5-1-1991

Aspects of vision addressed in introductory level education instruction: A survey of Nebraska colleges and universities

Jill M. Hlavac
Pacific University

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Abstract
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Degree Type
Thesis

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ASPECTS OF VISION ADDRESSED IN INTRODUCTORY LEVEL EDUCATION INSTRUCTION:
A SURVEY OF NEBRASKA COLLEGES AND UNIVERSITIES

By
Jill M. Hlavac, O.D.

A Thesis submitted to
Pacific University
Colleges of Education and Optometry
For the Degree
Masters of Education
in
Visual Function in Learning

May 1991

Committee Members
Anita McClain, Ed.D., Chair
William Ludlam, O.D.
Linda Tamura, Ed.D
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Jill M. Hlavac, O.D.

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Forest Grove, Oregon

Approved:

Anita McClain, Ed.D., Chair

William Ludlam, O.D.

Linda Tamura, Ed.D.

6-11-91

Date
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ACKNOWLEDGEMENTS

Thanks to Dr. Anita McClain for her guidance as chair of the thesis committee, to Dr. William Ludlam, committee member, for his inspirational support of behavioral/functional optometry, to Dr. Linda Tamura, committee member, for her recommendations and assistance, to William R. Mann, Campus Administrator at the Nebraska School for the Visually Handicapped and James Dills, Community Health Educator at the Nebraska Division of Health Promotion and Education, for their assistance in acquisition of information regarding Nebraska laws and regulations, to Dr. Norman Stern for his recommendations on survey design and on speaking to teachers, to Drs. Greg Schober and Mauri Bauer for use of their computer equipment, and a special thanks to my colleague and friend, Dr. Curt Delplanche, for his encouragement and continual support.
ABSTRACT

The purpose of this study is to assess the curriculum background, regarding vision, addressed in the Nebraska college level education instruction. The literature shows little in the area of determining the presentation of visual information in undergraduate education programs, so this study attempts to gain baseline data on a state-wide level. This was accomplished by sending one hundred twenty surveys to education instructors in 13 Nebraska colleges and universities. The respondents were asked to comment on visual information included in classroom textbooks, classroom discussions of the role of vision in learning and the signs and symptoms of reading-related visual problems. Also the instructor's interest in guest speakers and additional information about the role vision plays in reading.

The responses were grouped by instructor type and were tabulated. Of the 120 surveys sent to education instructors in 13 Nebraska schools, 61 surveys (50.8%) were returned. Elementary education instructors returned the highest percentage of surveys (26%), with 56 percent of respondents discussing the role vision plays in the classroom. Special education instructors returned 18 percent of the surveys, with the overall highest number of positive responses in each area of the survey (91% discussed vision to some extent in their course). Finally, recommendations to better implement exposure to relevant information regarding vision in the education curriculum is recommended via textbooks, guest speakers, and seminars.
INTRODUCTION

Educators are in a position to observe behaviors in their individual students and to make comparisons between students. If they suspect vision problems in any of their students they can make recommendations to parents or guardians for referral to correct the problems. Presently, there is no standard in education for including vision in the curriculum.

The purpose of this project is to determine, in Nebraska, what type of instructors (e.g. elementary education, special education) are currently presenting aspects of vision to their students, what areas of vision are most commonly discussed, and if pupil behaviors are discussed for the purpose of detecting vision problems in the classroom. Nebraska colleges were chosen for the study because the author is a lifelong resident of Nebraska and has plans to return to Nebraska to practice behavioral/functional optometry.

The Heads of Education Departments in Nebraska colleges and universities were contacted by phone prior to sending survey packages to be distributed to individual instructors. Data from the returned surveys was compiled into tables for analysis.

The short term purpose is to initiate communication with Nebraska educators and to assess the background education in vision. The long term purposes are to initiate or re-emphasize educators' interest in the role vision plays in reading and learning, to encourage educators to review their textbooks and curricula to include a section on vision and the detection of vision problems, and for all Nebraska educators to be aware of how to detect vision problems in their students.
DEFINITION OF TERMS

Accommodation (focusing) - the ability to make objects clear at any distance. The change in focus for objects at different distances is achieved through contraction or relaxation of the ciliary muscle in the eye, which in turn changes the curvature of the crystalline lens inside the eye.

Accommodative facility (focusing speed) - the ability of the focusing system of the eye to rapidly change focus from a distant object to clearly see a near object, and vice versa.

Acuity - the ability to resolve small objects or letters.

Amplitude of accommodation (magnitude) - the maximum amount the eye can focus for close objects.

Astigmatism - when light entering the different meridians of the eye does not focus at one position in the back of the eye.

Color deficiency - the inability to discriminate different colors or shades of colors.

Convergence - the ability to turn the two eyes inward to follow an object moving towards you and to fixate a near object for a sustained period.

Diplopia - double vision.

Far-sightedness (hyperopia) - a refractive status in which accommodation is necessary in order for objects to be seen clearly at any distance.

Figure-ground - the ability to perceive relationships between the details of words, letters, or objects and the background against which they are seen.

Fixating - the ability to hold the eyes steady while looking at a stationary object.

Form constancy - the ability to recognize figures which have been rotated or presented in a variety of sizes, shapes, textures and position in space, and their discrimination from similar geometric figures.

Near-sightedness (myopia) - a refractive status in which the optical system of the eye remains focused at a close distance and objects at a far distance appear blurry.

Refractive status - refers to how light is directed (refracted) through the optical components of the eye during its relaxed state.

Saccades - a type of eye movements in which the eyes make quick jumping movements from one object to another as in reading.

Suppression - the temporary suspension of the visual information transmitted to the brain from one eye when both eyes are being used.
Sustained focus - the ability to maintain clear and comfortable near vision for a prolonged period of time.

Tracking/pursuits - a type of eye movements in which the eyes are following a slow-moving target, like a rolling ball.

Two-eyed alignment (binocularity) - the ability to combine an object seen by each eye into a single visual picture.

Visual closure - the ability to recognize familiar figures that have been partially obscured or have had parts removed.

Visual discrimination - the ability to detect similarities and differences in shapes, forms, objects, letters, words, etc.

Visual matching - the ability to compare similar visual stimuli, such as consistently recognizing the letter "a" and matching it with another "a".

Visual memory - the ability to maintain a visual "picture" of the object or word seen after it has been removed from sight.

Visual perception - the processing and interpretation of visual information and its integration with the other senses and past experiences.
LITERATURE REVIEW

Nebraska Law 79-4,133\(^1\) requires every school district to:

separately and carefully, cause every child under its jurisdiction to be inspected to ascertain if such child is suffering from (1) defective sight or hearing, (2) dental defects, or (3) other conditions as prescribed by the Department of Health. Physical examinations are required for the children in attendance during the first quarter of each school year, to be provided by the school district.

Thereafter, as children enter school during the year, such inspections must be made immediately upon their entrance.\(^2\)

The Department of Health is given the right, through Law 79-4,134\(^3\), to prescribe rules and regulations for conducting school health inspections, the qualifications of the person or persons authorized to make inspections, and the health conditions to be observed and remedied. The two main objectives of a vision screening program for school children, as determined by the Nebraska Department of Health\(^4\), are:

1. To detect those children who have vision problems or potential vision problems that may affect the physiological or perceptive processes of vision, and
2. To find those children who have vision problems that interfere with performance in school.

Vision screenings, as regulated by the Department of Health\(^4\), are to be conducted by the nurse or teacher with assistance from the nurse serving the schools. Volunteers or health office assistants may be utilized if carefully selected and trained. The nurse is to train the volunteers and organize the program.

Regulations by the Department of Health\(^4\), regarding teacher observation states:

The teacher may suspect difficulties in vision if a pupil: rubs his eyes frequently, squints or strains to see the chalkboard, holds his book too close or too far away, complains of headaches or blurred print, frequently loses his place while reading, holds his head at odd angles, or has eye movements that appear uncoordinated.

Children who consistently present any of the symptoms of visual disturbance should be referred regardless of the results of screening tests. A visual screening consists of testing visual acuity using an ‘appropriate eye chart’. The recommended test for farsightedness and astigmatism is to use a plus lens and the
20/20 line of the chart. If the line can be read through the lens, the person is suspected to have some degree of hyperopia and should be referred.

Based on this method of testing for farsightedness and astigmatism, because no specific plus power is recommended, there may be inappropriate referrals, as well as undiagnosed errors in refractive status. For example, if the plus lens is of a low power (+0.50), almost all children will be able to read the line through the lens, thus failing the test and leading to an excessive referral rate. On the other hand, if the power is too high (+4.00), the majority will pass, resulting in undetected farsightedness. The Massachusetts Vision Test (MVT), used since 1940, recommends a +2.00 lens, and the more recently developed New York State Optometric Association (NYSOA) Vision Screening Battery uses a +1.50 lens. Either of these powers of plus lens is appropriate when screening for farsightedness. However, when screening for astigmatism, plus lenses are inappropriate and ineffective.

Referral criteria\(^4\) for visual acuity, as determined by the National Society for Prevention of Blindness, are as follows:

- Kindergarten through third grade: 20/40 or less,
- Fourth grade and above: 20/30 or less,
- A one-line difference between the two eyes, even within passing criteria, when the symbols are isolated for testing, or
- A two-line difference when the entire line of symbols are viewed at a single time.

Those who do not pass according to the established criteria should have the test repeated on another day with referral depending on two successive failures.

Nebraska Law 79-4,136\(^5\) states; it is the duty of the boards of education or school boards of the several school districts of the state to enforce the provisions of sections 79-4,133 to 79-4,138, governing physical examination requirements. According to James Dills, the Community Health Educator in the Division of Health Promotion and Education for the State of Nebraska (personal communications, May 15, 1991), the rules and regulations prescribed by the Department of Health, regarding Nebraska Law 79-4,133, were never permeated and although 79-4,136 is encouraged, it is not enforced. Thus, if the board of education or the school boards do not enforce vision screenings, and the schools do not provide vision screenings, teacher observation becomes the sole method of referral.
Because teachers may be the primary detectors of vision problems, it is important that they are educated in the role vision plays in reading and learning and what behaviors can be expected in students with vision problems. As listed previously, there are a number of signs and symptoms that may be observed by or reported to the teacher. A more comprehensive list may be found in "the Educator's Guide to Classroom Vision Problems" (See Appendix I).6

A review of education reading textbooks reveals a gamut of vision coverage. The books included in this discussion represent typical textbooks used for teacher education purposes, especially reading. Textbooks like Spache & Spache7 (elementary education) and Ekwall & Shanker8 (diagnosis and remediation of reading disorders) discuss aspects of vision in detail, from definition of terms, to student behaviors, screening tests and devices, visual perception, eye movements, vision therapy, and the impact of vision problems on reading. Moderate discussion was evident in Collins and Cheek9 (diagnosis and remediation of reading disorders), addressing low vision and visually impaired, visual discrimination and visual memory, screening tests, and signs and symptoms of students with vision problems. Tonjes10 (secondary education) made mention of eye movement patterns in reading, as well as, visual imagery during reading tasks. No mention was made at all, of the role vision plays in learning and reading in either Duffy & Roehler11 (elementary education) or Brozo & Simpson12 (secondary education).

Besides textbook coverage, discussion of the role of vision in reading and learning may be included in the teacher education curriculum. Every college has different requirements and every instructor uses different philosophies in teaching. Thus, there is expected to be a range of vision coverage in college curricula, possibly corresponding to the range of vision coverage in reading textbooks. It is the purpose of this project to determine the vision coverage in college curricula.
IMPLICATIONS

Nebraska Law 79-4.135\(^2\) requires vision screenings during the first quarter of every school year. Although encouraged, this law is not enforced. According to the regulations of this law by the Nebraska Department of Health, teachers become vision screening tools by detecting signs and symptoms of vision problems in their students. Thus, teacher education in the role vision plays in reading and learning and how to detect students with vision problems is important for identifying those students with vision problems.

It is logical that this education should come during undergraduate college training, before entering the elementary, secondary and special education classrooms. If education students are taught how to detect vision problems and are encouraged to practice it, their future students may benefit from early detection and referral for treatment, especially if school screenings are not conducted in their school districts.

Education instructors should be informed of what textbooks might be recommended by vision care specialists for their comprehensive coverage of vision in reading and learning. Acquiring education textbooks with a comprehensive section on vision would help instructors, who don’t already discuss vision, to incorporate it into their curricula. For those instructors that currently discuss vision in their classrooms, it can serve to enhance the depth of coverage.
METHODS

Thirteen Nebraska colleges and universities were selected from the 38 schools listed in the 1984-1985 Yearbook of Higher Education-A Directory of Colleges and Universities.13 (See Appendix II) Only those schools listed with Education Departments were selected for the survey, i.e. no technical schools, community colleges, or Bible schools.

Prior to sending the surveys, phone calls were made to inform the Department Heads that surveys will be sent and to determine the approximate number needed. Each survey package (see Appendix III) included a survey form, an instructional letter introducing myself and the project, as well as instructions for completion and return of the surveys. A cover letter was sent to the Head of each Education Department, also introducing myself and the project and requesting distribution of the surveys to Elementary, Secondary, Special Education and Reading Specialist instructors.

One hundred twenty surveys were sent to 13 Nebraska college and university education departments. The survey addressed the following eight questions, of which the respondent was to check the appropriate responses:

1. What areas of education do you instruct?
   - Elementary Education
   - Secondary Education
   - Special Education
   - Reading Specialist
   - Other

2. Do you discuss the role of vision in the reading and learning process?

3. What areas of the visual process do you discuss in the classroom?
   - Near-sightedness/Myopia
   - Far-sightedness/Hyperopia
   - Astigmatism
   - Eye Movements
   - Focusing/Accommodation
   - Two-eyed Alignment/Binocularity
   - Color Vision
   - Visual Memory
   - Visual Perception
   - Other

4. Does your course textbook have a comprehensive section on the role of vision in learning?

5. Do you discuss behaviors and symptoms indicative of visual problems?

6. Do you have guest lecturers speak to your class about vision?
7. Would you like to have a vision specialist speak to your class?

8. Would you be interested in acquiring information about the visual system and its function in learning?

Data from the returned surveys were grouped according to type of instructor, were tallied for each survey question, and were compiled into Tables 1-7. Percentages were calculated for the number of surveys returned by each instructor category and for each instructor type who discusses vision in the classroom. Also calculated were group percentages for each instructor category who discusses vision in the classroom. It was determined by dividing the number of affirmative responses to question two by the number of returned surveys for the corresponding instructor category in question one. The results of the remaining six questions were tallied according to affirmative responses by each instructor category. Percentages for questions three through six were determined using the number of affirmative responses from question two. All surveys, or “Total responses” from question one, were used in calculating the percentages for questions seven and eight.

RESULTS AND DISCUSSION

Question 1. Please indicate which areas of education you instruct. Check all that apply: Elementary Education, Secondary Education, Special Education, Reading Specialist, Other.

Based on the size of some Nebraska colleges and universities, not all schools have education departments. Those schools not having Education Departments were not included in the survey. Also, some smaller schools require instructors to teach in multiple areas of education. To accommodate these circumstances, the surveys were designed such that each instructor indicated all areas of instruction on one form. The areas addressed were Elementary Education(EE), Secondary Education(SE), Special Education(SpE), Reading Specialist(RS) and Other. Responses in the Other category came from instructors of Art Education, Learning Disabilities, Counseling, Educational Psychology, and Speech and Language Pathology. Instructors teaching in multiple areas of education included combinations of EE/SE, EE/SpE, EE/RS,
SpE/RS, EE/SE/SpE, EE/SE/RS, EE/SpE/RS, and EE/SE/SpE/RS. Each of these combination categories had between 1 and 6 samples with 19 total samples.

Of the 120 surveys sent to education instructors in 13 Nebraska colleges and universities, 61 surveys (50.8%) were returned (See Table 1). Ten of the 13 schools returned surveys. EE accounted for 26 percent of those returned, 18 percent were from SpE and 15 percent from SE. The “Other” category returned 10 percent and the remaining were from the eight listed instructor combinations.

Among instructors who completed the survey, Special Education instructors had the highest percentage response of addressing vision in the classroom. According to Bill Mann, Campus Administrator at the Nebraska School for the Visually Handicapped (personal communications, May 15, 1991), one reason special education instructors are the highest percentage of respondents may be the need for more instruction on working with visually handicapped students. Due to the number of rural schools in Nebraska, a multi-categorical classrooms program has been established that allows visually impaired students to be placed in classrooms with other handicapped students, as long as the instructor is certified to teach to a type of impairment represented by the majority of students, (e.g. if the instructor is certified to teach mentally retarded students and there is only one visually impaired student, the visually impaired student can be placed in the classroom with the mentally retarded students, regardless of the instructor’s adequacy in teaching the visually impaired. One step taken to improve this situation is a summer inservice program, offered by the University of Nebraska at Lincoln, to teachers of visually impaired students. It was designed as a supplement for teachers in rural areas that are working in the type of multi-categorical classrooms previously mentioned.

**Question 2.** Do you as an education instructor discuss the role vision plays in the reading and learning process? (See Table 2).

With respect to the question addressing the role vision plays in reading and learning, 65.5 percent overall responded affirmatively. The largest group percentage was the SpE instructors (90.9%). Only 56.2 percent and 22 percent of EE and SE instructors, respectively, responded affirmatively to discussing
### Table 1.
**Surveys returned**

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<th>TYPE OF INSTRUCTOR</th>
<th>RESPONSE</th>
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<td>Secondary Education (SE)</td>
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<td>Special Education (SpE)</td>
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<td>18</td>
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<td>Reading Specialist (RS)</td>
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<td>Other</td>
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<tr>
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<td>TOTAL</td>
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### Table 2.
**Discuss Vision in Classroom? (affirmative responses and percents)**

<table>
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<tr>
<th>TYPE OF INSTRUCTOR</th>
<th>RESPONSE</th>
<th>GROUP PERCENT</th>
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<td>40</td>
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### Table 3.
**Areas of Visual Process Discussed in Classroom (no. of affirmative responses)**

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<th>TYPE OF INSTRUCTOR</th>
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<th>FAR SIGHT</th>
<th>ASTIG</th>
<th>EYE MOVMTS</th>
<th>FOCUS</th>
<th>EYE ALIGN</th>
<th>COLOR</th>
<th>VIS MEM</th>
<th>VIS PERCEPT</th>
<th>OTHER</th>
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### Table 4.
**Textbooks with Comprehensive Vision Sections (no. of affirmative responses)**

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<th>VISION IN TEXTBOOK</th>
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<tr>
<td>EE, SE &amp; SpE</td>
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</tr>
<tr>
<td>EE, SE &amp; RS</td>
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<td>EE, SpE &amp; RS</td>
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<td>EE, SE, SpE &amp; RS</td>
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<tr>
<td>TOTAL</td>
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### Table 5.
**Discuss Behaviors and Symptoms (no. of affirmative responses)**

<table>
<thead>
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<th>TYPE OF INSTRUCTOR</th>
<th>BEHAVIORS</th>
<th>SYMPTOMS</th>
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<td></td>
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<tr>
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<td>Special Education (SpE)</td>
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<td></td>
</tr>
<tr>
<td>Reading Specialist (RS)</td>
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<td></td>
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<tr>
<td>Other</td>
<td>1</td>
<td></td>
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<tr>
<td>EE &amp; SE</td>
<td>2</td>
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<td>EE &amp; SpE</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>EE, SpE &amp; RS</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>EE, SE, SpE &amp; RS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>
vision in their classrooms. The group percentages for the remaining 25 surveys are as follows: 83 percent Other (5 of 6), 33 percent EE/SE (2 of 6), 67 percent EE/SpE (2 of 3) and 100 percent of all remaining combinations. Of these remaining combinations, each group contained between one and three samples and each included SpE, RS or both.

Only surveys responding affirmatively to the discussion of the role vision plays in the reading and learning process were considered for questions three through six. All those responding negatively were directed to questions seven and eight.

Question 3. Please check each area of the visual process that you discuss in your classroom: refractive status, eye movement and eye teaming skills, focusing ability, color vision, visual memory and visual perception. (See Table 3).

Respondants who discussed near-sightedness also discussed far-sightedness. This was represented by 62.5 percent overall (25 of 40) with 20 percent of these being SpE, 10 percent EE, 7.5 percent Others, and the remaining were dispersed throughout the combinations group, of which all, except for one EE/SpE and one EE/RS, responded affirmatively to discussing near- and far-sightedness. Astigmatism was discussed by 45 percent overall, with SpEd outnumbering EE 4:1.

Responses to discussing eye movements were again, 62.5 percent overall. The largest group representation was the SpE with seven of ten responding affirmatively to discussing eye movement skills, compared to three of nine EE. Additional respondants, not previously noted, were one SE and one EE/SE, each representing 4 percent of the 62.5 percent overall. The remaining results were identical to those for near- and far-sightedness, with the addition of one EE/SpE.

Sixty percent overall reported discussing focusing abilities in their classrooms. The findings were similar to those of eye movements with a slight increase in the number of EE instructors (5 of 24). None of the four SE and EE/SE, nor the SpE/RS respondants discuss focusing abilities.

Forty-five percent reported they discuss two-eyed alignment in their classrooms. Thirty-three percent of these were SpE, 22.2 percent were EE,
EE/RS and EE/SpE/RS each accounted for 11.1 percent, and the remaining 22.2 percent were dispersed through Other, EE/SpE, EE/SE/SpE, and EE/SE/SpE/RS.

Less than thirty-eight percent responded to discussing color vision. SpE were again the highest responders with responses also from EE, the Other category, and singles from five various combination groups.

Visual Memory was discussed in more classrooms than any other visual topic. Ninety percent of respondents reported discussing visual memory. This was represented by 100 percent of SpE, EE, Other, EE/SpE, SpE/RS, and other combination groups and 50 percent of SE, EE/SE and other combinations.

Visual perception was discussed by 85 percent of educators. Again, 100 percent of SpE, EE/SpE and SpE/RS responded affirmatively. EE and Other each decreased by one respondent. EE/RS also responded 100 percent.

Responses in the Other category under question three were from EE, SpE, Other, EE/SE and EE/SE/SpE/RS. Topics discussed in classrooms were Scotopic Sensitivity, visually directed reaching in infants, haptic perception, pacing related to visual perception, auditory-visual integration, eye-hand relationships, and visual problems that affect learning ability and your ability to teach those students. This category was represented by 22.5 percent of respondents.

**Question 4.** Does your course textbook have a comprehensive section on the various roles vision plays in the classroom environment?

(See Table 4).

A 1990 review of education textbooks by McClain, et al\textsuperscript{14} revealed that few education textbooks contain comprehensive sections on vision. Some of the authors of books that do include such sections are by Spache & Spache\textsuperscript{7}, Ekwall & Shanker\textsuperscript{8} and Harris & Sipay\textsuperscript{15}. Although specific titles and authors were not requested on the surveys, it was asked if their textbooks included a comprehensive section on vision. Only 20 percent responded that it was included in their textbook, with the majority of these being SpE or combinations including SpE.

**Question 5.** In class, do you discuss various behaviors and symptoms which could indicate that a student may be suffering from a visual problem? (See Table 5).
Although textbooks did not contain sections on vision, 80 percent of educators discussed behaviors and symptoms indicative of vision problems in students, with more than 31 percent of these being SpE and 21.8 percent EE instructors. As the majority of visual problems can be observed from desk work it is most likely that teachers would be the first to detect these problems. These problems may be observable by the appearance of the eyes, excessive tearing and red eyes, or by behavioral signs, such as squinting, head tilts, word reversals with reading and crooked writing. Oftentimes, the student might report headaches and nausea or that the print moves on the page. (See Appendix I for a comprehensive list of “Observable Clues to Classroom Vision Problems”)

**Question 6.** Do you have guest lecturers speak on the different aspects of vision in learning? (See Table 6).

Only 22.5 percent, or 9 of 40, have guest lecturers speak to their classes. Five of the nine were SpE, one EE, one EE/RS, one SpE/RS, and one EE/SpE/RS. No qualifications, such as optometrist, ophthalmologist or psychologist, were specified as to the expertise of the guest lecturers.

All 61 surveys were utilized in the evaluation of questions seven and eight.

**Question 7.** Would you be interested in having a vision specialist speak to your class? (See Table 6).

More than thirty-nine percent (24 of 61) responded affirmatively. Again the majority of these were from SpE (33.3%), followed by EE and EE/SpE (12.5% each), with dispersed amounts from SE, Other, EE/SE, EE/SpE, EE/RS, SpE/RS and EE/SE/SpE. (See Appendix IV for an outline to be used when guest lecturing.)

**Question 8.** Would you be interested in more information on the visual system and how it impacts the learning and reading process? (See Table 7).
### Table 6.
**Guest Lectures on Vision**  
(no. of affirmative responses)

<table>
<thead>
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<th>LECTURERS</th>
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<td>Reading Specialist (RS)</td>
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<td>Other</td>
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<td>2</td>
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<td>EE &amp; SE</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>9</strong></td>
<td><strong>24</strong></td>
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### Table 7.
**Requests for Information on Vision**  
(no. of affirmative responses)

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<td>SpE &amp; RS</td>
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<td>EE, SpE &amp; RS</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>43</strong></td>
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A total of 70.5 percent (43 of 61) requested information be sent to them. Again the majority was represented by SpE. SE had an overwhelming response of seven out of nine respondents. EE and Other were each split fifty-fifty. Five of the six combined EE/SE group requested more information and 100 percent of all other combined groups, except for EE/SpE/RS and EE/SE/SpE/RS, requested additional information. Of the last two mentioned groups, neither expressed an interest in acquiring more material on vision. (See Appendix V for a reference list of recommended books and videos for teachers requesting more information.)

CONCLUSION

A survey was conducted of Nebraska colleges and universities to assess the various aspects of vision addressed in introductory level education instruction. The motivation initiating this state-wide survey was my belief that teachers should be knowledgeable in the functions of vision in learning. Vision is perceiving and applying meaning to what we see. Vision includes distance and near acuity, two-eyed coordination, focusing, eye movements, and tracking. A defect in one or more of these areas often results in reduced attention span, comprehension, and general school performance. For example, a child may have 20/20 distance vision but exhibit symptoms such as blurred vision, headaches, or eyestrain while reading.

Teachers are in a prime position to observe student behaviors indicative of a visual problem. Thus, there is a need for educators to be able to detect vision problems in the classroom. If the teachers are instructed in what to look for in their students, the teachers can detect problems and direct the students to improved vision and learning. This in turn makes the educators’ jobs that much easier. Since the college level education curriculum is responsible for the preparation of our future teachers, it follows that information about the visual system should be presented in the formal education coursework. This survey attempted to determine to what extent vision and its associated dysfunctions are taught at the college level.

Among instructors who completed the survey, Special Education instructors had the highest percentage response of addressing vision in the classroom. Also, they expressed the most interest in acquiring additional information on vision and the role it plays in reading and learning, as well as
inviting a vision specialist to speak in their classrooms. Elementary Education instructors were split as to teaching vision in learning. Those who do teach it, gave diverse responses to what areas of vision are discussed. There was a fifty-fifty split in request for information, with a low desire for a vision specialist to lecture to their classes. Although Secondary Education instructors as a whole do not discuss vision in the classroom, they expressed an interest in receiving information, with less interest in guest lecturers. Of the remaining combination groups, those responding the most affirmatively to the questions were the groups containing a Special Education instructor, followed by groups containing a Reading specialist.

The range in vision coverage by the different instructor groups is probably determined by the levels of the classrooms their students will be teaching. For example, special education deals with students that may have special visual needs, such as the visually impaired students, and thus, a stronger background in vision is needed.

Why the percentage of elementary education respondents is not higher is disturbing. One possibility why more elementary education instructors don’t discuss vision, as pointed out by one respondent, is that vision is addressed in psychology classes directed for education, as well as in reading methods classes. During the elementary school years, learning to read is a prime objective and because vision plays such an important role in reading, one would expect elementary educators to also express a strong interest in understanding how vision impacts reading and learning. This interest may be implemented by a cursory exposure to the processes of vision, either through relevant textbooks, guest speakers, and/or seminars.

As a behavioral/functional optometrist, the researcher’s recommendations for education reading textbooks are: Spache & Spache and Ekwall & Shanker. Both of these books define terms used by vision specialists, discuss eye movements used in reading, list student behaviors indicative of vision problems and discuss vision screening tests. Acquiring education textbooks with a comprehensive section on vision would help instructors, who don’t already discuss vision, to incorporate it into their curricula. For those instructors that currently discuss vision in their classrooms, it can serve to enhance the depth of coverage.

Guest speakers, knowledgeable in the visual function in learning, may be the most effective means to communicate basic information about vision to
large audiences, in a short period of time. Also, the use of inservice seminars for education instructors may be productive in implementing this information into the classroom. It is in the researcher’s plan to one day return to Nebraska and fulfill this speaking role as a functional optometrist.

The researcher feels this project has opened some doors into the educational systems in Nebraska colleges and universities. Hopefully, follow-up will reveal that educators are seriously taking an interest in their students’ visual abilities and that vision problems are being detected, allowing for remediation. If we work together we can make a difference.
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Physical Examination of Pupils, Nebraska School Laws, §§ 79-4,133 (1967).

Physical Examination of Pupils, Nebraska School Laws, §§ 79-4,134 (1967).

Physical Examination of Pupils, Nebraska School Laws, §§ 79-4,135 (1967).


Physical Examination of Pupils, Nebraska School Laws, §§ 79-4,137 (1967).


APPENDIX I

OBSERVABLE CLUES TO CLASSROOM VISION PROBLEMS
(Copied from “Educator’s Guide to Classroom Vision Problems”6)

1. APPEARANCE OF EYES:
   - One eye turns in or out at any time
   - Reddened eyes or lids
   - Eyes tear excessively
   - Encrusted eyelids
   - Frequent styes on lids

2. COMPLAINTS WHEN USING EYES AT DESK:
   - Headaches in forehead or temples
   - Burning or itching after reading or desk work
   - Nausea or dizziness
   - Print blurs after reading a short time

3. BEHAVIORAL SIGNS OF VISUAL PROBLEMS:
   A. Eye Movement Abilities (Ocular Motility)
      - Head turns as reads across page
      - Loses place often during reading
      - Needs finger or marker to keep place
      - Displays short attention span in reading or copying
      - Too frequently omits words
      - Repeatedly omits “small” words
      - Writes up or down hill on paper
      - Rereads or skips lines unknowingly
      - Orients drawings poorly on page
   B. Eye Teaming Abilities (Binocularity)
      - Complains of seeing double (diplopia)
      - Repeats letters within words
      - Omits letters, numbers or phrases
      - Misaligns digits in number columns
      - Squints, closes or covers one eye
      - Tilts head extremely while working at desk
      - Consistently shows gross postural deviations at all desk activities
   C. Eye-Hand Coordination Abilities
      - Must feel things to assist in any interpretation required
      - Eyes not used to “steer” hand movements (extreme lack of orientation, placement of words or drawings on page)
      - Writes crookedly, poorly spaced; cannot stay on ruled lines
      - Misaligns both horizontal and vertical series of numbers
      - Uses his hand or fingers to keep place on the page
      - Uses other hand as “spacer” to control spacing and alignment on page
      - Repeatedly confuses left-right directions
D. Visual form Perception (Visual comparison, Visual Imagery, Visualization)
Mistakes words with same or similar beginnings
Fails to recognize same word in next sentence
Reverses letters and/or words in writing and copying
Confuses likenesses and minor differences
Confuses same word in same sentence
Repeatedly confuses similar beginning and endings of words
Fails to visualize what is read either silently or orally
Whispers to self for reinforcement while reading silently
Returns to "drawing with fingers" to decide likes and differences

E. Refractive Status (Near-sightedness, Far-sightedness, Focusing Problems, etc.)
Comprehension reduces as reading continued; loses interest too quickly
Mispromounces similar words as continues reading
Blinks excessively at desk tasks and/or reading; not elsewhere
Holds book too closely; face too close to desk surface
Avoits all possible near-centered tasks
Complains of discomfort in tasks that demand visual interpretation
Closes or covers one eye when reading or doing desk work
Makes errors in copying from chalkboard to paper on desk
Squints to see chalkboard, or requests to move nearer
Rubes eyes during or after short periods of visual activity
Fatigues easily; blinks to make chalkboard clear up after desk task
APPENDIX II

NEBRASKA COLLEGES AND UNIVERSITIES INCLUDED IN THE EDUCATIONAL SURVEY

Chadron State College
College of Saint Mary
Concordia Teachers College
Creighton University
Dana College
Doane College
Hastings College
Kearney State College
Midland Lutheran College
Peru State College
University of Nebraska at Omaha
University of Nebraska Lincoln
Wayne State College
APPENDIX III

SURVEY PACKAGE

INSTRUCTIONAL LETTER
SURVEY
COVER LETTER
Dear Education Instructor:

I am conducting a survey of Nebraska College and University Education Departments concerning the role vision plays in the reading and learning process. As a professional educator you have the privilege of instructing our future teachers. This position carries with it tremendous responsibility in requiring that you be fluent in many areas of teaching theory and learning modalities. I am specifically interested in one of these modalities: vision.

A lifelong resident of Nebraska and an alumnus of a Nebraska college, I intend to return to Nebraska after completing my education at Pacific University College of Optometry in Forest Grove, Oregon. I will be graduating this Spring with my doctorate and am concurrently earning a Masters degree in Education. It is my professional objective to integrate understanding and cooperation between the education and optometric professions.

Please assist me by completing the enclosed survey form. After completing it simply fold it into thirds and staple or tape it before dropping it in the mail. It has been addressed and stamped for your convenience. Thank you for your time and consideration.

Sincerely,

Jill M. Hlavac
QUESTIONNAIRE FOR EDUCATION INSTRUCTORS
(Please fold the completed form and mail to the listed address.)

1. Please indicate which areas of education you instruct. Check all that apply.
   ◊ Elementary Education ◊ Special Education
   ◊ Secondary Education ◊ Reading Specialist
   ◊ Other (Please specify: _______________________

2. Do you as an education instructor discuss the role vision plays in the reading and learning process? ◊ Yes ◊ No
   If yes, please answer the remaining questions. If no, please refer to questions 7 & 8.

3. Please check each area of the visual process that you discuss in your classroom.
   ◊ Near-sightedness (myopia)
   ◊ Far-sightedness (hyperopia)
   ◊ Astigmatism
   ◊ Eye movements
   ◊ Focusing (accommodation)
   ◊ Two-eyed alignment (binocularity)
   ◊ Color vision
   ◊ Visual memory
   ◊ Visual perception
   ◊ Other (Please specify: ______________________

4. Does your course textbook have a comprehensive section on the various roles vision plays in the classroom environment? ◊ Yes ◊ No

5. In class, do you discuss various behaviors and symptoms which could indicate that a student may be suffering from a visual problem? ◊ Yes ◊ No

6. Do you have guest lecturers speak on the different aspects of vision in learning? ◊ Yes ◊ No

7. Would you be interested in having a vision specialist speak to your class on the subject? ◊ Yes (Please list your address below.) ◊ No
   ◊ Yes, please address to: ____________________________________________
   ____________________________________________

8. Would you be interested in more information on the visual system and how it impacts the learning and reading process?
   ◊ No
   ◊ Yes, please address to: ____________________________________________
   ____________________________________________
   ____________________________________________

THANK YOU FOR YOUR TIME AND CONSIDERATION. IT IS GREATLY APPRECIATED.
Dear Head of Department (NAME),

I am conducting a survey of Nebraska College and University Education Departments concerning the role vision plays in the reading and learning process. I am interested in Nebraska schools because I am a lifelong resident of Nebraska and an alumnus of a Nebraska college. I also intend to return to Nebraska after earning my Doctor of Optometry and Masters in Education from Pacific University in Forest Grove, Oregon.

Please assist me by distributing the enclosed survey forms to the instructors of elementary education, secondary education, special education and reading specialist. Thank you for your time and consideration.

Sincerely,

Jill M. Hlavac
APPENDIX IV

GUEST LECTURE OUTLINE

I. Introduction
   Topic Statement (eg 90% parents take children to annual dental visits.
   What percent for annual vision exam?)
   Who I am (personal background, education, interests, specialties, experiences)

II. Sight vs Vision
   Sight: Ability to see/eyes response to light
   Vision: Ability to identify, interpret and understand what is seen
   Involves eyes, pathway and brain
   Learned and everyone sees differently
   (slides, lecture outline, overheads, etc.)

   Optometrist: Schooling and degree
      Refractions, Contact lenses fittings, Diagnosing and treating eye diseases
   Behavioral/functional optometrist: In addition to above,
      Developmental Vision, Vision Therapy/Training/Enhancement
   Ophthalmologist: Schooling and degree
      Specializes in diagnosing and treating eye diseases
      Eye surgeries
   Optician: Schooling (post high school)
      Dispense eye wear
      Some states (Washington) allow CL fittings and dispensing

III. Ocular Anatomy/ Refractive Error/ Ocular Health
   Ocular Anatomy (Slides, diagrams, etc)
      Cornea, iris, pupil, lens, retina, fovea, optic nerve
   Refractive Error (Slides, diagrams, etc)
      Myopia: “Eye too long” (look at distance through plus lens)
      Hyperopia: “Eye too short” (read through minus lens)
      Astigmatism: “Shaped like spoon or football” (cyl lens)
   Ocular Health
      Strabismus: “Eye turn”
      Amblyopia: “Lazy eye”
      Red eyes
      Blepharitis: “Crusts on eyelids”
      Possibly, Low Vision: Cataracts, glaucoma

IV. Visual Skills Summary
   Eye Movements (Visigraph or Eyetrac tapes)
      Fixations: “Looking at a stationary object”
      Pursuits: “Tracking” (roll a ball)
      Saccades: “Used in reading”
      Head Movements vs Eye Movements
   Accommodation/ Focusing
      “Like camera”
      Lens changes
      Refractive errors and accommodation
Binocularity/ Stereopsis/ Two-Eyed Alignment
(Two projectors, Coin toss or cap pen with one eye occluded)
Suppression: Filter and "ignore" information from one eye
(Hand in pocket)
Attention problems -- energy to suppress
Color Vision (Farnsworth D-15 examples)
Visual Memory (Tachistoscope)
"5-7 chunks of information"

Visual Perception
Visual Matching: "Recognize same letter" (printed overhead with all "a" circled)
Visual Discrimination: "Similarities and Differences" (A/a)
Figure/ground: "Sort out what is important" (Hidden cow picture)
Form Constancy: "Recognize figures that have been rotated or changed in size, color, etc" (Chair; rotated, compare to b,d)
Visual Closure: "Recognize familiar figures, partially obscured or removed" (Man on horse picture)

V. Signs and Symptoms
("Educator's Guide to Classroom Vision Problems" -- handout)
("The Effects of Vision on Learning and School Performance" -- handout)
Appearance of eyes (eye turn, red, tears, crusts, styes)
Complaints with desk work (HA, burn, itch, nausea, dizzy, blur)
Behavioral Signs:
Eye Movement (head turn, lose place, finger use, short attention, omits and/or repeats words or lines, small word reversals, poor drawing or writing)
Eye Teaming (complains of diplopia, repeats letters within words, omits, misaligns columns, squints, closes or covers one eye, tilts head, gross postural deviations)
Eye/Hand Coordination (must feel things, does not use eyes to guide movement, poor writing, misaligns vertical and horizontal, finger use, hand for spacing guide, L/R confusion)

Visual Form Perception (fails to recognize same word repeatedly, reversals, confuses likes and differences, confuses similar word endings and beginnings, poor visualization, whispers with reading, draws with finger to reinforce)
Refractive Status (reduced comprehension, mispronounces similar words as cont to read, blinks, holds book too close, too far, avoids near tasks, complains of discomfort, closes or covers one eye, errors in copying from board, squints, rubs eyes)
Comprehension decrease (BI prism with reading)

VI. Environmental Factors: Glare, placement in room, harmon distance, desk height
(Reference Ergonomics of Classroom study, Dr. Ritty, Dr. Cool)

VII. Vision Care Services
Screenings
Evaluations
Remediation: Spectacles, CLs, Vision Therapy
VII. Vision Care Services, cont.,
   Vision Hygiene (PUCO handout)
   Eye Injuries: Eye safety kit (sample kit, list of contents, slides of
   contents)

VIII. Research/ Case Examples
IX.   Video (Vision in the Classroom)
X.    Summary/ Questions/ Answers
XI.   Closing Remarks
APPENDIX V

REFERENCE LIST FOR TEACHERS

Books


Rowley E.V. Enhance your child’s development. Available through VisionExtension, Santa Ana, CA.


Videos

All children learn differently. Association for Children with Learning Disabilities (Orange County Chapter). Optometric Extension Program.

*parents or small groups


*educators and parents

Vision in the Classroom. Optometric Extension Program.

*educators and parents
Professional Organizations

American Academy of Optometry
Attn: Chairman of the Diplomate in Binocular Vision & Perception
118 North Oak St.
Owatonna, MN 55060

American Optometric Association
Communications Division
243 North Lindbergh Blvd.
St. Louis, MO 63141

Optometric Extension Program Foundation
2912 South Daimler St.
Santa Ana, CA 92705-5811

VisionExtension, Inc.
2912 South Daimler St., Ste. 100
Santa Ana, CA 92705-5811

College of Optometrists in Vision Development
P.O. Box 285
Chula Vista, CA 92010

Recommended Textbooks


