CHAPTER V

DISCUSSION
The results are discussed according to the hypotheses as follows:

Hypothesis 1. Given sufficient training, the severely mentally retarded individuals will learn to perform a complex vocational task, such as the assembly of a ball point pen.

The results of the present study showed that to a very high extent the severely mentally retarded individuals have the potential to learn a complex vocational task of assembling a ball point pen. Nearly 90 percent of them succeeded in learning the task and performing it when they were provided systematic training.

Following the repeated trials on the task, they were successful in correctly identifying the different parts of the pen, match the parts with the corresponding pictures and proceed with the task in a sequential order. This finding is in the expected direction as in accordance with the theoretical framework used here, namely Thorndike, the repeated trials should help in getting the desired responses, and then the active and vigorous exercise should help to build further on the acquired correct responses. Thorndike's law of exercise, also called the law of habit formation appeared to be quite useful especially for the mentally retarded.
individuals. The use of the repeated trials to elicit the correct response and then building on it helped the individuals in establishing the links between the stimulus (part of the ball point pen) and the response (what to do with it). Practice thus helped in 'binding' the right response to the stimulus in the process of assembling the different parts of the pen.

A similar observation was made by Estes (1970) on the learning patterns of individuals having mental retardation in that they found that repeated trials were required before enough associations could be found to provide a basis for a reliable response to the given stimulus. Kintsch (1970) was of the view that what facilitated learning of the severely retarded was not the 'arrangement' of the material presented for learning but the redundancy of the material itself. The more redundant the material, the easier it is to learn and recall. He concluded that the law of frequency and recency works best for individuals with mental retardation. Repeated presentation of the material helps in strengthening the bonds between the stimulus and the response.

To Thorndike, the mind is the connection system of man and the learning is the process of connecting, and it is precisely this point on which the severely mentally retarded are deficient and are unable to connect the events and tasks laterally or vertically. In fact Thorndike (1932) himself,
after evaluating the detailed researches, reasserted that repetition does function in learning, even if to stimulate the maturation called learning.

Although in the present study, repeated trials and exercise facilitated learning of the task for 90 percent of the individuals, there were nearly 10 percent who did not progress to a significant degree. They learnt but did not perform the task in the desired manner. This indicated that 'exercise' on the task which should have resulted in the 'binding' of the right response to the stimulus, did not occur for these individuals. Apparently, some individuals even among the severely mentally retarded need an additional 'impetus' to enthuse them to learn and perform on the task. This could be in the form of reinforcements, verbal or token.

Once the motivation is generated and there is sufficient enthusiasm and interest created for the task, then the process of drilling for the successful completion of the task could be effective. Thorndike, in his later researches, modified his earlier position and pointed out that in the process of connecting the stimulus and the response, the right response must be rewarded and that the practice given under the condition of appropriate rewards results in learning. He maintained that practice or drill in itself does not result in learning; learning occurs first by motivating, then by rewarding and then by drilling.
It seems possible to argue that the 10 percent of the subjects who did not succeed have also met the criteria for successful completion of the task, if they had been reinforced in their response through the successive approximation towards completion. The qualitative data indicated that a number of factors affected the functioning of the individuals in the severe range of mental retardation, such as 'acceptance' of the individual by the family, providing of the needed emotional support, opportunities for the development of skills towards independence in activities of daily living and appropriate functioning in the community, and exposure to learning environments, such as the Day Schools/Group Homes which can equip the individual with skills needed for independent functioning. The acceptance and care provided in the family helps them in becoming emotionally stable, and being in the company of similar individuals in Day Schools/Group Homes provides a base for their social integration and competence for functioning in the community. In the absence of such 'supports', individuals who are mentally retarded are prone to imbibe during their developmental years certain behavioural characteristics, which are difficult to be modified and are detrimental to their learning. This was demonstrated by one case in the present sample.
A woman was admitted to the Group Home when she was 35 years old. She as well as the experimenter had difficulty in working together and in training on the task of assembling the pen. Repeated trials were given to her, yet her progress over successive trials was only marginal. It was found that this individual had lived at home and was looked after by her family members in a very closed manner. She in fact represented a typical female case of mental retardation, in which families considered it safe to keep the person at home, since they were much more vulnerable to abuses outside the purview of their homes. Families tried to cater to their needs to the extent they could, but due to their deep emotional involvement they at times lost focus and became either over protective and extremely tolerant towards them or angry and depressed about their limitations. The treatment they accorded to the individual depending on the emotional adjustment to the situation adversely affected the independent development of such persons, and consequently their participation and integration within the family and in the society. This particular individual had acquired over the years certain behaviours such as excessive laughing, grabbing and touching which were difficult to be modified. She was stubborn and continued with such behaviours even when redirected to the given task. She enjoyed being reprimanded as she found it to be a strategy of getting the attention she
desired. The family of this individual had perhaps reached the 'limits' of endurance due to stress and lack of coping resources, such as their own morale, health and level of energy by the time they sought custodial care for her in the Group Home. She joined the home, but found it difficult to adjust in the new environment. She was angry and confused and this caused the family further stress.

This was reflected in her minimal progress on the task and low score. It thus appeared that some individuals may not be able to benefit from training using the repeated trials and exercise alone. They may do better if a reward could be used to motivate them.

**Hypothesis 2.** Since the basic deficit in individuals with severe mental retardation is of 'focalization and concentration', the learning materials presented in visual and acoustic forms will enable them to absorb the information presented.

The results of the present study indicated that when the learning materials were presented in visual and acoustic forms, the individuals with severe mental retardation were able to absorb the information thus presented. Due to deficits in focalization and attention these individuals needed images and words in forms and manner in which their attention could be drawn and held till they completed the task. The presentation of the task of assembling a ball point
pen to the individuals in the form of attractive realistic pictures provided them concrete visual images. Similarly, the presentation of the task in the form of clear and concrete language, using simple words provided them auditory cues to understand the task and work on it.

By the visual mode of training, 35 percent of the individuals in stratum I achieved the maximum possible score, indicating that the material presented to them in the form of pictures facilitated learning by providing focus and sustaining their attention. They were able to focus on the steps and guide their behaviour on the task, when pictures of the task served as visual stimulus. Likewise under the auditory mode used for training the subjects, when the different parts of the task were named to them clearly (in an attempt to draw their attention) 20 percent of the individuals in Stratum I achieved the maximum possible score. A majority of stratum II individuals however remained in the medium score range under both types of experimental conditions (visual mode 27 percent, auditory mode 20 percent). Thus, what the researches on attention and focalization of individuals with severe mental retardation revealed that the learning process of such individuals was impaired because of the limitation in attention, seemed true here to a good extent. The role of attention in the learning process of the mentally retarded was described by William James (1890) as follows: "It is the
taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others" (pp.403-404). It was maintained by Zeamen and House that "the reasons for the learning deficit do not seem to be in the area of instrumental learning, but rather in that of attention". They argued that the discrimination learning among the mentally retarded individuals requires the acquisition of a chain of two responses: (a) attending to the relevant stimulus dimension, and (b) approaching the correct cue of that dimension. The difficulty that most mentally retarded learners have in learning discriminations is found related to limitations in the first rather than the second phase.

McGhee (1969) concurred with the view expressed by Zeamen and House (1963) and observed that the basic deficit in the subnormal individual is that of attention. Therefore, when the learning material presented to the individuals engaged the attention and brought it to focus on the task, it facilitated the learning process of individuals with severe mental retardation. The use of visual and acoustic modes enabled them to absorb the information, resulting in the acquisition of the task. It was also observed by Norman (1969) that the human mind as a processor of information responded primarily
to meaningful information presented in acoustic and visual forms.

Gerstan, Carnine and White (1984) observed that the instructions or directions to the student should be related specifically to the relevant stimulus to help find the response to the stimulus and Rusch, Rose and Greenwood (1988) maintained that keeping the instructors simple and direct increases the chances that the learner will focus on the relevant stimulus. Additionally, Rusch, Rose and Greenwood indicated that the salience of the stimulus i.e., the prominence of the stimulus in the learner's environment is an important factor to be considered, with regard to the learner's attention to that stimulus; the more noticeable the stimulus the easier it would be to focus attention on it.

Studies conducted on the modality learning of individuals with mental retardation (Gerjuoy and Winters, 1970) indicated that clear and concrete words used under auditory stimulus condition facilitated learning of individuals with mental retardation. Evans (1970) indicated that the visual presentation of tasks facilitated learning, since the pictures provided an effective stimuli and established a direct linkage between the stimulus and the response. The author maintained that the pictures may induce greater visual imagery (mental pictures), which facilitated association between stimulus and response and also provided a control between stimulus-
response, thereby reducing the number of errors on the task.

Sidman (1971) reported an interesting study on a severely retarded adolescent, which involved six related but different tasks:

1. Selecting pictures in response to their spoken names.
2. Naming pictures.
3. Selecting printed words in response to their spoken names.
4. Naming printed words.
5. Selecting pictures to match printed names.
6. Selecting printed words to match pictures.

The results of this study indicated that the two stimuli, a picture and a printed word, could be seen as equivalent if they were given the same receptive label. Subsequent researches by Spradlin, Cotter and Baxley (1973) and Sidman, Cresson and Wilson-Morris (1974) indicated that the use of the stimulus-response method on retarded individuals helped them to develop their own learning sets and learning patterns, and when properly and adequately trained they could combine the responses to the stimuli in unique ways to meet the demands placed on them in their daily lives.

Studies by Sowers, Rusch, Connis and Cummings (1980) demonstrated that the pictures could be effectively used in training individuals with mental retardation for even a complex task such as 'reading' the clock to manage the time.
They found that the matching of pictures of the clock with the 'real' clock enabled them to perform their duties at the assigned times. Wehman and Hill (1981), and Wacker and Berg (1983) observed that the picture cues operated as the mediating variables, thereby enabling the individuals to control their performance within a chain of complex behaviours. Since individuals with mental retardation were easily distracted, a stable stimulus in the form of a picture helped them to focus and control their behaviour on the task.

A similar use of the auditory mode by researchers has been found helpful in learning and performance on tasks by individuals with mental retardation. Budoff and Quinlan (1964), Shapiro (1966), Carterette and Jones (1967) investigated the effects of the auditory stimulus in facilitating the learning of independent dressing and undressing skills. They reported that since the mentally retarded individuals lacked the ability to focus their attention, the trainers role modelling of such skills and providing them of clear and concrete verbal instruction facilitated the learning of the task. However they observed that among individuals with mental retardation, young children learned and performed better under auditory stimulus conditions, while the adults demonstrated better learning under visual stimulus conditions.
The findings of the above researches support the hypothesis that since individuals with mental retardation are deficient in areas of focalization and concentration, the materials presented in visual and acoustic forms will facilitate their learning and acquisition of the task.

Hypothesis 3. If the learning materials presented to the severely mentally retarded individuals are systematically organized in a sequential order after being broken into several steps and vividly presented they will be able to retain, store and reproduce the information presented in an organised manner.

The results showed that when the task materials were vividly presented to the severely mentally retarded individuals in a systematic organized manner it enabled them to retain and store the information presented and perform the task given. The task was broken into ten steps by the task analysis. Each step, leading to the next step and finally to the last step and to the completion of the task organized in a sequential order. This enabled the individuals to pick the part corresponding to the first step by matching it with its picture and then go on to pick the next part by matching it with the next picture and thus proceed in a sequence to complete the task of assembling all the parts together towards the assembly of the ball point pen. In essence, they followed a pattern of 'look then do' sequence which permitted them to
proceed in a continuous manner with little margin for error. In the event that they made an error of picking a part out of sequence they were quick to correct it since they found that it did not match its representation in the form of picture.

While this procedure undoubtedly helped a larger percentage (80 percent) of individuals, there were yet some who failed to demonstrate significant gains in the acquisition of the task. These individuals had difficulty in matching the parts with their corresponding pictures and in following the sequential order. It seemed that they were confused with parts which looked similar in shape and size (e.g., the nozzle and the stopper), and many times they flipped the pictures out of sequence and thus were not able to see the similarity between the part they picked and its corresponding picture.

It is true that the mentally retarded individuals are prone to mental instability due to their cognitive deficiencies but the degree of instability varied among different individuals as well as at different times in the same individual. A case of one individual, who lived with her family and attended the Day School, is found very representative of this problem. She had difficulty in proceeding with the task in the prescribed sequential order, as he had a tendency to fantasise and ruminate. Her uncontrolled imaginations often caused her confusion and, on such occasions she became either irritable and depressed or talked excessively. While she succeeded
eventually in learning the task, she did have difficulty in areas like matching of the parts with the corresponding pictures or turning of the sheets of pictures on the clip board in a sequential manner.

In fact, as the detailed observations indicated the individuals with mental retardation also go through a variety of experiences, but they are not able to communicate and share with others. Some of these experiences find expression in the form of certain behaviours, such as having an emotional outburst or being erratic, obstinate and demanding with sudden outbursts of temper tantrums. One such type was the case of a giggling, and stubborn individual, who tended to ignore all attempts for compliance with the trainer. He would sit in a vacant spot, sort of perplexed without seeming to understand or care very much, and after a time he would respond either by giggling or walking away. He also promptly returned when he was chased either by the trainer or by one of his peers. His progress on the task was not consistent. There were occasions when he was co-operative and sat through to complete the assembling of all the parts, while there were other occasions when he was ready to walk out of the door withdrawing himself from the activity.

The above cases demonstrated that the mentally retarded individuals have a paucity of adaptive behaviours in their repertoire. With significant degree of weakness in
communication relative to appropriate the task behaviour, and impaired cognitive functioning, such individuals are unable to conceptualize and retain information and guide their behaviour on the task. This limited ultimately the extent of their learning. In terms of Thorndike's theory of connectionism, learning is the organization of independent units of behaviour, even if this reflects the psychological atomism, but this seems to be quite true in case of the individuals having severe mental retardation.

Researches by O'Connor and Hermelin (1963) and Jensen (1965) had demonstrated the importance of organizing the instruction material for individuals with mental retardation to optimize learning for them. They maintained that since such individuals and particularly severely and profoundly retarded individuals lacked the ability to conceptualize and retain information, it was very necessary to 'maximise the easy method' of presentation which will enable them to learn and retain.

Spitz (1966) observed that since individuals with mental retardation are deficient in their ability to conceptualize, store and retrieve material, the task material presented to them needs to be well organized for optimal learning to occur. He added that the meaningfulness of the material may be further facilitative of their performance.
The findings were overall in line with the available evidence indicating that "in order to teach mentally retarded individuals to perform on tasks it is necessary to employ instructional procedures that will shape the worker's response repertoire toward successive approximations of the desired final response. One method of doing this, is to completely task analyse a skill area into a number of small sequential steps leading to a final terminal response" (Mori and Masters, 1980: 272).

In a training programme using sequenced pictures of the different parts of the task and presented vividly, the verbal pre-instruction and instructional feedback operated as mediators, and thus enabled the individuals with mental retardation to control successfully their performance on complex tasks.

Hypothesis 4. The level of I.Q. of the individual in the severe range of mental retardation will not limit one's competency on the job.

The present study indicated that the IQ of the individual in the severe range of mental retardation does not necessarily limit one's competency on the job. As the task was being attempted, initially some individuals with a lower IQ had difficulty in identifying and comprehending the different parts of the task, to match the parts with the corresponding pictures or the names and complete the task. They appeared
rather confused; they could not distinguish the nozzle from the stopper of the pen, or the refill from the barrel and attempted to keep the pen in the box even before completing the assembly of all the parts.

However, systematic training given to them spread over a period of time enabled these individuals to succeed in meeting the criteria of accuracy and finally the learning of the task.

The results showed that 30 percent of stratum I individuals were in the low range of IQ i.e., 25-29, but they could attain scores in the 30-36 range. 35 percent of the individuals in this stratum with a medium IQ, 30-34, attained scores in the medium and high score range of 30-36 and 37-40.

A probe into the qualitative data obtained from parents, staff, observations in the homes, and the case histories of such individuals revealed that there were certain conditions in the context of these individuals which were responsible for their poor performance rather than the low IQ. Firstly, most of these individuals had been raised in families where there was little opportunity for them to interact with people in a positive way whether within the family or outside their family circle or with similar individuals in a school or Group Home setting, depriving them of any positive stimulation or feedback. They were 'kept' in the family, fed and clothed and at a later stage even sent to school/Group Home more because such an option was available, rather than as a matter of
choice. This was one of the most usual situations in families with retarded members and particularly with severely retarded members. Families in general, irrespective of social strata or other distinctions find themselves 'lost', when it comes to accepting and dealing with the condition of 'mental retardation' of one of its members. Their initial emotional outbursts of shock, disbelief, anger, guilt, shame etc. and later their resignation to fate moulded their thinking and the type of treatment met to the retarded member. Some became over indulgent out of pity for the individual and some had rejecting attitude, in which event the individual was just kept and 'maintained in' the family.

Secondly due to the cognitive, social, interpersonal inadequacies they were unable to make a smooth transition from their home environment to the institutionalised environment. They were lost, upset, and even angry and unwilling to cooperate. Third, being severely retarded and having a low IQ in this range, being without appropriate 'supports' and stimulation needed for developing good social skills, such individuals developed certain repulsive behaviours for self-stimulation, such as rocking, slapping their body etc.

However, there were always exceptions to the rule. One particular individual in the group having a low IQ succeeded in getting a score in the maximum range of 37-40. It was not common for one having an IQ of 25-29 to demonstrate such
progress. This individual's case history revealed however, some factors which were crucial to his success, a very important one being the love, care and support that he enjoyed in his family. He was accepted by his family with all his limitations and provided with the emotional support needed for optimal growth and development. Parents' intimate knowledge of the limitations of the offspring proved to be a valuable resource for the person. A parent, especially the mother was more than just a caregiver. The role that she played in her child's day to day life made her learn many things. She learnt his strengths, limitations, interests and needs. This valuable knowledge helped the parents to come to terms with his disability and look for support services, which could help him to grow into a self sufficient and well adjusted person within the possible limits. His independence in most areas of self care, facility in communicating with others around him, and his motivation and eagerness to learn, reflected on the arduous and uphill task undertaken by his parents. He worked hard to overcome his cognitive limitations and acquired the skills, proving thereby that the efforts made during the developmental years are crucial for success on a task.

Individuals in Stratum II with a low IQ did not demonstrate comparable progress with training, but still made consistent progress. Nearly five percent scored in the medium range of 30-36. The case history of one individual
demonstrated that he had a low IQ, but could develop through his efforts and the support of the family, independence in areas of self-help, and good social and interpersonal skills. His living at home and the support of the family helped him emotionally to acquire a balance which was reflected in his pleasing personality. He learnt to communicate in simple short sentences, and moved about in his neighbourhood independently. The family belonged to a low income group and had no education. The individual was very cooperative with the experimenter and showed good motivation for learning the task. He took keen interest and diligently attempted it. In the Day School he attended, he was entrusted with the responsibility of the ‘office attendant’ in the principal’s office. He carried the files and other messages back and forth for people working in the school. He extended hospitality to the visitors in the office by offering them water and soft drinks, and neatly arranged the chairs for them. He was quick to recognize familiar people and greeted them which made him popular. Thus despite a low IQ, the sustained efforts of the individual, the encouragement of the family and the principal at the school helped him to progress in several areas, which enabled him to carve a place for himself at home and in school.

In contrast to this case, there was another individual, who despite a high IQ achieved low scores. She also lived at
home with her family and attended the Day School. The family belonged to the low income group, had no education, had low involvement with the retarded member and gave no support and encouragement towards development. This individual had grown to be a very shy and inhibited person. She attempted the task after a lot of cajoling and coaxing. She was motivated and cooperative, but her shyness and lack of communication skills hindered her progress. She rarely spoke and when she was spoken to, she would either look away or look down, and thus it was difficult to get her to proceed with the task. She would, at times hold a part of the task and stare at it. She would give the appearance of being afraid of others' presence in the room by becoming rigid and strained.

In retrospective, the first two case studies indicated that despite a low IQ the individuals demonstrated good progress on the task due to a high level of motivation and personal endeavour. They were also socially well adjusted which was reflected in their interpersonal skills and pleasing personalities. They proved themselves useful to their families and to the community. This was however not true of the third case. When an individual does not become useful to the family and society one is considered a burden on the resources of that family and the society, which is so true and so common for the severely mentally retarded individuals.
Researchers have indicated that the IQ of an individual is not the predictor of one's ability or potential for learning. Baroff (1986) was of the view that one of the most complex issues surrounding the IQ "pertains to the distinction between performance on an intelligence test and general competency". He added that the focus should not be "on the initial level of performance, but rather on the degree to which that level can be raised following training" (p.21).

Thus the hypothesis is validated to a good extent. Competency may be achieved through training in skills towards independence, cognitive development and emotional and social adjustment.

Hypothesis 5. All severely mentally retarded individuals will not respond equally well to different modes of learning, such as the visual mode, the auditory mode, or the combined visual and auditory modes.

The results showed that the individuals having severe mental retardation learn best through a preferred mode. It could be visual, or auditory or combination of the visual and auditory modes. Further, all of the severely mentally retarded do not respond equally well to any one particular mode of learning, as they have different aptitudes, and some differences, howsoever small even in levels of abilities.

The present study indicated that both the visual mode and the auditory mode facilitated learning and acquisition of the
task for the individuals with severe mental retardation. However a majority of the individuals (65 percent) responded to the visual mode than to the auditory mode. This was especially true for individuals who lived in Group Homes. They consistently performed better on the task under visual stimulus condition. The individuals (35 percent) who attended the Day Schools responded better to concrete verbal instructions which provided them the required cues to proceed with the task. This could be attributed to the fact that these individuals were atuned to hearing specific instructions through the day at school from their teachers and instructors.

Individuals who responded to the visual presentation of the task were able to attend to the picture of each part of the pen, pick the right part, match the part with the corresponding picture, and work in the correct order to complete the task. Individuals who could not attend to the pictures of the task due to distractions in the environment, such as noise, or other objects in the room, or even the presence of the trainer, they responded to the auditory presentation, such as repeated verbalizing of the name of each part of the pen (pick the barrel of pen, pick the nozzle of pen etc.). The parts were named and repeated in a sequential order. The instructions were given in the language familiar to the individuals, most of whom repeated the instructions after the instructor, in an echolalic manner.
When the visual and auditory modes were presented together, it facilitated learning among many more individuals in both the groups, i.e., those who responded to the visual presentation and those who responded to the auditory presentation.

Some researchers have indicated that the use of picture prompts was effective in the learning and acquisition of complex daily living and vocational tasks by adults having severe mental retardation (Johnson and Cuvo, 1981; Spellman, De Briere, Jarboe and Campbell, and Harris 1978; Thinesen and Bryan 1981). Picture prompts were used by these researchers to facilitate the performance by first showing the individual a picture of the first step of the task to be performed and then training the individual to use the pictures to guide his or her performance on the remaining steps of the task. The individual was taught through a combination of pre-instruction, feedback correction and repeated practice to imitate the performance depicted in the picture, turn to the next picture, imitate, perform and continue in this manner until the task was complete. Johnson and Cuvo used picture cues to train four moderately retarded individuals to cook simple food items independently, and Thimsen and Bryan taught three severely retarded adults to initiate grooming skills independently. Robinson-Wilson (1977) trained three severely mentally retarded adults in a sheltered workshop to prepare
items such as hot chocolate, jelly and hotdogs through the use of hand drawn picture recipes, colour coded stove dials, and a timer. Matson (1979) trained 24 moderately to severely retarded adults in an institutional setting to prepare a simple breakfast (coffee, instant cereal, juice and toast). Each of these experiments revealed that the individuals became independent by using pictures to establish self-directed stimulus control. Rather than relying on supervisors to guide their performance, the individuals used the pictures to guide their own behaviour.

Hence a potential advantage of training individuals to use the picture prompts was the reduced need for staff supervision. In addition, picture prompts helped the maintenance of previously acquired behaviour, and to maintain performance on the task in the absence of other training stimuli.

The ability of moderately and severely retarded individuals for successfully performing complex vocational task, by using picture cues had also been documented by Cuvo Leaf and Prorakove (1978), Gold (1972) and Irwin and Bellamy (1977), since it made (a) the process of learning relatively simple and did not require extensive training involving a laborious process by each individual, (b) once the individuals learned to use picture prompts, the amount of training needed on other tasks was reduced, if pictures of those tasks were
made available, (c) picture prompts promoted generalization or maintenance of performance or both, and (d) promoted independent performance on the tasks.

Similarly, the research on the acquisition of tasks using the auditory mode indicated that individuals with severe mental retardation had been successfully trained for tasks, such as sorting, folding, assembling, taping etc. and even for complex tasks such as operating a drill press, and travelling independently, and that they had also been able to maintain and generalize these learned skills to other tasks. Crosson (1969) trained severely retarded individuals in a sheltered workshop in the successful operation of a drill press pull, push, carry and turn by using sequenced auditory cues and action words. Training in pulling the handle of the drill, press down, and pushing it back up, and then carrying the materials, and again turning the handle was given by providing clear verbal instructions, large arm movements and cues for the sequenced steps. However, Crosson observed that due to cognitive limitations the individuals may not be able to carry over (generalization) these concepts to other tasks. He maintained that nearly all instruction that involved teaching new skills, required two components. First, a reinforcer that must follow the manual action; and second, the word(s) which must be spoken prior to and during the manual action. Laus (1974) experimented with training in orientation and mobility
of individuals with severe mental retardation. He observed that given clear verbal instructions, visual symbols and cues, such individuals could be successfully trained to travel independently to and from their homes to the activity centre or sheltered workshops. Mori and Masters (1980) maintained that the instructional training in vocational related tasks required the use of systematic verbal cues in a sequence of small behavioural steps and that employing of such an instructional procedure facilitated and shaped the worker's response repertoire towards successive approximations of the desired final response.

While there are several studies demonstrating the effective learning and acquisition of complex tasks using sequenced picture prompts and verbal instructions, there are very few studies to date, demonstrating learning and acquisition of tasks using the visual and auditory modes together. Bandura and Walters (1963), Kaufer and Karoly (1972) and Goldfried and Merbaum (1973) observed that responses to stimuli which served as mediating variables have traditionally been language based. However a developing area of research that has application to learning and acquisition of skills by the mentally retarded is the use of picture cues as the mediating variable (Connis, 1979; Johnson and Cuvo, 1981; Robinson-Wilson, 1977; Sowers, Rusch, Connis and Cummings, 1980).
McConkey and Green (1973) investigated free recall performance of 24 adults with mental retardation. The authors used three presentation methods: auditory, visual sequential and visual-simultaneous. The items presented were from 4 categories (fruit, clothing, animals and containers). For visual presentation slides of the items were made and projected and for auditory presentation the items were tape recorded. The results of this study indicated that the subjects recalled significantly more of the items under visual presentation than under auditory presentation. The authors concluded that "...retarded subjects recall more with visual presentation than with auditory presentation" (p.97).

Although, all the individuals in the present study were exposed to all the three conditions in a successive manner, the results showed some differences across the modes. Nearly, sixty-five percent of the individuals responded better to the visual mode indicating that this was their preferred mode as it facilitated their learning on the task. 35 percent of the individuals responded better to the auditory mode, indicating that this was found more stimulating by them in their learning of the task. When both modes were presented together all of them found it relatively easy to learn the task of assembling the pen, and thus acquire a more effective learning strategy.

Individuals with severe mental retardation varied as much as any other group of individuals in their
characteristics and temperament. Some individuals showed relatively more strength on non-verbal tasks: those that involved manual response, but did not require the use of verbal skills. Such individuals tended to succeed on tasks such as copying geometric designs, drawing pictures from picture books or identifying the missing parts in pictures or designs (Kochani and Keller, 1971). Then there were others who succeeded on verbal tasks where verbal commands were given such as for wearing the shoes on the correct feet or completing the buttoning sequence on a shirt, using backward chaining training (Gold, 1976).

Hypothesis 6. All severely mentally retarded individuals will not progress at the same rate through successive trials in the acquisition of a skill.

Individuals with severe mental retardation are known to differ in areas such as psychological, emotional, behaviour, personality traits etc. They also differ in their competency and ability for skill acquisition and performance. This was found in the present study, as some individuals progressed on the task faster than the others and took less time to respond to the given stimulus, i.e., the parts of the pen. Some individuals took less time to establish the similarity between the part of the pen and its corresponding picture and to proceed sequentially with the task. They were quickly able to establish the link between the stimulus and the response,
which enabled them to proceed in a 'look and then do sequence'. Individuals who found the auditory mode stimulating for learning were able to quickly connect the part of the pen with its spoken name and proceed with the task. Such individuals were able to meet the criteria for accuracy on the task with less number of trials. However there were some other individuals who could not proceed at this pace. They had to be given several trials before they could establish any similarity between the part of the pen and its picture or the spoken name. Just as with normal individuals the severely retarded individuals also, differed in individual abilities, in the grasping and application of a thought or an idea. Helmstadter (1970) observed that two persons observing exactly the same responses are likely to differ in their reaction to the responses and ability to record the responses (mentally) owing to their individual differences and attributes.

Data obtained during the initial phases of training indicated that 70 percent of the individuals of stratum I learned the task faster than the individuals of stratum II. They made less number of errors on the trials and thus achieved higher scores towards accuracy on the task. Individuals of stratum II took more time to learn and achieve accuracy on the task. In the early phases of training the scores attained by the individuals of the two strata varied
widely. However, the interesting point was that while individuals of stratum I, as a group showed better performance and acquired the skill faster than the individuals of stratum II, among the individuals of stratum I there were variations in their level of performance on the task and the speed maintained in the acquisition of the task. Some individuals were faster in establishing the link between the picture or the spoken name and its corresponding part of the pen while others took time to establish this link. This is attributed to certain factors which made it difficult for these people to respond to the stimulus with the same speed and correspondingly proceed with the same rate in a sequential manner towards acquisition of the task. Factors such as paucity of adaptive behaviours, lack of motivation and emotional instability were some of the reasons for their inability to focus on the task and proceed in a continuous manner towards completion of the task. One individual with such deficits who lived in the Group Home had difficulty in sitting still and in proceeding with the task. He was hyper-active and was also self-stimulating. While he could match the part of the pen with its corresponding picture, he would not do so; instead he would hold the part of the pen in his hand and start rocking. When prompted by the trainer to proceed with the task he would start muttering, indicating that he was not interested in proceeding with the task.
However this was not his usual pattern of working. There were days when he would sit through the entire task and work diligently and amaze the trainer with the quality of work he was capable of!

Similarly, there was a woman in the Group Home, who, when she was good, she was really good, with compliance to requests quick and accurate performance on the task and even being helpful to others in the training room! But when she was not in her best elements she would refuse to move from her seat will not perform the task and would resort to bizarre behaviours in order to draw attention. Just as among the non retarded people, these individuals also understandably had their good days and bad days!

An individual living in the Group Home had a rate of progress much slower than that of the others in the group, due to his getting confused with the task and thus unable to establish a spontaneous similarity between the picture and the part of the pen. He was not able to decide whether he had picked the right part even when it looked similar to the picture. There were several times when he picked the right part but did not proceed to assemble it because of being unsure or confused. His work speed was hampered due to this and consequently in completing the entire task.

Thus among the individuals with severe retardation there were wide variations in their rate of progress towards
acquisition of the task. Training through the successive phases however, gave them the needed practice and enabled them to meet the criteria for accuracy and learn the task.

Cattell (1986) investigated the response patterns of individuals with mental retardation in an experiment on 'reaction time'. He employed various methods for measuring the time intervals between stimulus and response. He looked at the differences between "sensory and motor responses, discriminative and associative reactions in the objective measurement of the time relations of human performances."

Cattell's observations of individual differences in 'reaction-time' seemed to hold true for the severely retarded individuals who operated with wide variations in the time taken to respond to a given stimulus, and on the consequent rate of progress made through successive trials on the task.

Butterfield and Nelson (1990) while discussing the cognitive mechanisms, had indicated that when a skill depends on an unchanging relation between stimulus and response elements, increased practice leads to faster and more accurate performance.

Hypothesis 7. Severely mentally retarded individuals living in the Groups Homes will perform better on vocational skills than severely mentally retarded individuals living with their families and attending Day Schools.
The present results indicated that the individuals who were severely mentally retarded and lived in Group Homes (85 percent) performed better on the task of assembling the ball point pen than a comparable group of individuals who lived with their families and attended Day Schools (30 percent). The Group Home individuals consistently showed better performance. Their success could be attributed to the following.

First, the individuals living in Group Homes had some discipline, a routine and training in activities of daily living. Moreover, since they lived with other such individuals and the resident staff it provided the opportunities for social interaction which helped to build interpersonal skills and self-confidence. Individuals with mental retardation lacked such skills. They also lacked emotional balance and were unable to regulate their lives. They needed someone to give them the support and controls required in these areas. This was possible in the Group Homes where the staff involved themselves in the lives of the residents and provided them ongoing guidance and direction for the routine activities. In contrast to this, individuals who lived with their families lacked discipline and structure in their lives. In a home environment although family members took care of the individual and ensured one's safety and comfort, generally they did not encourage independence in
areas of self care and the daily routine activities. By being over protective and indulgent they hampered the development of skills needed for independent functioning. There were also families who could not come to terms with their own emotions, which caused them to reject the individual leaving him to make his own adjustments. In both events the situation was not conducive to the individual's growth and development of skills for independent functioning.

The individuals in the Group Homes lived together and developed a kind of affinity for one another. They often formed small groups where they helped each other and learned from one another. Individuals living with their families did not have this advantage. They also did not have the needed supervision and consistent monitoring of their routines. Often they guided their own behaviour. Group Home individuals had opportunities for regular group recreational activities with their staff such as playing games, going to parks and to shopping areas. This helped in the acquisition of appropriate social skills. For individuals living with their families, recreation was generally restricted to watching television at home, or watching others at play. They could rarely participate in recreational activities of their neighbourhood.

Group Homes provided opportunities for training in prevocational skills like carpentry, making of paper bags, caning, weaving etc. This in a way enthused them and provided
the needed base for learning other skills. This was evidenced when an individual of the Group Home demonstrated his eagerness to not only learn the task of assembling the pen, but further teach the skill to his peers. Also, another resident showed such keen interest that he wanted to assemble the pens even after the trainer left, during his leisure hours!

In contrast the individuals in the Day Schools lacked motivation for the task and were impatient with it. They also lacked consistency. When they were absent from school, they had to be given 'orientation' trials in order to orient them with the task again. Moreover, when they went back to their classes and later to their homes they forgot all about the task, since they had several other distractions.

It seems essential to provide individuals with severe mental retardation, the necessary 'transition skills' in terms of vocational, social and community living skills before attempting shift/movement from one environment to another environment. Kurani (1990) maintained that many individuals find it difficult to adjust into the vocational training programme directly from home/classroom situation because of their low adjustment potentials, physical capabilities and new psychosocial role as a worker.
Two cases, one from the Group Home and one from the Day School, can be used to give an insight into the causes of possible differences in their performance on the task.

Individual A had lived in the Group Home for nearly 5 years. During this period he got accustomed to performing the routine tasks such as making his bed, arranging his room, cleaning the table prior to meal time etc. Typically in Group Homes the individuals themselves do much of the work. Their participation is of mutual benefit to themselves and to the Group Home. In fact it gives them a feeling of accomplishment, a sense of being needed. This was perhaps the most important reason for A being disciplined and task oriented. As the trainer would arrive at the Group Home to conduct the training he like most of his peers would start making his way towards the training room and would settle down for the day's work, with little prompting or request for compliance. While he was at work he was anxious to do it the right way, so he could get the trainers approval.

In contrast the individual B who lived with his family and attended the Day School, did not evince much enthusiasm for the task and viewed it as an opportunity for recreation. While in the training room, he would be often engaged in conversation or playing tricks with his peers. He was not interested in observing even another individual on the task and while he was on the task he was not 'all there'. Any
disturbance in the room would distract him causing him to start fidgeting in his seat. This individual met the criteria for accuracy after much more effort was made by the trainer.

Typically, families of individuals with mental retardation tend to be over indulgent due to an exaggerated sense of the helplessness of the individual. Overprotecting the individual perpetuates his dependence on his parents/caregivers thus preventing the learning of skills of which he is capable. The mother, who could otherwise be busy may find it easier to feed, bathe and dress the individual since he was slow to do these things by himself. It could also be a method of establishing a close, dependent, and in some ways mutually gratifying relationships. This did not happen, however, in a Group Home situation. Parents and others (who could be emotionally involved with the individual) were not there to 'protect him against any odds'. The individual had to learn to do things on his own with minimal supervision from the Group Home staff as a continuous, ongoing process. The ability to relate to others in everyday situation allowed friendships to grow with feelings of caring and sharing with one another. In essence, Group Homes closely approximated to the normalization process of individuals with mental retardation, the focus being the skill development towards independent functioning and optimal participation in community life.