

Knowledge of and Preferences for Long Cane Components: A Qualitative and Quantitative Study

Grace Ambrose-Zaken

Abstract: This article reviews the literature on the various components of long canes and reports on a study of the knowledge and preferences of 100 adults with visual impairments regarding the various components and types of canes. Results indicated that the terrain of a route, weather conditions, mobility demand, and purpose of an outing are important factors when choosing a cane.

Since the 1990s, there has been an expansion in the choice of long canes and their components (grips, tips, shafts, and coatings). People who are visually impaired (that is, are blind or have low vision) and the orientation and mobility (O&M) instructors who serve them have a greater selection than ever before in both the design of canes and the materials of which they are constructed. This larger variety means that it is possible to construct a cane that is matched to the preferences of a traveler who is visually impaired for a specific physical, travel, or environmental factor. To facilitate this capacity in persons who are visually impaired, certified O&M specialists must have accurate information on the components of canes that are available, their physical properties, and their performance under real-life conditions.

Farmer and Smith (1997) proposed that the most desirable characteristics of a cane are the ability to conduct tactile information, but not thermal or electrical energy; a good distribution of weight; and being lightweight, strong, durable, rigid, resilient, and highly visible in daylight and darkness. Although there is little indication in current research as to which canes exhibit the best of these traits, "travelers with visual impairments often express a strong preference" (Farmer & Smith, 1997,

p. 233) for specific features of canes. This article reviews research on the components of canes and reports on a study of the knowledge and preferences of 100 adults who are visually impaired with regard to the various components of canes.

Existing research on the components of long canes

The following brief overview provides the names, functions, variations, and research on modern cane components.

Tips

The cane tip is the point of contact with the ground. There are at least 10 types of tips to choose from, including plastic and nylon fixed tips (the ball, pencil, marshmallow, teardrop, and curved), metal glide tips, and moving tips (the ball, mushroom, marshmallow, and rubber wheel).

Fisk (1986) asked 16 adults for their preference after using three types of tips: metal glide, pencil, and marshmallow. The participants stated that marshmallow tips glided more easily over sidewalks than did nylon and metal tips. LaGrow, Kjeldstad, and Lewandowski (1988) found no significant difference among pencil, marshmallow, and curved tips in performance indicators, but the "subjects overwhelmingly preferred the curved tip" (p. 16).

Coatings

The visibility of a long cane functions to alert drivers and pedestrians to the presence of a cane user who is visually impaired. Choices in cane coatings include reflective epoxy paint; tape that glows in the dark; and other tape colors, including black. Franck (1990) found that 33 drivers were able to see the Reflexite AP 1000M Reflecting Tape from a distance that was nearly twice as far as the Scotchlite brand.

Length

Cane length is the measure from the top of the grip to the bottom of the

tip (end to end). Reaction distance is defined as the "amount of warning distance provided by the cane from the object in one's path; it is the amount of space or time available to react to the object" (Blasch, LaGrow, and De l'Aune, 1996, p. 297).

Uslan and Schriebman (1980) created a chart for prescribing the length of a cane according to the height of the arm and the length of the step. The cane lengths on this chart were never validated. In a Point/ Counterpoint debate (Altman & LaGrow, 1996), Altman explained that his cane technique--holding the cane in a relaxed hand by the hip--required a cane that was 8 inches longer than the cane that he used for the standard two-point touch technique, and LaGrow described eight factors that may also influence the choice of the length of a cane, including a student's height, pace, length of stride, hand position, posture, balance, stability, and level of experience in using canes.

Shaft

Cane shafts can be curved, folding, rigid, or telescopic. Folding canes have four to six sections, strung on one or two elastic cords, that fit together to form a straight cane or can be folded into a bundle.

Telescoping canes may have two to six sections that are fitted together like a radio antenna and can be extended or collapsed.

Shellingerhout, Bongers, van Grinsven, Smitsman, and van Galen (2001) studied 18 blind persons as they used their own canes and an experimental cane (a shaft formed at a 10-degree or 0-degree angle with the floor). They found that "obstacle detection was significantly better with the [experimental] curved cane, whereas drop-off detection and walking speed were comparable for the two canes" (p. 513). The participants' perceptions mirrored the results.

The most common cane shafts sold today are made out of aluminum tubing, carbon fiber or graphite tubing, and fiberglass (hollow or solid). Bickford (1993, p. 13) wrote this of his experiences with different shaft materials: "each one sounds different as it strikes the ground"; aluminum tubing was the heaviest, and solid fiberglass, carbon fiber, and hollow fiberglass were progressively lighter.

Grips

Cane grips are affixed to one end of the shaft for comfort and to aid hand control over the cane's movement. Considerations in the choice of grip include personal preference, durability, and control in wet conditions. Some options for grips include ethylene vinyl acetate (EVA) foam grips, heat-shrunk plastic grips, rubber or leather golf grips, and textured or orthopedic grips.

Brand

As the choice of brands of canes increases, brand names may become more important to consumers. Two studies were found that related to cane brands (Elliott, 1992). Four subjects scored the Americane, a telescoping cane, below average to poor on all indicators, and 11 subjects scored the Safe-T-Lite Cane, a cane with a strobe light that is mounted in the shaft to increase visibility, as poor (Elliott & Kuyk, 1992).

All the empirical studies that were just reviewed evaluated the participants' preferences. Although several studies were of familiar cane components and others tested new features, there was no substantive discussion of the effect of these components on conductivity, balance, weight, strength, durability, rigidity, resiliency, or visibility.

The purpose of the study presented here was to learn how employed adults who are visually impaired described their travel before, during, and after O&M instruction and how they currently traveled in familiar and unfamiliar areas. This study analyzed data from 98 lengthy interviews that were conducted between August 10, 1999, and August 15, 2001.

Method

Participants

The 98 participants who were visually impaired and employed included 41 men aged 19-84 (mean = 48.51, *SD* = 15.47) and 57 women aged 19-

83 (mean = 46.86, $SD = 14.13$). (A one-way analysis of variance found no significant difference between the men's and women's ages: $p = .585$.) Of the 98 participants, 18 were known to me, 6 had attended conferences, 51 were recommended by other participants, and 25 were located using online notices.

Ninety-five participants gave the exact age at which they were diagnosed with a visual impairment, 2 participants estimated their age at onset, and 1 participant's response was not recorded. The visual conditions of 68 participants were diagnosed from birth to 2 years, those of 3 were diagnosed when they were toddlers (ages 2-4), those of 10 were diagnosed when they were children (ages 5-10), those of 8 were diagnosed when they were young adults (ages 11-17), and those of 8 were diagnosed when they were adults (ages 18-54) (the age categories are from U.S. Bureau of the Census, 2004). Of the 95 participants who reported having 32 different etiologies, the majority had retinopathy of prematurity ($n = 17$), retinitis pigmentosa ($n = 14$), accident ($n = 9$), glaucoma ($n = 5$), optic nerve atrophy ($n = 3$), or retinoblastoma ($n = 3$).

Of the 97 participants who responded to the question on education, 14 had doctoral degrees, 36 had master's degrees, 20 had undergraduate degrees, 11 had completed adult learning after high school, 8 were enrolled in undergraduate programs, and 8 had completed no additional education after they graduated from high school. Fifty-five participants worked in the field of vision rehabilitation or rehabilitation education as rehabilitation teachers ($n = 15$), O&M instructors ($n = 9$), teachers of students who are visually impaired ($n = 7$), National Federation of the Blind (NFB) rehabilitation counselors ($n = 4$), NFB cane instructors ($n = 4$), administrators or counselors in agencies serving individuals who are visually impaired ($n = 13$), or were trained in the field of visual impairment but worked outside the field ($n = 3$). Forty-three participants were employed in or retired from jobs that were unrelated to this field.

The 98 participants who responded lived in 25 different states across all four regions of the United States: 5 in the West, 33 in the Midwest, 33 in the Northeast, and 27 in the South. Sixty-nine of the subjects were white, 22 were African American, 4 were Hispanic, and 3 were from the Middle East.

Ninety-three of 98 participants had received formal O&M instruction, and 5 had not. All 98 participants indicated they had owned and used a cane at one time in their lives. Of the 95 participants who responded to the questions on mobility tools, 55 used a cane, 25 used a dog guide, 7 used their vision, and 8 used a human guide as their primary mobility device.

Of the 96 participants who responded, 70 belonged to organizations that are specific to visual impairment--NFB ($n = 24$), American Council of the Blind (ACB; $n = 16$), Association for Education and Rehabilitation of the Blind and Visually Impaired (AER) ($n = 9$), the Blinded Veterans Association ($n = 1$), and the Council of Citizens with Low Vision ($n = 1$)--with 19 of the 70 belonging to multiple organizations: ACB and AER ($n = 10$); NFB and ACB ($n = 5$); AER and NFB ($n = 3$); and AER, ACB and NFB ($n = 1$). Six participants belonged to organizations that were not related to this field, and 20 did not belong to a membership organization.

Recorded interviews

The participants' approval was obtained prior to the start of the interviews, and all the interviews were audiotaped. Initially, 100 interviews were conducted; however 2 were inaudible and had to be discarded. Ninety-seven interviews were conducted by telephone, and 3 were conducted in person. Five paid transcribers transcribed 98 tapes. I reviewed all the transcriptions for their accuracy.

Forty-one interviews had no transcribers' omissions. Of the remaining 57 interviews, 51 had minor omissions, defined as "the context of subjects' statements was minimally affected"; in addition, six tapes had at least one major recording error, defined as "a portion of subject's content was either inaudible or not recorded." The Results section indicates how many of the results of the 98 participant interviews were included in the analyses.

Interview protocol

In qualitative research design, the human-as-instrument method is used in

the natural setting to collect data as unobtrusively as possible (Lincoln & Guba, 1985). During the one-to-one conversations, I attempted to record the participants' O&M experiences while maintaining empathic neutrality (Hoepfl, 1997). The interview with the first participant consisted of 28 questions and was 73 minutes long. Over the course of the first 10 interviews, questions and follow-up questions were added, changed, and deleted until the protocol was easily understood and included only open-ended questions that reliably instigated insightful responses. A final list of 42 questions and 16 follow-up questions was produced. (The list of interview questions is included as an [appendix](#) to the online edition of this article, which is available at <www.afb.org/jvib>.) Of the 42 questions, 12 were asked selectively (such as questions on childhood experiences of being blind). Although the final list of questions in the interview protocol was not finalized until the 10th interview, all of the questions about cane usage and mobility tools were included in the first draft of the interview and, therefore, were asked of each subject. This continuity allowed direct comparison of the 98 subjects on responses to these questions. The study was approved by the University Institutional Review Board.

Results

General versus specific statements about canes

Ninety-eight participants were asked questions, such as "How many different types of mobility tools have you tried?" "What travel tool do you use now?" "How many canes do you own?" "How do you decide which one to use?" "Where do you get your canes?" and "What brand of cane do you use?" I reviewed all the transcribed interviews using ATLAS.ti software for Qualitative Analysis Version Win 4.1, a software tool for managing qualitative data. As each interview was reviewed, codes were generated, such as for folding cane and convenience. Codes were grouped into themes and variations that aided in the development of key hypotheses (for example, folding canes are convenient). The results of these analyses are reported using both qualitative and quantitative measures.

Ninety-eight participants reported experience with 417 canes. The 417

canes were grouped, on the basis of the participants' descriptions, into four categories: (1) primary canes ($n = 75$), (2) spare canes ($n = 104$), (3) specialty canes ($n = 21$), and (4) canes that were owned but never used ($n = 217$). [Table 1](#) lists the novel statements that defined these four categories and their frequency across the participants.

Given the opportunity to describe their canes, only 2 participants gave the brand names and at least one specific technical attribute for each of the six components of canes (grip, shaft material, shaft design, coating, length, and tip). Only 16 participants gave an example of six of the seven possible cane categories (the six cane components plus the brand name).

In contrast, every participant used nontechnical terms or descriptive terms, such as *regular*, *mobility*, and *normal*, to describe their canes. Two mentioned owning one or more canes, but noted none of the seven specific attributes about the canes, and 19 mentioned only one specific component of their canes.

Mr. S

Of the two participants who gave detailed information about their canes, one, Mr. S, was a 62-year-old small-business owner who was born sighted and became totally blind when his retinas detached, the first eye at age 10 and the second eye at age 20. Mr. S indicated that he traveled alone both before and after he received O&M instruction and took mass transportation to get to and from work.

At the time of the interview, Mr. S owned 10 canes and indicated that he had used a variety of each type of cane component. At the time of the interview, his preferred cane was a 56-inch, folding, graphite California Cane with golf grip and marshmallow tip. Specifically, Mr. S preferred this California Cane because "O-rings in between the joints act like a shock absorber," the marshmallow tip "doesn't grab as much ... or catch as easily when you're tapping back and forth," the tape does not chip as easily and "still looks new," and the graphite is both flexible and durable. His preferred cane length was "from 54 to 58 inches long." The only exception was the grip; he stated: "The grip, ... hate it. The golf club handle, ... [I] don't really play golf, so I don't know." During the

interview, Mr. S explained why he had a variety of canes:

Question: You said that you have lots of canes. But do you choose different ones for different reasons when you're going out?

Answer: Yeah, when I used to work, I took a work one ... that's the one that got beat up to heaven.... I always try to keep one extra cane with me when I travel. If I go on vacation, no matter where I go, I always keep an extra one with me, just in case something happens--if it breaks or it gets left somewhere.... One time, I was in Carolina, and the cane broke. I took that one length off, which made it shorter, ... but that was better than no cane.

Mrs. N

The other participant who listed a specific attribute for all seven cane components was Mrs. N, a 48-year-old self-described "stay-at-home mom" who was job hunting at the time of the interview. Mrs. N reported that her vision was 20/400 and that she could see only hand motion owing to retinopathy of prematurity. In her previous job, she hired family members to drive her to and from work. Mrs. N was restricted to traveling in a group before she received O&M instruction at age 16. As she noted:

I had my original mobility training when I was 16 and again [when I was] in my 20s. I had two excellent instructors.... At 16, my instructor was right out of school, and he taught me everything that there was to know, which I promptly didn't use and stuck the cane in the closet for the next 10 years. I could get by without using [a cane] because I was traveling with other people and, you know, didn't really have the need. I didn't really feel the need until I was traveling alone. I wasn't really alone, my son was little, and I realized that I wasn't just responsible for me, I was responsible for him.

Mrs. N stated that "I [now] have probably the largest cane collection of anyone on earth." Her preferred cane brand is a 56-inch California Cane with a folding carbon-fiber shaft, standard nylon tip, and orthopedic golf grip. Among the reasons why she has so many canes in her collection is that she has canes of different colors. As she explained:

Question: How many canes do you own?

Answer: I probably have about three or four straight canes now and half a dozen folding ones.

Question: How do you decide which one to use?

Answer: I wear uniforms that require that you use black accessories like handbags and briefcases and things like that, ... so to be cute, I got a black cane so that I can be in uniform with my cane. I've got another one that has wood grain and another [that] is camouflage. At Christmastime, I wrap a red ribbon around my straight cane, so it looks like a candy cane.

Question: You use the black one for the uniform, but you don't use that every day?

Answer: No. I use a white California Cane every day. I have a white NFB telescoping cane. It has the advantage of being lighter, but I find that it's always folding up when I don't want it to. I think that the California Cane is probably my absolute favorite because it's lightweight and because when you extend it, it's as solid as a rock.

Ms. B

One participant who responded to questions about cane components, but did not mention any specific attributes, was a 72-year-old woman, Ms. B, a rehabilitation teacher who was born sighted and became visually impaired with an acuity of 20/200 at age 17 because of Best's disease. Ms. B continued to drive a car "short distances" into her 30s and then used mass transportation to travel to and from work. She owned one cane at the time of the interview, which she described as "just a regular cane." She used a telescope and support cane for most of her travel but carried a long cane for identification as a person who is visually impaired and obtaining assistance from sighted people. As she put it:

If I'm walking alone, I will carry my white cane when I go to the airport because I cannot read the monitors. I cannot see the sign when they say, "See the sign down there?" If I have my cane and I ask for directions, people are always helpful. If I don't have my cane and I ask for directions, I get something that I can't understand or else, "Just look at the sign, lady."

Mr. F

Mr. F, a 29-year-old man who works in information technology for a major corporation, also did not list any specific attributes when he was asked about his cane. He lost his vision from two separate accidents by age 11. Mr. F grew up in a rural area and received O&M instruction

shortly after he lost his vision and as an adult. A dog guide user, he was working from home at the time of the interview and had one cane. When Mr. F commuted to work, he would "catch rides with other people going to the office because there wasn't a bus or taxi between here and where I worked." He had this to say with regard to his cane:

Question: So, what kind of cane do you have?

Answer: It's an average white cane.

Question: What kind of tip?

Answer: I don't know. What are the choices?

Question: Marshmallow, glide, rain shine, pencil....

Answer: I don't know. I think it's a glide tip. It's not one of those big ones that I've seen on some people's canes.

Question: Is it metal?

Answer: I don't know if it's metal. Maybe like fiberglass.

Descriptions of the components of canes

The participants referred to the characteristics described by Farmer and Smith (1997) (*conductivity, balance, weight, strength, durability, rigidity, resiliency, and visibility*) when they described the types of cane components. "The new folding canes have gotten much more rigid," said a 69-year-old man with low vision from retinitis pigmentosa who owned six canes. [Table 2](#) lists the impact that the types of cane components have on seven of these characteristics, from the most to the least impact. For example, it indicates that a rigid fiberglass cane with a plastic grip and a metal tip is considered the most conductive cane that is currently available. Using a different grip in this combination of components would reduce the conductivity of the cane.

Brands of canes

Forty-eight participants mentioned seven brand names and five cane

retailers many times. The brands that they named were NFB ($n = 47$), Ambutech ($n = 26$), California Cane ($n = 20$), Ann Morris ($n = 4$), Hycore ($n = 5$), Mahler ($n = 5$), and White Cane Industries for the Blind ($n = 3$). The five retailers were Lighthouse for the Blind agencies in several states ($n = 14$), Maxi Aids ($n = 6$), Rainshine Umbrella Company ($n = 6$), respective state commissions for the blind ($n = 3$), and Lions Club organizations ($n = 4$). Three participants provided the names of cane retailers only when they were asked the brand of cane they used: Lions Club ($n = 2$) and Veterans Administration ($n = 1$). Twenty-five participants said that they did not know the brand of cane that they used or had used, and 22 stated that they owned mobility, normal, regular, or average white canes.

The comments about the choice of brands of canes suggest that the participants were more likely to know brand names if they had conversations about canes with O&M specialists, cane instructors, friends, relatives, or people they met at conferences or had bought canes themselves. The participants who were specific about brands were often able to give multiple and exact locations where canes could be purchased. There was no sense of absolute loyalty to brands overall; instead, the participants either tried different brands in search of specific characteristics (such as those that were lightweight or durable), bought canes from the same company because they were familiar with it, or could not remember the brand that they used. Here are some representative comments in response to questions about cane brands and where to purchase canes:

A 37-year-old man, who became blind at age 7 and who owned one cane, said, "I don't know [which brand I use]. I get whatever they have."

A 52-year-old congenitally blind man who owns three canes said, "I got it either from Maxi Aids or from Independent Living Aids. The one that I have from Anne Morris is my backup cane because I don't think it's well made. The carbon-fiber one came from a place called California Canes. So, I'm not particularly loyal to a given brand, I don't think."

A 45-year-old woman with low vision who owns two canes said, "I haven't the foggiest idea [which brand I like].... Isn't that terrible? I can't ever remember. The brand I had that folded up small, I got at the Dallas Lighthouse. I got two or three in a row and thought, 'This is the greatest thing ever,' and then I went

back to them and they said, 'No, we've never had a brand that folded up small.' So, I'm like, 'The heck you haven't.'"

A 57-year-old blind woman who owns eight canes said, "I bought an NFB cane because a friend at work was talking about this really lightweight cane. I bought one and went to Disney World. I was using the cane all day, and the lightness was wonderful. The noise drove me crazy because it [had a] little, metal, round, flat tip. The tick, tick, tick drove me crazy, and the dang thing would not stay telescoped."

Cane length

Thirty-six participants made 93 comments about cane lengths; 41 statements indicated a preference for longer canes; 11 were statements against using a longer cane; 26 statements indicated a preference for shorter canes; 5 statements indicated a desire for a different length of cane from the one they were currently using, either longer ($n = 3$) or shorter ($n = 2$); 6 instructors indicated the length of cane they recommended to their students, and 4 statements commented on the length (such as waist high, 38 inches) of canes that the participants had used in the 1970s.

Longer canes.

The statement "I like longer canes" was made 18 times; 10 participants mentioned canes between "50 to 56 inches long" and "2 inches longer than recommended," and 8 subjects mentioned canes "63 inches long" and "chin high." Twenty-two participants stated that they preferred longer canes when they "walked fast" or "took large strides" ($n = 9$), "had heavy-duty travel needs" ($n = 8$), or "wanted to relax their posture" ($n = 5$). Four participants who worked as O&M instructors used longer canes to "preview the immediate path" in front of their students when they were on an O&M lesson. Eleven participants mentioned that longer canes tended to "get caught between people's ankles" ($n = 5$), were "too much of a cane for indoor travel" ($n = 3$), and would "tell information too soon" ($n = 3$).

Shorter canes.

Twelve participants preferred shorter canes because they are "better for

walking in crowds and in buildings." Ten participants commented that when using a shorter cane, one had to "tighten up one's technique" ($n = 4$), "slow down" ($n = 2$), "expect a reduced warning time" ($n = 2$), and "lean forward" ($n = 2$).

Preferences for cane components

Analyses of the participants' characteristics (such as age, job, and affiliation) and the statements about cane usage and cane components did not indicate that certain types of people preferred certain cane components. Instead, the results indicated that the terrain of a route, weather conditions, mobility demand, and purpose of an outing more often determined the participants' choice of canes. The results further suggested that although some participants were more capable than were others of describing specific features of canes using precise terminology, almost all had an opinion on some aspect of the canes that they used.

Discussion

O&M might be defined as knowing where you are going and how you are going to get there. The results of this study suggest that another aspect of O&M is knowing the type of cane that one should use to get to one's destination. That is, consumers should own a range of canes, have knowledge of the variation among cane components, and be able to locate and buy new canes.

The participants' statements referred to almost all the most desirable characteristics listed by Farmer and Smith (1997). However, the limited number of descriptions of the components of the canes that were used regularly compared to the total number of canes that were mentioned may be a cause for concern. This lack of information about the components of canes may create difficulty for persons who want to replace their canes with the exact makes and models.

Experienced travelers stated that the following questions should guide the selection of a cane: How will I be getting to and from the destination? What is the terrain getting to and at the destination? What are the current and forecasted weather conditions? and What is the dress code of the

destination? Since certain combinations of components may work best under given conditions, travel may be safer and more satisfying when the appropriate cane is used for the trip. The results suggest that individuals who are visually impaired need to own a variety of canes, including a heavy-duty cane, an indoor cane, a spare cane, and a special-occasion cane.

With regard to heavy-duty travel (such as long-distance walking, walking on rough terrain, stressful travel, and travel in unfamiliar areas), the participants recommended a longer, rigid, aluminum or carbon-fiber or graphite cane with a marshmallow tip. A longer cane was defined as one that is anywhere from two to eight inches longer than chest height. Travelers who are confronted with adverse weather conditions may use ethylene vinyl acetate foam grips and solid tips.

For indoor travel, the participants noted that carbon-fiber or graphite and fiberglass shafts are lightweight but not as durable as other types of shafts. They limited their use of telescoping canes to light, indoor travel needs because these canes are prone to collapse unexpectedly. The participants preferred both telescoping and folding canes for their convenience in terms of storage at destinations, while riding in vehicles, and for use as spare canes. They recommended shorter canes that are made of aluminum or carbon fiber or graphite for walking in crowded areas and telescoping, carbon-fiber or graphite, or fiberglass canes with metal glide tips for dressy occasions.

The findings further support the importance of motivation, experience, and the need for knowledge and skills that are associated with one's mobility tool. The number of canes that persons who are visually impaired own may suggest something about these persons' ability to travel. The greater the variety of canes that one owns, the more experienced the traveler and the wider the types of environments in which one travels.

It is not uncommon to see an individual using a severely worn cane that has a missing or badly scarred tip, grip, or coating. This may be a sign that the traveler has limited knowledge of where and how to replace the cane. Worn-out canes may have serious safety implications for travelers

who are visually impaired, since such canes are at a greater risk of breaking en route and thus of providing compromised protection and sensory information. This study suggested that cane travelers should plan not for "if" but "when" their canes will break.

Conceivably, a concern about the longevity of a cane may, in itself, limit travel if a cane user is uncertain how he or she would replace this necessary tool. One goal for youths who are making the transition from high school to work or college and adults who are visually impaired may be to experience as many varieties of canes as are warranted by their individual needs.

Table 2 provides O&M specialists and cane users with a guide to mixing and matching individual cane components to create canes that have the desired amount of conductivity, balance, weight, strength, durability, rigidity, resiliency, and visibility. It indicates that rigid canes are more conductive, balanced, strong, durable, rigid, and resilient than are folding or telescopic canes; however, the participants overwhelmingly preferred to use folding canes for most travel needs, primarily because of their need to have a convenient travel aid that folds easily when they transfer into and out of vehicles. Directed instruction and experience are important avenues for cane users to gain the knowledge and skills that they need to understand the strengths and limits of different cane components, to be competent consumers of canes, and to be fluent in the terminology of canes, thus ensuring that they are familiar with the various types of canes that are available and are able to order canes that are matched to their travel preferences.

Limitations

One limitation of this study may be its sample, since many participants were professionals in the field of visual impairment, had a higher percentage of advanced degrees than does the population at large (either sighted or visually impaired) (American Foundation for the Blind, 2005; Stoops, 2004), and were politically active in consumer groups. Although these characteristics may also be seen as an advantage in a discussion of the components of canes, the participants were not representative of the entire population of cane users who are visually impaired, and thus the

generalizability of the findings may be limited.

References

Altman, J. T., & LaGrow, S. J. (1996). Point/counterpoint. *Journal of Visual Impairment & Blindness*, 90, 292-295.

American Foundation for the Blind. (2005). Blindness statistics [Online]. Available: <http://www.afb.org/section.asp?SectionID=15&DocumentID=1367>

Bickford, T. (1993). *Care and feeding of the long white cane: Instructions in cane travel for blind people*. Baltimore, MD: National Federation of the Blind.

Blasch, B. B., LaGrow, S. J., & De l'Aune, W. R. (1996). Three aspects of coverage provided by the long cane: Object, surface, and foot-placement preview. *Journal of Visual Impairment & Blindness*, 90, 295-301.

Elliott, J. L. (1992). Evaluation of the Americane: A telescoping long cane for the visually impaired. *RE:view*; 23(4), 190-193.

Elliott, J. L., & Kuyk, T. K. (1992). Evaluation of the Wayne Walsh Safe-T-Lite cane. *Journal of Visual Impairment & Blindness*, 86, 373-375.

Farmer, L. W., & Smith, D. L. (1997). Adaptive technology. In B. B. Blasch, W. R. Weiner, & R. L. Welsh (Eds.), *Foundations of orientation and mobility* (2nd ed., pp. 231-283). New York: AFB Press.

Fisk, S. (1986). Constant-contact technique with a modified tip: A new alternative for long-cane mobility. *Journal of Visual Impairment & Blindness*, 80, 999-1000.

Franck, L. (1990). Effect of a cane with microprism reflecting tape on the nighttime visibility of blind rural travelers. *Journal of Visual Impairment & Blindness*, 84, 8-10.

Hoepfl, M. C. (1997, Fall). Choosing qualitative research: A primer for technology education researchers. *Journal of Technology*, 9, 12-39.

LaGrow, S. J., Kjeldstad, A., & Lewandowski, E. (1988). The effects of cane-tip design on three aspects of nonvisual travel. *Journal of Visual Impairment & Blindness*, 82, 13-16.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. London: Sage.

Shellingerhout, R., Bongers, R.M., van Grinsven, R., Smitsman, A.W., & van Galen, G. P. (2001). Improving obstacle detection by redesign of walking canes for blind persons. *Ergonomics*, 44, 513-522.

Stoops, N. (2004). *Educational attainment in the United States, 2003: Current population reports* (Series P-20, No. 550) [Online]. Available: <http://www.census.gov/prod/2004pubs/p20-550.pdf>

Uslan, M. M., & Schriebman, K. (1980). Drop-off detection in the touch technique. *Journal of Visual Impairment & Blindness*, 74, 179-182.

U.S. Bureau of the Census, Population Division. (2004). *Population estimates by selected age categories*. Washington, DC: Author.

Grace Ambrose-Zaken, Ed.D., project coordinator, Department of Special Education, Hunter College, City University of New York, 909W, 695 Park Avenue, New York, NY 10021; e-mail: <[gambrose@ hunter.cuny.edu](mailto:gambrose@hunter.cuny.edu)>.

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