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Development of an assistive technology intervention for community older adults

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Abstract

Aim: To explore the use of the Ecological Validity Model as a guiding framework in the provision of a culturally-sensitive assistive technology (AT) intervention for community older people.

Methods: Twenty-seven Hispanic adults aged 70 years and older, and four individuals with expertise in AT participated in a concurrent nested mixed method study where the quantitative method (content validity ratio exercise) was embedded in the dominant qualitative method (focus groups).

Results: Findings informed the development of the Assistive Technology Life Enhancement Program (ATLEP); an intervention consisting of seven modules addressing AT devices with culturally sensitive elements.

Conclusions: The Ecological Validity Model, as well as, the input from older adults were both effective methodological strategies in tailoring the ATLEP intervention to the needs and circumstances of community-living older people living in Puerto Rico.

Keywords

older adults; assistive technology; disability; independent living

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Declaration of Interest

The authors report no declarations of interest.

INTRODUCTION

For older adults living independently in the community, it is important to maintain the ability to perform essential daily activities, such as: cooking, taking their medications, and getting dressed. As the general population gets older in the United States (US), there is an associated increase in the presence of chronic conditions, disabilities and health care costs (Hootman et al., 2009). Unfortunately, the rise in disabilities with increasing age is not known to occur uniformly among racial and ethnic groups. For example, much higher rates have been reported among older Hispanics living in Puerto Rico (29.9%) than among older Hispanics (20.6%) and Caucasians (15.0%) living elsewhere in the US (Erickson et al., 2013). Disabilities in older adults are a major public health problem, primarily because of negative impact their quality of life, as well as, the disability-associated health care costs, which accounts for 26.7% of all healthcare expenses for adults residing in the US during 2006 (Anderson et al., 2006). Therefore, preventing disabilities and promoting better health within the older population has become a social-economic priority in the US (Healthy People 2020, 2015).

The use of low cost assistive technology (AT), such as jar openers, seat lifts for furniture, and reachers can improve function in daily life activities and prevent the onset of disabilities. There is clear evidence that these technologies are beneficial with improving the functional independence of older adults living with disabilities. For example, Freedman and colleagues (2005) reported that half of the decline in personal assistance observed between 1992 and 2001 was a result of the independent use of assistive technology. Assistive technology has been found to mitigate functional decline, make tasks easier to perform, provide emotional security, and improve safety (Beech et al., 2008; Tinker 2004; Mann et al., 1999). Despite the benefits of AT use in older adults, research has shown that ethnic minorities living with disabilities in the US have not benefitted from their use. Hispanics living with disabilities in the US (including persons of Cuban and Mexican descent as well as Puerto Ricans) have reported a lower rate of using AT devices (59%) compared to individuals from other ethnic groups (71%) (Stepen et al., 2008).

A potential way to address older people needs for using AT is through community interventions that aim to increase this population's knowledge and skills with using AT devices. However, to our knowledge, no such interventions have been developed with input from older adults from a Hispanic background. Although Sellers and Markham (2013) evaluated the effectiveness of an AT intervention with raising awareness and increasing knowledge about AT in community-dwelling adults aged 21–96, they did not use input from older adults from different ethnicities to develop their intervention. Other community-based AT interventions for older adults living with disabilities have not been theory-based per se (Gottlieb et al., 2000; Mann et al., 1999; Mortenson et al., 2013). When developing culturally sensitive interventions, the use of a guiding theoretical framework as well as input from the target population is essential to augment the ecological validity of the treatment in question (Bernal et al., 2012).

In order to better address health disparities, meet clients' needs, and provide effective rehabilitation practices, it is increasingly important that rehabilitation professionals use

culturally competent interventions (Capell et al., 2008; Santoso 2013). Therefore, culturally competence within clinical practice has become a professional priority (Lindsay et al., 2014). However, two main challenges arise in this regard. First, no assistive technology evidenced-based interventions addressing treatment efficacy for ethnic minorities has been tested. Second, there are few theoretical frameworks that provide guidance on developing culturally sensitive interventions, and even less published examples illustrating the specific processes used to address culture in the development of the intervention protocol, (e.g., see Orellano et al., 2014). Domenech-Rodríguez and her colleagues (2014) reported the process to adapt an evidenced-based parent training intervention for Spanish speaking Latino parents using the Ecological Validity Model (EVM; Bernal, et al., 1995). EVM consists of eight dimensions of interventions with culturally sensitive elements that researchers and practitioners must consider when developing behavioral interventions (language, person, metaphors, content, concepts, goals, methods, and context). EVM has been reported to be effective as a guide for developing culturally sensitive behavioral interventions with Hispanic groups (Orellano et al., 2014; Rossello et al., 1999).

Based on their study with Latino parents, Bernal and colleagues (1995) reported that cultural adaptations can improve service delivery. Moreover, Orellano and her colleagues also applied the use of EVM to develop a culturally-sensitive, occupation-based health promotion intervention for older Hispanic adults who live alone. Orellano et al. concluded that the EVM can be used to translate culturally-centered interventions to other ethnic minority groups, which can augment their external validity.

Based on the successful application of the EVM in such research, the purpose of this study was to explore the use of this framework in the development of a culturally-sensitive AT intervention to manage and prevent functional limitations with a sample of community older adults from Puerto Rico (PR). Findings from this study can be used by researchers and community practitioners to cull the process whereby new interventions for ethnically diverse populations can be developed.

METHODS

This study was approved by the Institutional Review Board of the Medical Sciences Campus, University of Puerto Rico (MCS-UPR) as protocol number A4120115. Informed consent were obtained in writing from all participants. A concurrent nested mixed method design was used whereby the quantitative method (content validity ratio exercise) was embedded in the dominant qualitative method (utilizing focus groups) to collect both types of data during the intervention (Tashakkori et al., 2010). We chose to combine qualitative and quantitative approaches to have different but complementary perspectives to facilitate the understanding of multifaceted phenomena, such as: health, disability, and participation in daily activities (Mortenson et al., 2009). This design intended to comprehensively explore the necessary components for an AT intervention for older Hispanic adults living with functional limitations.

Participants

A purposeful sample of 27 Puerto Rican adults aged 70 years and older, who lived in the urban metropolitan area were recruited for this study. Participants were divided among three focus groups, having 7 to 10 participants each. We also organized a fourth focus group of AT experts. Focus group sample size was determined based on established guidelines outlined by Krouger and Casey (2000). The inclusion criteria for participants were: 1) 70 years and older; 2) Spanish speaking; 3) living independently in the community; 4) not receiving home health care services; 5) reported the need for help or having difficulties with two instrumental activities or one or more basic activities of daily living; 6) no severe cognitive impairment, as determined by a score of 12 or more in the Caban Minimental examination (Sánchez et al., 2003); and 7) willing to participate in a focus group. The exclusion criteria were: 1) evidence of severe cognitive impairment; and 2) living in an assisted living facility, skilled nursing, or a long-term care facility. Older adults who were not currently receiving home health care services were targeted for this study for two reasons. First, we intended to focus on those still relatively independent without significant functional limitations. Second, the team determined that understanding the perspective of this population could provide valuable insight as to their expectations regarding their future AT needs. For the fourth focus group, individuals with expertise in aging and assistive technology were included if: 1) aged 21 years and older and; 2) at least 5 years of experience working directly in AT services for older Hispanics.

Recruitment procedures

To recruit the participants, we first contacted the administrators of three activity centers for older adults in the PR metropolitan area, to whom the researchers provided a detailed explanation of the study procedures. Afterwards, these administrators approached potential participants in their respective centers and gave them an explanation of the study. If they demonstrated an interest in participating, the administrators scheduled a meeting. During this initial meeting, the researchers administered the cognitive screening questionnaire to potential participants. Three older adults did not obtain a score of 12 or higher in the Caban Minimental and were excluded. Next, the researchers met individually with those who passed the Caban Minimental in a private room to provide a detailed explanation of the consent form, which included the study purpose, procedures, potential risks, and benefits. Participants were given the opportunity to ask any questions. After addressing participants' concerns, they were asked to sign the consent form and were given a copy.

To recruit individuals with expertise in AT services, the researchers sent an e-mail invitation to 12 potential participants from a variety of organizations and institutions providing AT services in the area of San Juan, Puerto Rico, including inpatient rehabilitation hospitals, higher education colleges, the Puerto Rico Department of Health, and the Puerto Rico Tech Act Project. The e-mail included a brief explanation of the study purpose and procedures. Six experts expressed an interest in the study and met the inclusion criteria. A focus group was then organized and conducted at the Puerto Rico Assistive Technology Program. However, only four were able to attend. They included an occupational therapist who provided AT services at the Veteran Administration Hospital in PR, a gerontology educator from the Medical Sciences Campus University of Puerto Rico

specializing in AT services, an industrial psychologist who worked in the Puerto Rico Assistive Technology Program as the AT Design and Development Division specialist, and an educator with expertise in independent living services at UPR, Río Piedras Campus.

Data collection instruments

Participant demographics were collected including age, gender, level of education, medical conditions, marital status, residence, monthly income, and source of income. The Content Validity Ratio Exercise (CVR-E) was designed based on Lawshe's (1975) method to establish and quantify content validity by appraising an agreement among raters as to how essential a particular item is. The CVR-E included themes/topics identified from a literature review that was conducted in relation to the present study focused on AT interventions for community-living older adults with functional limitations. For this CVR exercise, participants were asked to rate if each topic should be included in the AT intervention using the following scale: essential, useful but not essential, or not necessary. The Focus Group Facilitator's Guide included open-ended questions following the Ecological Validity Model (EVM) to identify culturally sensitive elements necessary to be incorporated in the AT intervention. The guide also included questions as to any other components that should be included within such an intervention, as well as, culturally sensitive considerations related to their preference in its structure, including the type of facilitator, methodology, context, and desired outcomes.

Data collection procedures

The researchers collected the data during focus group sessions at the research sites. These procedures included the following steps:

Topic revision panel.—A panel was assembled consisting of four graduate students (Master's degree) in occupational therapy, the PI, and a psychology researcher from the Puerto Rico Assistive Technology Program (PRATP). Initially, each member was given a literature review that provided an overview of AT use by community-dwelling older adults. The literature review included articles in Spanish and English within peer-reviewed journals, published from 1999 to 2014, using the following databases: PubMed, Medline, EbscoHost, PsycInfo, CINAHL, ProQuest and AgeLine. The following search words were used: 'assistive technology'; 'assistive devices'; 'functional limitations'; 'community living'; 'community-dwelling'; 'intervention'; 'program'; 'aging-in-place'; and several synonym terms for 'older adults' (e.g. elderly, seniors, retired, aging). From this review, each member generated a list of relevant AT devices categories for the intervention. The list included AT devices from other interventions for community-dwelling older adults with functional limitations (Gottlieb et al., 2000; Mann et al., 1999; Mortenson et al., 2013). After each member worked individually, all panel members met to discuss the evidence and generated a combined list of the AT devices, which were then categorized. The panel refined and edited this list to determine the preliminary themes and topics for the intervention, which, in turn, was used to categorize into key domains.

Focus groups.—Focus group participants completed the CVR-E using the list of domains generated from the panel. Table 1 shows the list of topics included in the CVR-

E. Once this rating was completed, participants were asked open-ended questions of others suggested themes to be included in the intervention, and culturally sensitive considerations about their preferred intervention structure, facilitator, methodology, context, and desired goals. For example, questions asked of older participants included: 1) What do you expect to learn in an assistive technology intervention for older adults?; 2) What is the best way to learn about assistive technology?; 3) What is the best type for a person to teach you about assistive technology?; 4) How long should the intervention last?; 5) How can an assistive technology intervention help older people?; 6) What obstacles might older people have to attend and participate in an assistive technology intervention?; and 7) What other themes should be included in an assistive technology intervention for older people?

Data analysis

The researchers analyzed the qualitative and quantitative data in order to determine the preferred intervention structure, as well as, the best culturally sensitive elements required to adapt the intervention to the target community.

Quantitative data analysis: This analysis followed Lawshe's (1975) CVR criteria to empirically evaluate the intervention content validity. The CVR was computed for each AT category using the formula: $CVR = [n_e - (N/2)] / [N/2]$, where n_e corresponds to the number of participants indicating the topic to be essential and N is the total number of participants. This process established the minimum CVR values required for the inclusion of each particular AT category in the proposed intervention. All values were weighted the same whether obtained from the older adults or the AT experts. The CVR values were based on a one-tailed test set at a .05 significance level thereby requiring a .42 for the 31 participants.

Qualitative data analysis.—Transcripts from the focus groups were analyzed by the authors. As well, four occupational therapy graduate students were trained on qualitative methods by the researchers to analyze the qualitative data. Guided by the Ecological Validity Model, content analysis was conducted following the five steps, as suggested by Graneheim and Lundman (2004): 1) perform a *verbatim* transcription immediately after each focus group and transcribe related field notes; 2) conduct a careful review of the transcripts to become familiar with its content; 3) identify significant statements and recurring categories emerging from the data to develop the primary codes framed within the eight EVM dimensions; 4) categorize any other emergent codes within the dimensions of the EVM Domains where possible, and 5) determine any other latent content. A initial coding scheme was developed, discrepancies were discussed and inter-coder agreements were established resulting in the reclassification major themes and subthemes. Investigator triangulation, defined as the use of multiple researchers in collecting and interpreting data (Johnson 1997), was employed, as the researchers worked together to collect and analyze the recurrent categories language, person, goals, methods, and contextual barriers of the AT intervention. NVivo software (Version 9) was used.

Integration of quantitative and qualitative data.—In this study, data from both analysis of the CVR-E and focus groups were used to draw out the themes on cultural sensitivity that informed the content and structure of proposed AT intervention.

RESULTS

Studying findings are presented in three main areas: 1) participants' socio-demographic; 2) quantitative results of the CVR-E, which determined the AT categories that should be included in the proposed AT intervention, and; 3) qualitative results framed using the Ecological Validity Model, which contained the culturally sensitive elements. Ultimately, as described below, this data informed the development of the *Assistive Technology Life Enhancement Program* (ATLEP).

Socio-demographic profile of the participants

Twenty-seven older adults ranging in age from 70 to 89 years old (mean age = 80 years); whom were predominantly females (n=20, 74.1%), had some college education (n=17, 62.9%) and a monthly income of \$1,000 or less (n=18, 66%) participated in this project. The most frequently reported health conditions were arthritis (n=19, 70.3%), hypertension (n=17, 62.9%) and diabetes (n=11, 40.7%). Table 2 shows their overall profile.

The four individuals with expertise in AT, ranged in age from 41 to 62 years old (mean age = 48 years), were female with exception of one participant, and all had a college education with a monthly income of \$3,000 or more.

Determining AT Categories to inform the intervention: Quantitative findings

Quantitative findings. Table 1 outlines the CVR values for the 18 AT categories, as rated by the 27 participants and the four experts. The CVR exercise placed a total of 15 categories with a CVR of .42 and, as such, these were included in the ATLEP intervention. The remaining three AT categories obtaining marginal CVRs were: *AT for personal care and hygiene*, *AT for leisure activities*, and *AT for controlling electrical appliances*. These three categories were then re-examined and the category of *AT for leisure activities* was renamed *AT for leisure and recreation*; the category of *AT for controlling electrical appliances* was consolidated within the category of *AT for home management*. Finally, these AT categories were categorized into seven modules for the purpose of developing the intervention: (1) AT for eating, cooking and medication management; (2) AT for self-care, personal hygiene and toileting; (3) AT for dressing, rest, and sleep; (4) AT for home and community mobility; (5) AT for home access and safety; (6) AT for home management and shopping; and (7) AT for communication, leisure, and recreation.

Qualitative findings. A total of eleven themes emerged from the focus groups, which were then categorized according to the dimensions of Ecological Validity Model, as follows:

(1) Language.—This dimension refers to the use of culturally syntonic language for the ATLEP intervention to ensure that it is received, as intended. It involves cultural knowledge of verbal style. For example, older adults who participated in the focus groups used simple language free of technical jargon when describing their AT devices. For example, one referred to the sock aid as a “*little board*” and another referred to their rollator walker as a “*little cart*.” Therefore, an informal verbal style, free of technical jargon, in the development of the ATLEP intervention manual.

(2) Person.—This dimension refers to the racial and ethnic similarities or differences that can exist between a client and therapist, as well as, how comfortable the client feels with the therapeutic relationship. Both the older adult participants and the experts emphasized that the health professionals were most suitable to facilitate the ATLEP intervention, especially if they have AT knowledge. An older adult with prior experience using AT for lower body dressing, with AT services provided by an occupational therapist at Veterans Hospital, expressed the following:

“Definitely, the health professional is the person called on to perform such work. Because if you do not know about what you are going to teach, you cannot teach it. You first have to prepare yourself and then pass this knowledge onto the people with whom you are going to work with, so it should definitely be him [the therapist].”

Some participants identified older adult peers and lay community facilitators as well suited to facilitate the ATLEP intervention. An older adult explained the value of peer learning to boost their motivation to use AT devices:

“I would like to learn from the experience of something done by another person and that I can learn with her... If I can see that she learned, she can show me and I will learn too. If I can see that she does it with me, I will do it too.”

While the participants with expertise in assistive technology agreed that employing peers as facilitators could be effective, they stressed that they require specialized training from an occupational therapist and, even then, they should only be used *“as long as the devices are not high risk.”* Based on these recommendations, the researchers incorporated the training of lay community facilitators (e.g., peers).

(3) Goals.—This dimension considers the congruence between therapist and client regarding the outcomes of the intervention. These outcomes, in reference to the AT intervention, were thematically framed as follows: improved occupational participation and increased autonomy, safety, as well as self-efficacy.

Improved occupational participation.—This outcome refers to the ability of the AT to enable older adults to engage in desired occupations in ways that are personally satisfying. One participant described how she uses her walker to increase her functional mobility in order to engage in meaningful shopping activities:

“Since I don’t have a car or a relative who can take me, I go by myself to the drug. Here (pointing to the handles of the walker) I hang the bags with the supplies, and here (pointing at the walker basket), I put things inside and I come lugging like a packed mule.”

This is an example how an AT device could enable older people to do tasks that would otherwise be impossible; thus, increasing their potential to participate in meaningful activities necessary to fulfill life roles.

Increased autonomy.—This theme refers to the potential for AT devices to help older adults improve self-sufficiency in everyday tasks. One participant valued the autonomy that was possible by using ATs to maintain independence, as expressed:

“(AT helps) to lead a more independent life, fend for oneself. I have always been an independent person. I don’t like to depend on anyone unless it is absolutely necessary... Thus, whenever I can, I like to have anything that helps to keep me going with my independent life.”

Increased safety.—This outcome refers to the belief that AT has the potential to keep individuals safe, particularly during functional mobility. A participant recognized that her AT increased her safe performance in walking activities, and also increased her self-confidence:

“Well, I think that by having those devices (walkers), they give oneself (a sense of) security. You feel more secure knowing that one can use them anytime. And that gives you... ahhh... like stability.”

Increased self-efficacy.—Self-efficacy is defined as the individuals’ beliefs about their capabilities to achieve certain levels of performance which influence events that impact their lives (Bandura, 1994). Participants described how their performance of everyday activities was influenced, as voiced by an older adult:

“Other than my own experience, I can say that all of these things that we use help us, give us (a sense of) security, and there is something that is sometimes mental. I feel like I am capable of doing it better. I can, I can. But without the help of those things maybe I can’t...”

This participant’s particular experience validates the potential of AT devices to re-shape older adults’ perceptions of their functional limitations.

(4) Methods.—This dimension refers to the tasks/procedures required to achieve the ATLEP intervention goals, which need to be compatible and acceptable to the older adults’ culture to increase the likelihood of the intervention’s success. These methods were thematically framed as follows: teaching methods and group structure.

Teaching methods.—The methodologies most frequently mentioned were: practice, use of visual strategies and peer experiences. Practice was perceived by both the older adults and the experts as more effective in learning about the use and maintenance of AT devices than receiving only the information, as expressed by one participant: *“I can forget the information, but not if I’m taught how to deal with the device.”*

As suggested by the majority of the participants, practicing a specific skill aids in the retention of information, and retention is an important cognitive skill that can be a challenge in old age. Visual strategies were also recommended to enhance learning to use the device, such as: written and pictorial instructions, videos, and demonstrations. Visual strategies compensate for memory deficits that may arise with increasing age, as expressed by an older

participant: *"For us it's not easy to remember everything, so I believe that a list must be given to us."* Using videos were also seen as engaging.

Group structure.—Findings from the focus group of individuals with expertise in AT also recommended a group structure of 10 to 15 participants to deliver the ATLEP intervention. Groups were viewed as a way to encourage participant engagement. It was also agreed that sessions ranging from a half-hour to two hours were an appropriate duration for older people. Based on these results regarding methodology, the ATLEP intervention would utilize multimodal teaching and learning strategies, such as: practical experiences, demonstration, group discussions and visual strategies, which include written, pictorial, and video instructions. This combination of modalities intends to increase older adults' learning process, retention, and successful application of the learned concepts into real life experiences. The intervention structure will employ weekly, two-hour, group sessions consisting of 10 to 15 participants.

(5) Contexts.—This dimension considers social, physical, temporal, economic or political aspects that may restrict the participation of an older adult in the ATLEP intervention. Under this category, older adults revealed that the main challenges for participation were related to the access to social support and social stigma.

Access to social support.—This code refers to the availability and interaction among social resources that determine whether or not a person with a disability or chronic health condition can access a service provider or can have the means to move about his/her environment. Conflicting social resources refers to how participation in social activities such as medical appointments, family meetings, or child caregiving might pose a conflict with the time scheduled for the ATLEP intervention. In other words, older adults' social roles and routines may interfere with their participation in the ATLEP intervention and need to be taken into consideration through a collaborative process of consultation and negotiation. Furthermore, the availability of transportation was a barrier anticipated by some participants, if the intervention were not provided at their activity center. *"If the classes that you are going to offer take place in another location (other than in their activity center), then we would have transportation problems."* The aim will be for the ATLEP intervention to be provided at common community venues, such as: churches, health service programs, and activity centers for older adults.

Social stigma.—This was another expressed barrier for participating in the ATLEP intervention due to the image our society places on 'being old and using AT devices'. One participant expressed: *"Older people don't go to those places (AT intervention) because they say: no I am not old."* Therefore, a negative social connotation of using AT devices as a sign of loss of function and 'old age.' This connotation must be addressed to encourage participation in the ATLEP intervention, especially for those who are experiencing functional limitations as the result of the aging process. Social stigma will be addressed by emphasizing on the promotional materials that the ATLEP intervention will make life easier and safer instead of being an intervention to improve independence and function.

Integration of the Quantitative and Qualitative Findings

The merging of the quantitative CVR exercise and qualitative data from the focus groups informed the finalization of the ATLEP intervention. We linked the culturally sensitive elements of the dimensions of the Ecological Validity Model that resulted from the focus group data to the selected topics from the quantitative CVR exercise. This linkage resulted in these seven modules of the ATLEP intervention. Concerning the language dimension, for example, a simple verbal style, as noted by participants from the focus group, was used to develop the written handouts for each of the modules. Regarding the goal dimension, focus group participants identified goals for using AT devices guided the descriptions of the benefits of the AT devices that were included in each of the ATLEP modules. For example, in the module of *AT for home and community mobility*, the benefits of using canes is discussed in light of its potential to increase walking safety and occupational participation opportunities instead of focusing on the widely known benefit of canes attributed to maintaining or increasing older people functional independence. Moreover, the teaching methods that emerged from the qualitative data (practice, group discussions and visual strategies) were used to facilitate the participants' learning experiences in using the AT devices included in each of the seven modules that emerged from the quantitative data.

Discussion

This article describes the use of a mixed method study with the intent to develop a culturally sensitive AT intervention for community-living older adults with functional limitations. This is the first time that the EVM was used as a guiding framework to ensure cultural aspects were integrated into an AT for older Hispanics. Moreover, integration of results from the CVR exercise and focus group data was essential for tailoring the ATLEP intervention to the needs of the targeted population.

As healthcare professionals confront the challenge of providing evidence-based practice approaches, the need to design empirically-based interventions capable of withstanding scientific scrutiny is increasing. However, prior AT intervention designs for older adults (Gottlieb et al., 2000; Mortenson et al., 2013; Mann et al., 1999; Sellers et al., 2013) did not describe the process used for its development nor its theoretical foundation, which raises questions about the scientific rigor of these interventions. Moreover, having direct input from older adults in the development of the ATLEP interventions can ensure that the goals, content, and methods of the interventions are culturally appropriate and valid for this population.

The topics addressed by the ATLEP intervention, for the most part, are topics addressed by other AT interventions for older adults (Gottlieb et al., 2000; Mortenson et al., 2013; Mann et al., 1999; Sellers et al., 2013). However, this study adds new knowledge with regard to the value of using the Ecological Validity Model as a guiding framework for incorporating socio-cultural sensitive elements when developing AT interventions for ethnically diverse communities. For example, in the EVM dimension of methods, focus group data revealed the need to use literacy-appropriate materials for the ATLEP intervention, including: visual aids instead of written materials, practice and active participation instead of didactic presentations, and group format instead of individual sessions. Incorporating preferences as

voiced by the older adults and those that will deliver the ATLEP intervention ensures that the approach will be culturally-sensitive and client-centered where the aim is to improve uptake of assistive technology within the targeted population.. Moreover, these findings are consistent with published research, which found that learning is more effective if older adults practice the new skill or rehearse the new information during the teaching process (Fenter 2002; Zurakowski et al., 2006).

Within the EVM dimension of person that emerged from the focus group data, learning from peers' experiences rather than a purely professional-driven intervention, and employing community facilitators rather than only occupational therapy personnel were other important culturally sensitive elements that have been incorporated into the delivery of the ATLEP intervention. Published research has found that using trained lay community leaders to deliver health promotion interventions to older adults to be effective (Lorig et al., 2001). Overall, these culturally sensitive elements of the AT intervention are consistent with results highlighted by Orellano et al. (2014) in their lifestyle intervention for older Hispanics living in Puerto Rico.

The main limitations of this study were having a small convenient sample and the limited representation of male participants. In future studies, the aim will now be to assess the feasibility, acceptability, and effectiveness of this ATLEP intervention. Further research is also needed to apply and assess the EVM process for the development and testing of new AT interventions within culturally diverse populations.

Implication for Practice

The results of this study have several implications. First, the culturally-guided framework described here may be of use to practitioners interested in incorporating culture in interventions with ethnic minorities. Second, the documentation of each step of the process with developing the ATLEP intervention may be of interest to researchers and practitioners who aim to develop and use approaches with ethnically, culturally, socio-economically, and other diverse communities. Finally, when developing and applying culturally-sensitive interventions, AT professionals have the potential to improve the quality of services and treatment outcomes for individuals from various ethnic minority groups.

Conclusions

The aim of this study was to share the process used to develop the Assistive Technology Life Enhancement Program (ATLEP). This intervention consists of seven modules addressing AT devices that integrated culturally sensitive elements by using a theoretical framework (i.e., EVM) to inform this process. As well, the use of a mixed method study provided a 'holistic' approach and enabled diverse sources of data to inform this program. Given the aging population and ethnic diversity that exists, it is important that the needs and circumstances of those within such groups are considered during the process of developing an intervention. Ultimately, the aim is to improve the health equity and quality of life of ethnically diverse populations by ensuring AT services are tailored accordingly. To conclude, our study

contributes to the small, yet growing field of clinical interventions for such populations to address existent health disparities.

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Table 1

Content Validity Ratio of the Topics for the Assistive Technology Program

Item	CVR	Item	CVR
AT for eating	.52 *	AT for home access and security	.81 *
AT for cooking and meal preparation	.71 *	AT for home management	.52 *
AT for bathing	.80 *	AT for communication	.62 *
AT for toileting	.43 *	AT for leisure activities	.33
AT for personal care and hygiene	.33	AT for sleep and rest	.43 *
AT for dressing	.62 *	AT for shopping	.43 *
AT for functional mobility	.90 *	AT for controlling electrical appliances	.33
AT for community mobility	.90 *	AT funding	.81 *
AT for medication management	.71 *	AT service providers	.90 *

Note. CVR denotes Content Validity Ratio

* CVR values >.42 are significant at $p < .05$

Table 2

Socio-Demographic Data of the Sample of Hispanics Older Adults

Variables	n (%)
Age range (years)	70–89
Mean	80(14.8)
Sex	
Female	20 (74)
Male	7(25.9)
Educational level	
High school or less	10 (37)
Some college education	17 (62.9)
Monthly income	
Low (< \$1,000)	18 (66.6)
Medium (\$1,000 - \$2,000)	6 (22.2)
High (> \$2,000)	3 (11.1)
Health Conditions	
Arthritis	19 (70.3)
Hypertension	17 (62.9)
Diabetes	11 (40.7)
Overweight and obesity	3 (11.1)
Osteoporosis	5 (18.5)
Cardiac	10 (37)
Respiratory	7 (25.9)
Others	17 (62.9)