Original research

Intergenerational telementoring for the promotion of social relationships

Marie-Madeleine Bernard MD, PhD

Mathias Fruhwirth PEng

PACE 2000 International Foundation, Ottawa, Canada
E: mmb@pace2000.org / mf@pace2000.org

Martin Brooks PhD

National Research Council Canada, Ottawa, Canada
E: brooks.martin@sympatico.ca

Kate Oakley PhD

Elisabeth Bruyère Research Institute, Ottawa, Canada
E: kathoakley@gmail.com

Xuemei Wang PhD

PLEORA Technologies, Ottawa, Canada
E: xuemeiwang@rogers.com

Karim Guillaume Ouechni BSc

Frederick Janson MBA

PACE 2000 International Foundation, Ottawa, Canada
E: kokarim@gmail.com / greengenes1999@hotmail.com

M-M. Bernard, M. Fruhwirth, M. Brooks, K. Oakley, X. Wang, K.G. Ouechni, F. Janson. Intergenerational telementoring for the promotion of social relationships. Gerontechnology 2011; 10(1):38-50; doi:10.4017/gt.2011.10.01.005.00 Videoconferencing via PCs and the Internet may provide a powerful medium through which seniors can interact with and develop relationships with youth. The PACE 2000 International Foundation has developed accessible, reliable and easy-to-use solutions that bring both senior and youth communities together for their mutual benefit. In this study, 18 older adults aged 70±7 years, provided second-language coaching to 18 young people (nine students and nine unemployed youth), via the videoconference based Intergenerational Telementoring Station® accessible to people having restrictions. Evaluation was based on the systems server logs capturing user log-in and log-out data, as well as entry and final questionnaire data from participants and supporting staff. The results of these two pilot studies indicate that videoconference based telementorship programs may successfully expand their recruitment beyond the conventional student-mentee and adult-mentors' populations. Older adults, including people with restrictions, exhibited higher motivation and compliance rates compared to unemployed youth. All participants (youth and seniors) highly valued the program (average rating over 80%), particularly its inter-cultural aspects as well as the relationships they developed. Eighty-six percent of youth reported that they benefitted from the second language immersion experience via videoconference. Positive behavioral shifts were observed after only 2 to 4 sessions, and these can provide a starting point for further research. We conclude that customized videoconference based telementoring provides a positive and motivational experience, which exceeds the scope of typical conventional mentoring programs (i.e. target populations enrollment, interaction types, geographic independence, etc).

Keywords: telementoring, seniors, youth, videoconferencing, chronic diseases

Current evidence[1] indicates that the quantity and quality of social relationships in industrialized societies are decreasing. For instance, trends reveal reduced intergenerational living scenarios, increased age-related restrictions, and increased single-residence households. In addition, over the last two decades, a three-fold increase has been observed in the number of Americans who report having no person in whom they can confide. These trends are of serious concern because recent research suggests that social relationships exert an independent influence on the risk for mortality, comparable to, or exceeding, well established mortality risk factors such as obesity and physical inactivity[2]. The link, however, between social relationships and mortality is much less understood than other risk factors and may require innovative programs and the implementation of new models for measuring the relationship between social relationships and the risk of mortality[2]. One such approach, suggested here, is to examine the types of interaction proffered via videoconferencing.

PC-based videoconferencing and the Internet offer powerful means by which seniors can interact and develop relationships with young people[3,4]. Since 1998, the PACE 2000 International Foundation has created customized and easy-to-use (especially for seniors) technologies that promote bonding between young people and seniors in their respective environments[5,6]. More recently, in 2004, a new videoconference Intergenerational Telementoring® application was launched for the purpose of 'tele-mentoring' or virtual mentoring youth (whether at socio-economic risk, in need of conventional mentoring, or of adapting to a new learning environment) by older adults and homebound seniors.

In the past few years on-line or 'e-mentoring', 'cyber-mentoring' programs have developed (for instance, email, instant messaging, or online discussion boards). Although these Internet-based mentoring programs may occur in asynchronous and/or synchronous formats, there is a scarcity of programs that can combine videoconferencing commu- nication between seniors and youth, while simultaneously also sharing, writing and discussing documents in an accessible way.

Currently many mentoring programs are used for academic and professional purposes[7,8]. According to a USA national poll of mentors and non-mentors[7], middle-aged adults (34-54 years old) and young adults (18-24 years old) mentor at the highest rates. However, older adults, especially senior citizens (65 and over) are the least likely to be mentors. Employment status is also significant. Retired and unemployed people are less likely to be mentors. The authors[7] state that the main factors that would encourage non-mentors to be a mentor are: to meet the mentee near home or work; to allow them to: "Get expert help when needed", "Select from a range of schedules", "Access a variety of information sources" and "Benefit from orientation and/or training and from employer's facilitated time to volunteer".

Further research on mentoring programs[3] indicates that the success of these programs is dependent on a wide range of conditions and processes which are important to elucidate in order to accurately gauge the potential benefits of mentoring in social and health services[7,9-11]. These include but are not limited to (i) attributes that the mentor and youth each bring into the relationship, such as the mentor's skills and confidence and the youth's relationship history and current level of functioning; (ii) characteristics of the relationship, such as the frequency and pattern of their contact, the relationship's duration, the types of activities and discussions in which they engage, the degree to which the mentor serves as a role model and advocate for the youth, and the extent to which mentor and youth form an emotional bond with feelings of trust, empathy and positive regard; and (iii) contextual factors, such as the characteristics of the program and settings in which mentoring takes place, linkages to other important relationships and networks, as well as the value of and types of resources used to provide mentoring.

Additionally, the program's design and implementation are critical factors in the success of a mentoring program. From a design standpoint, studies of mentoring relationships have been predominantly cross-sectional[3]. Thus, they have not been well suited to addressing patterns of development and change in relationships over time. The quality of a program's implementation, however, needs to be assessed by careful measures of intervention exposure such as dose, duration, specificity and intensity of a given intervention[12], as well as program adherence (i.e., the extent to which a program occurs as planned). Nonetheless, attention to intervention exposure and adherence has been frequently neglected[12]. Other limitations of the design and implementation of a mentoring program identified by Dubois et al.[9] include the following: (i) Proposed psychometric tools often lack validation (i.e., their properties and appropriateness for use with different populations and types of mentoring are not well established); (ii) the perspectives of both mentors and youth on the relationship are often missing; (iii) alternatives to questionnaire-based methods for assessing mentoring relations, such as direct observation, have received little attention; and (iv) cost-benefit analyses, including potential cost offsets associated with reduced use of social, health, and criminal justice services by mentored youth as well as mentors, have not been attempted.

Previous PACE 2000 studies have yielded an unexpected long-term adherence by older adults (usually computer-illiterate and community dwelling) to intergenerational videoconferencing communication (VC) in group sessions involving cross-cultural VC-communications with newly landed immigrants[13]. Other evaluations included in-home tele-physiotherapy programs in the long term or after hospital discharge from orthopedic surgery[6,14,15]. The aims of the present study were to evaluate the quantity and quality of relationships that occur between seniors and young participants in the context of an Intergenerational Telementoring Program®.

MATERIAL AND METHODS
Participants

The program was offered as a support tool for the practice of a second language, 'to give the taste' of French or English, to two groups: (i) nine students, who wished to improve their second language skills in the Ottawa-Carleton region, Canada (Group A); and (ii) nine unemployed youth in the town of Bobigny, a suburb of Paris, France (Group B).

Telementors were encouraged to help the transfer of employment values, such as reliability, commitment, body and verbal expression, etiquette, punctuality, etc. to learners of Group B who were seeking employment skills. The telementors' objectives were to establish a relationship and help youth, notwithstanding any physical limitations and/or chronic diseases they might have which can contribute to social isolation. For example, one telementor had rheumatoid arthritis and used a wheelchair, and one had diabetes with renal impairment. Hiding the wheelchair and the arthritic hands from the camera was an easy task; our staff could have missed out identifying possible situational disadvantages to the diabetic telementor, since the patient had not expressed the request. The telementor's concern in fact was to avoid any reminder of his 'home-hospital' condition and to position the customized VC station in a 'friendly' location where neither nurse nor medical equipment may inadvertently show up on screen, etc. Thus, the specific goals of the project were academic mentoring (Group A), and career mentoring and personal development (Group B). Evaluations consisted of a common core of data related to intervention exposure and adherence, whereas the set of questions were specific to each group: group A (assessment of tools and activities used for academic learning), or group B (observations of behavioral changes).

Both groups of young participants were paired with seniors living at home or in a long-term care residence in Ottawa, Canada. Four students of group A and three telementors of group B had a previous experience in the PACE 2000 'Intergenerational Virtual

Village' (IVV). The IVV promotes social relationships between seniors and youth via accessible videoconferencing technologies, in station-to-station and group sessions, facilitated by intergenerational coordinators[5,13].

Hardware and Software
Personal computers were equipped with a webcam, ear-phones/speakers and high speed access to the Internet.

The Intergenerational Telementoring Station for People with Restrictions® features a simple, secure and user-friendly personal computer (PC) based system, which offers simultaneous '4D' communication (non-verbal 'body language' and verbal communication, as well as writing and reading on shared documents). The station combines customized videoconferencing along with simplified means for simultaneous sharing of computer based activities. This software program is the result of seven years of research and development of PACE 2000's IVV[5,13]. The IVV represents a virtual community consisting of programmed activities between youth and seniors, mediated by customized communication technologies. This telementoring program is a one-on-one application, designed to be accessible to individuals exhibiting motor or sensory difficulties. The software application features simplified interfaces, ergonomically adapted to visual, auditory and motor restrictions without the need for intervention by a technician.

This accessible and user-friendly '4D' videoconferencing station presents both participants viewed in face-to-face images, with the simultaneous sharing of information, documents and websites, as well as writing. The shared content is displayed in windows, which are refreshed symmetrically (identical at both stations) in size and layout and in real-time, whether the youth or the senior handles the commands. These processes offer the advantages over a synchronous meeting where partners cannot literally 'face' each other (nor themselves) while reviewing documents, in that youth and senior view each other face-to-face, 'on equal footing', while

still exploring content, dictating or writing. Indeed, the available non-verbal communication plays an important role in the relationship, helping the mentor in understanding how much information is being received and understood by the youth. Also, the risk of stigmatization associated with a restriction is minimal compared to face-to-face encounters because the senior is in control of what he wants to display via the camera prior to connecting with the student.

The mentee can explore unit websites or on-line documents that appear simultaneously in the identical frame and shape as on the 'telementor's' screen. Simultaneous viewing provides a feeling of mutual contribution (compared to a one-way learning process) and a sense of being treated 'on equal grounds'; this feeling is particularly beneficial to youth at risk and homebound seniors. It is also possible for the young person to write text on his or her PC which the telementor can remotely revise and modify instantaneously, orally or in writing.

Any shared computer application available on the PC station is accessible to both participants in an identical and synchronized way. That is to say, the partners experience an interaction, which is the same as when they are sitting side-by-side in front of a single screen (*Figure 1*). One user can implement an action such as web-surfing or document sharing, on his/her own PC and share it instantly with

Figure 1. PC screen capture of the PACE-2-Face™ application showing a student and her telementor, side by side; sharing can be initiated by selecting the 'Click to share' button (bottom right)

his remote partner, as the result of the action appears in an identical format and layout on his remote monitor. Furthermore in the case where one user has a restriction, the disabled person can communicate orally (or even by means of gestures) to the partner, his/her desired actions including an adjustment of functionalities on his PC such as microphone/speaker adjustments. The able-bodied user can implement (with partner's consent) the actions remotely on the disabled partner's PC.

Procedures

The interactive telementoring sessions are available in (i) private residences, (ii) schools and universities, (iii) retirement homes and long term care centers, and (iv) recreational centers with PC working stations.

Preparing for the evaluation of the program, a 'co-design' procedure was established with all stakeholders. For example, key informant meetings were held with employment counselors and administrators of the youth employment centre, recreologists and managers of the retirement home and the seniors' club, as well as interviews with prospective volunteer mentors and potential youth candidates. The descriptions of their routine activities informed and refined the design of the proposed intervention strategy, and contributed to finalizing the procedures set for the evaluation of the program.

As part of the intervention the following strategies were implemented: access to an on-line interactive scheduler tool, telephone reminders to seniors, SMS message reminders to youth, an on-line selection of links to recommended websites, and users' guides (which included themes and suggested content for seniors and youth).

The enrollment procedure first consisted of presentation sessions to prospective candidates (youth and seniors), followed by screening, initiation and orientation, matching into intergenerational pairs, coaching seniors for their first session (and second session if needed), as well as supervision and completion of the evaluation forms.

Recruitment of seniors

The senior participants were recruited in the Ottawa-Carleton area (i.e., a seniors' residence on Walkley Road, the francophone Richelieu Club, the Centre Pauline Charron (a seniors club), as well as residents of a long term care centre). Three of the individuals had previously participated in the activities of intergenerational videoconferencing group sessions of the PACE 2000 IVV[5,13]. Interested participants would enroll at the end of an introductory presentation.

Eighteen senior volunteer candidates who previously used the PACE-2-Face™ software application were recruited as telementors. Two additional participants dropped out prior to the first or the second scheduled session. Senior telementors had an average age of 70±7 years (59 to 82 years), which is considerably older than the usual recruitment age of conventional mentors aged 35-55 years. As expected with increased age, the majority of telementors (67%) suffer from one or more chronic diseases. Except for one candidate, all were computer illiterate. All exhibited some bilingual skills (French/English), and were natives of the other language.

Recruitment of youth

Group A consisted of nine secondary school or university students from the Ottawa-Carleton region, aged 14-23 years, eager to practice their second official language (Canada's official languages are English and French) via telecommunication technologies. Students applied through the organization 'Volunteer Ottawa' and through the PACE 2000 IVV. Priority was given to the PACE 2000 intergenerational coordinators of group videoconference sessions. The participants were students at one of two secondary schools (Sir Robert Borden High School and Hillcrest High School), or final year students at either Carleton University or the University of Ottawa who completed the telementoring program.

Group B consisted of nine unemployed youth aged from 18-25 years, from underprivileged social strata in the town of Bobigny, France, who completed the program.

16 potential mentees had been invited by the employment and orientation centre of La Mire in Bobigny. Notably, convincing underprivileged youth of the potential returns of the telementoring program, as well as inviting them to commit to regular visits to the center where the equipment was available, was often a difficult task, and required considerably more time and effort by staff than recruitment of mentees in Group A. The program consisted of 'giving the taste' of the English language and culture, and of practicing basic English conversation suited for potential jobs at the International Airport of Paris-Charles de Gaulle. The unemployed youth were paired with a Canadian telementor. These telementors were also encouraged to help with the transfer of 'employment values' to the unemployed youth seeking jobs.

Protocol description

Following the development phase, ten weekly, one hour, telementoring sessions were offered to the participants. They were given an introductory telementoring session immediately following equipment and application installation in the home of telementors, and at the community based career-training facility 'Centre La Mire' in Bobigny. Senior volunteer telementors received free equipment and application installation in their residence for the duration of the program. The Ottawa-Carleton area students were already equipped with a PC and high speed Internet access in their homes, whereas the young job-seekers in Bobigny had to visit 'Centre La Mire' where the telementoring station was located.

Evaluations consisted of pre- and post-program questionnaires specific to seniors, students or unemployed youth, completed by the participants, of post-session questionnaires, and/or direct observation data recorded by the respective intergenerational coordinators after each session.

Additional data generated by a hosting computer server, including an evaluation of the intervention exposure (i.e., session dates and duration), was inherent to the telementoring program. That is, the host server would record a list of contact logs, specifying the connection time on, off, its duration and the partners involved. This type of data contrasts the type of evaluations obtained in conventional mentoring programs where such data are difficult to gather. Program adherence was also recorded on an interactive on-line scheduler, which listed sessions cancelled or confirmed. Information on the type of activities performed was captured after each session and final questionnaires. Initial and final questionnaires were initially completed on paper and subsequently transferred to an on-line form.

The initial questionnaire served two objectives: (i) To facilitate inter-generational pairing by collecting basic demographic data on background education, preferred leisure activities, existing language skills and computer literacy;
(ii) To provide source data on pre-existing social relationships, by focusing on prior inter-generational exposure, including structural questions such as living arrangements (for instance, live alone, live with…), or functional questions (for instance, have a confidant?, frequency/ type/ perception of contacts with youth or seniors). In order to achieve sufficient sampling size, data will be pooled with a larger data sampling from IVV participants.

The final questionnaire addressed three categories of results: (i) exposure to the intervention and activities, (ii) relationship and bonding, and (iii) technologies.

In the category of relationship and bonding, the appreciation of behavior changes was considered to be important, particularly in unemployed youth (Group B). As no validated psychometric tool was available for the assessment of mentoring relationships over time[9], methods used to assess potential behavior changes were: (i) in groups A and B: direct observations of the mentee's various behavior changes to be reported by the telementors to their intergenerational coordinator at the end of each session, and in their final questionnaires, addressing open and closed questions, and (ii) for Group B only: direct

observation and recording by the counselor or a support staff at the employment centre before and after each on-site telementoring session. Also, in Ottawa, a telementors' reunion with PACE 2000 staff and intergenerational coordinators was organized at the end of the program, which provided an opportunity to receive feedback, as well as sharing their experience with their peers.

Statistical Analysis

The t-test and X^2 analyses were performed at a confidence limit of p<0.05.

RESULTS

Exposure and adherence

For Group A, the number and duration of the telementoring intervention sessions were first documented manually by staff. Then, logsheets were generated automatically by the host-server for Group B. Adherence of the intervention sessions was calculated to be the difference between the number of sessions planned and the number of sessions completed. Originally, the format for the planned sessions was ten weekly sessions lasting for one hour each. Although arbitrary, this duration was deemed reasonable and acceptable by both students and telementors. For Group B each new session was scheduled at the end of the completed one, whereas Group A participants had agreed on a preferential day in the week. Group A and Group B differed in the mean duration of the sessions (t=3.993; p=0.01). The intergenerational pairs in Group A completed between 5-9 sessions, each lasting for 65±24min, of which 10 sessions (17%) lasted for two hours. In contrast, the intergenerational pairs in Group B completed only 2-5 sessions, each lasting for 48±14min with the exception of one learner who completed 10 sessions lasting for one hour.

The number of sessions completed by Group A and Group B also differed (Chi-square=7.23, p<0.01). Of a total of 180 sessions planned somewhat arbitrarily for an evaluation period of ten weeks (90 sessions for each group), only 98 sessions (54%) were completed overall. Intergenerational pairs in Group A completed 59 of the 90 sessions
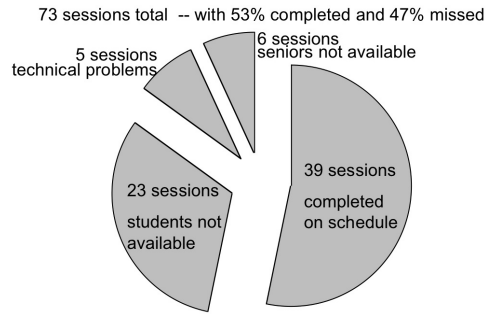

Figure 2. Senior telementors' and unemployed youth' sessions compliance

(66%), whereas the pairs in Group B completed 39 of 90 planned sessions (43%).

When comparing commitment to the scheduled number of sessions (*Figure 2*), the senior telementors were more compliant than the unemployed youth (X^2=6.41, p<0.025), despite the fact that the majority of participating seniors had one or more chronic diseases. It should also be noted that out of 29 telementoring appointment cancellations, the majority (23 sessions, or 79%) were due to lack of availability of the youth. The remaining 6 (21%) were related to telementors' issues.

Overall, the students (Group A) allocated more time and commitment to the program compared to the unemployed youth (Group B). These differences would appear to suggest differences in the motivation to participate and the degree of awareness of the potential benefits of the program; however, it should be noted that the unemployed youth had to travel to the employment center to attend their telementoring sessions, whereas the Ottawa students and telementors had enjoyed the convenience of using their home station.

Activities in sessions

The predominant activity for both groups (A and B), was verbal and body-language conversation, occupying a minimum of 40% of the time spent during the telementoring sessions for Group A, and a minimum of 60% of the time for Group B. Although the content of the conversation remained confidential as a ground rule, students of Group A carefully completed questionnaires at the end of each session, thereby describing their main

shared activities (*Figure 3*). Conversations, being the most common activity, could consist of 'interacting' with the experienced senior who could explain things in the work-a-day world such as working for extended periods of time and surviving in the real world. The conversations also consisted of storytelling from the telementors' own life experience, in their mother tongue. A student related that: "I particularly enjoyed listening to stories about his life. It turns out he knew Tom Cruise before he was famous…" The students would also discuss their homework from their French class. Another reported: "I enjoyed everything: just interacting and looking at cool websites together".

Conversation in the language of immersion (French) was predominant in Group A, occupying 40-70% of the time spent in telementoring sessions. It was followed by navigation of the Internet (30% in average) to explore selected, mutually recommended or new websites. Computer based applications, which were part of the recommended content, ranked third and occupied less than 20% of the time. It should be noted, however, that application use seemed to increase with time. Lastly it is noted that participation in other activities was marginal (*Figure 3*).

As the mentees of Group B were francophone discovering the English language, the conversation was mostly in French with exercises on English vocabulary and pronunciation, as well as simulations of activities to be performed in specific jobs at the International de Gaulle airport. These activities were supported by a customized guide and links to recommended websites for the specific program. The mentees from Group

Figure 3. Activities as a function of session number for Group A

B were matched exclusively with bilingual Canadians, after an unsuccessful experience with a unilingual anglophone telementor. The types of activities of the unemployed youth were reported to the staff in Bobigny and to the intergenerational coordinator in Ottawa, who shared an on-line chart.

Global appreciation

There is no difference in the global ratings of global appreciation of the telementoring program by the telementors between groups A and B. Mean ratings by the senior telementors in Group A were high at 8.2±1.3, on a scale of 0-10. Mean ratings of global appreciation by senior participants in Group B were even higher at 9.1±1.1 (*Figure 4*). Surprisingly, telementors in Group B were not discouraged by the absentee rate of their unemployed youth, or 'protégé', and highly valued their interaction with them. This observation is consistent with the prime motivations reported by the majority of mentors (i.e., to help young people succeed, to make a difference in someone's life, and willingness to work with youth in unique or difficult situations)[7].

There is no difference in appreciation of the program by youth between groups A and B. Mean ratings of global appreciation by the students were 9.1±1.5, whereas mean ratings of global appreciation by the unemployed youth were slightly lower, with a mean of 8.1±1.9 (*Figure 4*). An outlier datum in Group B provided the lowest score (4/10) which impacted on the average ratings: the mentee had expressed the desire to continue beyond her ten planned telementoring sessions, which extension could not be provided.

One might expect that students would appreciate the telementoring program more than the unemployed youth, since education may be expected to render students more aware of the potential long-term benefits of the program. However, according to this limited sampling, the appreciation rating was similar in both groups, despite the fact that unemployed youth were at a disadvantage since they had no home station and had to travel to use the station at the employment centre.
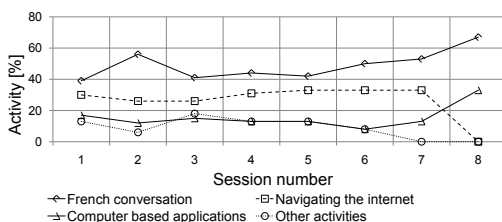
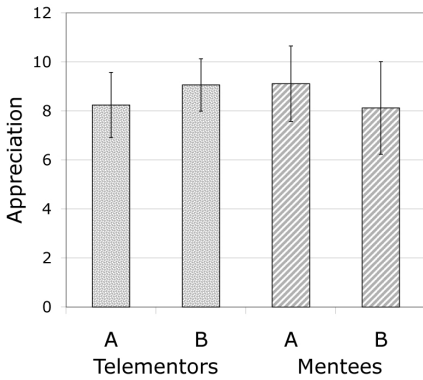Figure 4. Mean ratings of global appreciation by telementors (Group A and B), and mentees (Group A and B)

The number of comments retrieved from open-ended questions highlights the quality of the intergenerational relationship that developed, presenting with some features of a confidant:

Comments from youth include statements such as: "I particularly liked the fact that we could talk like friends"; "I had a chance to meet a great man who has taught me to live life to the fullest and always follow my dreams"; "I made a friend in less than eight hours"; "It brought joy to my life and to that of my partner"; "I enjoyed communicating with PT. very much; he was a very inspiring person and… we had a lot of fun". "My partner is a wonderful man and has a big heart. I hope… to shake the hand of the guy who made me smile and laugh throughout the summer". "I looked forward to talking to my partner everyday and I will miss him greatly".

The majority of participants (64% of telementors and 63% of youth) stated that they would like to continue to participate in the program.

Intergenerational relationship
As no validated psychometric tool existed to assess the quality of intergenerational relationships and their derived benefits, several questions pertaining to the level of enjoyment of the experience as well as possible bonding with their respective partner were included.

In response to the question: "How much did you enjoy the time spent with your partner (youth/ senior)?", both groups of participants responded with the same intensity using a scale of 0 to 10: 8.7±1.1 for seniors, and 8.8±1.4 for youth.

The telementors as well, describe their relationship as an opportunity, "for enjoying both, teaching and learning", for carrying "very frank discussions on all subjects", and expressed their appreciations such as: "Altogether it was a most enjoyable and enlightening experience for which I am grateful"; "I always enjoy speaking with young people and I hope my corrections of their errors were done in a gentle manner"; "For me the most enjoyable was to see tangible results from my mentee, session after session"; "I made constant discoveries thanks to my relationship with my mentee".
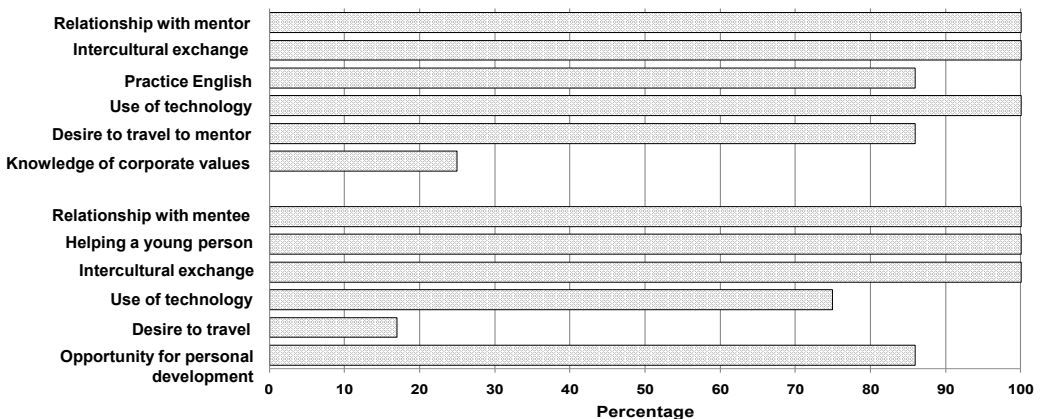

Figure 5. Benefits (total of 'Yes' answers) reported by unemployed youth (top) and mentors (bottom)

To a yes/no question, 100% of participating youth and seniors responded that they appreciated the relationship with their partner (*Figure 5*), notwithstanding age differences and possible health issues or restrictions of the seniors (restrictions did not appear on the camera). These comments support the view that our program prevents the stigmatization of older people and may act as an 'ice breaker'. Indeed, beyond the stated objective of helping a young person made by all the telementors, 88% of telementors also reported that the program served as an agent for their own personal development.

In addition, it is noteworthy that the majority (86%) of young participants from Bobigny expressed a desire to travel to meet their telementor, compared to only 17% of the seniors. This finding, however, is not surprising as many of the seniors experienced some form of restricted mobility. Nonetheless, the youths' desire to meet with their telementor at the end of the program support our policy of the past ten years, which has been to introduce an intergenerational pair at first only through the videoconferencing programs of the IVV prior to meeting face-to-face.

Benefits and changes

Behavior changes were observed in the following areas: self-confidence, self-expression and body comportment, enjoyment and confidence in carrying out a conversation in English, and self-efficacy in overcoming barriers to pronunciation and communication.

Notwithstanding the unemployed youths' lower adherence rate to the program compared to students', changes in the unemployed youth's behavior were noticed by their telementor (67%), as well as support staff at the Bobigny employment center (33%), often after as few as two to four telementoring sessions. In response to the question: "In your opinion, what has changed for your mentee after his/her completion of the telementoring program?", telementors in Group B stated: a shift in attitude or behaviour (67% of respondents), an increased confidence in English conversation (86%),

improved communication skills (83%), and improved self-confidence (60%). These questions were targeting the specific needs of a young population experiencing difficult living conditions and poorly equipped for job acquisition.

Examples of reported behavioral shifts by staff included increased confidence and ability in both nonverbal and verbal expressions of the young persons, a change in the facial expression during conversations in English, a proactive attitude in learning new words, a sudden courage to completely engage in a conversation in English, or to change career. It is to be noted that these behavior changes observed in the unemployed youth were not observed in the student group as they had started from the beginning with an appropriate learning behavior, i.e. a proactive and trusting attitude.

During the post-program evaluation, 90% of the telementors also endorsed the question "These days I feel more connected with youth". Seniors' positive and elaborate descriptions of the results achieved by their mentees are also an indication of successful behavior changes in the telementors themselves. Some of the telementors and mentees in Ottawa spontaneously stated that they liked getting to know someone else without having to meet with the person. This is consistent with our experience since 1998 that videoconferencing is an 'ice-breaker' in the building of new relationships. More research is needed to assess this ice-breaker effect, which may become a valuable tool particularly when participants face the fear of stigmatization.

All participants in both groups A and B indicated that they enjoyed the inter-cultural aspects of the program (*Figure 4*). Youth from Group A and B also reported benefiting from the practice of the second language (86%), although a one-trial program can only stimulate the drive in learning a new language and perhaps an appropriate speaking style, whereas conversational fluency may take years.

In addition to the primary goal of providing an opportunity to practice a second language, and 'to give the taste' of a French or English immersion experience, telementors were advised to provide young job-seekers of Bobigny with the chance to acquire employment values, such as mutual respect, reliability, commitment to schedules, engagement, etc. The mentees were not conscious of this goal as only 25% of them reported 'acquiring knowledge on corporate values' (*Figure 5*). Indeed, the question pertaining to 'corporate values' was not made explicit.

A particularly noteworthy behavior change was reflected by one of the mentees (NM). NM had been a school drop-out and had only experienced interim work at a hairdresser's. Just finding any job had been an uphill battle for two years, and her profile would not seem to lend itself to any administrative type of job. With the support of her telementor, a retired educator from France and Canada, she decided to change careers and applied for a long-term employment position with the Ministry of Finance in France. Her telementor coached NM for four sessions, each lasting approximately one to two hours, with some focus on the geopolitical chart of France, prior to her job interview. NM developed sufficient confidence to apply to the examination, and impressed the interviewers, in particular on the topic of telementoring. She succeeded in being hired against 180 other job seekers. This case is an eloquent case of unusual and rapid behavior change, since the chances were minimal, that NM's resume would have led to such a rapid career change in a conventional setting.

Technologies

The use of the telementoring technologies was appreciated by 100% of the youth, and also by 75% of the telementors (*Figure 5*). 100% of the seniors and youth considered the medium of videoconferencing to be very useful during their exchanges. In contrast to the younger participants, the seniors, aged 70±7 years were new to the use of such information technologies. However, at the end of the telementoring program, 77% of them felt more confident using computer technologies, 80% felt more at ease in front of the camera, and 100% considered the medium of videoconferencing to be very useful to their exchanges. Their comments were eloquent: "I feel [like I am] in the presence of my mentee"; "A visual exchange is so important"; "I can see how my mentee reacts". Younger participants had a sense of achievement when contributing to their telementor's computer literacy: "I was able to teach my partner how to work better with a computer".

Discussion

Our telementoring program is a formal program enrolling seniors 55+ and youth. A co-design process and pre-intervention strategies were conducted with the participation of relevant stakeholders (i.e., seniors, students, and unemployed youth) prior to finalizing the tools and content of the program. We consider that their involvement was important in the development of a successful telementoring program, and is consistent with the guidelines proposed by Ted Nellen[16p1] who stated "A project based approach works best". The project also served the purpose of assessing the appropriateness of the Information Communication Technologies (ICT) tool for the promotion of social relationships. Both of the studies reported here were prospective studies, allowing for the observation of patterns of relationships over time. This approach contrasts with other studies on conventional mentoring, which are predominantly cross-sectional, and some retrospective[9]. Data on intervention exposure and adherence are frequently neglected in mentors' programs[9,12], whereas the telementoring program also provides an inherent capture of data regarding the quality of the program's implementation. That is, the host server and the interactive scheduler generate automatic log sheets on time and duration of sessions, and of cancelled and rescheduled sessions.

In addition to the frequency and patterns of the telementoring sessions, other features have been captured more extensively by the students, such as: the types of activities,

time spent and tools the partners chose to use during the sessions (*Figure 3*), their reported discussions they engaged in, as well as the desire to continue their relationship. Considering the average duration of two months for these telementoring series of sessions and the recommendations from the USA poll of Mentors in America[7] that "mentors should meet no less than four hours per month for at least twelve months", further research is required on a larger sample size in order to assess the minimum time-involvement required for the mutual benefit of mentees and telementors.

So far, the known attributes which differentiate our program from conventional mentoring programs are the nature of its ICT tool and processes being used, its preferred target population of senior telementors, and its automated measures (for instance, intervention exposure and adherence). Larger samples are needed to confirm and further explain the results. For example, the observations made by telementors and staff, of rapid behavior changes in their mentees need to be verified. However, a comparison of telementoring and conventional mentoring, using controlled studies, may not address the question, as the vast majority of seniors don't apply for mentorship programs: only 6% of conventional mentors are 65 and over in the poll published by Mentors in America[7].

In the current pilot studies, the recruitment of seniors as telementors (up to 82 years of age) did not present any difficulty. Notwithstanding the unemployed youth's frequent rescheduling of sessions in Group B, seniors exhibited a high motivation and adherence to the program. Factors facilitating a telementoring relationship which do not exist in mentoring are: a home-based equipment, a hot-line allowing for timely expert advice, an interactive scheduler which offers flexibility to both partners, selected Internet sites and instant access to a variety of interests, while the partners view each other side-by-side. These features address important concerns expressed by mentors and non-

mentors[7]. Stigmatization and ageism also are less likely to occur because each participant can choose where the camera should focus before connecting with his mentee. Thus restrictions, wheelchairs and stretchers may be hidden from the camera if preferred. After inter-personal bonding via telementoring has occurred, it is our experience that partners are ready to meet face to face and take their relationship to a new level, despite any physical limitation.

In keeping with the evidence recently accumulated from Holt-Lunstad's meta-analysis[2], that the lack of social relationships is a mortality risk factor that requires as much attention from health professionals as does obesity and sedentarity, health research funding agencies may now favour such research. The increase in research will allow for a sufficient sampling of participants having physical restrictions or chronic disease. Measuring health indicators in these populations as an outcome of telementoring, may pave the way to providing health professionals with a social relationship prescription tool in the management of chronic diseases.

CONCLUSION
Results of the two studies reported here on the Intergenerational Telementoring Program Accessible to People with Restrictions®, provide evidence that customized videoconference based telementoring provides a positive and motivational experience for seniors and youth. The experience exceeds in scope (target population enrollment, interaction types, geographic independence, etc.) and in the traceability of intervention exposure and adherence, the experience typical of conventional mentoring programs. The experience has a positive significant impact on the participating students, the unemployed youth as well as the senior telementors, including participants having restrictions or chronic disease.

Considering that the lack of social relationships has recently been acknowledged as an important mortality risk factor, customized videoconference based telementoring may

provide an objective measurement tool for a new field of medical research aiming at understanding how social relationships develop and also have an impact on the risk of mortality. Lastly customized videoconference based telementoring programs may provide means to assess and prescribe social relationships in the context of chronic disease management.

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