CHAPTER 4
DESIGNING AND DEVELOPING OF TE MATERIAL:
APPLIED BEHAVIOUR ANALYSIS

“Effective practice must be founded on an adequate epistemology or theory of knowledge” (Entwistle, 1990).

For the present study keeping all the previously described paradigms in mind, the researcher has used Applied Behaviour Analysis (Behavioural model) ie Token economy procedures to see the effects on reading, writing & spelling. For this purpose TE material was developed, a detail of which is given in this Chapter. Accordingly this chapter has been divided into two sections. Section A presents the description of Applied Behaviour Analysis and its tenets and applications, followed by the steps taken in the present study to ensure their fulfillment. In Section B the description and attributes of TE procedures along with steps in designing and developing reference to reinforcement – the operant paradigm in question have been discussed.

SECTION - A

Systems that use principles of learning in applied settings are termed as behavioural models. **Behavioural models of instruction are systems for arranging the relationships among three variables antecedents, behaviour and consequences.** Skinner (1968) described these relationships as the “contingencies of reinforcement under which learning takes place”. Thus, teaching as viewed by these models is the practice of changing the form or occasion of a behaviour by deliberately arranging the contingencies of reinforcement. This is reinforced by a prototype of behavioural models of instruction namely Applied Behaviour Analysis.
“Applied behaviour analysis is the science in which procedures derived from the principles of behaviour are systematically applied to improve socially significant behaviour to a meaningful degree and to demonstrate experimentally that the procedures employed were responsible for the improvement in behaviour” (Alberto & Troutman, 1982).

It is a discipline devoted to the understanding and improvement of human behaviour. Applied behaviour analysis focuses on objectively defined observable behaviours of social significance, it seeks to improve the behaviour under study while demonstrating a relationship between the procedures employed and the behavioural improvement. It uses the methods of science – description, quantification and analysis.

4.1 TENETS OF APPLIED BEHAVIOUR ANALYSIS (ABA)

Applied behaviour analysis can be considered as an educational and evaluative system based on principles of learning and characterized by the following:

1. Use of Individualized Programmes

Programmes in which diagnosis of the presenting problem, analysis of the data and the treatment are individualized (Repp, 1983). Treatment is not prescribed for a specific etiological group, e.g., “dyslexics”, or “slow learners”, rather, programmes are implemented according to the characteristics and behaviours of the individual and according to the total environment of the individual, including considerations as parents, school, home environment.
2. Response definitions that allow direct observation and measurement

For example, aggression in a classroom could be initially defined as throwing objects; hitting, biting, kicking, or pinching others, tearing papers, spitting, and knocking over furniture. Then, if two observers who were given these lists did not agree that responding was occurring, each term would be more explicitly explained, clarifying the definition of the response.

3. Direct observation in the setting in which the behaviour occurs

An indirect approach such as an interview or a standardized test is not used unless “verbalizations in an interview” is the behaviour in question. In the preceding example, the child’s aggressive behaviour would not be measured on and/or inferred from any psychology test. It would be measured in the classroom and any other portion of the natural environment in which observation was appropriate.

4. Continuous measurement of behaviour

For example, instead of assessing the effectiveness of a special reading programme by testing a child today and four months later on a standardized spelling test, one would measure the child’s performance each day during the reading programme and perhaps many of the ensuing days to measure the continuing effect of the programme.

5. Data presented in numerical form

One would not report that a child was not in a mood to take a spelling test, that is why he scored poorly. Instead, one would report that on Monday the child made 8 errors out of 10, out of which errors involved consonants and 2 errors involved vowels. Summary statements could be made, but they would
still be in numerical form; e.g., shiv averaged 4, 7, 2, 5, 1, 4 correct responses during this week for each of the spelling tests.

6. A systematic introduction of independent variables

To approach credulity, ABA typically uses one of the four designs namely reversal, multiple baseline, multi element or changing criterion.

7. A continuing assessment of the reliability of measurement

To allow us to be relatively certain that the behaviour did change as a result of the programme.

8. A detailed explanation of the procedures, thus allowing replication

The necessity for clear, non technical reports of procedures is more important in ABA than in many other fields. Research in ABA should be, but is not always, written for the consumer of importance who regularly works with the population described. In this case it would be teachers and counsellors who work with a school going population.

9. The work is applied

Means work that is concerned with socially important behaviours.

10. An effort to develop conceptual systems

For example, we should not just present the steps in moving from one colour discrimination to another for a child. One should discuss the principle of fading as it is applied to the problem in general.

Steps taken for fulfilling the parameters of the nature and tenets of ABA are entered in Table 4.1.
<table>
<thead>
<tr>
<th>S. No</th>
<th>Nature &amp; Tenets of ABA</th>
<th>Steps Taken in the Present Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Specification of:</td>
<td>Teacher instruction</td>
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<tr>
<td></td>
<td>Antecedents</td>
<td></td>
</tr>
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<td></td>
<td>Behaviour</td>
<td>Written work on the worksheets</td>
</tr>
<tr>
<td></td>
<td>Consequences</td>
<td>Point earning, based on correct responses; reinforcement contingent on point earning</td>
</tr>
<tr>
<td>2</td>
<td>Socially significant behaviours</td>
<td>Academic performance in reading, writing and spelling</td>
</tr>
<tr>
<td>3</td>
<td>Systematic application of procedures</td>
<td>Through an experiment</td>
</tr>
<tr>
<td>4</td>
<td>To a meaningful degree</td>
<td>Increasing students levels of independence on academic task</td>
</tr>
<tr>
<td>5</td>
<td>Methods of Science:</td>
<td>Behaviours were operationally defined</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantification</td>
<td>In terms of scores</td>
</tr>
<tr>
<td></td>
<td>Analysis</td>
<td>Qualitative &amp; quantitative (detailed in Chapter-6)</td>
</tr>
<tr>
<td>6</td>
<td>Individualized Programmes</td>
<td>Instruction was carried out in groups, monitored individually for each student</td>
</tr>
<tr>
<td>7</td>
<td>Response definitions that allow direct observation &amp; measurements</td>
<td>Student responses were recorded as permanent products on worksheets for reading, writing &amp; spelling. Sample worksheet given in Appendix ‘D’</td>
</tr>
<tr>
<td>8</td>
<td>Direct observation in the setting in which the behaviours occurred.</td>
<td>Student reading aloud, handwriting of a student and written spellings as observed in the learning centre.</td>
</tr>
<tr>
<td></td>
<td>Continuous measurement of behaviour</td>
<td>Behaviours recorded for each session on scoring sheets; individual scores on reading, writing, spelling, total points and tokens earned. Appendix ‘N’</td>
</tr>
<tr>
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<tr>
<td>10</td>
<td>Data presented in numerical form</td>
<td>Separate scores for reading, writing spelling and token earnings on their totals.(reading 4 points, spellings &amp; writing 3 points each)</td>
</tr>
<tr>
<td>11</td>
<td>Systematic introduction of independent variables</td>
<td>Pre test, post test control group design where pre test is taken as baseline performance.</td>
</tr>
<tr>
<td>12</td>
<td>A continuing assessment of the reliability of measurements</td>
<td>Two pre tests and two post tests (LAT); student performance recorded for 38 sessions for each student in the total sample</td>
</tr>
<tr>
<td>13</td>
<td>A detailed explanation of procedures for replication</td>
<td>Researcher designed tokens &amp; token economy progress chart: details of procedures in Chapter 5.</td>
</tr>
<tr>
<td>14</td>
<td>Applied work</td>
<td>Applied work in Academic performance (Reading, Writing &amp; Spelling)</td>
</tr>
<tr>
<td>15</td>
<td>Development of Conceptual systems</td>
<td>Description of remediation with &amp; without TE</td>
</tr>
</tbody>
</table>

### 4.2 CLASSROOM APPLICATIONS

Applied behaviour analysis has had a conspicuous and dominant role in the field of education. Repp (1983) states that “the contributions of applied behaviour analysis to education have not necessarily been new but that they have re- emphasised the importance of thorough and **consistent application of learning principles, attention to details and systematic and objective evaluations.**
As per this approach the learning disabled individual is viewed simply as exhibiting deficient academic behaviours that can be altered through techniques commonly used with other behaviour disorders. Repp (1983) states that the behavioural approach has been successful in alleviating academic deficits in a variety of populations including mentally challenged, emotionally disturbed, disadvantaged and underachieving and normally achieving students.

Several early studies focused entirely on the elimination of disruptive behaviour in the special education classroom. Patterson, Jones, Whitter and Wright (1965) successfully employed a DRO Differential reinforcement of other behaviour procedure to eliminate the excessive movements of a hyperactive boys using candy and toys as reinforcers. Perline and Levinsky (1968) produced similar results with an entire class using tokens. Free time was also used as a reinforcing event by Osborne (1969) who made additional recess contingent upon “in seat” behaviour by individual children, and by Sulzbacher and Houser (1968), who employed a group response cost procedure whereby minutes of a special recess were subtracted contingent upon display or discussion of an absence gesture. A more comprehensive approach was taken by Birnbrauer (1964) and his associates, in that they dealt with both social and academic behaviour in one of the earliest classroom token programmes. Birnbrauer and Lawler (1964) were able to produce improvements in a number of areas such as entering and leaving the room quietly, in seat and on-task behaviour, and working at a task for extended periods of time. These results were replicated and extended in subsequent work utilizing both token reinforcement and programmed-instruction techniques. Birnbrauer, Wolf, and Kidder (1965) and Birnbrauer, Wolf, Kidder and Tague (1965) demonstrated the effectiveness of this procedure in accelerating academic productivity reducing error rates and decreasing disruptive behaviour.
The behavioural approach to the remediation of academic related behaviours is defined by three characteristics: **Individualization and mastery learning**, wherein the child’s strengths and weaknesses are assessed and progression is made at the child’s own rate after the successful mastery of each task; **Direct teaching that is** basic principles of learning are used in directly modifying the behaviours that need to be altered (e.g., remediating reading itself rather than trying to remediate an unseen processing deficit); and **Emphasis on measurement**, which is a vital aspect of the behavioural approach. It consists of continuous measurement of the behaviour that is being treated. This procedure results in immediate feedback as to the effectiveness of the treatment programme and permits changes when appropriate. In addition it modifies incompatible behaviours.

A number of behaviours are thought to impede the learning process in LD children. Three of the most commonly reported incompatible classroom behaviours are impulsivity, attention deficits, excessive motor activity

a) **Impulsivity**: Children experiencing academic difficulties often respond to academic questions faster than do normal children (Treiber, Lahey, 1983). Such children have an impulsive cognitive style in which errors are made because they do not take time to consider all the alternatives and the consequences of their actions. Thus, it is reasoned that in order to enhance academic performance it is necessary for learning disabled students to increase the latency of their responses. Williams & Lahey (1977) directly tested this hypothesis on a group of impulsive school children. Their results indicated that reinforcement for correct responding produced increases in accuracy, but not in latency. Similarly reinforcement for increased latency in responding did not produce accompanying improvements in accuracy.
b) **Attention deficits**: It has been suggested that attention deficits play a significant role in the underachievement of learning disabled children (Treiber & Lahey, 1983). Two meanings of the term attention are confused in these theories and need to be distinguished. First, reference is often made to overt attending behaviours, such as “being on-task”, grossly looking at academic work and directing eye movements toward reading stimuli. In this sense, learning disabled children are said to be “inattentive” and “distractible”, meaning that they frequently fail to direct peripheral attending behaviours to academic tasks. Second, it is often suggested that LD children have central deficits in attention. They are described as having difficulties in selecting relevant stimuli, filtering out irrelevant stimuli and maintaining concentration. Behavioural interventions understandably cannot be directly focused on central attention deficits, but a number of studies have attempted to modify peripheral attending behaviours in an attempt to improve academic performance (Treiber & Lahey, 1983).

c) **Excessive motor activity**: A considerable percentage of LD children are also classified as hyperactive, with the overlap estimated as ranging from 50% (Lambert & Sandoval, 1980) to as high as 80% (Safer & Allen 1976). Factor analytic studies usually identify a cluster of behaviours comprising a hyperactive dimension (i.e. short attention span, distractibility and impulsivity) which are frequently associated with LD children. Behaviour modification programmes have been quite successful in decreasing hyperactive behaviours (Kent & O’Leary, 1976).

The clearest demonstration that it is not necessary to reduce hyperactivity before remediating academic deficits comes from a study by Ayllon, Layman and Kandel (1975). The subjects were three children who
had been classified as both learning disabled and hyperactive and whose activity levels had been successfully controlled by methylphenidate when medication was discontinued, all subjects evidenced marked increases in hyperactive behaviour. A token reinforcement system was incorporated for correct responses in a math workbook in which the teacher gave a checkmark on a record card for each correct response. At the end of the day, checkmarks were exchanged for various prizes or periods of free time. This programme resulted in immediate improvement in the percentage of correct responses in Maths while performances in reading remained at low baseline levels, while in the reading class the level of hyperactivity remained unchanged. In the last treatment phase, the token reinforcement system was implemented during the reading period as well. Similar results were obtained with significant improvements in academic performance being noted while hyperactivity levels dropped to baseline medication levels. These results have been confirmed in a number of similar studies (Ayllon & Roberts, 1974; Ecket et al. 2002)

The observations reveal that direct reinforcement of academic behaviours (e.g., correct academic responses) resulted in improved academic performance while significant declines were seen in behaviours incompatible to learning such as inattentiveness, disruptiveness, and motor activity.

For the present study impulsivity, attention deficit and excessive motor activity were beyond the scope of the study.

Classrooms should be predictable environments in which children know what is expected and how to succeed. Such predictability occurs because the consequences of following procedures and rules and engaging in classroom work (e.g., task accomplishment & learning) should be rewarding to children, and often this happens (Dreikurs et al., 1982). At times however young children may not comprehend the connection between the task and the
consequence, or it may be too distant to be effective. Furthermore, other activities that interfere with learning might be equally or more rewarding. Thus the operant paradigm with its emphasis on antecedent conditions (instructions from the teacher, curriculum tasks, etc.) and consequent conditions (“rewards and punishments”) is well suited to studying problems associated with academic achievement.

For the present study the antecedent condition was instruction from the teacher to attempt the worksheet (on reading, writing & spelling), the behaviour was written work on the worksheets; and the consequent condition was point earning based on correct responses in the worksheet which subsequently earned only the experimental group corresponding tokens.

SECTION -B

4.3 TOKEN ECONOMY (TE) PROCEDURES

4.3.1 Origin & Attributes of TE

Token economies have been present for thousands of years with various forms of money used as tokens in our general societies. Within our educational societies, however, token economies are a relatively new phenomenon, occurring predominantly in the last 40-45 years. There are, however examples of token programmes long before the advent of Behaviour Analysis, or even of psychology (Kazdin, 1977). One of the first was that of Joseph Lancaster, who in the early 1800’s developed the monitorial system in England. Lancaster had initiated free education for the poor. Without enough teachers, Lancaster began a system in which students acted as monitors for groups of students. There were several types and duties of monitors (e.g. teaching, examining, keeping attendance, records), but the system in general seemed to revolve around the principle we now call reinforcement. In 1805, the Lancaster system was brought to New York, which made free education available to the poor. This was perhaps the first
**Token System**, used in American education and, it extended the English system and is quite similar to present token economies. The system, also advanced the idea of token loss for inappropriate classroom behaviour replacing with it the physical punishment system used before and since.

Token systems certainly continued in one form or another, but they were never systematically studied in order to determine how to make them more successful and with what particular behaviours and populations they would be successful. In 1961, applied work with tokens began before very much basic research had been undertaken with token systems. Staats (1961) started his work with tokens and language and Ayllon and Azrin (1968) began their large-scale work with tokens and psychiatric patients.

Birnbrauer and Lawler (1964) published the first report of work with a token system in a special education classroom. Of their 37 students, 14 had never attended school, 3 had been dismissed from school because of incorrigibility, and 4 had severe behaviour problems. Birnbrauer, Byon, Wolf and Kidder (1965) used a token system to support their programmed instructional materials for teaching academic and practical tasks like reading, writing arithmetic, and telling time. The success of token systems with academic and social behaviours in classrooms was demonstrated in this and in a continuing series of studies by these authors (Byon, Birnbrauer, Kidder & Tague, 1966; Birnbrauer, Wolf, Kidder and Tague, 1965). With these studies as a basis, teachers, psychologists and many others became seriously involved in the application of token systems as motivation and feedback devices for students with special needs, in a wide variety of settings.

A great deal of research has focused on the use of techniques derived from reinforcement theory to bring classroom behaviour under control and to upgrade academic functioning (O’Leary & Becker, 1967; Walker, Mattson & Buckley, 1969; Glavin, Quay, Werry, 1971, Eckert et al. 2002) **In many**
instances in special education the teacher must contrive special contingencies for students to increase the frequency of desired responses, thereby resulting in providing the type of reinforcement not commonly employed. Token economy procedures refer to one such contingency. An extensive body of literature indicates that a wide range of behaviours in diverse populations can be modified within a token economy milieu (Bongfiglio et al. 2004)

4.3.2 DEFINITION

“[These are systems that arrange conditions in a manner where the students can earn tokens for appropriate behaviour/criterion which can then be exchanged for something that is of value to them (i.e. something rewarding).]” Repp, 1983. This procedure has two components: The token production component, wherein the student meets some stated response requirement and receives a token; The token exchange component, wherein the student meets some token accumulation requirement and exchanges tokens for backup reinforcers.

Token economies resemble the ‘work for pay’ lives of adults as they are basically miniature monetary systems in which clients work for generalized secondary reinforcers, that are exchangeable for a variety of backup reinforcers. Three major aspects define a token system, namely, Behaviours to be reinforced are identified and defined; A medium of exchange is selected, that medium is referred to as a ‘token’; Backup reinforcers are provided, which can be purchased with a token.

For the present study the token production component was the work done on worksheets for reading, writing and spelling, correct responses of which earned a student points. For these corresponding points the students earned tokens. That is to say point earnings led to token production. The student was required to meet a specific token...
accumulation component and exchange his tokens for backup reinforcers.

4.3.3 **ADVANTAGES OF TOKENS:** A number of attributes of tokens as potential reinforcers can be identified:

- Tokens allow a highly individualized programme
- Tokens do no close their reinforcing powers when more responses are required for reinforcement, if the change is made gradually.
- Tokens are a concrete non varying source of feedback i.e. they are non ambiguous.
- Tokens are quite easy to pair with attention (which is more natural to learning environments).
- Tokens are easy to administer, providing reinforcement without disrupting the learner’s activities.
- Token reinforcement can occur immediately after correct responding (i.e. they bridge the time gap between responding and the eventual reinforcer).
- Token system allows not only variation in reinforcers for the same student, but it also allows variation in the eventual reinforcer across students.
- Token systems have an element of feedback i.e. token delivery provides information that appropriate responding has occurred while token removal provides information that inappropriate responding has occurred.

For the present study the concrete source of feedback ie tokens were square pieces of chart paper 4 cms x 4 cms with different clip art pictures made on them. The drawing and colour of the tokens was
changed for every session in order to avoid duplication by students.
(Appendix ‘J’)

### 4.3.4 DESIGNING A TOKEN SYSTEM

There are three basic considerations in the design of a token economy for a classroom (McLaughlin and Wellhains, 1989): **Identification** of the target behaviours to be reinforced on the token system; Determining the items on the **reinforcement menu**, and setting the **exchange rates** for back up reinforcers.

- **Identifying Target Behaviour (S)**

  The selection of target behaviours is a crucial component in the design of the token economy. The behaviours selected by the behaviour analyst should include **desirable behaviours that need to be increased or maintained**. One should select behaviours for token contingencies that will be reinforced in the natural environment after the token system has been terminated (Ayllon & Azrin, 1968). Initially, undesirable behaviours come to the attention of the teacher, in a classroom, situation. Undesirable behaviours can be used to identify appropriate alternate behaviours to reinforce. For example, if the teacher considers the level of off-task behaviours to be a problem, then a certain amount of time on-task can result in the delivery of tokens. By differentially reinforcing on-task behaviour, the teacher can increase on task behaviour and concomitantly decrease its alternate (i.e. off-task behaviour).

  One factor in designing a token economy is to implement a system that will allow the children to be successful immediately. Therefore, **initially one should select only a few behaviours for reinforcement**. By implementing a system that selects a few behaviours to reinforce, and subsequently extinguishes a few behaviours the children will access reinforcement opportunities more rapidly. In point of fact, the teacher could include some
behaviours that are already at a moderate or high operant level. This is done to increase the probability of reinforcement being delivered in the early part of the token programme. Across time the teacher can make the behavioural requirements more stringent by reducing the number of ‘easy behaviours’ on the system as well as their point values. If many behaviours are at problematic levels, the teacher may need to prioritize the selection of behaviours, selecting those behaviours that warrant immediate attention.

For the present study target behaviours were identified in the area of reading, writing and spelling as they underlie academic performance. These behaviours were highlighted in the referrals made by class teachers through a referral form (Appendix ‘G’). An error analysis was also done and the correction of undesirable behaviours ie errors in reading, writing and spelling became the target behaviours for the study.

- Developing the Menu of Reinforcers

Another activity involved is developing the menu of back up reinforcers. The efficacy of employing a variety of back up reinforcers, which could be traded for was validated in the early years of the development of token economies. Hall and Hall (1980) state that “selecting and using an appropriate reinforcer is a basic step in any behaviour change programme.” Unless suitable back up reinforcers can be identified a token system is not likely to be successful. Selection of back up reinforcers can be accomplished in the following ways:

1. Asking: The most basic method for determining a potential reinforcer is to ask what the individual prefers.

2. Observing: Watching what an individual does on a regular basis can provide a valuable source of information on what activities or events can be used for reinforcement.
(3) **Reinforcer sampling**: herein the individual is presented with a sample of the potential reinforcer in order to gain experience with it. The potential reinforcer is not presented contingently, the individual merely experiences it. After this brief exposure, future presentations of the reinforcer are contingent upon the desired behaviour. The rationale involved is to provide the subject with an opportunity to experience an unfamiliar stimulus.

(4) **Forced choice**: in this approach a series of potential reinforcers are made available and the individual selects one of them from the ‘menu’.

(5) **Trying and seeing**: The only way to determine whether any potential reinforcer will actually serve as a reinforcer is to try and see it (Hall, 1990). Factors such as age, interest level, activity level of the individual should also be considered.

For the present study a menu of reinforcers was developed through forced choice. The reason for this was reinforcers were selected for their compatibility to school situation and which were within the rules of the school.

- **Setting the Exchange Rates**

Once the target behaviours and the menu of reinforcers has been developed, exchange rates need to be designed. The amount of points to be awarded for various target behaviours as well as the cost of each back-up reinforcer, needs to be determined. However, there are no hard and fast rules. Rather, the teacher must try various rules and periodically revise the system to accommodate needs. Additionally target behaviours that are at higher operant levels should pay off at a lesser value than behaviours that are more difficult to perform for the child or class.

For the present study the exchange rate is shown in Table 4.2.

137
<table>
<thead>
<tr>
<th>Backup reinforcers</th>
<th>Exchange rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choosing where to sit in the learning centre</td>
<td>1 token</td>
</tr>
<tr>
<td>Play with plasticine</td>
<td>1 token</td>
</tr>
<tr>
<td>Toffee/sweet</td>
<td>1 token</td>
</tr>
<tr>
<td>Assemble a Puzzle (upto 8 pieces)</td>
<td>1 token</td>
</tr>
<tr>
<td>Use ‘paint brush’ programme on the computer</td>
<td>2 tokens</td>
</tr>
<tr>
<td>Wipe the blackboard clean with wet sponge</td>
<td>2 tokens</td>
</tr>
<tr>
<td>Notebook name tag sticker</td>
<td>2 tokens</td>
</tr>
<tr>
<td>Collect worksheets of students</td>
<td>2 tokens</td>
</tr>
<tr>
<td>Have a symbol like a star or a smiley face drawn on hand</td>
<td>2 tokens</td>
</tr>
<tr>
<td>Stand first in line to go to class</td>
<td>3 tokens</td>
</tr>
<tr>
<td>Take a blank colouring sheet home</td>
<td>3 tokens</td>
</tr>
<tr>
<td>Have his name written on the blackboard as star of week</td>
<td>3 tokens</td>
</tr>
<tr>
<td>St. John’s ‘Proud to be a Johnian’ Sticker</td>
<td>4 tokens</td>
</tr>
<tr>
<td>Take a ‘find the hidden objects in the picture’ worksheet home</td>
<td>4 tokens</td>
</tr>
<tr>
<td>Playing with finger puppets</td>
<td>4 tokens</td>
</tr>
<tr>
<td>St. John’s printed ruler</td>
<td>5 tokens</td>
</tr>
<tr>
<td>Colouring book to keep permanently</td>
<td>5 tokens</td>
</tr>
</tbody>
</table>

This exchange rate was put up on the classroom notice board.
Implementing the Token Economy

The basic method for establishing tokens as reinforcers first involves instructing the student(s) that a particular response will earn a token, and that at some time some number of tokens can be exchanged for something else. For some students instructions are sufficient to establish the relation between tokens and access to the terminal reinforcer. But for other students a number of pairings might be necessary. In such a case, one would first give a token to the student and allow (or physically guide) the student to exchange the token immediately either for a short duration (as in free time) or a small amount (as with food) of the reinforcer. After a number of these pairings, the time between token delivery and token exchange is gradually increased to the level appropriate when the token programme is in place. As this delay is being increased, the relation between responding and token delivery is taught. The student either is allowed to make the correct response or is physically guided through the correct response. A token is delivered and exchange is allowed. After a few pairings of this sort, the delay between token delivery and token exchange is increased. In addition, the number of responses necessary to earn a token is increased.

The implementation of the token economy procedures in the present study have been described in detail in Chapter-5 Conduct of the study.

4.4 REINFORCEMENT–THE OPERANT PARADIGM UNDER CONSIDERATION: Learning is demonstrated as acquisition of skills, an acquisition that can be affected by the way we arrange the learning environment for our students. Some events or changes in the environment increase the likelihood of recurrence, the process which is called reinforcement. The process involves increase in behaviour as a function of a change in stimulus conditions. The definition of reinforcement then is “a
procedure in which a response produces a stimulus change and as a result becomes more probable” (Repp, 1983).

However, in not every case does the environment change in the same way; and the way in which it changes will determine whether the term is labeled ‘positive reinforcement’ or ‘negative reinforcement’.

In arithmetic, the word “positive” means to add something while the word “negative” means to subtract or take away something. When these adjectives are applied to the word reinforcement, two types of stimulus changes can be described: (1) positive reinforcement refers to stimuli that are produced or added, while (2) negative reinforcement refers to stimuli that are removed or subtracted. Formally defining the two procedures: positive reinforcement is “a procedure in which a response produces a stimulus and becomes more probable” while negative reinforcement is “a procedure in which a response removes a stimulus and becomes more probable” (Repp, 1983). Thus the definitions imply that in both instances the word reinforcement refers to responding, and its description of responding is that responding increases. While dealing with academic behaviours the concern is with events that increase these behaviours.

For the present study only positive reinforcement was used. That is to say that when students in the treatment group demonstrated a particular number of correct responses, they were reinforced positively.

Types of Potential Reinforcers: Reinforcers can generally be classified as: Primary Reinforcers: Primary or unconditioned (unlearned) reinforcers are stimuli or events that by virtue of their biological importance serve as consequences to increase the probability of behaviours immediately preceding them and Secondary Reinforcers: Secondary or conditioned (learned) reinforcers can be defined as those initially neutral stimuli, that have acquired reinforcing capacity because of being paired with primary
reinforcers or established secondary reinforcers. Secondary reinforcers are further classified as: **Tangible Reinforcers**: A tangible reinforcer is an object or activity that increases the future probability of behaviours when the reinforcer is presented subsequent to the emission of that behaviour, e.g. toys, marbles; **Activity Oriented Reinforcers**: is an event or privilege e.g. helping the teacher, playing a game; **Social Reinforcers**: are verbal praises or signs of appreciation which are of four varieties, they can be physical contracts (e.g., hugs, pat on the back); proximity (i.e., standing or sitting near an individual); verbal statements (e.g., “good”, “shabash”) or non-verbal (e.g. smile, nod); **Generalized reinforcers**: A generalized reinforcer is a type of conditioned reinforcer, the effectiveness of which does not depend upon a single kind of deprivation. Tokens and money serve as generalized reinforcers as they provide the individual access to a wide range of other primary or secondary reinforcers.

In this study generalized reinforcers ie Tokens were used which could be exchanged for back up reinforcers. Backup reinforcers were either tangible or activity oriented or social reinforcers (Appendix ‘L’)

**Group Reward Techniques**: Although some children may require teaching on a one to one basis, most children learn better in group situations that are characteristic of classrooms. Hence group reward techniques like *token economy*, behavioural contract, peer rewards are used in school centered educational environments. These techniques can be utilized by specifying the role for getting reward(s) in a pictorial or written form on the notice board in the class/school; Stating the rules for getting the reward at the commencement of each period in clear and understandable terms in front of all children in the class; making sure that children have understood. This can be ensured by asking one or all the students to tell/speak out the rules for earning a reward in their own words.
For the present study a group reward technique namely token economy was used with the experimental group. The students were explained that they would have to demonstrate correct reading, writing and spelling behaviours in order to earn points. Once point earnings were made a total of these points would earn them tokens. Two points would earn them a token and every subsequent 2 points would earn them an additional token and likewise till they obtained a score of 10 and token earning of 5. The points and corresponding tokens with a list of backup reinforcers were put up on the notice board.