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ABSTRACT

The booklet contains 12 selected papers on equal educational opportunity for visually handicapped (VH) children that were presented at the 52nd biennial conference (June, 1974) of the Association for Education of the Visually Handicapped. Included are presentations on the following: the history and concept of equal educational opportunity (B. Lowenfeld), competencies needed by teachers of VH students who may also have specific learning disabilities (J. McCarthy), assessing the chronological development of VH children's spatial concepts (K. Szatlocky), a comparative study of cognitive development among blind and sighted students (K. Simpkins and B. Stephens), new directions in services for VH infants and preschoolers (J. Brown), preschool children's cognitive characteristics (M. Poulsen), methods and materials for teaching elementary school students to read with the Optacon (G. Lutz), closed circuit television as a low-vision reading aid (R. Schnur et al), the use of compressed speech and a listening skills training program with handicapped students (A. Connor), career education and the handicapped (K. Hoyt-also see EC 073 115), career education for the VH (J. Best), and the impact of the Supplement Security Income Program upon rehabilitation of blind or disabled individuals (F. Crawford). (LH)

Selected Papers

ASSOCIATION FOR EDUCATION OF THE VISUALLY HANDICAPPED

Fifty-Second Biennial Conference

2

June 1974

San Francisco, California

EQUAL EDUCATIONAL OPPORTUNITY FOR ALL THE VISUALLY HANDICAPPED

Association for Education of the Visually Handicapped
919 Walnut Street 4th Floor
Philadelphia, Pa. 19107

ASSOCIATION FOR EDUCATION OF THE VISUALLY HANDICAPPED

Known first as the Instructors of the Blind, and later incorporated as the American Association of Instructors of the Blind, AEVH began in 1853 with a national meeting of superintendents of sixteen residential schools for the blind. Except for a few years when national emergencies prevented, conventions have been held biennially since that time. At the 1968 convention, the name of the organization was changed to Association for Education of the Visually Handicapped.

In 1952 the Workshop method of national conferences was adopted and membership was broadened to include all who were interested in improving the educational opportunities of visually handicapped children. In the Workshops, educators are able to define problems and work actively toward their solutions. Under the leadership of their own elected officers, workshops may continue in common efforts between national conventions, often producing newsletters or taking action at regional meetings. Student chapters have now been formed at several universities and several state chapters are functioning very effectively. In 1974 AEVH developed regional organizations which combine considerable independence with a close and integral relationship with the international association. These facilitate regional meetings, bring into active participation many more members, and make AEVH responsive to the special needs within the region.

AEVH publishes a newsletter called the FOUNTAINHEAD, a volume of selected papers from its biennial conference, and provides the professional journal, EDUCATION OF THE VISUALLY HANDICAPPED, for its members. The organization also participates actively in teacher and houseparent/child care worker certification, training institutes, the development of special standards, the encouragement and report of research in the field, and cooperation with national and international agencies and organizations interested in the education of visually handicapped children and youth. The popular AEVH brochure on education of the visually handicapped as a career is annually sent to many guidance counselors and young people who seek information relevant to their own choice of a profession.

AEVH is affiliated with the Council for Exceptional Children, a Department of the National Education Association.

For further information, write AEVH Executive Secretary, 919 Walnut Street, 4th Floor, Philadelphia, Pennsylvania 19107.

MEETINGS

The following is a list of the conventions of the American Instructors of the Blind (1853-1871), the American Association of Instructors of the Blind (1872-1968), and the Association for Education of the Visually Handicapped (1968-1974):

1st Meeting:	August 16-18, 1853, at New York, New York
2nd Meeting:	August 8-10, 1871, at Indianapolis, Indiana
3rd Meeting:	August 20-22, 1872, at Boston, Massachusetts
*4th Meeting:	August 18-20, 1874, at Batavia, New York
5th Meeting:	August 15-17, 1876, at Philadelphia, Pennsylvania
6th Meeting:	August 21-23, 1878, at Columbus, Ohio
7th Meeting:	August 17-19, 1880, at Louisville, Kentucky
8th Meeting:	August 15-17, 1882, at Janesville, Wisconsin
9th Meeting:	August 19-21, 1884, at St. Louis, Missouri
10th Meeting:	July 6-8, 1886, at New York, New York
11th Meeting:	July 10-12, 1888, at Baltimore, Maryland
12th Meeting:	July 15-17, 1890, at Jacksonville, Illinois
13th Meeting:	July 5-7, 1892, at Brantford, Ontario, Canada
14th Meeting:	July 17-19, 1894, at Chautauqua, New York
15th Meeting:	July 14-16, 1896, at Pittsburgh, Pennsylvania
*16th Meeting:	July 12-14, 1898, at Lansing, Michigan
17th Meeting:	July 9-11, 1902, at Raleigh, North Carolina
*18th Meeting:	Jyly 20-22, 1904, at St. Louis, Missouri
19th Meeting:	August 21-23, 1906, at Portland, Oregon, at Salem, Oregon, and at Vancouver, Washington
*20th Meeting:	July 14-16, 1908, at Indianapolis, Indiana
*21st Meeting:	June 28-July 1, 1910, at Little Rock, Arkansas
*22nd Meeting:	June 25-28, 1912, at Pittsburgh, Pennsylvania
*23rd Meeting:	June 28-30, 1915, at Berkeley, California
*24th Meeting:	June 4-7, 1916, at Halifax, Nova Scotia, Canada
25th Meeting:	June 24-28, 1918, at Colorado Springs, Colorado
26th Meeting:	June 21-25, 1920, at Overlea, Maryland
27th Meeting:	June 27-30, 1922, at Austin, Texas
*28th Meeting:	June 23-27, 1924, at Watertown, Massachusetts
*29th Meeting:	June 21-25, 1926, at Nashville, Tennessee
*30th Meeting:	June 25-29, 1928, at Faribault, Minnesota
*31st Meeting:	June 23-27, 1930, at Vancouver, Washington
*32nd Meeting:	June 27-July 1, 1932, at New York, New York
*33rd Meeting:	June 25-28, 1934, at St. Louis, Missouri
34th Meeting:	June 22-25, 1936, at Raleigh, North Carolina
*35th Meeting:	June 27-30, 1938, at Lansing, Michigan

*36th Meeting:	June 24-28, 1940, at Pittsburgh, Pennsylvania
*37th Meeting:	June 26-30, 1944, at Little Rock, Arkansas
38th Meeting:	June 24-28, 1946, at Watertown, Massachusetts
*39th Meeting:	June 21-25, 1948, at Austin, Texas
*40th Meeting:	June 26-30, 1950, at Philadelphia, Pennsylvania
*41st Meeting:	June 29-July 3, 1952, at Louisville, Kentucky
42nd Meeting:	June 27-July 1, 1954, at Batavia, New York
43rd Meeting:	June 24-28, 1957, at Worthington, Columbus, Ohio
44th Meeting:	June 22-26, 1958, at Vancouver, Washington
*45th Meeting:	June 26-30, 1960, at Donelson, Tennessee
*46th Meeting:	June 28-July 2, 1962, at Miami Beach, Florida
*47th Meeting:	June 21-25, 1964, at Watertown, Massachusetts
*48th Meeting:	June 26-30, 1966, at Salt Lake City, Utah
*49th Meeting:	June 23-27, 1968, at Toronto, Ontario, Canada
*50th Meeting:	June 28-July 2, 1970, at New Orleans, Louisiana
*51st Meeting:	June 25-29, 1972, at Miami Beach, Florida
*52nd Meeting:	June 23-27, 1974, at San Francisco, California

*Copies of convention proceedings or selected papers for these meetings may be purchased by writing to the Association for Education of the Visually Handicapped, 919 Walnut Street, 4th floor, Philadelphia, Pennsylvania 19107. Copies of the Indexes for 1922-1930, 1931, 1932-1940, and 1944-1960 are also available.

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CONTENTS

EQUAL EDUCATIONAL OPPORTUNITY FOR VISUALLY HANDICAPPED CHILDREN: HISTORY AND CONCEPT

Berthold Lowenfeld, Ph.D.

Author and Educational Consultant
Berkeley, California

The topic "Equal Educational Opportunity for All the Visually Handicapped" has been chosen as the theme of this, the 52nd Biennial Conference of the Association for Education of the Visually Handicapped, and Ferne Roberts, our President-Elect and Program Chairman, has asked me to deliver the keynote address for this occasion. First, let me stress that I believe our Conference theme to be provocative and timely and that the Program Committee deserves great credit for having designed an excellent sequence of meetings dealing with so many ramifications of this theme. Second, let me confess that the breadth of my topic scared me considerably because I felt that in order to cover it, I would need more time and, in deference to the greater attractions of an evening in San Francisco I had from the beginning planned to limit my talk to about half an hour. Only when I decided to focus on some more definite aspects of the topic, was I able to proceed with the preparation of my talk. As a consequence, I have taken the liberty to change my assignment to "Equal Educational Opportunity for Visually Handicapped Children: History and Concept."

The history of the education of visually handicapped children is at the same time a long and a short one. It is a long one because individual blind children have been, albeit informally, educated practically for millenia, as the success stories of so many blind men and women show who acquired an education by their own efforts when no formal educational facilities were available to them. They were admired by their contemporaries and are still shining examples of human fortitude and persistence. True, many of them had the support of dedicated parents and ingenious teachers, but it was their own indomitable drive for achievement and spirit of adventurousness that carried them to success. Their names range from Homer to Helen Keller, from Didymus of Alexandria to Maria Theresia von Paradis of Vienna. And there are hundreds of names, each a symbol of success, in this line of blind self-emancipators.

The history of the education of blind children is a short one, because organized educational measures for them began only less than 200 years ago, in 1784, when Valentin Haüy established the first school for the blind in Paris. In the United States, it is even shorter because the first schools for blind children were opened in Boston and New York in 1832, less than 150 years ago.

At the time of the beginning of organized education for blind children no other form of providing education for them could have been conceived except for separate educational institutions. Why was this the case? There are two reasons. One is the general evaluation of blindness as a handicap and the other the condition of regular schools at that time. Blindness was generally considered to be such a serious, even overwhelming, handicap that no other but a highly specialized educational environment was considered adequate to cope with it. There is one comment in Haüy's famous *Essay on the Education of the Blind* which shows the limited expectations he had for the blind even after they had acquired an education: "No, we never pretend that those of the blind who even discover the most shining parts shall enter into competition, either in the liberal sciences or mechanical arts, with scholars or artisans who are blessed with the use of sight, even when their talents rise not above mediocrity (1786 in *Blindness 1967*, p. 183)." Such minimal expectations on the side of the founder of the first school for the blind show how severe a handicap he considered blindness to be. And the views of his less informed lay contemporaries must have been even more negative. No wonder then that only separate specialized facilities appeared feasible to him as a medium for the education of blind children. Public schools, the only alternative to separate facilities, were at that time, in Europe as well as in the United States, rigid, undifferentiated, and undifferentiating. Children were treated as little adults with no consideration of their special nature and needs; their minds were considered *tabulae rasae* on which the teacher had to engrave whatever he wanted them to learn, and this was confined to religion and the rudiments of the 3 R's. Understanding of the individual needs of children was not built into these schools. Of course, there were always teachers who showed a natural understanding of the children entrusted to them for an education, but they were the exception. All this made regular schools unlikely placement possibilities for deviant children. Thus, separate facilities came into existence.

The issue of equality in the sense of sameness was built into the education of blind children from its beginnings. Haüy and also America's outstanding educator of the blind, Samuel Gridley Howe,

the first director of Perkins, were both committed by their conviction to have the education of blind children conducted in the same way as that of seeing children. This led both of these otherwise great men into an unfortunate insistence that reading and printing for the blind must use the letter shapes commonly read by the seeing and the only concession to blindness was that embossed print was used. This insistence caused what is known as the "Battle of the Dots" that delayed acceptance of braille for many decades. This principle of sameness was enunciated most clearly by the outstanding blind educator, William Henry Churchman, who presented two resolutions in 1873 at the 3rd convention of this organization, then the AAIB: "First, That the education of the blind should as far as possible, conform to that of the seeing," and "Second, That in schools for the blind, apparatus and methods employed should vary as little as possible from those used in most approved schools for the seeing (Andrews & Bledsoe, 1972, p. 22)." Thus, the assumption could be made that separate and equal facilities were available for the blind when residential schools for them came into existence. Separate they were but about equal we will have more to say.

The general precept that education of the blind child should conform to that of the seeing dominated the field throughout the 19th and well into the 20th century. Though the question of reading and printing for the blind was decided in favor of braille, a reading medium that is blindness-compatible, methods applied in the education of blind children remained largely the same as those used in schools for the seeing. It was only in the second quarter of the 20th century that the increasing acceptance of psychology as a determinant of methods initiated a change. Educators who had considered intelligence and achievement testing of the blind as the only contribution psychology could make were made aware of the special psychological needs of visually handicapped children. They recognized that the visual handicap demanded special methods and that equality of educational opportunity could only be achieved by meeting the special needs of visually handicapped children. This constituted a considerable modification of the principle of sameness and shows that sameness does not necessarily result in equality. This recognition finds full expression in the program of this convention which deals with many of the areas in which special problems arise on account of the visual handicap: cognitive and concept development, communication skills, mobility, daily living skills, and sex education. Thus, we have come to the somewhat paradoxical conclusion that equality of educational opportunity for visually handicapped children can only be achieved by giving up the theorem

of educational equality in the sense of sameness and by meeting instead the special needs that grow out of the child's handicapping condition by a canon of special methods.

This recognition is not confined to visually handicapped children but extends to others who form minority groups. For instance, the child with learning disabilities, the mentally retarded child, the multihandicapped child, and the ghetto child. It is becoming increasingly understood and accepted that each of these minority groups of children have their own educational characteristics and require specific means of remediation and instruction. Indeed, integration of these children, or as the modern jargon goes, their mainstreaming, can only be viable if their special needs receive recognition and are met. Otherwise, equality of educational opportunity remains an unfulfilled dream.

Now to the concept of equality of educational opportunity.

Equality of opportunity is rooted in what has been called the American Creed. This Creed embraces ideals that were expressed in a number of declarations and have become a part of the American consciousness. They are articulated in the Declaration of Independence, in the Constitution of the United States and of many individual states, and in the Bill of Rights. They found their latest expression in the Four Freedoms enunciated in 1941 by President Roosevelt: The essentials of the Creed are basic equality, dignity of the individual, liberty to manage one's own personal affairs, the right to property, and certain inalienable rights of freedom, justice, opportunity, and the pursuit of happiness. To this must be added the Four Freedoms: Freedom of speech and expression, freedom of worship, freedom from want, and freedom from fear. This American Creed is not a set of dogmas as Gunnar Myrdal (1962) has pointed out: "The American Creed, just because it is a living reality in a developing democracy, is not a fixed and clear-cut dogma. It is still growing. During the Revolutionary epoch the interests of statesmen and philosophers and of the general public were focused on the more formal aspects of freedom, equality and justice. After a long period of material but not rapid spiritual growth, the American Creed is in this generation in a formative stage. It is now discovering its ideals in the social and economic sphere and in the realms of international organization (pp. 23-24)."

Public interest has indeed shifted from the lofty pronouncement of ideals to the social and economic realities of common life and to the educational rights field that is of special interest to us.

But before we go into these realities I want you to look with me a little closer at the meaning of equality, one of the most talked about but least understood issues. The question most often raised is: How can equality be achieved if we are all born unequal? John Dewey gives us the answer: "Belief in equality is an element of the democratic credo. It is not, however, belief in equality of natural endowments. Those who proclaimed the idea of equality did not suppose they were enunciating a psychological doctrine but a legal and political one. All individuals are entitled to equality of treatment by law and in its administration. Each one is affected equally in quality if not in quantity by the institutions under which he lives and has an equal right to express his judgement, although the weight of his judgment may not be equal in amount when it enters into the pooled result to that of others. In short, each one is equally an individual and entitled to equal opportunity of development of his own capacities, be they large or small in range. Moreover, each has needs of his own, as significant to him as those of others are to them. The very fact of natural and psychological inequality is all the more reason for establishment by law of equality of opportunity, since otherwise the former becomes a means of oppression of the less gifted (1939, p. 403)."

Here we have in a nutshell -- a precious and real golden one -- the clarification of a concept that is fundamental and relevant to our topic.

And now to the realities of what can well be called the educational rights movement. Its great moment came when Chief Justice Earl Warren read on May 17, 1954, the unanimous decision of the United States Supreme Court: "Separate educational facilities are inherently unequal." And "In these days it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity for an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms (Supreme Court of the United States, in *Brown v. Board of Education*)." The historic decree of 1954 made the "separate but equal" school provisions for black children illegal and created a shock wave of school integration measures that until today has not lost its impact and controversial character. The decree called for integration of black children into the regular schools but it soon became obvious that placement in these schools by itself would not suffice nor would it make up for the cultural and economic disadvantages under which these children had spent their preschool years. As a result, various special programs like Head Start and compensatory education came into existence to

make up for the adverse preschool influences and also to emphasize the cultural assets of the races from which many of these children stem. Federal and state legislative measures strengthened the movement that had a general impact on public school education. Thus, equality of educational opportunity for black children became the law of the land. But as so often the law was ahead of the people and the people must, as the phrase significantly says, live up to it.

Another milestone decision, closer to home, was the Pennsylvania Right to Education case. Its substance was that mentally retarded children were deprived of education by being excluded from appropriate educational experiences though they could learn and profit from education. The main argument that neither funds nor personnel and facilities were available was effectively counteracted by a statement of a spokesman for the Council for Exceptional Children: "If, in fact, the state does not have sufficient funds to educate all of its children, the handicapped youngster must take his share of the cut with the others...but do not expect the exceptional child to bear the whole burden of the state's financial difficulties, Mr. Governor and Mr. Legislator. He will suffer his share of the burden--but, by order of the Federal courts, he will no longer carry the whole burden." The decision reached by the court includes the following historical clause: "Having undertaken to provide a free public education to all of its children, including its exceptional children, the Commonwealth of Pennsylvania may not deny any mentally retarded child access to a free public program of education and training. It is the Commonwealth's obligation to place each mentally retarded child in a free public program of education and training appropriate to the child's capacity...among the alternative programs of education and training required by statute to be available, placement in a regular public school class is preferable to placement in a special public school class and placement in a special public school class is preferable to placement in any other type of program of education and training (Lippman & Goldberg, 1973, p. 31)." The decision in the *Pennsylvania Association for Retarded Children v. the Commonwealth of Pennsylvania* case of 1972 established education for all children as a public responsibility. Many other states have similar cases pending and some have passed legislation that establishes mandatory education for all. The State of Washington in 1973 enacted a law serving this purpose and as a result of it public schools must make provisions to educate all severely and profoundly retarded children. By 1980 enough special classes to accommodate these

children will have been established according to plans set up by the Bureau of Education for the Handicapped of the State of Washington.

California's State Superintendent of Instruction, Dr. Wilson Riles, has recently revealed legislation to be submitted that would require all public schools to offer special education for all mentally and physically handicapped children between the ages of 3 and 21. "Shocking as it may seem," he said, "literally thousands of handicapped youngsters are denied public education--a right provided, indeed required, for all normal children in California." He continued, "Those handicapped youngsters who do receive a program are often categorized with labels such as mental retardation and are removed from the mainstream of the educational system--a stigma that frequently remains with them for life."

With education-for-all requirements established either by law or litigation, there is no doubt that considerable numbers of retarded and other multihandicapped blind children will seek admission to public school facilities, local schools as well as residential schools. One can only guess at the extent of these demands because we do not know how many will be released from the state hospitals and how many parents will ask for their admission to public school facilities. The potential magnitude of the problem can be deduced from some figures that I collected in 1968 in connection with the *Study of Multihandicapped, Blind and Deaf-Blind Children in California* (1969). It revealed that there were 1,919 multihandicapped blind children of school age in the state of whom about 1,000 were in state hospitals. These multihandicapped blind children outnumbered "normal" blind children (1,111), almost 2 to 1. To provide special education for these children, quality education that gives them opportunities to develop their individual potential is the challenge with which we are confronted. It will take dedicated teachers, well-trained in educating multihandicapped blind children; it will need research and experimentation to find the best methods to assist these children; and it will require special facilities in school and community to meet the physical and recreational needs of these youngsters. It will also make parent-education programs a necessity. Let it not be said that we took these children out of institutions into the community only to put them into situations that were worse than those from which they came. Schools and communities must cooperate in providing for their education, health care, and leisure time activities. We must not fail them.

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A CRACK IN THE WINDOWS TO THE WORLD

Jeanne McRae McCarthy, Ph.D.

Leadership Training Institute in Learning Disabilities
Tucson, Arizona

Our theme for today is "Equal Opportunity for Perceptual and Motor Development." Yesterday, the theme was "Equal Opportunity for Cognitive Development." These two themes underline a quotation from William James, who said, many years ago, "The intellectual life of man consists almost wholly in his *substitution of a conceptual order for the perceptual order in which his experience originally comes.*"

With that profound statement I had planned to launch into an equally profound discussion of sensation and images, or perception and cognition, of language development, input-output and feedback systems, developmental psycholinguistics and on and on--until I realized that that approach would do little to bring conceptual order out of the topic of visually handicapped children who may also have specific learning disabilities.

Learning disabilities is a relatively new phenomenon on the educational scene. As recently as 14 years ago, 1960, learning disabilities did not appear even once on the program of the Council for Exceptional Children. There were no training programs for teachers. There were no provisions in schools for children with learning disabilities, there was no mention of learning disabilities in federal or state laws. The Association for Children with Learning Disabilities had not become a reality.

In a brief span of 11 or 12 years, a great deal has happened to the field. Twenty-seven states now have legislation on their books which refers specifically to learning disabled children. At the Federal level, learning disabled children have specific funding under Title VI-G of the Elementary and Secondary Education Amendments of 1970. For the first time, they are also mentioned in the new Rules and Regulations published by the Bureau of Education for the Handicapped, in the paragraph which defines who is handicapped. Few colleges or universities with teacher training programs in any category of special education do not have a

learning disabilities program. There are now parents groups officially organized in 47 states. Model Centers funded under Title VI-G have been developed in 44 states. Publishers are having a heyday with learning disabilities materials.

Because our field is so new, we have seen panaceas of all sorts developed to cure the learning disabled child. As educators, we have looked optimistically to medicine to cure them for us--first to the psychiatrists, and when that didn't work, to the neurologists and EEG technicians, then we looked to the optometrists, and when that didn't work, to the patterners, the creepy crawlers, or the crawly creepers. In some parts of the country the panacea is in massive doses of megavitamins, a little like the Glutamic Acid era, in other parts of the country the panacea is the development of alpha waves. Recently, I learned that learning disabilities are caused by allergies, and can be cured by antihistamines. I've also heard that learning disabilities are symptoms of hypoglycemia, low blood sugar, and can be cured by eating 5 small hi-protein meals a day. It is no wonder that the parents are confused!

We educators have developed our own miracle cures; in some parts of the country you may as well turn in your teaching certificate if you can't teach ITA - in others it is Distar. In Washington and Oregon it is the Slingerland program. In Texas it is Orton-Gillinghann. In the South it is the Shedd program. Precision teaching using 6 cycle graph paper to "count numbers while adding," or letters or whatever - is the only road to Rome for some. For others, diagnosis may go on for months before anyone gets around to teaching the child.

With all of this activity going on, where are we in the field of learning disabilities?

1. Although a great deal of progress is being made in the basic sciences of biochemistry, psychology, neuroanatomy, neurophysiology, etc., we do not yet know precisely how human beings process information, how or where they store it, or, in other words, *how they learn*. Practitioners in the fields of medicine, psychology and education continue to struggle with an elusive, amorphous disability about which few generalizations can be made.

2. The term learning disabilities continues to be used in a variety of ways, each referring to a different population of children!

(1) One group uses the term learning disability to refer to any child who does not learn for any reason, whether mentally retarded, deaf, blind, crippled, other health-impaired, etc. Learning disabilities then, to some is a synonym for learning problems due to any causes.

(2) Another group uses learning disabilities to refer to any child who doesn't learn for any reason as long as he is not retarded, a slow learner, environmentally deprived, a victim of teaching disabilities, etc.

(3) If learning disabilities is to survive as a respectable category of the handicapped, it is imperative that we reserve the label for children who are not eligible for services under any other category of the handicapped, but who are massively not learning in school. The learning disabled child is one whose learning pattern deviates so markedly from the norm of his peers as to require special education intervention.

According to the definition included in the Learning Disabilities Act, and in the recently published B.E.H. Guidelines, a child with a learning disability is "one who has deficits in one or more of the psychological processes which underlie language, spoken, or written. These may be manifested in listening, speaking, thinking, reading, writing, spelling or mathematical calculations. They do not include learning problems *primarily* due to mental retardation, sensory or motor handicap, emotional disturbances or to environmental disadvantage." (Children with sensory, motor, environmental or affected problems may also have learning disabilities and should receive multiple services).

Most states and local districts use this definition or some minor modification of it. We have almost unanimous agreement on the definition, and almost total lack of agreement on how to operationalize it.

For that reason I would like to suggest that you carry a much simpler definition in your heads. This simple definition would convey three concepts (1) the intact concept; (2) the discrepancy concept; and (3) the deviation concept. The learning disabled child is basically an *intact* child. He is not eligible for service under any other category of the handicapped. He has *discrepancies* in the psychological processes which underlie learning. These process deficits or developmental discrepancies

manifest themselves in discrepancies between capacity and achievement. His learning style *deviates* so markedly from the norm of his group as to require special education intervention.

A child may have a learning disability without the presence of other handicaps, or he may have a learning disability in addition to other handicapping conditions, and these require multiple services.

As we move away from the child who is learning disabled and nothing else, to the child who is learning disabled in addition to being visually impaired, we will need to concentrate on the discrepancy clause and the deviation clause, since he is entitled to special service because of his visual impairment. We are talking about the blind child who doesn't learn like other nice, "normal" blind children, or the visually impaired child with severe language problems; or the blind child with a finger agnosia. We could be speaking of the visually impaired child with severe auditory or visual perceptual problems.

What competencies does a teacher of visually impaired children need to have if she is to meet the needs of her students who also have learning disabilities? The teacher will need to have knowledge, skills, experience and materials in at least 8 areas of competence:

Sensory-Motor Processing: Sensory-motor processing refers to the operations whereby information is received, interpreted, stored, and integrated through the sense modalities and motor mechanisms and expressed motorically. The three broad categories which can be delineated for educational purposes are body orientation or body awareness, movement and haptic processing. Closely related to body awareness are the concepts of body schema or body image, laterality, directionality, orientation, synchrony, spatial relations, and temporal relations. The broad areas of movement include coordination, rhythm, agility, flexibility, strength, speed, balance, endurance (Frostig, 1970) and diadochokinesis. Haptic processing is associated with stereognosis, proprioception and localization of tactile stimuli.

Visual Processing: Visual processing involves the reception and translation of visual stimuli into meaningful concepts which can be retained to form new relationships which can be expressed graphically, motorically or orally. (Adequate visual acuity is assumed.)

Some of the visual processing functions are primarily perceptual, some conceptual, and some involve the integration of the visual stimuli with the motor output system. Among the perceptual functions are: attention, discrimination, figure-ground, closure, perceptual speed, constancy, recognitions, and some forms of memory. Among the conceptual functions are: abstraction, analysis, integration, synthesis, transduction and perhaps long-term memory. Among those functions requiring integration of the visual systems with the motor systems are: eye-hand coordination, visual-motor memory, and other forms of visual-motor coordination.

Auditory Processing: Auditory processing involves the reception, selection, and translation of auditory stimuli into meaningful concepts which can be retained to form new relationships which can be expressed. (Adequate auditory acuity is assumed.)

The two broad categories of auditory processing which can be delineated for educational purposes are perceptual and conceptual processes. The following are related to perceptual processing: attention, awareness, localization or focus, screening or figure-ground, recognition, discrimination, closure, sequencing, synthesis or sound blending, analysis, scanning and memory or signal retention. The broad area of conceptualization includes abstraction, integration, transduction, inference, monitoring, judgment or problem solving, and memory. Due to the significant role of language in educational achievement, expressive language, a function of auditory processing, will be viewed and discussed as an extension of this process.

Language Development: Language development involves a sequence of abilities to receive and understand information and/or ideas and communicate them in a meaningful, symbolic way in a written, spoken, manual or gestural form.

Language provides a means for naming or labelling objects and actions, distinguishing between their properties, and describing their interrelationships. Language development can be organized under four primary classifications: phonology, or sounds; morphology, or forms; syntax or structure; and semantics or meanings. The discrete elements in each category can be sequenced from the simple to the complex:

1. Phonology (sounds)
   - Babbling (sound production)
   - Articulation
   - Intonation
   - Discrimination
   - Imitation
   - Sequencing
   - Rhymes
   - Melody, rhythm, accent patterns
   - Sound blending
   - Diadochokineses
2. Morphology (forms)
   - Plurals
   - Tenses
   - Possessives
   - Comparatives
   - Prefixes
   - Suffixes
   - Compound words
3. Syntax (structure)
   - Grammar
   - Concatenations (sequencing)
   - Words
   - Phrases
   - Sentences
4. Semantics (meaning)
   - Over-generalized meanings
   - Specific meanings
   - Classification
   - Concept formation
   - Homonyms
   - Synonyms
   - Closure

Intersensory Integration: Intersensory Integration is the process by which sensory information from different modalities is co-ordinated or transduced. Sensory information appears to be processed by individual channels in a specific way and then integrated by intersensory processing. Intersensory integration refers to the central synthesis of multiple stimuli which are presented to the same sensory modality. Seeing and hearing are involved when a child reads orally. A child may be able to see well, to hear well, but have difficulty doing both simultaneously. Some children may need to shut their eyes as they process information auditorially. Determining subfactors of each channel is difficult because of intersensory transfer and the difficulty of isolating

them (particularly language subfactors). Task analysis techniques as described by Chalfant and Scheffelin (1969) represent a viable model for analyzing learning tasks and facilitating learning activities.

Learning involves an active transaction between an individual and some input. The input is meaningful when an individual performs certain operations or processes upon it. Processing cannot be "given" to a student. Assistance in the development of processes would appear to be the teacher function. Precise teaching strategies need to be developed. Students need to be given opportunities for concrete operations before abstract operations and symbolic content are expected. Rate of achievement varies from student to student and is an important consideration in task determination.

Social Adjustment and Emotional Development: Appropriate emotional development and social adjustment are basic to learning. It has proven helpful for the teacher to separate social behavior from emotional development, since the teacher can elicit dramatic observable changes in behavior, but may find information about emotional development much more difficult to verify. The modification of social behavior in the classroom is at least as important to the role of the teacher as effecting change in the child's ability to count.

Academics: Academic achievement traditionally involves a student's functioning in the scholastic areas of a curriculum which include vocabulary, reading, work-study skills, English mechanics, mathematics, and general understandings in science and social studies.

Reading: Research in reading, writing, and spelling has been abundant, conflicting and confusing. Much of the research falls into the category of redundant research. A possible organization of the content in this area would be:

1. Readiness
   - Discrimination (including auditory and visual)
   - Left-to-right progression
   - Following directions
2. Phonetic analysis
   - Aud-Voc association (letters, words, sound to sight and the reverse)
   - Auditory-visual application (vowels and consonants)

3. Structural analysis (morphology-syntax)
   - Plural nouns
   - Verbal tenses
   - Comparisons
   - Compound words
   - Contractions
   - Root or base word
   - Affixes
   - Possessives
   - Syllabication
   - Accent
   - Abbreviations
4. Context cues
   - Unfamiliar words (identification and meaning)
   - Multiple meanings
5. Comprehension
   - Literal
   - Interpretation
   - Critical
   - Work skills

In spite of the conflicting results of thousands of studies in reading, evidence from a variety of sources seems to support the following conclusions:

1. The most important variable in any reading program is the teacher; comparisons of teaching methods frequently show no significant differences. The *way* the teacher teaches is more important than *what* she teaches.

2. Any method of reading that uses a decoding approach will be superior to a sight method or one which stresses comprehension over word-attack skills.

3. Reading disability cases have more deficiencies at the automatic-sequential level than at the meaningful level.

4. Retarded readers perform at a lower level on tests of visual memory than good readers.

5. Retarded readers do not perform as well on tests of auditory memory as good readers.

6. Visual closure and sound blending are less well developed in poor readers than in good readers.

7. A positive correlation exists between intelligence and reading, particularly in young children.

8. The acquisition of spoken language is closely related to the decoding of written language.

Arithmetic and Mathematics: Research has identified a number of factors which seem to be related to success in arithmetic and mathematical operations, but the extent to which these factors, either singly or in combination, contribute to the attainment of different kinds of quantitative concepts is still open to question.

Studies (Chalfant and Scheffelin, 1969) related to the basic cognitive processes involved in quantitative concepts indicate that at least four factors are involved:

1. Spatial ability
2. Verbal ability
3. Problem-solving ability
4. Neurophysiological correlates

Some techniques to facilitate academic achievement might include:

1. Delineation of specific instructional objectives in all skill areas as well as content areas

2. Sequencing of skills into specific developmental sequences

3. Using criterion-referenced tests to determine the specific task the child has not yet mastered in the sequence

Parts of this series of activities are being provided by many publishers. Some publishers include in the instructional packets only material contained in their own published material. Others provide helpful suggestions using a wide range of suggestions in several basal series. Several school districts, as a part of their curriculum development activities, have found that development of skill sequences and learning packets by groups of local teachers is more meaningful than purchasing such programs from publishers. The process seems more meaningful than the product to some teachers.

The formal development of such techniques for individualization may provide the in-service training and the materials for a more

practical, feasible approach to individualization of instruction. It can be hypothesized that such an approach would reduce dramatically the numbers of children referred to special education as "learning disabilities."

I would like to leave you with one last thought, perhaps as profound as the quotation from William James with which we began our discussion this morning.

Progress is being made on many fronts, in the fields of neuroanatomy, neuropsychology, and biochemistry to name a few, in the study of the function of the central nervous system, the study of human information processing.

Much of what we think we know about human learning is in the form of hypothetical constructs. If we could slice ourselves in half and look at learning as it is happening, I doubt if we would see the little boxes of Guilford's factor analytic paradigm. I'm sure children's heads are not organized in layers either, with sensory levels and perceptual levels, and cognitive or representational levels. I'm certain we could not see Hibbs' cell assemblies and phase sequences, or Piaget's stages of cognitive development. I'm certain, however, that we would see a Rube Goldberg contraption in which there would be a continual flow of activity in the form of mechanical, electrical and neural energy. Careful research by such people as Karl Pribram at Stanford, Don Norman and Peter Lindsay, Jane and Norman Mackworth, and Gerald Senf are beginning to say something about human learning that has implications for teaching live children. Studies of memory and attention are especially important.

For example, Don Norman made a simple statement that has profound implications for all of us: "Sensory inputs are modality--specific for only about 1/4 of a second, the time it actually takes to process a visual trace into short term memory before that race is destroyed by new data from the next visual fixation." A visual trace is confounded almost instantly by linguistic rehearsal. This piece of information has been derived from experiments with children, and can be verified. And yet, we in education are still talking about visual learners and auditory learners as if they exist, and we are holding our heads because research in modality training is at best conflicting and confusing.

I would like to suggest that you each go back and look at some of the newer models of human information processing, Jane Mackworth, for example, and apply what we know about teaching to what they know about learning. A Taxonomy of Learning for the Visually Impaired could be developed from such a theoretical base that would truly result in "equal educational opportunity for all the visually handicapped."

THE ASSESSMENT OF SPATIAL CONCEPTS OF VISUALLY IMPAIRED CHILDREN

Kathleen A. Szatlocky

University of California
Berkeley, California

The purpose of this study was to replicate the test of *Stereognostic recognition of objects and forms* designed by Laurendeau and Pinard with visually impaired children. This test was constructed to demonstrate the primitive character of topological relations over Euclidean relations. Visually impaired subjects were used to demonstrate that children with a vision loss develop spatial concepts in the same sequence as normal children.

Piaget introduced a distinction between perceptual space and intellectual space, and, at the level of intellectual space, between sensorimotor and representational space. The distinction between perceptual space and intellectual space is of primary importance. Piaget explains in detail the differences between perceptual and intellectual space (Piaget 1956, 1967). Perceptual space is much more limited in scope than intellectual space. It is ego centered, that is, tied to a person's location to an object. What appears to be is what is of importance.

Intellectual space is an operational system and as such derives its content from abstractions of the actions and not from particular features of an object.

Piaget distinguished three major types of spatial relations based on geometry; metric or Euclidian space, projective space and topological space. The child's development of space is based on topological relations which precedes the projective and Euclidian structures which derive from them. "For instance, if you give a child of about three and one-half years old figures of the kind in Figure 7 to copy, he will copy them all as closed curves without paying attention to the metric characteristics, the equality of the sides, angles, etc. If you give him the type of drawing in Figure 8 to copy, he will copy them simply as open curves. If you give him a series like the one in Figure 9 with

one constant figure and another one either inside this figure or outside it or on the border, he will have no trouble copying this even though he cannot yet copy a square or make a closed triangle which differs from a circle." (Ripple & Rockcastle 1964)

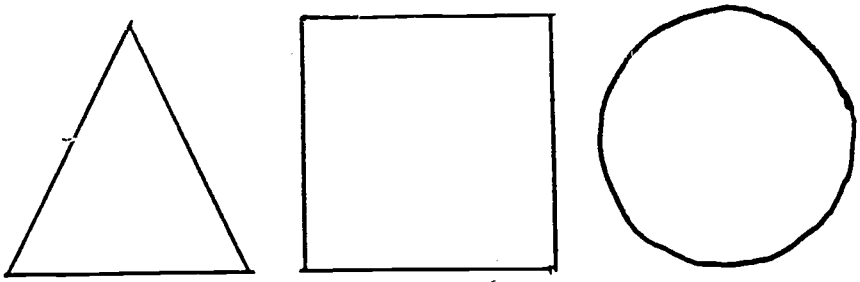

Figure 7

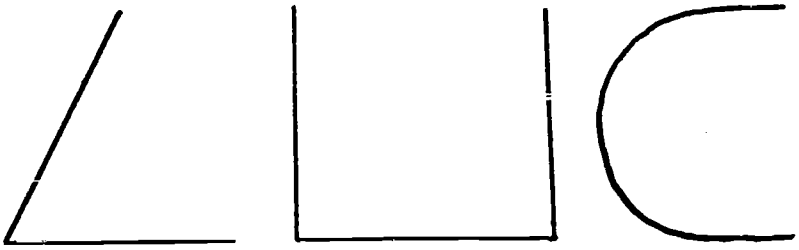

Figure 8

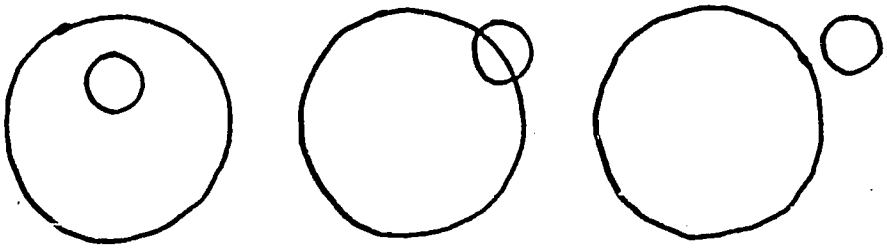

Figure 9

Piaget and Inhelder have conducted many studies looking into children's spatial concepts. Laurendeau and Pinard (1970) undertook the task of replicating some of Piaget and Inhelder's experiments on the development of space. However, experiments were conducted in an experimental context rather than the method clinic approach initially used by Piaget and Inhelder. To accomplish experimental testing required the standardization of test materials and of the testing conditions. Also, subjects were representative of the general population. Laurendeau and Pinard felt

that results generated from a more rigorous experimental design would permit a more critical evaluation of Piaget and Inhelder's general conclusion. In addition there was the advantage of providing normative data to analyze the behavior of children in a series of operational tasks.

Method

Subjects. Subjects were seventy visually impaired children ages two through twelve years. There were forty boys and thirty girls.

Testing. Testing took place at the school of the child or in the home in the case of the preschool children. Testing time was five to fifteen minutes for the school age children and fifteen to forty-five minutes for the preschool children.

The test consisted of three phases. The first phase was the recognition of common objects. The child had to recognize by touch a series of eleven familiar objects, for example, a comb, scissors, cup, spoon, penny, etc., presented to him in turn behind a screen. It was possible to move the hands behind the screen. There was a second trial if the child could not answer correctly on the first trial. Phase two was the recognition of shapes of a topological character. The child held each of the figures in turn without seeing them. The child had to designate on a board which held duplicates of all the shapes, the one that he had just touched. Phase three was the recognition of shapes of a Euclidian character. Twelve geometrical shapes were matched by touch. The topological differences among the shapes were reduced to a minimum in order to determine whether the child distinguished differences primarily by metric attributes of the shape, for example, length of sides, size of angles, parallelism of lines.

Results

The major task was to determine the chronological order of the development of spatial concepts. After the recognition of common objects comes discrimination of topological relations followed by discrimination of metric relations. It was necessary to examine the errors the children made in order to answer this question. Errors were classified according to whether the figures chosen had the topological characteristics of the figure that was touched. Those errors were considered successes at the topological level. A second category was made of all the other errors.

A comparison was made between the actual responses the children made and the theoretical distribution of errors based on chance. For eight of the twelve shapes of phase two, the children made more errors which were considered topological successes than would be expected by chance. When the comparison was made by age, the visually impaired children made errors on the same basis as the normal children made errors. After age five the comparison favored the responses at the topological level.

TABLE 1

Figure touched	Total errors	Distribution				P.	Signi.
		Actual		Theoretical			
		Topo-logical successes	Topo-logical errors	Topo-logical successes	Topo-logical errors		
Square	11	7	4	3	8	.27	.0118*
Disk (1 hole)	20	0	20	2	19	.09	
Closed ring	21	8	13	2	19	.09	.0002*
Irregular cross	42	34	8	15	21	.36	.0000*
Triangle	22	8	14	6	16	.27	.2221
Open ring	30	19	11	11	19	.36	.0021*
Rectangle	12	3	9	3	9	.27	.6686
Circle	18	0	18	5	13	.27	.0000*
Greek cross	34	25	9	12	22	.36	.0000*
Open rectangle	16	9	7	6	10	.36	.0791
4-cornered star	26	14	7	9	17	.36	.0476*
Disk (2 hole)	29	0	29	0	29		

*Significant at P = .05

TABLE 2

Age	Total errors	Distribution		P.	Significance
		Actual			
		Topological successes	Topological errors		
12	13	3	8	.25	.6093
11	5	5	0	.36	.0060*
10	22	9	13	.24	.0595
9	19	13	6	.29	.0004*
8	23	17	6	.29	.0000*
7	15	10	5	.25	.0007*
6	22	9	13	.27	.1119
5	66	22	44	.25	.1810
4	40	21	19	.27	.0005*
3	38	12	26	.22	.1119
2	20	11	9	.24	.0000*

*Significant at P = .05

The results are still preliminary at this time. Further analysis of the data will determine differences between children with useable vision and children without useable vision or differences between children with a congenital vision loss and those with a vision loss occurring later in life.

Conclusions

A major task of classroom teachers is to provide experiences for the child which enhance intellectual development. According to Piaget it is only through thinking at a high level that intellectual growth occurs. If a problem is too difficult, the child responds by either ignoring the problem or turning the problem into a different problem which he can handle. Learning then becomes a matter of rote learning facts which should be learned with understanding. The teacher must be able to evaluate the level of conceptual development of the child in order to plan activities at the appropriately high level. Use of a tool such as the one reported allows the teacher to evaluate the level of each child's understanding of basic spatial concepts. Also, the age norms which will be generated from the results of the study will provide the teacher with a set of guidelines for planning activities. Of major importance is the demonstration that children with a vision loss and normal children develop conceptually in the same manner. This information allows the teacher to utilize data which is known about normal children's learning ability.

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COGNITIVE DEVELOPMENT OF BLIND SUBJECTS

Katherine Simpkins and Beth Stephens

Temple University
Philadelphia, Pennsylvania

The project "The Development of Reasoning, Moral Judgment, and Moral Conduct in the Congenitally Blind," sponsored by The Bureau of Education for the Handicapped, served to identify major deficits in the cognitive development of blind children. Data obtained during the study indicated that when compared with sighted subjects of equivalent age and socioeconomic background, blind subjects did not differ significantly from sighted children in moral development, but did evidence delays of four to eight years in cognitive development as measured by Piagetian reasoning assessments.

Piaget's cognitive theory was chosen as a basis for the research because his approach allowed a step-by-step assessment of the development of successive intellectual modalities. The theory stresses the "active role" the child must play in organizing his environment. For Piaget, intellectual development involves the formulation and description of coherent and meaningful stages which reflect the direction and course of mental development. Intelligence is a process of adaptation and organization. The two processes of adaptation suggested by Piaget are assimilation, which involves the incorporation of the environment into present patterns of behavior, and accommodation, which involves the change in intellectual structures or schemas. This change is necessary to adjust to the demands which the external environment makes on the individual.

The theory of cognitive development posited by Piaget and Inhelder has made major contributions to the analysis of the development of reasoning and has provided ingenious methods to assess these processes (Piaget, 1928; Piaget & Inhelder, 1941).

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Through research Piaget (1960; 1962) has established that cognitive development proceeds through a hierarchical sequence of stages. As a child inwardly organizes or assimilates and outwardly copes with or accommodates to environmental experiences, thought is elaborated and organized (Stephens, 1972). Change from a reflexive to an inventive organism is defined by four hierarchical stages: sensory-motor, preoperational, concrete operational, and formal.

Sensory disturbance unique to those born blind hampers development of sensory-motor schemas from the outset and slows down general coordination as well as "concepts and behavior patterns essential to later successful school performances (Taylor, 1973, p. 159)." Since the blind are retarded in the acquisition of operations which precede reasoning, it is anticipated that they will be retarded in their achievement of operational processes which characterize the third stage of cognitive development, the concrete stage (Stephens, 1972).

Loss of vision results in three basic limitations according to Lowenfeld (1973): (1) range and variety of experiences, (2) mobility, and (3) interaction with the environment. These, in turn, place a child at a disadvantage in the areas of sensory stimulation, concept formation, and communication and as a result there is need for many concrete experiences to enable him to develop knowledge of the object world. As Barraga (1973) noted, manipulation of objects enables the blind child to gain the skills in manual inspection which are imperative for cognitive development. However, since the blind child lacks one source of sensory input, his perceptual processes are deficient. Therefore, other sources of sensory input must be exploited to the maximum.

Assessment of cognitive development in the visually handicapped traditionally has relied primarily on verbal procedures. The single test most frequently used with blind clients of all ages by psychologists has been some form of the Wechsler Scales (Bauman, 1973). Yet research by Cutsforth (1932), Nolan (1960), and Harley (1963) indicated that although the blind did manipulate verbal symbols with considerable fluency, their degree of understanding in terms of object reality was significantly impaired. While the Haptic Intelligence Scale (Schurrager & Schurrager, 1964) represented a noteworthy attempt to develop a performance test for the blind, it did not evolve from a specific theory of development. By contrast the adapted Piagetian reasoning assessments (Simpkins & Stephens, 1970) for use with the blind

and used in this present study, provide means for assessing operational thought or "thought in action" for subjects from age six onward. Research by Hatwell (1966) and the present investigators has provided proof that blind children can be assessed with Piagetian measures. These studies demonstrated that the blind student had serious retardation when he was compared with sighted, regardless of whether the sighted employed visual perception as in the present study or visual or tactual perception as in the Hatwell (1966) study.

Studies of conservation in the blind (Miller, 1969; Gottesman, 1971, 1973; Tobin, 1972) found the same hierarchical stages of Piagetian reasoning in blind subjects as in their sighted peers, but development was delayed. Three variables significantly related to performance on "conservation tasks" were identified in a study by Brekke, Williams, and Tait (in press); these were age, sex, and blind living at home versus blind living in an institution. Studies of classification and seriation skills using Piagetian theory as the bases were conducted by Friedman and Pasnak (1973a; 1973b) and Higgins (1973). Both blind and sighted children improved with age, but in general, the sighted performed more adequately. As a result, Higgins (1973) concluded that the blind child is more handicapped in obtaining data from his surroundings. This also supports findings of Kephart, Kephart & Schwartz (1974), Boldt (1969), Juurmaa (1967), and Zweilbelson & Barg (1967). Spatial imagery has been an additional area examined by Piagetian measures. Since blindness limits the individual's spatial perception, it may be anticipated that a blind child would experience difficulty in this area of intellectual functioning. Studies by Swallow and Poulsen (1972) and Swallow (1973) have assessed a child's concept of space in visually limited children (within the visual acuity range of 20/70 to 20/400). As a result, Swallow (1973) concluded that "...lack of sufficient physical encounters is probably more detrimental than the loss of vision (p. 69)."

The present study is the first attempt known to systematically and extensively apply Piagetian theory of cognitive development to the congenitally blind. The research sought to provide answers to questions regarding the functioning of blind children when compared with sighted peers. It is anticipated that the data obtained may serve as a research base for developing educational programs for visually impaired children designed to promote cognitive development.

Methodology

Population and Sample. The sample (N=150) was composed of 75 sighted (IQ 90-110) male and female subjects, and 75 congenitally blind persons (IQ 90-110) male and female subjects. IQ was determined by the WISC or WAIS Verbal for both sighted and blind subjects. The congenitally blind had no functional vision, i.e., light perception or less. Multiply-handicapped children were not included in the sample. The two subsamples, blind and sighted, were divided into cross-sectional samples of three age ranges: chronological age (CA 6-10, CA 10-14, and CA 14-18).

Due to the strict screening criteria and the limited number of children with severe visual deficits, the blind sample was obtained in eight states including both public and private residential and day school programs.

Description of Setting. Sighted subjects used in the present study were those used previously by Stephens, Miller, and McLaughlin (1969). These subjects were randomly drawn from public schools in the Bucks, Montgomery, and Philadelphia County School Systems in Pennsylvania. Measures of socio-economic status revealed the sample to be upper-lower and lower-middle class. Assessment was conducted in a specially designed mobile laboratory which contained two testing cubicles equipped with one-way viewing screens.

Blind subjects were randomly selected from eight Eastern states and were enrolled in both public and private residential and day school programs. Measures of socio-economic status revealed the sample to be upper-lower class. Assessment was conducted in the child's school.

Description of Variables. Reasoning experiments previously used (Stephens et al., 1969; Stephens, 1972) with the sighted samples were chosen for the present study. These included experiments of conservation, of elementary logic classification, of operativity and symbolic imagery, and of formal operations. Adaptations of these instruments for the blind were used in a pilot study carried out at Overbrook School for the Blind and Temple University (Simpkins & Stephens, 1970). In these experiments the subject was presented with a problem which involved manipulation of objects. Prior to the administration of any experiments, the subject was administered a measure to evaluate and promote his understanding of relational terms, as "more," "less," "same," "different," "bigger," and "less" (Griffiths et al., 1967). The following steps were involved in administration of the assessments:

1. Opportunity was provided the subject to become familiar with the experimental materials.

2. The experimenter noted whether the child indicated initial equality of comparison objects in conservation tasks.

3. After each transformation, the child judged equality or inequality of the objects.

4. After each question of judgment, the child was asked to explain his answer ("Why?," "Tell me more," "How do you know that?," etc.).

Ten assessments of conservation were administered each subject. In an effort to prevent establishment of a response set, two similar experiments (for example, Conservation of Substance and Conservation of Weight) were not administered successively. A description of the assessments follow:

1. Conservation of Substance: After the child agreed that two 6" balls had the same amount of clay, the child successively transformed one ball into a "hot dog," "a pancake," and into a dozen small pieces. In each case, the child compared the amount of clay in the transformed ball with that in the unchanged ball.

2. Conservation of Volume: After the child agreed to the equality of two clay balls and the equality of two beakers of water, one clay ball was successively transformed by the child into a "hot dog," "pancake," and a "dozen pieces." Then the child was asked whether the water levels in the beakers would remain the same if the transformed ball was placed in one beaker and the non-transformed ball in the other. In the second part of the experiment a metal ball of the same volume replaced one of the clay balls.

3. Conservation of Weight: Two clay balls of equal weight were placed on a scale. After the child agreed to their equality, the child transformed one clay ball to a "hot dog," "pancake," and a "dozen pieces." In this instance, the child judged the weight rather than the size of the transformed ball.

4. Conservation of Length: After two rods of equal length were placed parallel to each other, the child placed both hands on top of the rods in order to observe the movement as the examiner moved one rod four inches to the right, and then four inches to

the left. Finally, both rods were moved simultaneously, one four inches to the right and the other, four inches to the left. After each shift the child was asked if the rods were the same length.

5. Conservation of Length - Rod Sections: Four rods, each four inches long, were compared to one 16-inch rod. The transformations consisted of placing the four small rods in various shapes.

6. Conservation of Liquids: Two identical beakers were filled with equal amounts of water. After the child agreed to their equality, he poured the content of one beaker (with the assistance of the examiner, if necessary) successively into a tall cylinder, a short flat beaker, and four small beakers of equal size. After each transfer, the child was asked whether the containers had the same amount of water.

7. Dissolution of Sugar: The child weighed two identical beakers of water and two sugar cubes to establish equality of weight and establish equality of water levels. One sugar cube was dissolved by the subject while the other remained on the table for his use. The child was asked: (1) if the two beakers still weighed the same; (2) if, when dissolved, there was as much sugar in the water as there had been in the cube; and (3) if the water levels in the two beakers remained the same.

8. Dissociation of Notions of Weight and Volume: After the child agreed that two identical beakers contained the same amount of water, cylinders varying in weight and material, but of equivalent size, were placed in each beaker. Prior to each immersion, the child was asked to predict whether the water levels would remain the same. In a further task, a large cylinder was placed in one beaker and the subject was requested to select the cylinder or cylinders which, when placed in the other beaker, would cause the water in the second to rise to the same height as in the first.

9. One for One Exchange: The child was given eight dimes and instructed to exchange a dime for each package he bought from a collection of 12 packages. He was then asked whether he had the same number of packages as the experimenter had dimes. Later the roles (shopper, grocer) were reversed and the child was asked if he could purchase all the items on the table with the money he had.

10. Term to Term Correspondence: Original materials consisted of nine eggs and nine egg cups. In order to make the materials more manageable tactually, checkers were substituted for egg cups and poker chips for the eggs. The subject was requested to put a poker chip in front of each checker. After he agreed that there were the same number of checkers as poker chips, the examiner guided the child's hands as he placed the poker chips closer together. Later the poker chips were returned to their original position and the checkers moved closer together. Immediately following each transformation, the child was asked whether there were as many checkers as poker chips.

Logic-Classification Tasks

11. Classification: Original task requirements were to sort a set of 17 pictures into three related piles (ducks, birds, and animals). After the initial classification, the subject was questioned on class inclusion and possible class extension. The adapted measure involved real food rather than pictures and the child was requested to sort three piles containing apples, fruits, and foods on which the child was questioned.

12. Class Inclusion - Beads: A box containing ten wooden beads, eight of which were round and two of which were square was used. The child chose a name for each shape and his attention was drawn to the fact that all the beads were made of wood. The subject was required to judge whether there were more wooden beads or more square beads.

13. Changing Criterion: Twenty cardboard geometric figures which consisted of ten round, ten square; ten large, ten small; ten red, ten blue figures; were to be sorted into two stacks based on one criterion. After the subject explained his classification, he was encouraged to sort on another criterion. The procedure was repeated for a total of three sorts. The adapted measures substituted ten sandpaper figures for ten blue figures, and ten smooth figures for the ten red figures.

14. Intersection of Classes: Original materials consisted of two rows of pictures being presented. One row contained pictures of an identical object but in different colors. The other row contained pictures of different objects but identical in color. The adapted materials consisted of two rows of cardboard: one row with four wooden cutouts of different shapes, but same

texture; the other row contained four wooden cutouts, all the same shape but with different textures. Instructions were to choose a piece from an assorted array to place at the intersection of the two rows which would relate appropriately to both rows. Textures used were those found most highly discriminable in a study by Nolan & Morris(1971).

Operativity and Symbolic Imagery Tasks

15. Rotation of Squares: In the original tasks, the subject was required to draw the anticipated rotations of two cardboard squares, one red and one blue, which were mounted on a board. In the second procedure, the subject was asked to select one drawing which represented the way the red squares would appear at a specific position as it was rotated clockwise around a fixed point. In the adapted task, the red square was replaced by a sandpaper-covered square on the model and the model pictures. In the adapted task, since no acceptable method was found to adapt the drawing of anticipated rotations, that part of the subtest was eliminated.

16. Rotation of Beads: Three different colored beads mounted on a stiff wire were exhibited. After the beads were placed in a tube, the tube was rotated. The task was to judge which of the three beads would emerge first from the tube. The adapted measure used three beads differing in shape and texture mounted on a stiff wire which were tactually examined by the subject and given names. The subject assisted in placing the beads in the tube and followed the rotations of the tube by placing his hands on the examiner's hands as the examiner rotated the tube 180° to the right, 180° to the left and then 360° right and 360° left. The task was to judge which of the three shaped beads would emerge first from the tube.

17. Transfer from Two to Three Dimensions: An irregularly shaped cardboard frame was produced which had a thumb tack in the center portion. The subject was requested to place a button in exactly the same spot on an identically shaped board. Spaghetti was provided to serve as an improvised measuring device. Additional stimuli consisted of rectangular and oval shaped boards. A final task required the subject to place a ball inside a wooden box-type frame in exactly the same spot occupied by a ball in an identical wooden box-type frame. No adaptation was made for blind subjects.

18. Changing Perspectives - Mobile and Stationary: A cardboard tower, house, and tree were placed in specified positions on a table. After the subjects had moved to eight consecutive positions around the table, raised line drawings of the eight perspectives were used to depict each perspective. The subject was required to find the drawing which represented the complex when viewed from these perspectives. In the second part, the child was asked where he would have to go in order to "see" the perspective corresponding to a drawing shown him.

Formal Operations

19. Combination of Liquids: Five identical bottles of colorless liquids were placed on the table. The subject was told his task was to find bottles which, when mixed together, would produce a red color. When he used the correct combination of bottles, the subject was informed he had obtained the color.

Results

Mean IQ for sighted subjects (N=75) was 98.81 on The Verbal Scale; for blind subjects (N=75) Verbal IQ was 100.64. Mean CA for sighted was 143 months and for blind was 144 months.

Analysis of variance techniques were used to determine if significant differences existed between the blind and sighted groups on scores for the reasoning measures. The results indicated significant differences for each comparison favoring the sighted except on four measures of lower level reasoning tasks where near perfect scores were obtained by both sighted and blind subjects and in combination of liquids in which neither group attained the maximum scores. Therefore, no significant differences existed.

In general, there were few significant differences in the three age groups of blind subjects when performance of blind subjects CA 6-10 was compared with that of blind subjects CA 10-14 but significant differences were revealed on 20 of the 26 variables when comparison was made between CA 6-10 and CA 14-18. These data serve to suggest that although little change can be ascertained in the early years, growth of coghitive structures is taking place at a slow rate. In contrast, the sighted age groups revealed significant growth between CA 6-10 and CA 10-14 age ranges. Comparisons across groups of older blind (CA 14-18) with younger sighted (CA 6-10) subjects indicated few significant differences. This suggested an average lag of eight

years for blind subjects with the exception of conservation of volume where the sighted subjects surpassed the performance of the blind subjects indicating an even greater lag.

Analyses of covariance were computed to determine the effects of chronological age and mental age on the 26 reasoning variables. When both CA and MA were partialled out, significant differences between the blind and sighted subjects existed on 19 out of 26 variables, all favoring the sighted.

Factor analytic techniques were employed to determine whether reasoning and psycho-educational variables could be reduced to a smaller number of common factors and thereby determine the basic cognitive patterns or relationships among these variables for blind children and for sighted children. Of the ten factors obtained for the blind subjects, four were defined solely by Piagetian measures, two, exclusively by Wechsler Verbal (WISC) and Wide Range Achievement Test (WRAT) subscores, and four, by combinations of the WISC Verbal, WRAT, and Piagetian reasoning measures.

Implications and Conclusions

The study has attempted to assess and identify patterns of cognitive development in congenitally blind subjects in comparison with sighted subjects. Results have served to indicate that severe deficits exist in the cognitive functioning of the congenitally blind as defined by Piagetian reasoning measures. Piaget has emphasized the need to provide the child with opportunities for experience commensurate with his level of cognitive functioning, and then, to let the child do the experiencing. This suggestion is particularly applicable to blind children of average intelligence since they generally have the potential but not the type or quality of environmental interaction experiences required for normal development of logical reasoning. Therefore, the need exists presently to provide blind children with appropriate opportunities to reason in ongoing Piagetian based situations in order to determine whether the cognitive development of blind children can be significantly improved through educational intervention. The type and quality of environmental interaction patterns that support and lead to cognitive growth need to be identified and incorporated into our educational systems.

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NEW DIRECTIONS IN SERVICES FOR YOUNG VISUALLY HANDICAPPED CHILDREN

Janet M. Brown

California State Department of Education
Los Angeles, California

The importance of the early years in the development of visually impaired children has long been recognized. The basic foundations of trust in people, self-confidence, the ability to move and explore the environment, receptivity to new experiences, so necessary for normal development, are built in the first few years. It is in this crucial period that parents require positive support and help to gain confidence in their own ability to provide a home environment and experiences which will nurture their child's growth and to locate appropriate educational and therapeutic programs. It was the recognition of this need, and the large number of babies blind as a result of oxygen therapy in the late 40s and early 50s, that was responsible for the creation of a visiting service for visually impaired preschool children and their families in southern California, first under the auspices of the School for the Blind, later transferred to the State Department of Education. In Northern California, a private organization, the Blind Babies Foundation of the Variety Club, performs a similar function.

In 1971, due to cuts in the education budget, preschool services for blind children were eliminated, then reinstated in 1973. After a two-year hiatus, it has been a most interesting experience to return to the same field, and to note the changes that have occurred, both in the population of young visually impaired children, and in programs offered in local communities.

When the service for preschool visually impaired children was reinstated, thought was given to how a small staff, covering a large geographic area, could direct its efforts to provide more effective assistance to children and their families. Our first task was to identify the population, the second, to develop a system of cooperation with local school districts, nursery schools and other public and private agencies, in order to make the needs for service known, and to help to promote educational programs in the

communities in which the children reside. We have been guided by the philosophy of the Master Plan for Special Education in California which states the importance of early identification of handicapped children, the necessity for considering each child as an individual and developing appropriate educational strategies to meet his or her needs, and, wherever possible, to integrate the child into the mainstream of education.

Letters of notification were sent to school districts, pediatricians and ophthalmologists, public health agencies and hospitals, as well as to parents whom we had served previously. The original plan was to spend at least three months in case-finding, but we were soon inundated with requests for service. At the present time, we are in contact with 161 legally blind children.

Since our staff is composed of two educational advisors, soon to be augmented by a third person, it has been necessary to develop a system of priorities. First priority is given to new referrals. As soon as a referral comes into our office, the family is contacted by telephone or letter, and an appointment is made for a home visit. At this first visit we become acquainted with the child and the family, assess the needs, and, based upon these needs, develop with the family an initial plan or program for the child. During this first visit, we discuss the educational program for visually handicapped children provided in the community. It is surprising how many families are unaware that their child can receive a free public education close to home. Wherever possible, we attempt to find a community program in which the child can be enrolled. This may be a nursery school, an infant program which offers environmental stimulation, a public preschool program, Head Start, etc. Suggestions are made for activities that can be carried out at home. If the child needs medical services or therapy, and is not known to the Public Health department, with the parent's permission we report the child to the health department so that a public health nurse will be assigned to assist in making these arrangements. The names of all new children are sent to the local school districts in order to keep them informed of program needs.

The second priority is continuing home visits to families with whom we have established relations, offering on-going guidance. The frequency of visits will depend upon individual needs with priority given to very young children and to children for whom no programs are available. Since a large part of our efforts are devoted to finding appropriate community programs, our third priority is working with these programs in a consultative capacity. This is

a particularly important facet of our work, since many programs have never had the experience of working with a visually impaired child but will undertake the challenge if they can be assured of support through visits, consultation and inservice training to staff. During the past year our staff has provided inservice training to Head Start programs, private nursery schools, public health nurses, counselors at Regional Centers for Developmental Disabilities, occupational and physical therapists, and in one instance, to the medical staff of a neonatal intensive care unit. Where children known to us are enrolled in public school programs, we often serve as a bridge between home and school, helping parents and teachers develop more awareness and insight into each others' needs.

In referring children to educational programs we discuss with parents the available alternatives, the pros and cons of different kinds of programs, so that parents can make their own choice. For example, the choice may be between a nursery school for visually handicapped children or a nursery school which integrates a few handicapped children into the sighted population. We suggest that parents visit both programs and choose the one they feel most appropriate. If the parent wishes we will accompany them on these visits. Too often parents of handicapped children are dictated to by professionals, and again too often, many professionals will give conflicting advice which only contributes to parental feelings of inadequacy and confusion. We believe that our role as educational advisors is to help parents become more adequate and secure in their role as decision-makers. Some families whom we visit are involved with many professionals, social workers, nurses, therapists, teachers. Wherever possible we establish contact with all the people involved and try to agree upon a common plan of action, and attempt to define each professional's role and responsibility. It is not always an easy task to develop an interdisciplinary approach, but it is essential to make the effort to avoid the fragmentation and discontinuity of services which can occur when many disciplines are involved with one family.

Our population ranges from birth to six years of age. This year we have received more referrals for children under two years of age than ever before, reflecting growing sophistication to the importance of early intervention.

The children are enrolled in the following programs: 15 in infant programs, 17 in private nursery schools, 4 in residential nurseries, 3 in parent participation nursery schools, 24 in public preschool

classes for visually impaired, 7 in kindergartens with visually handicapped resource rooms, 8 in public school multihandicapped classes, 13 in Development Centers for Handicapped Minors, 4 in deaf and hard of hearing programs, 1 in a speech and language clinic, 5 in Head Start, and 2 in United Cerebral Palsy nurseries. Four children are receiving home services from itinerant teachers. Twenty-five of the younger deaf-blind children with whom we maintain some contact are enrolled in deaf-blind classes. Approximately 78% of the children known to our services are attending an educational program in their own community, ranging from one to five days a week. This represents a sizeable increase in the number of young blind or partially sighted children receiving educational services within the past few years. The most dramatic change has been the organization of classes for multihandicapped blind and deaf-blind children and the growth of infant programs, the majority of which were designed originally for retarded children but now are including children with many kinds of developmental disabilities.

The distribution of causes of blindness in our population is as follows: blind multihandicapped, excluding deaf-blind - 32; RLF - 22; optic nerve disorders - 22; bilateral cataracts - 13; congenital blindness, etiology unknown - 8; albinism - 6; retinoblastoma - 5; anophthalmia - 5; aniridia - 4; glaucoma - 4; severe myopia - 3; other causes - 13. Maternal rubella is the major etiological factor in the deaf-blind children population. Three important trends emerge from these statistics. One is the growth of the RLF population. Contrary to expectations, RLF is not disappearing. The majority of the RLF children we are seeing are under four years of age and were very low birth-weight premature babies. Most of these children were born in well-equipped modern hospitals and received superior medical supervision. In fact, it is the excellence of this care which accounts for the large number of RLF children, for the majority of these babies would have died under less favorable circumstances. The second trend is the continued growth of the multihandicapped blind population. Most of the deaf-blind children are now five years of age or older. We are receiving very few new referrals of deaf-blind rubella children and do not expect a reversal of this trend.

There is no way of ascertaining whether our population represents a significant number of the preschool visually impaired children in Southern California. There is no mandatory system of reporting, and while we make an effort to reach out in the communities through making our services known to other agencies, this is

somewhat haphazard. There a few private agencies serving blind children who do their own case-finding and offer their own services. We suspect that there are visually impaired children, particularly in poor communities, in rural areas, and in communities of Mexican-American concentration where Spanish is the predominant language, who are receiving no services of any kind. Mandatory reporting of handicapped babies by hospital and physicians and a well-organized system of vision screening for preschool children in public health clinics, designated neighborhood centers, or mobile units in rural areas, is still an unresolved need. Much remains to be done in making services, literature, and taped materials available to Spanish-speaking families. Through the cooperation of the Clearinghouse Depository in the State Department of Education, a small project has been undertaken to produce some of these materials.

While the problems, concerns and needs of parents of visually impaired children remain constant, we have noted some subtle but important changes in attitudes. One is the greater involvement of fathers. This year I have seen many fathers on my home visits. This can be attributed in part to the increased sharing of responsibility for the care of children that is an outgrowth of the women's movement. A larger percentage of children are living with their natural parents, even in single parent families. As programs expand, particularly for the multihandicapped, there is less pressure to institutionalize children at an early age. More parents are seeking and receiving genetic counseling. This service, offered through public health clinics as well as hospitals, should be available to all parents of handicapped children.

Although services for young visually impaired children have increased, much remains to be done, particularly in the area of giving early and timely assistance to families. The birth of a handicapped child is a traumatic event to both mothers and fathers. Before a mother leaves the hospital, bedside counseling should be provided, as well as the names and addresses of appropriate resources for followup assistance.

Most of the children we see receive good pediatric and ophthalmological care, but physicians generally are too busy to answer questions that are not concerned with medical issues. The responsibility for guiding parents in the area of child growth and development remains the responsibility of educators.

With the proliferation of early childhood programs, many teachers whose training was geared towards an older population will need to be re-trained with special emphasis upon child growth and development and working with families, as well as the organization of curriculum for the very young child. This is a matter of concern not only for special education departments in colleges and universities, but for school districts as well, in planning inservice education for staff. We have found that some teachers working with preschool visually handicapped children have benefited greatly from visits to other kinds of early childhood programs such as nursery schools, child care centers, and Head Start. With the trend towards greater integration of handicapped and nonhandicapped children, inservice education for the regular classroom teacher in the special needs of the visually impaired child is equally important.

While the debate continues in some educational circles as to the merits of integrated vs. segregated programs for visually impaired children, in many ways the topic is simplistic and skirts the real issues. The important question is how to design programs that provide a continuum of services so that each child can receive the kind of education best suited to his or her needs, with enough flexibility built into the system to allow for change.

Our experience with very young children has been that special preschool classes for visually impaired children are most profitable for the child whose development is at the level where he needs a highly structured program with intensive adult assistance. The emphasis in these classes is on gross motor skills, language development, visual training for low-vision children, self-concept, socialization and self-help skills. The child's overall development, rather than the visual status, is the most significant factor in the selection of a program, since some of our totally blind children have benefited from a regular nursery school where there are more opportunities for complex peer relationships and enriched play experiences.

Since all children, no matter how handicapped, benefit from some interaction with a normal peer group, perhaps we should consider the idea of housing many kinds of early childhood programs together on a campus designed for young children, where play areas can be shared and where children, as they are able, can move easily into new groupings. The value for all children, handicapped and nonhandicapped alike, of gaining through mutual interaction the important concepts of respect, friendship, and caring for one another, cannot be overestimated.

Those of us responsible for providing services to young children must always be alert to new trends, improvements in technology, developments in the fields of medicine, psychology and the allied professions. Through planning, interchange of ideas and experiences, research and experimentation, we will find the new directions necessary for improving the quality of our services.

COGNITIVE CHARACTERISTICS OF THE PRE-SCHOOL CHILD

Marie K. Poulsen, Ph.D.

Children's Hospital
Los Angeles, California

Gradually, in the course of development of the baby, his knowledge of the world and his actions upon the world become internalized and are represented in thought. By the age of two, the child can respond to an object in the absence of direct sensory stimulation from that object. This implies he has some mental image. We see this reflected in his make-believe play. For example, when a child picks up a branch and starts sweeping the walk, we know that he has the mental image of some object and some prior event. Whereas a developmentally younger child could sweep only if a model of a sweeper were present, the two year old can imitate on a deferred basis. In a development assessment of this child, we would say he has domestic mimicry, has deferred imitation and because he uses a branch to represent a broom, he has the use of ludic-symbolism. The presence of these symbolic forms of thinking indicate that the child is beginning what Piaget called the pre-operational period of intellectual development which will last for about five more years.

Two features characterize the child's thinking during the pre-school years. One is the development of make-believe or symbolic play and the other is the child's attempt at verbal reasoning. The though processes of the pre-operational stage differ not only quantitatively from that of the older child but qualitatively, as well. The pre-operational child does not have the complex mental operations of the older child. We see the pre-conceptual nature of this stage when the pre-school child attempts to reason logically.

In logic, a differentiation is made between deductive and inductive logic (Phillips, 1969, p. 42). Deduction is usually characterized as a process of reasoning from the general to the particular. For example, ALL CHILDREN LIKE TO PLAY. JOHNNY IS A CHILD. THEREFORE, JOHNNY LIKES TO PLAY. Induction is considered a method of reasoning from the particular to the general. CHILDREN WE KNOW LIKE TO PLAY, THEREFORE ALL CHILDREN LIKE TO PLAY. The child doesn't use either

deductive or inductive logic. His reasoning lies somewhere in between. He reasons from the particular to the particular. He has what Piaget calls transductive logic. His *transductive reasoning* sees a relationship between two particular items where there is none. For example:

Experience: When Aunt Molly came over, it rained.

Logic: Everytime it rains, Aunt Molly will come over.

Experience: I have a nap every afternoon.

Logic: I haven't had my nap, so it isn't afternoon.

These attempts at verbal reasoning are pre-conceptual in nature; the erroneous conclusions arise from the child's lack of understanding of general class concepts.

Another characteristic of pre-operational thought is that events are reasoned and judged by their *outward* appearance even though logic shows the truth to be otherwise. The classic example includes two balls of clay.

Example: Given two equal balls of clay, the child is asked to roll one into a sausage. When he is asked if there is more clay in one or if they are the same, the young child will respond there is more clay in one or the other.

Logically, the amount must be the same because they started the same, but the child is *perceptually bound* and makes judgments based on how things *look*. He has not yet developed the logic to indicate another possibility.

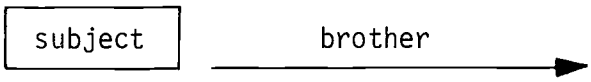
A third characteristic hindering the pre-operational child from correct logical judgment is that he does not have *reversibility* of thought. His focus is on the end product of his thought process; he cannot go back to the initial part and reconsider those variables. His processes are sequential, not simultaneous.

Example: A four year old boy is asked:

"Do you have a brother?" He says, "Yes."

"What's his name?" "Jim."

"Does Jim have a brother?" "No."



(Phillips, 1969, p. 61)

The relationship is one-way; it is irreversible.

In terms of the sausage experiment, even though the transformation is done right before his eyes, the child responds to the end result. His thinking cannot reverse itself back to the place of origin where he started with two *equal* balls of clay.

Another characteristic is that the child cannot handle *two changes* at the same time. In the forming of the clay sausage, the child cannot think simultaneously about the changes in thickness and length. He lacks the logical operation that would enable him to see that an increase in length is compensated for by a decrease in thickness. His particular answer will depend on whichever dimension has caught his attention. The child at this stage tends to center his attention on only one aspect of the event, either the thickness or length, and cannot shift to the other aspect. If his attention is centered on the thickness, he may answer that the ball has more clay. If his attention is centered on the length (which is the more common response), then the child will respond that the sausage has more clay. The cognitive task of the preschool is to provide the foundation for the eventual emergence of logic, where the child is no longer bound by his perceptions, where he can shift his attention to more than one aspect and where he can reverse his thinking process to the origin of the thought.

To accomplish this the child needs a variety of experiences which will allow him to discover properties of objects and events and relationships between objects and events.

Children need opportunities for the development of what Piaget calls *physical knowledge*. Through physically experiencing an object or situation, the child abstracts information. The feedback from the event helps the child build a mental representation of those experiences. Through a variety of experiences, the child builds an image abstracted from the properties of the many acts. This is the basis of concept formation.

The child through acting on an object also builds a *strategy* for acting on other objects. Once the child has developed such

strategies, he will know how to find out the physical nature of unfamiliar objects.

Handicapped children with conceptual difficulties need to experience primary relationships in the physical world on a *daily* basis before they are able to abstract information about their world. The teacher may have to demonstrate and/or help the child *live* the experience and develop the strategies. She extends experiences by providing verbal labels for these relationships.

Example: "Jane is climbing *up* the slide. Now Jane is coming *down*" or "Reach *up* and pick a leaf . . . Let's sit *down* and look at it."

Example: The teacher can ask the children whether or not the milk carton is empty and how can we find out.

Example: The teacher can ask what happens if the glass if filled too full, where will the milk go? Why?

Note from these examples that the teacher is helping the child discover the nature of physical objects as well as develop strategies for discovery. Children can predict answers and act upon the objects to discover the possibilities.

However, Piaget delineates another essential kind of experience which plays a necessary role at the pre-operational level. This second type of experience Piaget refers to as *logico-mathematical*. In logico-mathematical knowledge the important aspect is the *relationship* between and among objects. This relationship must be constructed by the child; it is not inherent in the objects themselves. Logico-mathematical knowledge is derived action on the objects rather than from the objects themselves. For example: Through *acting* on objects the child discovers that the sum of objects is independent of their spatial distribution and independent of the order in which they are counted.

Piaget delineates three areas of logico-mathematical knowledge: classification, seriation and number.

Classification requires the ability to see similarities and differences between objects and to group them accordingly. These skills develop naturally as the child attempts to mentally organize his world. The typical three year old will start to group the red squares from the blue squares and circles, but somewhere along the

line he loses the idea and begins to make the whole thing into something, like a tower, circle etc. The collection itself becomes a figure in space. These figural collections seem to show the child's thinking lies midway between his notion of the object and that of the class (Inhelder, 1970, p. 29).

Another typical three year old response sees a shift of orientation as the task of sorting progresses, i.e., the child starts with red squares, then shifts his response to red circles and then perhaps to blue circles. He has lost his primary class notion of red squares. One response serves as a stimulus for the next, rather than each response fitting into a preconceived plan (Lavatelli, 1973, p. 85).

As the child matures (4-5 years) he is able to stick with the initial criterion and sort out all the red squares. However, in looking at the group of objects as a whole the child does not have a stable concept of class comprehension. When given a group of red and blue squares, the child can group them on the basis of similarities. However, if asked if there are more square pieces or more blue pieces, the child will respond blue. The pre-operational child cannot think simultaneously of a smaller class of blue squares and larger class of red and blue squares.

According to a classification system, the class of squares is part of the system that includes red ones and blue ones, but the pre-operational child does not see this. He can center only one aspect (color in this case), and cannot shift simultaneously to another dimension (that of shape). He cannot reverse his thinking to the starting point of a group of squares and he uses transductive reasoning, i.e., he doesn't move from the part to whole (Phillips, 1969, p. 80).

The pre-school task is twofold: (1) to provide opportunities for the child to group according to similarities and separate according to differences, and (2) to provide opportunities for the child to develop mobility of thought, so that he may see various ways of grouping (Kamii, 1973, p. 217).

Example: After the child groups red, blue, small, large, circles and squares in one manner, the teacher can ask the child if he can find another way to sort them.

Note that the teacher is allowing the child to abstract the common property on his own. The child must act upon the objects himself

in order to build logico-mathematical knowledge. If the teacher abstracts the common property and says, "Find all the red squares," it becomes a perceptual recall task.

Seriation, a second logico-mathematical structure, involves the ability to arrange objects in a series according to some specific order. Whereas a classification task requires the child to separate objects that are different, the seriation task requires the child to order them according to their relative difference.

The three year old has not incorporated the idea of fixed order of a pre-seriation task even on a perceptual basis. Though he can match the individual items on a clothesline, he doesn't put them on his line in the right order. Furthermore, he doesn't even see the difference between the two lines.

A true seriation task requires the child to arrange a group of objects in order according to some dimension, such as size. Piaget used ten dolls that differed in size. The young child of four years can only construct isolated pairs of dolls.

As the child matures (around 5 years) he may form a correct series through a trial and error strategy. Though he seriates the items, it is done at a pre-operational level. He does not yet have the complex mental operation of having a *system* for solving the problem, such as choosing the largest and next largest, etc.

A systematic method implies the reversibility of thought that the pre-operational child doesn't yet have. To follow a systematized strategy the child must keep in mind that the object he chooses is both smaller than the one he has chosen and larger than the ones that remain.

Merely copying a perceptual model will not develop the logico-mathematical structure of seriation. The child must *act* upon the objects himself to build the logical system. The teacher can guide discovery in the child by asking questions that will require the child to be aware of his actions, such as why did you choose that spot? Could it also go here? Why? Why not?

Number is the last area of logico-mathematical knowledge. As in the development of classification and seriation concepts, number concepts grow through a sequence of phases.

When a three year old is asked to make another row with the same number of circles as mine he will construct a row with similar end points as the model, but not regard the number in between.

Later, the child develops the pre-number concept of 1:1 correspondence. He starts thinking in terms of one for you and one for me. However, he is sure that two rows have the same number only if they are lined up one to one. If one row is spread out, the pre-operational child who is perceptually-bound and irreversible in thought maintains that the spread out row contains a greater number of circles.

The pre-school objectives for developing number includes helping the child make judgments of equivalence, "more" or "less." Such activities as table setting offer the child the opportunity to judge the equivalence of cups, saucers, napkins, cookies, spoons, forks to the tea party participants. Halfway thru the party, the children can compare the amount of cookies left.

In terms of the preschool program, the goal is not to produce pre-operational behavior, but to provide the experiences that allow the child to develop the processes of thinking which will eventually lead to logical thought (Kamii, 1973, p. 217).

It is the feedback from the child's own actions that allows for the discovery or development of physical and logico-mathematical knowledge.

The teacher can facilitate discovery by asking thought provoking questions, i.e. "Can you think of another way to do that?" and by encouraging the child to predict cause/effect relationships of his own activities. "What do you think will happen?"

One added note I wish to include is the relationship of affective growth to cognition. The child's affective life provides the energy that makes intelligence function. The quality of the experience will be determined and increased by the child's curiosity, his confidence in his own ability to figure things out, and his eagerness to approach and be approached and exchange ideas with his peers and significant adults.

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OPTACON READING IN THE PUBLIC SCHOOL

Gale W. Lutz, Project Teacher

San Diego City Schools
San Diego, California

Spanning the last three years, San Diego City Schools, with support from EHA Title V-1, has developed methods and materials for use in teaching school-age children to read with the Optacon. Initially lessons and procedures were developed as a product of teaching five braille-reading secondary students. These were modified, consolidated, and printed in the form of teachers' and students' manuals during the second year of the project. Finally, a sequence including supportive lessons was produced to meet the needs of blind students from kindergarten through sixth grade.

The Optacon

As many teachers of the visually handicapped are aware, the Optacon is a portable electronic device which produces a tactile likeness of print symbols. Weighing only four pounds, it can be carried by use of a shoulder strap, allowing the Optacon to be used in a variety of reading situations.

Learning Sequence for Secondary Students

The sequence of Optacon reading experiences developed in San Diego is outlined below. Each step is accompanied by the rationale for its particular place in the learning process.

1. Introduction to the physical aspects of the Optacon

Understanding the physical properties of the Optacon is prerequisite to learning to use the device effectively.

2. Introduction to general tactile discrimination

Because the ability to detect differences in symbols is requisite to the decoding process of reading, the first Optacon lessons teach the student to discriminate between symbols. Subsequent lessons refine this ability.

3. Introduction to alphabet in simple type style

Learning letters is a logical next step from the perceptual abilities developed in Step 2 and is one step closer to reading. A simple type font free of serifs and other complexities is selected.

The alphabet is divided into four letter groups and one group is taught at a time. Reading meaningful material is probably the greatest motivating factor in early lessons. For this reason simple words and short sentences are introduced within each letter group.

No special lesson is designed to introduce marks of punctuation; the student encounters these within the lessons for the first letter group. It is difficult to introduce these symbols in isolation since their meanings are highly dependent on the context in which they appear.

4. Checking comprehension

Comprehension can be checked periodically as the teacher interacts with the student during reading sessions. This informal technique is efficient at this time, because the student's reading rate is likely to be too slow to benefit from prepared lessons for the assessment and development of comprehension. By asking questions about what the student has just read, the teacher can determine, within acceptable limits, the student's level of comprehension. These questions should elicit responses which will show the student's ability in these areas:

Knowledge of general content
Knowledge of specific details
Recall of sequences of events

5. Introduction to tracking

Tracking is postponed until the student has become familiar with more than half of the letters of the alphabet. At this point the student is motivated to track independently because the symbols perceived as he moves the camera are now meaningful.

Tracking is introduced after the third, but before the last letter group, is learned. The relatively simple skill of moving the camera along a printed line is developed first, making use of

the tracking aid. The tracking aid device holds the Optacon camera relatively steady, but allows for movement up and down or across the page. This skill is then integrated with reading skills already developed by having the student reread materials presented previously while the teacher was tracking. With the use of this sequence, many students can track independent of the tracking aid or teacher's assistance by the time the alphabet in the simple print style is learned.

6. Introduction of word attack skills and numerals

Word attack skills are introduced at this point as an important step toward independent reading. Numerals are introduced after letters in the simple type style have been learned because they are not usually essential to reading short stories which is the student's most immediate and motivating need in the early stages.

7. Developing increased reading rates using simple type style

Prior to the introduction of any new symbols, proficiency in reading with those already learned is developed. At this point in the program, the student's level of reading comprehension with the Optacon should be determined. This assessment is necessary as students at the junior and senior high school level bring to the learning situation a wide range of ability and experience in reading. Reading rates can then be improved with the student reading material at a comfortable yet challenging level.

Improved reading rates cannot be expected to be an automatic product of practice. For this reason, special instruction is required which will push the student to read at a faster rate. Immediate access to any printed material in its original form is the primary benefit of the Optacon, but increased reading rates greatly expand this usefulness. Letter recognition rate seems to be an important key to overall reading rate. Periodically, accuracy of letter recognition needs to be checked and necessary remediation taken. With accuracy assured, speed of letter recognition can be pursued.

8. Introduction to alphabet in complex style

The complex type style is introduced only when the student has shown proficiency in reading print in the simple type style. This is done to help the student maintain a continuously rapid development. This would be difficult if the student is confused by the introduction of too many unfamiliar symbols.

An effective time to introduce the complex type is the point at which the student has attained a reading rate in the simple type style of approximately 15 to 20 words per minute with an acceptable level of comprehension. The process used for developing initial skills and then increasing reading rate and comprehension with this type should be parallel to that used with simple type style.

9. Maintenance of records

Maintaining records of student progress can provide important information for future Optacon programs. Records should include:

Pre-test data

- Tactile discrimination
- Braille speed and comprehension
- General academic achievement
- Intelligence
- Attitude toward self and Optacon
- Recognition of Optacon letters

Interim data

Logs showing--
- Optacon reading; manipulative skills
- Optacon reading; comprehension
- Optacon reading; rate skills

Post-test data

- Tactile discrimination
- Braille
- Attitude toward self and Optacon

At the end of ten months and approximately sixty hours of training, students in the San Diego Project could read grade level materials on which they were to be tested at the rate of 15 to 30 words per minute. When reading recreational materials at a lower comprehension level they attained reading rates of 28 to 59 words per minute.

Learning Sequence for Elementary Students

The progression of learning activities developed for kindergarten and elementary students was produced with the understanding that the Optacon student will be learning to read along with his peers. It is quite possible, and early experiences tend to be supportive, that the young students can learn braille and the Optacon concurrently. A pre-school program could plan an important role in the expansion of the blind child's curriculum which includes both braille and Optacon reading.

The sequence for elementary skills development follows.

1. Introduction to the Optacon and a brief discussion of what it can do--not learning in detail the various components

2. Introduction to reading readiness including tactile discrimination

3. Introduction to plastic Thermoform letters

4. More complete introduction to physical aspects of the Optacon

5. Read letters and words with the Optacon, introducing these in the same sequence as used in the preprimers

6. Read first preprimer and related reading activities as the teacher tracks with the camera

7. Introduction to tracking with student using the tracking aid

8. Reread some stories as student tracks using the tracking aid

9. Student reads independently of teacher and tracking aid

10. Introduction to more advanced reading skills such as reading guide-words in glossaries

11. Introduction to teacher-made materials and test formats.

Two important differences occur between the secondary and elementary sequence. First, the introduction of letters is a matter of convenience and efficiency for secondary students. For elementary students, letters are introduced in the sequence that occurs in the preprimer series used.

Secondly, the teacher tracks for the student for a longer period of time with elementary students.

Constraints Affecting Optacon Learning

As with the development of any new instructional program, certain areas emerge as presenting more of an obstacle to the learning process than others. Some potential and realized problem areas that developed in San Diego are listed here, though not necessarily in their order of importance.

1. Motivation

Secondary students may have more of a problem maintaining a high level of interest because they have already developed alternative forms of receptive communication. It takes many long hard hours to develop a high degree of competency with the Optacon. Additionally, in the early stages, it is quite difficult to find high interest reading material written at their level of reading.

2. Support from school and parents

A supportive environment to Optacon reading needs to be established both at home and at school. The teacher of the visually handicapped needs to work closely with other teachers and with parents to help the Optacon student develop independence in using his new skills.

As students progress toward independence with the Optacon, they will be able to read in an expanding variety of personal and practical reading situations. They may become self-conscious when using the Optacon where they can be observed by their peers. Some may feel that the Optacon makes them "different," others that they will be laughed at because of their low reading rates. Each student will react differently to these early experiences, and the teacher needs to be sensitive to the individual emotional needs of each student.

At home, parents can encourage their child to read letters which have been typed, magazine articles, or printed instructions such as recipes. In the classroom the student can use his new skills in reading dittos, either original or retyped, reading short assignments in texts, in practicing vocabulary or spelling words and in a large number of other situations.

It cannot be assumed that the student will automatically read the new material which is now available to him. Patterns of dependence on others for access to print may be difficult to change. Family members and friends are likewise accustomed to reading for the blind student and must be encouraged to help him be independent in his reading habits. Additionally, the student needs to be made aware of the tremendous amount of printed information in his environment to which he now has access.

3. Slower reading rates

The Optacon student perceives one letter at a time. Through practice the recognition of letters can become almost instantaneous, greatly increasing speed. Reading rates can also be improved by anticipating the ending of a word or phrase so that many letters or words can be skipped.

4. Format

Unusual or complex print formats can present serious obstacles. Students seem to handle these more easily if they first develop a high level of competency in reading with regular formats. As the student's skills develop, the teacher can be helpful by introducing increasingly complex formats geared to help the student meet immediate reading needs such as graphs and teacher-made tests.

5. Type fonts

Some type styles are more difficult than others in the decoding process. For this reason, initial instructional materials use a type font that is as simple and free of complexities, such as serifs, as possible.

Teacher Preparation

Ideally, a prospective Optacon reading teacher should become knowledgeable and skillful in the following:

- Process and techniques of teaching tactile reading
- Technical and manipulative aspects of the Optacon
- Various approaches to teaching Optacon reading
- Methods of tailoring Optacon instruction to meet the needs of individual students

One method of teacher preparation evolved in the Spring of 1974. The decision was made to teach Optacon reading to certain blind students at the Frances Blend School in Los Angeles, California. The instructional materials developed earlier in San Diego were selected for use.

Teacher preparation, involving seven evening sessions and one school day of observation, was conducted by this writer. Skill in maintenance and use of equipment was developed at the first meeting. Each prospective teacher was afforded the opportunity for "hands on" experience with the Optacon.

Later meetings were used to develop teacher skills in using and modifying instructional materials. This on-going process proved to be effective because specific problems could be solved as they might arise.

Potential for Research

The art of teaching Optacon reading is still in its infancy. Teachers in the field have a deep need for solutions to a variety of problems relative to how students learn to read with the Optacon. Research might answer some of the following questions:

1. Specifically, why are some letters harder to learn than others?

2. Do Optacon readers "assemble" words one letter at a time, or can they read whole words?

3. What specific techniques lead to the greatest improvement in reading rates?

4. What affective factors are most important to the learning situation?

5. What instruments are the best predictors of student success in Optacon reading?

6. What reading situations are best satisfied through use of the Optacon?

7. What scope and sequence of activities produces the most rapid development of skills and independence in the Optacon reader?

Conclusion

The Optacon needs to be viewed from the perspective that it has proven itself to be an effective communication tool for blind students. Immediate access to printed material can make an important contribution to the personal, educational, and vocational independence of people who are blind.

USE OF CLOSED-CIRCUIT TELEVISION AS A LOW-VISION READING AID

Ronald Schnur, M.Ed., Gerald Fonda, M.D., and
Henry Thomas, M.S.

Eye Institute, St. Barnabas Medical Center
Livingston, New Jersey

Closed-circuit television (CCTV) was first suggested for use as a low-vision reading aid by Potts, Volk and West in 1959. Their idea was that a television system could be arranged so that ordinary printed material could be greatly magnified on a television receiver to benefit those with low vision. Such a CCTV reading aid, they pointed out, would not only provide high magnification and instantaneous enlargement, but would be superior to the then available optical projection systems for two reasons: because the electronic image intensification of CCTV would provide better image contrast, and because the CCTV monitor would act as an effective light source, with the advantage of having the luminance relatively independent of the direction of the viewer.

Since then, CCTV reading aids have been made commercially available by over a half-dozen companies, and have been obtained by many people with low vision. However, few general guidelines have been made available to indicate which among low-vision people seem to benefit from the use of CCTV, in what way CCTV may be of greatest benefit, and how CCTV users employ CCTV in their daily lives. Consequently, a project to explore these concerns was initiated by Gerald E. Fonda, M.D. at the Eye Institute, Low Vision Rehabilitation Service, St. Barnabas Medical Center, Livingston, New Jersey, in conjunction with Henry Thomas, M.S., and Ronald Schnur of the New Jersey State Commission for the Blind and Visually Impaired. Since it was found that the great majority of CCTV users were students using CCTV at home or in the classroom, it was felt to be

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Note: This investigation was supported by a grant from the Seeing Eye, Inc., Morristown, New Jersey. Project Director: Gerald E. Fonda, M.D.

appropriate to present some of our findings before the Association for Education of the Visually Handicapped. Interest in CCTV reading aids was also stimulated by the work of Weed (1968) and Genensky, *et al.* (1972); interested readers are further referred to Davis, Asarkof, and Tallman (1973) and Friedman (1973).

Method

Subjects

Seventy-five people with low vision were selected for evaluation from the private practice of the project director (Fonda) and from the clientele of the New Jersey State Commission for the Blind. These people, by and large, represented all those low-vision people the project staff felt might possibly benefit from a trial exposure with the apparatus and who were willing to take part in such an evaluation. All were given thorough eye examinations. Their measured visual acuity, in the better eye with correction, ranged from roughly 1/200 to 20/200, with two-thirds of the sample having acuity less than 20/320. Ages ranged from eight to 90 years of age, with 60% of the sample being students under 24 years of age.

Apparatus

The CCTV apparatus, assembled for purposes of initial evaluation of subjects, consisted of a small television camera, equipped with a zoom lens and a close-up addition, mounted on a table-stand with the camera pointed down. This camera could pick up the image of any ordinary printed material placed on the table beneath it, and reproduce this image on a television monitor placed on the table next to the camera. The transmission of the image is through wires connecting the CCTV camera with the monitor, not by transmission of TV waves through the air; hence, the term *closed-circuit* television. The idea is that the image of the printed material can be greatly magnified on the CCTV monitor, more than by any other low-vision aid, and that the degree of this magnification may be quickly adjusted by use of the zoom feature. Our apparatus was able to produce 35x magnification, which could be increased by having the reader move very close to the CCTV monitor.

The person using CCTV is instructed to sit at the table and pass his reading material beneath the CCTV camera while reading the magnified image on the CCTV monitor. This manipulation may be a bit tricky for most readers at first; however, improvement was rapid in those people who finally obtained a CCTV aid for their use. The reading material must be held flat so that it does not go out of focus, and attention must be paid to the configuration of printed lines and columns on the page so that switching from line to line and column to column will be smooth and easy.

Procedure

This investigation was conducted in two parts. In the first part, subjects received a trial evaluation to judge the degree CCTV seemed likely to be of benefit to them, with the criteria for evaluation consisting of the degree of improvement in reading speed, reading comfort, and reading endurance over that of the user's ordinary mode of reading. Attention was also paid to the individual reactions of the reader. As a result of these evaluations, 15 people obtained CCTV for their own use. Details of this evaluation procedure have been reported previously (Fonda, Thomas, and Schnur, in press).

A second part of this investigation consisted of following the progress of the group of CCTV users. Contact was maintained within ongoing professional relationships, by field visits, and by questionnaires and telephone when personal contact was not possible. Attention was paid to the advantages and disadvantages of CCTV as they became apparent, as well as to the various users' individual mode of usage. Readers had obtained several different commercial makes of CCTV reading aids and were followed for six to 18 months after obtaining CCTV at the time of this report.

Results

The part of this investigation that bears upon recommending CCTV as a low-vision reading aid has been reported in detail (Fonda, Thomas, and Schnur, in press). However, those findings may be briefly summarized here before commenting on CCTV usage.

Those not Benefiting from CCTV

Sixty of the 75 low-vision subjects (80%) evaluated did not appear to benefit from the CCTV and did not obtain one. In descending order of frequency, the reasons for not obtaining a CCTV were as follows:

1. Relatively good vision (acuity greater than 20/400)

2. Extremely poor vision, on the order of less than 1/200, measured in the better eye with best correction

3. Preference for spectacle or other low-vision aid

4. Lack of interest or motivation; some people for whom CCTV produced improvement had little occasion to read printed material in their normal daily routine

5. Poor ability to manipulate the apparatus

6. Expense of the CCTV apparatus

No albinos appeared to benefit from CCTV.

CCTV Users

Fifteen of 75 subjects initially evaluated (20%) showed an increase in reading speed, reading comfort, or reading endurance, compared to their ordinary mode of reading, that was marked enough to warrant obtaining CCTV for their own use. Some of the characteristics of the group are noted as follows:

1. Most of this group had very low vision. Two people had visual acuity of 1/200, and seven people had visual acuity less than 5/200 in the better eye with correction. Only one person had acuity better than 20/320.

2. CCTV primarily benefited many in this group by allowing a greater ease and endurance of reading, and not by greatly increasing reading speed. This was particularly true for those whose low-vision spectacles required them to hunch over their books to read at a distance of two inches or less, producing discomfort and fatigue.

3. Eight of the 15 had not previously been able to read ordinary print with their conventional low-vision aids because improvement had been inadequate. Three were Braille users.

4. Thirteen of the 15 people were under 26 years of age. Twelve were students, and all appeared to be very highly motivated to read.

As with any low-vision aid, acceptance and use of CCTV proved to be a highly individual matter, dependent on the user's particular reading needs, reading ability, motivation, and visual functioning. Therefore, data on each subject obtaining CCTV for his own use is presented (Table 1), rather than presenting group statistics which would tend to obscure the individual differences which are the most important consideration in dealing with low vision. Several cases, in addition, are discussed near the end of this report.

Fourteen of the 15 people obtaining CCTV can be considered to have benefited from the device. The exception was a 14-year-old boy whose failure was due to brain damage and possible mental retardation associated with his visual condition. Although the greater magnification provided by CCTV benefited the child visually, this boy's cerebral handicaps precluded improvement in his reading.

Five people (including one classroom teacher) in this group can be considered to use CCTV in conjunction with school activities to a great extent, and seven others can be considered to use CCTV in conjunction with school in a minor or adjunct fashion. No major problems were reported with monitor glare or flicker although some users reported having to adjust room lighting and contrast controls to reduce glare. One person preferred reversed polarity (white on black) as a means of reducing glare. One person reported extended problems with breakdown and repair. No one reported problems with manipulation of reading materials or with the CCTV controls, although keeping the pages of thick books in focus was considered troublesome at times.

Discussion

Recommending CCTV

It was found that the usefulness of CCTV as a reading aid for a particular individual could be assessed only through a trial with the device, not through prediction from eye condition or visual

Table 1. Case Summaries of Subjects Using CCTV

Case No.	Age	Distant Vision	Near Vision and Reading Distance	Diagnosis	Basic Magnification and Reading Distance with CCTV	Reading Speed (words/min.)		Comments
						CCTV	Ordinary Aid	
1	17	O.D. 1/200 O.S. NLP	Does not read with present aid	O.D. congenital glaucoma O.S. enucleation	20x at 4 1/2"	8	0	Braille, tape, and readers also used. Print reading possible only with CCTV. CCTV reading speed increasing to about 16 wpm after 1 yr. Uses CCTV for mail, personal material.
2	14	O.D. 1/200 O.S. 1/400	24 pt. at 3"	cortical blindness	18x at 3"	0	0	CCTV purchased by school system. Subject unable to read due to neurological impairment. CCTV of no use.
3	23	O.D. 2/200 O.S. 4/200	8 pt. at 4/5"	Leber's optic atrophy	18x at 12"	10	0	Subject lost print reading ability--can read print only with CCTV. Is regaining reading ability. Reading speed has increased with practice to 60 wpm. Uses CCTV for college work.
4	22	O.D. 3/200 O.S. 3/200	10 pt.at 1/5"	cong. cataracts, surgical aphakia	----	68	53	CCTV less fatiguing, Has master's degree in humanities. Used CCTV in graduate school.
5	16	O.D. 3/200 O.S. 3/200	18 pt. at 1"	cerebral blindness	22x at 8"	0	0	Braille reader. Is learning print letters on CCTV.
6	25	O.D. LP O.S. 20/1000	5 pt. at 1 1/2"	RLF	7x at 11"	116	217	Grad. student uses CCTV for statistics, tables, and machine read-outs. CCTV is less fatiguing.

Table 1. Case Summaries of Subjects Using CCTV (Continued)

Case No.	Age	Distant Vision	Near Vision and Reading Distance	Diagnosis	Basic Magnification and Reading Distance with CCTV	Reading Speed (words/min.)		Comments
						CCTV	Ordinary Aid	
7	11	O.D. 5/200 O.S. 5/200	18 pt. at 1 1/4"	Leber's congenital amaurosis	7x at 18"	36	0	Previously learned by tapes and readers with some reading of large print. Keeps CCTV in classroom, is gaining proficiency with it.
8	15	O.D. 6/200 O.S. 6/200	8 pt. at 2"	Leber's congenital amaurosis	18x	27	21	Parents purchased CCTV because of increased reading endurance.
9	17	O.D. 10/200 O.S. 10/200	8 pt. at 1 1/4"	Leber's congenital amaurosis	8x at 16"	68	47	Service organization purchased CCTV. Endurance increased. Reading speed increased with practice.
10	28	O.D. 5/200 O.S. 10/200	Cannot read with present aid.	Leber's congenital amaurosis	----	58	0	Subject cannot read regular print due to poor central vision. Is a professional, uses CCTV in office for business letters, etc.
11	15	O.D. 5/200 O.S. 5/100	10 pt. at 1"	Leber's congenital amaurosis	20x at 6"	5	11	Braille reader. Gaining working familiarity with letters.
12	90	O.D. 5/100 O.S. 5/2000	8 pt. at 3"	macular degeneration	10x at 12"	70	0	Wished to read financial tables.
13	18	O.D. NLP O.S. 5/80	10 pt. at 2"	RLF	7x at 24"	74	58	Endurance increased with CCTV
14	53	O.D. 20/400 O.S. 20/200	8 pt. at 5" with 2x spectacle magnification	macular degeneration	7x at 14"	68	D	Teacher keeps CCTV in classroom. Reads solely on CCTV in preference to spectacle aids.
15	12	O.D. 20/800 O.S. 20/240	5 pt. at 3"	Leber's congenital amaurosis	7x at 14"	75	51	CCTV increased reading ease.

acuity. This trial, at a minimum, should be long enough to allow the reader to become thoroughly familiar with the CCTV and should employ the same kind of reading material that the reader intends for his own use. It is only in this manner that the potential CCTV user, with reference to his particular visual functioning, reading habits, and reading needs, can assess the variable zoom magnification, the postural requirements, the manipulation of reading materials, possible difficulty with glare or flicker, and other important differences as well as subjectively comparing the CCTV to alternate low-vision reading aids available to him.

A trained person, thoroughly familiar with low-vision correction, low-vision functioning, and the range of low-vision aids available, including CCTV, should supervise this initial trial.

This is important for two reasons. First, CCTV should be regarded as one alternative among the many low-vision reading aids available, including, among other aids, taped and recorded material, live readers, braille, low-vision spectacle lenses, hand lenses, and non-optical aids. Which reading aid is best for a particular person is not only a function of the reader's visual condition and reading habits but will also depend on the kind of reading done and the demands of the reading situation. For instance, a student with poor vision may use tape-recorded textbooks as his primary reading aid, high-add spectacles for class use because they are easily portable, and CCTV for diagrams or articles assigned on short notice for which reading with spectacle lenses might be too fatiguing. Another student with a similar eye condition and acuity may employ a different set of low-vision reading aids, with CCTV, perhaps, being his primary aid, and taped materials being used rarely. The point is that any particular individual should be expected to employ a *mix* of reading aids depending on his reading abilities and needs; therefore, a specialist trained in low-vision correction is needed to familiarize the reader with the range of aids available and to recommend the precise reading aid or combination of reading aids that will suit the individual's needs. Naturally such a specialist must not only be familiar with low-vision correction, but he must be familiar with the demands of low-vision reading and functioning in schools, homes, offices, and other settings.

Secondly, this trained person is necessary to instruct the reader in specific CCTV usage. Most CCTV users, it was found, learned the necessary manipulation of reading materials fairly easily and were able to adjust the various controls and room lighting to suit their individual preference. Users also determined for themselves how long they could use the CCTV before fatiguing--in most cases, tolerance for use increased with practice until most readers could use CCTV from about one to five hours per day. However, many first time CCTV users tended to set the CCTV to its maximum magnification, even though more efficient reading was generally obtained by setting the CCTV to the minimum magnification necessary for the user to identify the words. Using minimum necessary magnification is helpful to the reading process in several ways.

Using minimum necessary magnification may enable the reader to include a whole word within his field of view, rather than just a few letters. This allows reading by recognizing word forms, a more efficient process than reading letter by letter. Individual letters may not be as distinct as with the use of greater than the minimum necessary magnification; however, the reading process, as Bateman's (1963) research indicated, may still function at a high level if the word form provides enough cues for word recognition. Setting the magnification to the minimum necessary also allows the reader to take advantage of his reading experience; he may be able to glance over many of the "little words" in reading and may use the context to give himself useful cues that will, combined with his perception of the word forms, enable him to understand the meaning. For instance, if an experienced reader is reading an article on Charlemagne and comes across a long word beginning with Ch, he will not have to see each letter or even the entire word in order to recognize the meaning. Using the minimum necessary magnification also makes it easier to keep the print in focus and to follow the lines and columns on the page. However, it must be cautioned that this principle of using the minimum necessary magnification is most important for experienced readers. Those learning to read print should use greater than minimum magnification to aid in the letter recognition process that is characteristic of beginning readers.

Types of Magnification

There is a further consideration in deciding on the desired magnification in that magnification on the CCTV is produced in two ways, termed basic magnification and approach magnification.

Basic magnification is defined as the measured increase in the size of the image on the CCTV monitor. The greater the basic magnification, the more the reader's field of vision is constricted on the CCTV monitor. For instance, increasing the basic magnification from 10x to 20x will reduce the field of vision in half.

Approach magnification is produced by the reader moving closer to the CCTV monitor; that is, by the reader reducing his reading distance. For instance, a reader who decreases his reading distance from 16 to eight inches will effectively double his obtained magnification. This is possible with reading distances as close as four inches. The advantage of approach magnification is that it is simple, that it is natural (witness the many partially-sighted children naturally shortening their reading distance), and that it is a flexible method of magnification. For instance, a CCTV user may read efficiently with less than maximum magnification, as described previously, but will employ approach magnification, by momentarily moving as close to four inches to the CCTV monitor, in order to identify words that are not immediately recognizable or are in particularly small type size. Of course, reading at a close focal distance such as this requires the ability to visually focus at that distance, so that readers who are myopic or have great accommodative amplitude, such as is found in very young readers, will have an advantage. For others, a specialist might prescribe reading additions for this distance to be used in conjunction with the CCTV. Following this procedure, it is possible to increase the basic 35x magnification by halving the reading distance and to 140x by again halving the reading distance; however, no reader evaluated required nearly this magnitude of magnification. Therefore, in summary, it is advisable to have the experienced reader decrease the magnification to the minimum necessary to recognize word forms and then instruct him to momentarily shorten his reading distance when he needs to recognize occasional details or difficult words.

Using CCTV: Representative Cases

Because adaptation to CCTV was highly individual, modes of using CCTV may be illustrated best by some brief case descriptions. All cases are summarized in Table 1, referred to previously.

Elementary school use. J.is an 11-year-old boy in the sixth grade of public school. His measured visual acuity in the best eye with correction is very poor, about 2/200, with a diagnosis of congenital primary retinal degeneration. Before acquiring CCTV, he was able to do some large-print reading with high-add spectacle lenses, but he relied on taped and recorded materials, with some help from readers, in order to progress in school. He has adamantly refused braille since being in school. About a year ago, CCTV was acquired on the recommendation of an ophthalmologist familiar with low-vision correction.

In class, J. keeps his CCTV on a low table near his desk, convenient for use at all times. His class is run in an open manner, with the children doing much of their work individually at different times or in different areas of the room with the teacher functioning as a resource person. In this way, J.'s CCTV is used individually by him in the same way that he and the other children individually use their workbooks at their own desk, the science materials at the science area, reading modules at the reading area, and so forth. J. uses his CCTV for math problems, textbooks, and especially for his reading skill builders and short diagrammatic worksheets. He prefers reversed polarity (white on black) although other people with similar eye functioning, in our experience, did not. He writes with the aid of spectacles, but will check his written work on the CCTV.

J. found, at first, that the edges of the paper tended to blank out, but he solved that himself by using a blank sheet of paper of the same color next to the page. He had no problems in manipulating his books or in following the columns and lines of reading material, although it was occasionally difficult to keep the reading material in focus. He reads at a distance of 18"; he finds this less fatiguing than 1-1/4", his reading distance with high-add spectacles. His CCTV is used for a period of about one hour a day, with taped materials and readers used for the greater part of his reading. He rarely uses his low-vision spectacles in class, in preference to CCTV, although he uses them in other settings because they are easily portable. J. considers the CCTV to be particularly helpful in making available to him many

of the short workbook and module assignments that were difficult to transcribe on tape and that were too fatiguing to manage with his low-vision spectacles. He found that the presence of CCTV in the classroom was readily accepted by his classmates, and was quickly regarded as a teaching machine for his use in the same way the classroom's cassette recorders, mathematics aids, and science equipment are used by the rest of the class. He is still a slow reader, reading at about 36 words per minute, but he finds that he is improving with practice. J. varies the magnification on the CCTV depending on the difficulty and print style of the reading material. He reports that he can read any print on it with sufficient magnification, including material he cannot read with spectacle lenses. Adjusting and using the machine has become automatic; J. adjusts the zoom lens to his preferred magnification and employs approach magnification for small letters or difficult words.

High school use. B. is a 17-year-old senior in high school, an average student who hopes to attend a two-year college. Her visual acuity is 10/200 with a diagnosis of Leber's congenital amaurosis. A local service organization obtained a CCTV for her after her family had read about the device in the *Reader's Digest*. She has had her CCTV for about one and one-half years, keeping it at home where she uses it for reading textbooks. She also uses CCTV for math although the small sub- and super-scripts are difficult to make out. For this sort of math, she prefers using her spectacle lenses at a distance of one and one-half inches. B. finds that she can read on the CCTV for about half an hour before her eyes and back fatigue; she usually uses CCTV for about an hour a day in half-hour sessions. This is also her tolerance with spectacle lenses. B. found that dittoed material or material in blue is difficult to read and that large books are difficult to keep in focus. In summary, B. uses three reading aids in about equal proportions: spectacles at a rate of about 50 words/minute, CCTV at a rate which has slightly increased with practice to about 75 words/minute, and live readers. B. has reported extensive problems with equipment breakdown and repair. She does not use CCTV for writing.

D. is seventeen and is an above-average student in 11th grade. She keeps her CCTV in her bedroom where she uses it for reading the Bible and for reading personal matter, including her own mail. Her vision is extremely low (1/200 O.D., NLP O.S., congenital glaucoma). D. is a braille user who also relies on taped books and readers. She did not know her print letters before acquiring

CCTV; she has since learned them and can read at about 16 words per minute. She uses her CCTV only occasionally for school use but insists that the freedom it gives her to read her own mail is itself of such importance that she will take the CCTV to college with her. She is an extremely highly motivated reader for these specialized uses. When she first used CCTV, her reading rate was about eight words per minute, but it has since improved significantly.

College use. Two cases will be mentioned. R. has Leber's optic atrophy with best vision of 4/200 O.U. He was unable to read regular print with even a +40 (10x) spectacle lens, so he used braille and recorded material. However, using CCTV as his primary reading aid, he has finished the first year and a half of college and is continuing. Due to deteriorating vision, R. had lost most of his ability to recognize print words; when first evaluated on CCTV, he read at 10 words/minute. However, with practice, he now reads at 60 words/minute, using 15x basic magnification, plus approach magnification. R. uses the CCTV for periods ranging towards five hours daily. He does not use the CCTV for writing.

R. finds that textbooks are not generally used in his college courses. Rather, it is more common to find courses assigning many journal articles, published papers, chapters from books, and recent publications on short notice. Given this short-article format for course readings, R. found that recorded textbooks that must be prepared in advance were an unwieldy form of reading aid, while readers presented him with the familiar problems of using volunteer and student help. The CCTV's ability to instantly provide magnified reading material proved to be its greatest asset for him, rather than the speed or comfort of reading.

B. is a graduate student in social research with measured acuity of 4/200 in the best eye as a result of RLF. She uses both spectacle aids and CCTV. Using her spectacle reading lens (+32D), she is able to read at the remarkable rate of 217 words/minute at a distance of one and one-half inches. She also has remarkable endurance, being able to read for several hours at a time with only short breaks. She has found CCTV to be less fatiguing posturally, however, since she can move the reading material under the camera lens rather than moving her head across the page at a close distance as she is forced to do with her high-add spectacle lenses. Her reading rate with CCTV is slower (about 116 words/minute)

than with spectacles, but the CCTV is useful to her in several specialized ways besides being less fatiguing. B. uses the CCTV as a typing aid, copying material viewed on CCTV on her typewriter. For another purpose, she tried focusing the CCTV camera on her typewriter, using a commercial attachment for this purpose, but found that only a few letters could be seen and that this arrangement made erasing difficult. B. also uses the CCTV for her statistical tables, scientific reports, and mathematical displays as well as using it as a magnifier for her Marchant electronic calculator. In summary, this student still relies on spectacle reading lenses for the greatest part of her reading but increasingly uses CCTV for specialized mathematical and statistical uses as well as for print reading.

Professional use. Three adults using CCTV will be briefly mentioned to illustrate the range of CCTV use.

C., a lawyer, has 10/200 best vision due to Leber's congenital amaurosis. His vision varies greatly, but he has not read print for years due to poor central vision. He keeps a CCTV device on a table in his office. His legal practice includes a great deal of interviewing, so that his reading requirements consist only of short memos, business letters, and other brief matter. His use of CCTV, typically, will consist of reading a short memo or personal note on the CCTV at one side of his office and then returning to his desk and phone, freeing his secretary from reading this sort of matter to him.

E. is an elementary school teacher with 10/200 vision as a result of macular degeneration. Print reading is difficult due to a central field loss. E. keeps a CCTV to one side of her classroom and uses it frequently over the course of the day for short periods of time. She can read at about 68 words/minute on the CCTV, but could not read regular print without it. After class, she uses it more extensively to grade papers and do administrative work.

T. is a 90-year-old gentleman with best vision of 10/200 (macular degeneration). He is retired and likes to read the financial tables. He could no longer make these out with a +32D reading addition, but is able to by using 10x magnification on a CCTV, reading at about 70 words/minute. This man was reading at this rate and adjusting the controls of the CCTV to his own satisfaction within five minutes of first exposure to the device.

Summary and Conclusions

Seventy-five low-vision people were evaluated for suitability to CCTV as a low-vision reading aid. Eventually 15 of these people acquired CCTV for their own use and contact was maintained with this group in order to follow their progress. Some of the findings may be summarized as follows:

Advantages of CCTV

1. Allows very high magnification

2. Increases the field of vision

3. Increases the reading distance--permits reading with better posture and less fatigue

4. May increase reading speed when vision is very poor, e.g., 4/200

5. Instantly magnifies ordinary reading material

6. Permits good contrast and uniform lighting

Disadvantages of CCTV

1. Expensive

2. Not easily portable

Main Findings

1. CCTV should be regarded as a reading aid for *very* low-vision as a last resort before braille is recommended. Several people, including some braille users, could read print with CCTV although they could not read print with any other low-vision reading aid. No one who could use other optical low-vision reading aids could not also use CCTV.

2. The primary benefit of CCTV may be in any of several areas, among them that CCTV makes ordinary print matter instantly accessible, that it may increase reading endurance, speed, or comfort, that it may enable a specialized use, such as engineering diagrams, or a combination of any of these or other factors.

3. CCTV should be regarded as one alternative among many available low-vision aids. It may be expected that most low-vision readers will employ a combination of reading aids, which may include CCTV. Corrective lenses may be used in conjunction with CCTV.

4. CCTV should be recommended by a specialist, and only after a trial during which individual characteristics and needs, as well as alternate reading aids, can be considered.

5. High total magnification may be produced by combining basic magnification with approach magnification.

6. CCTV fit in easily with school usage. Its individual use in elementary school fits in with the general classroom trend towards individualized instruction, self-instruction, and teaching by use of short diagrammatic worksheets. In college use, it was found that some students used CCTV for up to five hours per day and found it invaluable in keeping up with the trend towards using many short assignments of articles rather than the use of textbooks.

7. Only those motivated to read succeeded with CCTV.

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COMPRESSED SPEECH, LISTENING SKILLS, AND HANDICAPPED STUDENTS

Aikin Connor

Compressed Speech and Aural Media Center
Sacramento, California

Background and Introduction

My presentation is titled "Compressed Speech, Listening Skills, and Handicapped Students" which implies, I hope, that I will address those three topics individually as well as collectively. As individual topics I intend only to identify, define, and delimit each of them; collectively, I hope to establish and document some observed inter-relationships among them.

First, I would like to set the stage, as it were, to describe the specific context within which my remarks, observations, and interpretations are to be made.

I am Director of the Compressed Speech and Aural Media Center Project, funded by a federal grant under Title VI-B to the California State Department of Education. This project, which succeeded and extended an earlier Title VI Project, like its predecessor, is operated through the Clearinghouse Depository for the Visually Handicapped (CDVH). The CDVH is a legislatively mandated operation which locates and/or provides instructional materials in Special Media appropriate for handicapped students in the State of California.

In 1963 the CDVH was founded specifically to aid visually handicapped students and their teachers in public schools from kindergarten through grade 12. In 1969 this mandate was extended to furnish assistance to community college, state college, and university students. Then, in 1972, it was broadened further to include students in private schools and colleges.

The big change, however, for CDVH was in 1971, when its services were extended, by legislative mandate, to include orthopedically

handicapped, educationally handicapped, educable mentally retarded, and students in home-bound and hospital educational programs, as well as the visually handicapped. In one move, the target client population was increased over thirty times its original size.

By category, the CDVH clientele now numbers approximately 2,500 VH, 9,500 OH, 66,000 EH, 34,000 EMR, 11,000 others.

Fortunately for CDVH, most students in all these various categories of handicaps have at least one common problem which can be addressed, and to some extent ameliorated, by one common means. The problem is that they cannot read traditional inkprint books. The solution is to reproduce those books aurally and to make them easily available as tape recordings.

So in 1968 a project was funded through Title VI funds to develop a library of master tape recordings of needed educational material which could be duplicated as required by handicapped students. This project was called, reasonably enough, the Master Tape Library Project. This proved to be such a good idea that when its original span of three years was completed, the State took over the operation.

However, it was also quite apparent by that time that aural presentations of educational materials were so successful that the service needed to be expanded and that exploration of new ideas in aural media needed to be made. As they say in the theater, "Enter the Compressed Speech and Aural Media Center Project."

Funds were granted to expand the existing Master Tape Library service to handicapped students and to explore a new and promising idea called "compressed speech." The exploration and expansion are now completing their third year and will be incorporated as on-going programs of the CDVH, funded by the State.

I hope the stage is now set and the context for my presentation is established, for I would like now to address the topics of compressed speech, listening skills, and handicapped students.

Definitions

At the outset I said I would identify, define, and delimit these terms.

Perhaps it would be more meaningful to use the term "time-compressed speech" rather than "compressed speech," for it is the time that is compressed, not the speech. Time-compression of speech--shortening the time required for speech--may be accomplished in several ways.

The simplest way, and the way with which everyone is familiar to some extent, is merely to speed up a recording, so that the elapsed time to play it through is shorter than it would have been at normal speed. If you have experienced this means of compressing or shortening speech-time, you know that the more the recording is speeded up, the higher-pitched the voice of the speaker becomes, ending finally in a sort of Donald Duck effect which is well-nigh impossible to understand.

A second way to effect time-compression of speech is to delete or shorten pauses between words, phrases, and sentences. This technique does not alter the speaker's voice and is quite satisfactory--up to a point. That point, for me at least, is reached when all natural pauses are deleted, leaving the speaker, and the listener, virtually breathless. In this extreme case, the natural flow of spoken language is so badly distorted that the listener's comprehension suffers. A second serious disadvantage is that the rate of compression is limited by the reader's use of pauses.

A third and rather complex means of compressing speech-time is to reduce the amount of redundancy which is found normally in the pronunciation of various English phonemes. The redundancy to which I refer is traceable graphically as repetitious patterns of sound. Since a phoneme is, by definition, identifiable as a single sound element, repetition of the sound pattern is unnecessary, at least theoretically, for identification. Practically speaking, however, speech begins to sound a little strange when all such redundancies are removed. Nevertheless, this technique has much to recommend it. Unfortunately, it is complicated and costly and it provides only a limited amount of compression, even at its most extreme application.

The most generally satisfactory means of time-compression is called the "sampling method". A simple illustration will make this method clear. Imagine that you have a tape recording 100 feet long. Suppose that from each inch of that tape you snip a tiny segment--say an eighth of an inch. Now you throw away all the tiny segments you snipped out and then splice all the remaining 7/8 inch segments back together. You will have thrown away about one-eighth of the tape--12 1/2 feet. The tape remaining will now be 87 1/2 feet long. When played at normal speed, the speaker's voice will retain its original pitch, but it will take 12 1/2% less time to listen to it.

Now before you develop the picture of technicians sitting around snipping and splicing tape, let me assure you that an ingenious

electro-mechanical device has made this unnecessary. Actually, there is more than one such ingenious device, but the one which we use at the Compressed Speech and Aural Media Center Project is called the Whirling Dervish. The Whirling Dervish is a spindle with four equally-spaced pick-up heads which whirls around, passing over a recorded tape. At the points in which the heads come in contact with the recorded tape, they pick up the recorded signal and transmit it to an ordinary tape recording unit. The gaps between the pick-up points, naturally, do not transmit a signal, thus representing the throw-away segments of our example.

The second topic I promised to define is "listening skills". Although "listening skills" is a term with self-evident meaning, i.e., ability to listen, there are a few things I should say about what is meant by the term in the present context.

First and foremost, we are talking about both hearing (the perception of the speech sound) and oral language ability (the understanding or interpretation of the speech sound). Thus "listening skills" here means the ability to perceive the sound signal of speech and the ability to interpret speech as language.

Second, we will be speaking about several specific areas of psycholinguistic ability as measured by a battery of aural tests.

Third, we will be considering "listening skills" as a group of interrelated cognitive skills which are identified and developed by a specific training program used in the Project.

Although I have, in a sense, already identified "handicapped students" as the client population of the CDVH, there is a sub-population or sample of that large population of whom certain observations have been made. It is these observations which will document the inter-relationships I spoke of initially.

This sample or sub-population consisted of 145 students, of whom 59 (41%) were Educationally Handicapped, 74 (51%) were Visually Handicapped, and 8 (6%) were Educable Mentally Retarded. The remainder were not identified by handicapping condition. All the students were in public school programs in California, from 1st to 12th grade with ages ranging from 8 to 20.

Research

Even in the original conceptualization of the Compressed Speech and Aural Media Center Project, research was considered an important and

integral part of the exploration of compressed speech techniques with handicapped students. However, because the Project also was conceived as a demonstration-type project, it was felt that the research operation should be compatible with *that* intention.

The implications of these considerations were that the research needed to document the practical utility of compressed speech for handicapped students and to suggest more effective ways to utilize aural media generally, should be conducted in a "natural" setting as opposed to a laboratory or controlled setting. This approach has sometimes been called "action research."

"Action research," unfortunately, has come into some considerable disfavor, as a term, with professional researchers. The feeling seems to be that it has been applied to projects whose faulty methodology and procedures were excused on the grounds that they were not conducted in "controlled settings" but in the classroom. However, so-called "action research" can be reasonably tidy and can give us a great deal of insight. It may also allow for greater serendipity--that marvelous, unexpected bonus of unanticipated findings.

The research study conducted by the Compressed Speech and Aural Media Center Project was designed and executed by Dr. Rose-Marie Swallow of California State University at Los Angeles, Dr. Marie Poulsen of UCLA Children's Hospital, Mr. Robert Gowan, the original Project Director, and numerous teachers of handicapped students in California. The data were gathered during the Spring of 1973. Much of the analysis and interpretation of the data herein reported are my own.

Three main research questions were posed:

1. Are there associations between the ability to comprehend oral language and certain selected psycholinguistic variables (e.g., sound blending, auditory discrimination, auditory closure)?

2. Is improvement in listening comprehension associated with specific psycholinguistic abilities?

3. Is the ability to comprehend compressed speech associated with these specific psycholinguistic abilities?

Research Design

The plan of the research was simple, but strong. The students were first given a battery of tests of listening comprehension and psycholinguistic abilities. After testing, they underwent a training program designed to improve their ability to comprehend by listening. At the end of the training program they were retested to assess the degree to which their comprehension-by-listening had improved. All activities with the students were within their normal school program.

Research Variables and Measures

The variables and measures used in the investigation were as follows:

1. Age - teacher report

2. Class level - teacher report

3. IQ (below average, average, above average, gifted) - teacher report of various tests

4. Handicap category - teacher report

5. Auditory closure (ability to fill in the missing parts of incomplete words presented orally, by producing the total word) - Illinois Test of Psycholinguistic Abilities (ITPA)

6. Auditory reception (the ability to derive meaning from oral material) - ITPA

7. Sound blending (ability to synthesize sound into words) - ITPA

8. Auditory Sequential Memory (ability to reproduce from memory varying sequences of digits) - ITPA

9. Auditory Association (ability to relate concepts presented orally) - ITPA

10. Auditory Discrimination (ability to discriminate similar and dissimilar pairs of words presented orally) - Wepman Test of Auditory Discrimination

11. Language Usage (ability to handle standard English syntax and grammatical structures) - California Achievement Test, Level 3-4

12. Listening Comprehension (functioning level of understanding aurally presented material) - Gilmore Oral Reading Test, Forms A & B

One other variable, called "Figure-ground Relationship" was measured, but the investigators discounted all results because of the clear unreliability of the test used.

To assess ability to comprehend compressed speech, the Gilmore Test was compressed at a rate of 30% compression.

It should be noted here that a major difficulty in analyzing and interpreting the data from the above tests arose from the fact that several of the tests, the Gilmore in particular, were not standardized as complete oral activities. What this means, primarily, is that we really do not know how reliably they may measure what they are said to measure.

Listening Skills Training Program

The training program used in the investigation was developed under a U.S. Office of Education grant in the Alameda County Schools by Leonard Lasnik. It consists of three levels, each of which devotes two lessons to each of eleven identified skills:

1. Inferring connotative word meanings
2. Identifying mood, humor, etc.
3. Providing examples by details
4. Re-stating sequences of ideas
5. Identifying main idea
6. Predicting sequences of thought
7. Inferring speaker's purpose
8. Applying standards to judge persuasion
9. Inferring main idea from specifics
10. Judging logical validity
11. Identifying sequence ambiguities

The lessons were read and recorded in the Master Tape Library studios in Sacramento and duplicates were sent to each of the 35 teachers who participated. After each student finished the training program, he or she was given the Gilmore Oral Reading Test, Form A, to measure the success of the program.

Results and Interpretation

Although I am prepared to document with an array of technical information the findings I report, it seems to me that for the sake of simplicity and communication we might forego such technical discussions. I asserted at the outset that all findings (unless otherwise noted) are statistically significant. Also for the sake of simplicity I will not lead you down all the various winding paths of related analyses which we followed to answer the research questions posed. If you will remember the limitations and constraints of our sample of students and the measures we employed to collect data, that should furnish you with sufficient grains of salt.

Question 1: Is listening comprehension related to psycholinguistic abilities?

Answer: Yes and no. When listening comprehension was defined as the score on the Gilmore Oral Reading Test, given before training or after, it correlated significantly with each of the psycholinguistic variables tested. However, when listening comprehension was defined as the difference between that score and the individual student's grade level expectancy, it was quite a different matter. No correlation of any substantial degree was found. The reason for this apparent paradox is really quite simple; age and class level were, themselves, correlated very highly with each of the psycholinguistic abilities measured. This may suggest that these abilities are, to some extent, developmental.

Question 2: Is gain in listening comprehension related to psycholinguistic variables?

Answer: Yes, but only with language usage, and that was a negative correlation! I am frankly unable to interpret this finding sensibly. I suspect that it may be simply the product of unreliable test scores--a problem about which I spoke earlier.

Question 3: Is the ability to comprehend compressed speech related to psycholinguistic variables?

Answer: Precisely the same as the answer to Question 1--yes or no. The high correlations observed disappear when class level is taken into account.

Summary of Research

Although the major findings of the research seem to be negative, much was learned in the process. One tangential finding, for example, was that student performance on tests of comprehending compressed speech is much more erratic than on tests of normal speech comprehension. This suggests to me that perhaps the student needs to be able to control the rate of compression himself, varying it according to his current ability to comprehend. Fortunately, such a thing is possible. At least three machines are currently being marketed which allow the user simply to turn a knob clockwise to increase effective rate of speech or counterclockwise to decrease it.

A second important finding was that students can learn to listen more effectively. The average gain for the entire group who participated in the Listening Skills Training Program was over 1 1/2 grade levels--not bad for 6 weeks!

Third, a fairly large amount of data was gathered which can be analyzed to respond to other questions.

Finally, in conducting the research, many teachers and students (besides those who participated) were introduced to compressed speech and listening skills training.

Other Project Activities and Accomplishments

Expansion

Besides the major research effort, the Project expanded the Master Tape Library holdings from around 1,000 titles to well over 3,000. Duplications have increased over 50%. Compressed speech orders now represent about 12% of all duplications.

Special Study Institutes

Two Special Study Institutes on "Learning Through Listening" were held in 1972 and 1973 at San Francisco State University and California State University at Los Angeles, respectively. These institutes brought together teachers of handicapped students and leading authorities on aural media, compressed speech, and listening comprehension.

"Spin-offs"

At least two demonstration-research projects have been developed as a direct result of the project. One, in Anaheim, will take place next fall; the other, conducted by Mr. Ray Van Alstyne as a master's degree project in his classroom at Evergreen Elementary School was completed this past spring. Partly because I think you will be interested in the results and partly because Van Alstyne's design may furnish you with a simple, sturdy, and clean model you may wish to use with your own students, I have developed a quick review and summary of the study.

The purpose of the Van Alstyne Study was two-fold: to determine if EMR children can utilize compressed speech effectively and to explore effects of different lengths of presentation.

Twelve students, with IQ's ranging from 52 to 77, and ages ranging from 10 to 14, were divided into two equal groups of 6 each with a mean IQ for each group of 68+. Mean reading levels for the two groups were also similar, as was mean age. Each group had one girl and five boys.

The text material used for this study was an adventure story of an appropriate reading level--3rd grade. The book is divided into 8 nearly equal length chapters. The text was read and recorded by a professional reader and compressed at 20%.

Group One was presented a single chapter at one hearing--about 10 minutes duration--immediately after which a test covering that chapter was given. Group Two was presented with two chapters at one hearing--about 20 minutes duration. The test covering the two chapters was given immediately.

The tests for all chapters were multiple choice, with three possible answers. Every attempt was made to minimize errors caused by a lack

of understanding of procedure or by giving the children too difficult a task to which to respond. The questions were asked verbally. The children then made marks in the first, second, or third empty box by each number on their answer sheets, indicating their choices of answers. The possible answers were repeated, to be certain the children could respond.

The purpose of the study was well served. Dramatic evidence that EMR students can utilize compressed speech effectively was obtained by comparing a so-called "normal" class's mean score with that of the EMR Group One on the test of Chapter One given immediately following the presentation. The mean score for the "normal" group was 63% correct, and for the EMR Group One, 62%.

The length of presentation was shown to affect test scores. Group One, whose presentation and test covered one chapter per hearing scored significantly higher ($p < .05$) than Group Two on the means of all chapter tests. In fact, except for two chapter tests in which the group means were identical, Group One scored higher than Group Two on each chapter test.

After one month, retention of information was also tested. Although the difference between the means of the two groups was not significant on the retest, both groups scored surprisingly high. The mean for Group One was 66%, for Group Two, 61%, and for the total combined groups, 64%. The investigation attributes the high retest scores, in part, to having reviewed frequently-missed questions and answers of the first tests after each test.

Further analysis of the data is planned, as is further investigation.

Future of the Project

In conclusion, I would like to reiterate that the activities of the Project will be incorporated as on-going programs within the CDVH (as indicated in the handout literature). Revision of the Listening Skills Training Program is now underway. Initial field testing has been arranged for next Fall, and, hopefully, the revised version will be ready for production next Spring.

Workshops and in-service training sessions with teachers will be held more or less continuously to stimulate interest and professional expertise in teaching children to listen more effectively.

Finally, innovations in recording, such as new indexing systems, formats, etc., will be introduced and evaluated.

CAREER EDUCATION AND THE HANDICAPPED PERSON

Kenneth B. Hoyt

United States Office of Education
Washington, D.C.

Introduction

Career Education represents a response to a call for educational reform. This call has arisen from a variety of sources, each of which has voiced dissatisfaction with American education as it currently exists. Such sources include students, parents, the business-labor-industry-professional community, and the general public. Special segments of the population, including the economically disadvantaged, minorities, the handicapped, and gifted persons have also expressed deep dissatisfaction with both the appropriateness and the adequacy of educational opportunities that are made available to them. While their specific concerns vary, all seem to agree that American education is in need of major reform at all levels. Career Education is properly viewed as *one* of several possible responses that could be given to this call.

Career Education seeks to respond to this call for change through making education as preparation for work both a prominent and a permanent goal of our entire educational system. To accomplish this goal, career education seeks first to unite all segments of the formal educational system in this common effort. To this, we seek to add the collaborative efforts of both the business-labor-industry-professional community and the home and family structure in ways that enhance attainment of this goal for all persons through a broad range of community services and activities.

NOTE: These remarks represent personal thoughts of the author and, in no way, are intended to imply or represent an official position of the U.S. Office of Education.

From the beginning, career education advocates have proclaimed that they seek to serve *all* persons of all ages in all kinds of educational settings. In practice, we have seen career education programs primarily limited to elementary and secondary school youth enrolled in regular public school programs. This situation cannot continue if the promises of career education are to be attained. In this article, the problem will be illustrated through considering implications of career education for handicapped persons.

Basic Definitions Essential for Understanding Career Education

Six basic words must be redefined in order to understand the concept of career education itself. These six words are: (1) "work;" (2) "career;" (3) "vocation;" (4) "occupation;" (5) "leisure;" and (6) "education."

"Work" is conscious effort aimed at producing benefits for oneself and/or for oneself and others. As such, it is unimportant whether such effort is paid or unpaid in nature. What is important is that it represent the basic need of all human beings to achieve - to accomplish - to *do* something productive that allows the individual to discover both who he/she is and why he/she is. With this definition, work is properly viewed as a human right - not as a societal obligation.

"Career" is the totality of work one does in his or her lifetime. Thus, any person can have only one career. That career typically begins prior to entering formal schooling and continues well into the retirement years.

"Vocation" is one's primary work role at any given point in time. Vocations include paid employment, but they also extend to unpaid work roles. For example, we can speak of the "vocation" of the student, the full-time volunteer worker, or the full-time homemaker just as easily as we can speak about the "vocation" of the plumber, the physician, or the engineer.

"Occupation" is one's primary work role in the world of paid employment. Economic returns are always considered among the work values of persons engaged in occupations although these might not be considered at all by persons in certain vocations. The occupations of many persons will be synonomous with their vocations. One can never have an occupation without having a vocation although, of course, one can have a "vocation" without being engaged in an "occupation."

"Leisure" consists of activities, other than sleeping, in which one engages when not performing in his or her vocation. Thus, "leisure" holds possibilities for both "work" and for "play."

"Education" consists of all those activities and experiences through which one learns. As such, it is obviously a lifelong process and considerably broader in meaning than the term "schooling."

All that follows is based on an assumption that these six basic words are understood and their meanings agreed upon. Those who disagree with one or more of these definitions will necessarily find themselves disagreeing with much of the remainder of this presentation.

With the way in which these six terms are defined, "career education's" definition, in a generic sense, becomes simple and straightforward. *Career education consists of all those activities and experiences through which one learns about work.* As such, it makes no restrictions in meaning whether one speaks about work of the homemaker, the musician, the lawyer, or the bricklayer. Some work will require advanced college degrees while other work may include no formal schooling of any kind. Some work will be in the form of primary work roles, paid or unpaid, while other work will be carried out as part of one's leisure time. To the extent that work is judged "successful," it does typically - and, in these times, increasingly - require some learned set of vocational skills.

Further Consideration of the Meaning of Work

The preceding definition of "career education" brings us back to further consideration of the meaning and implications of the four letter word "work." Work, as used here, is a concept available only to human beings in that it is restricted to conscious effort - to something that the individual thinks about and chooses to do. It is this quality of conscious choice that most clearly distinguishes the word "work" from the word "labor." That is, "labor," like "work," may very well result in production of benefits, but it does not carry with it the connotation of something that the individual consciously chooses to do. Instead, "labor" is more accurately regarded as forced, involuntary effort that lacks personal meaningfulness and significance for those who perform it.

Why do people work? Answers given to this question can be grouped into three broad classifications of reasons - economic, sociological, and psychological. Work, in the world of paid employment,

always includes economic reasons and, if maximally meaningful to the individual, carries sociological and psychological reasons as well. Economic reasons, of course, center around the needs most of us have to accumulate income so that we can purchase goods, products, or services produced through the work of others. Sociological reasons center around recognition that one's work contributes to the goals of our society in a positive way - that what one does has benefit for one's fellow human beings. Psychological reasons center around personal recognition of one's accomplishments - around the feeling of being *someone* through being able to say that one has accomplished *something*.

While most persons experience economic reasons for working and many, although not all, can readily observe the sociological significance of the work that they do, the single reason for working that can be said to apply to all persons is that which centers around the psychological dimension. Former President Lyndon Johnson perhaps expressed this need for work as clearly as anyone when, in a speech, he said: "To hunger for use and to go unused is the greatest hunger of all." He was, of course, referring to the human need of all human beings to feel that someone needs them for something - that it does matter to someone that they exist - that, because they are alive, the world is, in some way and to some degree, better off.

The concerns and scope of career education extend to all three of these basic reasons for working. It is this breadth of concern that enables career education to say that it is concerned with all persons of all ages in all settings from all levels of educational background. The basic premise of career education is that the need to work is a basic human need for all human beings. That is why we refer to work as a "human right" rather than as a "societal obligation."

Career Education and Handicapped Persons

In a recent paper, C. Samuel Barone, USOE Bureau of Education for the Handicapped, presented the following predictions regarding the approximately 2.5 million handicapped youth who will leave our school systems in the next four years:

525,000 - 21% - will be either fully employed or enrolled in college.

1,000,000 - 40% - will be *underemployed* and at the poverty level.

200,000 - 8% - will be in their home community and idle much of the time.
650,000 - 26% - will be unemployed and on welfare.
75,000 - 3% - will be totally dependent and institutionalized (Barone, 1973).

Predictions, such as these, raise very grave concerns for those dedicated to the career education movement. The prediction that one million of these handicapped youth will be *underemployed*, is a very serious matter indeed. The concept of underemployment is one that pictures a person as possessing greater degrees of productive capability than the tasks he or she is asked to perform routinely require. Underemployment leads to boredom on the job and is seen by many as a major contributor to worker alienation in our society at the present time. To predict that this will be the fate of 2 out of every 5 handicapped youths leaving our school system in the next four years can only be regarded as a serious indictment of our educational system and of the larger society.

We have, for far too long, seemed to act as though a handicapped person should be both pleased with and grateful for any kind of work society provides. Unlike other persons, we seem to assume that, if a person is handicapped, boredom on a job is impossible. Worse, much of society has seemed to assume that, while most persons should seek work compatible with their interests and aptitudes, such considerations are not necessary when seeking to find employment for handicapped persons. If *any* job in the world of paid employment can be found for the handicapped person, we seem far too often to be personally relieved, and surprised when the handicapped person is anything less than effusively grateful.

Similarly, we seem to assume that those handicapped persons who are not employed in the world of paid employment are not and cannot be working. This is, in the philosophy of career education, both false and wrong. We know that, for example, the fact that a person is unemployed and on welfare certainly does not mean, for many such persons, that they do not work. There is a very great deal of work being carried out in many welfare homes, the results of which are readily apparent to any who visit in such homes. Yet, because persons on welfare are not engaged in the world of paid employment, society seems to assume that they are not working. Even more tragic, some seem to assume that people on welfare do not want to work. If the human need to work pictured here has any validity at all, it certainly applies to persons on welfare just as to all other persons.

The 200,000 youth who are predicted to be in their home community and idle much of the time can certainly not be written off as persons with no interest in working or no personal needs to work. Something should be provided for such persons, whether it be paid or unpaid work. The field of the handicapped has, for years, been promoting the concept of the sheltered workshop for those who are unable to compete effectively in the world of paid employment. The prime rationale for the sheltered workshop must surely lie in recognition of the human need for work that is being discussed here. If this concept is valid for those in sheltered workshops, it is certainly also valid for those who are not.

Career education seeks to make work possible, meaningful, and satisfying for *all* individuals. To do so for handicapped persons demands, first of all, that we regard their right to choose from among the widest possible set of opportunities equally as important as for any other individual. We seem too often to be satisfied when we have found *something* that a handicapped person can do. We should be dissatisfied until and unless we have explored, to the fullest possible extent, the total array of work that might be possible for a given handicapped person. To stop prior to reaching this point is being less than fair to the handicapped person and to the larger society.

One further basic principle of the career education movement would seem to have some relevance for handicapped persons. This is the principle that holds that we should seek to emphasize the individual's successes, not his or her failures. In career education, a conscientious attempt is made to emphasize accomplishments - attainments - achievements - *doing*. This can best be carried out by refusing to emphasize failures and shortcomings. It would seem that this principle holds some positive potential for working with handicapped persons who, far too often, are made well aware of their limitations and, in the process, effectively limited in discovering their talents. We have, it would seem, been sometimes too much concerned about helping the handicapped realize and appreciate how much society is doing *for* them. In so doing, we run the risk of de-emphasizing, for many handicapped persons, how much each can do for himself or herself.

Concluding Remarks

Handicapped persons are as deserving of whatever benefits career education has to offer as are any other individuals. To date, not many career education programs have made the kinds of special

efforts necessary in order to make career education a reality for handicapped persons. It is hoped that these remarks may stimulate both those in career education and those working in the field of the handicapped to work together in order to correct this lack of attention. The need to work *is* a human need of all human beings. Handicapped persons *are* human beings.

Reference

Barone, C. S., Paper presented to a Forum of National Organizations sponsored by the Vocational Evaluation and Work Adjustment Association, the National Rehabilitation Association, and the Presidents Committee for the Employment of the Handicapped. October 25, 1973.

CAREER EDUCATION AND THE VISUALLY HANDICAPPED

John P. Best

Region XIX Education Service Center
El Paso, Texas

In order to understand the career education related needs of the visually handicapped, it is first important to review career education in general. Against this frame of reference some unique needs of the visually handicapped gain greater perspective.

An overview of career education reveals that the concept encompasses the entire school program. It is a process of unification of the curriculum with the career goals under constant consideration. During the 1970's schools will work with approximately 26 million students. Out of every 10 youngsters in grade schools now, three will not finish high school and eight out of ten will not finish four years of college. The job of education then, is to help students prepare for the changing world of work. Under the broad umbrella of career education are found the areas of occupational education and technology, academic education, community involvement, and guidance and counseling. As the K through 6 students become involved in health, spelling, science, English, reading, social studies, art, mathematics, and physical education, the concepts of career education are interwoven with the curriculum. An awareness of the world of work leads to career investigation and orientation through activities covering such topics as values of work, dignity of work, why people work, job opportunities, attitudes, values, and motivation. As the awareness stage progresses, the developing self-understanding and information build up empirically to lead to decision-making skills. As the students progress through the seventh and eighth grades, the information base is broadened to include more detailed occupational information, including skills, education, and physical requirements of various jobs and job clusters. Included is information regarding job entry requirements, developing job interests, self-appraisal, job opportunities, and training opportunities. More information is brought into play regarding present and future salary opportunities in various occupational fields along with more and more information designed to help the individual in personal decision-making regarding

educational plans and occupational choices. Career exploration and investigation during the ninth and tenth grades should be achieved through hands-on experiences in laboratories, shops, and through experiences in various community resources. A combination of the opportunities for exploration and experiences provided through the school, home, and community helps the student to examine further his or her own interests, aptitudes, and abilities. During the eleventh and twelfth grades the areas of awareness, orientation, investigation, and exploration tend to become more focused through comprehensive course offerings plus the options of developing specific vocational skills, apprenticeship experiences, and on-the-job training. By the time of completion of high school the individual should be equipped to make decisions regarding career and/or college training. The skills for laying out and subsequently modifying the blueprint for life are developed through the career education model, thereby giving meaning and purpose to the educational experience. Additionally, the trend is more and more moving in the direction of emphasis on the responsibility of the school for placement of the individual.

Casual reference to this capsule of career education might lead to the conclusion that these are the normal activities of most schools. To some extent this is true. The point of major importance is the constant focus on the objectives of the total educational experience. Subject matter in isolation and without a clear link to its use and purpose has been the cause of confusion to many students. Educators who have lost sight of the reason for education have contributed to the dilemma. Career education then is a systematic and integrated approach to preparing the individual to cope with his or her career in a changing world.

All of what has been covered so far certainly has relevance for the education of the blind and visually handicapped. However, it is essential to add some other considerations. Included in these are the importance of special compensatory study skills, activities of daily living, orientation and mobility, a high visual index, social skills, and availability of career and occupational information. Rather than attempt to attack all of these areas here, the focus will be on two areas: social development and career information.

In a recent study by this auther, various areas of school programs for the visually handicapped were examined in the light of the desires of ex-students. When the area of student life was investigated the ex-students made their opinions very clear. The

individuals who demonstrated the highest degrees of personal independence in such categories as orientation and mobility, personal self-care skills, and ability to integrate into the sighted community were the ones who recommended the most liberal social living environment for the blind and visually handicapped in school. This was true of both the college students and the individuals who pursued some other career direction. The administrators of the programs studied strongly concurred with this. If the blind or visually handicapped individual is to compete with his or her sighted peers, it is essential that normal social development experiences be not only allowed, but emphasized. This means boy-girl relationships, independence of movement, decision-making opportunity, a wide range of social interactions, uncensored information sources, and the opportunity to make mistakes and profit thereby. It further means that opportunities must be provided to learn the social mores by interaction and involvement and the opportunity for honest feedback to establish a frame of reference. In this author's opinion, the most damaging possibility is the stifling effect of over-protection. If normal social development is to occur, there must be a climate of openness, honesty, and opportunity for the same real life experiences encountered by the sighted person. Through normal social development, the blind and visually handicapped will have a much greater opportunity to take advantage of the career education opportunities outlined earlier.

There has always been a dearth of career and occupational information materials in the media which can be independently utilized by the visually handicapped. Region XIX Education Service Center in El Paso, Texas, is planning an activity for the 1974-75 school year which is designed to make more information of this type available. Through a project to be funded by the Texas Education Agency plans are underway to identify and categorize the career information needs of grade 9 blind and visually handicapped students by surveying a sample of residential and public school students and staff. The information gained will be analyzed by an advisory panel of experts. This analysis will be interfaced with *V*ital *I*nformation for *E*ducation and *W*ork already developed by Region XIX Education Service Center. Career information materials will be selected, modified, and field tested. The field tests will be conducted in various programs for the visually handicapped in order to gain more information preliminary to preparing prototype packages in braille, recorded forms, etc. for broad distribution. At the conclusion of the first year a summary report and recommendations for further action will be prepared. It is anticipated that this

project will become the vehicle for preparing a large number of materials packages in various areas of occupational and career education, thereby making the career education model described more attainable for the visually handicapped.

It is clear that the implementation of the career education model will greatly strengthen programs for the blind and visually handicapped. In order to actualize such programs it will be necessary to integrate all of the special training aspects of education of the blind and visually handicapped into the program in the same way that career education is integrated with the regular curriculum. Social skills and career information development simply provide some of the special ingredients needed. These, combined with orientation and mobility and activities of daily living, will support the development of complete programs, properly recognizing the unique needs of the blind and visually handicapped.

THE SUPPLEMENTAL SECURITY INCOME PROGRAM--ITS PHILOSOPHY AND POSSIBLE IMPACT UPON THE REHABILITATION OF THE BLIND

Fred Crawford

Social Security Administration
Baltimore, Maryland

The Supplemental Security Income Program for the Aged, Blind, and Disabled (SSI) replaced former Federal-State programs of assistance to needy aged, blind, and disabled persons in the 50 states and the District of Columbia effective January 1, 1974. SSI is administered by the Social Security Administration and benefits are payable based upon nationally uniform eligibility standards. Although this new program has brought about many changes, such as the establishment of a basic Federal income floor for those persons who require income maintenance assistance, the SSI program maintains close working relationships and cooperation with the states. States may elect to supplement basic Federal payments and may either choose to administer their own program of state supplementation or they may contract with the Social Security Administration to administer their supplementation programs at no expense to the states.

Because studies have shown that approximately half of all SSI beneficiaries also receive payments under the Old Age, Survivors, and Disability Insurance program, commonly known as Social Security, it may be helpful to contrast this program with SSI. Eligibility for Social Security cash benefits is based upon the insured status of a worker through whom coverage is extended to his or her dependents. Therefore, Social Security is work-related, has no means test, is compulsory for most workers, and is contributory on the part of employees and employers. SSI has a means test, is paid for from general revenues, is not work-related but offers incentives for those who work, and the program provides opportunities for rehabilitation. The philosophy of the SSI program is that people who are able to earn a living should; people unable to earn a living should have help. Many aged, blind, and disabled persons fall into this later group.

A blind person of any age whose income and resources are sufficiently limited may be eligible to receive SSI monthly benefits. The statutory definition of blindness found in the Social Security Law is

defined as 20/200 or less central visual acuity in the better eye with the use of a correcting lens, or a reduction in the field of vision to an angular distance no greater than 20 degrees. For those persons who received Aid to the Blind payments in December, 1973, the definition of blindness which was in effect in state public assistance plans as of October, 1972, is being used as the definition for continuing eligibility of these former recipients.

The purpose of the SSI program is to supplement the income of the aged, blind, and disabled whose income is below certain levels. Therefore, an individual does not have to be totally without income in order to be eligible for Supplemental Security Income payments. There are a number of income exclusions, notably for blind persons who work. After allowable exclusions of earned or unearned income are taken into account, the remaining countable income will reduce SSI payments so that checks are issued in varying amounts. Effective July 1, 1974, the maximum SSI monthly benefit for an individual will be $146, and for a couple $219. Additionally, states may have supplements that are added. For example, a blind person in California could receive a combined federal and state amount of $265, and a blind couple could receive up to $500 a month.

Certain other eligibility requirements must also be met. An SSI beneficiary must be either a citizen of the United States or a lawfully admitted alien for permanent residence. Beneficiaries must also be residing in one of the 50 states or the District of Columbia. Individuals must file for all other benefits to which they may be entitled such as Social Security, Workmen's Compensation, and Veterans' benefits. A blind or disabled person under the age of 65 is referred to the appropriate state vocational rehabilitation agency and must accept the services offered to him. Patients in public institutions such as prisons or state hospitals are not eligible for those months in which they are institutionalized.

Because the Association for Education of the Visually Handicapped is concerned with the needs of both the blind and the visually handicapped, perhaps you want to know how blindness is determined and whether visually handicapped individuals may qualify for SSI. The presence of a qualifying disability or statutory blindness is based upon a disability determination made by a State Disability Determination Unit. These determinations are made based upon the examinations of medical specialists in local communities. The determination of blindness may be made from evidence furnished by the examination report of either an Optometrist or Ophthalmologist. Some applicants for SSI who have severe visual impairments but who

are not statutorily blind may qualify as disabled. The income disregards and other policies relating to disabled beneficiaries would then apply.

Let us now turn our attention to children. This is the group of blind and disabled potential eligibles in which you have the greatest interest. For the first time both blind and disabled children can receive income maintenance payments under the SSI program if they reside anywhere in the country. Heretofore, some of the states made Aid to the Blind payments to blind children but disabled children were not eligible. A blind or disabled student living at home will have the income of the family taken into account in determining whether or not SSI benefits are paid. If the family already receives Aid to Families with Dependent Children (AFDC) under title IV-A of the Social Security Act (a program administered by the states), a blind or disabled child may choose between the AFDC and SSI programs. In some instances it may be more advantageous to the family and the child to receive benefits from one or the other of these programs. A student residing at a state or private nonprofit school for the blind may be eligible for benefits while not in school. While enrolled in the residential school, however, the value of room and board will serve as countable unearned income with an allowable exclusion of $20 a month. While there may be exceptions, most schools indicate that room and board constitutes value in excess of current SSI income limits.

Program ties and linkages have already been established so that an applicant for SSI benefits may also become eligible or at least be referred for other programs to meet specific needs. It has already been noted that blind and disabled persons under the age of 65 who are old enough to participate in vocational rehabilitation services are referred for this service. The Social Security Administration makes 100 percent federal funds available to state vocational rehabilitation agencies. This additional money will assist these state agencies in their efforts to rehabilitate larger numbers of SSI beneficiaries. Also, 25 of the states have adopted criteria so that eligibility for SSI payments carries with it eligibility for Medicaid. Medicaid programs can prove to be a good source of funding for minimizing many of the medical problems which affect the health and level of functioning of many blind and disabled children. Social Security district offices also often make referrals to social service and other specialized agencies and schools in local communities.

There is already evidence to show that the SSI program, although still in its early stages of operation, will have a dramatic effect upon children. The children referred to, of course, are those blind and disabled infants and youths whose individual and family income and resources are inadequate to meet their needs. Over 55,000 applications for benefits to children have already been received. There were fewer than 3,000 children under the age of 18 receiving SSI benefits during the month of January, so it is easy to see how children in large numbers are beginning to file for enrollment in the program. The Social Security district office, where all applications are to be filed, is commonly viewed in a different perspective than was the case when applications were made in county welfare offices. Because the law under which SSI operates does not impose liens or include provisions of relative responsibility, there is no need to fear the adverse future consequences of filing an application for enrollment in the program.

The Vocational Rehabilitation Act of 1973, PL 93-112, focuses the attention of state vocational rehabilitation agencies on the provision of rehabilitation services to the severely handicapped. The severely handicapped certainly include blind children who must learn to compete in a sighted world where many traditional occupations practiced by blind persons have become either obsolete or unprofitable. With the existing close ties between the Social Security Administration and the vocational rehabilitation community nationwide, we have reached a milestone in 1974 which should mark the beginning of greater opportunities for independence and productive lives for economically deprived blind children now and in future years.

Although the SSI program is still in its infancy, its philosophy and concepts have already become clearly defined. To be fully successful as a new concept in the area of income maintenance, the SSI program requires the close coordination and cooperation of federal, state, and local efforts aimed at meeting the needs of our aged, blind, and disabled citizens.

The Federal government is now paying a larger share of income maintenance costs thereby relieving the states and other welfare jurisdictions of some of their financial burdens. There is an opportunity now for the strengthening of state and federal relationships so that activities on behalf of the poor will interface with each other. With lighter caseloads in state welfare agencies, these agencies may now be able to reorder their priorities and add new services.

As professional workers and educators, you have a key role to play both in the SSI program and in your local community. You will no doubt know visually handicapped children and possibly aged, blind, or disabled family members of your students who are in need of the kind of financial assistance the SSI program can provide. You will also recognize that while financial help is important, there are many other kinds of aid that are not now available in your state. Because you will be among the first to recognize gaps in services and unmet needs, you can work for the establishment of total service programs in order that together we may better meet the needs of the whole visually handicapped child or adult.