CHAPTER IV

Statement of the Problem Definitions & Delimitations

Statement of the Problem:

To develop systems engineering approach to the management of school organisation:

**Hypothesis - 1:**

The human system elements working under Theory-Y administrative structure are significantly superior to those working under Theory-X administrative structure with respect to:

i) Job effectiveness,

ii) Job commitment.

**Hypothesis - 2**

The necessary & sufficient conditions for commitment to a job are:

i) Job manageability,

ii) Opportunity to exert,

iii) Immediate & continuous awareness of one's performance,

iv) Autonomy,

v) Continuous interaction within & without the system,

vi) Immediate reward.

...67
Definitions & Delimitations:

1. **School Organisation:**

For the purpose of this research school organisation will comprise of the following:

i) **Structural components,**
ii) **Operating components,**
iii) **Flow components.**

A brief detail of these components is given below:

1) **Structural Components:**
   a) **Formal material structural components:**
   These include the school plant, the building, the ground, the classroom structure, the open space and closed space, the library & laboratory buildings, the furniture, the play equipment - fixtures, the gymnasium, auditorium and the swimming pool. In general, formal material structural components include the framework of closed and open spaces like land, buildings, rooms, surface, supports and motion paths in which the activities are located supported and protected.

   b) **The formal non-material structural components:**
   These include time table, the service rules & regulations, curricula, admission system, the evaluation procedures, design of all formal structures, the
administrative procedures, the arrangement of furniture, the arrangement of closed and open spaces, rules & regulations that guide the formal interactional relationships flowing from higher levels of hierarchy to lower levels and vice versa, the protocol structure, the duty charts and the position descriptions etc.

c) The informal material structural components:
These include the garden decorations, the class room decorations, the room flooring, wall paintints etc. etc.

d) The informal non-material structural components:
These include the design and arrangements of all informal material structural components, non-prescribed design elements of all frame-work of closed and open spaces, colour combination of curtains, walls, doors, windows and furniture, the general organisations, environmental climate within which the formal and informal interactions of the organisation are taking place, styles of all informal interactions flowing from higher levels of hierarchy to lower levels and vice versa.
ii) **Operating Components:**

a) **Formal material operating components:**

These include the students, the teachers, the laboratory and the library equipment, the books, the maps, models, the teaching aids, films, tapes, administration personnel. In general, formal material operating components include people and the equipment that act upon the energy & information flow components and on administrators, teachers, students and peons to change their condition to the desired one.

b) **Formal non-material operating components:**

These include the teaching techniques, evaluation procedures, co-curricular activities, field trips, clubs, excursions, dramas, debates, symposium etc., plans of performance and their sequence in space & time, plans of procedure for realising operations, strategies developed for realising the desired outputs and off-setting the deviating, the technical know-how of people working in the organisation.
c) Informal non-material operating components

These include teacher-teacher relationship, student-teacher relationship, the administration-staff relationship, the student-administration relationship. All informal interactions flowing from higher levels of hierarchy to lower levels & vice versa. The formal and informal material & non-material operating components act upon the material, information & energy flow components to effectively modify these components in the desirable direction. There is no water tight compartmentalisation between structural and operating components. In fact there is an overlap among these components. Some components are there which have both structural as well as operating component status.

iii) Flow Components:

Flow components can be broadly divided into material and non-material components. The material flow components comprise of all those elements that enter the system to get operated upon by the operating components to change their state and then leave the system—patients in the hospital, passengers in a train, the learners in a school system are some examples of the material flow components.
In a school system an individual teacher or an individual administrator can also be called a material flow components to the extent that he gets changed through experience of interaction with other components in the system.

The non-material flow components comprise of information flow components and the energy flow components. The information flow components consist of all kinds of data needed for achieving systems objectives such as examination results, observation made by parents, teacher's and administrator's appraisals etc. Energy flow components comprise of fees and other kinds of income, electricity, public appreciation of the programmes etc.

II. Systems Engineering Approach

For the purpose of this research, systems engineering approach involves:

i) Analysing the school system components individually,

ii) Analysing the school system components in relation to each other,

iii) Analysing the school system components in relation to the whole structure,

iv) Analysing the school system components in relation to the goals to be achieved,

v) Identify the constraints & analysing the school components in relation to the constraints,

vi) Analysing the alternative ways of achieving the goals,
vii) Devising suitable plans and strategies,
viii) Devising suitable execution procedures,
ix) Devising evaluation procedures,
x) Determining suitable corrective & remedial measures,
xi) Developing work break structures at all stages of execution,
xii) Developing work & operation packages,
xiii) Developing integrated approach to the solution of problems,
xiv) Remaining continuously conscious of the minimization and maximization principle,
xv) Investigating the applicability of operations research techniques in the solution of specific problems,
xvi) Identifying the specific problems and working out their general solutions.

III. Theory - X:

For the purpose of this research Theory-X is the same as given by McGregor and assumes:

1) Human beings are inherently lazy and will shun work if they can.

2) People must be coerced, directed, controlled and motivated by fear of punishment or deprivation to impel them to work adequately toward the achievement of organisational objectives.
3) The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, and wants security above all.

The details of the administrative structure relevant to the Theory-X assumptions are:

i) Flow of authority down a hierarchical chain in which each subordinate has only one supervisor,

ii) Recognition of strictly formal relations & disrecognition of informal relationships,

iii) Careful specification of work and fitting the worker to the job,

iv) Subjecting the workers to compulsion for attaining organisational objectives,

v) Increase of control with the increase of deviant behaviour,

vi) Existence of logical incentive system organised strictly on formal basis,

vii) Divide and rule policy,

viii) Maintaining distance with the subordinates,

ix) Considering human beings as mechanical units of the enterprise mechanically carrying out the instructions,

x) Derecognising the human side of enterprise,

xi) Considering workers like children who need to be told what to do and who must be watched carefully,

xii) Policing the workers,
xiii) Widening the conflict between the individual goals and the organisational goals,

xiv) Considering a worker as simply a set of bones, muscles, and a set of brain neurons capable of efficiently handling machines and processes under the influence of rewards and punishments.

IV. Theory - Y Assumes:

1) The expenditure of physical and mental effort in work is as natural as play or rest.

2) External control and the threat of punishment are not the only means of inducing people to work towards organisational goals. Man will exercise self-direction and self-control in the service of objectives to which he is committed.

3) Commitment to objectives is a function of the rewards associated with their achievement.

4) The average human being learns, under proper conditions, not only to accept but also to seek responsibility.

5) The capacity for exercising a relatively high degree of imagination, ingenuity, and creativity in solving organisational problems is widely, not narrowly, distributed in the population.

6) Under the conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilised.

The details of the administrative structure relevant to Theory - Y assumptions are:

...75
i) Flow of authority and communication in both formal and informal systems,

ii) Varied and enriched work,

iii) Considering human workers as dignified people capable of creative involvement,

iv) Grouping tasks into different meaningful jobs to accommodate individual talents and capacities,

v) Grant of autonomy to the worker,

vi) Making the worker aware of his performance so that he may initiate corrective action instead of being directed to take it,

vii) Introducing challenging assignments so that the worker may learn and grow,

viii) Fitting the job to the worker,

ix) Making the organisational objectives compatible with the individual objectives,

x) Giving due attention to the human side of the enterprise.

V. Job Effectiveness:

For the purpose of this project job effectiveness with respect to a teacher implies the extent to which the teacher succeeds in helping a child to grow academically.

The academic growth of a child was measured through teacher made achievement tests. The details of measurement are given in the chapter on "Developing tools of measurement".
VI. Job Commitment:

For the purpose of this project job commitment refers to:

1) The capability and earnestness in a worker to self-generate, self-coordinate, self-regulate and self-control his/her activity.

2) The capability and earnestness in a worker to self-evolve his/her activity.

VII. Capability to Self-generate:

This refers to the capacity to self-initiate learning activities on the part of a learner and self-initiate teaching activities on the part of the teacher. The student and the teacher should not depend upon external provocations for initiating the teaching-learning activity.

VIII. Capability to Self-coordinate, Self-regulate and Self-control:

These capabilities refer to the system becoming in-built. Regulation, coordination and control are the properties of any inbuilt system. Any servo-system becomes totally automatic in its performance if and only if it has the properties of regulation, coordination and control.

IX. Capability to Self-evolve:

The human activity systems are not closed systems. They are open systems capable of evolution in their activities. All servo-systems are homeostatic, whereas a human activity system is homeodynamic which continuously moves towards evolution.
Movement towards evolution implies moving from one state to the next and so on. In the case of homeostatic systems there is always a quick return of the system to its original state if disturbed from that state. This is what sometimes is called 'Constancy' principle. Maintenance of body temperature is an example of homeostatic system.

The human learning systems will get reduced to servo-systems if there is no deliberate attempt on the part of the supra system to induce in the learning system self evolutionary capability.

X. Job Manageability

For the purpose of this project job manageability implies the capability on the part of a worker to be able to handle the job. For a learner it implies his/her being able to handle the learning material. For a teacher it implies his/her being able to handle the responsibility assigned. At no point should a behaving individual get completely lost. The individual learner/teacher should be able to regulate, coordinate and control the human activity assigned to him/her. In technical terms manageability refers to system stability. The details of measuring job manageability are given in the Chapter on "Development tools of measurement".
XI. **Opportunity to exert**

This project recognises two kinds of exertions viz.

i) Mechanical

ii) Creative

Mechanical exertion is blind and springs from exteroceptive effort. Examples are: exertion done while copying the material or while cramming the material etc. Mechanical exertions involve only the subcortical regions of the brain. Such exertions are outward directed rather than inward directed.

Diagonally opposite to mechanical exertion is creative exertion. Creative exertion springs from proprioceptive effort, and involves the mediating process of the cortical regions of the brain. Creative exertions are involved in such activities as solving a problem, making notes and summaries of long text material, interpreting results, drawing conclusions, taking decisions involving complex processes, building up designs of structures, diagnosing diseases, analysing and synthesizing, organising and managing activities etc.

Creative exertions are inward directed and are guided by the principles of self-regulation, self-coordination, self-control and self-evolution. This project is mainly concerned with the opportunity to creatively exert. The details of measuring 'Exertions' are given in the Chapter on "Developing Tools of Measurement".

...79
XII. **Awareness of Performance:**

For the purpose of this project awareness refers to a behaving individual being in a state of awareness of the results of his/her performance. The assumption is that a behaving individual gets completely involved in his/her performance if he/she is continuously fed with the result of his/her performance with respect to:

i) How correctly he/she is performing in relation to the goal?

ii) How much he/she is aware of the total system interactional network?

iii) Where he/she stands with respect to the other members of the group?

iv) Where he/she stands in relation to the self-assigned goal?

v) How he/she is progressing towards the goal in relation to the time-past and present?

vi) How much aware he/she is about the tangible and intangible consequences of his/her performance.

The details of the measurement of awareness factors are given in the Chapter on “Developing Tools of Measurement”.

XIII. **Autonomy:**

For the purpose of this project autonomy implies:

i) Developing in the behaving individual the sense of responsibility by holding him responsible for the activity systems generated by him.
ii) Granting to the behaving individual the freedom to perform his assignment as he thinks best in the interest of the achievement of goals.

iii) Granting the behaving individual the security that is essential for maintaining good mental health.

iv) Granting the behaving individual stability in terms of involving him in manageable jobs.

The details of the measurement of autonomy factors are given in the Chapter on "Developing Tools of Measurement".

XIV. Interaction:

For the purpose of this project interaction has to be immediate and within and without the system. The interaction gets generated through competitive settings, discussion groups, project work, seminars etc. The details have already been given in Chapter - III under "Systems Forces".

XV. Rewards:

For the purpose of this project reward has two dimensions viz., tangible and intangible. Expectation of reward has been considered as "Reward Awareness". This is the same thing as incentive in the common terminology. By reward is meant the actual reward given after completing an act and comprises of cash reward, cups, trophies, books, promotions, increments, appreciation, patting, public announcements of appreciation etc.