HUMAN
CONNECTIONS

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Low Vision Driver Education Training

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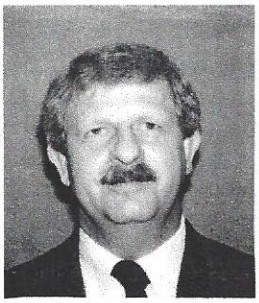
Introduction



Safe operation of a motor vehicle requires that the driver be able to detect visual clues with his or her field of vision and be able to distinguish them clearly enough to allow the brain to make an accurate assessment as to the correct action required. Many individuals presenting mild to moderate visual acuity loss are capable of picking up visual clues with their field(s) of vision but, because of their reduced central visual acuity or detail perception, are unable at times to define or interpret these clues. Since 90 to 97 percent of all driving clues are picked up by one's field of vision, researchers at the West Virginia Rehabilitation Center (WVRC) hypothesized that certain visually challenged individuals, with full fields of vision and mild to moderate central visual acuity loss, could learn to drive safely with appropriate low vision aids and specialized driver education training.

In 1985, a multidisciplinary group of researchers consisting of a driver rehabilitation specialist, an optometrist specializing in low vision practice, a psychologist, an orientation and mobility specialist, an audiologist, and an occupational therapist set out to explore and formulate ways of screening, training, and assessing the driving potential of a select group of visually challenged individuals. The results and conclusions of this ten-year effort will be discussed in the following article.

Vision Requirements for Candidates Selected for Inclusion in Study

Visually challenged students who were accepted for participation in WVRC's initial three-year pilot study (1985-1988), and identical low vision driver services which followed for the next seven years (1989-1996), had to meet and maintain the following visual requirements:

- distance visual acuity between 20/50 and 20/200 inclusive, with best standard spectacle or contact lens correction in the better eye;
- visual field of 120 degrees horizontally and 80 degrees vertically or greater in the same eye as used for the visual acuity determination;
- 20/40 or better distance visual acuity using distance optical low vision aids prescribed by either a licensed optometrist or ophthalmologist;
- no ocular diagnosis or prognosis which was likely to result in significant deterioration below the protocol levels of visual acuity and visual fields as stated above.

All such candidates who volunteered to continue in this pilot study/continuum of services were also required to submit to other evaluations administered by the multidisciplinary team of professionals as stated previously. Since driving is a complex task, researchers felt that the results of the latter assessments would provide a clearer picture as to the strengths as well as areas needing improvement for this group of individuals who, for the most part, did not anticipate that one day they might qualify for driver education services, much less access to driver licensure.

> ***Since driving is a complex task...this group of individuals...did not anticipate that one day they might qualify for driver education services, much less access to driver licensure.***

Initial Screening Results

Of the 107 individuals identified by clinical low vision sources as meeting this study's visual protocol, 69 individuals returned voluntarily to participate and complete the series of evaluations conducted by the multidisciplinary research team. Of those 69, 56 individuals illustrated

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A WORLD OF DIFFERENCE

acceptable performance scores and were invited to return to the center at a later date to initiate formalized programs of low vision driver education training.

Since most candidates never dreamed that someday they would be given the opportunity to demonstrate their functional competency behind the wheel of an automobile, evaluation results illustrated that most students had problems related to the dynamics of the driving task such as:

- Distance eye-lead time
- Head and eye scanning
- Following distance from other road users (big picture awareness)
- Yielding procedures when turning or when approaching crossroads
- Hazard perception awareness
- Independent decision making
- Distance detail awareness and identification.

Training Strategies

Forty-seven of those 56 participants who completed the aforementioned multidisciplinary assessment procedures satisfactorily returned voluntarily to initiate a comprehensive yet individualized six- to eight-week low vision driver education training program. The latter consisted of concurrent educational experiences involving approximately 40 hours of classroom driver education instruction, an additional 30 hours of vision utilization training as a passenger in a vehicle (with and without the use of low vision aids), and approximately 50 hours of actual on-road driving under the auspices of a certified driver rehabilitation specialist. All aspects of hazard perception and independent decision making were covered. All on-road driving was undertaken in a dual brake controlled vehicle. In addition, various audio and video self-study formats as well as remedial driver education classroom instruction (evenings) were incorporated into students' daily class schedules as needed or suggested by project staff.

Two instructors, a driver rehabilitation specialist and an orientation and mobility specialist (the latter serving primarily as a visual skills instructor), shared and collaborated on teaching responsibilities. For example, after driving a designated route, respective students would then be taken by car as passengers over the same route with their visual skills instructor to review and remediate any problem areas which arose yet could not be addressed at the time by the driver rehabilitation specialist because of the dynamics of the driving scene. Such on-site reviews might include: a review of roadway characteristics, awareness of fixed as well as other hazards affecting one's path of travel and/or speed, presence or absence of pavement markings or road signs, and understanding of any traffic control devices present.

Assessment Techniques

A third area of investigation by project researchers was observing, evaluating and rating the dynamic driving behaviors of students on a standardized 40-mile test route. The latter was developed by and patterned after Michigan State University's Driver Performance Measurement (DPM) research.

> You may be disappointed if you fail, but you are doomed if you don't try.
>
> —*Beverly Sills*

This weekly in-car assessment, instituted midway through each student's respective training program, included the student driving through rural, residential, business, and inter-city settings. It exposed the student to a wide range of driving experiences—some easy, which even the best drivers are expected to handle without difficulty—and others more complex, which even the best drivers may have problems negotiating. Two trained evaluators were always present with the student during respective runs.

Such standardized procedures proved to be a very effective method of establishing a baseline on and an ongoing assessment of progress in driver performance of project candidates.

One major conclusion from repeated use of DPM procedures with project candidates throughout this ten-year study was that individuals who completed low vision driver education at WVRC satisfactorily performed at a level comparable to their normally sighted counterparts in terms of basic visual skills and demonstrated above average skills in vehicle handling and ability to react to traffic hazards. Another clear finding is the strong need for the continuation of formalized low vision driver education programs like that existing at WVRC, especially for visually challenged individuals who have not adequately prepared themselves conceptually for the rigors involved in the dynamics of the driving task.

Driver Licensure

Thirty-one individuals who completed WVRC's formalized program of low vision driver education training satisfactorily were afforded the opportunity to undergo comprehensive driver license testing by specially trained driver license examiners employed by the West Virginia Division of Public Safety. The latter testing included: vision reexamination at the completion of training, road laws knowledge tests, environmental awareness screening (functional vision assessment with and without low vision aids while seated as a passenger in a vehicle), and an actual on-road test (approximately eight to ten miles in length). The latter was conducted in a dual brake controlled vehicle provided by WVRC.

Eventually, all 31 of these individuals became legally licensed to drive in West Virginia. Restrictions were applied on a case-by-case basis by the West Virginia Division of Motor Vehicles and included such driving restrictions as: daytime driving only, 50-mile radius, use of bioptics, or no interstate driving.

Conclusion

A telephone survey, conducted by this author during October 1996, with

each of the 31 participants who completed training satisfactorily and are now licensed, revealed:

- An accumulation of 215.0 total person years of driving for this group of visually challenged drivers
- Nearly 100 percent educational and/or vocational placement
- A change in marital status for 12 graduates (single status to married status within five years after licensure)
- Both accident- and violation-free driving records by 14 of 31 graduates
- At least one accident by 12 graduates (18 accidents for the total group), yet they were not at fault in ten of those accident situations
- At least one minor traffic violation (eight violations for the total group) by seven graduates
- Involvement by only two drivers in both accidents and violations
- Twice the number of at-fault accidents and traffic violations by those falling in the 20/50 to 20/70 visual acuity category versus those graduates falling in the 20/80 to 20/120 or 20/140 to 20/200 visual acuity category.
- **Distance Visual Acuity Ranges**

	# Male	# Female
20/50–20/70	8	3
20/80–20/120	3	3
20/140–20/200	9	6

Since the onset of the West Virginia study, the number of states which now officially permit the issuance of restricted driver licenses to visually challenged individuals utilizing bioptic telescopic lens systems has risen from 11 states to approximately 29.

A legislative proposal is being submitted to the 1997 West Virginia Legislature which is intended to: expand formalized low vision driver education and training programs instate within the public as well as the private sector; facilitate the screening, training, and testing process for such applicants who wish to drive legally; and develop fair standards which will ensure that public safety issues are addressed and maintained.

WVRC is a public/residentially based vocational rehabilitation facility located in Institute, West Virginia. It is operated by the State of West Virginia's Division of Rehabilitation Services.

Those interested in more information can write or call: Charles P. Huss, Coordinator, Low Vision Driver Services, West Virginia Rehabilitation Center, P.O. Box 1004, Institute, West Virginia 25112-1004, telephone number 304-766-4803, FAX 304-766-4816. ●

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