A MAJOR ADVANCE IN 3D AND VR TECHNOLOGY:

Improve The Lives Of Long-Term Care Residents And Their Caregivers

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THE QUESTIONS

- Is it possible to improve the quality of life for the elderly, especially those living in nursing homes and long-term care facilities, so that they experience less anxiety, less depression, less mood swings, less mental health issues and less of all the other pressures the elderly face in a situation many of them never wished to be in?
- Can the staff in these facilities find less stress and consider their jobs to be more rewarding and satisfying?
- Can facility executives and investors find ways to use technology as a positive return on investment in their facilities to benefit all stakeholders?

THE SITUATION AND THE NUMBERS

This greater than $64,000 challenge is one that nursing home and long-term care facility operators are increasingly faced with. CEOs of such facilities are well aware of the statistics, as are all levels of government. They know a tsunami is headed their way as the cohort of seniors over 65, and increasingly over 85, is a numbers game they cannot ignore. Improved diets, exercise and improved medical care may hold back the tide. But it can’t stop it.

CAN WE SOLVE IT?

Can we take the edge off the problem? Can quality of life for the elderly, especially those in nursing homes and long-term care, be improved? Can facility staff find their jobs less stressful and more satisfying? Is technology at least a partial answer to improve the situation? And if so, is the return on investment justified?

THE NUMBER OF AMERICANS AGES 65 AND OLDER WILL MORE THAN DOUBLE BY 2060.

U.S. Population Ages 65 and Older, 1960 to 2060 (Millions)

Source: PRB analysis of data from the U.S. Census Bureau.
**THIS PAPER’S PROPOSITION**

The problems of the elderly are well known: anxiety, depression, drug dependence, loneliness, dementia, lack of mobility, loss of family and friends. What this paper proposes is that there are ways to improve the situation for residents that can in turn be a catalyst for staff satisfaction, and for a positive return on investment. It requires a small investment in the application of new technologies as part of an ongoing recognition that there is a way forward. The potential is just waiting to be explored.

That way is the use of 3D and VR technology. Because the immersive VR method combines the benefits of so many stimuli, this paper will explore and highlight the success of therapies that use a similar approach to create positive responses in the brain activity of elderly patients.

In particular, this paper will look at the opportunity presented by a remarkable new development from 3Scape Systems on 3D and VR technology.

**POPULATION AGED 85 AND OLDER, CANADA, 1966 TO 2051**

Sources: Statistics Canada, Census of Population, 1966 to 2016. Data for 2021 to 2061 are population projections from the M1 medium-growth scenario of national projections. The projection data have as a base population the population estimates based on the 2011 Census, adjusted for net undercoverage. For more information, see the report Population Projections for Canada (2013-2063), Provinces and Territories (2013 to 2038) (Statistics Canada Catalogue no. 91-520-X).

**NON-PHARMACOLOGICAL THERAPIES IN USE TODAY**

Introducing certain stimuli to residents in assisted living facilities has yielded very encouraging results in the past, particularly in seniors experiencing dementia and loss of mobility. Studies have shown improvements in muscle memory, movement, energy levels, and cognitive function in seniors who participate in:

- Talk therapy
- Distraction therapy
- Music therapy
- Reminiscence therapy

A major benefit of all these therapies is that pharmacological intervention is not involved.
TALK THERAPY

WHAT IT IS

Talk therapy is a traditional method for stimulating cognitive function in the elderly by engaging in conversation with a psychologist/psychiatrist. Talk therapy may be valuable for anyone going through a tough time with emotional problems they are unable to work out on their own.

According to the National Alliance on Mental Illness (NAMI), more than 6.5 million Americans over age 65 suffer from depression. While some live with unaddressed mental health concerns long before they turn 65, NAMI suggests signs of depression in seniors can be attributed to lifestyle changes that typically come with age, such as new living arrangements, finances, health issues, loss of loved ones, and their own mortality, as reported in the New York Times (NYT).

Geriatric clinical psychologist, George Kraus, explains that the aging process affects the way people relate to themselves and to others. He proposes three principal issues the elderly deal with, including:

1. “How to adapt to the biggest transition of their lives—their changing health, the idea of getting older, and their changing family and work roles,
2. how to cope with the grief and loss that accompany their advancing age and decreasing abilities, and
3. how to manage their interpersonal relationships with others.”

Kraus suggests that if seniors remain silent about the feelings of depression and uncertainty that can stem from dealing with these three principal issues, their true emotions can often come off as symptoms of dementia.

BENEFITS

Talk therapy can be a helpful part of a depression management plan that does not involve pharmacological intervention. Kraus puts it this way:

“Listening to and being there for elderly clients is invaluable to them not only because it makes available a problem-solving process that may ameliorate their distress, but also because it brings a heightened sense of connectedness and bonding with you. When this happens, they are not alone, and in that moment, neither are you.”

Kraus maintains how simply giving seniors an opportunity to open up and discuss their feelings about the inevitable lifestyle changes that come with age can improve their quality of life and happiness as they transition into a new stage of life.

LIMITATIONS

There is a concern that people get labeled with the societal stigma that can be associated with their issues, whether that be mental health, emotional health, and so on. For the therapist, there is always the risk of client attachment. On a group level, the individual may succumb to the power of group beliefs and be dependent on the group.

Talk therapy is a one-on-one process between client and therapist. In a nursing home situation, it becomes a labour intensive situation, no matter how valuable to the individual resident it is.
WHAT IT IS

Distraction therapy is a method of non-pharmacological intervention used by therapists to distract patients from both physical and mental pain. Its application is becoming more widespread.

The British Columbia Children’s Hospital has recently agreed to run clinical tests of the VR game Farmoo, developed by Simon Fraser University graduates Henry Lo and Janice Ng with their teen cancer patients.

The game is based on Lo’s personal experience while battling lymphoma. The simulation allows patients to forget their pain by distracting the brain with a task. If clinical trials are successful, the hospital is looking at installing the game permanently in its pain management facility.

Home Care Assistance in Perth, Australia, found that the art of distraction can be a very useful technique in dementia, using the technique to refocus the attention of a senior from a negative behaviour to a positive one. “Be sure to try to understand what the senior is saying before trying to distract him or her as there could be something important he or she is trying to communicate.”

“Dementia patients often feel lost, because they feel that they don’t belong anywhere,” said Kim—they may be confused about their surroundings or who they are, or estranged from family members overwhelmed by their care. “By giving them a beautiful beach,” Kim said, “I want them to feel found again.”

DISTRACTION THERAPY

BENEFITS

Distraction therapy is not limited to any specific demographic. A qualitative study by Tamara Backhouse in Age and Ageing found that social interventions, such as offering a cup of tea or a walk, have often been used as first-line interventions for dementia-related behaviours. Backhouse suggests that assisted living facility staff viewed these actions as ‘distraction’ techniques and most effective when used at the immediate sign of a dementia-related episode.

“In individualized social interventions are being used in the moment as first-line treatments for dementia-related behaviours,” Backhouse confirms.

VR AS DISTRACTION THERAPY

In 2014, Dr. Sonya Kim, a former emergency room doctor and entrepreneurial visionary from the Bay Area, developed a program called One Caring Team in order to respond to the need for progressive solutions in geriatric care. Kim understood that seniors are often hospitalized for preventable conditions made worse by loneliness, depression, and anxiety. One Caring Team, a care call program, checks in on seniors during the day to monitor their mood, medications, and appointments, and encourages them to chat about positive subjects. To treat dementia patients who are unable to maintain cohesive conversation, Kim offers VR experiences to make users feel safe and welcome.

These images from an fMRI scan show areas of the brain affected by pain, and how they become significantly less active when a patient is immersed in a VR world.

“A 2015 study in the Psychology of Consciousness journal further reinforced these results, reporting that adults using VR as a method of distraction experienced up to 82 per cent reduction in pain in comparison to those who are not using VR.

Although some of Kim’s patients struggle with verbal communication, they have found other ways to express their happiness. Some hum along, others blow kisses, and some even ask for more VR time—responses that bring obvious delight to both therapists and family members.

LIMITATIONS

Distraction Therapy, like Talk Therapy being one on one, is labour intensive. It can take a great deal of time, ideal if a one on one situation is desirable. It has clear disadvantages if the desired result is to impact multiple residents at the same time.
MUSIC THERAPY

WHAT IT IS

“Music therapy is the skillful use of music and musical elements by an accredited music therapist to promote, maintain, and restore mental, physical, emotional, and spiritual health.” (Music Therapy Association of Ontario)

The Music Therapy Association of British Columbia (MTABC) uses music therapy to ignite both physical and emotional responses in elderly clients. According to the MTABC, music has the power to stimulate cognitive functions, such as short- and long-term recall, reality orientation, and learning opportunities.

“Music therapy sessions can provide a pleasurable and non-threatening environment where musical cues, rather than direct, formal questioning, can stimulate and encourage reality orientation,” the MTABC Geriatrics website states.

“Long-term recall can be facilitated through musical association with childhood and adult experiences. The use of themes, melodies and/or lyrics can prompt short-term recall, important for maintaining independence and assisting in activities of daily living.”

These findings are supported by the work of the Institute of Music and Neurologic Function (IMNF) in New York. IMNF researchers conducted a study to find out whether or not music therapy could positively affect the neurological and cognitive functions of persons with dementia. The variables measured included attention, recognition, verbalization, EEG changes, functional status, behaviour, depression, and cognitive status.

As a whole, it was found that over half the participants in the verbal reminiscence and music therapy groups showed improved scores following treatment.

In a more recent study by Gallego and Garcia (2017), patients with mild to moderate dementia underwent a Mini-Mental-State Examination (MMSE) to evaluate their orientation in time and place, attention, verbal memory, language, and motor skills. Total scores ranged from 0 to 30 points. As seen in the graph, patients experienced an increase in all factors following four sessions of music therapy. The results of both studies imply there is indeed good potential for improvement in patients with dementia.

BENEFITS

According to the MTABC, the use of music to accompany physical activity can enhance repetitive exercise and provide diversion from pain. They also suggest rhythm can stimulate physical activation, increased steadiness, and smoothness in physical functioning.

Music therapy has also proven successful in stimulating physical activity and distraction from chronic and/or injury-related pain.

In 2014, an American documentary called Alive Inside: A Story of Music and Memory directed and produced by Michael Rossato-Bennett, won the Audience Award at the 2014 Sundance Film Festival. The film deals with the subject of people suffering from Alzheimer’s and how music therapy can help and ease their suffering. In many chapters of the film Dan Cohen, of Music and Memory, places music headphones on patients and we see them become very expressive; his pioneering efforts have placed personal music players in nursing homes.

The film received positive response from critics. Rob Nelson in his review for Variety said that “Michael Rossato-Bennett captures some amazingly transformative results in the treatment of dementia through music.”

When discussing the impact of music on an environment so often typified by isolation, one of the patients describes his desire for freedom.

LIMITATIONS

Steve Swayne is the chair of Dartmouth College’s Department of Music.

“It’s comforting to believe that songs can help dementia patients recall their lost selves. But music can also harm as much as it helps, creating false memories, confusion, and distress.

For someone suffering from dementia, we have no easy way of knowing whether she is genuinely recalling a song and how the recall challenges her present situation, which is decidedly not that earlier time and place. We hope that the patient is experiencing joy, but that joy can be laced with anxiety or even terror from being awakened by familiar sounds into an unfamiliar world.”

Kimberley Sena Moore in Psychology Today (August 15, 2014) says that music can trigger memories that may not always be good.

“In a clinical setting, music therapists are trained to be aware of responses that may indicate heightened anxiety, even in clients who are unable to speak for themselves. For example, consider a community of individuals living with dementia or Alzheimer’s. Although music can be a powerful elicitor of memories for them, the ‘wrong’ music can have a different effect, causing anxiety and distress in one individual that could easily spread throughout the group.”
REMINISCENCE THERAPY

WHAT IT IS

Reminiscence therapy, as defined by the American Psychological Association, is “the use of life histories – written, oral, or both – to improve psychological well-being.”

Initially presented by internationally-renowned geriatrician Robert Butler and psychologist Erik Erikson, this method of therapy stimulates cognitive function in seniors showing symptoms of Alzheimer’s, depression, and chronic conditions. In essence, reminiscence therapy (RT) requires patients to recall past experiences by reciting their memories verbally, or on paper, encouraging them to reflect on significant life events in their past.

One of the more progressive developments in the field is the “Dementia Village,” established in 2009 in the Netherlands, and called Hogeweyk. Hogeweyk is a round-the-clock residential care space that spans several city blocks (or around 8,500 square feet) and holds 24 buildings and 12 stores, including a diner, post office, barber shop, pet store, library, museum, and even a movie theatre.

The Dementia Villages are based on the principles of RT and designed to provide familiar surroundings and reference points for their residents. Seniors can choose to live in a 1950s style home, or visit a shop outfitted as if in the 1970s. Similar concepts are being established in the United States, like the Glenner Town Square in Southern California. It will include an Old Town gaslight street and a Navy Town section.

“Reminiscence therapy can be a powerful tool for dementia patients,” says Dr. Peter Whitehouse, professor of neurology and neuroscience at Case Western University and president of the Intergenerational Schools International. “It makes those with Alzheimer’s more content and happier because they return to a time in their lives when there was no perceived failure—a time when their memory was intact and they did not feel lost.”

Not every community can afford to build these large-scale establishments for their aging populations. Although there are a growing number of devices and “smart-home” offerings being developed to assist seniors in their daily lives as they age, there is a vast need for technology that targets the emotional wellbeing of persons—especially those that struggle with cognitive disorders. It is for this precise reason that 3D and VR technology is becoming so important.

BENEFITS

Reminiscence therapy administered through 3D and VR reduces the burden of overhead costs from development and implementation, while maintaining a high level of impact on patients. The versatility of these technologies also allows for the creation of an unending number of scenarios, environments, and storylines that can resonate strongly, particularly with groups. It is arguably one of the newest and most advanced tools in a recreational therapist’s arsenal.
THE 3Scape Model
How 3Scape Systems Technology Compares and Complements Other Non-Pharmacological Therapies

Talk, distraction, music, and reminiscence therapies all involve stimulating the mind and body to improve cognitive function and boost physical functions. 3Scape Systems takes this process beyond what has already been proven effective by combining both visual stimuli and the immersive attributes of 3D/VR video.

To achieve this, 3Scape Systems has developed research-based, specialized videos in 3D and VR formats to create immersive experiences for seniors based on the principles of reminiscence therapy. These 3D/VR productions combine elements of geriatric psychology and visual storytelling with research-based findings on how colour, music, sight, and sound affect brain activity.

“3Scape has the potential to honour and validate the life stories of elderly patients, in particular if it’s used as a medium for reminiscence therapy or mindful meditation. It can reduce mood disorders, such as depression, and anxiety, and promote an overall sense of wellbeing in elderly patients.”

Dr. Suparna Madan, Section Head, Geriatric Psychiatry University of Calgary

The effectiveness of 3D and VR-based cognitive rehabilitation has already been well established. 3Scape incorporates proprietary elements specifically developed and tested for geriatric populations:

1. 3Scape is a story-based narrative, which engages the audience better.
2. 3Scape is offered in 3D immersive projection for use in groups, thus encouraging enhanced socialization. It is also offered in VR for individual use.
3. Both 3Scapes’s 3D and VR combine evocative visuals, nature sounds, and emotive music for a dynamic combination of sensory feelings.
4. 3Scape videos include built-in psychological triggers to enhance the experience.

By shooting at a high frame rate, adjusting colourization for aging eyes, slowing down the pacing, setting a high resolution, and ensuring a continuous narrative in each video, the 3Scape production team is better able to fulfill the specific rehabilitation needs of residents, as well as their caregivers’ intervention requirements.

What’s more: 3Scape offers flexibility and is available 24/7 at the push of a button.

The 3Scape 3D/VR solution is the result of a multidisciplinary collaboration between patients, physicians, researchers, therapists, and caregivers. It has the potential to become a versatile platform for progressive geriatric treatment and care, as well as a valuable source of information regarding healthy aging.

If immersive 3D and VR technology is brought into residential homes and long-term care facilities as a tool for caregivers, aging populations experiencing symptoms of dementia, Alzheimer’s, and/or other forms of cognitive impairment will have a renewed opportunity to heighten their quality of life despite the aging process. Feedback at this time tells us that residents would actually look forward to seeing 3Scape programs once a week.

Clinical Trials are Currently Underway

As 3D/VR products are still undergoing the last stages of clinical trials, the success of similar immersive stimulant-based therapy methods can be used to extrapolate the positive results of experiences like 3Scape.

In-depth testimonials and information about the 3Scape technology can be found at www.3scapesystems.com.
THE OPPORTUNITY TO SCALE

One of Henry Ford’s greatest achievements at the Ford Motor Company was building assembly lines for the new Model T Ford. He could scale up production without losing quality.

Being able to scale in a nursing home/long-term care facility is another proposition. So much of the care is one-on-one, as shown in this paper with therapies, such as talk and distraction. Even music therapy, though lending itself to group participation, does not have the broad appeal and impact as does a 3D presentation.

What 3Scape’s 3D system offers is the ability to include multiple residents at one time, giving each participant an experience to share, and one that is beginning to provide caregivers relief from stresses in the workplace.

For investors and CEOs, 3Scape offers up possibilities of providing a powerful, human service to their residents at reasonable cost, allowing them to scale this program in all their facilities.

A FINAL WORD

Can we shift the perception of nursing homes and long-term care as a holding facility where we keep people until they pass on, or can we make it an enjoyable experience that celebrates the life they have lived? 3Scape Systems holds out that possibility.

SET UP A FREE ONLINE DEMO TODAY.
TALK TO OUR PRODUCERS

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