
33.	Do you think that garbage can be of any use to you ?	ES	Yes No	2 1	
M IX	Do not pollute sources of water				
34.	Do you wash your clothes, utencils near the well, pond, river or other sources of water ?	ES	Yes No	1 2	
35.	Do you wash yourself after defecating near the source of water ?	ES	Yes No	1 2	
36.	Do you bathe yourself and wash your domestic animals near the source of water ?	ES	Yes No	1 2	

S.No	Aspects of the NHEES Message	Area	Response	Code No.	Remarks
i	ii	iii	iv	v	vi
M.X.	Keep your body clean, pay special attention to nails and teeth				
37	How often do you take bath ?	HE	Daily	5	
			On alternate day	4	
			Twice a week	3	
			One a week	2	
			Any other response	1	
38.	What doy you use to clean your body ?	HE	Soap	2	If more than one responses are ticked, maximum marks would be 2 only.
			Chikniemitti	2	
			Basen/Atte	2	
			Soap stone	2	
			Any other response	1	
39	What do you use to wipe your body dry after bath ?	HE	Towel/Anguchee	2	
			A piece of cloth	2	
			Any other response	1	
40.	How often do you wash the cloth/towel with which you wipe your body ?	HE	Daily	4	
			Once a week	3	
			Once a forthnight	2	
			Any other response	1	
41.	Do you clean your eyes, ears teeth, nose and face as you get up in the morning ?	HE	Yes	2	
			No	1	
42.	Do you brush your teeth daily ? Specially after taking meals ?	HE	Yes	2	
			No	1	
43.	What do you use for brushing your teeth ?	HE	Datun	3	
			Tooth paste	3	
			Tooth powser	3	
			Charcoal	1	
			Any other response	2	
44.	Do you wash your hands before and after taking meals ?	HE	Yes	2	
			No	1	
45	Do you wash your mouth thoroughly after every meal ?	HE	Yes	2	
			No	1	
46	How often do you cut your nails ?	HE	Once a week	4	
			Once a fortnight	3	
			Once a month	2	
			Any other response	1	

S.No.	Aspects of the NHEES Message	Area	Response	Code No.	Remarks
i	ii	iii	iv	v	vi
47.	When you wash your hands do you clean your nails ?	HE	Yes No	2 1	

	Area	No. of item	Minimum marks	Maximum marks
*	N – Nutrition	12	12	42
	HE – Health Education	21	21	71
	ES – Environmental Sanitation	14	15	42
	Grand total :	47	48	155

NB

* Do not enter areawise for item 149 – 157 gain and losses as discussed in meeting. For each item indicate plus and minus for gain and losses.

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UNICEF MESSAGES

* Continue breast-feeding as long as possible. Avoid bottle-feeding.
* Add supplementary food from the age of four months onwards.
* Immunize your child before the first year as early as possible.
* Include in the daily diet of your child a variety of available foods in adequate amount, distributing them at least among three regular meals.
* Use safe water for cooking and drinking.
* Use drainage water for raising food plants. Make provision for a soak pit.
* Provide sanitary facilities in the school and in the community; do not urinate, defecate or spit anywhere but at the place provided.
* Keep your school, home and village surroundings clean. Make provision for compost pit.
* Do not pollute sources of water
* Keep your body clean, pay special attention to nails and teeth.