INTERDISCIPLINARY RESEARCH EDUCATION IN
COMMUNICATION AND SOCIAL INTERACTION AMONG
HEALTHY OLDER ADULTS

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An innovative gerontology education program was developed to advance research on
aging that is interdisciplinary and promotes the translation of knowledge from lab to
life. The program focuses on communication and social interaction in healthy aging.
It brings together faculty mentors, graduate students, and post-doctoral fellows
from six different postsecondary institutions in Canada. The program unifies basic
laboratory research in hearing, vision, and cognition with applied research in
audiology, biomedical engineering, optometry, psychology, speech-language pathol-
ogy, human factors, and social work. The design, implementation, and evaluation of
the first year of the program are described and future directions are suggested.

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In 2002, the Canadian Institutes of Health Research (CIHR) developed a new funding mechanism, the CIHR Strategic Training Program Grant\textsuperscript{1}. The funding mechanism was developed to achieve one of CIHR's core objectives “to provide leadership in building capacity within Canada's health research community through the training and development of researchers, and fostering the development and ongoing support of the scientific careers of women and men in health research” (CIHR, 2004). Specifically, the funding would enable the development of programs to train graduate students to conduct health research in an interdisciplinary and translational context. These new initiatives were expected to emphasize the importance of applying research results to achieve improvements in practices and technology related to health. The need to train the next generation of health researchers to bridge problems and solutions from lab to life is in keeping with the more general re-definition of health in a socio-environmental framework rather than the traditional biomedical physical model.

In 2002, one Strategic Training Program Grant was sponsored by the Institute of Aging, with additional support coming from the Institute of Gender and Health and Knowledge Translation. The theme of this first Canadian training program in aging was “Communication and Social Interaction in Healthy Aging”\textsuperscript{2}. In developing our proposal we argued that communication was an important aspect of healthy daily living for older adults and that there was a need for an interdisciplinary approach to research training on this topic.

\textsuperscript{1}Over six years, the total commitment from CIHR, Institutes and Partners will be approximately $85 million. Each project can be funded up to $300,000 per year for six years, for a total per project amount of about $1.8 million. The allocation of funds is dictated by CIHR such that the bulk of the money is provided to graduate students with other funds available for travel and educational activities (e.g., workshops, on-line learning).

\textsuperscript{2}Our training program is supported by a Strategic Research Training Grant from the Canadian Institutes of Health Research, Institute of Aging, Institute of Gender and Health, and Knowledge Translation. The following are the participating faculty mentors and post-secondary institutions: Patrick Bennett, Alison Sekuler, and Ellen Bouchard Ryan (joined in 2004), McMaster University; Meredyth Daneman, Hans Kunov, Kathy Pichora-Fuller, and Bruce Schneider, University of Toronto; Jocelyn Faubert and Jean-Pierre Gagné, Université de Montréal; Karen Li and Natalie Phillips (joined in 2003), Concordia University; Charles Scialfa, University of Calgary; Patricia Spadafora, Sheridan College Institute of Technology and Advanced Learning. Requests for information on the program can be directed to Kathy Pichora-Fuller or Bruce Schneider, Department of Psychology, University of Toronto at Mississauga, 3359 Mississauga Road North, Mississauga, Ontario L5L 1C6 Canada.
In almost every activity of daily living, older adults need to communicate with other members of the community. Communication is necessary in order to sustain health and well-being. Nevertheless, many older adults report that they often experience communication difficulties. Age-related declines in communication have many adverse effects on the person with the deficit, and also on his or her family members, caregivers, and significant others (see, e.g., Scherer & Frisina, 1998; Seniors Research Group, 1999). For example, both cross-sectional and longitudinal research indicates that older adults with unremediated vision and/or hearing loss experience significantly poorer quality of life and cognitive function, as well as significantly higher mortality, compared to those with remediated or normal sensory function, with the conclusion being that auditory and visual function play a role through their effects on both general health and social relationships (Appolonio, Carabellese, Frattola, & Trabucchi, 1996). Perceptual status is highly correlated with cognitive status (Baltes & Lindenberger, 1997; Lindenberger & Baltes, 1994; Uhlmann, Larson, Rees, Koepsell, & Duckert, 1989) and cognitive function, as measured by speed of processing, also has been found to be strongly correlated with mortality in a longitudinal study conducted in the Netherlands (Smits, Deeg, Kriegsman, & Schmand, 1999). In addition to the significance of communication to the everyday health of older adults, good communication between patient and clinician is essential to the success of almost every aspect of health care services delivery.

Many impairments contribute to communication problems in older adults, including hearing and vision impairments, speech and language impairments (e.g., disorders resulting from strokes or degenerative diseases), and cognitive impairments (e.g., dementia). Hearing loss is the most prevalent cause of communication problems in healthy older adults; by retirement age, about 25% of the population has a hearing loss; by 75 years of age, almost half are affected; and over 80% of those living in residential care are hard of hearing (e.g., Davis, 1995; Kricsos & Lesner, 1995). The prevalence of vision impairment also is high and increases dramatically with age, such that it is not only difficult for many older adults to read written communication but also to lipread spoken language (Erber, 2002; Erber & Osborn, 1994; Erber & Scherer, 1999; Karp, 1988). Auditory and visual status contribute substantially to the degree to which older adults engage in, and derive enjoyment from, those discretionary activities usually associated with a satisfactory life style (Marsiske, Klumb, & Baltes, 1997). Furthermore, physical and cognitive impairments reduce older adults’ abilities to produce and comprehend both written and spoken messages (Schneider & Pichora-Fuller, 2000). Importantly, many of these sources of communication problems co-occur and solutions require a better
understanding of how they interact (e.g., Kiessling et al., 2003). Loss of communication, due to one or more of these sources of difficulty, often results in isolation, with increased susceptibility to depression (Cacciatore et al., 1999; Mulrow, Tuley, & Agvila, 1992; Naramura et al., 1999). Clearly, the ability to communicate plays an important role in maintaining a healthy and satisfactory lifestyle (Hummert & Nussbaum, 2000). Because of the importance of maintaining good communication in an aging population, there is a pressing need in society to develop clinical and community services, assistive technologies, and environmental modifications to accommodate those who, for one reason or another, are unable to communicate effectively.

Meeting this need and developing and implementing effective interventions will require interdisciplinary research. Human communication systems are extremely complex. They are affected by an individual’s sensory, motor, cognitive, and social status, all of which change with age. Following the recently revised International Classification of Functioning, Disability and Health (World Health Organization; WHO, 2001), our approach will consider how the functioning of the individual is modulated by the social and physical contexts within which communication occur. In many instances, these contexts change rapidly as the individual ages and as society adopts technological change. For instance, innovations in information technology are beginning to alter the ways in which older adults gather information and communicate with family, friends, health care providers, and health researchers. The development of such communication technologies almost always ignores the special needs and possible activity limitations of older adults. We need to understand the impact of such technologies on communication in older adults, both to ensure that barriers to communication are not created and also to develop more effective ways of using such systems to improve communication (e.g., internet cafés for older adults). For example, research by our group might assess the degree to which these new modes of communication affect older adults’ sense of connection to family, friends, and the larger community, and how they influence lifestyle choices including health decision-making and action-taking.

GOALS

We set out five goals for the new training program in “Communication and Social Interaction in Healthy Aging.” First, we aimed to provide our trainees with excellent education in one of the core disciplines of hearing science, vision science, cognitive science, gerontology, human factors, or biomedical engineering. Second, we resolved to convince the
trainees of the advantages of an interdisciplinary approach to research. Third, we undertook to ensure that the trainees would acquire a working knowledge of the research techniques of other disciplines. Fourth, we wanted trainees to experience working in an interdisciplinary research team. Fifth, we put emphasis on the importance of engaging trainees in translating laboratory research to practical solutions for everyday problems encountered by older adults.

**DESIGN**

**Participants**

The program is administered at the University of Toronto at Mississauga (UTM) under the direction of Bruce Schneider. Other core faculty mentors in the Department of Psychology at UTM are Meredyth Daneman and Kathy Pichora-Fuller. There is one other core faculty mentor from the University of Toronto (Hans Kunov in the Faculty of Engineering) and there are eight core faculty mentors from five other Canadian post-secondary institutions (University of Calgary, McMaster University, Université de Montréal, Concordia University, and Sheridan College). Each year one or two additional faculty members will be invited to participate in one of the workshops and then to join the team of mentors. The mentors bring expertise in various aspects of aging and communication, including research on hearing, vision, cognition, biomedical engineering, and health disciplines including audiology, optometry, speech-language pathology, and social work.

Students apply to the program and are selected based on their interest in communication and social interaction in aging, their academic performance in their own discipline, demonstrated potential for developing a career in research on aging, evidence of interest in learning to use an interdisciplinary approach to research, and willingness to undertake training beyond the minimum requirements of their home program. Seven graduate students were accepted into the program in 2002; three more were accepted in 2003. We have also sponsored five post-doctoral fellows. The graduate students receive a stipend and all trainees are entitled to participate in the workshops and other educational activities. We expect to increase the number of trainees to 25 by the fourth year of the program.

**OVERVIEW OF PROGRAM STRUCTURE**

The program was designed to achieve the general goals of CIHR and our five specific goals. Rather than try to create a new stand-alone
curriculum, we decided to layer our program on top of the various existing disciplinary graduate programs in which our students already received training. Every trainee would complete the regular requirements of their home disciplinary program in their own university. In addition, they would participate with faculty and trainees from other post-secondary institutions to obtain more specialized hands-on and team experiences in interdisciplinary and translational approaches to research on communication and social interaction in aging. Thus, in the early stages of program development, we avoided the negotiations that we anticipated might be problematic had we attempted to formalize a new program to be taken by students at different institutions. By casting our program as enrichment rather than a substitute for conventional research training, we also largely avoided challenges related to the mismatch between interdisciplinary and translational research and traditional academic disciplinary culture.

The program is delivered in a number of components. The primary component is a series of four workshops on the topics of audition, vision, cognition, and social interaction. In the first year, the audition and vision workshops each ran for five days; they were held in Montreal in consecutive weeks. The cognition and social interaction workshops each ran for three days and were held in Toronto in a two-week period that also included a “Fundamentals Workshop.” The annual Fundamentals Workshop serves to provide the trainees with an overview of the program and allows for overarching topics to be introduced. In the first year, two such overarching topics were “The Brain,” and “Communicating Research to the Public.” Another annual component of the program is a “Research Symposium,” at which the trainees and faculty present the results of their research and interact with a distinguished guest researcher who is not a mentor. The Fundamentals Workshop, the four main workshops (audition, vision, cognition, social interaction), and the Research Symposium bring the trainees and faculty mentors together as a group for concentrated learning experiences. In addition to attending these events, each trainee is expected to spend a term working in a lab outside of their home discipline so that they have firsthand experience of research in another discipline and so that they are able to work on an interdisciplinary research project.

IMPLEMENTATION

Learning about Communication

Bearing in mind that a great deal of discipline-specific intellectual development occurs in the laboratories and departments to which
students have been formally admitted, that value-added “heart” of this training program is the workshops in several areas pertinent to the understanding and study of communication and social interaction in healthy older people. These workshops, which are concentrated learning experiences, bring all trainees together for periods of instruction lasting between one and two weeks. During this time, mentors and other experts in the relevant disciplines present material on the core topics of vision, audition, cognition, and social interaction. As might be expected by their extended duration, the workshops are quite detailed, involve both traditional lectures and problem-centered activities that allow students to interact while evaluating past research and consider how they might adapt their own studies to include a multi-disciplinary approach to the issues they are addressing.

Effective communication depends on efficient sensory and perceptual functioning. Thus, two workshops developed in our program deal with vision and audition, the senses that have been most thoroughly examined in experimental and applied aging research. These workshops provide foundational knowledge of sensory anatomy and physiology, age-related changes in the mechanisms subserving signal processing (e.g., reduced pupil size and clouding of the lens), common age-related pathologies like tinnitus and cataract, and some of the most important sensory functions that underlay communication such as acuity in vision and pitch discrimination in hearing. These workshops also introduce students to the psychophysical methods that provide the paradigms for research. Because clinical tests of visual and auditory function are often encountered in the literature and may be valuable additions to the trainees’ skill set, we also have workshop components devoted to the administration and interpretation of the most commonly used clinical assessment techniques. Finally, both workshops present material, including simulation activities, on the psychosocial consequences of age-related sensory decline. Table 1 provides a partial list of the topics covered.

While intact sensory systems are critical to communicating with others, there is a substantial cognitive component to effective communications as well. Whether the communicative vehicle is speech, the Internet, way-finding signage, or bodily movements and facial gestures, communication requires that attentional resources be allocated to the information stream, sometimes over long periods of time. Working memory, as well as long-term episodic and semantic memory, are necessary if one is to encode this often ambiguous and context-bound information accurately and develop appropriate responses to it. Because communication often occurs in multi-tasking situations
**TABLE 1** Partial List of Workshop Topics

<table>
<thead>
<tr>
<th>Auditory aging</th>
<th>Visual aging</th>
<th>Cognitive aging</th>
<th>Social interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy and physiology</td>
<td>Anatomy and physiology</td>
<td>Brain-behaviour relationships</td>
<td>Ageism</td>
</tr>
<tr>
<td>Acoustics and psychoacoustics</td>
<td>Optics and psychophysics</td>
<td>Research methods</td>
<td>Qualitative research approach</td>
</tr>
<tr>
<td>Pathologies</td>
<td>Pathologies</td>
<td>Pathologies</td>
<td>Aging and social interaction</td>
</tr>
<tr>
<td>Binaural hearing</td>
<td>Binocular vision/stereoscopy</td>
<td>Language comprehension</td>
<td>Psychosocial framework</td>
</tr>
<tr>
<td>Simulations</td>
<td>Colour vision</td>
<td>Cognitive speed</td>
<td>Participatory research</td>
</tr>
<tr>
<td>Soundscape</td>
<td>Contrast sensitivity</td>
<td>Verbal ability</td>
<td>Interview skills</td>
</tr>
<tr>
<td>Audiovisual speech</td>
<td>Visual fields</td>
<td>Attention</td>
<td>Focus group methodology</td>
</tr>
<tr>
<td>Music</td>
<td>Light adaptation</td>
<td>Working memory</td>
<td>The built environment</td>
</tr>
<tr>
<td>Room acoustics</td>
<td>Low vision</td>
<td>Testing global cognitive status</td>
<td>Wayfinding</td>
</tr>
<tr>
<td>Psychosocial impact</td>
<td>Psychosocial impact</td>
<td>Executive control</td>
<td>Individual and family systems</td>
</tr>
<tr>
<td>Hearing testing</td>
<td>Visual testing</td>
<td>Ethics</td>
<td>Caregiving experiences</td>
</tr>
<tr>
<td>Hearing aids</td>
<td>Lenses</td>
<td>Referral and incident reporting</td>
<td>Social policy issues</td>
</tr>
<tr>
<td>Assistive technology</td>
<td>Assistive technology</td>
<td>Cultural differences</td>
<td>Multicultural perspectives</td>
</tr>
</tbody>
</table>
where goals change over time, deficits in executive control and task-switching may render communication less accurate or more demanding. As such, an understanding of cognitive aging is essential to those studying communication in the elderly.

Another workshop developed under our training grant concerns cognitive assessment. Table 1 lists some of the topics covered in this three-day workshop. The workshop begins with a synopsis of what is known about age-related changes in learning, memory, attention and higher-order aspects of language processing. Included in this material is coverage of recent work from the neuro-imaging literature on brain-behavior relations in cognitive aging. The core of the workshop provides students with “hands-on” experiences with commonly used global and specific measures of cognitive function such as the Mini-Mental Status Exam (Folstein, Folstein & McHugh, 1975), the Vocabulary and Digit Symbol subtests of the Weschler Adult Intelligence Scale (WAIS-III) (Wechsler, 1997), the Stroop and visual search tasks as indices of attention (see Madden & Whiting, 2004), and the Wisconsin Card-Sorting Test (Heaton, 1981), a test of executive control. Finally, the workshop covers the important issues of ethics in research, referring participants who may need medical attention, and accommodating those from different cultures in our research.

Communication is, by definition, a social process that occurs within diverse relationships and environments. An understanding of the psychosocial components and barriers to communication in the elderly can add an important dimension to research by perceptual and cognitive gerontologists, but also holds the potential to create system-wide applications to foster communication in the elderly at a variety of levels. Our one-week workshop on social interaction was designed to introduce trainees, most of whom are “dyed-in-the-wool” empiricists, to this important facet of communication in healthy aging.

The week begins with foundational presentations on ageism, aging, and social interaction that derives from the psychosocial perspective (e.g., Gleberzon & Cutler, 2002; Schneider, Kropf, & Kisör, 2000; Schulz, & Salthouse, 1999). Then trainees are introduced to qualitative research methods (e.g., Creswell, 1998), including focus groups (e.g., Krueger, & Casey, 2000), and interviewing techniques (e.g., Kvale, 1996). Trainees have a chance to conduct focus groups and interview elder caregivers about the challenges they face. Because communication often occurs in built environments that can be either friendly or hostile to elders, the next component of the workshop deals with how environments such as care facilities and public spaces can be constructed to facilitate communication and social interaction. Discussion panels with older people are used to provide information on
the lived experiences of sensory loss, caregiving for Alzheimer’s patients and dealing with elder family members in a multi-cultural setting (Elliot, 1999; Killick, & Allan, 2001). Finally, information on social policy and international aging and health agendas is presented. In addition to materials drawn from textbooks and academic journals, trainees also are exposed to lay brochures and documents published by consumer and non-academic sources on the internet such as the WHO (2002) report “Active Aging: A Policy Framework,” the collected works of Alvarez (1999), or online tips on “Communicating with Impaired Elderly Persons” (1998). A list of contents for the workshop is shown in Table 1.

LEARNING TO COMMUNICATE

Trainees and mentors develop and maintain their careers studying the mechanisms and effects of good communication. To engage in and fund that work, we must communicate with those outside our discipline. This is true within the lab because failures at communication can cause research participants to misunderstand the tasks we present to them, become frustrated, or leave with a mistaken sense of what the study was about. Failures to communicate what we do will have a negative impact on careers because peers and grant review committees will not understand the meaning and importance of the work. Poor communication also works against an accurate public understanding of the research, which may have untoward consequences for policy and the future of science.

Several components of the program develop communications skills in trainees. At annual research meetings, trainees present the results of their studies in a setting modeled after major conferences. This is a forum in which they can overcome anxieties about public speaking, hone the delivery of material, learn to answer questions from the audience, and receive feedback on both the content and the presentation of their research.

At the 2004 research meeting, we added a one-day workshop on writing grants, the most important vehicle by which research aims and outcomes are communicated to funding agencies. The workshop required trainees to write an application for either a post-doctoral fellowship or a research grant that was then evaluated by trainee-mentor teams who used funding criteria of the relevant agencies. Mentors with experience on the review panels of major federal funding agencies then held a “mock” review panel in which several grants were evaluated. This allowed trainees to learn how their writing can affect a multi-disciplinary group of scientists who may have scant knowledge of the particulars in a grant.
Two other recent activities drove home the difficulty and importance of communicating effectively outside our discipline. In September, 2003, we asked Jay Ingram to develop a workshop on communicating to the public about science. He is the co-host and producer of Discovery Channel’s award-winning@discovery.ca, the first and only daily science and nature news magazine on television. A part of Ingram’s presentation consisted of reviewing case studies to highlight differences between effective and ineffective science broadcasting for the lay public. Another exercise focused on the nonverbal communication that can facilitate understanding by others when we talk about research. A third component required trainees to write a brief description of their research area. By highlighting the frequency with which these descriptions relied on discipline-specific terminology, trainees’ attention was drawn to the difficulty of moving easily between the highly technical and precise language of science as practiced to the more accessible level of description needed to communicate about our work to others.

One of the most enlightening exercises about “doing communication” came out of the focus groups with elder caregivers who were taking part in our Social Interaction workshop at the Sheridan Elder Research Centre. These men and women, many of whom were retired academics and professionals, were asked to describe their concepts of research in aging. In retrospect, it should not have been surprising that their views of research bore little direct resemblance to the research being conducted by most trainees. For some, their concept of research was rooted in their own experiences as the victims of telephone market research. For others, their concept of research was constrained to the practical; in pharmacological interventions for Alzheimer’s disease and in programs to alleviate the stress and burden resulting from caregiving. This is not to say that the basic research being carried out by many of the trainees is unimportant. It does, however, illustrate the chasm between the scientist’s and the layperson’s view of important science, underscore the value of working to educate the lay public about our work, and serve as a reminder that scientists who can move skillfully between basic and translational research will be more successful in garnering public support.

EVALUATION

Integral to the strategic research training initiative is the series of four topic-specific workshops designed to introduce trainees to areas other than their primary fields of study. Four topic-specific workshops were offered for the first time in 2003. These were (1) audition, (2)
vision, (3) social interaction, (4) cognitive aging. All participants in the workshops, including trainees as well as one or two faculty mentors, were invited by the workshop organizers to complete an anonymous written evaluation on site before leaving the workshops.

**Audition**

For the audition workshop, students were asked to complete a survey to assist facilitators' with workshop preparations as well as a post-workshop evaluation. Twelve participants (100%) completed the workshop evaluation. They evaluated the workshop by responding to six items on a five-point Likert-type scale. Table 2 provides a summary of participant ratings for each item. As can be seen, trainees were quite positive in their response to the experience. Comments to the open-ended question about “what aspects of the workshop I liked best” included an appreciation of the breadth of the material, the novel approach to the material, links to theory, and the incorporation of the views and experiences of clinicians. The lowest score was obtained to the appropriateness of the facilities at the School of Audiology which were under renovation at the time of the workshop. The highest score was given to the lab component of the workshop and some of the comments about what trainees liked best about the labs included learning how to administer and interpret pure-tone audiometry, training in calibration, and hands-on experience with the clinical equipment.

**Vision**

The same written evaluation questionnaire was used for the vision workshop. Fifteen participants (100%) completed evaluations. Table 2 provides a summary of participant ratings for each item. The overall rating was 4.3 on a five-point scale; most responses were 3 or higher. The lowest score pertained to the opportunity for participants to share their knowledge and expertise, probably because there was not enough time allocated to reflections on learning. The highest score pertained to the appropriateness of the facilities in the School of Optometry. Comments about what the trainees liked best included the clear focus on research applications, the laboratory components, the practical recommendations for optimizing vision during experiments, and the very comprehensive discussion of pathologies and basic visual functions. Twelve of the 15 respondents specifically referenced the value of the hands-on laboratory component of the workshop. Some respondents suggested that there could have been more time on basic facts
about the eye, optics, and physiology, with a clear definition of all terms assuming no background knowledge. Others suggested involving older adults in labs on testing, emphasizing aging to a greater extent.

### Social Interaction

The social interaction workshop was held at the Sheridan Elder Research Centre and was the only workshop that involved the participation of older adults. It provided an important opportunity for trainees to reflect on the connection between their research and the lived experiences of older adults. Although most of the trainees were familiar with laboratory research, they had relatively little prior experience with qualitative research. An entirely qualitative format was chosen to evaluate the outcome of this workshop. Eleven participants completed a feedback sheet that asked them to describe the components of the workshop that should be enhanced, reduced or remain the same in future offerings. Two other participants sent the workshop leader a narrative account of their experiences as their evaluation of the workshop. The trainees indicated that they would have liked more information about professionals working with older adults, more specific information on interview techniques, more print materials, theoretical frameworks for integrating social interaction, perception, and cognition, more on qualitative research methodology, including a demonstration of software, and a discussion of human factors. Aspects of the workshop they felt should remain the same included the session on qualitative methodology, the heavy practical aspect of the workshop, interview opportunities, the balance of lecture and interactive activities, and the brainstorming sessions regarding how to test quality of life and other psychosocial outcome measures.

### TABLE 2 Evaluation Results for Workshops (Ranges in Parenthesis)

<table>
<thead>
<tr>
<th>Item</th>
<th>Hearing</th>
<th>Vision</th>
<th>Cognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, the workshop was effective</td>
<td>4.33 (4–5)</td>
<td>4.13 (3–5)</td>
<td>4.4 (3–5)</td>
</tr>
<tr>
<td>The objectives of the workshop were met</td>
<td>4.58 (4–5)</td>
<td>4.43 (3–5)</td>
<td>4.4 (3–5)</td>
</tr>
<tr>
<td>The facility provided an appropriate setting</td>
<td>3.92 (3–5)</td>
<td>4.85 (4–5)</td>
<td>4.2 (2–5)</td>
</tr>
<tr>
<td>The lab experience was helpful</td>
<td>4.83 (4–5)</td>
<td>4.73 (3–5)</td>
<td>4.5 (4–5)</td>
</tr>
<tr>
<td>Participants had opportunity to share their knowledge and expertise</td>
<td>4.25 (3–5)</td>
<td>3.85 (2–5)</td>
<td>4.7 (3–5)</td>
</tr>
<tr>
<td>The workshop material and practical experience will be helpful in my research program</td>
<td>4.29 (4–5)</td>
<td>4.00 (3–5)</td>
<td>4.2 (2–5)</td>
</tr>
</tbody>
</table>
The only response to “what areas should there be less of” recommended reducing the activities concerning ageism sensitivity.

A number of comments were reported by trainees after the social interaction workshop that underscore the value of the interdisciplinary approach to training embraced by the faculty mentors. We include them here to illustrate the value of this framework for learning. One trainee wrote:

There is more to inquiry and research than numbers, statistics and cross-sectional studies. That is, so many of us focus on one area of the body, excluding the participant ‘human.’ What I mean is we assign code numbers and narrow classification schemes without addressing any one participant as a whole—why did Mr. #3124 perform so poorly in my experiment? Was my equipment not calibrated? What we (and I, until this point) failed to realize was the importance of the “why” question as it applied to Mr. #3124 as a “person” and not simply #3124. I learned that both quantitative and qualitative paradigms have times and places for their appropriate application and that, yes—a researcher can be versed in both dialogues and still maintain his/her credibility with steadfast members of both camps. So many of us operate on the assumption that research that does not involve numbers, or hard and fast exclusion criteria, is simply not worth conducting—after all, how informative can it be if it can’t be quantified . . . but, in actual fact, qualitative research can often provide data that other methods are sure to miss—if you ask the right questions—we should select based on inclusion criteria sometimes as well.

**Cognitive Aging**

Eleven participants (100%) completed the same written evaluation for the cognition workshop. Table 2 provides a summary of participant ratings for each item. The overall rating was 4.4 with most responses being 3 or higher on a five-point scale. Comments about what the trainees liked best included the balance of time spent on lecture and interaction, learning about a wide range of tests, discussing how and which assessment tools are appropriate to our studies, and the fact that “the workshop addressed real needs realistically.” The highest score pertained to the opportunity to share knowledge and expertise. The lowest scores pertained to the appropriateness of the facilities, a conference room at a local hotel, and the helpfulness of the material for the research programs of individual trainees. Some suggested that there be more material on neuropathology, more context for how each of the tests might be used in research, and better integration across workshops to avoid repetition and improve the potential for building knowledge.
DISCUSSION

Lessons Learned

Rich data emerged to shape and inform subsequent workshops. A number of lessons were learned from trainee feedback both on the evaluation questionnaires and through many conversations held with students as we worked our way through the inaugural workshops. We have identified the five most important lessons we learned. First, the most effective delivery method appears to be an interactive one with a blend of lecture and hands-on activities. Trainees consistently reported the valuable learning inherent in them. Second, there needs to be some “down time” between consecutive workshops in order to maximize the learning experience. In 2003, we scheduled the workshops in two-week blocks with little or no time between workshops. The schedule proved to be quite demanding in terms of both the length of time away from home and the rigour of the workshops. In response to feedback from the trainees, we have designed the 2004 schedule so that trainees will have a free day between workshops and a shorter overall schedule, with some workshops being offered in alternate years. Third, in addition to “down time” between workshops, there also needs to be “down time” within workshops. For many trainees, the workshops expose them to disciplines outside of their primary area of study. Because they are learning not only new material but also new ways of thinking, there seems to be wisdom in building in the opportunity to reflect on and integrate new learning. Fourth, some trainees (and faculty mentors) reported problems with a web-based application for pre-workshop readings. Some problems arose because there was inconsistency in how the workshop organizers used the tool to post material and communicate with trainees. A more concerted effort will be made to encourage both organizers and trainees to use these applications in a more uniform fashion and on a regular basis. We remain convinced that it is helpful to use web-based tools to archive and share instructional material and to enhance communication amongst participants in the program.

Future Directions

The original project proposal outlined our intent to create a web-based component to training. A virtual environment holds the potential to bridge the geographic and conceptual gaps among both trainees and mentors. Regular postings about interdisciplinary topics were intended to augment and complement the face-to-face workshops and annual research meetings. In addition, online learning was viewed as
one way to build on our emerging sense of identity as a community of learners.

Launching all components of our strategic training program proved to be too ambitious for the first year. It is the intention of the mentors, working with the trainees, to design and pilot the community of learners component in 2004. In doing so, we will draw on the extensive body of literature available about Computer Mediated Communication (CMC) to create a system that works for this initiative (Hathorn & Ingram, 2002; Herrmann, 1998; Nichani, 2002; Stepich & Ertmer, 2003; Trentin, 2001). There are a number of preliminary questions to be answered as we design this system: What are the anticipated learning outcomes? Is our goal to design a tool for teaching, information sharing, problem solving, and/or community/team building? Do we want our work to be cooperative, wherein work is divided and parts are delegated to different participants, or collaborative, in which all participants work together on the entire project? Should communication be asynchronous, synchronous, or both? Do we want to limit ourselves to the basic technology already available to all members of the group or invest in new technology? How do we want to “manage” the site?

Additionally, the project proposal calls for an emphasis on translational research that will be a thrust of future efforts in both training and research experience. On the training side, we are in the process of developing a human factors and biomedical engineering workshop to be offered first in 2005. It will be a four-day lecture and laboratory experience that covers such topics as anthropometry, medical human error, displays and controls, warning devices, and human-computer interaction. To provide trainees with direct experience in translational research, several applied projects have been initiated. These include one examination of localizing sounds in an automobile (i.e., the ambulance siren problem), icon comprehension in people with cognitive impairment, and the use of the Internet to facilitate the effective use of listening devices.

REFERENCES


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