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Implementing an interdisciplinary intergenerational program using the Cyber Seniors® reverse mentoring model within higher education

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ABSTRACT

Intergenerational service-learning in higher education positively affects older adults and students, but little is known about the effectiveness of interdisciplinary, reverse mentoring programs that use technology as the medium of bringing generations together. This study describes an intergenerational service-learning program that utilizes reverse mentoring within higher education, the "Engaging Generations Program," at a midsized public university in New England where students help older adults learn about technology, and students gain communication and teaching skills. In this article, we outline how the program was implemented, present quantitative data on participation outcomes for students and older adults and qualitative data from older adults, and discuss best practices. Analysis of pre/post surveys found that students' attitudes toward aging improved ($p < 0.01$) and older adults interest in technology improved ($p < 0.05$) after program participation. Best practices identified included: multiple meetings with the same pair to deepen friendships, in-person training for student leaders, student responsibility for scheduling, tailoring sessions to each participant, student documentation of meetings, and active involvement by community partners.

KEYWORDS

Intergenerational service-learning; technology or digital divide; interdisciplinary; college students; older adults; attitudes toward aging

Introduction

The University of Rhode Island (URI) is strategically working toward engaging students in service-learning and becoming increasingly interdisciplinary across the campus to enhance student and research outcomes, particularly among the health professions. In higher education, utilizing intergenerational service-learning has positively affected older adults and students in health and aging-related courses (Andreoletti & Howard, 2016; Penick, Fallshore, & Spencer, 2014; Singleton, 2006). However, little is known about the effectiveness of this approach when implemented in an interdisciplinary manner with reverse mentoring (when younger adults provide support and knowledge

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to older adults), and when using technology as the medium for bringing generations together.

An interdisciplinary group of faculty members became inspired to implement the URI Engaging Generations Program to connect college students and older adults using the reverse-mentoring model after viewing the Cyber-Seniors ® documentary (Rusnack & Cassaday, 2014). The documentary highlights a program in Canada that connected high school students and older adults at a retirement community so that the older adults could learn about using technology. There are many delightful moments in the documentary where generations come together. For example, participants video chat with grandchildren, search for partners on a dating web site, and online chat with new friends. The students in the film discuss how the program helped break down their own stereotypes of older adults, such as elders not being able to learn technology. The older adults seem excited by their new-found technological skills and appreciated the interactions with younger adults.

In the URI Engaging Generations Program, university students work together with older adults to help them learn about technology, and students gain communication and teaching skills. The program integrates service-learning components into existing courses/curricula within multiple majors and programs; develops University partnerships with community organizations providing services to older adults; and collects quantitative and qualitative information for program evaluation and research. Faculty members appreciate the value of the program in preparing future health and human service professionals to work with older adults (American Society of Consultant Pharmacists, 2015; Gerontological Society of America, 2012). In addition, key concepts in gerontology and life-course theory are identified, offering students genuine interactions with older adults (Murakami, Lund, Wright, & Stephenson, 2003), although improving social connectedness for older adults in the state.

First, this article will review literature pertaining to intergenerational programs, the use of reverse mentoring, and the digital divide. Next, it will discuss how the URI Engaging Generations Program implemented Cyber-Seniors during the Spring 2016 semester, including advantages and challenges of using an interdisciplinary approach; the evaluation research methods used; and the outcomes of participation for students and older adults. Last, the article will highlight best practices identified in developing and implementing this model.

Literature review

Intergenerational programs in education and service-learning in higher education

Since the late 1970s, intergenerational programs have been implemented in educational settings to bridge a divide between older and younger generations so that individuals from different generations can collaborate to nurture and support each other (Newman, 1997). Many of these programs have been linked to promoting intergenerational unity, cultural values continuity (i.e., maintaining the community values in younger generations), and community activism (Kaplan, 1997). These programs have provided older generations the chance to pass along wisdom, values, and life experiences to younger generations (Newman & Hatton-Yeo, 2008), and much of the research on intergenerational programs

has focused on challenging young adults' stereotypes of older adults (Bringle & Kremer, 2006; Dorfman, Murty, Ingram, & Evans, 2003; Greene, 1998; McCrea & Smith, 1997; Newman, Faux, & Larimer, 1997; Pillemer & Suitor, 2002). Some exceptions to this trend include programs that have focused on the needs of older adults, including social needs (Wang & Chonody, 2013), an increased openness to younger generation's ideas (Young & Janke, 2013), reduced negative self-perceptions and depression (Hernandez & Gonzalez, 2008), and well-being (Underwood & Dorfman, 2008). Older adults have noted the benefits of personal interaction, intergenerational relationships and understanding, and the opportunity to share life experiences with a young person who was willing to listen (Underwood & Dorfman, 2008).

Within higher education, the use of service-learning has been gaining national prominence (Underwood & Dorfman, 2008). Service-learning can be defined

> "as a credit-bearing educational experience where students participate in an organized service activity that meets community needs and also provides an opportunity to reflect on the service activity in such a way as to gain further understanding of course content and an enhanced sense of civic responsibility"

(Bringle & Hatcher, 1996, p. 222). Service-learning can be differentiated from other types of experiential education, such as community service or internships, because it is meant to give equal attention to both the learning and service components of the experience and the benefits of participation for providers and recipients (Furco, 1996).

The use of intergenerational service-learning approaches in higher education has positively affected both older adults and students in health and aging-related courses through various models (Andreoletti & Howard, 2016; Penick et al., 2014; Singleton, 2006). Regarding younger generation participants, service-learning has been instrumental in increasing positive perceptions of older adults, acknowledging ageism stereotypes within themselves, and developing interests in working with older adults (Augustin & Freshman, 2016). Further, according to a review by Roodin, Brown, and Shedlock (2013), much of the gerontology service-learning research has focused on students' attitudes and perceptions about the elderly, students' career choices, and students' mastery of course content. More positive benefits for attitudes, perceptions, personal growth, and community service have been found compared to course content improvements. However, less is known about the effectiveness of intergenerational service-learning when implemented in an interdisciplinary manner and with reverse mentoring. This article is also unique in that it incorporates the concept of digital literacy.

Interdisciplinary approach

Interdisciplinary approaches have been identified by institutions of higher education as a priority to produce collaborative and interdisciplinary knowledge. Interdisciplinary programs are flexible and designed to affect individuals across multiple types of programs. Additionally, this flexibility suggests the potential to reach multiple generations to bridge generational gaps. However, the impact of interuniversity groups using interdisciplinary programs has not been explored (Holley, 2009). Interdisciplinary programs "encourage interaction, learning, and research across disciplinary boundaries that have traditionally divided the university" (Holley, 2009, p. 332). This process can often encourage

interaction across disciplinary boundaries to create research that is both informative and multi-faceted (Klein, 1990). Additionally, interdisciplinary programs in higher education have the potential to strengthen the professional identity of the participating programs (Wenger, 2005).

Reverse mentoring

Several modalities of intergenerational approaches have been used to meet the needs of older generations including social, economic, cultural, spiritual, and civic affairs (Teater, 2016). Newer to the various program styles is reverse mentoring, a concept where younger adults provide support and knowledge to older adults. This approach has been effective in the business sector to help older workers gain technological skill or generational perspectives (Murphy, 2012). Reverse mentoring allows young adults to develop leadership skills through mentorship, share new ideas and knowledge with older generations, and address generational leadership differences. This, in turn, allows older adults to benefit from the younger generation's knowledge and encourage the younger generation to assume a teaching role (Meister & Willyerd, 2010; Murphy, 2012; Sessa, Kabacoff, Deal, & Brown, 2007). For example, a program that uses reverse mentoring might allow youth to teach an older adult to use social media—thus, providing a setting where the youth takes on a level of expertise to benefit the older adult, although the young person simultaneously develops his/her leadership skills. Unlike many of the previous modalities of intergenerational programs, reverse mentoring maintains a focus on an open approach, where mentors and mentees are both encouraged to share knowledge, positive meanings, and emotions to facilitate a positive connection (Spreitzer, 2006).

Digital divide

Technology plays a central role in many aspects of everyday life, making digital literacy increasingly important (Czaja et al., 2006). Computer anxiety in older adults has long been recognized as an obstacle to digital literacy (Laguna & Babcock, 1997), and a recent study demonstrates similar computer anxiety among older adults despite increased computer usage in this population (Wild et al., 2012). Although older adults use computers more, they are more likely to feel anxious compared to younger generations because of their expectations around privacy (Karavidas, Lim, & Katsikas, 2005). Researchers have also reported that older adults have increased difficulty learning and using technology compared to younger populations (Charness, Schumann, & Boritz, 2002). Training older adults to use technology can help mitigate anxiety regarding its use (Czaja et al., 2006). One study, using mostly qualitative methods of a single course-based service-learning project, showed promise for the use of technology to help older adults gain computer skills and help students gain teaching skills and more positive attitudes toward older adults (Natvig, 2007). Programs, such as the Older Adult Technology Services (OATS) in New York, provide computer training courses to older adults, and these courses have shown to improve older adults' computer skills and usage, social connectedness, social participation, and access to information (Gardner, 2010).

Social media is one important area for training because of the potential to connect older adults to a meaningful network of people and information. Although older adults may

initially express computer anxiety related to the lack of privacy found on social media, research demonstrates that privacy anxiety can be mitigated through frequent use of social media and computer programs as older adults become more familiar with the programs (Karavidas et al., 2005). Additional research demonstrates that social ties among internet users are more than 20% greater than non-internet users (Hampton, Goulet, Rainie, & Purcell, 2011). Many may assume that internet-based connections do not provide any meaningful connection to others. However, research on social networking sites, such as Facebook, consistently shows that internet-based connections support rather than weaken close friendships (Hampton et al., 2011). Yet, among older adults, social network resources tend to be underutilized. For example, 9% of those who used Facebook in 2014 were aged 55 and older, and sites, such as Youtube and Twitter, had less than 8% who were aged 55 and older (Global Web Index, 2014). This gap suggests additional efforts are needed to help older adults understand the potential benefits of the internet and how to use it to engage with the digital world.

Our project focuses on filling a gap in the intergenerational programming field. We wanted to assess outcomes: (1) for older adults related to social connections and technology use, and (2) for younger adults related to attitudes toward aging and older adults, self-efficacy, and comfort and confidence in working with older adults. This article advances the literature due to its presentation of an intergenerational, service-learning program that utilizes an interdisciplinary approach, reverse mentoring, and technology to bring people together. This program has purposefully emphasized an interdisciplinary model with various modes of participation, which meets the needs of multiple academic programs and classes while gathering outcome data to inform program implementation and contribute to the literature.

URI engaging generations program: Cyber-Seniors®

Program idea

The impetus for the development of this program was viewing the Cyber-Seniors® documentary. At URI, there are many faculties across campus dedicated to gerontology and geriatrics and in particular, there is a focus on interprofessional education and interdisciplinary collaboration. URI is fortunate to have a gerontology program, so there are courses across the campus related to issues of aging and health throughout various departments, including Human Development & Family Studies (HDF), Pharmacy, Sociology, Political Science, Nutrition, Kinesiology, Physical Therapy, Nursing, and Engineering. There is also a Geriatric Education Center on campus that provides education and training for health professionals in gerontology and geriatrics (National Association for Geriatric Education, 2013), and an Osher Lifelong Learning Institute (OLLI), a program that provides noncredit courses to adults aged 50 and over (The Bernard Osher Foundation, 2005).

We held a viewing of the Cyber-Seniors documentary at URI during the spring semester of the 2015 Aging and Health Week. Approximately, 80 older and younger participants attended, and we asked participants to complete an Interest Survey to gauge interest in developing a program like Cyber-Seniors. We received overwhelming interest from students and older persons in attendance, with 96% of students and all older adults

showing some interest in the program. During the summer of 2015, we met to discuss how the program could work, and we launched a trial program in Fall 2015.

Program implementation

The program includes faculty leaders primarily from Human Development & Family Studies (HDF), Pharmacy, and Sociology. We work to meet three objectives: (1) promote civic engagement and service-learning for college students; (2) help prepare future health and human service professionals for careers; and (3) improve social connectedness and interest in technology for older adults. Our trial program ran from September through December 2015, and based on our experiences, we finalized the plan for the Spring 2016 program. The program information and data presented in this article are from the Spring 2016 semester where we worked with one senior center and the OLLI.

Program models for older adults

The Spring 2016 program had three models for students to meet with older adults. These models were based on student availability, as well as staff feedback about site schedules (e.g., lunch, transportation) and the older adult constituents' interests.

In the first model, *individual appointments*, URI student mentors from different majors held 30–60 minute one-on-one sessions at the senior center. During the sessions, older adults generally brought their own devices and asked specific questions of the students; students answered questions, taught new skills, and tailored the sessions based on needs and interests. Often times, the senior signed up for additional sessions with that particular student mentor, which often led to the development of close relationships between students and seniors.

The second model, *matching program*, matched students in one gerontology class with OLLI members, and each pair met for at least 6 hours during the semester at mutually agreed upon times, days, and locations. The pairs chose how to spend their time based on their interests and capabilities. Partners were generally matched based on the technology used (e.g., Android vs. iPhone) and other personal characteristics, such as careers and hobbies. To identify older participants, OLLI members received a recruitment e-mail, and they signed up using an online registration form that also included information about what they hoped to learn in the program. After being accepted into the program, they were asked to join the university class during one of their regular sessions to meet their assigned partner.

For the third model, *drop-in sessions*, student mentors, usually a mix of students from different majors, held sessions at the OLLI building. The students were available for a 2–4 hour block of time, and the OLLI members could stop by during that time to receive technology support. This model was designed to be flexible and accommodating to meet the needs of OLLI members who were extremely busy and might only need assistance for a short time.

Student involvement

Overall, we offered this program as a service-learning opportunity for students who may be future health and human services providers. We see it as a way to address current health care challenges, such as a lack of geriatric training, and an amiable precursor for

students learning about person-centered health care and long-term services and supports. In a more general sense, it aims to improve intergenerational relations and communication and reduce age-segregation in our rapidly aging society. The program also benefits liberal arts learning – improving problem-solving skills and giving students the opportunity to take on the role of teacher (instead of student).

Each student mentor in the program took part in an hour-long training session prior to working with seniors. The training included information about program logistics, tips for working with older adults, and suggestions for how to solve technological questions.

The flexible nature of the program and variety of models offered have enabled different departments to get involved because students who participate can meet the requirements of multiple colleges, majors, and programs. Currently, students participate through coursework (i.e., class integrates participation as a service-learning assignment), independent study credits, and experiential education hours.

Because of the interdisciplinary nature of the program, and the varied schedules and needs of students, it is important that the program offers multiple ways for students to be involved. For example, for pharmacy students who needed experiential education hours, we found that placing them at OLLI drop-in sessions or at the senior center with individual appointments worked best with their rigorous course load. For HDF and Sociology students obtaining independent study credit, we found their more flexible schedules meant we could place them where needed and have them serve as student leaders and/or research assistants. The involvement of the gerontology class worked well for the matching program. Further, the flexible nature of the program has been incredibly helpful. There have been times when a student who signed up for the matching program is unable to meet their partner for the full 6 hours. They can instead participate in drop-in sessions at OLLI or individual appointments at a senior center. Although research becomes more challenging as students in the program participate for different numbers of hours and different modalities, we feel strongly that the interdisciplinary and flexible nature of our program is a definite strength in meeting the needs of older adults and students, and should be maintained.

Evaluation methods

To evaluate the program during the Spring 2016, all methods were IRB-approved (exempt review due to minimal risk to participants) and included participants providing informed consent. We collected data through multiple mechanisms, including student logs of each session, pre/post surveys, and reflection papers. We used this information to track participation, identify best practices and challenges, and examine outcomes.

In this article, we present quantitative data from the student and older adult pre/post surveys and qualitative data from the older adults' post-survey. Data were collected online using SurveyMonkey or collected using hard copies and entered into SurveyMonkey. Subsequent publications will detail results from other evaluation methods.

Student surveys

Student mentors completed a pre-survey at least 1 day prior to holding any sessions and filled out a post-survey within a week after finishing their hours. We present outcome data

from standardized measures included on the surveys that have been validated and assessed for reliability. We included the Fear of Older People sub-scale from the Anxiety about Aging scale (Lasher & Faulkender, 1993), which includes five 5-point Likert scale questions (strongly disagree to strongly agree) that are summed to create the scale score (higher scores indicate less anxiety toward older people); the Psychological Growth sub-scale from the Laidlaw, Power, and Schmidt (2007) Attitudes Toward Aging Scale, which includes seven 5-point Likert scale questions (strongly disagree to strongly agree) that are summed to create the scale score (higher scores indicate the more they embrace growing older), and the New General Self-Efficacy Scale (Chen, Gully, & Eden, 2001), which includes eight 5-point Likert scale questions (strongly disagree to strongly agree) that are summed to create the scale score (higher scores indicate more self-efficacy). Cronbach's alpha for the scales in this study ranged from 0.68–0.91. Further, we present data from three questions related to working with older adults in which students state how much they agree or disagree with the following statements, using a 5-point Likert scale (strongly disagree to strongly agree): *(1) I am likely to volunteer in the field of senior services, (2) I am comfortable working with older adults, and (3) I am confident in teaching older adults how to use technology.*

Older adult surveys

All older adults who participated in the matching program completed the full version of the pre/post surveys. Older adults who took part in individual appointments and drop-in sessions completed a shortened version of the pre-survey, and those who took part in at least three individual appointments or drop-in sessions were asked to complete a shortened version of the post-survey. These participants were asked to complete the shortened versions of the surveys due to time constraints, as many participants at these sites refused to take the survey when it was lengthier.

In this article, we include outcome data from the Lubben Social Network Scale (LSNS-6) (Lubben et al., 2006), which is a valid and reliable measure that includes six 6-point Likert scale questions about family and friendships that are summed to create a total score (higher scores indicate less isolation). We also included a social engagement measure (derived from Glass, Mendes de Leon, Bassuk, & Berkman, 2006) in which older adults were asked four 4-point Likert scale questions about how often they participate in social engagement activities (i.e., community service or volunteer work; courses or discussion groups; social and community groups; visiting friends;) with responses of never, rarely, sometimes, and often; we created a single summary index by summing the items (higher scores indicate more social engagement). Due to a low Cronbach's alpha for the 8-item measure that also included paid work; movies, restaurants, or sporting events; talking on the phone; and group exercise, we adjusted the measure to include only the four most highly correlated items as suggested by Tavakol and Dennick (2011). Cronbach's alpha for the LSNS-6 and the social engagement measure in this study ranged from 0.64–0.88. We also present data in which older adults were asked how much they agree with three statements, using a 5-point Likert scale (strongly disagree to strongly agree): *(1) I like working with technological devices, (2) I use technological devices many ways in my life, and (3) Generally I feel okay about trying to solve problems on a technological device* (questions derived from Loyd & Gressard, 1985). Last, this article includes

data from responses to the open-ended question: *why would or wouldn't you recommend the Cyber-Seniors program?*

Analysis

Quantitative data were analyzed using SPSS (v. 24). To address missing data, we used mean substitution for scale items when the respondent only missed one question on the scale, and listwise deletion when pre/post scores were not available (Neuman, 2011). For the older adult data, we used mean substitution for one older adult who missed one social network question and for one older adult who missed one social engagement question. For the student data, we used mean substitution for five students who missed one anxiety about aging question and for one student who missed one self-efficacy question. Using mean substitution in these instances did not change the statistical significance of our findings. We assessed for univariate outliers using boxplots and found one extreme outlier on the social network measure for older adults, and one extreme outlier for students on the anxiety toward aging, attitudes toward aging, and self-efficacy measures (i.e., the student answered the same response for every question). We deleted these outliers from the analyses (Enders, 2010), which did not change the statistical significance of our findings. To assess for change in students' pre- to post-test scores, we used Wilcoxon Signed Ranks tests because the scores were not normally distributed. We used paired sample *t*-tests to assess pre- to post-test change in older adults' scores. To examine effect size of the pre- to post-test differences, we used Cohen's *d*. We analyzed open-ended responses for older adults using thematic analysis. To do this, two people on the research team examined the responses word-for-word, organized every response by consensus into themes and sub-themes, and identified key quotes within each theme.

Results

During the Spring 2016, 87 older adults participated in the program, 37 older adults completed at least three sessions with the program (for a total of 243 sessions with student mentors), and 25 of those who did at least three sessions completed both pre/post surveys (*M* age = 72.96); therefore, the overall response rate for taking the pre/post surveys was 68%. Thirty-six individuals took part in the individual sessions at the senior center, 20 participated in the matching program, and 31 attended the drop-in sessions.

Additionally, 28 students (*M* age = 21.82) participated, representing five different majors across campus (HDF, Pharmacy, Health Studies, Communicative Disorders, Psychology), and 26 completed the pre/post surveys. The response rate for taking the pre/post surveys was 89.3%. The students provided approximately 289 hours of service. In HDF, most of the student mentors were juniors or seniors. With Pharmacy students, most of the students were in their first professional year (i.e., P1 students, third year out of a 6-year pharmacy program).

Student outcomes

See Table 1 for results of pre/post differences tests for student outcome measures. Students' attitudes toward aging improved following participation in the Cyber-Seniors

Table 1. Student pre/post scores $N = 26$.

Measures[d]	Pre mean(*SD*)	Post mean (*SD*)	*Z* value	*p* value	Cohen's *d*	% Showing improvement	% Missing
Anxiety about aging[a] ($n = 24$)	20.94 (3.42)	21.83 (2.81)	−1.84	0.06	−0.32	54.2	7.7
Attitudes toward aging[b] ($n = 24$)	27.50 (3.20)	29.42 (3.19)	−2.95	< 0.01	−0.60	66.6	7.7
Self-efficacy[c] ($n = 19$)	33.09 (3.80)	33.60 (4.17)	−0.65	0.52	−0.13	47.4	34.6
Volunteer senior services ($n = 24$)	3.64 (0.87)	4.00 (0.91)	−1.41	0.16	−0.33	54.2	7.7
Comfort work OAs[e] ($n = 20$)	4.09 (0.79)	4.50 (0.59)	−2.18	< 0.05	−0.49	45.0	23.1
Confident teach OAs ($n = 20$)	3.87 (0.81)	4.38 (0.58)	−2.07	< 0.05	−0.67	50.0	23.1

Notes:

[a] Possible scores range from 5–35, with higher scores indicating less anxiety toward older people.

[b] Possible scores range from 7–35, with higher scores indicating the more they embrace growing older.

[c] Possible scores range from 8–40, with higher scores indicating more self-efficacy.

[d] Sample sizes vary across the different measures because we handled missing data using listwise deletion, and we deleted extreme outliers.

[e] OA refers to older adults.

program, with post mean scores improving by two points ($p < 0.01$) and the effect size showing a medium effect. Mean scores on two of the questions (i.e., *I am comfortable working with older adults*, and *I am confident in teaching older adults how to use technology*) were also significantly higher than pre-test mean scores ($p < 0.05$) with medium effect sizes. On the other measures, 47–54% of students demonstrated improvement, although these differences were not statistically significant.

Older adult outcomes

See Table 2 for pre/post score differences tests for older adults who participated in the program. Post mean scores on the item, *I like working with technological devices*, showed significant improvements ($p < 0.05$) with a medium effect size. Other measures were not statistically significant.

In analyzing the answers to the question, "why would or wouldn't you recommend the Cyber-Seniors program?," two themes emerged as the primary reasons why participants ($N = 29$) would recommend the program: (1) appreciation for the intergenerational interaction, and (2) value in the educational opportunity.

Regarding the intergenerational interaction theme, mentioned by 17 people, participants enjoyed the teachers and liked interacting with a younger person/millennial, as evidenced by this quote from a female participant:

> "Because the young people are wonderful. They are very helpful, it was a very positive experience."

Participants stated that they liked interacting with "young, intelligent people" and found themselves continuing to participate because of how much they enjoyed their intergenerational, one-on-one interactions. Many people appreciated how patient instructors were with them and how thorough they were with their explanations and suggestions, and that this method of instruction was critical when learning these new technologies. One person specifically mentioned how the instructors did not "talk down" to him, which is an experience some older adults have had when working with family members trying to help them with technology. Last, one participant valued the intergenerational interaction because she felt that program brought important awareness to the issue of ageism and helped the young adults view older adults in a more positive light.

For the educational opportunity theme, discussed by 19 people, older participants found the program to be a good educational experience. In their responses, participants discussed how the program was informative and understandable, and that this helped them solve many of the problems they had with their technological devices and answered specific questions about applications (apps) and programs they wanted to use. One man who learned to use Microsoft Word and e-mail on his phone stated,

> "No reason why I wouldn't [recommend]! Students were great, even when they didn't have all the answers, we worked through it. There is a need for the program."

Further, they discussed the experience as "fun" and "friendly," and how they enjoyed learning in a relaxed atmosphere. Some of them discussed that the program provided a new learning opportunity for someone who would be willing to take on the challenge of learning new technology, with one person stating "You're never too old to learn." Further,

Table 2. Older adult pre/post scores ($N = 25$).

Measures[c]	Pre mean (*SD*)	Post mean (*SD*)	*t* value	*p* value	Cohen's *d*	% Showing improvement	% Missing
Social network total scale[a] ($n = 24$)	17.75 (5.52)	17.42 (4.82)	0.48	0.63	0.11	41.7	4.0
Social engagement[b] ($n = 15$)	9.25 (2.62)	9.63 (2.06)	−1.25	0.23	−0.35	56.3	40.0[d]
Like working with tech ($n = 23$)	2.78 (0.90)	3.09 (0.90)	−2.61	< 0.01	−0.55	34.8	8.0
Use tech many ways ($n = 25$)	2.96 (0.89)	3.36 (.95)	−1.85	0.08	−0.37	44.0	–
Solving problems tech ($n = 25$)	2.44 (1.08)	2.56 (1.04)	−0.90	0.38	−0.18	16.0	–

Notes:

[a] Possible scores range from 0–30, with higher scores indicating less social isolation. A score of 12 or less indicates social isolation.

[b] Possible scores range from 0–12, with higher scores meaning more engagement in social and productive activities.

[c] Sample sizes vary across the different measures because we handled missing data using listwise deletion, and we deleted extreme outliers.

[d] The social engagement measure was not included on the shortened survey, which explains why there was 40% missing data.

individuals appreciated that the program enabled them to stay up-to-date when it came to using technology in their daily lives. Last, one participant conveyed how the program helped her feel comfortable and confident in using technology in ways that she did not previously.

> "Having a patient, kindly, knowledgeable teacher has enabled me to not be depressed with these expensive devices I purchased and used only nominally. Now I feel uplifted about technology rather than depressed. It has opened up a new world for me."

On the contrary, there were three people who were hesitant to recommend the Cyber-Seniors program. Two of the individuals discussed scheduling issues and not knowing if friends would be interested in learning technology, and one person did not appreciate the survey questions.

Discussion

The URI Engaging Generations Program: Cyber-Seniors connects older adults and university students, helping older persons learn to better utilize technological devices and helping students gain valuable teaching and communication skills to enhance their education. After running a trial program, we identified three models to connect students with older adults at senior centers and OLLI and ran a pilot study. In assessing pre/post survey changes for students, we identified statistically significant improvement in students' attitudes toward aging, confidence in teaching older adults, and comfort in working with older adults. For older adults who completed at least three sessions, we found statistically significant improvement in older adults' interest in working with technology, and we identified that older adults valued the intergenerational relationships that developed and appreciated this educational approach for learning about technology. These findings validate the previous literature reviewed in this article showing that intergenerational programs (e.g., Augustin & Freshman, 2016) can increase young adults' positive attitudes toward older adults, which can help them to develop interests in working with older adults.

There are several approaches to university-community partnerships (Timmermans & Bouman, 2008) that provide students with service-learning opportunities that further their aging-related knowledge and skills to become informed professionals in the future (Kolomer, Lewinson, Kropf, & Wilks, 2008). The approach described here has demonstrated how the URI Engaging Generations: Cyber-Seniors program has played an integral role in students' programs, providing students an opportunity to supplement their learning with practical experience by tapping into students' native technological skill-set. Generally, today's students are proficient in the use of technology, and harnessing that in the university classroom benefits older generations in the community, who might lack proficiency to benefit socially from technology. It is an effective pathway for university-community partnerships.

Although it is important to work across disciplinary boundaries (Holley, 2009), it is also important to work across university boundaries to have a more comprehensive understanding of how this program could be beneficial in multiple settings. Researchers at URI are thus collaborating with researchers at other institutions to both examine differences across the various models as well as comparisons with other programs

around the country who are implementing similar programs. Future research will further investigate the reverse mentoring model, stereotypes across generations, specific technologies of interest to older adults and techniques for improved use, and researchers plan to utilize a control/comparison group and examine data longitudinally in future studies.

Successful strategies

At URI, we have found a number of strategies that have been important to the success of the program. First, we had a trial period during the initial year of the program in which we experimented with different ways of getting students involved before fully implementing our program. Over time, program elements have been modified based on feedback from participants and site coordinators, observed trends in participation, and various evaluation techniques. Since the Spring 2016, we expanded the program to include seven senior centers, one OLLI site, one Program of All-Inclusive Care for the Elderly (PACE) site, and two URI classes, and our discussion below includes best practices that we have learned including and beyond the Spring 2016.

Second, we currently have a group of interdisciplinary faculty members and student leaders who provide training and support to the students. We found that holding an in-person training at the beginning of each semester helps ensures all student mentors understand their roles and responsibilities and that program expectations are explained in a consistent manner. This provides an opportunity to students to ask questions and exchange contact information, so they can rely on one another as resources. Faculties are able to justify the time spent on the program because it connects to their research agendas, teaching responsibilities, and can be used for placing students in experiential education. The departments that are involved are supportive of this venture.

Third, we work with the students to identify times each week they can hold sessions, and ask them to coordinate their availability with the site directors in advance. Using predetermined dates/times ensures that scheduling does not become overly burdensome for faculty. This also encourages professionalism in the students, as they are held accountable for any necessary modifications.

Fourth, although we provide students with teaching modules and resources to help with teaching technology, most of them prefer to tailor their content and approach to each participant. Having this content available, particularly when students first get started, is helpful for providing students with ideas on how to teach older adults about different programs and applications. Access to tablets is important, particularly at certain sites where participants may not have devices of their own. In general, many older adults bring their own devices because it is helpful to gain comfort in using them and then learn how to do this on their own, but students also bring their own devices as a way to offer suggestions for what works for them.

Fifth, accurate documentation of each encounter is important for the service-learning aspect of the program. Students keep logs of their sessions, write reflections, and give presentations to their peers about their program experience. This ensures students understand the value of the program for their own learning, as well as why and how it can benefit older adults.

Last, it is imperative that each community partner is actively involved in making this program successful by advertising and recruiting participants (i.e., posting signs on and off site as well as announcing in any newsletters). Each site has a senior center staff member who develops sign-up sheets based on student availability, identifies a place where the students can meet with the older adults, answers any questions from the students or older adults, and stores program materials when not in use. Some sites have found it important for a staff member or volunteer to make reminder calls to participants to ensure attendance. It is also very important to have a reliable, fast Wi-Fi connection. When this is not the case, older adults can easily become frustrated and this can affect the experience, often out of the student's control.

Lessons learned

As with any program, there are lessons learned from what has worked and pearls of wisdom that were not initially known. Most notably, we determined that one-on-one interaction between the two generations is ideal. We learned this in reviewing the qualitative data findings as well as in conversations with students during class and in meetings and conversations with staff at the sites and with older adults. Both generations wanted the one-on-one interaction so they could get to know one another because they appreciated the natural relationship that forms. Further, older adults valued that the program is individualized to their interests and abilities rather than provided in a class setting where content could not as easily be specifically tailored to meet individual needs. Overall, we have found there is genuine interest in this program across generations, and we have found that the program is best served in a small, personal setting.

We have enlisted the mantra of, "go with it and be flexible." The need for flexibility and openness to new experiences among faculties and students mentors involved is imperative. In many situations, having the service-learning framework in place allows learning to happen organically, and the flexibility encourages the student to engage in problem solving and critical thinking in ways that would not happen without the program in place. Students learn, for example, that older participants may forget what has been learned previously or that questions may come up that are beyond their skill set, but that they can teach the skill again (or in another way), and they can learn together (e.g., search the internet, watch a video).

Ensuring the program is connected to students' curriculum is also important. For example, pharmacy students in their first professional year (P1) are the ideal level for this program because they have not yet acquired the clinical skills to use at their experiential sites, but they can build patience, communication, and listening skills through program participation, all necessary to work with older adults. As such, this program encourages pharmacy students to appreciate the importance of communication, and recognize that if they can teach an older adult how to use their tablet, they can better explain how to take their medication. Although it may not seem apparent, the same skillsets of patience and clear instructions are needed to do both of these things effectively. The program also works well for upper-level undergraduate students in the HDF and Sociology classes because it helps them more thoroughly understand scholarly concepts using real-world applications, such as aging-in-place, age

segregation, productive aging, heterogeneity of the older adult population, and the importance of social support.

Study limitations

We note some limitations related to the study design. First, we note our sample size limitations and recognize that the older adult sample is not representative of all participants in the program because some participants completed a shortened version of the survey and not every participant completed a pre/post survey. We also acknowledge limitations of the study due to missing data. For example, the amount of missing data on the social engagement measure for older adults may have affected its lack of statistical significance; therefore, we included effect size statistics to mitigate these potential Type II error concerns. Further, we cannot make causal claims about the program at this time because we do not have a control group and not controlled for other internal validity issues. Similarly regarding students, we cannot fully attribute changes in scores to the program compared to course content or other classes, and we did not compare student scores across the different models due to small sample sizes. Future research will address these limitations through the use of incentives and comparison across models and to other programs across the country.

Conclusion

Based on our experiences and the research presented, we strongly believe that we have identified a valuable program that meets its objectives and is flexible enough to continue to meet the needs of students, older adults, and faculties involved. Faculty members can prepare students to work in aging-related fields and provide students with opportunities for genuine interactions with older adults, bringing course concepts to light. Students may gain teaching, communication, and problem-solving skills, and older adults may gain confidence with technology and social connections. Universities and aging services organizations can utilize this model to design similar programs within their communities.

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