1976

A multi-sensory curriculum for young children : [a paper] ...

Mary Barbara Stark
University of the Pacific

THE MULTI-SENSORY CURRICULUM FOR YOUNG CHILDREN

by

Mary Barbara Stark

A MULTI-SENSORY CURRICULUM FOR YOUNG CHILDREN

Presented to

The University of the Pacific

School of Education

In Partial Fulfillment

Of The Educational Specialist Degree

in

Educational and Counseling Psychology

by

Mary Barbara Stark

January, 1976

A MULTI-SENSORY CURRICULUM FOR YOUNG CHILDREN

CHAPTER I

INTRODUCTION

Several philosophers, beginning with Aristotle, have emphasized the importance of training all the senses at an early age. Aristotle felt that the training of the senses was basic to all knowledge. Sense was the first level in his three parts of the soul. In the analogy of the house, the senses were the same as the bricks and lumber which were fundamental to the building of a house.

Later, Rousseau advocated training the senses. As a result, he felt that experience should precede instruction. Thoreau also felt that people learn best from nature. Both believed that individuals develop by stages, and that the first stage was one of observing and learning on one's own.

If this is accepted as a prerequisite to learning, then the development of the senses through planned sensory training is basic to later cognitive learning. According to Maria Montessori, "There are periods in childhood for gaining sense impressions and fixing habits, which, if they are neglected, can never be redeemed." (Montessori, 1962)

Maria Montessori went further than just developing a philosophy of education. She developed a method and materials to carry it out. According to her, "The control of error through the material makes a child use his reason, his critical faculty, and his ever increasing capacity for drawing distinctions. In this way a child's mind is conditioned to correct his errors even when these are not material or apparent to the senses." (Montessori, 1962)

Montessori felt that training of the senses, no matter which one, helps the child distinguish and classify and then notice differences.

"Thus the child, having acquired the power of distinguishing one thing from another has laid the foundations of the intelligence." (Montessori, 1917)

Maria Montessori and Jean Piaget had many things in common. They both believed that education should start with observation of the child. They found that linguistically his/her development is ahead of his/her intellectual development and so, often educators are led to believe he/she can profit from formal education as he/she talks well. A few children have matured enough to start reading and number work at age five, but the large majority are not ready for this. Therefore Montessori and Piaget believed that the child should be allowed to progress at his/her own pace and make discoveries for himself/herself.

Both of them offer one way for the child to participate actively in the learning process through development of the sensory areas. A child first learns through touch and feel and later through sight and sound. In many classes of early education, the learning is geared to passively listening to the teacher and dealing with abstract ideas. Montessori and Piaget advocated manipulating concrete objects, intuitively making discoveries for oneself.

With the present shift to early development of academic skills and pushing reading in the kindergarten, if there is any scientific basis for developing the senses first, then some research is indicated to answer the demand of parents, administrators and legislators for earlier and earlier cognitive training.

R. C. Orem states in his book Montessori and the Special Child, "Currently one of the more exciting possibilities for research is the coupling of basic Montessori principles with the emerging educational

technology." (Orem, 1969) He also feels that "There is, then, evidence that capacity does determine what is learned and how it is learned. Such findings do not deny that children 'learn to learn' or that at any age they can learn techniques that enable them to use their abilities more effectively. All that such studies argue is that development sets limits as to what can be learned at any particular point in the child's life."

"These studies are in keeping with the positions of Piaget and Montessori. As we have seen, neither of these innovators advocates acceleration of mental growth. What they do emphasize is the necessity of providing the child with the settings and stimuli that will free him to realize his capacities at his own time and pace. Such a standpoint is quite different from one that advocates the acceleration of mental growth." (Orem, 1969)

Two extensive ERIC searches produced only one article on formal research, although there were numerous short references to multi-sensory training using sight, sound and touch. A summary of the article describing this research states "Differential effects of four preschool programs were evaluated through pre- and post-batteries of standardized tests. The interventions represent levels of structure along a continuum from the traditional to the highly structured preschool. Results from all instruments differentiated among the programs, and clearly favored the highly structured preschool." (Karnes, 1970) This program was multi-sensory to a degree, but again, largely emphasized the three senses, taste incidentally and smell, not at all.

Therefore since there did not seem to be any formal research which considered all of the senses in all areas of the program, this was the

basis for the following research.

Statement of the Problem

Since many educators and philosophers, including Montessori and Piaget, advocate training of the senses as a prerequisite to formal learning, and since two ERIC searches failed to turn up such research it was decided to test out if the use of a multi-sensory curriculum does influence the achievement level of young children.

Nuli - Hypothesis

The students in the experimental classes will show no significant gain on the standardized test used in the post-testing over the children in the traditional classes.

Definition of Terms

Young children as used refers to children in classes for normal and mentally retarded, ages four years, nine months to five years, nine months for the normal child, and to children under eight years in the mentally retarded classes.

Multi-sensory curriculum refers to activities to develop the skills of seeing, hearing, tasting, smelling, feeling, and emotional response.

CHAPTER II

Review of the Literature

From Aristotle to the present, a number of philosophers and educators have stressed the importance of sensory training in the basic education of people. Although Aristotle considered it the foundation, he realized that this was just the starting point for later wisdom. "Further, we do not consider any of the senses to be Wisdom. They indeed are our chief sources of knowledge about particulars but they do not tell us the reason for anything, as for example, why fire is hot, but only that it is hot." (Noll & Kelly, 1970) Without the bricks or foundation later learning and knowledge would not be relevant.

St. Augustine realized that sensory training was basic to all learning and that knowledge was dependent upon sense knowledge for its meaning. "But learn he does not at all, unless he himself sees what is spoken about; and in that case he learns not by means of spoken words, but by means of the realities themselves and his senses." (Noll & Kelly, 1970) According to this philosopher, when we recall something which has happened before or been experienced before, our images are based on sense impression and committed to memory.

Later, Rousseau strongly advocated that children be allowed to develop naturally and on their own for the first few years of their life. He believed that children should be left free to experience life before starting formal education. "Education should allow the child to develop toward self-sufficiency, to grow naturally, to learn naturally, to react to life with joy and spontaneity, to develop his creative potentialities." (Noll & Kelly, 1970)

Jean Piaget is a modern philosopher trained in the Rousseau institute who enthusiastically follows this line of thinking. He believes the child should be allowed to experience things and make discoveries for himself. His first stage in development is the sensory-motor stage. In his book Science of Education and the Psychology of the Child, he states "Sensory education has, in fact, been given a great deal of attention since earliest times and Froebel attempted to codify it for pre-scholastic levels." (Piaget, 1969) As a result, Piaget believes that children should be allowed to play rather than be given abstract lessons in reading, arithmetic, and spelling which are usually presented as dreary chores. If the child is actively involved, especially in the early years, he becomes absorbed in the learning process.

Emerson and Thoreau were later advocates of sensory training and allowing the child to develop naturally and without formal training during the formative years. They believed that nature was the best teacher in these early years. Pestalozzi also emphasized the influence of nature on the senses. "Sense impression of Nature is the only true foundation of human knowledge." (Noll & Kelly, 1970)

Pestalozzi also stated, "All that follows is the result of this sense-impression, and the process of abstraction from it. Hence in every case where this is imperfect, the results also will be neither certain, safe, nor positive, and in any case, where the sense-impression is inaccurate, deception and error follow." (Noll & Kelly, 1970)

Maria Montessori was not only a philosopher advocating sense training, but she developed a complete set of materials to facilitate this training. She started her work with retarded children and soon expanded it to normal children. According to Piaget, "Generalizing her dis-

coveries with unparalleled mastery, Maria Montessori then immediately applies to normal children what she had learned from backward ones; during its earliest stages the child learns more by action than through thought, suitable school equipment serving to provide this action with raw material leads toward knowledge more rapidly than either the best books or even language itself." (Piaget, 1969)

Madame Montessori emphasized the training of the senses to develop a very fine discrimination of differences. She stated "Beauty lies in harmony, not in contrast, and harmony is refinement; therefore there must be fineness of the senses if we are to appreciate harmony. The aesthetic harmony of nature is lost upon him who has coarse senses." (Noll & Kelly, 1969)

She also believed there was an optimum time for this training which was between three and seven years of age. If the training is to be most effective it must be during these early years. "But very often sense education is most difficult for the adult, just as it is difficult for him to educate his hand when he wishes to become a pianist. It is necessary to begin the education of the senses in the formative period if we wish to perfect this sense development with the education which is to follow." (Noll & Kelly, 1969)

For some time Montessori's theories fell into disrepute and it is only recently that she has again begun to be accepted. Today there are many Montessori schools springing up. Also, many of the educational toys and materials being developed for kindergarten and early childhood education are similar to her materials. One reason for adapting this material is to allow for more flexibility in use and more variety.

In recent years more has been written about multi-sensory training

than before. There was very little in the periodicals or in books on the subject before 1972. Since that time there has been an ever increasing number of articles and books written. Even though this is true, there does not seem to be much effort to extend this training to all phases of the curriculum for young children. Viola Hillis describes a Multi-sensory Linguistic approach which she used in teaching reading. "The auditory, kinesthetic, and visual senses are employed in each exercise with the sense of taste and smell dramatized whenever possible." (Hillis, 1971) She also states "The senses of smell as well as taste are put into effect through the use of the imagination if real experiences are not readily available." (Hillis, 1971)

In the book Thinking Goes to School, Hans G. Furth and Harry Wachs emphasize that "The general body and sense activities ... are considered to be the source of the developing academic skill or modality training for the child of primary school age." (Furth & Wachs, 1974) These writers feel as Montessori did that,"It is unreasonable to let children first become failures and then do appropriate activities that should have been done in the first place. Here then is a clear case where activities originally designed for special children, such as body and sense thinking are appropriately incorporated into an innovative program." (Furth & Wachs, 1974)

Some of the newer books on curriculum for kindergarten emphasize learning through the senses in some areas such as art, creative dramatics, and writing. David and Mary Minless in their book Guide to an Effective Kindergarten Program stress informal means of developing mathematical concepts and other basic concepts. However sensory training as such is mentioned specifically only in the area of the arts. "The

arts are a very important aspect of the school curriculum. They are particularly important in the kindergarten curriculum because the young child does most of his learning through his senses ... he learns more by doing than by reading, talking, or listening." (Minless, 1972)

Some of the newer books were written for parents and encourages them to develop a child's senses. Two of these books are Guiding Your Child to a More Creative Life by Fredelle Maynard and Your Child's Sensory World by Lisa Liepmann. Both of these books point out the importance of sensory training by the parents but do not relate this training particularly to the school curriculum. For example, "Parents can help keep a child's senses alive by providing a generous range of experiences and time to savor them." (Maynard, 1973) Also "Richard Lewis has gathered from many countries evidence of the sudden vision that comes to a child whose senses are alive." (Maynard, 1973)

In the book Your Child's Sensory World, the author takes each sense, analyzes how a child who is dominant in that sense acts, what activities will develop that sense, and then gives a series of games to be played by the parent and child if he is weak in that area. As she points out, "Your child's sensory world influences his whole way of life -- learning, playing, and communicating." (Liepmann, 1973) She also feels "Sensory deprivation at four and five affects learning ability in first grade and after." (Liepmann, 1973)

Since both of these authors feel that sensory training is so important and many parents do not have the time or knowledge available for this training, it seems important to develop a program which will give this training to all children.

The author of Left-Handed Teaching, Gloria Castillo, devotes her

book to showing how training in the effective domain can be joined with training in the cognitive domain to create confluent education. She stresses the use of sensory education especially in the area of developing the imagination. "When you first introduce the child to a group fantasy, be sure to use sensory words and phrases to heighten his imagination whenever possible ... add as many details as you wish as you tell the story. Use many sensory words to describe colors, smells, sounds." (Castillo, 1974)

In the section on nature, the author stresses sensory training. She encourages using all five senses, even to blindfolding the child so as to heighten the responses to his other senses. She feels that a "baby freely and enthusiastically uses all his senses in order to learn about the world around him. He will feel it, taste it, shake it to see if it makes any sounds. By school age he has learned to ignore his other senses almost completely as sources of information. Traditional curricula tend to reinforce this restriction by emphasizing reading, writing, and arithmetic -- primarily visual experience." (Castillo, 1975)

Current writing in the field of mental retardation often stresses the importance of a varied program which will help the child to develop along the same lines as a normal child but at a slower pace. Therefore, if sensory training is important for the normal child, it seems reasonable to believe that it is important for the retarded. The most recent court ruling in California would seem to bear this out. It states that tests are culturally biased and therefore many children placed in special programs are just lacking certain training which would enable them to keep up and that this training is needed before the testing is done. Sensory training is needed as a basis for further learning.

According to Marianne Frostig and Phyllis Maslow in their book Learning Problems in the Classroom, "Children who have difficulty in directing their attention are usually helped when the same information is presented through two or more sense channels. This is true when the meaning of the stimuli is the same." (Frostig & Maslow, 1973) They also emphasize, "The sensory-motor phase, during which the child's world is explored by all the senses and movement simultaneously, lays the foundation for later perceptual skills." (Frostig & Maslow, 1973)

Of course, Madame Montessori began her work with retarded children. When she had such good results with her apparatus with these children, she later expanded its use to the normal child.

Dr. Karnes' description of his research points out "Verbalizations in conjunction with the manipulation of concrete materials were considered to be the most effective means of establishing new language responses. The game format (card packs, lotto games, models and miniatures, sorting, matching, and classifying games) created situations where verbal responses could be made repeatedly in a productive, meaningful context without resorting to rote repetition; often the child could visually and motorically assess the correctness of his thinking before he made an appropriate verbalization." (Karnes, 1970) He also emphasized "that the naming and labeling activities prevelant in the three curricula, especially activities which emphasized matching, sorting, and classification, may have helped the experimental group make this gain. Such activities were scheduled to provide opportunities for vocabulary development and for more precise, expanded, and flexible use of language; however the method of presentation relied heavily on visual materials." (Karnes, 1970)

With the ever growing number of articles and books emphasizing the need for sensory training, a curriculum for use with young children seems to be worth developing. There appears to be a need to test the use of this training in all areas of the curriculum, not in an isolated few. This then is the rationale for this research.

CHAPTER III

Method

In the summer of 1971 before the actual start of the experiment, time was spent researching the materials available which could be used, the work that had already been done in the area of multi-sensory training and the type of test to be used that would be best suited to the children that would be in the program.

The Research and Development Department of the school district was approached and a petition written for permission to conduct such a project. This was granted with the proviso that all materials, equipment, and even test materials, be purchased by the experimenter.

As a result, numerous catalogues were studied to determine which materials would give the widest range of multi-sensory experience for the least amount of money. All materials were carefully selected so that there would be little duplication and wherever possible would have more than one use.

The corners for the various sense activities were researched and planned to give the greatest number of experiences possible for the money spent and the space available.

The total curriculum was studied and plans made to supplement the basic curriculum wherever possible to provide multi-sensory experiences.

Wherever practical, materials which could be donated or brought by the children were used, so that children, parents and school would play a joint part in the program.

As the year progressed, any new articles or new equipment or learning materials which became available were studied to see if they would fit

into the program. This was important as it was impossible to invest a large sum of money all at once as there was no special funding for the project.

Unfortunately, the last day of school, there was a break in and all tapes, movies, slides, tape recorders, movie camera, regular camera, typewriters and other materials were stolen. It was necessary to replace these before the 1973-74 program began.

In 1971-72, the two groups of kindergarten children were from the same school. This school is naturally integrated and has representation from all ethnic groups. A large percentage of the families are from low income and welfare homes since the building of a large number of low income houses. The older homes and families were from the middle income group largely and so the change in the neighborhood had created friction.

In this school the classes are divided by age rather than by random selection. Therefore, the experimental group was the youngest, aged four years, nine months to five years, one month in September. The control group was the oldest, aged five years, six months to five years, nine months in September. The experimental group happened to have five children who were largely Spanish speaking, knowing little English in the fall. Since there were none in the control group, the scores of the Spanish children were not considered in the final computations. The population of the neighborhood is very transient so only those children who were in the classes for the whole year were included.

The Stanford Early School Achievement Test was chosen after considering several. Level 1 is divided into four parts, one dealing with the environment, one with math, one with letters and sound, and one with aural comprehension. This is a paper and pencil test. Even though it

was a little difficult to administer in October, as the children were not used to the format, it seemed the most suitable of the standardized tests available.

Before actually beginning to use the curriculum, the month of September was used to get the class organized and to analyze the strengths and weaknesses of the children. The first week of October both groups were tested. As the groups were not totally randomly selected, no comparison of pre-test scores or post-test scores was attempted. The statistical basis of comparison was gain scores only.

Following this, the teacher of the experimental group held a meeting for parents to explain the program. Any parents who could not attend the meeting were visited in the home so all were aware of the goals of the program. At this time volunteers were solicited to assist in the room and to prepare certain materials for use during the year. Little active response to assisting in the room was gained but some help in preparing materials resulted.

The room was set up with learning centers to be used during activity time primarily, but throughout the session whenever possible. There was a center for sight with a book corner furnished with soft cushions, low book shelves, a set of reference books, The Wild Life Encyclopedia, and plenty of picture books. There were also lotto games, sorting materials of all sorts, puzzles and other manipulative materials which required sight primarily in their use. There was also a primary typewriter so the children could write their names and dictate stories for others to write. There was a large picture file and newspapers to encourage language development. The newspaper pictures were used to encourage the children to write lines to fit the pictures. When they were

studying the "letter of the week" the children would search the papers for words beginning with that letter.

The corner for sound had the record player, two tape recorders, a buzzer board and cards for patterning the sounds, sound cylinders, and various rhythm instruments. There was a listening post and filmstrip viewer, a supply of records and books, records and filmstrips, and tapes for use with a group of children.

The center for touch had the "Sense and Tell Kit," three feeling boxes, a series of Montessori type materials to distinguish thickness, length, and texture. There was also a collection of various cloth textures, lots of manipulative games and materials, and various types of seeds, gravel, macaroni, rice, beans, buttons and other material for use in collages. There were blocks, pegs, and beads for stringing and following patterns. The children were encouraged to use the material blindfolded wherever possible to increase the sense of touch and make the activity more challenging.

There was a center which was used at least once a week for cooking. The items cooked in the room used the electric pot or fry pan. Cookies and other items requiring the use of an oven were baked in the teacher's lounge. There were plenty of measuring cups and spoons as well as plastic knives, forks, and spoons to set the table, and a chance to actually participate in the cooking activity. During the time they were studying the "letter of the week" the food cooked usually began with that letter. For example, "granola" was used for "g", "nut chews" for "n" and "pudding" for "p". The children enjoyed this and tried to bring foods from home to fit the letter for Wednesday's show and tell.

At the beginning of the year there was a housekeeping corner which

enabled the children to dress up and act out their feelings. As they tired of this, the corner was changed into a store. There was a large collection of empty boxes and containers which gave the children practice in choosing items by the sound of the beginning letter. Also each item was priced so the children had a chance to learn numbers in a meaningful way. A cash register, telephone and a storekeeper's apron helped to create a feeling of actually running a store.

The centers were changed and added to from time to time as interest lagged. There was also an art center where they could experience a variety of media. Whenever possible there were games which were brought out for three or four to play, but this depended upon help to supervise, at least at the beginning.

During the parents' meeting and home visits, the plan for "show and tell" was explained to all and a copy of the format and a vocabulary of sensory words was distributed. Rather than the usual little cars or dolls or some item grabbed on the fly, there was a definite plan based on the five senses. The parents were urged to help the child in his choice and in working out a description of the item using the sensory vocabulary.

Monday was sight day -- anything that could be looked at or a description of something seen; Tuesday was sound day -- a book, record, or object which made a sound or some noise which had been heard such as a fire engine or thunder; Wednesday was taste and smell day -- anything which could be tasted or smelled or a description of something smelled or tasted (it was hard to separate these two senses so they were combined); Thursday was touch day -- anything to touch and feel such as different kinds of material or a strange rock or an object which had a

variety of textures or something to be described that a child had felt; Friday was emotion day -- how one feels inside, as, for example, happy, sad, scared, surprised. This day the children loved to bring something to scare the teacher. (A copy of the format and the vocabulary is included in the appendix.)

When the curriculum was used, every effort was made to involve as many of the senses as possible in all areas. It was necessary to read and plan carefully in order to carry this out. At first, there did not seem to be much that could be done in some areas but with work it became easier.

The readiness activities before reading and the basic concepts were easy to do as Montessori's didactic materials were developed particularly for this area. Even though the actual Montessori materials were not used as they were too expensive, the ideas were adapted. First of all, the children were given lots of opportunity to sort items of all kinds. Then they worked with similarities and differences and finally with arranging them in order. At first the sorting was gross, as two colors, but later it became finer as shades of the same color were used. Even here the first sorting was dark and light shades until finally the shades were nearly the same.

This sorting was also done with sound cylinders, matching two cylinders that had the same sound. The buzzer board was used and the children tried to determine whether two signals were the same or different. Later on they tried to repeat the signal. At first there was just a long _____ and a short . signal. Later these were mixed up and the long signals were shortened until they were not much longer than the short.

The sorting and classifying in the touch area was easy to do. The materials in the "Sense and Tell Kit" were used as well as the rubber circles for thickness, the lengths, and the various textures. Also there were the materials in the "Touch and Match Kits." The first set has only one texture to be matched but Set II has double types of material.

For smell, the children were given bottles with various spices and other elements to match. These items were in pill bottles so the children could smell them easily. At first they were given smells that were quite different but later were closer together.

The same plan was used for taste with the children matching tastes as well as smells. Of course the tastes depended on smell to a great extent but when it came to lemon pepper, the children really had to work hard to distinguish the taste. Sometimes they brought items from home for others to guess by taste.

When the class started to study the letters of the alphabet and worked on the "letter of the week" this letter was stressed in all ways possible. A Child's Concept Alphabet offered many suggestions to make this meaningful and a successful experience. For example: the letter "B"shows pictures of words beginning with that sound, suggests discussion of words with that letter as the beginning of the word, and the meaning of the words "baking a brownie;" "batting a ball;" or "building with blocks." The letter "B" could be made with clay, sandpaper or other material. The child could "feel a blanket," or "smell and taste a banana." It also recommended talking about the concept of "big" and "between." This same format was used for each letter of the alphabet.

Houghton Mifflin's reading series, Getting Ready to Read was the basic program used with the above activities as it stressed letters of

the alphabet and beginning sounds. The letter of the week was based on the order of the letters as they appeared in this text. This helped the child really learn the letter being studied and not just repeat them in order by rote.

The program included small objects which gave the child a chance to sort them into boxes according to the initial sound. The text also placed a good deal of emphasis on context clues. Whenever possible, other sensory stimuli were used when they fit the sentence. A good deal of emphasis was on rhyming words which were illustrated in many ways. This helped to reinforce the discriminating ability of the child.

As many of these children were from homes where "standard" English was not spoken, language development of all kinds was an important part of the curriculum. Following the ideas put forth by Dr. Merle Karnes and others in describing an experimental program for four-year-old disadvantaged children, "manipulative and multi-sensory materials were chosen to provide the framework for eliciting the verbal responses necessary for language development which was considered to be a critical area of deficit for disadvantaged children. ....Through manipulative experience, the child moved to physical mastery of a concept and was required by the teacher to make appropriate verbalizations. Moving from structured, physical involvement within a meaningful, productive context to independent, conceptual verbalizations is fundamental to every aspect of intellectual functioning." (Karnes, 1970)

The Peabody Language Development Kit, Level P was the basis for much of this activity. Whenever possible, the lesson was supplemented with other materials. When the fruits and vegetables were being discussed, there were actual fruits and vegetables used for a tasting lesson. Others

were also used besides the ones in the kit. The children discussed how each one looked (shape and color); how it felt (rough, smooth, soft, hard, juicy) how it sounded when chewed (crisp, crunchy, or soft) and how it smelled and tasted.

At Halloween, the children enjoyed carving a pumpkin, scooping out the insides and had fun with the word "squishy." They spent a good deal of time trying to think of other things that also had this feel, such as mud and wet sand between the toes.

A good deal of reading was done to acquaint the children with all types of stories and language. Often the reading was in small groups or at times for the whole class. The children especially enjoyed the "smelling" books and the "touch and smell" ones. The novelty never wore off and these books were requested over and over. To increase the interest in stories, many of them were acted out or became the basis for puppet shows. The children loved the paper bag puppets and the puppet stage which a senior citizen's group made. This gave the children a chance to develop their vocabulary, the concept of sequence, and a chance to express themselves in front of others without becoming self-conscious. As Ernest Siegel states in his book Special Education in the Regular Classroom, "By means of puppets, such children (exceptional children) are able, without fear, to satisfy the natural need to be the center of attention, for the audience watches the puppet rather than the child." (Siegel, 1969)

When teaching the child to write his name, a multi-sensory approach was used. First he/she was helped to recognize his/her name when written. Many of the children learned to know all or most of the names when they saw them. After this recognition was gained, the names of the

letters were repeated as the child's name was written. The child was given his/her name cut out of sandpaper letters so he/she could feel the shape of the letters. Beans were glued to a piece of cardboard to give another tactile stimulus. Finally, during one cooking lesson, each name was spelled out in pancake dough and cooked so each child had his/her own distinctive pancake. This was especially enjoyed by all.

A good deal of time was spent developing listening skills as this is one area that is weak with many children. Because listening is basic to later academic work it must be consciously developed. There were several books which were helpful in developing this skill, especially Goldie Marie Gigores' Improving Listening Skills, Celestine Houston's Learning to Listen, and Bernice Wells Carlson's Listen! and Help Tell the Story. Again dramatics and puppetry were used to help increase listening.

The tape recorder, both a small cassette and a large one, were used to help the child express himself/herself, listen for sounds, follow directions and develop an enjoyment of poetry and stories. The small cassette was used mostly for recording the children's voices and stories. The large recorder was used with the listening post to work on taped lessons or to listen to a story or poem.

Math lent itself very well to a multi-sensory approach. Piaget's theories were used a great deal as he stresses the need of sorting first, then copying sets, matching sets, determining the concepts of "greater than" and "less than" or "equivalent;" the ability to count, to number; recognition of numerals, and finally simple addition and subtraction.

The kindergarten math series of Houghton Mifflin emphasized numbers, conservation of numbers, geometric shapes and sizes. When studying

shapes, food was used as well as the more conventional objects of balls, blocks, chairs or books. There was a square meal when everything used such as plate, napkin, crackers, cheese pieces, and pieces of lunch meat were square. Another day everything was round, another day a rectangle, and a fourth day a triangle. The children liked this very much and worked hard trying to find food and materials to fit the shape.

As Dorothy H. Cohen points out in her book The Learning Child, "Because mathematical principles can be drawn so well from concrete, pliable materials -- floor and table blocks, scales and weights, containers, and so on -- mathematics learning is well suited to kindergarten." (Cohen, 1972) She also states "The materials are no more than the means by which a process of learning takes place which is indispensable to later formal learning. They are the tools by which a child can bring into focus and then go on to clarify further his personal understanding of a wide variety of content, both objective and subjective, learned through his senses." (Cohen, 1972)

A set of scales allowed the children to compare weights of many objects such as feathers and paper, two rocks of different sizes and shape, beads and blocks and other objects. Tangrams, peg boards, small blocks, color cubes, attribute blocks, were all used to foster these math concepts.

Cooking was most valuable in teaching math concepts of all kinds. The children learned to measure, to understand fractions, to be aware of time with the use of a timer, to see changes in quantity such as cake rising or cookies spreading out in a pan when baked. It was fun to have each child "write" out his/her idea of a recipe at the beginning of the year and then see how their ideas changed during the year. Some of the

first recipes were quite surprising.

Money is a hard concept for young children to grasp so having a store in the room helped here. Only the simplest forms of money were used as this concept takes many years to develop.

In science, stressing all of the senses was particularly easy as this is usually one area which is covered in most science books. Plants of all kinds, including carrot tops, beet tops, a sweet potato vine, cactus, and an avocado plant were part of the room. The children enjoyed the hamster and a discussion of the food he liked. Goldfish were also included as a part of the program. Again the ideas expressed by Dr. Karnes were also used, "Concepts taught during the structured periods were reinforced during directed play and especially during the music period. For example, when body parts were introduced in science or counting in math, these concepts were stressed in songs and rhythmic activities during music." (Karnes, 1970)

Science and social studies were sometimes combined as in a study of the seasons. The holidays were included here, and why certain holidays had certain traditions. For example, Halloween is in October in the fall of the year, so pumpkins and corn stalks are used as they are plentiful at this time of the year. Also this is the time the nights are becoming darker and bats are out.

Again, Thanksgiving is in the fall when the harvest is in and people are thankful for the food. A cooking lesson based on the food used at the first Thanksgiving was well received. The children made applesauce, cornbread and butter. Many had no idea how butter was made and enjoyed this part especially. They also tasted turnips, onions, grapes, nuts, and other foods available at this season of the year.

Christmas is during the winter with short, cold days, good smells (such as pine), and taste, such as gingerbread cookies, candies, apples, tangarines, oranges, candy canes, mince pies or plum puddings. Even though there is seldom snow in Sacramento the weather cooperated this time and there was a snowfall on a school day so snow and cold were experienced.

Easter is a new beginning when spring comes, flowers begin to grow, trees sprout leaves and blossoms and baby chickens, lambs and other new animals appear. The class was fortunate to see a day old camel at the zoo during their visit. They had their pictures taken and were on TV watching one of the attendants feeding the baby with a bottle.

Since there was a Jewish child in the class, the Jewish holidays, the food, and traditions connected with these holidays were stressed. This gave the other children a chance to learn about a religion not familiar to them.

During the Chinese New Year, the children enjoyed making a large dragon which was used to parade around the school. Also the Chinese parents shared some of their food with the class such as rice wafers, fortune cookies and other treats.

As there were several Mexican children, Cinco do Mayo was a big day. The Mexican costumes, the Aztec calendar, the Mexican flag and money were all a part of the celebration along with the instruments used and the dances danced. There were different types of food such as the two kinds of tortillas, tacos, and sweets used by the Mexicans.

All these lessons helped the children appreciate the importance of each culture.

Besides the holidays and customs of the various cultures, the

children learned how the location of a country can affect the way of living. When talking about Alaska, they became aware of how the cold affected the type of clothing worn, the houses and the choice of foods. Hawaii was also studied. Again, the differences in the clothing, food, activities and occupations were stressed. A large collection of photographs from Hawaii was used to help illustrate this. The book Let's Go Places by Helen Young Fox was a good source of ideas for this type of unit of study. People who had traveled or lived in other countries were invited to visit the class. One woman had a collection of wooden shoes of all sizes and styles from Holland which she shared with the class. This made Holland and the wetness of the country more real for the children.

Music also lent itself to a multi-sensory approach. The songs were often chosen to fit the letter of the week and also the season or holiday. A great deal of action was used with most of the songs as this gave the children a chance to feel as well as hear the music. When talking about good health practices a series of songs describing how to care for teeth and what foods to eat for a good breakfast were used. Many Hap Palmer records were used as they helped reinforce in a new way a number of basic concepts.

In art, all types of material were used. The children like the experience of modeling with clay from bread and glue, making animals from vegetables and fruits with toothpicks, making objects with caramels, and making their own muffin man with carrot strips, olive slices, and small pieces of sausages. A gingerbread boy was decorated by each child. Frosting art gave them a chance to experiment with decorating a cup cake or cracker with various types of candy as well as frosting. Of course,

the various types of clay, such as salt and flour, plasticine, play dough, clay to be baked, and cornstarch clay gave the children a chance to feel and work with various textures.

All types of seeds, dried plants, rickrack, lace, macaroni, popcorn, and wood were used in collage' pictures. Some very unusual things were done. Many of the children used their imaginations to make space rockets, boats, houses, and their idea of a germ, although some were content to make a design. They enjoyed being able to choose any materials they wished, and often combined a large variety in their work.

These were the main ways the curriculum was used, although there were many chances each day to introduce the multi-sensory idea in a casual way. At Christmas the children learned the importance of thinking about others as they made tray favors for a convalescent hospital near the school. When these were done, the class took a walking trip to the hospital to deliver the favors and visit with some of the patients. It was felt that the children needed to learn that emotions were sensory and that the child must be led to talk about them. Emphasis was placed on feelings and acceptable ways of expressing them. It was also stressed how others feel so the child could respond appropriately and move out of his self-centered world.

In May, both groups were again given the Stanford Early School Achievement Test. This time there was little trouble in administering the test as the children had had experience with paper and pencil activities and had little trouble following directions.

The control group used the traditional materials usually found in a kindergarten setting. As Henry W. Ray states in his article, Designing Tomorrow's School Today: The Multi-sensory Experience Center, "Despite a

growing consensus among educators that the learning environment can crucially affect the quantity of experience a child encounters during a school day, relatively little change has occurred in most classroom design over the years. Today many schools are still containment centers -- designed to hold classes while students memorize the "stuff" necessary for advancement to the next higher instructional level." (Ray, 1971) There was easel painting all year starting with painting a piece of paper cut in the shape of an apple (red). In October, the shape was a pumpkin (orange); November, used the traditional turkey shape (brown); and December, a tree (green) with colored balls. Later the children could do free style paintings.

The other areas used for activity time were the housekeeping and dress up corner, large floor blocks, small block building, toy cars to ride on, and a few manipulative materials such as beads for stringing, puzzles, and construction toys as Lincoln logs, Leggo, and tinker toys.

The math work was largely use of work books, or the teacher demonstrating with the flannel board the shapes, numbers, size, and position concepts. There was little or no chance for the children to do this.

The Southwest Regional Laboratory basic concept program was extensively used. All children were taken through each phase of the program without first finding out if they already knew the concept. These included colors, shapes, sizes, amounts, positions, pre-math and pre-reading. This program utilizes teacher stories, books to point out the picture illustrating the concept being taught and criterion tests to assess mastery. If needed reinforcement with pictures in small groups was used and then retesting was done.

The pre-math and pre-reading sections were introduced in March and

April after the beginning reading program was well underway and the math work books had been used for an extended time. Math was started with the workbooks the first month and the beginning reading program in November. It seemed a little unusual to teach the difference between a letter and a word after the children had been reading for several months. This was the way the concept program was designed however.

The art activities were largely teacher made with patterns and set format -- clay modeling to a form for a Christmas present (candle holder) all the same, ghosts to be cut and pasted in order 1 - 5, letters of their names pasted to a sheet of paper. Easel painting was about the only free expression used.

Story time was for the whole group and the students were expected to sit and listen. Some movies and filmstrips were used but always in a large group setting.

The reading program was for all. It was a highly structured program which did not allow a child to use his own powers of observation or different approach to learning. The program was the same for all, the only difference was the rate of progress. Because a child could take a book home he/she had to be able to read it to another person. This was about the only chance for individual attention. Much of this reading became memorization as the children could not read the words when they were confronted in other contexts or materials.

Science was the traditional talk of weather, seasons, observation only of experiments done by the teacher, plant growing, chicken hatching, animal care (kangaroo rat), study of zoo animals before a trip to the zoo with pictures and films.

Two cooking activities only were used during the year -- applesauce

and cornbread. These were done by the teacher with the students watching.

Social studies used the basic books and materials furnished by the state. Little chance was given for the children to be actively involved.

Language development was show and tell with each child being assigned to a time to bring in something and describe it for the others. About five students participated each day. There was some acting out of stories but little in a formalized way for language development such as the Peabody Kit.

The major emphasis for the year was the SWRL basic concepts program and the SWRL beginning reading program, math, activity time, with some art, music and physical education activities. Science and social studies were incidental if there was time.

This teacher was a dedicated one who was considered a good teacher in the traditional method. She put in a great deal of time, effort and planning, and enthusiasm in her work as this was her choice of assignment after many years of teaching. She had been a first grade teacher before this year.

In 1972-73 the research was replicated with two groups of mentally retarded children. The groups were in different cities, were a little older than the kindergarten group in chronological age, and both were in the trainable category. Since the experimenter was no longer teaching young mentally retarded, it was necessary to find someone to carry out the program. The experimental group was in a private school in Spokane with a young teacher who was very cooperative. She started the year with great expectations which had to be modified as she began working

with the children. She found they did not learn as fast as she had expected and so she began exploring many ways of teaching the same concept. This lent itself well to the multi-sensory approach as review can be boring if done in the same way all the time.

The control group was a class of children in the trainable school in Sacramento. This class used more of the traditional methods of teaching similar in many ways but more basic to that used by the control group in 1971-72. A large percentage of the time was spent in language development.

Because of the language limitations of both groups, a different test was used -- The Minnesota Preschool Scale. This was chosen after a good deal of study as it had a non-verbal as well as a verbal score which seemed to fit more nearly the ability of these children. The pre-test was given both groups in October and the post-test the last of April.

The actual curriculum was not as extensive and was more basic because of the mental age of the children. The cooking experiences were popular as some of these children were not allowed to help with the cooking at home because of the fear of getting hurt. The children helped to make pudding, popcorn, and make butter. They also washed the dishes after their experiences and after their lunch and set the table each day for lunch. Several learned to pour juice and milk from a pitcher and pass a plate of crackers, sandwiches or cookies without spilling. To quote from one report written at the end of the year: "J. is much less apprehensive of school now. He seems to have had little outside stimulation and our cooking experiences always provide extra joy for this boy."

Colors were stressed all year in all ways possible, as color of food,

color of materials, color of animals (live ones whenever possible), color in clothes they made such as Indian headdress and jacket, and the lifesize tepee and canoe they made to play in. Many of the music and rhythm games stressed color as well as their art activities and the stories read to them. Some of them even learned to read the color words.

Studying shapes was done in many ways as tracing, working with blocks of various shapes, using stories, music, art activities, cutting a face on the jack-o-lantern (circle for eyes, triangle for nose, and rectangle for mouth) and cookies cut in various shapes.

A visit to the class in January by the experimenter proved interesting. These children were doing many more things than most retarded children of this age. Most could count to 10, could read their names, read several "survival words" such as exit, stop, go, and color words. The reports at the end of the year showed that five of the children had learned at least five letters, could read 10 - 15 words, knew their colors and shapes, could count to 10, and some could write their names. Even though there was not significance in the gain scores of this group their functional level had increased a great deal more than the control group.

Finally, in 1973-74, the curriculum was again used in one of the kindergarten classes at the same school as in 1971-72. This year the school became a part of the Early Childhood Education program being initiated in California. For this reason the California Test of Basic Skills was the instrument used for testing as it was the required test for all ECE schools in Sacramento.

The experimental class was again the youngest and the control group the middle one this time. Because of the emphasis on parent in-

volvement and community help, instructional aides and cross-age tutoring, the program was easier to carry out this year and the results seemed to bear this out. There was often a ratio of one adult to five or six children or less, so the class received a great deal of small group or individual help in many areas.

Both the experimental and control group shared the same aides, both had several parents working in the room, both had crossage tutors, and both were given $200 to buy instructional materials for the room. Each one had a cassette recorder, filmstrip viewer, and listening post as well as some physical education equipment.

The experimenter used all of the instructional materials money to supplement the multi-sensory material already on hand. Catalogues were studied carefully and the materials chosen which would reinforce what was being done. She also spent some of her own money to insure as wide a variety of experiences as possible. The program was similar to the one in 1971-72 but was modified to meet the needs of these children and to utilize the adult help available to as great a degree as possible.

CHAPTER IV

Findings

Since the kindergarten classes were not set up on a random basis but were selected by age, the Mann Whitney U Test was used instead of an analysis of variance. In subtest one and three the expanded formula for tied scores was used. It was also used as a check for the other three scores. The gain scores from pre- to post-test for both groups were ranked and the U score computed.

It was found that in all instances there was apparently significance in the scores so the null hypothesis was rejected. There was significance at the .02 level in subtest 1; significance at the .05 level in subtest 2; significance at the .002 level in subtest 3; significance at the .02 level in subtest 4 and .05 in the total scores.

There was no significance found in the verbal, non-verbal, or total scores with the retarded group. Therefore, for this group, the null hypothesis was accepted.

The results of the CTBS test in 1973-74 in the total prereading scores showed significance at the .01 level. Therefore, in this case the null hypothesis was rejected.

It was found that there was greater significance overall the second time in the kindergarten group as there was more help and so more chance to fully implement the program. Also, because of the extra funding, there was a chance to add needed materials to improve the curriculum. As the program progressed it became easier to think of new ways to carry out the goals of the curriculum so the children benefited more. Each year the makeup of the school population changed. There were more emotional

and neurological problems with the children, but even so, the results improved.

The charts at the end of this chapter show the gain scores and rank for each set of tests for the three years.

Stanford Early School Achievement Test 1971-72

Subtest I

Experimental Subject	Gains	Rank	Control Subject	Gains	Rank
1.	3	18	1.	6	25.5
2.	11	32.5	2.	12	34.5
3.	11	32.5	3.	-2	4
4.	-10	1	4.	10	32
5.	7	28.5	5.	-2	4
6.	2	16	6.	9	31
7.	0	10	7.	0	10
8.	12	34.5	8.	7	28.5
9.	3	18	9.	4	21
10.	1	14	10.	3	18
11.	-1	6.5	11.	-2	4
12.	1	14	12.	4	21
13.	-6	2	13.	7	28.5
14.	14	36	14.	4	21
15.	1	14	15.	5	23.5
16.	6	25.5	16.	0	10
17.	7	28.5	17.	0	10
18.	5	23.5	18.	-1	6.5
		$R_1 = 355$			$R_2 = 333$

$Z = 2.2$ .02
reject null hypothesis

Subtest II

Experimental Subject	Gains	Rank	Control Subject	Gains	Rank
1	7	24.5	1.	7	24.5
2.	9	29.5	2.	2	3.5
3.	10	32	3.	3	8
4.	3	8	4.	3	8
5.	5.	13.5	5.	7	24.5
6.	12	35.5	6.	4	14.5
7.	9	29.5	7.	7	24.5
8.	11	34	8.	4	14.5
9.	12	35.5	9.	4	14.5
10.	3	8	10.	6.	20.5
11.	7	24.5	11.	3	8
12.	6	20.5	12.	4	14.5
13.	4	14.5	13.	4	14.5
14.	5	18.5	14.	3	8
15.	7	24.5	15.	-3	1
16.	10	32	16.	3	8
17.	10	32	17.	8	28
18.	2	3.5	18.	-1	2
		$R_1 = 415$			$R_2 = 241$

$U = 70$
reject null hypothesis

Subtest III

Experimental Subject	Gains	Rank	Control Subject	Gains	Rank
1.	11	29.5	1.	6	18.5
2.	4	10.5	2.	1	1.5
3.	16	34	3.	8	23
4.	12	31.5	4.	12	31.5
5.	17	35.5	5.	4	10.5
6.	9	24	6.	13	33
7.	3	6	7.	11	29.5
8.	17	35.5	8.	6	18.5
9.	3	6	9.	4	10.5
10.	3	6	10.	4	10.5
11.	3	6	11.	7	22
12.	1	1.5	12.	5	14
13.	6	18.5	13.	6	18.5
14.	6	18.5	14.	2	3
15.	5	14	15.	3	6
16.	5	14	16.	10	26.5
17.	10	26.5	17.	10	26.5
18.	6	18.5	18.	10	26.5
		$R_1 = 336$			$R_2 = 330$

$Z = 2.0$, .002
reject null hypothesis

Subtest IV

Experimental Subject	Gains	Rank	Control Subject	Gains	Rank
1.	4	22.5	1.	3	18
2.	1	9	2.	2	13.5
3.	4	22.5	3.	2	13.5
4.	9	33	4.	14	36
5.	11	34.5	5.	3	18
6.	5	26	6.	5	26
7.	2	13.5	7.	3	18
8.	8	32	8.	1	9
9.	7	31	9	6	29
10.	3	18	10.	3	18
11.	6	29	11.	1	9
12.	6	29	12.	2	13.5
13.	-1	3.5	13.	-3	2
14.	0	5.5	14.	1	9
15.	11	34.5	15.	-4	1
16.	1	9	16.	-1	3.5
17.	5	26	17.	4	22.5
18.	4	22.5	18.	6	6.5
		$R_1 = 401$			$R_2 = 265$

$Z = 2.2$ .02
reject null hypothesis

Total

Experimental Subject	Gains	Rank	Control Subject	Gains	Rank
1.	25	27.5	1.	22	23
2.	25	27.5	2.	17	17.5
3.	41	35	3.	11	8
4.	14	11.5	4.	29	30
5.	40	34	5.	10	6.5
6.	30	31	6.	31	32
7.	14	11.5	7.	21	21
8.	48	36	8.	18	19
9.	25	27.5	9.	19	20
10.	4	3	10.	16	16
11.	15	14.5	11.	9	5
12.	14	11.5	12	15	14.5
13.	3	2	13.	14	11.5
14.	25	27.5	14.	10	6.5
15.	24	25	15.	1	1
16.	22	23	16.	12	9
17.	31	33	17.	22	23
18.	17	17.5	18.	8	4
		$R_1 = 378.5$			$R_2 = 267.5$

$U = 94.5$
reject null hypothesis

Minnesota Preschool Scale Test 1972-73

Verbal-C Score						Non-Verbal-C Score						Total-C Score					
Experimental			Control			Experimental			Control			Experimental			Control		
Subject	Gains	Rank	Subject	Gains	Rank	Subject	Gains	Rank	Subject	Gains	Rank	Subject	Gains	Rank	Subject	Gains	Rank
1.	-5	1.5	1.	12.5	12	1.	2.5	3	1.	14.5	13.5	1.	-3	1	1.	13.5	12
2.	1.5	3	2.	18	14	2.	4.5	5	2.	18	15	2.	3	3	2.	18	14.5
3.	10	10	3.	26	16	3.	0	2	3.	34.5	18	3.	6	5	3.	32.5	17
4.	6	5.5	4.	8	8	4.	12	11	4.	3	4	4.	42	18	4.	7	6
5.	8	8	5.	6	5.5	5.	5	6	5.	12.5	12	5.	5	4	5.	8	7
6.	2.5	4	6.	14.5	13	6.	22	17	6.	6	7	6.	9	8	6.	12	10
7.	-5	1.5	7.	33.5	18	7.	14.5	13.5	7.	11	9.5	7.	-1	2	7.	26	16
8.	12	11	8.	8	8	8.	10	8	8.	21.5	16	8.	11	9	8.	12.5	11
9.	27.5	17	9.	19.5	15	9	-1.5	1	9.	11	9.5	9.	18	14.5	9.	16	13
$U = 55.5$ $R_1 = 61.5$ $R_2 = 109.5$ accept null hypothesis						$U = 50.5$ $R_1 = 66.5$ accept null hypothesis						$U = 52.5$ $R_1 = 64.5$ $R_2 = 106.5$ accept null hypothesis					

California Test of Basic Skills 1973-74

Experimental			Control		
Subject	Gains	Rank	Subject	Gains	Rank
1. 43		23	1. 31		19
2.	61	32.5	2.	56	29
3.	27	9.5	3.	29	12.5
4.	67	36	4.	43	21
5.	55	28	5.	27	9.5
6.	61	32.5	6.	25	5.5
7.	51	26	7.	25	5.5
8.	34	15	8.	37	18.5
9.	11	1.5	9.	37	18.5
10.	64	34	10.	35	16.5
11.	49	25	11.	11	1.5
12.	28	11	12.	48	24
13.	29	12.5	13.	35	16.5
14.	65	35	14.	25	5.5
15.	38	20	15.	57	30
16.	73	38	16.	22	3
17.	69	37	17.	44	22
18.	54	27	18.	25	5.5
19.	60	31	19.	26	8

$U = 76.5$ $R_1 = 474.5$

reject null hypothesis

CHAPTER V

Summary and Conclusions

Since there were many philosophers and educators who believed that sensory training was basic to all learning, and since there did not seem to be any research already done in this area, it was felt that some research was needed to find out if the use of a multi-sensory curriculum could affect the achievement level of young children. The null hypothesis was that the experimental classes would show no significant gain on the post-tests used over those in the regular class.

Two classes from the same population were chosen. Both groups were given a pre- and post-test using the Stanford Early School Achievement Test. After setting up the room with interest centers based on the five senses, the curriculum was enriched in all areas whenever possible by emphasizing the five senses. The class became an activity oriented one with a chance for the children to manipulate concrete objects as much as possible and thus make discoveries for themselves. This was in contrast to the more formal type of class with passive participation by the students and the teacher handing out the information. Abstract learning was avoided as much as possible as it was felt the children would learn more if they found the answers for themselves.

The results for the two kindergarten groups in 1971-72 seemed to substantiate the premise that such a program is beneficial. With the retarded group this did not appear to be true although the experimental group made surprising gains in many areas. "For young children to experience the fullness of being which is the underpinning of mental health, they must experience their bodies and bodily senses with competency and not be

diverted to the more adult modes of sitting and listening too soon." (Cohen, 1972)

The kindergarten control group was given a program of basic concepts keyed almost entirely to pictures and stories. They were also started on beginning reading since the Southwest Regional Laboratory program was introduced in many classes in the district. This program started reading in November before the children had mastered their letters and sounds. Implied in this program is the theory that the children will learn these skills along with the reading.

The post-test scores on the Stanford Early School Achievement Test, particularly in subtest 3 (letters and sounds) did not seem to bear this out. In the experimental group ten received perfect scores on the post-test but only two in the control group did, even though their pre-test scores were higher. For those children in the experimental group who were ready, a program of simple reading was introduced after completing the Getting Ready to Read series. Not all of the children had to participate so the feeling of failure was avoided. According to Dorothy Cohen, "Implicit in this experience (reading) is the assumption that children learn little of value before they can read, and so the sooner they learn to read, the better for their intellectual progress. In reality, children learn a great deal before they can read and much of that is good solid information. The fact that they learn it by seeing, hearing, touching, tasting, and smelling does not make the information less accurate or the learning style less valid." (Cohen, 1972)

Even though the retarded group did not show any marked significance, there might have been several reasons for that. In the first

place, the children in the experimental group tested higher to begin with than the control group. Although the gains which this group did make were not measured, possibly the test was not geared to measure the right things. The teacher was a new one and this was her first teaching position. Finally she became pregnant and whenever she was absent the substitute was not a certificated teacher.

If the chance ever presents itself, the experimenter would like to try again with a group of young retarded. Also, it may be that it would require a longer time to get significant results since these children learn at a slower rate.

Ernest Siegel states, "Many authorities -- e.g., Skeels (1966:240) -- point out that impoverished environments, depriving children of attention, love and sensory experiences can result in retardation, but that these same retardates when transferred to a more enriched environment often show startling gains in IQ." (Siegel, 1969) Lisa Liepmann also pointed out " ... a deprived sensory environment affected the baby's health, intelligence and general well-being." (Liepmann, 1972) These comments seem to lend support to the idea of trying this type of curriculum for retarded children at a later time.

The 1973-74 program was primarily arranged to meet the requirements of the ECE program. The multi-sensory curriculum seemed to be a natural for this and so it was implemented the whole year. The fact that it was an activity oriented program and there was great variety in materials and plenty of adult help, no doubt contributed to the significant gains the children made.

The control group also had parental help, instructional aides (the two groups divided the aid time so both had the same people), and

cross age tutoring. Therefore, it was not just an increase in adults which made the difference apparently but the type of equipment and material provided.

ECE instruction was intended to be geared to individualized instruction to meet the needs of each child. The flexible multi-sensory program met the criteria for the individualization very well. "To understand the way in which the play program of the kindergarten and its raw material -- blocks, paint, and clay -- help the children to utilize the knowledge gained through their senses, the very word learning must come in for fresh interpretation." (Liepmann, 1972)

"Parents can, and should, be knowledgeable about schools; can, and should, work closely with school personnel in thinking wisely about goals and objectives for children. At the same time they can, and should, recognize the specialization that in no way denies the importance of the parents." (Liepmann, 1972)

The results of these experiments were gratifying and seem to indicate that this type of curriculum has advantages for all children, particularly for those, who for some reason, may have experienced sensory deprivation at a young age.

Recommendations

The multi-sensory curriculum was described in great detail but is not too specific as one of the important aspects is to adapt the curriculum to the needs of the children and utilize whatever is available from parents, community, and the interests of the group. Therefore, if a teacher wishes to try such a curriculum, first, know the children, then

start planning as many ways as possible to use this multi-sensory approach. The experimenter has been doing it each year since 1971-72 and each year it is different, but she never loses sight of the basic goal -- multi-sensory instruction.

A replication of the study with young mentally retarded should probably be undertaken if the opportunity arises. However, a new instrument for testing should be used if a suitable one can be found which would more nearly measure growth in basic concept knowledge such as an achievement test which did not depend largely on verbal responses or paper and pencil format.

The study may need to be carried on for a longer period than seven months as retarded children learn at a slower rate.

APPENDIX I

Bibliography

1. Almy, Millie; Chittenden, Edward; and Miller, Paula, Young Children's Thinking, Studies of Some Aspects of Piaget's Theory, Teacher's College, Columbia University, New York, (1967)

2. Ault, Roz, Kids Are Natural Cooks, Houghton Mifflin Co., Boston, Mass., (1972)

3. Brearley, Molly and Hitchfield, Elizabeth, A Guide To Reading Piaget, Routledge & Kegan Paul, Ltd., Great Britain, (1966)

4. Brown, ReMona, Kindergarten Calendar, T.S. Denison & Co. Inc., Minneapolis, Minn., (1970)

5. Burton, Maurice and Robert, The International Wildlife Encyclopedia, Marshall Cavendish Corporation, New York, (1969)

6. Carlson, Bernice Wells, Listen! And Help Tell The Story, Abindon Press, New York, (1965)

7. Castillo, Gloria A., Left-Handed Teaching, Praeger Publishers, New York, (1974)

8. Clark, Carol E., Rhythmic Activities For the Classroom, Instructor Publications, Danville, N. Y., (1969)

9. Cohen, Dorothy H., The Learning Child, Pantheon Books, New York, (1972)

10. Dunn, Lloyd M.; Horton, Kathryn B.; and Smith, James O., Peabody Language Development Kit, Level #P, American Guidance Service, Inc., Circle Pines, Minn., (1968)

11. Fisher, Dorothy Canfield, Montessori For Parents, Robert Bentley, Inc., Cambridge, Mass., (1965)

12. Forte, Imogene and MacKenzie, Joy, Kids' Stuff, Reading And Language Experiences, Incentive Publications, Nashville, Tenn., (1969)

13. Forte, Imogene and MacKenzie, Joy, Creative Math Experiences For The Young Child, Incentive Publications, Nashville, Tenn., (1973)

14. Fox, Helen Young, Let's Go Places, T. S. Denison & Co., Minneapolis, Minn., (1971)

15. Fox, Helen Young, Practical Project Units for Kindergarten, T. S. Denison & Co., Minneapolis, Minn., (1964)

16. Frostig, Marianne and Maslow, Phyllis, Learning Problems in The Classroom, Greene & Stratton, New York, (1973)

17. Fuller, Elizabeth Mechem and Ellis, Mary Jackson, Learning How To Use The Five Senses, T. S. Denison & Co., Minneapolis, Minn., (1961)

18. Furth, Hans, G., Piaget And Knowledge, Prentice-Hall Inc., Englewood Cliffs, N. J., (1969)

19. Furth, Hans G. and Wachs, Harry, Thinking Goes To School, Oxford University Press, New York, (1974)

20. Gigous, Goldie Maries, Improving Listening Skills, F. A. Owen, Publishing Co., Dansvillie, N. Y., (1969)

21. Ginsburg, Herbert, and Opper, Sylvia, Piaget's Theory of Intellectual Development, An Introduction, Prentice-Hall, Inc., Englewood Cliffs, N. J., (1969)

22. Gray, Klaus and Miller, Forester, Before First Grade, Teacher's College, Columbia University, New York, (1966)

23. Greenberg, Polly and Epstein, Bea, Bridge-To-Reading (7 volumes), General Learning Corporation, Morristown, N. Y., (1973)

24. Hillis, Viola S., The Multi-Sensory Linguistic Approach, Reading Newsreport, Volume VI, No. 2., Nov-Dec., (1971)

25. Hoffman, James, A Child's Concept Alphabet, Instructional Fair, Inc., Birmingham, Mich., (1968)

26. Houston, Celestine, Learning to Listen, T. S. Denison & Co., Minneapolis, Minn., (1968)

27. Karnes, Merle B.; Taska, James A.; and Hodgins, Audrey S., The Effects Of Four Programs of Classroom Intervention On the Intellectual And Language Development of 4-Year-Old Disadvantaged Children, American Journal of Orthopsychiatry, Vol 40, No. 1, January, 1970

28. Kephart, Newell C., The Slow Learner In The Classroom, Charles E. Merrill Books, Inc., Columbus, Ohio, (1960)

29. Kocher, Marjorie B. The Montessori Manual of Cultural Subjects, T. S. Denison & Co., Minneapolis, Minn., (1973)

30. Le Captain, Jeannette, Learning to Skip And Dance, T. S. Denison & Co., Minneapolis, Minn., (1971)

31. Liepmann, Lisa, Your Child's Sensory World, Dial Press, New York, (1973)

32. Lillard, Paula Polk, Montessori, A Modern Approach, Schocken Books, New York, (1972)

33. Lorton, Mary Baratta, Workjobs, Addison-Wesley Publishing Co., Menlo Park, Calif., (1972)

34. Marshall, J. Stanley; Pedendorf, Illa; and Swartz, Clifford, Sense and Tell Kit, Scott, Foresman & Co., Glenview, Ill., (1968)

35. Maynard, Fredelle, Guiding Your Child To A More Creative Life, Doubleday, Garden City, N. Y., (1973)

36. McKee, Paul and Harrison, M. Lucile, Getting Ready to Read, 4th Edition, Houghton Mifflin, Co., New York, (1966)

37. Minless, David and Mary, Guide To An Effective Kindergarten Program, Parker & Sons, Los Angeles, Calif., (1972)

38. Montessori, Maria, The Absorbent Mind, Dell Publishing Co., Inc., New York, (1967)

39. Montessori, Maria, The Child In The Family, Avon Books, New York, (1973)

40. Montessori, Maria, The Discovery Of The Child, Ballantine Books, New York, (1967)

41. Montessori, Maria, The Montessori Method, Schocken Books, New York, (1964)

42. Montessori, Maria, Dr. Montessori's Own Handbook, Schocken Books, New York, (1965)

43. Montessori, Maria, The Secret Of Childhood, Ballantine Books, New York, (1966)

44. Montessori, Maria, Spontaneous Activity In Education, Schocken Books, New York, (1965)

45. Moore, Dan, Explorations In Gross Lotor Skills and Sensory Perception, Denoyer-Geppert, Chicago, Ill., (1972)

46. Murrow, Casey and Liza, Children Come First, American Heritage Press, New York, (1971)

47. Noll, James Wm. & Kelly, Sam P., Foundations Of Education In America, Harper & Row Publishers, New York, (1970)

48. Orem, R. C., Montessori And The Special Child, G. P. Putnam's Sons, New York, (1969)

49. Orem, R. C., Montessori, Her Method and The Movement, G. P. Putnam's Sons, New York, (1974)

50. Peck, Ruth L. and Helen E., Art And Language Lessons For The Elementary Classroom, Parker Publishing Co. Inc., New York, (1969)

51. Piaget, Jean, A Child's Conception Of Movement And Speed, Ballantine Books, New York, (1970)

52. Piaget, Jean, Science Of Education And The Psychology Of The Child, Orian Press, New York, (1970)

53. Radler, D. H. and Kephart, Newell C., Success Through Play, Harper & Row Publishers, New York, (1960)

54. Ray, Henry W., Designing Tomorrow's School Today: The Multi-sensory Experience Center, Childhood Education, February, (1971)

55. Robison, Helen F. and Spodek, Bernard, New Directions In The Kindergarten, Teacher's College, Columbia University, New York, (1970)

56. Rosner, Jerome, Perceptual Skills Curriculum 5 Volumes, Walker Educational Book Corporation, New York, (1973)

57. Rowan, Betty, Learning Through Movement, Teacher's College, Columbia University, New York, (1963)

58. Scott, Louise Binder, Fairy Tales In Rhyme, F. A. Owen Publishing Co., Dansville, N. Y., (1961)

59. Scott, Louise Binder, Learning Time With Language Experiences For Young Children, McGraw-Hill Book Co., New York, (1968)

60. Scott, Louise Binder, Puppets For All Grades, F. A. Owen Publishing Co., Dansville, N. Y., (1960)

61. Schwebel, Milton and Raph, Jame, Piaget In The Classroom, Basic Books, Inc., New York, (1973)

62. Snedeker, Noreen Davey, My School Book, T. S. Denison & Co., Minneapolis, Minn., (1970)

63. Van Witsen, Betty, Perceptual Training Activities Handbook, Teacher's College, Columbia University, New York, (1967)

64. Weber, Evelyn, Early Childhood Education, Perspectives On Change, Charles A. Jones Publishing Co., Worthington, Ohio, (1970)

65. Williamson, Victoria, Classroom Cookery, Creative Teaching Press, Inc., Monterey Park, Calif., (1975)

APPENDIX II

SHOW AND TELL

We are introducing a new approach to "show and tell" related to our emphasis on developing the five senses in all phases of the curriculum. We are following the enclosed format:

Monday	- Sight	- Something to look at or something seen to tell about.
Tuesday	- Sound	- A record, book, or some object making a sound such as a bell, etc., or something to tell related to sound such as a noise heard at home or traveling.
Wednesday	- Smell and Taste	- Tell of something eaten or smelled or bring to class some unusual food or flower or object with an odor or taste to share.
Thursday	- Touch	- Anything which has an unusual texture or feel or a variety of textures.
Friday	- Emotions	- Share experience or bring something to class to evoke emotions such as surprise, happiness, suspense, etc.

I am passing out a list of words related to the senses to help the child develop a vocabulary that is more expressive and aids the child in becoming more observant. I hope it will aid you in talking with your child about his many sensory experiences and will be fun for you and him/her.

"Developing a Vocabulary of the Senses," Alexander Frazier, Elementary English, Volume 47, pp 176-84, February 1970.

THE SENSE OF SOUND

babble
bang
bark
bawl
bay
beat
bell
bellow
blab
blabbermouth
blare
blast
bleat
blubber
boom
bray
buzz
cackle
caw
chant
chat
chatter
cheep
cheer
chime
chirp
chuckle
clack
clamor
clang
clank
clink
clunk
converse
coo
crackle
crash
creak
croak
croon
crow
crunch
cry
deaf
deafening
din
drawl
drone
drum
dumb
fizz
gab
gabble
giggle
gobble
gong
gossip
groan
growl
gruff
grumble
grunt
gurgle
harmony
hear
hiss
hoarse
honk
hoot
howl
hubbub
hullabaloo
hum
hush
jabber
jangle
jaw
jeer
jingle
knock
laugh
laughter
lecture
lisp
listen
loud
low
melody
melodious
mew (meow)
moon
monotone
monotonous
moo
mum
mumble
murmur
mute
mutter
neigh
overhear
pad
patter
peal
peep
pitch
plunk
pop
prattle
preach
purr
quack
quiet
racket
rant
rap
rasp
rattle
rave
recite
rhythm
ring
ripple
roar
roll
rumble
rustle
say
scream
screech
shriek
shout
shrill
silent
silence
sing
singsong
siren
sizzle
slam
smack
snarl
snort
snuffle
song
sonic boom
sound
soundless
speak
speech
splutter
squall
sqawk
squeek
squeal
stammer
stereophonic
still
strum
supersonic
swish
tap
tattle
thud
thump
tick
tinkle
toll
tom-tom
tone
tongue-tied
toot
tread
trill
trumpet
tune
twang
twitter
undertone
uproar
vocal
voice
volume
wail

warble
weep
whimper
whine
whiney
whinny
whisper
whistle
whoop
yap
yell
yelp
yip
yodal

THE SENSE OF SIGHT

admire
appear
appearance
array
attractive
auburn
beautiful
beauty
becoming
binoculars
black
blank
blare
blaze
blazing
bleached
bleary
blind
blindness
blink
blond
blot
blue
blur
blurred
bright
brighten
brightness
brilliance
brilliant
brindle
brown
brunt
clean
clear
color
colorful
colored
colorless
crystal
dapple
dark
darken
dazzle
dazzling
dim
dingy
dirty
discolor
discolored
distinct
drab
dusky
dye
eye
eyewitness
fade
faded
faint
fair
farsighted
flash
flashy
flicker
foggy
gaudy
gawk
gaze
glance
glare
glasses
gleam
gleaming
glimmer
glimpse
glint
glitter
glittering
glisten
glistening
gloom
gloomy
gloss
glossy
glow
glowing
goggle
good-looking
gorgeous
gray
green
grimy
hallucination
handsome
hazy
homely
hue
illusion
image
indistinct
invisible
light
look
looking glass
magnify
microscope
mirage
mirror
misty
mottled
murky
nearsighted
notice
observe
observant
observer
observation
ogle
orange
pale
pastel
peep
peek
peer
periscope
perceive
perception
pictures
pigment
pink
polished
pretty
purple
radiance
radiant
recognize
red
reflect
reflection
refector
reveal
review
scan
scene
scrutiny
see
shade
shadowy
sharp-sighted
sheen
sheer
shimmer
shimmering
shine
shining
shiny
show
showy
sight
smeared
smudged
soiled
sooty
sparkle
sparkling
speckled
spectacle
spectator
spectrum
splotched
spotted
spy
squint
stain
stained
stare

streak
streaked
stripe
striped
sunny
survey
tarnish
tarnished
telescope
tinge
tint
transparent
twinkle
twinkling
ugly
ugliness
unattractive
view
viewpoint
visible
vision
vista
visual
visualize
watch
watchful
well-groomed
white
whiteness
yellow

THE SENSE OF TOUCH

alive
blush
blushing
bristly
brush
bumpy
caress
chill
chilly
coarse
cold
coldness
contact
cool
crawly
creepy
crisp
cuddly
dab
damp
deadened
downy
dull
dry
dusty
feathery
feel
feeling
feverish
flabby
firm
flat
fluffy
flush
flushed
fondle
fumble
furry
fuzzy
gooey
grab
grasp
grainy
greasy
gritty
gummy
hairy
handle
hard
heavy
hit
hot
humid
itch
juicy
jumpy
lifeless
light
limp
lukewarm
lumpy
maul
massage
moist
numb
oily
pat
peck
pet
pinch
powdery
prickly
pull
push
rough
rub
sandy
scratch
scratchy
sharp
shiver
shivering
shivery
shudder
shuddering
shuddery
shove
silky
slap
slick
slimy
slippery
smooth
solid
soft
spongy
springy
squashy
squeeze
stiff
sticky
sting
stinging
stretchy
strike
stroke
sweaty
tag
tap
temperature
tepid
texture
thorny
tickle
ticklish
tingle
touch
toughened
uneven
velvety
vibrate
vibrating
warm
warmth
wet
wooly

THE SENSE OF TASTE

acid
appetizing
biting
bitter
bland
curdled
delicious
distasteful
flavor
flavored
flavorless
flavorsome
gingery
green
high-seasoned
honeyed
hot
insipid
luscious
mellow
nauseating
palatable
peppery
ripe
rotten
salty
savor
season
seasoned
seasoning
sharp
sip
sour
spice
spiced
spicy
spoiled
stale
sugary
sweet
tainted
tangy
tart
taste
tasteless
tasty
unappetizing
unflavored
unpalatable
unripe
unseasoned
untainted
vinegary
yummy

THE SENSE OF SMELL

aroma
aromatic
bouquet
deodorant
deodorized
deodorizer
fragrance
deodorize
fragrant
fumes
incense
moldy
musty
odor
perfume
perfumed
pungent
odorless
putrid
rancid
rank
reek
scent
scented
smell
smelly
sniff
snuff
spicy
stench
stink
stinky
strong-scented
strong-smelling
sweet-scented
sweet-smelling
whiff