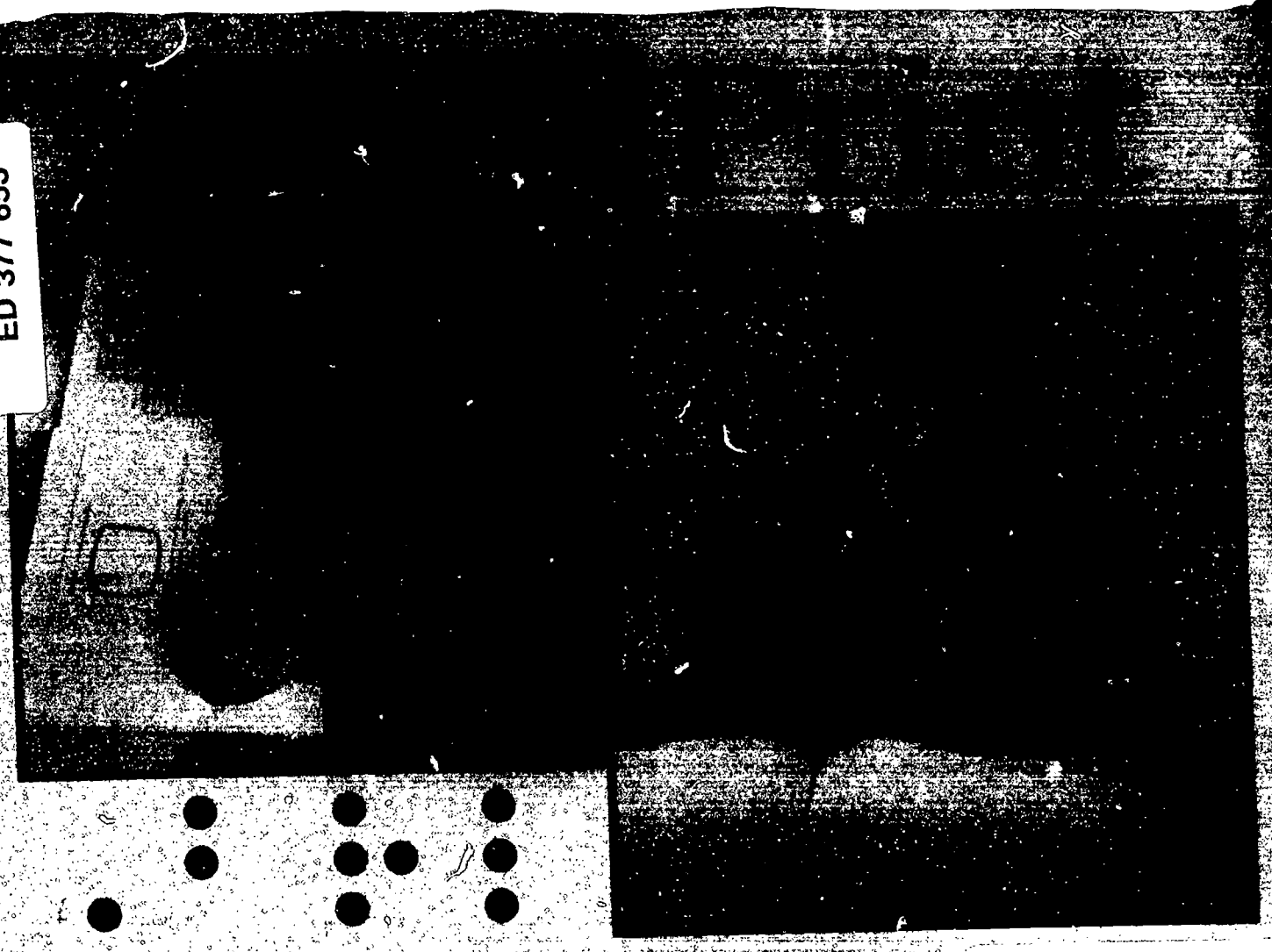
DOCUMENT RESUME

ED 377 653 EC 303 581

AUTHOR	Caton, Hilda, Ed.
TITLE	Tools for Selecting Appropriate Learning Media.
INSTITUTION	American Printing House for the Blind, Louisville, Ky.
PUB DATE	94
NOTE	190p.
AVAILABLE FROM	American Printing House for the Blind, 1839 Frankfort Ave., Louisville, KY 40206 (large type and braille also available).
PUB TYPE	Guides - Non-Classroom Use (055)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	Blindness; Braille; Check Lists; Decision Making; *Educational Media; Elementary Secondary Education; *Evaluation Methods; Individualized Education Programs; Large Type Materials; Literacy; Low Vision Aids; *Media Selection; Partial Vision; Reading Instruction; *Student Evaluation; Tactile Adaptation; *Visual Impairments

ABSTRACT

This manual assists in developing educational goals and Individual Education Plans for children with visual impairments, by providing guidelines for selecting appropriate learning media for optimum literacy development. Part 1 describes the target populations, the members of the interdisciplinary team, and the team members' responsibilities. Part 2 outlines and describes the actual assessment procedure and part 3 provides a detailed set of instructions for evaluating child attributes and environmental attributes (educational environment, family, and home attributes). Appendices contain questionnaires, report forms, and checklists which reflect each stage of the assessment procedure. In addition, a list of assessment instruments with addresses of publishers is provided, as is a glossary of eye terms. (Contains 56 references.) (DB)



TOOLS for Selecting Appropriate Learning Media

Hilda Caton, Ed.D., Editor

AMERICAL

TOOLS
for Selecting
Appropriate Learning Media

Hilda Caton, Ed.D.
Editor

AMERICAN PRINTING HOUSE
FOR THE BLIND, INC.

1839 Frankfort Avenue
Mailing Address: P.O. Box 6085
Louisville, Kentucky 40206-0085
Phone: 502-895-2405
Toll Free: 800-223-1839
Fax: 502-895-1509

TABLE OF CONTENTS

Forward 5

Introduction 7

Part I Populations and Team

Section 1 Target Populations 10

Section 2 The Interdisciplinary Assessment Team . 12

Part II Procedure Followed

Section 3 Assessment Procedure 18

Part III Attributes Assessed

Section 4 Child Attributes 32

Eye Report 33

Physical Report 38

Functional Low Vision Assessment . . 39

Clinical Low Vision Assessment . . . 67

Educational Assessment 85

Cognitive 86

Affective 94

Psychomotor 97

Section 5 Environmental Attributes 100

Educational 101

Family and Home 104

Appendices

Appendix A Assessment Procedure 106

Appendix B Attributes Assessed 111

Appendix C Assessment Instruments 152

Glossary of Eye Terms 164

References and Other Sources of Information 173

ACKNOWLEDGEMENTS

Members of the project advisory committee recommended the expansion of Section II of Print and Braille Literacy: Selecting the Appropriate Learning Media (Caton, 1991). Members of this committee are:

Project Director

- Hilda Caton
  Research Scientist
  American Printing House for the Blind

Members:

- Sr. M. Margaret Fleming, Primary Teacher, St. Lucy Day School, Upper Darby, PA
- Ruth Holmes, Retired Teacher, Illinois School for the Visually Impaired, Jacksonville, IL
- Randall Jose, Optometrist, The Lighthouse of Houston, Houston, TX
- Fredric Schroeder, Director, New Mexico Commission for the Blind, Santa Fe, NM
- Susan Spungin, Associate Executive Director for Program Services, American Foundation for the Blind, New York, NY
- Robert Winn, President, Hadley School for the Blind, Winnetka, IL
- Diane P. Wormsley, Director of National Initiative on Literacy, American Foundation for the Blind, Atlanta, GA

ACKNOWLEDGEMENTS

The following contributers and staff personnel wrote manuscripts which were edited and included in this manual. Their knowledge and expertise made the manual possible.

Contributors:

- Sr. M. Margaret Fleming, Upper Darby, PA
- Ruth Holmes, Jacksonville, IL
- Randall Jose, Houston, TX
- Fredric Schroeder, Santa Fe, NM
- Susan Spungin, New York, NY
- Diane P. Wormsley, Atlanta, GA

Project Staff:

Beth Gordon
Research Associate

Betty Modaressi
Assistant Editor

Eleanor Pester
Research Scientist

Carol Roderick
Research Assistant

Martha Simmons
Reviewer

It is important that persons using this manual to assist in the selection of appropriate learning media for children who are visually impaired understand the environment in which these children live and are being educated as well as the future environment for which they are being prepared. The forward (p. 5) by Fredric Schroeder contains the background information which describes these environments and sets the tone for using the subsequent sections of the manual.

Hilda Caton, Ed.D.
Editor

FORWARD

Selecting appropriate learning media for children who are blind and visually impaired is one of the most serious issues confronting today's educators. The problem is complicated by the fact that blindness and normal sight are not dichotomous. Most people who are blind have some remaining vision. Hence, it is not unreasonable to use that vision at times and in ways where it can be utilized effectively. Yet, our field has struggled to understand and operationalize what constitutes appropriate utilization of vision.

We have experienced a generation of children who are blind struggling to use print when clearly print was not the appropriate medium. The real tragedy is not so much diminished functioning, as damaged self-esteem. Children who are blind are already subjected to a society that expects little from them. If the tools and strategies available to them are ineffective, then they will logically internalize society's diminished view. There has been much written about the recent decline in braille literacy. Yet, its full impact can only be understood if we recognize that with the loss of literacy comes the loss of hope and self-confidence.

While society expects little from people who are blind, the blind themselves have worked toward creating a positive vision of blindness rooted in the belief that the blind can compete on terms of real equality. What we believe about blindness inevitably forms the foundation of our expectations. Wittingly or unwittingly our expectations drive our day-to-day decisions and determine what we regard as effective or ineffective. This simple truth should not and must not be acknowledged casually and then set aside. As educators, we must recognize our responsibility, not only to teach, but to teach from a basis of real understanding about the true potential of our students.

While no one would argue against individualized instruction, individualizing instruction can subtly erode our expectations. Without a clear vision of the true potential of children who are blind, we can become content by measuring progress irrespective of whether that progress has clear recognizable direction. In order to ensure that our instruction has direction, we must regularly be exposed to people who are blind working and participating actively in society. As educators we must recognize the importance of adult blind role models, not only for our students but for ourselves. By spending time with active adults who are blind we can begin to reshape our own perspectives on blindness, replacing myth and tradition with fact and reality. We can develop a positive hopeful view of blindness and believe that people who are blind can become fully participating members of society.

To understand full participation and believe in it intellectually is not the challenge. The challenge is to believe it in our hearts

and demonstrate our beliefs in the way we teach our children. If we fundamentally believe that our students can grow up to be literate adults capable of competing with the sighted, then we will automatically look for those methods which allow them to function accordingly. Our responsibility is clear. If children who are blind are to shake off society's assumption of diminished capacity, then they must have the skills to truly compete – not sort of compete, not sometimes compete, not partially compete, but truly compete -- in ways that will win them the respect of others and a place of full participation in society.

It is critical that we not overlook or underplay the importance of high expectations. We pride ourselves on continuing education and professional involvement. Yet, we must add to this list an active affirmative commitment within ourselves to developing and sustaining a positive view of blindness based on our students' potential to be normal people with normal hopes, normal dreams, and normal abilities.

Fredric Schroeder, Director
New Mexico Commission
for the Blind

INTRODUCTION

This manual is intended for persons involved in developing educational goals and Individual Education Plans for children with visual impairments. It is important to understand that evaluation for selecting the appropriate learning media should be a part of the comprehensive, nondiscriminatory assessment required by P.L. 101-476, the "Individuals With Disabilities Act," of 1990.

Because the selection of the appropriate learning media has a direct relationship to the goals of literacy to be attained by children with visual impairments, it is critically important that these goals, at any level of the educational program, must relate directly to the sense modalities and the selection of learning media they will use. The assessment must be comprehensive and must indicate the present level of performance in each learning medium and provide justification for change, addition, or deletion of a learning medium to assure each child's access to literacy to the greatest extent possible. Assessment of literacy goals and learning media must be a continuing process, occurring a minimum of one time a year and more frequently if necessary.

It is anticipated that this manual will be used by many different people for different purposes. Some users will need less detailed information than others. Therefore, the information is presented in three basic parts, each containing different levels of information. These parts are:

Part I - Populations and Team. A brief description of the target population(s), the members of the interdisciplinary team, and the team members' responsibilities.

Part II - Procedure Followed. An outline and brief description of the actual assessment procedure.

Part III - Attributes Assessed. A detailed set of instructions for evaluating child attributes and environmental attributes (educational attributes, family and home attributes).

The appendices contain questionnaires, report forms, and checklists which reflect each stage of the assessment procedure. In addition, a list of assessment instruments with addresses of publishers and references to sources of information related to the assessment of children who are visually impaired is included.

There is considerable repetition among some of the sections of the manual so that persons who do not need to use the entire manual will not have to go to several sections for specific information. For example, persons who are responsible for identifying the types of persons needed on the interdisciplinary assessment team might use Part I, Section 2, The Interdisciplinary Assessment Team which contains a brief description of the team members and their

duties. However, persons who must select the actual team members should use Part II, Section 3, Assessment Procedure, which gives more detailed information about the team members. In addition, Appendix A contains checklists related to the team members. Those who are responsible for planning the entire assessment would also use Part II, Section 3, which provides an outline of the procedure and a description of each step in the process. Appendix A also contains checklists for this procedure. Persons who are responsible for conducting the evaluations would use Part III, Sections 4 and 5, which give specific instructions for conduction them, descriptions of the procedures and instruments to be used, etc. Appendix B, which contains detailed checklists for each part of each section in Part III, should also be used for conducting the evaluations. The listing of sources for obtaining instruments in Appendix C will also be useful to persons conducting the evaluations.

To permit the use of the manual described above, it is packaged in a loose-leaf binder so that specific sections and the checklists in the appendices that accompany them can be removed by persons who need them and other sections can be used by others. Checklists can be copied if necessary.

To facilitate use of the manual, a question and answer format is used. Questions for each section are as follows:

Section 1 - The Target Populations

1. Who is the student who needs to be assessed?
2. Who will be responsible for conducting the assessment?

Section 2 - The Interdisciplinary Assessment Team

1. What is an interdisciplinary assessment team?
2. What are the goals of the interdisciplinary assessment team?
3. Why is it important for assessments to be conducted by an interdisciplinary team?
4. Who should be members of the interdisciplinary team?
5. What roles will the interdisciplinary team members have in the assessment?

Section 3 - Assessment Procedure

1. What is the assessment procedure that should be followed for selecting the appropriate learning media for students who are visually impaired?
2. What activities should occur at each stage of the assessment procedure?

Section 4 - Assessment of Child Attributes

1. What questions should be answered by the eye report?
2. What should be included in the functional low vision assessment?
3. Who will conduct the functional low vision assessment?

4. What is the basic procedure for a functional low vision assessment?
5. What should be included in the clinical low vision assessment?
6. Which optical devices can be used to improve visual functioning?
7. Which non-optical aids can be used to improve visual functioning?
8. What should be included in the educational assessment?
   a. What should be included in the cognitive assessment of children who are visually impaired?
   b. What should be included in the assessment of affective development of children who are visually impaired?
   c. What should be included in the psychomotor assessment of children who are visually impaired?

Section 5 - Assessment of Environmental Attributes

1. What should be included in the assessment of the educational environment of children who are visually impaired?
2. What should be included in the assessment of the family and home environment of children who are visually impaired?
3. What questions should be answered by interviews with the family?
4. What questions should be answered by interviews with the student?

PART I

Populations and Team

Section 1 - Target Populations

Section 2 - The Interdisciplinary Assessment Team

TARGET POPULATIONS

This manual is intended for two target populations. One is the student population to be assessed. The other is the population of persons responsible for conducting the evaluations.

Who is the student who needs to be assessed?

The student population consists of students who are visually impaired for whom the appropriate learning media must be selected. It is important to remember that the student who is visually impaired is first of all a whole person with strengths, weaknesses, abilities, disabilities, and problems. These characteristics and any combinations thereof are unique to each individual student and they must be considered individually for each student when the appropriate learning media is being selected. For some students, the selection process is less complex than for others. Children who are totally blind, for example, will use braille as their learning medium. Other children who are visually impaired may use standard print, large print, braille, or any combination of these. These students who are visually impaired are the primary student population of the assessment procedures.

1. Young children who have been identified as visually impaired, but have not been evaluated to determine their learning media.

2. Students who are legally blind who appear to have sufficient vision to read print, standard or large print.

3. Older students who are visually impaired who are having difficulty with the learning medium in use.

4. Children who have become visually impaired because of an accident or illness.

5. Children whose vision has been improved through surgery or the use of new optical devices.

6. Children whose vision has decreased because of progressive eye disorders.

Who will be responsible for conducting the assessment?

The total assessment of the student should be conducted by an interdisciplinary team of experienced professionals consisting of:

1. Teachers of students who are visually impaired with:
   - Background and experience in assessment of children who are visually impaired.
   - Good understanding of the various levels of normal child development and what may be expected at each level.

- Ability to make concrete recommendations and communicate the visual needs of the individual to the members of an interdisciplinary assessment team or those who work with the students and are responsible for their learning.

2. Educators trained and experienced as assessment specialists, i.e., educational diagnostician, psychometrist, social worker and so forth.

3. Others designated by the school to assist in the child's assessment, i.e., school psychologists, classroom teachers.

It should be noted that a good assessment will require the cooperation of teachers, parents, paraprofessionals, and others who are directly responsible for determining skills that children who are visually impaired will need to become productive, competitive participants in the vocational fields they choose to enter as adults.

THE INTERDISCIPLINARY ASSESSMENT TEAM

P.L. 94-142 is the "Education for all Handicapped Children Act of 1975." P.L. 99-457 of 1986, reauthorizes existing Education of the Handicapped discretionary programs and amends P.L. 94-142 to include incentive money for states to serve children from birth to age five. P.L. 101-476, The "Individuals with Disabilities Act," of 1990 renamed and amended the 1975 Act. These laws mandate a nondiscriminatory evaluation of handicapped children prior to the decision to provide special services and the decision as to the type of placement to be made for each child. Comprehensive assessment is required prior to the establishment of educational goals and the development of the Individual Education Plan for each handicapped student.

What is an interdisciplinary assessment team?

The interdisciplinary team consists of members of various disciplines who will evaluate the student in the areas discussed in this manual.

What are the goals of the interdisciplinary assessment team?

The interdisciplinary team is responsible for the total initial evaluation. Specific evaluations to be conducted by individual members of the team are discussed in Part III, Section 4, Assessment of Child Attributes.

1. To select the appropriate learning medium/media for each child who is visually impaired.

2. To determine the present level of visual functioning, the special individual needs concerning use or non-use of vision, and to make concrete suggestions for present educational planning.

3. To provide a means for organizing information critical to making decisions about learning media.

4. To enable students to achieve academically commensurate with their abilities.

5. To assist with instructional planning relative to present levels of performance and Individual Education Plan (IEP) goals and objectives.

Why is it important for assessments to be conducted by an interdisciplinary team?

It would be nice if there were a simple recipe or a formula to be followed that would result in the selection of the appropriate learning media for each student who is visually impaired. Unfortunately, after deciding that children who are totally blind will use braille, there is no simple way to decide what learning media is right for other children who are visually impaired.

It is important that the best interests of the child be considered above all others. These interests cannot just reflect the child's present needs, but must also consider his or her future needs. The individual as a unique whole with all of his or her abilities and talents, inabilities and problems must be assessed to make the right determination.

The most effective way to do this is to look at information about the student's eye condition, functional vision, possible use of low vision aids, educational progress, affective development, and physical development. This information can best be gathered through examinations, observations, tests, checklists, interviews, anecdotes, and other means by a number of people. These people make up the interdisciplinary evaluation team.

When all of this relevant information has been gathered, the team meets to share and discuss the results of their individual assessments. Each of these assessments is like a single piece of a puzzle. By sharing their information and expertise with each other, the team members attempt to create a picture of the whole child and to determine the best learning media for him or her to use at this particular time. Professionals, families, and students must work together to assess, evaluate, and determine the most appropriate reading and writing methods and media.

Who should be members of the interdisciplinary team?

Any concerned person in the child's environment with whom he or she comes in contact may make the initial referral, but the following individuals have special roles to play in the assessment process. Some will actually meet to make the decision and recommendations, but all will contribute information upon which this decision will be based.

For further discussion of the role each member of the team is expected to play and what to do if your educational system does not have one or more of the people described, read the sections which follow this one.

1. The student – the most important team member
2. Family – parents, guardians, and/or caretakers

3. Teacher of students who are visually impaired and responsible for this student

4. Teacher who has primary responsibility for this child's education if other than teacher of students who are visually impaired
   - Regular classroom teacher
   - Special education teacher in another disability area

5. School administrator or designee

6. Medical specialists – ophthalmologist, low vision clinician, and/or optometrist – especially one who works with an educator in the field of vision

7. Psychologist

8. Educational diagnostician, psychometrist

9. Social worker

10. A supervisor of activities requiring movement – orientation and mobility specialist, playground supervisor, physical education teacher

11. Occupational or physical therapist

12. Speech therapist

13. Audiologist

14. Early childhood specialist (when appropriate)

What roles will the interdisciplinary team members have in the assessment?

1. **Student.** The student who is being assessed is often left out of the assessment process. The younger a child is, the easier it is to assume that the decision can be made without the child's presence. Just as parents may have very definite ideas about the learning media for their children, the children themselves may also have very definite opinions, wants, and desires. The children's feelings should be taken into account whenever possible. Students, especially older ones, who have played an active role in the process will be more likely to support the decision that is made.

2. **Families.** Families have much to contribute both to the assessment process and to supporting the students as they

learn in the selected media. Families may include parents, guardians, or caretakers who are responsible for and concerned about the child's welfare and educational development.

Many families know very little about blindness and visual impairment, but they are willing to learn. Families who are well-informed can be most helpful in selecting learning media.

Families new to the special education process need various kinds of information. Some may be open to new information. Others may resist various concepts, especially if they have come to view blindness-related techniques such as the use of braille as inferior to the use of print. Some families may be overwhelmed by their lack of knowledge, and therefore, may not appreciate the importance of their observations.

Family members should be encouraged to share their observations about how and when their child uses vision. If braille is recommended, they should also learn the rudiments of braille. These skills will help the family support the use of braille in home and school activities. Resource materials on the history, use, and skills of braille should be made available to all members of the family of a child who is visually impaired.

Family members who communicate openly with their child's educators can provide valuable information about the student's performance at home. They can also discuss their expectations for the child, their attitudes toward various learning media, and their perception of the student's future needs. Information of this kind from a child's family is critical to providing a strong foundation for reading and writing.

3. **Teacher of students who are visually impaired.** The teacher of students who are visually impaired and who is responsible for the student who is being assessed is also the school official who is most likely to be responsible for gathering the information for this assessment. This teacher may also be responsible for implementing instruction and developing a curriculum for the child to follow.

   Ideally, this teacher should have some background and experience in assessment of children who are visually impaired, a good understanding of the various levels of normal child development and what may be expected at each level. It is also necessary to have the ability to make concrete recommendations and communicate the visual needs

of the individual to the members of the team and to those who work with and are responsible for the student's education.

The teacher of students who are visually impaired is in a good position to make relevant observations and use sound judgment in completing the assessment, using existing information about the student's academic achievement, developmental level, and medical history.

This teacher will be the one who encourages the family to relate their observations about how and when the student uses vision and to share their feelings about the reading medium they feel the student should be using. This teacher should build a relationship with the family so that they will feel comfortable enough to talk about their child. At the same time, the teacher may have to educate the family about braille so that they will have a good basis for their decisions concerning their child's education.

4. **Classroom Teacher.** The teacher who has the primary responsibility for the student's education in the classroom is an important member of the interdisciplinary assessment team. This teacher may be a regular classroom teacher or a special education teacher in another disability area. This teacher might even be a teacher of students who are visually impaired in a self-contained or resource room in either a day or residential school.

   The classroom teacher spends the most time with students and is able to observe how they perform on a variety of tasks and in a variety of situations, and may be in the best position to compare their performance with peers to determine how well they are keeping up. It is also possible that this teacher because of availability may have good rapport with the students' parents.

5. **School Administrator or Designee.** The school administrator or designee is usually responsible for bringing the team together for the assessment meeting. Ideally, this person would be trained and experienced as a teacher of students who are visually impaired. If not, this could be a good learning experience. In either case, the administration controls the purse strings and needs to be in on the planning. If the administration sees a real need for additional services for this child, more effort will be made to fund those services.

6. **Medical Specialists.** Medical specialists involved in the assessment could include the family physician, pediatrician, ophthalmologist, low vision clinician,

and/or optometrist. Information from these medical personnel will be essential to a good assessment. However, in most cases this information will be furnished in a written report rather than by a specialist attending the assessment meeting. Occasionally, a medical specialist, especially one who works closely with an educator in the field of vision may attend an assessment meeting. This will be a good learning experience for the specialist whose expertise is medical or functional rather than educational.

7. **Other Possible Team Members.** In addition to the people already mentioned who will play important roles in the assessment of the child, a number of other people may be able to make valuable contributions to the assessment process. These people include a psychologist; educational diagnostician; psychometrist; early childhood specialist, particularly one experienced in working with children who are visually impaired; a social worker; a supervisor of activities requiring movement such as an orientation and mobility specialist, physical education teacher or playground supervisor; occupational or physical therapist; speech therapist; and audiologist. Because of the uniqueness of each child and each school situation, the people who work with the child and have valuable contributions to make to the assessment process will vary from child to child. As was the case with the medical specialists, these people often may not attend the assessment meeting but may contribute their unique perspective through a report or an interview.

8. **Alternative Personnel.** Every situation is unique. Therefore, the people who are included on the assessment team may have different titles and job descriptions than the ones mentioned above. The important thing for this assessment is not what the person's title is, but what that person has to contribute. In the sections that follow, information which is essential for a good student assessment will be described and instruments for obtaining this information will be suggested. This information must be collected for every assessment. The individual who will probably be responsible for compiling information for a student profile is the special education teacher whose training is in the education of children who are blind or visually impaired.

PART II

Procedure Followed

Section 3 - Assessment Procedure

ASSESSMENT PROCEDURE

What is the assessment procedure that should be followed for selecting the appropriate learning media for students who are visually impaired?

The determination of the student's learning media must be made by an interdisciplinary team. This team will evaluate the student using a variety of materials before reaching a conclusion. It is important to remember that the parent and the student are members of the team and have major roles in the decision-making process.

The following is an outline of the assessment procedure which should be used:

1. Referral
2. Selection of Interdisciplinary Assessment Team Members
3. Data Collection
   - a. Background Information
   - b. Medical Assessments
     1. Eye Report
     2. Physical Report
   - c. Low Vision Assessments
     1. Functional
     2. Clinical
   - d. Educational Assessments
     1. Cognitive
     2. Affective
     3. Psychomotor
   - e. Environmental Assessment
     1. Educational
     2. Family and Home
        - (a.) Parents
        - (b.) Students
4. Data Interpretation
5. Assessment of Results by Interdisciplinary Assessment Team
6. Media Recommendation
7. Implementation
8. Follow-up Evaluation
   - a. Required
   - b. Upon request

What activities should occur at each stage of the assessment procedure?

1. **Referral**

The assessment procedure usually begins with a referral to the local school system. The referral may be made by the parent, teacher of students who are visually impaired, classroom teacher, ophthalmologist, the student, or anyone else involved in working with the student. The school system will then contact the parent or guardian of the child to explain the evaluation process, why the child has been referred (if the referral comes from someone other than the parent), and obtain written permission to begin the assessment process.

Ideally, the initial evaluation should be done before the student enters school so that any necessary training in readiness skills (visual, tactual, and auditory) may be started before a formal educational program is begun. However, a student may be referred, evaluated, or re-evaluated at any time.

2. **Selection of the Interdisciplinary Assessment Team Members**

After permission to evaluate the child has been obtained, the interdisciplinary team must be selected. Team members are usually selected by the person in charge of the team. This is often the school administrator, but can be others on the team. The members of the team have been discussed in greater detail in Section 2, The Interdisciplinary Assessment Team but bears repeating here. Ideally, the team should have the following members:

- the student
- a parent
- a teacher of students who are visually impaired
- a primary teacher (mainstream or special education)
- a clinical low vision specialist
- an ophthalmologist
- a psychologist
- a psychometrist or educational diagnostician
- the school administrator

- an early childhood specialist

Additional members may include an audiologist, speech therapist, physical therapist, occupational therapist, orientation and mobility specialist, and social worker, depending on the needs and characteristics of the individual student. Members may also be selected from other disciplines if necessary.

3. **Data Collection**

Information based on the student's visual functioning, tactual skills, intellectual abilities and achievements, learning style, medical history, social skills and attitudes, parental input, and so on is collected through both formal and informal evaluations, observations, and interviews. All information should be both comprehensive and appropriate.

Each component of the assessment process will be explained in greater detail in Section 4, Evaluation of Child Attributes.

a. **Background Information**

The first step is to accumulate as much background information as possible. This includes:

- prior medical reports
- vision assessments
- educational and psychological tests
- developmental milestones
- orientation and mobility reports
- sociological interviews or observations

This information will be useful in determining the methods and materials to use in the evaluation, as well as in providing information about the student's progress or lack of progress.

b. **Medical Assessments**

The medical assessment consists of two separate components, and both are important when considering the total child. These must be completed by a member of the medical profession. They are:

(1) Eye Report

The eye report should be current and verify that the student is visually impaired. It should contain the following information:

- etiology

- diagnosis
- treatment
- near and distance acuities (with and without correction)
- visual fields (blind spots or scotomas)
- age of onset
- medication (to control glaucoma, etc.)
- prescription

One of the most critical components of the eye report is the stability of the student's eye condition. If the condition is not stable, this must be taken into account and discussed when determining the student's learning media.

(2) Physical Report

The general physical report should be reviewed to determine whether the student has other medical conditions, either physical or cognitive, that would affect the selection of learning media. This report could include information about such things as stamina, motor development, diabetes, cerebral palsy, hearing loss, or mental retardation.

The report should also indicate any medication that the student is taking which could affect visual or tactual functioning. Many medications can cause nystagmus, blurry or fluctuating vision, and dilated pupils.

c. **Low Vision Assessments**

The low vision assessments, both clinical and functional, will be critical components of the student's evaluation. Both should be done by someone who is trained to evaluate students who are visually impaired.

(1) Functional Low Vision Assessment

The teacher of students who are visually impaired should administer the functional low vision assessment for the purpose of providing a description of the child's ability to use vision in both an educational and a home setting. The results of this assessment point out problem areas in the educational setting and help set priorities for using low vision procedures and technology to resolve those problems.

The functional low vision assessment should evaluate the following factors:

- physical factors (working distance, endurance, fatigue, eye strain, headaches, stamina, posture, head position)
- environmental factors (natural and artificial lighting, glare, color, and contrast sensitivity)
- print reading factors (demands created by print size, print style, spacing, clarity, contrast, reading speed, comprehension, and accuracy – both silently and orally)
- writing media
- ability to use the blackboard
- non-prescription aids (tilted desk surfaces, typoscopes, dark lined paper)
- prescription aids (what has been tried in the past, effectiveness, portability, frequency of use, independent use)

If the student has had a functional vision assessment in the past, the results of that exam should be compared with the current information to see if there has been an increase or decrease in the student's visual functioning. If a decrease is noted, this will have a significant impact on selecting appropriate learning media or recommending a change in the current media.

(2) Clinical Low Vision Assessment

This assessment is performed by a clinical low vision specialist who looks at the following aspects of the child's vision:

- distance visual acuity
- intermediate distance visual acuity
- near visual acuity
- refraction
- contrast sensitivity function
- binocularity
- central fields
- peripheral visual fields
- glare and illumination
- color vision
- ocular-motor skills
- low vision prescription

The clinical low vision assessment occurs after the teacher of students who are visually impaired has conducted a functional low vision assessment. This evaluation should not take place unless the teacher of students who are visually impaired is present.

The clinician will evaluate the potential usefulness of any low vision devices in regard to learning media in addition to evaluating the present visual status of the child.

d. **Educational Assessments**

The educational assessment is probably the most extensive since it looks at many different aspects of the child. The evaluations are concerned with the child's cognitive, affective, and psychomotor development. Each of these components has several subsections.

(1) Cognitive Development

The term cognitive is used here to describe intellect, mental abilities, creativity, memory, and reasoning skills.

Cognitive assessment is a relatively formal evaluation and is based on performance rather than observation. Most of the assessment should be completed by a trained psychologist, educational diagnostician, or psychometrist, but some information can be gathered from the classroom teacher or by the teacher of the students who are visually impaired. The assessment of cognitive development should include information about the child's performance in these areas:

- intellectual development
- concept development
- language development
- reading and writing
- visual perception/discrimination
- tactual perception/discrimination
- auditory perception/discrimination

If the student is a pre-reader, cognitive development must be evaluated to determine if the student has the mental ability to learn to read. This component will also provide information on the student's readiness for learning to read.

If the student is already reading, the assessment team should determine whether the student's performance is commensurate with ability and school placement. Factors which must be considered are:

- reading rate
- comprehension
- accuracy

- whether the student's reading skills have progressed over time
- chronological age and grade level
- student's performance on class assignments, achievement tests, and grades

If there are discrepancies between the performance of the student who is visually impaired and his or her peers in these areas, this may be an indication that the student needs a more appropriate learning medium for some, if not all, tasks.

The student's conceptual and language development will also provide information for determining the appropriate learning media. Here again, the team must consider whether the student's ability is commensurate with chronological age and developmental level.

Perception and discrimination skills should be evaluated with caution. Consideration must be given to whether the student has had sufficient tactual or visual opportunities to develop these skills. Performance may be affected by lack of opportunity for tactual or visual exploration or approach, rather than ability. If the student has lacked the opportunity for this, training and experience should be provided and then the evaluations may be conducted, or a reassessment may be necessary.

(2) Affective Development

The student's affective development is often given little attention, but it is often just as important as the cognitive development. The assessment team should focus on how the student functions as a whole unit, rather than on just certain aspects. In assessing a student's affective development, the team should consider these factors:

- functional development outside the classroom
- socialization skills
- motivation for literacy
- motivation for visual learning
- motivation for tactual learning
- motivation for auditory learning

Assessment of functional development and socialization skills outside the classroom can provide information on whether the student uses a

more tactual or visual approach to non-academic tasks (such as in the lunchroom, in the library, playing on the playground, or playing at home). Information will also be provided or whether the child considers himself/herself sighted or blind, whether the child pretends to see in order to please others, and how strongly the child associates with peers who are sighted and visually impaired.

The student's motivation is also a critical issue. If the student has negative perceptions about reading or about using a certain medium, this must be taken into consideration. Both the family and the student may need assistance in understanding the benefits of each medium. If students do not understand the benefits of a particular medium, it will be extremely difficult to persuade them to use it and training will likely be unsuccessful.

The assessment of affective development is often done informally, either through observations or interviews. It can be conducted by the psychologist, educational diagnostician, psychometrist, early childhood specialist, classroom teacher, or teacher of students who are visually impaired, with considerable parental input.

(3) Psychomotor

The last area to be evaluated under the educational assessment is the student's psychomotor skills. Research shows that a close relationship exists between physical development and the development of reading and writing skills. The assessment should include information on the child's:

- general health
- stamina
- gross motor development
- fine motor development
- orientation and spatial development
- mobility

The student's general health and stamina are especially important if there are multiple disabilities. Evaluators should pay strict attention to the child's attendance record. Excessive absenteeism needs to be taken into account. The evaluators should also look at the child's stamina, both visual and physical, and

consider how long the student can use vision efficiently and whether the student tires easily and needs frequent rest periods.

Motor development, both fine and gross, plays a part in determining the appropriate learning medium. The student's motor development should be commensurate with his or her own abilities and those of peers. If the child has poor motor skills, the assessment team must determine whether this is due to a physical problem or the lack of experiences and opportunities.

Orientation, spatial development, and mobility are also key elements to consider. The assessment team should pay close attention to how well the student gathers information about the environment and the process used to travel from one place to another. The team should also note how much information the student acquires visually and how dependent he or she is on auditory and tactual cues.

e. **Environmental Assessments**

The interdisciplinary team must determine how the student functions in an ideal and less than ideal visual environment, in both an educational and a home setting. Five factors influence the student's visual performance:

- brightness
- contrast
- time
- distance
- image size

Brightness means that the child has a sufficient amount of light to complete the visual task. Some children prefer dim lighting while others favor bright lighting conditions. The interdisciplinary team member conducting the assessment should also evaluate whether there is a problem with glare. Glare causes fatigue and discomfort and can easily be eliminated.

The proper contrast between the task and the background will help improve the child's visual performance. Black on white provides the greatest contrast but other colors will also provide good contrast against white or yellow paper.

Students should also have sufficient time to complete assignments. If the student always seems to need an excessive amount of time to complete assignments, the

interdisciplinary assessment team needs to consider whether the current learning medium is appropriate.

Distance and image size are also important factors to evaluate. The child needs to know the proper distance for optimum viewing. The interdisciplinary assessment team should consider the physical comfort of the child and whether speed and accuracy are affected by an extremely large print size.

(1) Educational Environment

The student should be observed in several different settings at various times throughout the day. Areas of concern may be:

- fatigue
- performance
- motivation
- attitude
- use of the various sensory channels
- approach to tasks requiring the use of near vision (especially in relationship to reading and writing)
- the student's overall functioning in an educational setting

It is extremely important that results of the observation be recorded by the evaluator. They may be recorded in the form of notes or on checklists designed for that purpose. Many of these checklists can be completed by the parent, classroom teacher, special education teacher, teacher of students who are visually impaired, or anyone else who interacts with the student on a regular basis. The assessment team may wish to have all of the team members and/or all of the student's teachers complete the checklists and then compare the results. This will help provide a thorough profile of the student and point out areas of consistent strengths and weaknesses. Checklists which cover the areas of concern previously mentioned are included in Appendix B.

(2) Family and Home Environment

The home environment is often difficult to evaluate, but can provide critical information about the student that may have been impossible to obtain in another setting. The student may behave one way at school and another way at home. This could include a comparison of the student's

behavior in a familiar environment and an unfamiliar environment, especially if the student is in a new school or new classroom.

Another benefit from observing the student at home is that information can be obtained from the entire family. This information can include the family's attitudes, expectations, aspirations for the student and whether these goals are realistic. The evaluator may also discern whether the family is fostering dependence or independence in the child by their actions.

The best method to obtain information about the family is through interviews. Interviews may occur in either the home or educational setting. However, both the parents and the student may feel more comfortable and less intimidated in their place of residence. In-home interviews and observations may help establish trust and open communication between the family and the assessment team.

(a) Parent Interviews

The interview may or may not occur during the observations. Parents should be encouraged to discuss how and when the child uses vision, their expectations about the learning media, and their attitudes towards the various learning media.

The interviewer should be familiar with the questionnaire that is being used and should ask direct and appropriate questions. These questions should be geared to obtaining as much information as possible. The interview should be conducted with respect for the parent's needs, concerns, and expectations.

Since parental attitudes about learning media are critical factors for the team to consider, parents with negative feelings about any media will need instruction in the benefits their child may derive from the use of this media.

(b) Student Interviews

Interviews with the student, either formal or informal, can provide information concerning the student's feelings about future needs, expectations, and aspirations as well as

perceptions about visual functioning.

Probably the most critical component of the student interview is the student's attitude toward each learning medium. It is important to discover if the student has preconceived notions either for or against the various media. It is also important to determine whether the student is aware of the media and technology that is available. If the student does not have this information, someone should explain what is available. The evaluation team should remember that print and braille media are equally efficient and should convey this to the student. As with the parents, the interview should be conducted with respect for the student's needs, concerns, and expectations.

4. **Data Interpretation**

After data collection has been completed, each team member should write a report on the area(s) evaluated. The report should include the following information:

- date of evaluation
- student's name and date of birth
- general history (physical, medical, relevant information from previous evaluations)
- initial observations (rapport, student wasn't feeling well, difficulty paying attention)
- instruments and methods used
- student responses, areas of strengths, weaknesses, or other data which may be important in the evaluation
- test scores
- conclusions (general summary of findings)
- recommendations

5. **Assessment of Results by Team**

The interdisciplinary assessment team, including the parents, and possibly the student, will meet and discuss the findings of the evaluations. They will discuss any changes in the student's needs and check to be sure that everyone present understands the findings and their implications. If a team member cannot be present, relevant information from that member's report should be read by the school administrator or designee and taken into consideration.

After reviewing the information, the interdisciplinary team will determine if the student should continue using only the current media, or should receive instruction in braille or

print as a supplementary medium, or receive instruction in both. The prevailing service delivery system must NOT influence the selection of the learning media.

6. **Media Recommendation**

The evaluation team must remember that the learning media must be both portable and versatile and that the existence of reading machines and other complex technology should not detract from the student's right to have truly independent, functional learning media (Maryland School for the Blind, n.d.). The student's preferences and concerns should be given consideration, but all the components from the evaluation should be taken into account. Vital factors are the student's future visual changes as well as future educational and vocational needs, especially during times of transition. Remember that as the student advances from elementary school to middle school and from middle school to high school, print size diminishes and reading demands increase. The student should leave the school system with the literacy skills necessary for success in higher education and/or employment.

The evaluation team should also remember that the recommendations they make are not set in stone. A student's needs may change over time and what was appropriate at one point in time may not be appropriate in the future. Also, the medium does not have to be either print or braille. Many children benefit from being taught both, with the final outcome a student who is able to choose and use the most functional medium for a given situation.

The student with multiple disabilities may have different needs from one with only a visual impairment. A student with multiple disabilities may need more functional reading skills than literary ones (South Carolina Department of Education, 1993). The special needs of this student will have to be considered when deciding upon the most appropriate learning medium and when implementing that decision.

7. **Implementation**

The media selection process is not over after a decision has been reached. A plan for carrying out the recommendations must be developed. Some, but not all, members of the interdisciplinary team will help develop and implement the recommendations.

If training in a new medium is needed, the appropriate team members will decide who will implement the training, what the objectives and goals are, how the goals will be met, how often the student will receive instruction, and where the instruction will occur.

Successful performance of the student who is visually impaired rests with both the parent and the professional. It is through encouragement, positive reinforcement, and an enthusiastically taught, carefully sequenced curriculum that a student will have an opportunity to reach his or her full potential.

8. **Follow-up Evaluation**

The follow-up evaluation will look at several things. It will examine the efficiency of the media the student is presently using and determine if it meets the student's current and future needs. It will also determine if the student is progressing at a rate comparable to his or her abilities.

a. **Required**

It is important that everyone involved in the assessment process remember that this is not a one-time decision. P.L. 101-476 requires the IEP Committee to conduct a complete follow-up evaluation three years after the initial one. Also, the IEP Committee must meet once a year to review the student's progress. It is also necessary for the student's teachers to do an evaluation at least every six months. This will ensure that changing needs will continue to be met as the student progresses through the school system.

b. **Upon request**

If the media is not meeting the student's current or future needs, then the student may need to be re-evaluated to determine the appropriate learning media. This may be requested at any time.

This has been a brief introduction to the assessment process. Although it may seem overwhelming, it actually occurs in a logical manner. The next section will explain the student evaluation in greater detail.

Note: A short outline of this section and checklists can be found in Appendix A.

PART III

Attributes Assessed

Section 4 - Child Attributes

Section 5 - Environmental Attributes

ASSESSMENT OF CHILD ATTRIBUTES

The following section is intended to assist in the development of educational goals and Individual Educational Plans for children who are visually impaired. As a part of the process, it is specifically designed to assist in the selection of the most appropriate learning media for these children. The areas for assessment which are included are:

1. Eye examination by an ophthalmologist or optometrist
2. Functional vision assessment by an educational specialist trained in the education of children who are visually impaired
3. Functional vision assessment by a clinical low vision specialist
4. Educational assessment by persons trained to work with children who are visually impaired
5. Assessment of educational and family environments

The section on functional vision assessment by an educational specialist was written by Ruth Holmes, retired assessment specialist at the Illinois School for the Visually Impaired.

The section on functional vision assessment by a clinical low vision specialist was written by Randall Jose, optometrist at the Houston Lighthouse for the Blind, Houston, Texas.

Each of these areas is discussed in detail in this section, and suggestions are given for conducting the evaluations or for obtaining the information needed from each area. An eye report form, checklists, and informal assessment procedures can be found in Appendix B. In addition, references to criterion-referenced tests and norm-referenced tests are given in Appendix C.

Eye Report

Eye examination by ophthalmologist or optometrist

The purpose of this examination is, obviously, to gain as much information as possible about the physical (medical) aspects of the child's visual impairment. The most efficient way for team members to get this information is through an eye report furnished by the ophthalmologist or optometrist (preferably an ophthalmologist). Eye reports take many forms and are interpreted in many ways. If they are used appropriately, however, they can furnish valuable information to persons responsible for selecting the appropriate learning media for children who are visually impaired.

Much of the information in the following is taken from an article entitled "The Eye Report Points the Way" (Dennison, 1981). Although it is not a new publication, it provides an excellent description of what an eye report is and what it is **not.** Appendix B contains questions in the form of an eye report which should be answered by the ophthalmologist following the eye examination. This report will provide the interdisciplinary team with the information they need regarding the physical (medical) aspects of the child's visual condition.

What questions should be answered by the eye report?

The purpose of this section is to aid the team in making the most efficient use of the information found in an eye report. First the team members need to recognize the report for what it is – a communication from a professional to a professional. It contains confidential information. It is the record of what could be determined at the time of the eye examination, either from medical examination or from history taking. It is <u>one</u> set of data for one individual student which can assist in educational planning and in selecting the appropriate learning media. It is a listing of <u>some</u> of the essential materials a student needs in order to build a productive and successful life.

Secondly, the team needs to recognize the eye report for what it is not. Its limitations must be known. The report is only as good as the interest and knowledge of each of the professionals who handles it. It is not a news/gossip column. It cannot be assumed to be a sealed foreordaining prophesy in today's world of science. It is not a clue to services needed by *all* students. It is not the architectural design for an individual's entire life.

The above means that the team is going to use the Eye Report to help them do the most efficient planning with and for each student who is visualiy impaired for whom they have responsibility. Additional source material should be sought regularly so that interest and information can be kept current.

Eye reports vary from a scribbled prescription (Rx) to multi-paged, single-spaced, highly technical forms. However, several basic types of information are needed for educational planning, including the selection of the appropriate learning media. These types of information are:

- visual acuity - distance and near - with and without correction
- prescription (Rx) being worn
- diagnosis
- etiology
- prognosis
- field of vision

Visual Acuity. Distance visual acuity is usually reported in Snellen notation (National Society for the Prevention of Blindness, 1969). Acuities reported in this notation look like fractions, but are not. For example, a visual acuity of 20/20 means that the person being tested can see at 20 feet what a person with normal vision can see at 20 feet. An acuity of 20/200 (legally blind) means that the person being tested can see at 20 feet what a person with normal vision can see at 200 ft. It is important to understand that some students who are legally blind according to Snellen notation may have enough vision to use print and other visual materials, to some extent, as their learning medium. However, it is also important to understand that braille may be the most appropriate learning medium for these students. It is also extremely important to remember that many of these students may use both braille and print as their learning media.

Near visual acuity is most frequently reported in the American Medical Association (A.M.A.) notation. This notation is in inches and indicates the best distance for reading. As in reporting distance acuity in Snellen notation, the A.M.A. notation resembles fractions, but they are not fractions. For example, normal reading vision would be reported as 14/14 (in.). The notation for legal blindness would be 14/140 (in.). The interpretation of these notations is the same as that for distance vision.

There are other notations for visual acuities. If the notation on the eye report presented to the team or to the teacher is not the same as those described above, an ophthalmologist, optometrist, or optician should be consulted.

Occasionally, the difference made by the corrective lens prescribed by the eye specialist may help in making the decision regarding the learning media, though not always. For example, if no corrective lens is prescribed, it does suggest that the central vision cannot be improved. However, some individuals manage to function rather effectively with extreme low acuity while others seem not capable of functioning even though possessing much better acuity. In such cases, the team and/or teachers must use other information in

addition to visual acuities to help in making a decision as to what medium or combination of media will serve the student best.

Prescription (Rx) Being Worn. The strength of lens prescriptions is measured in units called diopters. Diopters are reported in the form of numbers which range from 1 (one) upward. Obviously, the higher the number, the stronger the correction. Numbers preceded by a plus (+) indicate a correction for hyperopia (farsighted) and those preceded by minus (-) indicate myopia (nearsighted).

When studied in conjunction with the strength of the prescribed lens, the correction achieved can have significance in working with the individual student. For example, if vision of Hand Movements (the ability to see the shadow of hands and detect movement) can be corrected to 20/200 with a minus 10 diopter lens it is reasonable to expect the individual to wear the prescription with little resistance. If, however, vision of 20/400 can only be corrected to 16/300 with a plus 11 diopters lens the possibilities of belligerent resistance are great.

Information about lens prescriptions is frequently the one least appreciated by educational planners. Yet, if its basic principles are understood it is not difficult to interpret and it can serve in several capacities:

- It may supply additional information. If the eye specialist gives an incomplete diagnosis, the Rx will complete the refractive diagnosis. (Myopia might be the diagnosis and the Rx indicate the condition is compound myopia or a prism symbol will indicate a latent muscle imbalance which may not be mentioned.)

- It serves as a check and balance against other items. If the prognosis is given as <u>stable</u>, comparison of the Rx with that of other years will be a reinforcement or a refutation. If the prognosis is given as <u>grave</u>, comparison of the Rx's of several dates will indicate how <u>grave</u> the situation is at the present time.

- Third, the prescription considered with other items can aid the team and/or the teacher to better understand problems related to wearing the prescribed glasses, restricted fields of vision, and distance required for critical visual tasks.

Some prescriptions which may be found on the eye report are given below. This outline is an oversimplification of the combinations possible and is given only as a review (or introduction) for persons who need to be alert to the information which can be gained from the written prescription.

Some samples of Possible Rx's are:

Myopia	-12.25 D. (Diopter) (Indicates rather high nearsightedness).
Compound Myopia	-12.00 -.75 cyl. x 90° (Indicates astigmatism in addition to myopia).
Hyperopia	+6.00 D. (Farsightedness, strong enough to give symptoms of eye fatigue.)
Compound Hyperopia	+6.00 +.75 x 15° (Indicates astigmatism in addition to myopia.)
Post Cataract	Usually requires a high plus lens (+9.00 or more) unless the cataractous lens was removed from a myopic eye. If the eye was corrected with a -15.00 D. lens before surgery for cataract, the Rx might become a -4.00 D.; if it had been -7.00 D., it might be changed to a +4.00 D. for the aphakic (post cataract) eye.
Astigmatism	+1.75 cyl. x 75° (Correction for astigmatism only.)

The above are very basic. Specialists have many ways of indicating corrections. If other notations are used, the eye specialist should be consulted.

Diagnosis. The description of what is being dealt with is essential. Few would question the need for this item. Yet, there is great disparity in the accounts given for it. Incompleteness seems to be the greatest problem. For example, the eye specialist may very well give only myopia as a diagnosis when in fact the eye condition that presents the greater problems during school days may be night blindness which is part of the larger and more inclusive diagnosis of retinitis pigmentosa (primary pigmentary degeneration). The myopia may be of little consequence in the academic setting for which the team will be planning. The night blindness, on the other hand, may be presenting insurmountable problems to the student who is visually impaired without anyone knowing the condition exists.

Etiology. The why (origin) of the eye condition gives some input for age of onset and inheritance. Frequently a few words, perhaps one word, in this item is the best clue a teacher has in attempting to work with the student who is visually impaired and the family of such an individual. <u>Inherited</u> carries its own flag! Sometimes parents experience a feeling of guilt when the etiology is given as inherited or congenital. Team members and teachers working with these families should be extremely sensitive to this problem.

Prognosis. This is the expected progress or ultimate development of the eye condition. This is one item which has significant impact on the selection of the learning media. For example, students with a diagnosis of primary pigmentary degeneration

(retinitis pigmentosa) and a record of retinal detachment in one eye along with grave as a prognosis should certainly begin learning braille at a very early stage so that educational progress does not stop when they are no longer able to function visually. Also, activities of a strenuous nature might be guarded against and career planning should include consideration of the severity of the eye condition.

Field of Vision. The visual field, or field of vision, is the entire area which can be seen while the eye remains fixed on one point. If the widest angle of this field which can be seen is less than 20 degrees, the person can be considered legally blind (Harley & Lawerence, 1984). Children with such a visual field restriction may be able to read print, but the reading speed would probably be very slow since only a part of most words could be seen. For these children, it is very important to evaluate the reading speed, fatigue factor, and comprehension level before a decision regarding reading media is made. It is possible that some children with restricted fields may read both braille and print.

Other Considerations

Once the eye report of the child who is visually impaired has been reviewed, the team and teachers need to think in terms of *functioning* vision. Functionally, vision is either central or peripheral.

Central Vision, or macula vision, provides color discrimination and allows critical or sharp (exact) seeing tasks. Reading, whether close or at a distance, is a central vision task. This is the vision which is attained when corrective lenses are prescribed. When the macula is not developed sufficiently, as in total cataract, or is deteriorated, as in macula degeneration, corrective lenses are of no value. Acuity can rarely be better than 20/200 if macula or central vision is lost. With this problem a student may wear no glasses, appear to see normally, and not be able to do any critical visual task.

Peripheral Vision, which provides awareness of movement and serves in dim light, is vital to mobility. Without peripheral vision, the student is literally "lost in a telephone booth." More important is the fact that with only peripheral vision remaining, travel and many school activities can be major problems.

Eye Report Form

Appendix B contains an example of a relatively complete eye report form. Items are a composite of a number of eye report forms. This form provides excellent frames of reference both for the eye specialist who will complete it and for those who would be expected to use the completed form.

Physical Report

The general physical report should be reviewed to determine whether the student has other medical conditions, either physical or cognitive, that would affect the selection of learning media. This report could include information about such things as stamina, motor development, diabetes, cerebral palsy, hearing loss, or mental retardation.

The report should also indicate any medication that the student is taking which could affect visual or tactual functioning. Many medications can cause nystagmus, blurry or fluctuating vision, and dilated pupils.

Functional Low Vision Assessment

Visual abilities are not innate, automatic reflexes, but a progressive skill in discrimination involving cognitive interpretation and subsequent conceptual integration of environmental stimuli. This includes the reactions and interactions of a person in a total learning environment. The total learning environment may be manipulated, the individual pace set, and that pace regulated as a person grows and learns. Deviation and dysfunction do not exclude the development of the visual process, if the steps in the developmental sequence of visual functioning are used as a base from which to assess and build a program of learning.

Functional vision refers to the ability to use vision to perform desired tasks (Corn, 1986). When speaking of functional vision, it is necessary to consider the entire visual process rather than just the abilities of the sensory organ itself to receive light rays. Today it would seem that the population with visual impairment includes many students who have sensory organ receptors that are relatively intact, but have problems related to the perceptual process itself. This may cause a student to demonstrate problems with interpretation of what is being seen and integrated into daily living. The student may not be able to sustain visual attention with any degree of success especially in the early years. Without special developmental and systematic instruction, the visual stimuli does not enter the system in any meaningful manner.

The primary challenge of a functional low vision assessment is to determine the present level of visual functioning, the special individual needs concerning use and non-use of vision, and to make concrete suggestions for present level educational planning. These suggestions and recommendations should then be considered in conference with the other members of the interdisciplinary assessment team to determine how the student's special needs may best be integrated into the Individual Educational Plan (IEP). The assessment, suggestions, and recommendations will also provide a basis for on-going review and planning.

What should be included in the functional low vision assessment?

The general plan for the assessment of visual functioning in children should follow the same sequence as the physical development of visual functioning in these children. Decisions related to the development of the assessment plan, including the materials to be used, should be based on this developmental sequence.

Basic Sequence in the Development of Visual Functioning

- Light reception
- Fixation
- Focus
- Tracking and scanning
  - Horizontal
  - Vertical
  - Diagonal
  - Circular
- Accommodation
- Discrimination
  - Form - gross shapes
  - Specific detail
    - Outer
    - Inner
    - Various sizes
    - Color, light and dark
    - Likeness and difference
- Visual memory - various levels
- Visual motor skills - various levels
- Spatial relations and orientation
- Visual discrimination and imagery (perceptual - cognitive)
  - Figure-ground differentiation
  - Visual closure
  - Part-whole, whole-part relationships
  - Matching
  - Categorizing
  - Sequencing
- Integration

Sequence in Presentation of Materials

- Concrete - actual object
- Representative - picture or drawing
- Abstract or symbolic - letter form or some marking representing an object, picture, or environment such as words and sentences which stand for or suggest something else when seen

Adapted from: Barraga, N. C., & Morris, J. E. (1980). Source book on low vision. Program to develop efficiency in visual functioning. Louisville, KY: American Printing House for the Blind.

Other Factors to Evaluate

The following factors should also be evaluated for most students:

1. **Working distance.** Near and distance, with or without correction. It is preferable to have these measurements made by an optometrist or a clinical low vision specialist. However, experienced evaluators may be able to approximate distances.

2. **Use of blackboard.** Ability of the student to use the blackboard. Indicate the type of illumination that is needed.

3. **Non-optical aids.** This includes the following:

   a. Lighting assessment
      - Penlights can designate visual response (flashlights may also be used).
      - The Light Box (available from the American Printing House for the Blind) can be a good assessment tool in checking response to various intensities of light, especially in the very young child or in a child who cannot give a verbal response.
      - Adjustable floating arm desk or floor lamps that can be moved and arranged to the best advantage of the student to determine if additional well-directed light is needed. For some students much less light than ordinary room light may be in order.
      - Sun filters can be used to regulate glare.

   b. Contrast in materials and figure-ground discrimination, near and distance, in both indoor and outdoor environments

   c. Print size and clarity

   d. Various writing media such as felt tipped pens and soft pencils

   e. Regular ruled paper versus special darker ruled paper for writing

   f. Tilted desk surfaces, reading stands, music racks

   g. Typoscope and/or straight strip to help maintain the line in continuous text

h. Eyeglass straps or neck chain for reading glasses or full-time wear glasses

i. Use of CCTV

j. Use of Computer

4. **Optical aids.** Those in use or those which can be used should be noted both for near and distance as well as for full-time wear. The type of prescribed aids should be noted and their purpose described (see section on Clinical Low Vision Assessment). They may be prescription glasses for full-time wear, high-power reading glasses, a magnifier, a telescope for distance, or combinations of these. The condition of the aids should be noted as well as the ability of the student to use them properly. If the aid or aids are rejected, it is important that those working with the student be aware of this. If a magnifier or telescope is tried and found to be helpful, this can provide impetus toward securing a low vision evaluation by an ophthalmologist or optometrist who specializes in this area.

Who will conduct the functional low vision assessment?

1. Teachers of students who are visually impaired, preferably with:

   a. some background and experience in individual testing and diagnosis.

   b. good understanding of the various levels of normal child development and what may be expected at each level.

   c. ability to make concrete recommendations and communicate the visual needs of the individual to the assessment team or those who work with and are responsible for the student's education.

2. An educator trained and experienced as a teacher of students who are visually impaired and who is designated as a specialist or supervisor in a residential setting or in a regular public school program.

What is the basic procedure for a functional low vision assessment?

No two evaluations will be exactly alike. They may all follow a basic pattern, but some may consist of only selected parts of the overall assessment plan. This will depend upon the needs of the student being evaluated. The environment in which the assessment is being conducted or the purpose for which it is being conducted

may also dictate how it is done.

The following outline provides a base. Each item will be discussed briefly on the following pages.

1. Referral
2. Collecting and Studying Background Information
3. Observation
4. Interview
5. Formal Assessment
6. Report

Caution: Most professionals who conduct functional vision assessments do not have medical training and are not doctors. They can provide pertinent observations and information that can be of value to the ophthalmologist or optometrist, but should be careful not to overstep the bounds so that good communication between the doctor and members of the assessment team can be productive.

1. Referral

The purpose for the referral often helps to determine the direction the assessment will take, the assessment instruments chosen, and the methods used in the evaluation of the child's visual functioning. The assessment process may also reflect observations, questions, and concerns of the person or persons who make the referral. Some common sources of referrals are:

- Parents, guardians, and/or caretakers
- Teachers, supervisors, and administrators
- Special teachers or workers in other disability areas
- Medical specialists, especially those who work with an educator of children who are visually impaired

2. Collecting and Studying Background Information

One of the major steps in preparing for the functional low vision assessment is to gather as much background information as possible about the student. This information will help the assessment team make decisions about the direction of the evaluation and the selection of instruments and tasks to be used. Background information is especially important if the evaluation is an initial assessment. The following information should be gathered before the formal low vision assessment:

<u>Medical</u>
- Ophthalmological and/or optometric report
- Clinical low vision report
- Report of student's general physical condition

<u>Educational</u>
- Academic records and IEP

- Chronological age and grade level
- Developmental level

Social and psychological report or notes

Orientation and mobility report

3. Observation

Observations are a vital part of the assessment. They often supply information which is not always obtained in the formal evaluation time. Observations can be made by the evaluator in a variety of settings as well as at different times, or they may be a collation of the observations of several individuals who have a close working relationship with students. These observations should be largely concerned with the visual behaviors of the students as they relate to the many facets of daily living and learning.

People doing the observations may have different degrees of knowledge regarding visual behavior responses. Therefore, it is recommended that most evaluators use checklists. Checklists provide directions for the observer to follow, provide good information, and many times can be completed in a relatively short time. The evaluators should have several checklists on hand from which to choose so that individual needs may be met both for the observer and the student. Short checklists that provide basic information are often preferred, especially by the busy educator, by a person without much background, or by the evaluator. Appendix C provides information about a number of checklists which are appropriate. Some persons from whom information for completing the checklists may be obtained are:

- Parent, guardian, or caretaker
- The regular classroom teacher
- Special education teacher if other than the evaluator
- An administrator who has contact with the student
- A supervisor of activities requiring movement - supervised in an open situation such as a playground
- Any other person in the student's daily environment

When checklists are not appropriate, or are not available, the collection of data from several observations is useful.

4. Interviews

Interviewing appropriate personnel may be done at the time of observation or at different times. The evaluator should ask direct and appropriate questions to get as much information as possible about the visual behavior of the student. Questions on the checklists or other publications listed in Appendix C can serve as a guide for these questions.

If the child is very young or low functioning and not very verbally responsive, the parent or caregiver may help by answering questions during the course of the formal evaluation. Observations may also be done at this time as well. All of these activities can help to establish rapport and communication with the child.

5. Formal Assessment

Types of assessment

- An initial evaluation of a student.
- A follow-up evaluation to observe changes in visual functioning, to monitor progress, to make further recommendations.
- Clinical-Diagnostic teaching which is on-going and in which the child is seen on a regular basis. This method may be used when there is little or no communication with a very young or developmentally delayed student.

Setting for assessment

- A specially designed and designated room for the purpose of low vision testing in a school, a low vision clinic, etc.
- A room designated for use when evaluating a student in a regular day school program when the evaluator is itinerant. This may be a media center, a cafeteria, a cloak room, or an unused classroom.
- A home which might be appropriate for a very young child.

Gathering materials

Having the necessary materials at hand will help the evaluator get as much information as possible in the allotted time. Items you may need include:

- the instrument or instruments to be used. This may include many of the materials needed in the Diagnostic Assessment Procedure from the Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980).
- a portable light that may be adjusted as well as a light box if the location allows.
- an adjustable surface such as a reading board.
- clipboard and paper for note taking.
- appropriate materials that may be used to re-enforce a problem response or to establish rapport and allow for observation of visual behavior (especially in the visual-motor areas), or to establish reading patterns in continuous text.

- several types of pencils and pens and several kinds of paper.
- appropriate level text books with various sizes of print.

Individual needs

The formal evaluation for visual functioning should be tailored to meet the individual needs of the students:

- The age and/or developmental level of the student
- The educational level of the student
- The needs established in the referral
- The ophthalmological report
- Any information about related medical and/or limiting physical problems

Structure of the assessment

The general structure of the functional vision assessment should follow the basic sequence of visual development, as stated above. Preliminary information gathered, observations, and interviews should provide a base line and general direction.

Instruments

The selection of assessment instruments is important so that they may be appropriate for the given situation as well as help to indicate problem areas. Some basic instruments are:

- Visual Efficiency Scale, (Barraga, 1970)
- Diagnostic Assessment Procedure, Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980)
- Parents and Visually Impaired Infants (PAVII), (Chen, Friedman, & Calvello, 1990)
- Functional Vision Evaluation, Project IVEY, (State of Florida Department of Education, 1983)
- Functional Vision Assessment Form, (Texas School for the Blind and Visually Impaired, 1991)

Full references to these instruments, including publishers and addresses, can be found in Appendix C.

Notes

Note taking is vital. Observations while the student is working need to be recorded accurately. If there is not an opportunity to take many notes, write down a word or two that

will direct your thinking, or if possible, use a small tape recorder. Immediately after the session is over, expand your observation by adding other comments. Sometimes little details that are easily forgotten as time elapses can be very important when analyzing the results for the report.

6. Report

Content

Obviously, the report must be based on a thorough study of the data and information gathered. The person preparing the report should look for:

- Areas of strength
- Areas of weakness
- Information such as lighting needs, working distances at near and far, visual motor responses (gross and fine motor), ability to track and follow continuous text, ability to write, writing materials needed, optical or non-optical aids needed, print size, etc.

A general outline for writing the report (see case studies) may include:

- The date of the evaluation
- The child's name and birthdate
- General optical history including any medical or physical problems which might be related
- Initial observations and the general response of the student - general rapport
- Instruments and methods used
- A general discussion of responses, areas of strength, areas of weakness and other observations and data which might be pertinent
- Conclusion - general summary of findings

Recommendations

Recommendations should be concrete, clear, and concise. They may include, but are not limited to the following:

- Recommendations for instruction in areas of weakness
- Recommendations for appropriate learning media
- Recommendations regarding the condition and care of optical aids or glasses
- A time for re-evaluation

CASE STUDIES

The following case studies illustrate the procedures for a functional vision assessment of a preschool child (3 yrs.), a follow-up referral 18 months later of the same child, a primary age student (7 yrs.), a residential school student (13 yrs.), and a high school student (15 yrs.).

These procedures do not have to be rigidly followed, but they do provide guidelines for conducting such assessments. Remember, these are examples of case studies conducted by Ruth Holmes and her conclusions and recommendations may not represent the views of the other contributors.

Case Study One - Preschool Child - 3 Years Old

An initial evaluation of a preschool child not yet assigned to a specific educational program.

Name _____ Date of Evaluation _____

Birthdate _____

A... is a three-year-old female who has a medical diagnosis of Downs Syndrome with hypotonia, bilateral club foot, congenital cardiac problems, and is diagnosed as legally blind. She has had cataracts removed at three months and five months, and is wearing +15.00 extended wear contacts at present. The mother indicates that they seem to help, but there is occasional trouble with slipping. A... appears to tolerate them very well.

A... was evaluated for visual functioning during a one and one half hour session. Her mother was present during the entire session as A... indicated by actions and response that she would be more secure and cooperative if her mother stayed. Her mother interacted with A... and with the evaluator providing additional information as requested. The mother was very cooperative and sometimes provided an avenue through which the evaluator could work with the child, especially at first until good rapport could be established.

A... was unable to walk, but she did scoot around the floor on her bottom. She is able to move to anything within her visual range, and either played with it for a short while or examined it and went on to something else.

Instruments and Methods

1. Diagnostic Assessment Procedure, Program to Develop Efficiency in Visual Functioning, Barraga & Morris (1980)
2. Functional Vision Evaluation, Project IVEY, State of Florida, Department of Education, (1983)
3. Tasks presented and observations made according to the established sequence of visual development
4. Interview of mother

Discussion

A... is visually curious. She is able to accomplish the basic optical functions. She responds to light, reacting with a blink reflex to quick movements. Examination of pupillary response indicated that the left eye appears to constrict more rapidly than the right eye, but they both react to light. It was noted, with the use of a light box in which the light intensity can be regulated and controlled, that she was able to tolerate good diffuse white light of rather high intensity before starting to squint or turn away.

The left eye stayed in an esotropic (turned inward) position while the right eye moved to follow objects a majority of the time. Occasionally she showed an intermittent esotropia with a movement of the right eye in to the nasal side and the left eye out. This movement was not consistent enough to make a determination as to whether she is using one eye more than the other. When the object is positioned just right, she may be using both. She was able to look at and take objects presented from either side.

A... is able to focus, fixate, and track horizontally, vertically, and in a circular pattern following a light, balls, balloons or other items of gross nature. She is able to locate scattered objects with good basic scanning patterns. Her visual attention was relatively short, although she demonstrated some ability to extend this time.

Eye-hand coordination within her level of functioning is good. She is able to reach for and grasp items which are presented within a six to ten inch visual range with accuracy. Her depth perception at near point appeared to be good. She did not under or over reach. She was able to handle two items at a time (one in each hand), and she could place them as directed when one direction was given and one placement requested at a time. She was able to stack two blocks and could accurately place rings on a spindle. She can hold a crayon, but did not show much interest in marking with it.

Working distance was established, but it should be noted that the working space for the evaluation was limited. A... tracked a rolling ball or spotted items on the floor at distances of six to eight feet, but would bring the item up to a six to ten inch range to examine its detail. She moved up to within a foot to see her eyes, nose, and mouth in a mirror. She was able to point to these parts as named.

Conclusions

A... is working at the very beginning of the optical-perceptual level of visual functioning. She is working at an approximate two year level visually. She is visually curious and should be encouraged to develop using the visual mode with attention being given to working distance and contrast of materials. Simple well-defined tasks and materials should be used. Good lighting is essential, with special attention given to eliminating glare. She demonstrated ability to learn to develop visually, but will require much repetition and encouragement using multi-sensory stimulation.

Recommendations

1. Multi-sensory stimulation should be continued using visual, auditory, tactual, gustatory and olfactory senses as appropriate.

2. A... should have a well lighted area in which to work. This should be relatively free of glare. Extra specially directed light does not seem to be indicated at this time, but may be necessary at a later date as tasks of increasing difficulty may demand. Be aware that bright sunlight in an outdoor or indoor environment may hamper visual response.

3. Attention should be given to good contrast in both objects and materials which are presented. One should be sure that the background on which the presentation is made is in good contrast with the object or material presented.

4. Matching and identification of geometric shapes as well as matching simple single item figures and pictures with little detail and good contrast should be worked toward. Concept development should be a part of this.

5. Stencil forms may be fastened to paper and A... may be encouraged to handle a crayon and color the figure using discrimination in discovering all the places not covered. Much support will be needed in this type of activity. When the outside form is removed, identification of the form, shape, or object can be a learning experience.

6. Simple, one item pictures relating to solid objects should be used capitalizing on A...'s interest in books and papers.

7. A... should continue to be encouraged to bring items which are smaller in size and items with more detail to within a six inch visual range. Items of this nature should be presented within a six to ten inch range. She tends to do this herself, but as materials become more demanding, specific instruction on this skill may be required.

8. A... should be encouraged to lengthen her periods of visual attention to an activity.

9. A... should be re-evaluated in one year to determine her rate of growth and development in visual functioning.

Signed
Title (Vision or Low Vision Consultant)

Case Study One - Preschool Child 4 Years Old - Follow-Up Referral

Name _____ Date of Evaluation _____

Date of Birth _____

A... is a four-year-old female who has a medical diagnosis of Downs Syndrome with hypotonia, bilateral club foot, congenital cardiac problems, and is diagnosed as legally blind. She has had cataracts removed at three months and five months, and is wearing extended wear contacts at present.

A... has been assigned to a room for children with physical disabilities who are developmentally delayed and has received both physical therapy and occupational therapy during this past year. Consideration is being given to a different placement.

A... was re-evaluated for visual functioning following an 18 month interim period. The evaluator spent two hours observing this subject in the classroom, during an eating session, and in a physical education class. The formal portion of the evaluation was done in two 45 minute sessions. There was a period of one and two weeks between the two formal testing sessions. The evaluator chose to use the Diagnostic Assessment Procedure, Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980), as a basis for comparison since portions had been given in the first evaluation. Selected tasks in addition to those used previously were used. It should be noted that A... had a cold and was not wearing her contacts during the last 45 minute session of the formal evaluation.

This student is an outgoing little girl who is more mobile as she has learned to walk. Her gait is slow and studied, but improvement and security in travel were noted during the four week period of observation and testing. She is visually curious with a tendency to be restless, easily distracted, and has a tendency to perseverate. She must move toward things or move them toward her in order to see them clearly. Interest is quickly lost when things are out of her visual range. She has not yet learned to move with them or search her environment in any organized way.

A... uses her right eye. The left eye seems to have lost some vision in the past year. Her eyes were alternately patched. She was noted to function well with the right eye with no complaint when the left eye was covered. There was great objection to having her right eye covered. She finally consented with mirror play. It was noted that she could see only at near point and could not readily identify objects unless they were very close. She was very uncomfortable during the entire time her right eye was covered.

Distance Vision With Correction

A... was able to follow larger, gross items such as a ball or a person as they moved away from her up to a distance of six to eight feet. She did not seem able to initiate viewing of an object beyond approximately three feet. Beyond that point she would lose interest or tend to move toward the object.

Near Vision With Correction

A... was able to see items at greater distance, but she brings the item or picture to within the two to six inch range for study and recognition. For instance, when a picture was presented at eight to ten inches, she reached for it and brought it to within a four to six inch range before she was able to identify it accurately.

Distance and Near Vision Without Correction

During the second part of the evaluation, A... did not wear her contacts. There was a noticeable difference in visual functioning. Her distance vision was diminished, and her near point working distance became two to four inches with less accuracy.

Lighting

Good lighting with glare control is necessary. The materials used in the evaluation contrast with the background on which they are placed and should be clearly defined, especially until consistent recognition develops. More individual lighting may be required as her materials become smaller with greater detail.

Present Areas of Improvement and Areas of Need:

1. A... is able to track a specific object horizontally, vertically, and diagonally, as well as shift gaze but her search and scanning patterns are poorly organized.

2. A... does not accommodate readily for the lack of vision on the left side. She needs to be taught to do this.

3. There is emerging color and shape recognition, but greater accuracy needs to be developed.

4. A... is able to compensate for her problem with depth perception at near point. She does this by checking with her tactual sense when reaching for something, eating from a plate, or stacking blocks. She has had little spatial experience so this needs to be explored as her skills with walking and movement need to be improved.

5. A...'s attending skills have shown much improvement, but need further work.

6. Improvement in visual discrimination of likeness and difference and/or identification of color, shape, size and objects or pictures was noted, but she needs to work toward greater consistency.

Impression

A... is functioning at about a three-year-old visual level. She has demonstrated progress in the last 18 months, at a slow rate, but with very recognizable improvement. This is especially true in areas of tracking, visual attention, and visual recognition of objects, people, and familiar places. She is starting to work nicely at the representational level along with the concrete level and is able to relate the two with familiar items.

A... is able to identify and compare shapes, objects, and figures in pictures of single items and those with more than one item or figure. She does this with limited accuracy.

A...'s scanning and search patterns are not well organized. She tends to miss things to the left because she has not yet learned to turn her head further to the left to compensate for lack of vision on that side.

A...'s depth perception problem needs repetitious work in all environments both at home and at school, at near point and especially in space so that she learns distances and depth. Shadows may be a problem.

A... is slow to understand directions, but if they are repeated slowly, and she is given time, she is able to follow through at her own level. She has some emerging basic concepts such as big-little, long-short, up and down, and same and different.

Recommendations

1. A... should have follow-up care with her ophthalmologist on a regular basis. It is also recommended that glasses be considered as back-up when contacts cannot be worn.

2. Objects should be placed to the left (gradually further to the left) requiring her to find them. When moving in space, she should be taught to scan to the left to compensate for the lack of vision on that side. Scanning on the right side should not be eliminated.

3. Organization in search patterns should be taught.

4. As A... walks, she should be encouraged to look at things in her environment, go to them, identify, and in general explore.

5. Exercises and general practice with distances and depth perception should be done both at home and in school, in a variety of environments, and in many different situations, especially as her ability to move continues to improve.

6. Attention should be given to providing good lighting, especially glare control, and to providing good contrast in materials.

7. Attention should be directed to her working distances when she is given learning tasks.

8. A... should be encouraged to lengthen her visual attention span.

9. Blackboard work and work with stencils are recommended to encourage gross motor work with eye hand coordination at near point.

10. Color and shape discrimination of objects and figure, or picture identification all need to be incorporated where possible in any learning activities.

11. A... should have a teacher of children who are visually impaired in a regular on-going program.

12. A... should be re-evaluated when her classroom teacher or the teacher of children who are visually impaired feels that this is indicated.

Signed
Title (Vision or Low Vision Consultant)

Case Study Two - Residential School Student - 13 Years Old

Name _____ Date of Evaluation _____

Birthdate _____

This student is currently functioning with print as his learning medium, but is having difficulty keeping up with his class. Braille has been recommended as a secondary medium until the student learns it well. At that time the student will have a choice of media.

B... is a thirteen-year-old male student functioning at grade level in a regular program at a residential school. He has been having difficulties with sustained visual work and some print reading in the classroom. Referral was made to determine what might be helpful to him in the way of aids and to determine how he is functioning visually.

B... has a diagnosis of bilateral congenital glaucoma, procedures for repair of retinal detachment in the left eye, band keratopathy, and aphakia in the right eye. With medication, the left eye seems to be under control. Distance visual acuity is no light perception in the right eye and 4/200 in the left eye.

B... was evaluated during a two hour period. His teacher was previously interviewed. He was very cooperative and it is felt that good rapport was maintained during the entire time, although he did indicate at one point that he did not like to miss swimming.

Instruments and Methods

1. Diagnostic Assessment Procedure, Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980)
2. Selected tasks in addition to the instruments used
3. Interview with the regular classroom teacher

Visual Aids - Optical and Non-Optical

1. B... wears tinted spectacle correction which includes a bifocal for full time wear for both near point and distance.

2. B... is more accurate with at least a 5x magnifier in addition to his present bifocal in order to read 18 point print with comfort for an extended period of time.

3. B... has good skills for both reading and writing with the CCTV. He can work more easily with this aid than with a magnifier.

4. A tilted desk is helpful as his work needs to be close and good lighting directed to it. He tends to resist using either, but it was noted that speed and accuracy were more consistent with them.

5. B... works noticeably better with good well-directed light which can be manipulated to alleviate shadows from his head or surrounding objects.

6. A felt tipped pen or a good soft pencil and dark-lined paper are a requirement. He is able to read a good dark ditto in 24 point type with letters and words well spaced.

Working Distance

B... is able to identify gross items such as a ball of eight inches in diameter, a circle of six inches in diameter, etc., at two to four feet in space. The contrast of objects with their background needs to be pronounced. He is able to read words on the blackboard using letters approximately two inches high from a distance of eight to 10 inches. It should be noted that there was good illumination on the blackboard and the contrast was good.

At near point his working distance is two to four inches depending upon the size of the material and the detail discrimination required. Accuracy diminished with sustained work.

Discussion

B... prefers the visual mode of functioning, but needs to be encouraged to use aids (optical and non-optical) which enhance his vision. He should be able to request what is needed in a certain situation, such as CCTV or extra light, and feel comfortable in using it. He tends not to want to bother with an aid of any kind, optical or non-optical, but his work was noted to improve in both speed and accuracy with aids appropriate for a particular activity. This was noted particularly in reading and writing activities.

It should be noted that B... indicated that his vision seems to fluctuate at times, and that it takes a little while to adjust in the morning.

B... is able to track both in space and at near point. His distance vision is not adequate for detail much beyond two feet. He is able to identify gross shape and forms at greater distances depending upon the size, contrast, lighting, and direction. He has difficulty locating objects in space, especially light colors on light background. He also has difficulty with depth perception, but compensates well for this by using other sensory cues.

On the whole, B... uses his existing vision adequately except that he is not always willing and does not always seek to arrange

materials to his advantage or to use optical and non-optical aids which would help him to function with greater ease, speed, and accuracy.

Recommendations

1. B... should begin to learn braille. He is a good student and should be able to handle both media. He has only one eye in which the vision seems to fluctuate. Though he uses his existing vision well and is visually oriented, braille would give him the opportunity to use the medium which best meets his needs in a given situation.

2. B... should be seen in the Low Vision Clinic to determine if a pair of reading glasses might be more helpful. It would also be useful to have an evaluation for a telescope.

3. B... should have on-going ophthalmological examinations to monitor his glaucoma and to determine whether his vision remains stable.

4. B... should have some time each week with instruction in the use of optical and non-optical aids. This should be done in team work with his regular classroom teacher as well as his teachers for extra-curricular study.

Signed
Title (Vision or Low Vision Consultant)

Case Study Three - Mainstreamed Primary Student - 7 Years Old

This student is mainstreamed into a regular classroom and is having difficulty. The classroom teacher and the administrator believe that her problems are related to her visual functioning.

Name _____ Date of Evaluation _____

Birthdate _____

C... is a petite seven-year-old girl. She is assigned to a regular first grade classroom. She was referred because she was having difficulty in beginning reading and writing. It was felt that there might be a vision problem. She has, however, had no prior ophthalmological or medical vision work-up.

C... was evaluated during a two hour observation period in the classroom and during a physical education class. There was an opportunity for two brief teacher interviews. In addition to this observation, she was tested on an individual basis. She was very tense during the first 15 minutes, illustrated by wringing of hands, talking a great deal with many inappropriate or irrelevant answers and statements. She soon relaxed and good rapport developed between her and the evaluator. She was very cooperative during the entire time and seemed to enjoy the various tasks.

Instruments

1. Diagnostic Assessment Procedure, Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980)
2. The Functional Vision Evaluation, Project IVEY, State of Florida, Department of Education (1983)

Discussion

During the observation, C... was a quiet, shy, little girl who often physically removed herself from the group and seemed to function just outside the group. Many times she did not interact with her classmates appropriately although she indicated by action that she was always aware of what they were doing. She made efforts to interact, but almost always on the fringe edges. At times, she was in her own little world.

C... was noted to have very poor eye contact. She tended to move her head and/or body around a great deal while talking to someone. There seemed to be more constant visual contact with a book or the blackboard. It was noted that she sometimes maintained visual contact with the board while moving her head or body. She was easily visually distracted by movements and what other children were doing. She, therefore, found it difficult to maintain visual attention and thus to sustain an activity. She was generally slow

to respond to directions, but, as she relaxed and became more interested in a task, visual attention time was increased.

The blink reflex was intact, and her pupils responded to light. She was able to converge, but convergence was slow. She was able to shift gaze from one place to another readily. Tracking in the horizontal, vertical, and diagonal planes, and in a circular pattern at gross levels was good. Tracking patterns with symbols and representational materials at near point were not well developed. She tended not to follow smoothly across the page, but sometimes skipped lines or objects on the page. Search patterns at gross levels were generally good, but not well organized, especially at near point. She could accommodate well for near to far work, and back to near.

General working distance was eight to ten inches at near point and twenty plus feet at distance. She had good peripheral responses. She did not need any extra lighting. Normal room lighting was sufficient.

Size relationships and spatial arrangements, especially when the differences were not pronounced, were areas of difficulty. Spacing and size relationships problems could be seen in her writing and reproduction of shape and figures.

Spatial relationships presented problems. She was oriented with left and right, but was not able to move about consistently maintaining adequate visual pursuit. Immediate eye muscle coordination was good if she were visually attending. At near point, she was unable to adequately space objects and arrange them according to pattern. It was noted that she was able to handle spatial arrangement with one item, but more than one became problematic. She also tended to work from right to left if not structured with the activity. She rotated patterns when reproducing them at times, especially when dealing with simple abstract patterns.

Discrimination of likeness and difference of internal detail, and also small or closely related objects and symbols, more abstract in nature, tended to be inaccurate. She sometimes made mistakes and corrected herself, demonstrating visual recognition of her own tendency to error.

Visual memory was also problematic. She was able to retain two or three items visually for a short period of time and recognition of objects, pictures, and the like indicated that visual memory is functioning, but not at expected levels where abstract recognition and multiple figures are required. She also had difficulty when spacing and size considerations were involved.

C... was able to do simple visual sequencing with pictures when a simple story was involved, but had difficulty at an abstract level.

Visual closure was accomplished when missing parts and puzzle parts were presented. When identification of part-whole relationships in puzzle completion were required, it became problematic.

Conclusions

C... is at a five-year-old to six-year-old level of visual functioning. She is also functioning between the representational and abstract level with some specific problem areas. These areas of need are:

1. Eye contact and sustained visual attention
2. Organized search and scanning patterns
3. Precise tracking patterns, especially at near point
4. Spatial orientation and arrangement at gross levels where sustained visual attention is required, and also at near point where more specific recognition of direction and degree of turn is required
5. Visual memory, especially at abstract levels
6. Discrimination of likeness and difference where internal and fine detail are concerned
7. Visual sequencing, especially at abstract levels
8. Part-whole relationships

A number of these problem areas require basic visual processing. Her vision itself seems to be within normal range. Problems with personal interrelationships and emotional interaction along with these visual processing problems may contribute each to the other, thus hampering learning.

Recommendations

1. A good ophthalmological examination should be made to rule out any physical eye problem.

2. Individual instruction directed toward specific areas of need should be provided.

3. A follow-up evaluation of visual functioning should be done in one year to determine the rate of progress and to note any changes.

4. C... needs to be encouraged in all activities at home and at school to extend and sustain visual attention.

5. C... needs to be taught to organize scanning and tracking patterns at near point.

6. C... needs to be encouraged to hold head and body still and to specifically maintain eye contact with people - not a stare - but to extend eye contact time.

7. C... should have a limited amount of visual stimuli at any one time with simple directions. The amount may be increased as tolerance is developed.

8. A typoscope, or other guide, may be used when doing reading activities or where following definite lines is required.

9. Pattern duplication, puzzle work, dot to dot tasks, letter and simple word games, sequencing tasks, and the like should be offered to help with discrimination, spatial orientation, and eye muscle coordination.

10. Accuracy should be a basic requirement for all activities.

Signed
Title (Vision or Low Vision Consultant)

Case Study Four - Resource Room Student - 15 Years Old

This student is presently assigned to a high school resource room with only general special education help. He has had the services of a teacher of students who are visually impaired in the past, but is not receiving services at present.

Name _____ Date of Evaluation _____

Birthdate _____

D... is slight of build and an active 15-year-old boy with a diagnosis of genetic dysmorphic syndrome - athetoid cerebral palsy with multiple associated congenital deformities. He has been seen by both an ophthalmologist and an optometrist. He has had a strabotomy and has glasses for high myopia. He is presently wearing a high negative correction for distance only. He removes his glasses for detailed near point work. He has a visual acuity at distance of 20/60 in the right eye and 3/200 in the left eye, with correction, according to his last medical report. His prognosis is stable at the present time. He is assigned to a resource room in a high school. He has been followed previously for his visual needs by the teacher of children who are visually impaired.

Instruments and Methods

1. Observation
2. Brief interview of teacher
3. Diagnostic Assessment Procedure, Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980)
4. Selected activities and tasks

Discussion

D... has an average working distance of 6 to 8 inches when dealing with items which are gross in nature. Pictures were identified at 14 to 16 inches with glasses. If the print or detail is small, he uses a 2 to 4 inch working distance without correction. He seems to adequately adjust his glasses to meet the demands of the material with which he is working. At times, however, he looks over his glasses rather than removing them.

D... moves well from place to place from a visual standpoint. He can identify 1 to 1 1/2 inch letters on the blackboard at distances of 8 to 10 feet with his correction. He was able to hit the basketball rim with the ball in the gym and could see other students and activities at 30+ feet accurately.

Lighting

D... works well in normal lighting conditions. Since he sits near the window he gets good room lighting and good natural light as well. The teacher regulates the sunlight with the shades. He should be aware of glare and make his own adjustments for this. No special problem was observed.

Discussion

D... is a very restless young boy who was observed to have some difficulty interrelating with the group, though he is making an effort to do this. He sits in the front of his classroom near the window which provides the best lighting possible and limits his environmental distraction. He tends to be distracted by outside movement and noise. When the other students are working or when he is reminded, he settles down to the task at hand.

His search and scanning patterns in space are good. He is able to shift gaze without a problem. He tracks horizontally, vertically, diagonally, and in a circular pattern in space. His near point tracking patterns, especially on the printed page, need to be improved. He is not able to consistently follow across the page or to the next line for any extended time. He tends to move too rapidly, missing items or words, thus needing to back track. He does not always seem concerned (or to recognize) when something does not come out as it should. This is particularly true at the abstract level. He enjoyed manipulation tasks at a concrete level. This was easy for him, so he would correct himself and be more careful. He easily put aside or hurried through things that were a challenge to him.

D... is able to converge both eyes and indicated that he uses his left eye along with his right eye for travel and gross motor movement. He was not observed to have any difficulty with depth perception in such situations as on stairways or in securing balls and reaching for items. It should be noted, however, that he was moving and working in familiar territory. His eye hand coordination at gross levels was within normal limits. Fine visual motor control, however, was not well developed. This is seen in his handwriting, design reproduction, and block patterning. He is functioning at a first to second grade level in this area of visual motor control.

Spatial relations, especially at near point, are a problem area. He tends to turn items in rotation. He has difficulty with alignment and spacing with objects, especially on the printed page. He has learned to compensate and gauge distances for gross movement in space.

Discrimination at basic levels is good, especially with familiar items. He has difficulty recognizing likeness and difference at

more abstract levels with greater detail. Size recognition, especially when the size differences are not great, is a real problem. This is to be noted in his writing and in selection and arrangement of graduating sizes in rods, lines, or other objects similar in size. He also has trouble with recognition of size differences of shapes which are similar in nature.

D... is able to achieve visual closure, but part-whole relations were a problem area. Puzzle work also showed his inability to deal with discrimination of figures and how the parts fit with the whole. His problem with spatial relations and degree of turns also showed itself in the puzzle activity.

D... was able to categorize and sequence on a limited basis. His matching skills seemed to be intact. He has color recognition. His visual memory is below the normal range.

Impression

D... is functioning visually between a representational and abstract level. He is much more comfortable with the concrete level and with items or objects which require manipulation. His specific areas of need are fine visual motor integration, spatial relations at near point in detailed design and at abstract levels, size relationship, discrimination of likeness and difference where similar detail is concerned, part-whole relationships, and visual memory.

D... wears glasses and has learned to manipulate them to meet a particular need by taking them off when detail and small print are involved and putting them on for distance use. At times he tends to look over them as they slide down on his nose. Because of this manipulation of his glasses, it is necessary to have them adjusted and tightened more frequently than usual.

D... tends to be restless and not well organized. He needs to slow his pace. He works too rapidly with little attention being given to accuracy. His visual attention span is short as is his general attention span.

Recommendations

1. D... should continue to be followed by his ophthalmologist on an annual basis so that his high myopia condition can be monitored. Should there be any sudden changes, he should go to the ophthalmologist immediately.

2. D...'s glasses should be adjusted periodically and he should be encouraged to keep them in place or take them off rather than look over them.

3. Since D... does not currently have vision services on a regular basis through the special education district, it is recommended that he have at least minimal help from a teacher of children who are visually impaired.

4. Since D... tends to write to the size of the space between lines, a smaller space which would limit the size of his writing might be used to encourage him to write smaller. Paper with dark lines and smaller spaces between them might be helpful.

5. Special instruction and tasks directed toward size relationship, spacing, and alignment; starting at concrete levels and progressing to abstract levels is recommended. Working on abstract writing skills and requiring him to read his own writing should prove to be helpful.

6. Tracking exercises with various sets of materials may be used.

7. Puzzles, word searches, and word puzzles would be helpful in developing better skills with part-whole relationships and degree of turn as well as discrimination.

8. Materials should have good contrast and be of clear regular type. A strip of paper under the line might be of help in following from one line to another as well as across the line.

9. D... should continue to sit in the front of the room near the window. The sunlight should also be controlled. It would be wise to teach him to regulate his own light.

10. D... should be re-evaluated for functional vision in at least two years unless his vision is observed to change or a change is reported by his doctor.

Signed
Title (Vision or Low Vision Consultant)

Clinical Low Vision Assessment

Components

The following assessment components need consideration in determining the extent to which print, braille, and/or auditory skills will enhance learning of the students in the academic environment and in the nonacademic environment. Every student who is visually impaired (especially a child with low vision) needs an annual eye examination by an optometrist or ophthalmologist, a comprehensive low vision examination by a low vision clinical specialist, and a functional/educational evaluation by a teacher of students who are visually impaired. All these assessments should begin by the age of three or as early as possible.

Discussion

Before the clinical examination, the child should have a functional/educational assessment by persons who are trained to work with students who are visually impaired. This functional assessment is typically performed by most teachers as a part of the educational assessment program and for placement decisions. A wide variety of assessment forms are available, but it is most advisable to use what you have already so as not to add additional work for the teacher. The idea of the functional low vision assessment is to provide the clinician with a description of the child's ability to use his or her vision in the educational and home setting (if possible). Also, the assessment is to point out problem areas in the educational setting and help set priorities for using low vision procedures and technology to resolve those problems. Again, most teachers of students who are visually impaired do an assessment of their students, and this assessment will provide the information without having to resort to a second low vision assessment. If an assessment is needed, it is best to use the educational assessment tools available or one of the published low vision assessments (see Appendix C) on an interim basis. After two assessments in which the doctor uses the information and the teacher sits in on the examination process, the doctor and teacher can sit down and modify the document to better reflect the needs and goals of the student. Most important, keep the assessment and assessment form flexible!!

Rule One: If the teacher does not attend the examination with the child, the doctor should not consider any treatment options until teacher input is obtained. The doctor will often reschedule.

Rule Two: If the doctor obviously does not read the teacher's functional vision report – then get a new doctor. Without the teacher-doctor interaction, the low vision clinical assessment loses most of its effectiveness in

helping to select the most appropriate learning media for the student who is visually impaired.

Rule Three: Don't forget the input of the parent. Many a low vision treatment program has been lost and made useless because the parent was not a part of the decision-making and assessment process.

Rule Four: Don't forget the child. He or she is the most important member of the team.

What should be included in the clinical low vision assessment?

Distance Visual Acuity

The distance visual acuity is an important function as well as an administrative/legal measurement. The acuity measured in a low vision clinic is often measured using high contrast charts with special optotype. The teacher should not become confused with different notations of acuity levels on different doctors' reports. All of these measurements are correctly describing the student's acuity under those test conditions. Fortunately, most of the time the differences are not significant. If a difference exists, ask the clinician for an explanation, especially as to how it affects the child's ability to function visually in the classroom. Most classroom activities require 20/40 vision. A child with 20/200 acuity will need to change the environment by making it five times bigger. (Divide 40 into the bottom number of the 20/200 Snellen Acuity. In this case, 200 ÷ 40 = 5X.) As an approximation, the print will need to be five times larger than regular print, five times bolder, or be held five times closer (which requires special lenses). Remember, this is only a classroom **approximation.** For other tasks requiring 20/20 vision, the child will need ten times magnification, or be ten times closer to the object to see it (200 ÷ 20 = 10X). The clinical assessment will provide information that will allow an optimum level of magnification to be used in the classroom. It is very important for both teacher and doctor to remember that some children with 20/200 acuity (remember this is a test measurement in an office or clinic) will function quite differently. This can be due to the personality of the child, family or teacher support, the educational setting, and a host of other visual skills problem areas.

Intermediate Distance Visual Acuity

The intermediate distance visual acuity is an acuity measurement that is often neglected. It represents the eye's ability to resolve detail at arms length. This acuity can be important when determining the student's ability to perform in computer classes, shop classes, art classes, etc. It is not always needed as part of

the functional assessment, but should be given consideration in many cases. The teacher should be aware of this measurement and ask for it as part of the clinical assessment when intermediate tasks are being considered as part of the student's educational plan. Unless an alternate work distance is specified, the clinician will give an acuity at sixteen inches. Many times it is more valuable for the doctor to provide the size an object needs to be at a particular distance rather than an acuity designation. Knowing that a student needs to have letters one-half inch in height at sixteen inches is more important than an acuity recording of 20/200.

Near Visual Acuity

The near visual acuity is probably the most important test in the clinical evaluation as it pertains to the decision of reading and writing modality. The teacher must keep in mind that the near acuity is again a clinical measurement that determines the child's ability to resolve the detail of the test being presented that day. There are variations in test results that are normal and should be accounted for when using these measurements for educational planning. The most significant difference is the acuity with single letters or numbers and when using paragraph test material. Normally, the paragraph material will allow an individual to see smaller letters because they can guess words from context. With the low vision student the acuities usually remain the same. For some of the students who have not learned to eccentrically view efficiently, the single letter acuity will be two or three lines better than the paragraph acuity. This means the therapy should concentrate on visual skills and not merely magnification. If the child can only read large print size paragraph material, but can read magazine size print single letters, the prognosis for reading regular text print is very promising. If the student can only read large print in paragraph or single letter tests, then the prognosis is not quite so good and the child will depend on higher levels of magnification to be able to read text material.

The near acuities will sometimes have notations like 20/20 which is the same as your distance Snellen. This measurement is useless unless a distance at which the test was conducted is also recorded. The point system is used on many charts. This is a printer's way of determining the size of the block on which the letter is printed or carved to create a printed letter. Some 6 point letters will cover up the whole block and others with serifs will not cover the whole block and thus will print smaller. Some charts have different size point letters than others for this reason and thus are an unreliable measurement of near acuity unless the actual chart is available for comparison. The Jaeger system is an arbitrary set of sizes that have no relationship to one another and can often be of significantly different sizes on different charts. This is a useless measurement for educational purposes. The most commonly used measurement in low vision clinics is the M system.

These letters or numbers have direct relationships in size. A 4M letter is twice as big as a 2M letter, etc. All 4M letters and numbers are basically the same size on all charts. The acuity is properly measured as the test distance over the acuity. .4/4M means the student read a 4M text at a .4 meter or 40 centimeter work distance. Like all other near acuity measurements, the M notation is useless without a distance included.

Refraction

The importance of the refraction is to determine whether the student's acuity can be improved with glasses or contact lenses or with a change in the present glasses or contact lenses. The teacher needs to know whether the student needs to wear the correction for distance, near, or both. For some children, even though they are near-sighted, the use of lenses does not improve their acuity. Many of these children are being forced to wear cumbersome and unattractive prescriptive eyewear when they do not have to. Some children read better with their glasses off (high myopia). The teacher needs to know if glasses are needed and when they should be worn. The doctor will also evaluate the use of contact lenses to improve visual functioning. Contact lenses should be considered for all children with a visual impairment (since these children are just as interested as the next young adult in looking good), especially when there are high refractive errors and very small visual fields involved.

Contrast Sensitivity Function

Over the last few years the Contrast Sensitivity Function test has become more important to our understanding of a student's ability to function visually. Just as in hearing there are decibel losses of hearing accounting for the inability to function in different auditory environments, there are also unique frequency losses of vision. This is what the Contrast Sensitivity Function (CSF) measures. The student can have low frequency losses which will indicate mainly mobility related problems. Glare control and special filters will be considered in these situations. In high frequency losses, the problems will be more related to high detail near point tasks. The teacher will have to pay more attention to appropriate lighting and the doctor will prescribe special lenses to reduce the affect of the CSF loss (doublet systems or full field systems). Telemicroscopes will be difficult to use with these students. Students for whom all frequencies are depressed will need lots of special attention and will always function at a much lower visual level than is expected from the acuity measurement alone. The CSF data helps determine the need for filters, side-shields, and special lighting, and often dictates the type of lens design used in the low vision prescription. The CSF can be viewed as students' ability to adjust to their environmental changes. A 10% drop of lighting in the room would not cause change in functioning or even measurable acuity loss for students with a

depressed CSF curve. Small changes in their environment or in their school materials will significantly reduce their ability to do the task visually. Many of these children are labeled behavior problems because they could do a task and then, all of a sudden, they say they can not do it. The teacher thinks it is an attitude problem, when in fact, the sun went behind the clouds and the room illumination dropped 10%, almost unnoticed by the teacher or classmates. (However, we must remember these children are like all the rest and do occasionally have attitude problems.)

Binocularity

Many students use both eyes (have binocular vision) but it is very stressful and results in poor reading, short attention spans and some behavioral problems. The low vision clinician can help by providing a correction that will allow the student to enjoy comfortable binocular vision. For some students the vision is best in the right or the left eye and material should be presented in a way that favors that eye. For some children, one eye will inhibit the optimum vision of the better eye. This is retinal rivalry and can occur even when there is very little acuity in the worse eye. In this case patching can make a huge difference in functioning. Everything from improved eye tracking to crossing the mid-line can be improved with a simple patch. Special contact lenses can be designed in some cases to eliminate the rivalry and yet maintain the use of the peripheral vision for mobility purposes. There are children who have diplopia (double vision) and do not report it (especially amongst the multi-handicapped). Patching can result in some dramatic improvements in visual functioning in these cases. Children who have large head turns can be doing this to eliminate diplopia, these behaviors should be recorded for the doctor. The teacher's observations and the doctor's clinical assessment are both needed for developing an appropriate treatment program for binocular vision problems.

Central Visual Fields

Most field tests will measure the central 25-30 degrees. This area is most important to disease detection but is of little value to educational planning. The teacher needs to know the size and quality of the visual field at the near working distance. This is best measured with the Amsler Grid which is a test that measures approximately the central ten degrees of field. It detects the presence of blind areas (scotomas) and areas of distorted vision. A child can have good central acuity but with the presence of scotomas and distortion, the functional vision will be substantially reduced. The doctor will also have to prescribe differently under these conditions. This test will also tell the teacher and doctor where the child is moving the blind spot to look around it (eccentrically view). This will indicate the need for eccentric viewing training in conjunction with or preliminary to the prescribing of a low vision device.

Peripheral Visual Fields

The measurement of peripheral visual fields (30 degrees to 90 degrees) is usually done with an arc perimeter or Goldmann type of field analyzer which tests out into the periphery. This test is important for indicating the need for mobility instruction and/or explaining a student's difficulties with travel. If the visual fields are restricted to 40 degrees or less, mobility training should be evaluated and seriously considered. When it gets to 10 degrees, all students should use a cane even if they have tremendous visual skills. At the more severe levels of field loss, the use of prisms and reversed telescopes may be helpful. The position of the remaining field is important to the educational setting. If the child has lost the whole right side of vision, then he or she should not sit on the left side of the classroom as this will put the good left side of vision against the wall. If the child has lost the superior (upper) fields, then it may be difficult to see certain overhead projections and slide screens when they are positioned in the upper field. If the child has only 10 degrees of central vision, the teacher needs to present materials to the child from the center of vision. If the teacher is standing even slightly to the right or left of the child, the child might not respond. The teacher may think the child didn't understand the task when in fact the child just didn't see the task. The teacher must know where the vision is for each student and where the child cannot see.

Glare and Illumination

The glare and illumination aspect of assessment prevails throughout the clinical examination. Special tests for glare and glare recovery are typically performed only when problems are presented from the functional assessment. The clinician can help the teacher set up appropriate lighting for the student. Hats, sideshields, sunglasses and special tints can all be utilized to help the student maintain maximum visual functioning under all lighting/environmental conditions.

Color Vision

The main test for color vision problems usually comes from the classroom. If the child has difficulty with detecting or naming colors in class, then more extensive clinical testing is needed. The D-15 color test is most often used as it provides the clinician and teacher with information on whether the student has color vision deficits significant enough to interfere with educational or vocational tasks. There are some preferential looking tests now that can be used to detect the presence of basic color recognition skills for even a non-verbal student. Most students who are visually impaired will have some color vision difficulties, especially with more subtle color recognition tasks.

Ocular-Motor Skills

Moving the eyes systematically and smoothly is very important to good visual functioning. It does not do the student any good to have 20/40 vision, if it takes five minutes to find the 20/40 target or object. As indicated earlier, many of the clinical tests show how well a student is eccentrically viewing to maintain as clear and consistent an image as possible. This is an ocular-motor skill and can be trained. The better the child eccentrically views, the more success there will be with the use of devices and the more the child will enjoy a higher level of visual functioning.

Low Vision Prescription

There are four ways to enlarge an image for the visually impaired. You can increase the SIZE, you can move the object CLOSER or use APPROACH MAGNIFICATION, you can use a telescope to get ANGULAR or optical enlargement and you can use a CCTV to get ELECTRO-OPTICAL enlargement. Each of these will be discussed separately.

Size Magnification

As you can see from Figure 1, the image on the retina gets twice as large when the object is made twice as large. This is the magnification principle when providing the student with large print texts. The letters are larger and they create an enlarged retinal image. Students writing with a bold line pen, can produce up to 5X magnification over their writing with a regular pen. The advantage of this type of magnification is that it allows a more normalized working distance. Its disadvantages are the cost to reproduce a lot of materials, the inability to enlarge a lot of educational materials or tools for learning, and the increased size and weight of the materials.

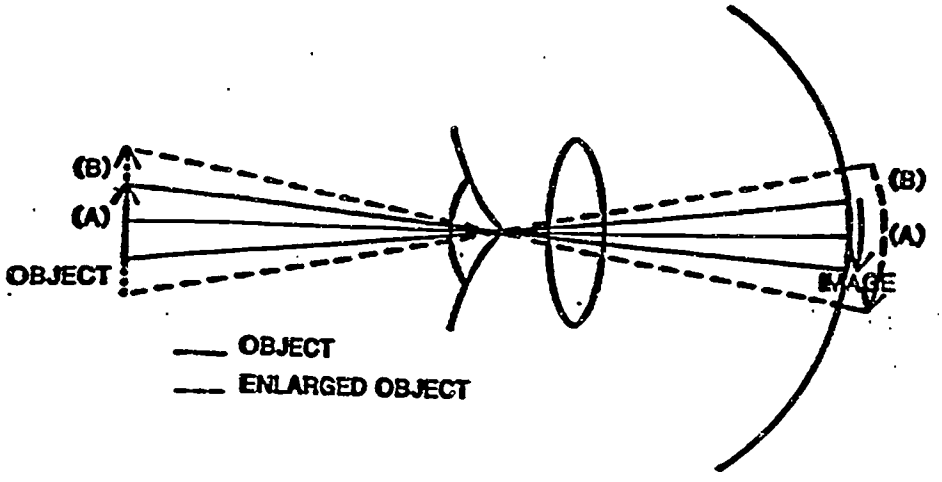


Figure 1. Relative-size magnification. Relative-size magnification increases the size of the retinal image by enlarging the actual size of the object. Not enough retinal cells are stimulated by the small object (A) to send an impulse up the optic nerve to the brain. If the size of the object is doubled, (B), the image is double in size and twice the number of cells are stimulated. The cells now send an impulse to the brain and the visual information is perceived and the object is seen in detail.

Approach Magnification

Approach magnification simply means that as an object is brought close to the eye, the retinal image becomes larger. The relationship is such that as an object is brought to one-half its present viewing distance, the size of the retinal image doubles. If the distance decreases by one-quarter or one-eighth, the image size will increase four times or eight times respectively. (See Figure 2). It is important to note that the enlargement of the image occurred without the use of microscopic lenses. Lenses do not create magnification; the decreased viewing distance does. The microscopes are used to provide a clear image for the student. The main disadvantage of approach magnification is the close working distance the student must maintain for near vision activities.

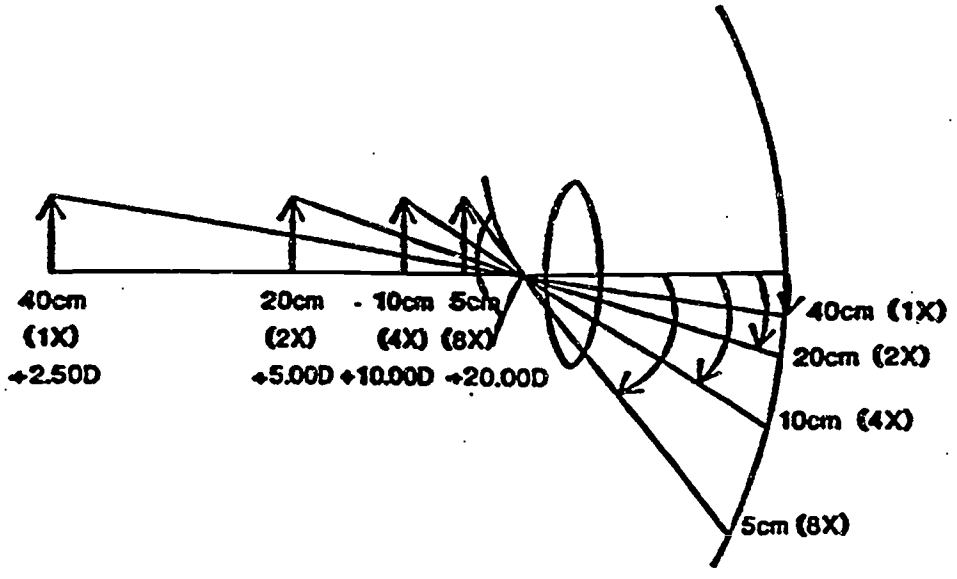


Figure 2. Relative-distance magnification. In relative-distance magnification, the image enlarges proportionately as the object is brought close to the eye.

Angular or Telescope Magnification

The telescope is useful for distance objects that cannot be enlarged or moved closer. However, it has a limited field of view. (If the field of view were adequate, the telescope would be bulky like binoculars.) The telescope bends the rays of light so that they optically create a larger image on the retina. Because the image is enlarged on the retina, the brain assumes the object has moved closer to the eye and the object will appear closer to the student (like binoculars). Figure 3 shows the principle of Angular or Telescopic magnification.

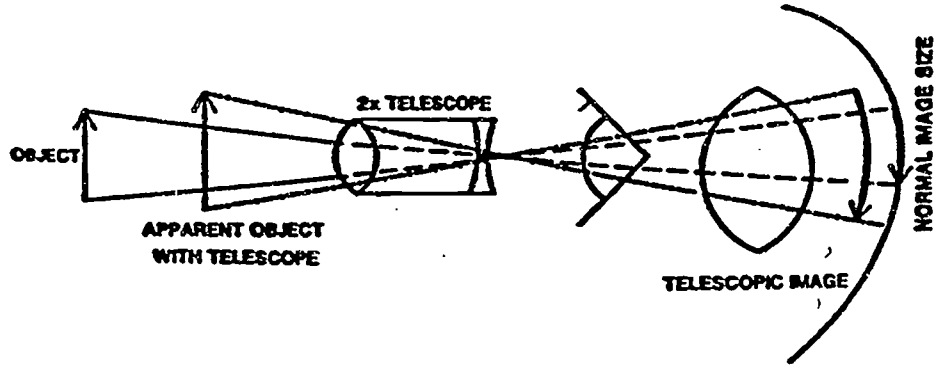


Figure 3. The light rays enter the telescope, and instead of leaving in the same direction they entered and forming a normal image, the telescopic lenses increase the convergence of the rays and the rays enter the eye as though coming from an apparent object sitting much closer to the eye than the real object is. Thus, the brain perceives the object as being bigger and closer, and greater detail is seen.

Electro-Optical Magnification

The most common example of this type of magnification is the closed circuit television. This system has a lot of advantages in that it can provide high levels of magnification and yet maintain a practical field of view and high contrast. Because the material moves across the screen, the need for eccentric viewing skills and good tracking skills is minimized. This is also a negative attribute of the system in that students become lazy in their ocular-motor skills. They find it very difficult to use more practical optical systems when they are needed later on in their educational programs. The CCTV uses both size and approach magnification. It electronically enlarges the image on the screen (size) and lets the student sit as close to the screen as needed to see the material (approach).

Which optical devices can be used to improve visual functioning?

Optical Devices - Overview

To be successful in low vision training, the clinician-teacher team must develop a familiarity with a wide variety of low vision devices. This will allow the team to meet the individual needs of each student. The same level of magnification can be prescribed in a wide variety of designs. While it is not in the scope of this text to present all the individual devices available, an effort will be made to introduce the teacher to the types of systems available and some potential applications to problem solving they may have.

Hand Held Telescopes

The hand held telescope is designed for spotting distance objects or other short-term distance tasks. It is small and can be kept in a pocket or purse, or hung around the neck between uses. The hand held telescope is used when a distance object has to be recognized; a street sign for example. Some uses of telescopes are as follows:

- To enhance independent travel by allowing the student to see stop lights, street signs, store signs, bus numbers, etc.
- To watch television for short periods of time.
- To see who is coming up the front walk or at the front door.
- To watch birds or squirrels in the backyard.
- To view flowers in one's garden.
- To find the location of the daily paper when thrown on the front lawn.
- To use at ball games, concerts, etc.
- To use to sightsee while riding as a passenger in the family car.
- To see the blackboard in school.
- To see pins/scores for bowling.
- To see street names, house numbers, etc., from the car.
- To watch girls and boys!
- To use on hikes, in parks, and other nature-related activities.

Most hand held telescopes are monocular and are used with the preferred eye. Most hand held telescopes have a focusing ring to make the image as clear as possible. Some telescopes will not focus for objects closer than 8 feet and so the teacher should know the focal range before training with the system. The stronger the power of a telescope is, the smaller the field of view will be when looking through it.

Clip-on Telescopes

The clip-on telescope is usually used monocularly. When a telescope is needed, the student simply takes out his clip-on telescope and slips it over the top rim of his glasses. Often the student will have better results if he patches the eye without the telescope during the initial stages of training. Plastic clip-on patches are often used for this purpose. The clip-on telescope has a focusing ring and objects to be viewed are focused by turning this ring. The clip-on telescope is useful for short-term telescopic needs. For example, if a student has to see the blackboard during a class, he can sit at his desk and clip the telescope on while it is needed. It can also be used for TV viewing and concerts. As with the hand held telescope, the increased magnification will reduce the field of view. As with any low vision device, use of the clip-on telescope is maximally effective only after practice in getting used to viewing through it. Since it covers the entire eye, it cannot be used when the person must move around. It is too difficult for most people to learn to adapt to the spatial distortions of the telescope while walking. Its major advantage is that it leaves both hands free; its major disadvantage is its weight.

Bioptic Telescope

When a person needs a telescope for constant use and yet is frequently moving about, a bioptic telescope must be prescribed. This type of telescope uses a single vision plastic ophthalmic lens as a carrier. A small hole is drilled in the top part of the lens and a miniature telescope is mounted through the prescription lens. When a distance object is to be viewed in detail, the head is dropped down and the person raises his eyes into the telescopic portion. After viewing the object through the telescope to gain the necessary information, the head is raised again and the person proceeds to walk looking through the conventional lens. This type of telescopic correction is very useful when the tasks or activity require the patient to be mobile. A clip-on bioptic can be prescribed, but it must be inserted and removed for each visual task.

Training should follow a step-by-step process similar to that used with the hand held telescope. The individual should not become frustrated but realize this is a difficult system to learn to use and progress will be slow. It is a very valuable system and learning to use it effectively will pay off well. It is particularly useful in vocational and educational settings, and can even be used for driving.

Full Field Telescope

Some telescopes are prescribed with the telescope covering the full lens in the frame (similar to the clip-on). This type of telescope gives a larger field of view than the bioptic but is used only for visual activities requiring the student to be standing or sitting. It is extremely difficult or impossible to walk about with this type of lens. If a student is prescribed one of these devices, he or she must receive very special instructions on how and when to use it. This type of telescope is usually prescribed for unique vocational and recreational needs.

Magnifiers

Magnifiers are designed to help the low vision patient with reading and close tasks such as sewing or knitting. These aids come in two basic categories: those mounted on stands, and those held in the hand. Typical uses of magnifiers are:

- Reading newspapers for short periods.
- Reading labels, prices, etc., while shopping.
- Seeing dials, gauges, and other controls on ovens, grills, ranges, etc.
- Reading recipes.
- Looking up phone numbers and addresses.
- Reading mail.
- Scanning large print (headline, titles, subheadlines, etc.) of books or newspapers prior to reading smaller print with microscope.
- Seeing measuring tapes, dials, gauges, etc. in the workshop setting.
- Reading labels on medicine bottles.
- Proofreading manuscripts or typed materials.
- Threading needle on a sewing machine.
- Reading TV Guide.
- Quick check of prices, figures, etc., from manuals related to jobs or classroom tasks.
- To check hygiene of contact lenses.
- To read bus/train schedules.
- To read maps.
- Occasional use in classroom activities.
- To read menus in restaurants.
- Verifying correct denominations of currency.
- To see in a variety of educational tasks.

As with telescopes, the purpose of a magnifier is to assist vision by providing a magnified image on the retina.

Hand Held Magnifiers

The most common optical device is the hand held magnifier. It is designed to be used mainly for short term near visual tasks as can be seen from the list of activities described previously. For example, if one were to look up a number in a telephone book or wanted to see the stamped price on an item at the store, a hand held magnifier would be the optical device of choice. Often the hand held magnifier is a second optical device for people who do not want to put on their reading spectacles. It can also be used as a training aid preliminary to prescribing a spectacle microscope because it can be used at a more customary working distance than the spectacle devices.

Stand Magnifiers

The stand magnifier is preferred by many people because it is relatively easy to use. It is a good aid to use during training periods. The stand magnifier automatically sets the lens at the correct distance from the reading material. Thus, it is frequently used when hand tremors or palsies prevent the student from maintaining a consistent working distance with a hand held magnifier or microscope. Stand magnifiers are usually of two types, focusable and non-focusable.

Spectacle Mounted Microscopes

A microscopic correction mounted in spectacles is chosen because it allows the user to keep both hands free to hold the material to be viewed. Powers from 2X to 20X are available. Microscopes are prescribed for similar tasks as outlined for magnifiers, as well as:

- Long-term reading sessions (texts, newspapers)
- Writing tasks/signature (2X-4X)
- Making out checks, balancing books
- Crocheting, knitting, needlepointing, etc. (2X-4X)
- Gardening - inspecting for insects on plants
- Reading shipping invoices, receipts, etc.

When using a spectacle mounted microscope the student has to hold the reading material very close. Some high power microscopes require the material to be held as close as 1/4-inch from the student's eye. The stronger the microscope, the closer the student will have to hold it to the eye. Each microscope has a critical focal distance and material must be held at exactly that distance. This close distance will seem very uncomfortable at first, but with patience and practice, it will become easier and more relaxing. The student may need to start out with low magnification and large print, and slowly work up to the needed magnification for regular text print. Newspapers should be used only after the student has demonstrated success with other materials.

For some students, learning to read with a microscope is the first time they have seen small print in many years. They are actually teaching their brain to see again. Often after learning to use the microscope to read, the student will report an improvement in distance vision. This learning process is slow and requires effort.

Telemicroscopes

A telemicroscope is essentially a near point telescope. It is designed to give the magnification needed without requiring the reading distance to be so close to the eye. Some people find it very difficult to hold material very close to their eyes as required by the microscope, but still need a spectacle device to have two hands free. Other people have occupations or specific visual tasks which must be done at a longer distance; for example, someone who is required to read gauges on machinery and physically cannot get extremely close to them. It is for these people that the telemicroscope is designed. The telemicroscope typically has a working distance of 8 inches to 16 inches. Although a telemicroscope provides magnification at a longer working distance, it has a very critical focal point and a very small field of view. The small field makes it difficult to read. It will take much practice before the student can use it comfortably and efficiently. Usually the individual using a telemicroscope loses his place constantly and has difficulty keeping a target in focus for extended periods of time. It is used more successfully for intermediate distance spotting tasks such as reading labels and gauges. Some typical tasks this device is prescribed for are:

- Reading computer print-outs as they leave the printer.
- Viewing typed material while the material is still in the machine or seeing the computer screen.
- Seeing timing marks, inside carburetors, etc., by mechanics.
- Looking at gauges, dials, etc., which are not accessible.
- Writing when a microscope does not leave enough working distance.
- A few people can read with them more comfortably because of the longer working distance and they are not confused by the very small field and critical focus.
- Reading music while playing instruments.
- Working with power tools (added distance increases safety).
- Interviewing, in order to observe expressions on the face of the person being interviewed.

Optical System Advantages and Limitations

Device	*Magnification needed*	*Field of view needed*	*Work distance needed*	*Mobility required*
Microscope (MS)	Practical in +8 to +48 diopter. Special doublets preferred +32 to +80 diopters.	The full field microscope provides the largest field of view for comparable magnification. Half-eye or bifocal design will result in some loss of field of view, but will allow for mobility.	Has the shortest work distance of any system for comparable magnification.	Full-field design precludes mobility. Half-eyes or bifocals allow mobility but reduce field of view advantage.
Magnifier (MG)	2x to 5x is practical as a hand magnifier. Above 5x (+20), use stand or pocket magnifier.	The magnifier is a compromise between the large field of the microscope and the small field of the telemicroscope. The patient can adjust the work distance/field of view to suit personal comfort.	Magnifiers allow a more normalized work distance for comparable magnification. This advantage dissipates at 8x magnification and above.	Magnifiers are portable and do not interfere with mobility. Acceptable for use in public.
Telemicroscope (TSMS)	Practical only up to 8x magnification (32D). Can design as a binocular with cap for greater power.	Provides the smallest field of view of all devices for comparable magnification.	Has the longest work distance for comparable magnification. Usually not a practical field of view, 6x and above, with surgicals and/or bioptic design.	Full-field precludes mobility. Surgical design allows for travel and mobility, but severely reduces field.
Telescope (TS)	Hand-held systems practical up to 10x. Bioptic design practical up to 6x. Above 10x, consider binoculars (monocular?.	Not applicable; all are used for distance. A focusable telescope suffers a loss of field of view over the use of caps when used as a near telescope.	As a distance device, a telescope has a small field of view. A bioptic will have the smallest field of the types of telescopes typically prescribed. Hand-held systems provide a larger field of view. Consider binoculars (monocular). Fields 6 degrees and less are typically not practical. Keplarian telescopes have a larger field of view than Galilean.	Full-field precludes mobility,especially above 2x. Bioptic design, while reducing field of view, allows for travel, mobility, and even driving.
Electro-optical	System is practical from 8x to 60x.	For higher magnification, it allows a more normalized work distance. May need reading correction with CCTV.	The words moving across the screen give the patient an apparent larger field of view as it allows for faster information processing.	The system precludes mobility. Materials must be brought to the system for magnification. There are some portable systems, but to date, they are not very successful.

Which non-optical aids can be used to improve visual functioning?

Non-Optical Aids

Non-optical aids are often useful in enhancing the use of vision with or without optical aids. Generally, non-optical aids are for one of three different purposes: increasing illumination, increasing contrast, and providing physical comfort.

Contrast

Contrast is extremely important in helping a person read printed material. Contrast can be enhanced by using a felt tip pen. One can also write larger to give a magnified image.

Another effective contrast enhancer is a piece of yellow filter paper placed over the print or yellow clip-on filters over the student's spectacles. Yellow filters tend to make print look blacker. A typoscope is a piece of black cardboard with a slit in it. A typoscope has two general uses. By blocking out all but the line of print viewed through the slit, it helps the student keep his place while reading. Also, when a single line of print is framed by black, that line tends to appear to stand out better and appear blacker, thus increasing contrast.

Reading Stands

The purpose of reading stands is to hold reading material in a comfortable position so that students can maintain a close working distance without straining neck and back muscles or tiring their arms. Many people find a comfortable chair, a reading stand, and a good adjustable lamp very helpful when reading. They provide the comfort needed for extended reading sessions. Also, new ergonomic designed magnifiers help reduce posture fatigue.

Note: These are just some general categories of the types of devices used in a low vision program. From these basic units, a host of special systems can be designed to meet the unique needs of a student who is visually impaired.

Educational Assessment

What should be included in the educational assessment?

The purpose of this assessment is to gain as much information as possible about the child's cognitive, affective, and psychomotor skills. The most efficient way for team members to obtain this information is through a series of formal and informal evaluations, observations, and interviews which may be conducted by a psychologist, educational diagnostician, early childhood specialist, psychometrist, vision teacher, or the classroom teacher. However, the person or persons conducting the assessment should be trained in the development and education of children who are visually impaired.

The age of the child will determine where to begin and what instruments to use. Assessment instruments for preschool children often consist of developmental checklists or age-referenced items from standardized tests requiring little or no vision. Readiness skills are emphasized. Assessment of older children is usually more formal. Intelligence and achievement tests are often used, many of which have several subtests. The team members must keep in mind that, regardless of age, the child may not have the experiences necessary to master some concepts.

The educational assessment plays an important role in the selection of the appropriate learning media. First, it determines whether the child has the mental capability necessary for reading. It also provides information about the child's academic readiness as well as about areas of strength and weakness. Next, it provides information about the child's attitude toward various learning media. Finally, it determines whether the child has the motor skills necessary for some media.

The sections that follow explain each part of the educational assessment in greater detail. Assessment procedures for preschool children are explained first, followed by assessment procedures for school-age children. The educational assessment will provide the interdisciplinary team with the information they need to help determine the appropriate learning media to be used by children who are visually impaired.

Cognitive Assessment

One of the main purposes of the assessment is to determine if the child has the mental capability necessary for reading. This may be difficult to determine in a preschooler because the child may have the intellect to learn to read but not have the necessary experiences to do well on a formal evaluation. In such an instance, the assessment team will have to determine whether the child was unable to see the task or did not understand the concept.

With older children, the assessment will help determine if the child's performance is commensurate with abilities. If the child is not functioning at the appropriate level, other factors that could affect performance must be considered.

A second purpose of the educational assessment is to provide information about the child's academic readiness and areas of strength and weakness.

Intelligence tests can provide useful information about the child's cognitive ability, but should not be the only instrument used. Academic achievement tests and developmental checklists can also be quite helpful. These tests and checklists, when used together, help to give a more complete picture of the whole child.

Factors that influence cognitive development are all interrelated and are very much experiencially based. These factors encompass the child's intellectual development, language development, concept development, as well as auditory and listening comprehension.

"Lowenfeld (cited in Scholl, 1986, p.76) lists three restrictions of blindness on cognitive development: on the range and variety of experiences, on the ability to move about, and on the control of the environment."

Personnel Responsible for Assessment

- Psychologist
- Educational diagnostician
- Psychometrist
- Early childhood specialist

Assessment of Preschool Children

When evaluating small children, it is difficult to use an actual intelligence test. Sharon Bradley-Johnson (1986, p. 37) states that it is "impossible at this time to obtain a valid IQ score for children with little or no vision under the age of four." She recommends "using age-referenced items from standardized tests that do not require vision or that can be adequately adapted to circumvent visual requirements and still measure the same skills" (1986, p. 37).

Some evaluators use developmental checklists to help determine the child's cognitive abilities. These checklists are available from many different sources. Some are designed for use with all children and follow the normal sequence of development for children, while others are specifically designed for use with children who are visually impaired.

Developmental checklists tend to look at the child's cognitive, language, fine and gross motor, socialization, and self-help skills. Often the evaluator can simply check a box indicating whether the skill was observed. Other checklists may be more specific and ask about the degree of mastery.

Assessment of School-Age Children

Bradley-Johnson (1986, pp. 80-81) states that "good judgement is particularly important in interpreting results of intelligence tests for visually impaired and blind students. Ashman (1982) suggests that to avoid overinterpreting test results for these students, the standard error of measurement should be used to describe a range of performance rather than reporting a single score."

Bradley-Johnson also explains (1986, p. 81) that "in a review of studies on the reliability of the WISC, Tillman (1973) found that internal consistency and test-retest coefficients were about the same for blind students as for sighted students. He noted that few studies have been done with blind students on the validity of the WISC. Keep in mind when interpreting results of IQ tests that for some visually impaired and blind children, abstract concepts tend to take longer to develop than for sighted students."

See Appendix C for references to norm-referenced, criterion-referenced, and informal measures for preschool and school-age children.

What should be included in the cognitive assessment of children who are visually impaired?

Language Development

Language development in children who are visually impaired is very similar to that of children who are sighted. However, the rate of development may be somewhat slower for a child who is visually impaired. Mills (Scholl, 1986) states that the slower rate of development may be caused by slower physical development, a more restricted range of experiences, and lack of visual stimulation.

Language development and auditory development parallel each other; however, language development is also closely connected with concept development. Since all of these are based on experiences, the child should have the opportunity for as many concrete experiences as possible so that language will be meaningful.

Language is both receptive and expressive. The information the child takes in through the auditory channel is receptive language, while the child's actual speech output is expressive language. It is critical that the child's hearing be checked in order to ensure that the child can maximize this learning medium. "The child needs to develop auditory skills of discrimination, localization, identification, closure, sequence, and memory for stories" (Heinze, 1986, p. 302).

Language development is comprised of two steps: listening and understanding. A child who is visually impaired may take longer to attach meaning to certain words. The understanding of concepts is gained through the manipulation and tactual exploration of concrete objects. As the child explores an object, the object should be described in vocabulary that is appropriate to the child's language level, thus enhancing the child's receptive language skills.

How the child responds during a conversation will provide information about his or her expressive language skills. To evaluate a child's expressive language skills the examiner should observe the child participating in several conversations.

"Scott et al suggested that children with visual impairments or blindness should learn position concepts early. Thus, assessment of a young child's knowledge of these concepts is helpful. It may take a visually impaired or blind child longer to learn concepts such as left, right, and up, and so they need to be taught as early as possible. Further, these children must rely heavily on these concepts, more so than sighted children, to function effectively" (Bradley-Johnson, 1986, p. 42).

Adapted from Scholl, G. T. (1986). Growth and development. In G. T. Scholl (Ed.), Foundations of education for blind and visually handicapped children and youth: Theory and practice (pp. 65-82). New York: American Foundation for the Blind.

Concept Development

Concept development is closely related to language growth. Language plays an important role in the acquisition of new concepts and the refinement of those that already exist. Concepts underlie both the child's ability to bring meaning to symbols and to derive meaning from symbols. Concept development begins with the concrete, then moves to representative, and finally goes on to the most advanced stage, abstract.

In order for the child to develop concepts, the child needs to be provided with as many experiences as possible so that there is a foundation to build upon. Without experiences, there will be no concepts. If the parent has not provided the experiences along with the necessary language to go with it, the teacher or someone else must do this for the child before the child will be ready to learn to read. It must be understood that some children, especially those who are totally blind, will never understand some concepts because they cannot be perceived tactually.

Other essential factors that are basic to concept development are body image and spatial awareness. The child needs to be aware of the environment and begin to name surroundings and understand his or her place in the environment.

The child must understand the connection between the object and the word that describes it. The child must also learn that adjectives describe objects. This goes hand in hand with language development.

Reading and Writing Comprehension

The child's ability to read and write must be evaluated to determine if the medium that is currently being used is appropriate. If the child is not able to perform at the same level as classmates, another form of learning medium may need to be considered. The information obtained from the checklists in Appendix B for reading and writing efficiency will be helpful in this process.

Visual Perception/Discrimination

Visual perception is the ability to interpret what is seen. In other words, it is the ability to understand and interpret meaningfully all information received through the visual sense. It is a decision-making process that is more closely related to the

child's learning opportunities and capabilities than is the condition of the eyes (Barraga, 1992). Factors that influence the student's visual perception/discrimination skills are:

1. Figure-ground discrimination - the ability to discriminate visible things and the background against which they are seen

2. Visual closure - the ability to perceive a total picture when only a portion is visible

3. Part/whole relationships - seeing and perceiving the individual parts combined into an integrated whole

4. Whole/part relationships - seeing and perceiving the whole as an assemblage of unique and individual parts

5. Form discrimination - the ability to distinguish differences and/or similarities among forms

6. Object discrimination - the ability to distinguish differences and/or similarities among objects

7. Matching by shape, color, and size - the ability to group objects that are equal or similar in a specific way

8. Categorizing by color, shape, size, purpose of object - the ability to classify objects by certain characteristics

9. Sequencing - the following of one object after another in a chronological or logical order

10. Symbolic representation - a conventional or familiar sign that stands for or suggests something else when seen

The basis for these definitions is Program to Develop Efficiency in Visual Functioning, (Barraga & Morris, 1980).

Tactual Discrimination/Perception

The child needs to be able to make fine discriminations between sizes of objects, consistencies, and so on. Development moves from gross discriminations involving familiar manipulative objects to fine tactual discrimination which involves small muscles and fingertips (Lowenfeld, Abel, & Hatlen, 1969). According to Barraga (1986), perceptual discrimination may follow this sequence:

1. Awareness and attention - notices differences in textures, temperatures, vibrating surfaces, and materials of varied consistencies

2. Structure and shape - perceived when the hands grasp and manipulate objects of many shapes and different sizes

3. The relation of parts to the whole - understands that an entire object is made up of many different parts, develops this by taking apart and putting objects back together again

4. Graphic representations - when three-dimensional objects are represented in two-dimensional form beginning with simple geometric forms and increasing to more complex drawings

5. Braille symbology - requires a tactual kinesthetic perception comparable to that of print letter and word recognition

Other skills that may be associated with tactual perception are the ability to match or sort by texture, shape, or size; categorize as same or different; left to right progression; and sequencing.

Auditory Comprehension/Perception and Listening Comprehension

Auditory perception/comprehension involves a number of components. Scholw & Nerbonne (1989, p. 92) state that among these are:

1. Detection - experiencing the awareness of sound (influenced by hearing acuity and intensity level of signal)

2. Discrimination - ability to distinguish between individual speech stimuli

3. Identification - ability to identify or label what one has heard by repeating, pointing to, or writing a word or sentence

4. Attention - ability to attend to the speaker and the message being conveyed (degree and quality of the listener's attention influences how well speech is perceived)

5. Memory - ability to retain or store verbal information for long and/or short periods of time

6. Closure - speech elements which are received, properly discriminated, and retained for further processing and which are brought together into a meaningful whole

These skills are necessary for learning readiness. If the child is not able to discriminate between sounds, recognize phrasing in sentences, and the rhythm of words within sentences, the child will experience difficulty with learning (Lowenfeld, Abel, & Hatlen, 1969). Since this area overlaps others, the teacher may introduce activities throughout the day that will help develop meaningful vocabulary.

CHECKLISTS FOR THIS SECTION CAN BE FOUND IN APPENDIX B. THEY ARE INTENDED TO PROVIDE ADDITIONAL INFORMATION ABOUT THE CHILD'S ABILITIES. THEY ARE IN NO MANNER INTENDED TO TAKE THE PLACE OF A FORMAL INSTRUMENT, RATHER, THEY ARE TO BE A SUPPLEMENT.

On some questions, if no is checked you may wish to make notes explaining that response. Also, if no is checked on a majority of answers, those questions will provide information on areas of concern which may need to be worked on and may indicate that the child is not using an appropriate learning media.

Affective Development

For the purpose of this manual, the term affective refers to the emotional aspects of the child. This encompasses personality, social development, self-concept, and self-esteem.

Although the cognitive abilities of the child are important, the affective development is just as crucial. The students' views and attitudes toward themselves, their visual impairment, literacy, the various forms of media available, and future goals must be considered since they will also impact educational progress. The most effective method of assessing the child's affective development is through observations, interviews, and checklists.

As the child grows, self-concept begins to develop. Scholl (1986) states that this is a life-long process and will change as the child responds to the environment. The child's world gradually expands from family to others as relationships are built. The pattern of development is the same for both children who are visually impaired and sighted children. Children who are visually impaired may develop in some areas more slowly than sighted children do (Tuttle, 1984).

Many factors will shape the child's attitudes and influence self-concept. Scholl (1986) lists three such factors:

- acceptance, love, support and feelings of success from the family
- experiences with success and failure provided by the environment
- feedback from the peer group

Through these interactions, the child will learn what is and is not acceptable in particular situations based on the responses received from others. These responses will influence the student's self-concept, self-esteem, and the acceptance of the visual impairment. However, Scholl (1986) states that the ultimate adjustment of the person with a visual impairment is dependent, in large measure, on parental attitudes and their adjustment to the child and the child's visual impairment. Therefore, parents should be helped to develop positive attitudes within the family. This will help to foster positive self-concept and self-esteem in the child.

Personnel Responsible for Evaluation

- the psychologist
- the psychometrist
- the educational diagnostician
- the early childhood specialist
- the classroom teacher
- the teacher of children who are visually impaired
- the parent

What should be included in the assessment of affective development of children who are visually impaired?

Functional Development

This aspect is concerned with how the child functions when completing non-academic tasks. It is also concerned with the type of activities the child participates in during recreation or free time. Observations frequently provide the most information. The questions on the checklist in Appendix B will provide valuable information.

Socialization

As the student grows and matures, the socialization process shifts from the family to the teacher and then to the peer group. Children learn what is appropriate or inappropriate through observation. Many times, this is through non-verbal behavior such as a nod, smile, or shake of the head. A child who is visually impaired may miss these cues and thus be unable to change inappropriate behavior in order to be accepted. This may lead to low self-esteem and a poor self-concept.

Observations will provide information about the child's socialization skills. Many checklists that are specifically designed to assess a child's socialization skills are commercially available. The checklist in Appendix B will also be useful.

Motivation

The student's feelings towards the visual impairment will strongly affect acceptance of various forms of learning media. If the student has a negative attitude towards the visual loss, there may be a great deal of reluctance or resistance toward using an alternative form of learning media that is thought to be different

or even inferior. When the student does not have the motivation or desire to use a certain form of learning media, the teacher should provide positive role models and training in the use of the appropriate media. This includes providing positive information about the advantages of the learning media. This training should be extended to the entire family to improve their understanding of the advantages of a particular medium.

Interviewing the student will provide information about the student's attitude towards the visual impairment and the various forms of learning media. Since this may be a difficult and stressful subject, the interview should be conducted with sensitivity and respect.

Psychomotor Development

Psychomotor development is the development of the motor skills as they relate to mental processes. Assessment of such development will be based primarily on observation of the student's performance in the following areas:

- physical stamina
- gross motor development
- fine motor development
- orientation
- spatial development
- mobility

In addition to these observations, a general medical examination and information about the circumstances of the child's birth should be included in the assessment because of the close relationship of the psychomotor development to general health and factors such as low birth weight, abnormally long labor, prematurity, and so forth.

Since vision stimulates psychomotor development, assessment of these skills may be a good predictor of how well a preschooler who is visually impaired will do on reading print without special intervention. Children who are visually impaired and who have good general health and physical stamina will usually follow the same sequence of growth and learning as normally sighted children but may take a little longer or may need stimulation other than visual for motivation. For example, a child who is visually impaired may learn to crawl a little later than other children or learn only when he or she hears a sound and associates it with a favorite toy, food, etc. This could be an indication that the child is depending on senses other than vision to get information. Braille might very well be the medium of choice for such a child.

Here are some other ways that psychomotor development relates to beginning literacy. Eye/hand coordination skill is required for stacking blocks just as it is for reading and writing on print workbook pages. The same child who has difficulty with coordination on the playground may have difficulty with print reading and writing. Children who are visually impaired and who may have limited mobility will have difficulty gathering information and developing concepts essential for understanding and reading. If children have difficulty orienting themselves in space, they may also have difficulty orienting themselves on a page in a book and may not understand spatial concepts.

Just as the ability to use one's eyes is a prerequisite for good print reading, a student who is visually impaired must be able to perceive and differentiate between patterns of raised dots and move across a page in an organized way for good braille reading. Psychomotor assessment should help determine whether a student will be able to do this.

Obviously, any student must have good general health and physical stamina to grow and learn at a normal rate. If a student who is visually impaired is not keeping up with peers and is suffering from generally poor health, his or her lack of physical stamina and desire to learn new things may be more to blame for lack of progress than is an inappropriate reading medium. On the other hand, if the student is in generally good health but is unable to read for periods of time equal to those of peers, the present reading medium may definitely be suspect.

Some students may also have other handicapping conditions, identified and possibly unidentified, which will affect psychomotor development. For example, a student who is visually impaired and has a hearing loss will not be able to rely on auditory cues to provide him or her with information. A student with emotional problems may have difficulty relating to the things around him or her in an appropriate way.

What should be included in the psychomotor assessment of children who are visually impaired?

Because of the special media students who are visually impaired use, they will often be slower both at developing psychomotor skills and at performing psychomotor tasks. It must be kept in mind that ultimately these students will be out in the world competing with their sighted peers for jobs. They will not always be given more time to perform a task just because they are visually impaired. Rather, they will be expected to perform the same amount of work as their sighted peers. As the student's psychomotor skills are assessed, it is important to ask if this student is keeping up and learning to use the most efficient medium available to him or her for each task.

Readiness

Since psychomotor assessment is so closely related to cognitive assessment, particularly at the preschool levels, the same assessment instruments already cited which contain gross and fine motor, and/or spatial assessment can often be used for this assessment as well. Examples of such instruments are:

- Battelle Developmental Inventory
- Bayley Scales of Infant Development
- Vineland Social Maturity Scale
- Brigance Diagnostic Inventory of Early Development
- Growing Up
- Informal Assessment of Developmental Skills
- Oregon Project for Visually Impaired and Blind Preschoolers-5th Edition
- Callier-Azusa Scale
- Developmental Activities Screening Inventory

- Koontz Child Development Program
- GUIDE Developmental Skills
- Frostig Developmental Test of Visual Perception-Developmental test of Visual Perception-2nd edition.
- Developmental Test of Visual Motor Integration
- Motor Free Visual Perception Test
- Peabody Mobility Programs
- Stanford Multi-Modality Imagery Test

Assessing psychomotor development will require several observations of the child's behavior as well as interviews with the parents or primary caregivers concerning their observations of his or her performance and development.

School-Age Children

For school-age children, academic achievement will take on new importance and psychomotor skills may seem to fade into the background. Tests will probably not mention motor development at all. Instead, developmental skills, daily living skills, and mobility and orientation skills will be used to see if the student is mastering the special psychomotor skills needed. The Informal Assessment of Developmental Skills provides checklists and rating scales for this type of assessment.

Tests of academic achievement and social development will also provide insights into the student's ability to keep up with peers on tasks requiring psychomotor development. Examples of such tests measuring these skills are:

- Stanford Achievement Tests
- KeyMath Diagnostic Arithmetic Test
- Test of Achievement Skills
- Wide Range Achievement Test
- Vineland Social Maturity Scale

Because students who are visually impaired may be given more time to complete assignments, or less demanding assignments, than their normally sighted peers, grades and report cards may not be a good indicator of the students' abilities. Observation of students' behavior in class, comparison of the behavior with that of their peers, and discussion of what the teacher expects of the students who are visually impaired and how the teacher views the students' behavior, will give a much better indication of how the students are actually performing.

Checklists for this section can be found in Appendix B, Psychomotor Development.

ASSESSMENT OF ENVIRONMENTAL ATTRIBUTES

After evaluating the child from a medical, functional, and educational standpoint, the student's environment should be assessed. This will help the interdisciplinary team determine how the student functions in ideal and less than ideal conditions. The information gained should be valuable when determining the appropriate learning media for various situations.

The environmental evaluation should be done in both the educational and home settings. If an evaluation of the home setting cannot be completed, some information may be obtained through an interview with either the student or the parents.

The information on the evaluation of environmental attributes was adapted from Visual Impairment in the Schools (Harley & Lawrence, 1984). Questions that should be answered by the environmental assessment are in Appendix B.

Educational Assessment

For the purpose of this manual, the environment refers to the classroom and any other learning areas such as home, resource room, etc.

After the child has been evaluated, the child's classroom and other environments should be assessed. The decision concerning which reading media is most appropriate should not be based solely on the environment and anything it may be lacking. Remember that the environment can be adapted to meet the needs of the student.

"The proper visual environment which allows for maximum comfort and visual performance is essential for the visual learner" (Harley & Lawrence, 1984, p. 86). Therefore, it is critical to determine how the child functions in an ideal and less than ideal visual environment when determining the appropriate learning media.

Five factors influence a student's visual performance:

- brightness
- contrast
- time
- distance
- image size

If these factors, which are inherent in every visual task, are carefully controlled to assist the individual needs of each student, seeing becomes easier (Harley & Lawrence, 1984). Unfortunately, many children are struggling to function in less than ideal conditions and failing to reach their potential. The environment should be designed in such a way that the visual needs of the child will be met. However, it must be kept in mind that different tasks may require different modifications and what works best for one child may not work well for another. Also, print may be the best solution for one situation while braille is more appropriate in another.

When conducting the assessment, the evaluator should describe the present conditions in which the student is functioning. If the environment is not designed to meet the student's needs, the evaluator should also describe how the student functions when these needs are met.

<u>Personnel Responsible for Evaluation</u>

- Teacher of Students who are Visually Impaired
- Educational Diagnostician

What should be included in the assessment of the educational environment of children who are visually impaired?

Brightness

Any visual task requires a sufficient quantity of light in order to be completed. However, bright lights are not always the answer. Some eye conditions require average to bright lighting while dim lighting is required by others. Harley & Lawrence (1984) state that the minimal lighting level varies according to the individual requirements of the task. Since the student's lighting needs depend on both the eye pathology and the visual task itself, the ability to provide variable lighting rather than increased levels of illumination is the most important factor (Harley & Lawrence, 1984). Portable individual study lamps with variable intensity lighting controls can be used to provide high and low levels of illumination.

A brightness condition that may cause discomfort, fatigue, or annoyance is glare (Harley & Lawrence, 1984). Glare can often be reduced by re-orienting light sources, using non-glossy inks or paper, using certain colors, and seating the child properly.

A lighting system which distributes light in equal amounts from all directions or angles is considered ideal. If natural lighting is used, the weather and time of day must be considered. Pulling shades up will provide the maximum benefit on dim, cloudy days while pulling shades down can reduce glare from snow. If natural lighting is not used, fluorescent lighting is preferable to incandescent lighting.

To determine the best placement for boardwork and seat work, the teacher may have the child move to different areas of the room.

Contrast

Visual efficiency can be improved by providing the proper contrast between the visual task and the background. Ideally, the brightness level of the task should be comparable to the brightness level of the background.

The student's materials should provide sufficient contrast. Black on white provides the greatest contrast but there may be a problem with glare. Glare can be reduced by using buff colored paper. Black, blue, green, and purple ink provide a good contrast against white or yellow paper. When using a black or green chalkboard, white chalk is more visible than yellow.

When writing, the following supplies may be helpful:

- soft lead pencil on unglazed cream-colored paper
- light green lines 3/4 to 1 inch apart help provide the necessary guides for writing
- fiber-tipped pens with black ink are often used for greater contrast
- providing white on black materials on which the child can manipulate various learning materials (Harley & Lawrence 1984, pp. 90-92).

Time

Students with low vision usually read at much slower speeds than their normally sighted classmates and may need additional time to complete tasks. Sufficient time must be provided in order for the student with low vision to accomplish a visual task (Harley & Lawrence, 1984). Students who read 50-100 wpm may wish to consider another form of learning media if an alternative media can improve accuracy and speed, while reducing fatigue.

Distance

The visual task must be positioned at the proper distance in order for the student to perform most efficiently. The proper distance will vary from student to student and depend upon the eye condition. For children with hyperopia, working with materials at a distance may help while children with myopia may simply need to move a book closer. If the student is only a few inches away from the page, posture and comfort need to be considered. Easels and bookstands can help with this. Sometimes moving a child to the front of the classroom will help him or her see details on a chalkboard.

Image Size

The child should have the proper image or print size for accomplishing the task. The proper size will vary for each child, and the teacher may have to experiment in order to determine what works best for the child. "The size of the type required is the smallest print size that the student can read efficiently, even with an optical aid" (Clarke, Lutters, & Dote-Kwan, 1993). Some children do very well with the large print used in the lower grades but have difficulty with the smaller print as they progress through the higher grades. Two factors to consider when trying to determine the proper size are physical comfort and reading speed. If the print size is so large that accuracy and speed are affected, another medium may need to be considered.

Family and Home Assessment

The last section concerns the assessment of the family and home environment. The family is extremely important since they are probably the only ones who will be constant participants in the interdisciplinary team throughout the child's education. They provide valuable information that would be impossible to obtain anywhere else. The parents' attitudes, educational goals, and hopes for their child will influence the child's own opinions. If the parents have positive attitudes towards various learning media, this will be reflected in the child's attitude. Likewise, negative attitudes will also be reflected.

What should be included in the assessment of the family and home environment of children who are visually impaired?

Generally, interviews and observations are used to gather information about the family. If possible, these interviews and observations should be conducted in the child's home. Doing a face-to-face interview there can provide invaluable information about the child that cannot be obtained in any other way. In the home, an assessment team member can get an idea of the family's reading habits, the kind of lighting the child uses, the ways the child uses his or her leisure time, and, if the child is present, how he or she moves around in familiar surroundings.

The family's needs, concerns, and expectations should be respected throughout the assessment process. This is especially true when going into the home. Since meeting with the family at home eliminates transportation and babysitting problems, some families may find this easier. Some families will be more comfortable being interviewed in familiar surroundings. Some families will need to be assured that the process focusses on evaluation of the child's use of vision and on the important information the family can provide to help in the selection of the appropriate learning media, not on their house and housekeeping. It may be important in some cases to explain to the child's family how the questions being asked will help in deciding what media their child should learn.

What questions should be answered by interviews with the family?

Parent Interviews

The interview may or may not occur during the observations. Parents should be encouraged to discuss how and when the child uses vision, their expectations about the learning media, and their attitudes towards the various learning media.

The interviewer should be familiar with the questionnaire that is being used and should ask direct and appropriate questions. These questions should be geared to obtaining as much information as

possible. The interview should be conducted with respect for the parent's needs, concerns, and expectations.

Since parental attitudes about learning media are critical factors for the team to consider, parents with negative feelings about any media will need instruction in the benefits their child may derive from the use of this media.

What questions should be answered by interviews with the student?

Student Interviews

Interviews with the student, either formal or informal, can provide information concerning the student's feelings about future needs, expectations, and aspirations as well as perceptions about visual functioning.

Probably the most critical component of the student interview is the student's attitude toward each learning medium. It is important to discover if the student has preconceived notions either for or against the various media. It is also important to determine whether the student is aware of the media and technology that is available. If the student does not have this information, someone should explain what is available. The evaluation team should remember that print and braille media are equally efficient and should convey this to the student. As with the parents, the interview should be conducted with respect for the student's needs, concerns, and expectations.

Student Observations

Observations are a vital part of the evaluation process and often provide information that could not be obtained otherwise. Observations have several advantages. Many checklists have been developed based on observations. There are many different types of checklists or other forms available. They can be used by a variety of personnel and can often be completed in a relatively short period of time and in many different settings. The evaluator may also pick and choose sections from different checklists which are relevant to a given situation. The focus of the observations should be the student's visual behavior with an emphasis on educational tasks. However, careful attention should also be given to tasks involved in day-to-day living.

Checklists may be brief or longer and more involved. If checklists are not used during student observations, the evaluator must be certain that good notes are taken. The observer must write down key observations or phrases and expand on them when the observation is completed. More detailed information can be added immediately afterwards.

APPENDIX A

Assessment Procedure

Outline

Assessment Procedure

I. Referral
II. Selection of Interdisciplinary Assessment Team Members
III. Data Collection
    a. Background Information
    b. Medical Assessments
        1. Eye Report
        2. Physical Report
    c. Low Vision Assessments
        1. Functional
        2. Clinical
    d. Educational Assessments
        1. Cognitive
        2. Affective
        3. Psychomotor
    e. Environmental Assessments
        1. Educational
        2. Family and Home
            (a.) Parents
            (b.) Students
IV. Data Interpretation
V. Assessment of Results by Interdisciplinary Assessment Team
VI. Media Recommendation
VII. Implementation
VIII. Follow-up Evaluation
    a. Required
    b. Upon Request

Assessment Procedure Checklist

	Completed	Date
Referral	_____	_____
Interdisciplinary Assessment Team Selected	_____	_____
Background Information Collected	_____	_____
Eye Report	_____	_____
Physical Report	_____	_____
Functional Low Vision Assessment	_____	_____
Clinical Low Vision Assessment	_____	_____
Cognitive Assessment	_____	_____
Affective Assessment	_____	_____
Psychomotor Assessment	_____	_____
Assessment of Educational Environment	_____	_____
Assessment of Home Environment	_____	_____
Parent Interview	_____	_____
Student Interview	_____	_____
Assessment Meeting	_____	_____
Media Recommendation	_____	_____
Implementation	_____	_____

Referral Information

Referred by: _____

Date of referral: _____

Reason for referral: _____

_____

_____

Permission for assessment received: _____

	Yes	No
New referral:	_____	_____
Re-evaluation:	_____	_____

Interdisciplinary Assessment Team Members

Name	Position

Media Recommendation

Meeting held: _____

Members present	Recommendation		
	Print	Braille	Both
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____
_____	____	_____	____

Implementation begins: _____

APPENDIX B

Attributes Assessed

Assessment of Child Attributes

- Eye Report
- Physical Report
- Functional Low Vision Assessment Report
- Clinical Low Vision Assessment Report
- Educational Assessment Reports
  - Cognitive
  - Affective
  - Psychomotor

Assessment of Environmental Attributes

- Educational
- Family and Home

Outline

Eye Report

Eye reports may vary from a few scribbled notes to a multi-paged, highly technical report. However, five basic areas should be included.

I. Visual Acuity (near and distance)
   a. With glasses
      1. Determine legal blindness
      2. Amount of correction achieved
   b. Without glasses
II. Prescription Being Worn
   a. Gives complete refractive diagnosis
   b. Serves as a check and balance against other information
   c. Indicator of problems related to wearing lenses
III. Diagnosis
   a. Provides description of student's eye condition
   b. Needs to be as complete as possible
IV. Etiology
   a. Origin of the eye condition (congenital, inherited)
   b. Age of onset
V. Prognosis
   a. Expected progress or ultimate development

Other information that should be contained in a eye report includes:

I. Refractive Errors
   a. Astigmatism
   b. Myopia
   c. Hyperopia
II. Central Vision (Macula Vision)
   a. Provides color discrimination
   b. Allows critical or sharp (exact) seeing tasks
   c. Reading is a central vision task
III. Peripheral Vision
   a. Provides awareness of movement
   b. Vital for movement
   c. Serves in dim light
IV. Treatment
   a. Medication
   b. Surgery
   c. Patching

Eye Report

Completed by: _____

Date: _____

	Tested (Y-N)	OS	OD	OU
Visual Acuity				
Near				
With correction	_____	_____	_____	_____
Without correction	_____	_____	_____	_____
Distance				
With correction	_____	_____	_____	_____
Without correction	_____	_____	_____	_____
Lens Prescription	_____	_____		
Diagnosis	_____	_____		
		_____		
Etiology	_____	_____		
		_____		
Age of Onset	_____	_____		
Prognosis	_____	_____		
Visual Field		_____		
Refractive Error	_____	OS	OD	OU
Myopia	_____	_____	_____	_____
Hyperopia	_____	_____	_____	_____
Astigmatism	_____	_____	_____	_____

	Tested (Y-N)	Yes	No
Central Vision	_____		
Impaired		_____	_____
Peripheral Vision	_____		
Impaired		_____	_____
Treatment	_____	_____	_____

If so, what: _____

_____

Physical Report

Completed by: _____

Date: _____

	Excellent	Good	Fair	Poor
General Health	_____	_____	_____	_____
Hearing	_____	_____	_____	_____

	Yes	No
Other Handicapping Conditions	_____	_____

If so, what _____

_____

	Yes	No
Restrictions	_____	_____

If so, what _____

_____

Other comments: _____

_____

Outline

Functional Low Vision Assessment

I. Assessment Purpose
   a. Determine the present level of visual functioning
   b. Determine special individual needs concerning visual and non-visual use
   c. Make concrete suggestions for present-level educational planning

II. Basic Sequence in Visual Functioning
   a. Light reception
   b. Fixation
   c. Focus
   d. Tracking and scanning
   e. Accommodation
   f. Discrimination
   g. Visual memory
   h. Visual motor
   i. Spatial relations and orientation
   j. Visual discrimination and imagery
   k. Integration

III. Sequence in Presentation of Materials
   a. Concrete
   b. Representative
   c. Abstract

IV. Other Factors to Evaluate
   a. Working distance
   b. Ability to use blackboard
   c. Non-optical aids
      1. Lighting assessment
      2. Contrast
      3. Print size and clarity
      4. Writing materials
      5. Typoscope
      6. CCTV
      7. Computer
   d. Optical Aids

V. Basic Procedure for Assessment
   a. Referral
   b. Collection and study of background information
   c. Observation
   d. Interview
   e. Formal Evaluation
   f. Examine results of evaluation, observation, interview
   g. Develop comprehensive report, including strengths and weaknesses
   h. Share results, make recommendations, and implement decisions with interdisciplinary team
   i. Follow-up

Functional Low Vision Assessment Report

Completed by: _____

Date: _____

	Yes	No
Previous low vision exam	_____	_____

General optical history and relevant medical information: _____

_____

_____

Instruments and methods used: _____

_____

_____

Areas of strength: _____

_____

_____

Areas of weakness: _____

_____

_____

Lighting needs: _____

Working distance: _____

Visual motor responses: _____

Ability to track: _____

Special materials for writing: _____

Non-optical aids used: _____

Optical aids used: _____

Print size: _____

Recommendations: _____

Outline

Clinical Low Vision Assessment Report

I. Clinical Visual Profile
A clinical low vision assessment is conducted by a low vision specialist and should contain the following information:

a. Distance visual acuity
b. Intermediate distance visual acuity
c. Near visual acuity
d. Refraction
e. Contrast sensitivity function
f. Binocularity
g. Central visual fields
h. Peripheral visual fields
i. Glare and illumination
j. Color vision
k. Ocular-motor skills
l. Low vision prescription
    1. Size magnification
    2. Approach magnification
    3. Angular or telescope magnification
    4. Electro-optical magnification

II. The low vision clinician may prescribe optical devices for the child. These low vision aids may include:

a. Hand held telescopes
b. Clip-on telescopes
c. Bioptic telescopes
d. Full field telescopes
e. Hand held magnifiers
f. Stand magnifiers
g. Spectacle mounted microscopes
h. Telemicroscopes

III. Non-optical aids are often useful in enhancing the use of vision with or without optical aids. Generally they serve one of three different purposes: increasing illumination, increasing contrast, and providing physical comfort. Non-optical aids may include:

a. Contrast
    1. Felt tip pens
    2. Yellow filter paper
    3. Typoscopes
b. Reading stands

Clinical Low Vision Assessment Report

Completed by: _____

Date: _____

	OD	OS	OU
Distance visual acuity:	_____	_____	_____
Intermediate distance visual acuity:	_____	_____	_____
Near visual acuity:	_____	_____	_____

Refraction: _____

Contrast sensitivity function:	Yes	No
low frequency loss	_____	_____
high frequency loss	_____	_____
no frequency loss	_____	_____

Binocularity _____ _____

Central visual fields

size of visual field _____

areas of distorted vision _____

Peripheral visual fields	Yes	No
right field loss	_____	_____
left field loss	_____	_____
superior field loss (upper)	_____	_____

Glare and illumination: _____

	Yes	No
Color vision loss	_____	_____

If so, what colors: _____

Ocular-motor skills: _____

	Yes	No
Low vision prescription:	_____	_____

If so, what: _____

	Yes	No
Optical aid(s) prescribed	_____	_____

If so, what: _____

	Yes	No
Non-optical aid(s) recommended	_____	_____

If so, what: _____

Other comments: _____

_____

_____

Outline

Cognitive Assessment

I. Purpose
   a. Determine if the child has the mental capacity necessary for reading
   b. Provide information about the child's academic readiness
   c. Provide information about areas of strength
   d. Provide information about areas of weakness

II. Readiness
   a. Developmental checklists are most often used for this age group

III. Areas of assessment
   a. Cognitive skills
   b. Language skills
   c. Fine motor skills
   d. Gross motor skills
   e. Socialization skills
   f. Self-help skills

IV. School-age children
   a. More formal tests are used

V. Areas of assessment
   a. Language development
      1. Parallels auditory development
      2. Is closely related to concept development
      3. Is based on experiences
      4. May be expressive
      5. May be receptive
      6. There are two steps in language development
         (a.) listening
         (b.) understanding
   b. Concept development
      1. Allows child to bring meaning to symbols
      2. Allows child to derive meaning from symbols that are read
      3. Is based on experiences
      4. Body image is important
      5. Spatial awareness is essential
   c. Reading and writing comprehension
      1. reading efficiency using print
      2. reading efficiency using braille
      3. writing skills using print
      4. writing skills using braille
   d. Visual perception/discrimination
   e. Tactual perception/discrimination
   f. Auditory comprehension/perception and listening comprehension

Checklist for Language Development

		Yes	No
1.	Can the child express himself orally?	___	___
2.	Can the child answer questions appropriately?	___	___
3.	Does the child recite previously heard information which has no real meaning (verbalisms)?*	___	___
4.	Can the child take turns in a conversation and stay on one topic?	___	___
5.	Does the child jump from one topic to another during a conversation?*	___	___
6.	Is the child's language development age and/or grade appropriate?	___	___
7.	Does the child participate in story-telling activities?	___	___
8.	As the child becomes older and language becomes more advanced, is more time required to attach meaning to certain words?*	___	___
9.	Can the child effectively communicate ideas and concepts with others?	___	___
10.	Does the child understand positional concepts such as:		
	left and right	___	___
	up and down	___	___
	top and bottom	___	___

*If yes is checked, this may be an area of concern and should not be overlooked.

If no is checked, please explain.

Checklist for Concept Development

		Yes	No
1.	Is the child's concept development age and/or grade appropriate?	___	___
2.	Is the child making progress and moving from concrete to abstract concepts?	___	___
3.	Does the child understand the various concepts used in different subject matter, such as:		
	reading and language arts	___	___
	math	___	___
	social studies	___	___
	science and health	___	___
	physical education	___	___
4.	Is the child being provided with real-life experiences and hands-on activities to help enhance concept development?	___	___
5.	Does the child understand concepts that foster academic readiness such as:		
	likeness and difference	___	___
	small and large	___	___
	medium	___	___
	big and little	___	___
	shapes (geometric)	___	___
	in and out	___	___
	up and down	___	___
	top and bottom	___	___
	left and right	___	___
	front and back	___	___

	Yes	No
sides	___	___
corners	___	___
middle	___	___
above and below	___	___

If no is checked, please explain.

Checklist for Reading Efficiency Using Print

		Yes	No
1.	Is the child's progress comparable to age and ability level? (this may include vocabulary, reading comprehension, speed, and accuracy)	___	___
2.	Is the child able to complete assignments in approximately the same amount of time as classmates and still maintain accuracy?	___	___
3.	Can the child stay on task for extended periods of time?	___	___
4.	Is the child's work comparable to that of classmates in terms of quantity and quality?	___	___
5.	Is the child fatigued after completing assignments?*	___	___
6.	Is the child always behind in completing assignments?*	___	___
7.	If so, has this affected the child's self-esteem?*	___	___
8.	Is the child comfortable using print as his or her reading medium?	___	___
9.	If the child also knows braille, are reading rates, accuracy, and comprehension comparable with print?	___	___
10.	Are environmental factors (such as illumination, proper seating, contrast, glare reduction, print size, distance from the page) appropriate for the student in the classroom?	___	___

*If yes is checked, this may be an area of concern and may indicate that the child is not using an appropriate learning media.

If no is checked, please explain.

		Yes	No
11.	Are the student's reading skills transferable? (i.e., Can the child access information outside the classroom in other, less ideal, environments?)	___	___
12.	Is the child's working distance close to the page? (The greater the distance the easier it is to focus for long periods of time.)*	___	___
13.	Is the child using correct posture?	___	___
14.	Does the child need a bookstand?	___	___
15.	Does the child use any aids to access print information? If so, what?	___	___
16.	Will these aids be available to the student after graduation?	___	___
17.	Are the aids portable?	___	___
18.	Are the aids fostering dependence?*	___	___
19.	Are the aids promoting independence?	___	___

*If yes is checked, this may be an area of concern.

If no is checked, please explain,

Checklist for Reading Efficiency Using Braille

		Yes	No
1.	Has the student read braille in the past? If so, for how long?	___	___
2.	Is the student a proficient braille reader?	___	___
3.	Is the student's progress comparable in age and ability level (i.e., vocabulary, reading comprehension, speed, and accuracy) to that of peers?	___	___
4.	Is the student able to complete assignments in approximately the same amount of time as classmates and still maintain accuracy?	___	___
5.	Can the student stay on task for extended periods of time?	___	___
6.	Is the student's work of comparable quality to that of classmates?	___	___
7.	Is the student fatigued after completing assignments?*	___	___
8.	Is the student comfortable using braille as a reading medium?	___	___
9.	Has being a braille reader affected the student's self-esteem?*	___	___
10.	If the student is also a print reader, are reading rates, comprehension, and accuracy comparable?	___	___
11.	Are the student's reading skills transferable? (i.e., Can the student independently access information outside the school environment?)	___	___

*If yes is checked, this may be an area of concern.

If no is checked, please explain.

Checklist for Writing Skills Using Print

		Yes	No
1.	Is the child's handwriting legible?	___	___
2.	Can the child read back what has been written?	___	___
3.	Can the teacher read what the student has written?	___	___
4.	Are the student's note-taking skills comparable in quality to that of classmates?	___	___
5.	Does the student have adequate writing tools such as lined paper, felt-tip pens, and so on?	___	___
6.	Is the child close to work when writing?	___	___
7.	Can the student write for long periods of time?	___	___
8.	Does the student fatigue quickly?*	___	___
9.	Can the child complete written assignments in a timely manner?	___	___
10.	Does the child need low vision aids to help complete writing tasks?	___	___
11.	Will the student's writing skills/ability transfer to other environments?	___	___

*If yes is checked, this may be an area of concern.

If no is checked, please explain.

Checklist for Writing Skills Using Braille

		Yes	No
1.	Are the student's writing skills comparable to his age and ability level?	___	___
2.	Can the student access what has been written?	___	___
3.	Is the student proficient on a braillewriter, slate and stylus, and other note-taking devices?	___	___
4.	Can the student stay on task long enough to complete assignments?	___	___
5.	Does the student feel fatigued after completing assignments?*	___	___
6.	Will writing skills/ability transfer to other environments?	___	___
7.	Can the student use current technology (computers that are not only capable of speech but also produce print and braille copies of materials, Braille 'n Speak, etc.) effectively and efficiently?	___	___
8.	Can the student write using both print and braille?	___	___
9.	Does the student use print for some subjects and braille for others?	___	___
10.	Can the student incorporate braille into everyday life?	___	___

*If yes is checked, this may be an area of concern.

If no is checked, please explain.

Checklist for Visual Perception/Discrimination

		Yes	No
1.	Does the child recognize familiar people visually?	___	___
2.	Does the child recognize familiar objects visually?	___	___
3.	Does the child recognize self and others in a mirror or photograph?	___	___
4.	Can the child name simple outline pictures of familiar objects?	___	___
5.	Can the child select single elements in a picture?	___	___
6.	Can the child identify a variety of objects in a picture?	___	___
7.	Can the child match simple pictures or designs?	___	___
8.	Can the child match simple pictures by inner detail?	___	___
9.	Can the child match similar pictures or objects when rotated?	___	___
10.	Can the child identify colors?	___	___
11.	Can the child identify common objects regardless of minor structural changes?	___	___
12.	Can the child identify common objects which are partially hidden in the environment?	___	___
13.	Can the child identify objects partially hidden in pictures?	___	___
14.	Can the child copy or follow a simple pattern?	___	___
15.	Can the child sequence several items by a given attribute (i.e., shape, size, or color)?	___	___
16.	Can the child arrange a set of pictures to tell a story?	___	___

		Yes	No
17.	Can the child recognize a change in a familiar room or setting?	___	___
18.	Can the child retrieve a toy from the place where it was last seen?	___	___
19.	Can the child identify missing objects?	___	___
20.	Can the child identify how objects or environments are similar and different?	___	___
21.	Can the child describe familiar objects or environments?	___	___
22.	Can the child describe details in pictures and drawings?	___	___
23.	Can the child draw a figure or a person?	___	___
24.	Can the child draw recognizable pictures of familiar objects or activities?	___	___
25.	Can the child locate a specific object from a group of dissimilar objects?	___	___
26.	Can the child locate a specific object against a cluttered background?	___	___
27.	Can the child locate a specific object from a group of similar objects?	___	___
28.	Can the child select an object when only part of it is visible?	___	___
29.	Can the child select an object when there is a similar background?	___	___
30.	Can the child locate a specific object in a cluttered environment or against a similar background?	___	___
31.	Can the child select a named object among several objects when only a part of it is visible?	___	___
32.	Can the child select a named object or picture from a cluttered background containing moderate detail?	___	___

If no is checked, please explain.

Fatigue

1. How quickly or easily does the student tire?
2. Can the student use his or her vision long enough to complete tasks?
3. How long can the student focus comfortably on objects?
4. What other factors may contribute to fatigue?

Working Distance

1. How close does the student hold objects?
2. Does the student use correct posture and/or positioning? (i.e., Does the student sit up straight or hunch over work?)

Questions have been adapted from Low Vision: A Resource Guide with Adaptations for Students with Visual Impairments (Levack, 1991).

Checklist for Tactual Discrimination/Perception

		Yes	No
1.	Can the child distinguish one object from another tactually?	___	___
2.	Can the child make fine discriminations between two objects?	___	___
3.	Can the child discriminate between two objects on the basis of shape and structure?	___	___
4.	Does the child understand part/whole relationships?	___	___
5.	Does the child understand whole/part relationships?	___	___
6.	Can the child tactually sort or match according to size?	___	___
7.	Can the child tactually sort or match according to shape?	___	___
8.	Can the child tactually sort or match according to texture?	___	___
9.	Can the child tactually categorize objects as the same or different?	___	___
10.	Can the child follow a left to right progression?	___	___
11.	Can the child follow a left to right progression from beginning to end?	___	___
12.	Can the child complete sequencing activities?	___	___
13.	Can the child copy a pattern?	___	___
14.	Can the child categorize braille shapes as the same or different?	___	___
15.	Can the child turn pages of a book one at a time?	___	___

If no is checked, please explain.

Fatigue

		Yes	No
1.	Can the child work for long periods of time before making errors in discrimination? For how long?	___	___
2.	Can the child work long enough to complete the task tactually?	___	___
3.	What other factors may contribute to fatigue?		

Braille Knowledge

1.	Does the child understand that the dots have meaning (either as words or letters)?	___	___
2.	Does the child understand that different configurations of dots represent different words or letters?	___	___
3.	Does the child understand that braille is a method for both reading and writing?	___	___

If no is checked, please explain.

Checklist for Auditory Comprehension/Perception and Listening Comprehension

		Yes	No
1.	Can the child run simple errands that require short-term memory?	___	___
2.	Can the child play games involving guessing how the speaker is feeling according to his or her tone of voice?	___	___
3.	Can the child identify favorite songs, voices, background noises?	___	___
4.	Can the child point out how sounds differ from different locations?	___	___
5.	Does the child respond with body movements to sounds of different quality?	___	___
6.	Can the child differentiate between words that sound alike?	___	___
7.	Can the child discriminate between words that begin with the same sound?	___	___
8.	Can the child discriminate between sounds that end with the same sound?	___	___
9.	Can the child find words that begin with the same sound?	___	___
10.	Can the child make up different stories from sounds made on a tape?	___	___
11.	Can the child rhyme?	___	___
12.	Can the child finish poems with rhyming words?	___	___

These questions have been adapted from a developmental list suggested by Lowenfeld, Hanninen, and Harrell and compiled in Guidelines and Games for Teaching Efficient Braille Reading, (Olson, 1981). Other questions have been adapted from Lowenfeld, Abel, & Hatlen, (1969).

If no is checked, please explain.

Outline

Affective Development

I. Purpose
   a. To assess the emotional aspects of the child
   b. To provide information about the child's personality, social development, self-concept, and self-esteem

II. Areas of assessment:
   a. Functional development
   b. Socialization skills
   c. Motivation towards different forms of learning media

Checklist for Functional Development

		Yes	No
1.	Does the child use a visual approach to complete tasks?	___	___
2.	Does the child use a tactual approach to complete tasks?	___	___
3.	Does the child use an auditory approach to complete tasks?	___	___
4.	Does the child use a combination of approaches to complete tasks? If so, describe.	___	___
5.	Does the child play games that require vision?	___	___
6.	Does the child prefer listening activities?	___	___
7.	Does the child rely on visual clues to obtain information?	___	___
8.	Does the child rely on auditory clues to obtain information?	___	___
9.	Does the child rely on tactual clues to obtain information?	___	___
10.	Does the child rely on a combination of senses to obtain information? If so, explain.	___	___
11.	Briefly explain the tasks the child was observed completing.		
12.	How does the child function in the lunchroom, library, or on the playground?		

If no is checked, please explain.

Checklist for Socialization Skills

		Yes	No
1.	Does the child exhibit appropriate behavior in a variety of settings?	___	___
2.	Does the child consider himself or herself blind?	___	___
3.	Does the child consider himself or herself sighted?	___	___
4.	Does the child get along well with other children in the class?	___	___
5.	When assigned to a small group for a project, does the child participate?	___	___
6.	Does the child pretend to see in order to fit in with peers?	___	___
7.	Does the child exhibit good self-esteem?	___	___
8.	Has the child accepted the visual impairment?	___	___
9.	Does the child play alone or in groups?		

If no is checked, please explain.

Outline

Psychomotor Assessment

I. Purpose
   a. Assess the development of the motor skills as they relate to mental processes

II. Readiness
   a. Usually based on observations in the following areas:
      1. Physical stamina
      2. Gross motor development
      3. Fine motor development
      4. Orientation
      5. Spatial development
      6. Mobility

III. School-age children
   a. Usually based on observations in the following areas:
      1. Developmental skills
      2. Daily living skills
      3. Mobility skills
      4. Orientation skills

Checklist for Psychomotor Development

The child's psychomotor development will need to be evaluated periodically as he or she grows and develops. The following checklist is not meant to be exhaustive of the information which can be gathered in this area but will provide some basic questions to begin asking for each assessment. When answering these questions, no answers will probably require some explanations. If several answers to the last eight questions are no, the child's visual impairment may be severe enough to be interfering with normal activities, including those which effect literacy, and alternative ways of doing such activities should probably be explored.

		Yes	No
1.	Has the child's health generally been good?	___	___
2.	Is the child free of other disabilities or impairments?	___	___
3.	Has the child's physical development followed the normal sequence?	___	___
4.	Is the child doing the same things physically as his or her normally sighted peers?	___	___
5.	Is the child relatively accident free?	___	___
6.	Does the child move from place to place without difficulty?	___	___
7.	Does the child locate a chair, the swings, etc., without difficulty?	___	___
8.	Does the child seem to enjoy participating in gross motor activities such as running, skipping, and hopping with his or her normally sighted peers?	___	___
9.	Does the child seem to enjoy activities which require ball-handling skills such as throwing a ball at a target, catching a ball, bouncing a ball, and hitting a ball?	___	___
10.	Does the child enjoy stacking and building with blocks, working puzzles, coloring, or other fine motor activities which require eye/hand co-ordination?	___	___

Cognitive, Affective, and Psychomotor Assessments

Completed by: _____

Date: _____

Instruments used: _____

	Cog.	Lang.	Motor	Social	Self-help
Area assessed:	____	____	____	____	____

Raw score: _____

Standard score: _____

Age equivalent: _____

Grade equivalent: _____

Strengths: _____

_____

Weaknesses: _____

_____

Instruments used: _____

	Cog.	Lang.	Motor	Adaptive	Ach.
Area assessed:	____	____	____	____	____

Raw score: _____

Standard score: _____

Age equivalent: _____

Grade equivalent: _____

Strengths: _____

_____

Weaknesses: _____

_____

Developmental checklist: _____

	Cog.	Lang.	Motor	Social	Self-help
Area assessed:	____	____	_____	_____	_____

Score: _____

Age equivalent: _____

Strengths: _____

_____

Weaknesses: _____

_____

Developmental checklist: _____

	Cog.	Lang.	Motor	Social	Self-help
Area assessed:	____	_____	_____	_____	_____

Score: _____

Age equivalent: _____

Strengths: _____

_____

Weaknesses: _____

_____

Other comments: _____

_____

_____

_____

_____

Outline

Environmental Assessment - Educational

I. Purpose
   a. To determine the student's visual environment
      1. The proper visual environment allows for maximum comfort and visual performance which is essential for the visual learner

II. Factors that influence the visual environment
   a. Brightness
   b. Contrast
   c. Time
   d. Distance
   e. Image Size

Environmental Assessment - Educational

Completed by: _____

Date: _____

Brightness

	Dim	Bright
Preferred lighting	___	_____
	Yes	**No**
Variable intensity lamp used	___	_____

Preferred placement for boardwork: _____

_____

Preferred placement for seatwork: _____

_____

Contrast

	Yes	No
Sufficient contrast of materials	___	_____
Is increased contrast in materials needed?	___	_____
Special materials used	___	_____
Are special materials needed?	___	_____

If so, what: _____

_____

Time

	Yes	No
Is extra time needed to complete assignments?	___	___
Is extra time given to complete assignments?	___	___

Distance

	Held close	Held far
Distance of material for optimum viewing	_____	_____

Other comments: _____

_____

_____

Checklist for Environmental Assessment - Educational

		Yes	No
1.	What type of illumination is used in the classroom?		
2.	Where does the child sit?		
3.	Is the lighting adjustable?	___	___
4.	Does the child face away from the windows?	___	___
5.	Does the illumination change during the day?	___	___
6.	Does the illumination change during the different seasons?	___	___
7.	Is there a problem with glare (on the blackboard, on the student's books or paper, walls, floor)?	___	___
8.	Is there sufficient contrast between the ink and paper?	___	___
9.	Is there sufficient contrast between the chalk and the blackboard?	___	___
10.	Does the child use any aids to improve contrast? If so, explain.	___	___
11.	Does the child have sufficient time to complete tasks?	___	___
12.	Does the child need additional time in order to complete tasks?	___	___
13.	Does the child know the distance to place materials for optimum viewing?	___	___

If no is checked, please explain.

Outline

Environmental Assessment - Family and Home

I. Purpose
   a. Provide information that can only be obtained from family members
   b. Determine the parent's attitude towards various forms of learning media
   c. Determine educational goals
   d. Determine the student's attitude towards various forms of learning media
   e. Determine the student's educational goals
   f. Determine the student's attitude towards the various forms of learning media

II. Methods used
   a. Checklists
   b. Interview guides

III. Areas assessed
   a. Parental attitudes towards various forms of learning media
   b. Parental expectations for the child
   c. Parental attitude toward the child's visual impairment
   d. Parental attitude toward adjusting the home environment for the child
   e. Student's attitude towards print and braille
   f. Student's educational goals
   g. Student's attitude towards the visual impairment

Parent Interview

Completed by: _____

Date: _____

Instrument used: _____

Family member interviewed: _____

Findings: _____

_____

_____

Instrument used: _____

Family member interviewed: _____

Findings: _____

_____

_____

Other comments: _____

_____

_____

Checklist for Family and Home Assessment

The assessment team member who is doing the family assessment might consider asking questions such as the following:

Daily Living Activities		Yes	No
1.	Does the child get dressed without assistance?	___	___
2.	Does the child use a variety of fasteners (snaps, zippers, buttons, etc.) on his or her clothes?	___	___
3.	Is reading material for both adults and children present in the home?	___	___
4.	Does the child like to read or be read to?	___	___
5.	Does the child sit a reasonable distance from the set when watching television?	___	___
6.	Does the child use utensils rather than his or her hands when eating?	___	___
7.	Does the child relate well to other members of the family?	___	___
8.	Does the child play age appropriately at home?	___	___
9.	Does the child play with other children his or her age in the neighborhood?	___	___
10.	Does the child move around in the environment with ease?	___	___
11.	Does the child do any tasks tactually which would normally be done visually?	___	___
12.	Is the child expected to take care of his or her own needs (get a drink, use the bathroom, etc.)?	___	___
13.	Is the child expected to do chores around the home (make his or her own bed, feed a pet, empty the trash, set the table, wash dishes, etc.)?	___	___
14.	Does the home environment need to be adjusted for the child? If so, explain.	___	___

Eye Condition	Yes	No
1. Do other members of the family have the same eye condition as the child being assessed?	___	___
2. Do the parents seem to understand the child's eye condition?	___	___
3. Has there been a change in the way the child uses his or her vision?	___	___

Educational Expectations		
1. Do the parents read braille?	___	___
2. Do the parents think the child will ever use braille if he or she does not now?	___	___
3. If the parents do not know braille, are they interested in learning braille?	___	___
4. Do the parents know anyone who uses braille?	___	___
5. Do the parents have a positive attitude about braille as a learning medium?	___	___
6. Do the parents have a positive attitude about print as a learning medium?	___	___
7. Are the parents pleased with the child's educational progress?	___	___
8. Do the parents seem to have realistic educational goals for the child?	___	___
9. Do the parents seem to have realistic occupational goals for the child?	___	___

The interviewer should be sure to write down comments made by family members as well as recording his or her own observations as these questions are asked.

If no is checked, please explain.

A Parent's Perspective on Selecting the Appropriate Learning Medium

A parent of a child with low vision often asks, "Will my child read print, braille, or both?" The following list of questions were written by Carol Roderick, a parent of a child who is visually impaired, and may help the parent decide what questions need to be answered during the assessment.

1. What are the criteria that are used in making this decision?

2 Why would my child need braille?

3. If braille is chosen as the medium, will braille materials be available?

4. Braille is so bulky, can my first grader carry it?

5. How can I help my child learn braille if I don't know the braille code?

6. Can a braille reader be in a mainstream classroom or will my child need to go to a school for the blind in order to receive an appropriate education? If my child does need to go to a school for the blind, will this be a permanent placement?

7. If both print and braille are chosen, will all my child's energy be spent on learning how to read or will my child also have time to learn the other things a primary student learns (i.e., math, spelling, social studies, science)?

8. If my child reads print, how tired will the child's eyes be at the end of the day?

9. How will my child look reading print in a meeting or when giving a speech?

10. If print is the chosen learning medium, how much magnification will be needed? Will this be portable? How expensive will it be?

11. What qualifications does the teacher have to teach braille?

12. Is the assessment team looking at **what my child needs** or what is easiest for the school system to provide?

13. How much time will be given to my child when learning to read?

14. What support will the classroom teacher have from the teacher of children who are visually impaired?

15. What will be the easiest medium for my child as the print size gets smaller?

16. Will I have regrets if I don't teach my child braille and it is needed later?

17. Can a braille reading student keep up with a print reading student?

18. How much large print and braille materials are available for children and/or adults?

19. When would my child read print and when would braille be read?

20. If we decide to change the medium later, how far behind would my child be from peers? How would this effect reading speed, accuracy, and comprehension?

21. Who is going to be on the assessment team? What are their qualifications to assess a child who is visually impaired?

22. How long will this assessment take and where will it be conducted?

23. What can I do to prepare my child and myself for the assessment? What information do I need to come with (previous test results, eye reports, etc.)?

24. What is in the assessment? What are they testing?

25. Can I be there for the assessment?

26. At what age do we start looking at the learning medium for a child who is visually impaired, and why do we start then?

27. Where do I get assistive technology devices for my child?

28. Since this technology is so expensive, is there a place where we can borrow it?

29. What about organizations that have grant programs? (Lions clubs, etc.)

30. Does health insurance ever pay for these devices?

Student Interview

Completed by: _____

Date: _____

Instrument used: _____

Findings: _____

_____

_____

Instrument used: _____

Findings: _____

_____

_____

Other comments: _____

_____

_____

APPENDIX C

Assessment Instruments

Instruments and Publishers

Norm-Referenced Tests for
Infants and Preschoolers

Criterion-Referenced Tests and
Informal Measures for
Infants and Preschoolers

Norm-Referenced Tests for Visually
Impaired and Blind School-Age
Students

Criterion-Referenced Tests and
Informal Measures for Blind
and Visually Impaired Students

Instruments and Publishers

ABCs of Visual Difficulty: Teacher's Observation Checklist
Getmna, G. N., & Milkia, G. M., (1973)
American Optometric Association
St. Louis, Missouri
and
Understanding low vision
Randall T. Jose

Arizona Articulation and Proficiency Scale, 2nd Edition
Barker-Fudala, J., & Reynolds, W. M. (1986)
Western Psychological Services
12031 Wilshire Blvd.
Los Angeles, CA 90025

Basic School Skills Inventory-Diagnostic
Hannill, D. D., & Leigh, J. E. (1983)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757-6897

Battelle Developmental Inventory
Newborg, J., Stock, J. R., & Wnek, L. (1984)
Riverside Publishing CO.
8420 Bryn Mawr Ave.
Chicago, IL 60631

Bayley Scales of Infant Development-2nd Edition-Infant Behavior Record
Bayley, N. (1993)
The Psychological Corporation
P.O. Box 839954
San Antonio, TX 78283-3954

Blind Learning Aptitude Test
Newland, T. E. (1971)
University of Illinois Press
P.O. Box 4856
Hampden, Post Office
Baltimore, MD 21211

Boehem Test of Basic Concepts-Revised
Boehem, A. (1986)
The Psychological Corporation
555 Academic Court
San Antonio, TX 78204-2498

Braille Unit Recognition Battery
Caton, H. R., & Duckworth, B. J. (1985)
American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Brigance Diagnostic Inventory of Early Development
Brigance, A. (1978)
Curriculum Associates
5 Esquire Road
North Billerica, MA 01826-2589

adapted by

American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Callier-Azusa Scale
Stillman, R. (1978)
Callier Center for Communication Disorders
1966 Innwood Rd.
Dallas, TX 75235

Carrow Elicited Language Inventory
Carrow-Woolfolk, E. (1974)
Riverside Publishing CO.
8420 Bryn Mawr Ave.
Chicago, IL 60631

Cognitive Abilities Scale
Bradley-Johnson, S. (1987)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757-6897

Detroit Tests of Learning Aptitude-3rd Edition
Hammill, D. D. (1991)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757

Developmental Activities Screening Inventory II
Fewell, R. R., & Langley, M. B. (1984)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757

Developmental Test of Visual Motor Integration-3rd Revision
Beery, K. E. (1989)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757

Diagnostic Assessment Procedure Program to Develop Efficiency in Visual Functioning
Barraga, N. C., & Morris, J. E. (1980)
American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Dolch Word List
American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Frostig Development Test of Visual Perception-Developmental Test of Visual Perception-2nd Edition
Hammill, D. D., Pearson, N. A., & Voress, J. K., (1993)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757-6897

Functional Vision and Media Assessment
Sanford, L., & Burnett, R. (1993)
Consultants for the Visually Impaired (CVI)
P.O. Box 8594
Hermitage, TN 37076

Functional Vision Assessment Form
in
Low vision: A resource guide with adaptations for students with visual impairments
Levack, N. (1991)
Texas School for the Blind and Visually Impaired
1100 E. 45th St.
Austin, TX 78756

Functional Vision Criterion-Referenced Checklists
in
A teacher's guide to educational needs of blind and visually handicapped children
Mangold, S.
American Foundation for the Blind
New York, NY (book no longer in print)

Functional Vision Evaluation Form
Project IVEY, (1983)
State of Florida
Department of Education
Tallahassee, FL

GUIDE Development Program
Educational Training & Products Foundation

Growing Up: A Developmental Curriculum
Parent Consultants
201 Hardy Circle
Austin, TX 78757

Illinois Test of Psycholinguistic Abilities, Revised
Kirk, A., McCarthy, J. J., & Kirk, W. D. (1961-1968)
University of Illinois Press
P.O. Box 4856
Hampden, Post Office
Baltimore, MD 21211

Informal Assessment of Developmental Skills for Visually Handicapped Students
Swallow, R. M., Mangold, S., & Mangold, P. (1978)
American Foundation for the Blind
C/O American Book Center
Building #3
Navy Yard
Brookland, NY 11205

KeyMath Diagnostic Arithmetic Test
Conaolly, et, al. (1976)
American Printing House for the Blind
P.O. Box 6085
Louisville, KY 40206

Koontz Child Development Program: Training Activities for the First 48 Months
Koontz, C. W. (1974)
Western Psychological Services
12031 Wilshire Blvd.
Los Angeles, CA 90025

Low Vision Observation Checklist from Program to Develop Efficiency in Visual Functioning
Barraga, N. C., & Morris, J. E. (1980)
American Printing House for the Blind
P.O. Box 6085
1839 Frankfort Ave.
Louisville, KY 40206

Motor Free Visual Perception Test
Clarusso, R. P., & Hammill, D. D. (1972)
Academic Therapy Publication
20 Commercial Blvd.
Novato, CA 94949

Ordinal Scales of Psychological Development
Uzgiris, I. (1989)
University of Illinois Press
P.O. Box 4856
Hampden, Post Office
Baltimore, MD 21211

Oregon Project for Visually Impaired and Blind Preschoolers-5th Edition
Brown, D., Simmons, V., & Methvin, J. (1986)
Jackson County Education Service District
101 North Grape Street
Medford, OR 97501

Parents and Visually Impaired Infants (PAVII)
Chen, D., Friedman, C., & Calvello, G. (1990)
American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Peabody Mobility Program
Harley, R., Wood, T., & Merbler, J. (1980)
Stoelting Company
Oakwood Center
620 Wheat Lane
Wood Dale, IL 60191

Receptive-Expressive Emergent Language Test-2nd Edition
Bzoch, K. R., & League, R. (1991)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757-6897

The Snellen Charts
Albini. (1885)
The National Society to Prevent Blindness
500 E. Remington Road
Schaumburg, IL 60173

Stanford Achievement Tests
Staff of The Psychological Corp. (1989)
The Psychological Corporation
555 Academic Court
San Antonio, TX 78204-2498

adapted by

American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Stanford-Binet Intelligence Scale-4th Edition
Thorndike, R., & Hagen, E. (1986)
Riverside Publishing CO.
8420 Bryn Mawr Ave.
Chicago, IL 60631

Test of Achievement Skills (TASK)
Part of the Stanford Achievement Tests
American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Test of Adolescent Language-3
Hammill, D. D., Brown, V. L., Larsen, S. C., & Wiederholt, L. (1994)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757

Test of Language Development-Primary-2nd Edition
Newcomer, P. L., & Hammill, D. D. (1988)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78735

Test of Language Development-Intermediate-2nd Edition
Newcomer, P. L., & Hammill, D. D. (1988)
PRO-ED
8700 Shoal Creek Blvd.
Austin, TX 78757

Vineland Adaptive Behavior Scales-Expanded Form
Sparrow, S. S., Balla, D. A., & Cicchetti, D. (1985)
American Guidance Service
Publishers Building
Circle Pines, MN 55014-1796

Vineland Social Maturity Scale
Has been replaced by Vineland Adaptive Behavior Scales

Wechsler Adult Intelligence Scale-Revised
Wechsler, D. (1981)
The Psychological Corporation
P. O. Box 839954
San Antonio, TX 78283-3954

Wechsler Intelligence Scale for Children-3rd Edition
Wechsler, D. (1991)
The Psychological Corporation
P. O. Box 839954
San Antonio, TX 78283-3954

Wechsler Preschool and Primary Scale of Intelligence
Wechsler, D. (1989)
The Psychological Corporation
P. O. Box 839954
San Antonio, TX 78283-3954

Wide Range Achievement Test (5 Years & up)
American Printing House for the Blind
1839 Frankfort Ave.
P.O. Box 6085
Louisville, KY 40206

Norm-Referenced Tests for Infants and Preschoolers*

	Areas Assessed			
	Cognitive	Motor	Adaptive	Language
Basic School Skills Inventory-Diagnostic (4 to 6 years, 11 months)			X	X
Battelle Developmental Inventory (birth through 8 years)	X	X	X	X
Bayley Scales of Infant Development-2nd Edition (2 to 30 months)	X	X		
Carrow Elicited Language Inventory (3 to 7 years, 11 months)				X
Cognitive Abilities Relevant to Education (2 and 3 years)	X			
Stanford-Binet Intelligence Scale-4th Edition (2 years to superior adult)	X			
Test of Language Development-Primary-2nd Edition (4 to 8 years, 11 months)				X
Vineland Social Maturity Scale (3 to 18 years, 11 months)		X	X	X
Wechler Preschool and Primary Scale of Intelligence Verbal Scale (4 to 6 1/2 years)	X			

Criterion-Referenced Tests and Informal Measures for Infants and Preschoolers*

	Areas Assessed by Subtests				
	Cognitive	Play	Motor	Adaptive	Speech/ Language
Bayley Scales of Infant Development-2nd Edition (2 to 30 months)				X	
Brigance Diagnostic Inventory of Early Development (birth to 6 years)	X	X	X	X	X
Growing Up: A Developmental Curriculum (birth to 6 years)	X		X	X	X
Informal Assessment of Developmental Skills (infants and preschoolers)	X		X	X	X
Ordinal Scales of Psychological Development (birth to 2 years)	X	X			X
Oregon Project for Visually Impaired and Blind Preschoolers-5th Edition (birth to 6 years)	X	X	X	X	X

Norm-Referenced Tests for Visually Impaired and Blind School-Age Students*

Tests	Areas Assessed			
	Cog.	Ach.	Adaptive	Language
Basic School Skills Inventory-Diagnostic (4 to 6 years, 11 months)			X	X
Battelle Developmental Inventory (birth through 8 years)	X		X	X
Blind Learning Aptitude Test (6 through 17 years)	X			
Carrow Elicited Language Inventory (3 to 7 years, 11 months)				X
Detroit Tests of Learning Aptitude-3rd Edition (6 through 17 years)	X			
KeyMath Diagnostic Arithmetic Test (K through grade 6)		X		
Stanford Achievement Test (Grades 2.5 to 9.9)		X		
Stanford-Binet Intelligence Scale-4th Edition	X			
Test of Achievement Skills (Grades 8 through 13)		X		
Test of Adolescent Language (11 yr. to 18 yr., 5 mo.)				X
Test of Language Development-Primary (4 to 8 years, 11 mo.)				X
Vineland Social Maturity Scale-Revised (Birth to 18 years, 11 mo.)			X	X
Wechsler Adult Intelligence Scale-Revised (16 yrs and up)	X			

Norm-Referenced Tests for Visually Impaired and Blind School-Age Students*

Tests	Areas Assessed			
	Cog.	Ach.	Adaptive	Language
Wechsler Intelligence Scale for Children-3rd Edition (6 1/2 through 16 1/2 years,	X			
Wechsler Preschool and Primary Scale of Intelligence (4 to 6 1/2 years)	X			
Wide Range Achievement Test (5 years and up)		X		

Criterion-Referenced Tests and Informal Measures for Blind and Visually Impaired Students*

	Areas Assessed
Braille Unit Recognition Battery (for students who have had training in braille)	Knowledge of Grade 2 literary braille
Diagnostic Inventory of Early Development (Birth to 7 years)	Motor, language, self-help readiness, reading, and arithmetic
Dolch Word List (6 to 9 years)	Knowledge of sight words
Informal Assessment of Developmental Skills for Visually Handicapped Students (Birth through school age)	Visual functioning, unique academic needs, (i.e., Optacon, typewriter, braillewriter), orientation and mobility, vocational skills, and behavior
Oregon Project for Visually Impaired and Blind Infants and Preschoolers-Revised (Birth to age 6)	Cognitive, language, self-help, socialization, fine motor, and gross motor

*Charts on pp. 159-163 were taken from Psychoeducational Assessment of Visually Impaired and Blind Students. (Bradley - Johnson, 1986).

GLOSSARY OF EYE TERMS

Glossary of Eye Terms

Abduction: rotation of the eye outward.

Adduction: rotation of the eye inward.

Accommodation: the ability of the eye to see clearly at different distances by changing the lens curvature.

Accommodative esotropia: inward deviation of the eyes, more marked for near than far vision, increased by ciliary muscle contraction in accommodation.

Achromatopsia: a form of color blindness in which no color whatsoever can be perceived.

Albinism: a genetic trait characterized by the absence of the normal amount of pigment cells in the uveal tract.

Alexia: word blindness due to defects in higher brain centers, not a visual deficiency.

Amaurosis: blindness.

Amblyopia: uncorrectable subnormal vision—suppression blindness—lazy eye.

Amblyonia ex anopsia: amblyopia acquired through lack of use of the eye.

Ametropia: a refractive error of the eye—parallel rays of light are not focused on the retina.

Angular magnification: enlarging the retinal image through the use of lenses.

Aniridia: congenital incomplete development of the iris.

Anisometropia: a condition in which the refractive powers of the two eyes are unequal.

Anisocoria: inequality of the pupil size of the two eyes.

Anisoconia: a condition in which the images focused on the two retinas are of unequal size.

Anterior chamber: space behind the cornea and in front of the iris containing aqueous fluid.

Aphakia: absence of the crystalline lens of the eye.

Aqueous fluid or humor: a watery transparent fluid lying in the anterior and posterior chambers; variation in its volume changes the intraocular pressure.

Astigmatism: an optical system whose surface is not spherical; the radii of curvature vary in different meridia.

Band Keratopathy: calcium deposits in the cornea.

Binocular vision: the simultaneous use of vision in both eyes.

Biomicroscopy: examination of the eye with the slit biomicroscope externally and internally.

Canal of Schlemm: a circular space at the junction of the cornea and sclera external to the angle of the anterior chamber and through which aqueous fluid passes into the ciliary veins.

Cataract: any opacity of the crystalline lens of the eye.

Chiasm: see optic chiasm.

Choroid: the vascular, pigmented, middle layer of the posterior segment of the eye.

Choroideremia: a genetic defect in which the choroid and part of the retina are absent.

Choroiditis: inflammation of the choroid.

Chromosome: one of 46 filaments found in the fertilized reproductive cell containing the factors (genes) determining the transmissible qualities of the organism.

Ciliary body: the pigmented ring of uveal tissue lying between the iris and choroid; is important in accommodation and aqueous fluid formation.

Closed circuit television: an electronic magnifier that uses a camera and television-like screen to project print into larger sizes.

Coloboma: a cleft in the uveal tissue inferiorly, due to a congenital malformation.

Conjunctiva: the transparent membrane which covers the inner surface of eyelids, the outer surface of the sclera and bridges the angular space between.

Conjunctivitis: inflammation of the conjunctiva.

Convergence: the ability of the two eyes to bring their visual axes to focus on a near object; to cross or turn the eyes inward.

Cornea: the transparent, anterior surface of the eye through which light must pass to enter the eye.

Corneal dystrophy: a variety of defects in the corneal structure characterized by a loss of transparency.

Corneal edema: excessive fluid in the cornea.

Cyclitis: inflammation of the ciliary body.

Cycloplegia: a paralysis of accommodation.

Crystalline lens: see lens.

Day blindness (hemeralopia): deficient vision in good illumination with comparatively better vision in dim illumination.

Degeneration of the retina: destruction of retinal cells with loss of vision in this area; e.g., primary pigment degeneration; macular retinal degeneration.

Detachment of the retina: a separation of the retina by fluid from the overlying choroid.

Diopter: the refractive power of a lens with a focal distance of one meter.

Diplopia: double vision; the false perception of two images when only one is present.

Divergence: the ability of the two eyes to bring their visual axes away from a near object and focus on one more remote.

Duction: the movement of the eye resulting from normal eye muscle contraction.

Dyslexia: partial inability to understand meaning of words.

Electronic magnification: enlarging the retinal image by using electronic devices (i.e., CCTV, viewscan) to enlarge the size of the print on a screen which is then viewed by the individual.

Emmetropia: the ability of the eye at rest to focus parallel, distant rays of light on the retina.

Enophthalmos: retraction of the eye into the orbit.

Enucleation: surgical removal of the eyeball from the orbit.

Epiphora: excessive tearing of the eye; lacrimation.

Esotropia: a manifest overconvergence of the visual axes of the eyes; crossed eyes, convergent strabismus.

Exophoria: latent outward deviation of the eyes in which, with binocular vision suspended, the eyes deviate outward.

Exophthalmos: an abnormal protrusion of the eyeball from the orbit.

Exotropia: a manifest divergence of the visual axes of the eyes; wall eyes.

Extraocular muscles: the four recti and two oblique muscles attached to the outer surface of the eye which move the eye in varying directions of gaze.

Focal distance: the distance that a magnifier must be held from the material being viewed to obtain the clearest image.

Focus: *n*. a point to which rays of light are directed when refracted; *v*. the act of bringing rays of light to meet at a point.

Fundus oculi: the interior, posterior surface of the eye visible through the pupil wnen observed with the proper instrument.

Fusion: an ability of the brain to perceive as one image the two dissimilar images seen by each eye.

Gene: a nucleo-protein molecule found in the chromosome which exerts a specific structural or functional quality of the organism.

Genotype: the sum total of an individual's hereditary pair.

Glaucoma: a term used to describe a group of conditions having the common feature of an elevated intraocular pressure resulting in a loss of visual function.

Hemianopsia: a loss of half the peripheral field of vision.

Heterophoria: a latent or nonmanifested deviation of the visual axes that is elicited when the fusional stimuli have been eliminated.

Heterotropia: a manifested deviation of the visual axes, also called strabismus or squint.

Homonymous: having the same side of the field of vision; a right homonymous hemianopia is right-half blindness.

Hyperopia (hypermetropia): farsightedness; a refractive state in which parallel rays of light would be focused behind the retina.

Immunity: freedom or resistance to disease caused by an altered reactivity to endogenous or exogenous stimuli.

Intraocular pressure: the pressure within the eye exerted against the inner walls which maintains the shape and size of the eye.

Iris: the anterior portion of the uveal tract seen as the colored surface surrounding the central pupil opening.

Iritis: inflammation of the iris.

Keratitis: inflammation of the cornea.

Keratoconus: a conical curvature of the cornea.

Lacrimal system: the tear apparatus composed of the gland and drainage structures.

Lagophthalmos: an inability of the eyelids to close and protect the cornea.

Lens: a transparent, biconvex, elastic, avascular spheroid structure located behind the pupil and the iris whose function is to vary the refractive power of the eye.

Macula: the central retina on which the object of gaze is focused.

Magnifier: a lens or set of lenses that increase the size of the retinal image.

Magnification: the enlargement of the size of the retinal image of the object being viewed.

Magnifying power: the amount of enlargement of the size of the image on the retina that a device or procedure provides.

Marfan's syndrome: a widespread abnormality of connective tissue which results in spider-like fingers and toes and often accompanied by subluxated lens and severe myopia.

Melanoma: benign and malignant tumors usually containing brown pigment cells.

Microphthalmus: an abnormally reduced diameter of the eyeball.

Miosis: a reduction in diameter of the pupil.

Mydriasis: an enlarged pupillary opening.

Myopia: a refractive error of the eye in which parallel rays of light focus in front of the retina; nearsightedness.

Night blindness (nyctalopia): impairment of the function of the retinal rod vision resulting in reduced ability to see in lower illumination.

Nystagmus: a rhythmic, involuntary movement of the eyes.

Occipital lobe: the posterior cerebral cortex in which the visual nerve pathways terminate.

Ophthalmoplegia: paralysis or inability to move the muscles of the eyes, internal and external.

Ophthalmoscope: an instrument for visualizing the interior of the eye through the pupil.

Ophthalmoscopy: examination of the interior of the eye.

Optic atrophy: destruction of the function of a part or all of the nerve fibers composing the optic nerve.

Optic chiasm: the juncture and partial crossing of the two optic nerves behind the orbits inside the cranial cavity.

Optic nerve: a coalescence of the retinal nerve fibers to exit from the posterior surface of the eye.

Optic neuritis: inflammation of the optic nerve.

Orbit: the bony cavity of the skull in which the eye is located.

Orthophoria: manifest and latent alignment of the visual axes of the two eyes.

Orthoptics: methods used to improve abnormal visual sensory perceptions and reflexes in early childhood.

Perimeter: an instrument for measuring the peripheral field of vision.

Perimetry: measurement of the peripheral vision.

Peripheral visual field: the side vision, the area visible around the center of gaze.

Phenotype: the appearance or physical characteristics of an individual determined by both the genetic and the environmental factors.

Photopic vision: the ability to discriminate color by central retinal function of cones.

Photophobia: abnormal sensitivity of the eye to exposure of light.

Phthisis bulbi: a destroyed eyeball, soft and shrunken in size.

Posterior chamber: space behind the iris and in front of the lens, containing aqueous fluid.

Presbyopia: the normal reduction in accommodation due to age.

Prism diopter: the ability of a prism to deflect the ray of light one centimeter for each meter of distance.

Pseudoisochromatic plates: a set of colored plates some of which appear to be of the same color to individuals with color-vision abnormalities.

Ptosis: a drooping of the upper eyelid.

Pupil: the black, round opening in the center of the iris.

Quadrantanopia: loss of one quadrant of the visual field.

Refraction: the physical property by which a ray of light is deflected from its course as it passes from one medium to another of a different optical density.

Relative size magnification: enlarging the retinal image by making the object being viewed larger (i.e., large print).

Relative distance magnification: enlarging the retinal image by bringing the object being viewed closer to the eye.

Retina: the inner, transparent membrane of light sensitive nerve tissue.

Retinal correspondence: the situation in which the central fixation of each eye is on the foveal area of the retina.

Retinal dysplasia: incomplete development of the retina.

Retinitis pigmentosa: a hereditary degeneration and atrophy of the retina.

Retinoschisis: a congenital abnormality of the retina characterized by splitting of the retinal layers.

Retinoscope: an instrument for measuring the refractive power of the eye

Retinoscopy: an objective method for determining the refractive power of the eye.

Retrobulbar neuritis: inflammation of the optic nerve occurring without involvement of the optic disk.

Retinopathy of prematurity: an affection characterized by an overgrowth of immature blood vessels from the retina into the vitreous behind the lens; occurring in premature infants.

Sclera: the white, opaque, fibrous outer covering of the eye.

Scotoma: a blind area in the field of vision.

Scotopic vision: the ability to discriminate light and dark and motion by the peripheral retina, a function of the rod cells.

Stereopsis: the degree of fusion which permits the perception of depth or third dimension.

Stereoscopic (vision): vision in which objects are perceived as having three dimensions.

Strabismus: see heterotropia.

Subluxation of lens: condition of the lens when a portion of the supporting zonole is absent and the lens lacks support in one or more quadrants.

Suppression: a positive visual inhibition occurring in the cortex; may be monocular or alternating; may lead to amblyopia.

Tangent screen: an instrument for detecting abnormalities in the central field of vision.

Telescope: a device that uses two lenses, an objective and ocular-lens, to provide angular magnification for objects that are at a relatively long (usually greater than 20 feet) from the observer.

Tonometer: an instrument for measuring the intraocular pressure.

Tonometry: measurement of the intraocular pressure.

Trabeculum: the filtering spaces in the angle of the anterior chamber through which the aqueous fluid passes into the Canal of Schlemm.

Trachoma: a destructive, chronic, contagious form of conjunctivitis.

Typoscope: a reading aid made by making a slot in black construction paper and used to isolate one part of a line being read from the other words on a page.

Uveal tract: the pigmented, middle, vascular layer of the eye composed of iris, ciliary body and choroid.

Uveitis: an inflammation of the uveal tract.

Vitreous: the gel filling the space within the eye posterior to the lens and ciliary body.

Visual acuity: the ability to see or distinguish small separations between portions of the visual fields.

Taken from Visual Impairment In the Schools. (Harley & Lawrence, 1984).

REFERENCES

&

OTHER SOURCES OF INFORMATION

References

Anderson, S., Bolgon S., & Davis K. (1986). Oregon project for visually impaired and blind preschool children (5th ed.). Medford, OR: Jackson County Education Service.

Barraga, N. C. (1986). Sensory perceptual development. In G. T. Scholl (Ed.), Foundations of education for blind and visually handicapped children and youth: Theory and practice (pp. 83-98). New York: American Foundation for the Blind.

Barraga, N. C. (1992, July). Print braille literacy: Selecting the appropriate learning media. Summer seminar conducted at the American Printing House for the Blind, Louisville, KY.

Barraga, N. C., & Morris, J. E. (1980). Program to develop efficiency in visual functioning. Louisville, KY: American Printing House for the Blind.

Bettenburg, A. (1985). Instruments and procedures for assessing young children. St. Paul, MN: Minnesota Department of Education.

Bradley-Johnson, S. (1986). Psychoeducational assessment of visually impaired and blind students: Infancy through high school. Austin, TX: PRO-ED.

Caton, H. (Ed.). (1991). Print and braille literacy: Selecting appropriate learning media. Louisville, KY: American Printing House for the Blind.

Clarke L., Lutters C., & Dote-Kwan J. (1993). Determining appropriate learning medium. Unpublished manuscript, Low Incidence Disability Advisory Committee (LIDAC), Visually Impaired Subcommittee of LIDAC, California.

Corn, A. L. (1986). Low vision and visual efficiency. In G. T. Scholl (Ed.), Foundations of education for blind and visually handicapped children and youth: Theory and practice (pp. 99-118). New York: American Foundation for the Blind.

Delacato, C. H. (1959). The treatment and prevention of reading problems. Springfield, IL: Charles C Thomas.

Eldridge, C. (1979). Braille literacy: The best route to equal education. Journal of Visual Impairment & Blindness, 73, 331-333.

Ferrell, K. A. (1991). Course materials: Early childhood education of the visually handicapped: Basic seminar. Unpublished manuscript, American Printing House for the Blind, University of Louisville, Louisville, KY.

Harley, R. K., & Lawrence, G. A. (1984). Visual impairment in the schools. Springfield, IL: Charles C Thomas.

Heinze, T. (1986). Communication skills. In G. T. Scholl (Ed.), Foundations of education for blind and visually handicapped children and youth: Theory and practice (pp. 301-314). New York: American Foundation for the Blind.

Jose, R. T. (Ed.). (1983). Understanding low vision. New York: American Foundation for the Blind.

Knowlton, M. (1991). Minnesota functional vision assessment. Minneapolis, MN: (Grant No. 039-St1-090). National Institute of Handicapped Research. (G00863524).

Langley, M. B. (1980). Functional vision inventory for the multiple and severely handicapped (A Peabody Vision Project). Chicago, IL: Stoelting Co.

Levack, N. (1991). Low vision: A resource guide with adaptations for students with visual impairments. Austin, TX: Texas School for the Blind and Visually Impaired.

Lowenfeld, B., Abel, G. L., & Hatlen, P. H. (1969). Blind children learn to read. Springfield, IL: Charles C Thomas.

Maryland School for the Blind. (1987). The role of braille in the education of blind and visually impaired children at the Maryland School for the Blind. Baltimore, MD: Author.

Napier, G. D., Kappan, D. L., Tuttle, D. W., Schroberger, W. L., Dennison, A. L., & Lappin, C. W. (1981). Handbook for teachers of the visually handicapped. Louisville, KY: American Printing House for the Blind.

Olson, M. R. (1981). Guidelines and games for teaching efficient braille reading. New York: American Foundation for the Blind.

Sanford, L., & Burnett, R. (1993). Functional vision and media assessment: For students who are pre-academic or academic and visually impaired in grades K-12. Hermitage, TN: Consultants for the Visually Impaired.

Scholl, G. T. (1986). Growth and development. In G. T. Scholl (Ed.), Foundations of education for blind and visually handicapped children and youth: Theory and practice (pp. 65-82). New York: American Foundation for the Blind.

Schow, R. L., & Nerbonne, M. A. (1989). Introduction to aural rehabilitation (2nd ed.). Austin, TX: PRO-ED.

Seabrook, L., Spann, O., & Swaffield, S. (n.d.). South Carolina literacy media assessment. Unpublished manuscript, South Carolina Department of Education.

State of Florida Department of Education. (1983). A resource manual for the development and evaluation of special programs for exceptional students: Volume V-E: Project IVEY: Increasing visual efficiency. Tallahassee, FL: Author.

Swenson, A. M. (1988). Using an integrated literacy curriculum with beginning braille readers. Journal of Visual Impairment & Blindness, 82, 336-338.

Tuttle, D. (1984). Self-esteem and adjusting with blindness. Springfield, IL: Charles C Thomas.

Other Sources of Information

Allman, C. (1991). Technical assistance paper. Florida Department of Education.

Association for Education and Rehabilitation of the Blind and Visually Impaired. (1988). AER yearbook of the Association for Education and Rehabilitation of the Blind and Visually Impaired: 1987. Alexandria, VA.

Barnhart, C. L., & Barnhart, R. K. (Eds.). (1982). The World Book dictionary. Chicago: World Book-Childcraft International.

Bradley-Johnson, S. (1994). Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school (2nd ed.). Austin, TX: PRO-ED.

Cates, D. L., & Sowell, V. M. (1989). Using computers to improve braille reading speed: A review of the literature. Journal of Visual Impairment & Blindness, 83, 361-364.

Colenbrander, A. (1977). Dimensions of visual performance. Archives of American Academy of Ophthalmology, 83, 332-337.

Corn, A., & Ryser, G. (1989). Access to print for students with low vision. Journal of Visual Impairment & Blindness, 83, 340-349.

Council of Executives of American Residential Schools for the Visually Handicapped. (1990). Literacy for blind and visually impaired school-age students: A position paper of the Council of Executives of American Residential Schools for the Visually Handicapped. RE:view, 22(3), 159-163.

Crespo, S. E. (1989). The braille system in Latin America. Journal of Visual Impairment & Blindness, 83(6), 317-318.

Eldridge, C. (1979). Braille literacy and higher education. Education of the Visually Handicapped, 11(1), 8-12.

Gashel, J. (1988). National convention calls for braille literacy. Future Reflections, 7(3), 31-32.

Huebner, K. M. (1989). Daily uses of braille as told by four adult braille users. Journal of Visual Impairment & Blindness, 83(6), 308-309.

Koenig, A. J., & Holbrook, M. C. (1989). Determining the reading medium for students with visual impairments: A diagnostic teaching approach. Journal of Visual Impairment & Blindness, 83(6), 296-302.

Koenig, A. J., & Holbrook, M. C. (1991). Determining the reading medium for students who are visually impaired via diagnostic teaching. Journal of Visual Impairment & Blindness, 85(2), 61-68.

Koenig, A. J., & Holbrook, M. C. (1993). Learning media assessment of students with visual impairments: A resource guide for teachers. Austin, TX: Texas School for the Blind and Visually Impaired.

Koenig, A. J., & Ross, D. B. (1991). A procedure to evaluate the relative effectiveness of reading in large and regular print. Journal of Visual Impairment & Blindness, 85(5), 198-204.

Mack, C. (1989). The impact of technology on braille literacy. Journal of Visual Impairment & Blindness, 83(6), 314.

Mangold, S. (1990). Keynote address, Saskatchewan, Canada.

Mangold, S., & Mangold, P. (1989). Selecting the most appropriate primary learning medium for students with functional vision. Journal of Visual Impairment & Blindness, 83, 294-296.

Mullen, E. A. (1990). Decreased braille literacy: A symptom of a system in need of reassessment. RE:view, 22(3), 164-196.

Poppe, K. J. (1991). Distribution of quota registrants in 1990 by grade placement, visual acuity, reading medium, school or agency type, and age: A replication of Wright's 1988 study. Unpublished manuscript, Department of Educational and Technical Research, American Printing House for the Blind.

Rex, E. J. (1989). Issues related to literacy of legally blind learners. Journal of Visual Impairment & Blindness, 83(6), 306-307, 310-313.

Schroeder, F. (1989). Literacy: The key to opportunity. Journal of Visual Impairment & Blindness, 83(6), 290-293.

Spungin, S. J. (1990). Braille literacy: Issues. Washington, DC: American Foundation for the Blind.

Spungin, S. J. (1990). Braille literacy: Issues for blind persons, families, professionals, and producers of braille. New York: American Foundation for the Blind.

Stephens, O. (1989). Braille - Implications for living. Journal of Visual Impairment & Blindness, 83(6), 288-289.

Swallow, R. (1994). Emerging braille literacy: Learning module, Project VIDEO. Big Bear Lake, CA: Author.