

# Empowering Wellness: Design Thinking for Assistive Technology in Long-term Care

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Quality of life (QoL) of residents in long-term care (LTC) facilities is a crucial outcome of care. This concept is influenced by individuals' physical and mental functioning, values, social relationships, and environment (Kehyayan et al., 2015). It is now widely recognized that a person-centered approach to care in LTC facilities is of central importance to resident QoL as it respects and supports individuals' unique needs, preferences, and values (Davies et al., 2022; Li & Porock, 2014). Person-centered care (PCC) goes beyond the traditional exclusive focus on medical needs, allowing residents in LTC to actively participate in their care plans, valuing their choices, autonomy, and overall well-being, supporting family involvement and ensuring an engaging and fulfilling life within the care facility (Davies et al., 2022).

Long-term care typically includes a range of services that help meet the medical and non-medical needs of people with chronic illnesses or disabilities. While most of the LTC population is 65 and older, young adults (who are defined in the health care industry as 65 or younger) make up a substantial part of the LTC population due to complex care needs that cannot be effectively addressed in the community (Hay & Chaudhury, 2013). These individuals may require assistance due to traumatic injuries or illnesses, developmental disabilities, or other complex medical conditions (Becker et al., 2012; Hay & Chaudhury, 2013; Shieu et al., 2021). Not only are the medical needs of these younger adults distinct from those of older residents, but they also have unique psychological needs, preferences, and interests.

## Person-Centered Care

The PCC model moves away from a one-size-fits-all approach and instead stresses partnership between healthcare professionals, individuals, and their families to make decisions that enhance the individual's QoL (Davies et al., 2022). It is important to encourage individuals to participate actively in their care decisions, including discussing their treatment options, setting goals, and determining the best approach to meet their needs (Davies et al., 2022; Kehyayan et al., 2015). This approach empowers, fosters a sense of control and autonomy over their lives, and contributes to improved emotional well-being, self-efficacy, and resilience (Davies et al., 2022).

Long-term care residents often face challenges regarding isolation and loneliness and are at higher risk for depression (Becker et al., 2012). To address this, PCC inspires social interaction and engagement within the community, promoting a sense of belonging and reducing feelings of isolation. Also, by creating environments that feel more like home and less like traditional institutions, PCC helps lessen the harmful effects of institutionalization (Davies et al., 2022). This can make residents feel more comfortable and at ease and increase happiness. Another relevant factor is that PCC emphasizes respecting individuals' dignity, autonomy, and rights. A person-centered care approach recognizes that individual needs and preferences may change over time, so care plans should be flexible and adaptable to accommodate these changes and evolving circumstances.

### Assistive Technology

As mentioned, in LTC settings, residents often face physical and medical challenges impacting their QoL (Harry et al., 2017). Assistive technology (AT) is “any item, piece of equipment, or product system, whether acquired commercially, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (Federici et al., 2014, p. 178) and is a potential means to addressing these challenges (Bartfai & Bowman, 2014; Federici et al., 2014; Scherer, 2014). However, when AT focuses exclusively on function, without consideration of psychosocial needs such as identity, autonomy, and intimacy, its use may result in embarrassment, isolation, and exclusion, compromising rather than enhancing well-being (Parette & Scherer, 2004).

In accordance with the aims of PCC, the likelihood of such unintentional adverse outcomes should be minimized when residents can actively participate in identifying and customizing AT solutions that support their wellness goals. By empowering residents to actively participate in identifying and creating solutions using AT, a person-centered approach should enhance overall well-being, foster a sense of purpose, and ensure that not only functional but also psychosocial needs and goals are addressed. Active user engagement in the conceptualization and design of AT solutions should enhance the technology's appeal, minimize associated stigma, and foster participant feelings of accomplishment and empowerment (Parette & Schere, 2004).

## Design Thinking

One initial means by which PCC can be effectively incorporated into AT solutions is the integration of design thinking workshops. These workshops make use of an iterative creative design process to help identify resident needs (functional and psychosocial) through creative expression to begin the process of exploring possible AT solutions, a task traditionally addressed by health professionals with little input from residents themselves (Conner et al., 2018). Design thinking allows residents to become co-creators of their care experience (Melles et al., 2020). Integrating design thinking into the LTC environment through such workshops represents a significant shift toward PCC, enhancing resident self-efficacy and contributing to overall health, life satisfaction and QoL (Conner et al., 2018).

## The Present Study

This study assessed if a design thinking-focused “creativity-for-purpose” workshop followed by person-centered AT integration would positively impact young adult LTC residents' QoL. It was anticipated that using a PCC approach to AT selection and design would strengthen the sense of connection to and meaningfulness of these aids and improve the well-being of the residents. This study predicted that participating in the workshops, actively engaging in AT design, and the subsequent actual use of the created AT would increase residents' well-being, meet their unique needs, foster a sense of purpose, and improve their QoL.

## Method

### *Participants*

The sample consisted of six young adults (ages 35 to 66, four women and two men) living in Bethany CollegeSide Young Adult unit and selected from a group of 12 residents who volunteered to participate in the initial design thinking workshops and AT integration sessions. The six research participants consisted of all those from this group who expressed willingness to also participate in the evaluation of the intervention. Due to complex needs, all residents in this unit require 24-hour nursing support in their daily living; therefore, the researchers worked with the care team staff, who assisted in supporting the participation of all interested residents.

## *Procedure*

The intervention evaluated in this study was a joint initiative involving collaboration between Red Deer Polytechnic (RDP) and Bethany CollegeSide. Following approval from the RDP Research Ethics Board, all residents residing in Bethany CollegSide Young Adult Unit were provided information about the upcoming creative design workshops and the AT creation/modification sessions (see below) and asked if they were interested in participating. Before the beginning of the first workshop, all individuals who indicated interest were approached individually by the researchers and presented with the opportunity to also participate in the project evaluation. Arrangements were then made for participation in the initial data collection session.

## *Ethics*

Before participant enrollment, this study received ethics approval from the Red Deer Polytechnic Research Ethics Board (REB). All participants were advised of the study's purpose, requirements, risks and benefits before giving informed consent. The participants were explained their right to withdraw from the study without any negative consequences to their care, and their privacy was protected throughout the study. The data analysis omitted potentially identifying information when writing about the participants or using quotes. All materials used in this study were stored securely to protect the confidentiality of the participants and were only available to the research team.

## Design Thinking Workshops and Technology Integration Sessions

### *Design Thinking Workshops*

(Intervention phase 1): A series of design thinking workshops tailored to adults' unique needs and preferences in LTC. These workshops provided a structured environment for residents to 1) identify personal wellness goals, whether related to mobility, communication, comfort, or other areas; 2) share their challenges and experiences with assistive technology; 3) collaborate with caregivers, technology experts, and peers in brainstorming valuable solutions. The design thinking workshops involved questions and interview procedures and encouraged discussions about what contributes to happiness and personal well-being for participants. The discussions included producing creative products and images (drawings, collages, participant photos, or other

internet-sourced images) representing happiness and well-being for use in the next phase of the intervention with engineers and technicians from RDP's Centre for Innovation in Manufacturing Technology Access Centre (CIM-TAC).

### *Assistive Technology Integration*

(Intervention Phase 2): Once the participating residents completed the design thinking workshops, they worked closely with the RDP CIM-TAC team and Bethany care staff in prototyping and testing the designed AT in real-life situations, ensuring practicality and effectiveness in addressing the residents' wellness goals. This involved adapting existing technologies or developing new, resident-designed prototypes depending on their needs and desires.

A variety of AT modifications and prototypes were developed, including a painting easel which attaches to a wheelchair arm and can accommodate different canvas sizes, as well as holding a container of paints and brushes, providing the resident with the autonomy to take her supplies and paint anywhere. Based on input from another resident, a footrest/massager was designed and developed to help strengthen her feet and ankles and support her legs during activities. Another participant contributed to the design of a scrapbooking shelf, which allowed her to store all of her supplies and then use the attached fold-up table to do her scrapbooking. Additionally, several personalized wheelchair trays and accessories, such as oversized cup holders, were designed and created based on resident suggestions and collaboration.

### *Sleep Quality Monitoring*

In conjunction with the intervention initiative, a sleep monitoring technology, TochTech Technologies SleepSense Sensors, was provided to all residents of the Young Adult Unit. Piloted at other Bethany locations, these sensors provided information on various aspects of sleep quality, such as sleep duration, amount of deep sleep, number of sleep interruptions, etc. The present study did not involve directly accessing this health information. However, participants were asked about the quality of their sleep and whether it improved following the implementation of the intervention, with residents prompted to relate information from the sensors if they chose.

### *Questionnaires and Interviews*

Additionally, data was collected after gathering informed consent by administering a hard-copy questionnaire consisting of brief standardized measures before and after the two-phase intervention. The questionnaire package consisted of four scales (assessing life satisfaction, sense of person-centered care, general self-efficacy, and happiness) in addition to demographic information (name (collected for comparing pre- and post-data), age and gender). Another brief scale on AT satisfaction was completed once the residents identified a specific AT device, assessing current satisfaction with that technology and again after phase two.

Finally, following the intervention, semi-structured one-on-one verbal interviews occurred at the Bethany CollegeSide facility. The interviews were structured to collect insights into the residents' emotional well-being, interpersonal relationships, personal development, and social inclusion and to retain information regarding the workshops and AT selection.

## **Results**

### *Questionnaire Data*

The questionnaire results indicated improvements in all categories after the intervention, supporting our expectations for enhanced well-being, with the largest effects for life satisfaction, self-efficacy, PCC relating to 'atmosphere,' and AT satisfaction.

### *One-On-One Interview Themes*

The one-on-one interviews asked participants about self-perceptions of emotional well-being, interpersonal relationships, personal development, social inclusion, and related questions about the creative product and the selected assistive technology. Although the quantitative data did show improvements in the predicted outcomes, analysis of the one-on-one interviews identified several themes reflecting ongoing challenges and the general impact of the intervention, leaving room for improvement in these projects. Participants' interview responses were valuable in establishing the benefits of the creative design and AT workshops and areas for improvement in future trials.

### *Life Satisfaction*

The first theme centered on how satisfied the residents were with life in general. With one exception, participants expressed overall satisfaction with their lives at Bethany CollegeSide, with one resident relating, for example, “I moved in about a year ago, and I felt home. God gives us what we need to be, so I'm here for a reason,”, and,

Everything here is pretty much looked after, and I kind of like how [another resident] put it one time, he said, ‘It's good, but you know, in some ways, wouldn't it be better if we were out struggling to pay rent?’ [. . .] sometimes the challenges in life are what's rewarding when we succeed.

The second theme identified the levels of agency and autonomy the participants felt within LTC and revealed mixed reactions. Several spoke about the freedom to come and go as they pleased, suggesting they could still engage in social activities outside of the facility and procure some ‘normality’ in their lives:

Well, I do mostly things on my own [. . .] I'm independent, so I like to go out with friends and go out with myself just to get out, so I'm not stuck in the building all the time.

On the other hand, others mentioned that even though they had some freedoms, their care was out of their control:

I guess this is the end of the road, right? That's why everybody winds up here. So that really sums up the control of life. It's all of a sudden, you're at the end of the road. Your control is diminished.

Of course, all residents in LTC have their own personalities, backgrounds, and experiences that impact their attitudes and behaviours when they are in these facilities. In conjunction with those factors, the environment, resources and social engagement they encounter can also contribute to their perceptions of agency and autonomy.

### *Optimizing Environment*

The third theme emphasized the physical limitations of their environment. Three participants explicitly mentioned their need for space and alone time, with one noting the value of “hav[ing] my own space that I can relax in, [where] nobody's using the bathroom,” and another

stating that “My biggest problem is to get people to give me space.” Relating to the physical environment, several residents also expressed frustration with the inadequacy of doorways, halls and dining room space in accommodating wheelchairs, particularly given the number of residents who require these mobility aids. However, not all the comments were negative, with one participant, for example, expressing appreciation for the ready availability of a call button if needing help.

### *Internal and External Relationships*

The central importance of social connectedness to QoL in LTC was apparent in a number of participant statements, with one poignantly noting, “I miss my husband every day... We’ve been married twenty-one years, and I still feel like a newlywed.” Other residents also spoke about relationships outside of the residence, with one indicating that their friends and family dislike visiting the building, making it difficult to have strong relationships. Another mentioned the importance of building trust with other residents and care staff before opening up to them and acknowledged that it can be challenging but worth it in the end. Regarding personal connections within Bethany CollegeSide, some indicated connections were made due to convenience, while others were based on similarities in lifestyle or demographics. For example, one related, “There's the one girl has just come into the place so I think I'll get to know her. She's, I think, the right age group.

In addition, two of the residents commented that the creative design workshops initiated social connections, both internal and external:

There's so many little benefits that are coming from this stuff [. . .] So that opened up some neat conversations, but you'd never have guessed that from any of this project. It was never set up to do that, but that's what came out of the art part of it. (Participant A3)

Well, you got to meet people that you didn't know. And you got to feel them out. What are they like? Who are they? What background did they come from? Right? And we got to sit there and talk and tell them what we like. And then they got, they got an idea, and we can open up and make friends at the same time. (Participant A1)

### *Subjective Intervention Impact*

All of the participants had positive feedback concerning the intervention, ranging from social connections (“I really enjoyed it. It kind of brought me closer to one lady that was paired



with me during that.”), to personal wellness (“It maybe helped me see what I really wanted out of life, or from life, or that I had from life.”), attained goals with AT (“It’s amazing how accessible the table is to me. And [the engineer] didn’t put any thoughts in my head. I just told him what I wanted. And you can see I got exactly what I wanted.”; “I like the fact that I can drive my easel outside and paint. That’s something I have not been able to do since I moved here.” and general gratitude for the experience (“From what I could see, it made each of us very happy and feel special . . . I feel honoured to be in this study.”; “I hope this just spreads out to other colleges and, you know, all over because isn’t this fabulous for everybody?”).

Overall, the qualitative analysis found that participants were very satisfied with the creative design workshops and integrated AT, as evidenced by the identified themes. This process supports PCC’s platform and underscores its benefits and areas for improvement.

## Conclusion

This study uncovers that personalizing care in LTC facilities through resident engagement in exploring and identifying individual needs empowers and contributes meaningfully to QoL. The results reveal that implementing creative design workshops and AT integration processes focusing on PCC practices enhances residents’ well-being. The data indicates that facilitating the personalization of care to explore and identify needs tailored to the individual and promoting residents’ involvement in their care are strong enmeshed components of PCC and QoL. Furthermore, the application of the PCC approach in these workshops is integral to the use of AT, which involves a complex relationship between the cognitive, physical, and social characteristics of the residents and the environment, all relative to the efficacy of the AT (Bartfai & Boman, 2014).

These outcomes have numerous implications for the scholarship of well-being. First, they reinforce the notion that implementing creative activities such as creativity-for-purpose workshops can serve as interventions for enhancing well-being and QoL (Conner et al., 2017). Also, previous quantitative research has discovered that LTC facilities that implement PCC models and focus on resident preferences are correlated with improvements in life satisfaction and self-efficacy, which is supported in this study (Davies et al., 2022).

This project aimed to identify whether participation in creative design workshops and active engagement in the design and development of AT solutions increase well-being, meet needs,

foster a sense of purpose, and improve QoL, and it was successful in doing so. Overall, this study determined that PCC is crucial to recognizing young adults' goals, preferences and needs in LTC and that effective AT solutions should focus on meeting functional and psychosocial needs. Future research should seek to comprehend how these key interlocking elements can be executed to enhance PCC while reflecting on the underlying components of LTC facilities, such as traditional medical services, to identify what is possible in PCC planning. In sum, PCC cultivates a supportive and tailored approach to LTC, enhancing residents' QoL. This method influences a more positive and rewarding experience for individuals receiving LTC services by underscoring respect, autonomy, and holistic well-being.

Ultimately, it is hoped that this intervention will contribute to constructing effective, user-friendly, and socially inclusive AT solutions, inspiring a more positive and fulfilling experience for individuals receiving LTC services by emphasizing dignity, respect, autonomy, and well-being.

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