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The Future of Aging
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Smart Home Technology: Enhancing Independent Living

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Smart Home Technology: Enhancing Independent Living

A collaborative research project among St. Catherine University, Best Buy Corporation, and Benedictine Health Services.

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Financial Disclosure

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Objectives

1. Describe smart home technologies and what they can do.

2. Understand the implications of using smart home technologies from the perspective of older adults and their families.

3. Describe the results of a year-long study on the use of smart home technologies with older adults in independent living

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Background

- Conversations among the three partners.

- Research would involve

  - Interprofessional team of students and faculty

  - Follow participants over the course of a year

  - Qualitative

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The Partners

- St. Catherine University
- Best Buy Corporation
- Benedictine Health System

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St. Catherine University

- 4859 students
- 305 Faculty
- 3 Schools & 3 Colleges
- Henrietta Schmoll School of Health
  - 33 Programs
  - 4 Degree levels

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St. Catherine University

Our mission is to educate women to lead and influence.

We educate at all degree levels through valuing and integrating the liberal arts and professional education within the Catholic intellectual tradition, emphasizing scholarly inquiry and social justice teaching as lived by the Sisters of St. Joseph of Carondelet.

We welcome a rich diversity of students, with a baccalaureate college for women at the heart of the university and graduate and adult colleges for women and men. Committed to excellence and opportunity, St. Catherine University develops leaders who act with integrity.

(St. Catherine University, 2019)

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St. Catherine University Motivation for Participation

- Opportunity for scholarly inquiry working directly with community partners

- Opportunity for student-faculty collaborative research

- Opportunity for interprofessional collaborative research

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Introducing Best buy Assured living

LIFE MADE EASY WITH THE COMFORT, SAFETY AND CONVENIENCE OF SMART HOME SOLUTIONS COMBINED WITH EXPERT SERVICE AND PROFESSIONAL INSTALLATION

SMART AGING MEANS
SMART LIVING

Best Buy® has a new service that empowers you to take advantage of smart home technology to make your life more convenient and fun. We're excited to get you started.

EXPERT ADVICE
AT THE IN-HOME CONSULTATION, OUR ADVISORS WILL DETERMINE THE BEST EQUIPMENT SETUP FOR YOUR NEEDS.

SAFTEY AND CONTROL
USE THE WI-FI DOORBELL CAMERA TO SEE AND TALK TO VISITORS AT YOUR FRONT DOOR.

VOICE CONTROL
USE TO TURN LIGHTS ON AND OFF, LOCK DOORS, AND CHANGE THE TEMPERATURE.

REMOTE ACCESS AND CONTROL
USE THE MOBILE APP TO CONTROL HOME DEVICES FROM YOUR SOFA OR ACROSS THE COUNTRY.

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Best buy Assured living

A GREAT ASSORTMENT OF PRODUCTS THAT CAN MAKE YOUR LIFE EASIER WHILE GIVING YOU PEACE OF MIND BY FEELING MORE COMFORTABLE, SAFE AND SECURE IN HOUR HOME

Know who is at your door without having to open it

WI-FI DOORBELL CAMERA

Use a voice assistant to turn on/off lights, change the temperature, and check your schedule for the day

VOICE CONTROL WITH AMAZON ECHO

Unlock/Lock your door from your mobile app to let family or friends in while you're away

DEADBOLT LOCK

Create lighting that turns on automatically if movement is detected

SMART LIGHTING

Save money on energy by controlling your thermostat with voice, apps or schedules

SMART THERMOSTAT

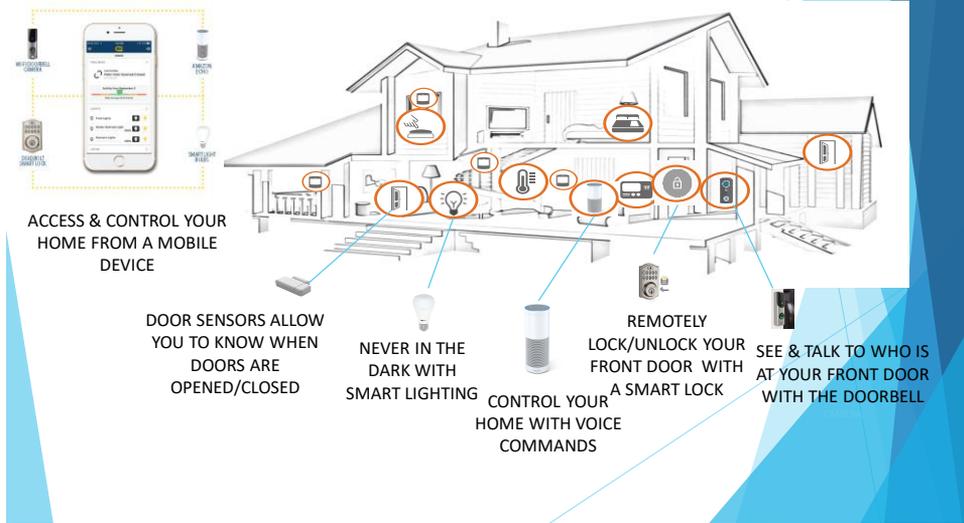**Access anywhere, anytime mobile or online**

ONLINE DASHBOARD & MOBILE APP

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A typical Assured Living installation

includes home automation devices combined with standard motion and door sensors

ACCESS & CONTROL YOUR HOME FROM A MOBILE DEVICE

DOOR SENSORS ALLOW YOU TO KNOW WHEN DOORS ARE OPENED/CLOSED

NEVER IN THE DARK WITH SMART LIGHTING

CONTROL YOUR HOME WITH VOICE COMMANDS

REMOTELY LOCK/UNLOCK YOUR FRONT DOOR WITH A SMART LOCK

SEE & TALK TO WHO IS AT YOUR FRONT DOOR WITH THE DOORBELL

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Automation and voice control technology

VOICE ASSISTANT

Add **convenience** and **fun** to your home automation with Alexa at the center of your solution as a voice assistant.

Ask Alexa to turn your lights on/off

"Alexa turn off my bedroom light"

Ask Alexa to change the temperature in your home

"Alexa change the temperature to 68 degrees"

Ask Alexa to lock your doors

"Alexa lock my front door"

Alexa can also:
Play music | Set timers & reminders
Check your calendar activities | Get the weather
Check the time | Listen to audiobooks
Check traffic | Listen to jokes

MOBILE APP

Use the mobile app to turn the lights on/off from your bed or vacation home

Use the mobile app to lock/unlock your door from any location

Use the mobile app to change the temperature of your home or set a schedule to save on energy usage
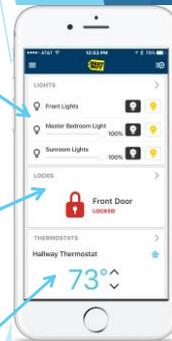
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Best buy experts with you every step of the way

FROM THE INITIAL CONSULTATION, AT THE INSTALLATION, AND AFTERWARD TO ANSWER ANY QUESTIONS YOU MAY HAVE

To learn more, schedule a consultation with our advisors

Our Advisors have been trained to understand your unique needs and work with you to find the right solution for you.

A Geek Squad Agent trained on Assured Living Home Automation will install everything for you. After the install, Geek Squad Agents will be available by phone for technical support of Assured Living

After you complete your in-home consultation and have decided on the right solution for you, an installation will be scheduled with our Geek Squad

Your Advisor will also be present at your install to ensure you are properly trained on how to use your new home automation devices

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Customer feedback has been positive ...

ACTIVE AGERS EXPERIENCE HIGHLIGHTS:

1. Home Automation -Doorbell cam is#1 requested item
   - "I live alone and I feel so much better never having to answer the door without knowing who is there!"
2. **Voice** commands!!!
   - "I want voice control on every level of the house"
   - "I'd like even more things possible with voice activation"
3. Peace of mind knowing **family will be alerted** if there is an issue
   - Most active agers prefer contacting a family member instead of medical support

LOVED ONES EXPERIENCE HIGHLIGHTS:

1. Knowing Mom is "**up & about**"
   - "It takes two seconds to check my app and see Mom is OK"
2. Knowing Mom is "**safe & secure**"
   - "I love knowing Mom's doors are closed and locked at night"
   - "Getting alerts for **unusual activity** is amazing peace of mind"
3. Seeing Mom's daily activities
   - "I have a lot **more insight about Mom's overall well-being** based on the data"

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Benedictine Health System

Number of states: 5

Number of campuses: 33

Number of assisted living/independent units: 2,114

Number of nursing beds: 2,542

Total number employee FTEs: 3,734

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Benedictine Health System

Vision

We create Benedictine Living Communities where health,

wellness and choice come to life.

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Motivation for Partnership with Assured Living

Assured living as an opportunity help persons stay in their home longer.

4 Applications for us:

- Persons on waiting lists for our housing with services would have support while they wait

- Persons discharging from transitional care would have support to avoid return and or re-hospitalization

- Save on staff time through smart home technology

- Market differentiator for tenants, family and employees

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Scope and Support

- Original scope BHS wide, realized to large and limited capacity

- Unsure if product would work in an environment where staff are coming and going--adding movement to measurements

- Unsure if seniors would use or value

- Decided to test product and outcomes in narrower scope

- Focus on Benedictine communities in Rochester - Madonna Towers

- Best Buy Project Management and St Kate's Research support

- Would move to phase II as appropriate

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The Assured Living Project

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Literature Review

- Older adults will adopt smart home (SH) technologies if use is perceived as having advantage over traditional coping strategies (Golant, 2017).

- Perceived home safety and independence in daily occupations are negative predictors of adoption of SH technologies (Arthanat, Wilcox, & Macuch, 2018)

- Caregivers perceive the SH technology as more useful than participants did (Mehrabian et al., 2015).

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Literature Review cont.

- Pros of SH Technology

  - Sense of safety (Pol et al., 2016)

  - Control environment with voice, greater independence and reduced caregiver burden (Noda, 2017)

  - Smart speakers blend into the environment, are aesthetically pleasing (Morris et al., 2016; O'Brien, 2016)

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Literature Review cont.

- Cons of SH Technology

  - Potential for social isolation (Cocco, 2011)

  - Feeling that privacy is being invaded (Cocco, 2011)

  - Feeling they don't have necessary skills to set up and learn to use smart home technology (Anderson & Perrin, 2017)

  - Potential for false alarms, lack of privacy, high cost, low ease of use, and stigmatization (Peek et al., 2014)

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Methodology

- Qualitative study reviewed / approved by IRB

- A convenience sample of 10 participants

- 5 completed study with 3 in-depth interviews

- Phenomenological approach to capture experiences and contextual factors influencing SH technology adoption

- Interview data analyzed using NVivo® and modified grounded theory

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Results
- Participant description
- Participant themes
- Family themes

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Overview of Study Participants: They report

Family and friends check up on me from occasionally to at least twice a day

Others are either never or always concerned about my safety

Range in age between 75 and 90

Interact with staff between one and several times a day

Never feeling concerned about my own safety

Participants are active: 91% leave their apartment 3 or more times a day

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Pre-Installation of Smart Home Technology: Participant Themes

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Pre-Installation:
Overview of Themes

Participants

https://www.flickr.com/photos/diabetescare/14589702095

- Had routine activity patterns
- Did not need the SH technology
- Had experience with other technology
- Kept in touch with family
- Thought the senior living community was a wonderful place

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No Need for SH Technology

"So, I figure, I don't really need it [the technology]. You know, I think that's the attitude some of these people take, too. That it isn't something they need. They don't want anybody checking in on them."

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Experience with other Technology

- *"I do technology"*
    - iPad
    - Computer games
    - Surfing the internet
    - Emailing
    - Phone/smartphone for communicating
    - Online shopping
- *"I'm not the best at computers. I can do the basics."*

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In Touch with Family

"I think they all know, pretty much, what's going on with me because if there's anything, [my family member] will let them know. [My family member] and I keep good contact."

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Senior Living Community is a Wonderful Place

"It really is a wonderful place to live. Really friendly...We really have everything we need here...The staff, there isn't [anything] they wouldn't do for you. They all go to any ends...[The staff] check on us every day. They call and make sure everybody is okay."

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Routine Activity Patterns

"I have an iPad that I always put music on in the morning...And then, about 8:00 I'll go down to the exercise room and I do a half hour on the Nu-Step...Then I go up and eat my breakfast...And I'll usually go in and look at some of the mail, and write checks, or do some reading...we have Communion service...go up to my room and eat some lunch... we have sing-along, and I belong to that group. we have bingo...Then after supper, I go to my room and I may watch television...Sit and read, or sometimes I'll play solitaire on my iPad... I don't go to bed until 11."

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2-Months Post-Installation of Smart Home Technology: Participant Themes

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2-Months Post-Installation: Overview of Themes

http://www.freestockphotos.biz/stockphoto/17511

Participants

- Did or did not change but want to help the student researchers

- Discuss that family can "see" their activity

- Thought of Alexa as a nice friend

- Think community living staff already watch

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Change from the Technology

"I don't know that it has changed any of my activities. None that I can think of."

"Pretty much I do the same types of things, daily, weekly...so there really isn't much change."

"I'm using it for a lot of stuff aren't I..It is changing me."

"I just feel like I'd like to do it for you people."

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Family Can See

"I haven't had any problems. I just go on as usual and she can see that I'm just going on as usual."

"The first night she called me. She said is your refrigerator open or closed….because..she could see."

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Alexa's a Nice Friend

"It's a nice friend to have."

"It's given me peace of mind, it's another level of security which I feel good about."

"Sometimes we talk about her as if she's a real person...a roommate."

"They get a kick out of her....he always wants to know what (is) Alexa's word for the day."

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Staff Watch Out for Us

"They really keep good track of you, and if you're signed up for supper, and you don't show up, they'll call your room. If you don't answer, and haven't shown up, they'll send somebody up. They really do take good check on you."

"We have to check in every morning and someone's always kind of watching out for us. So it's not like we're isolated."

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Post-Installation of Smart Home Technology: Family Member Themes

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Family Member Interviews: Overview of Themes

Family Members

- Felt technology provided peace of mind
- Felt privacy was respected
- Thought greater benefit if poor memory or health decline
- Influenced activity changes
- Feel point of contact is their role
- Were interested in specific sensor data information

https://pixabay.com/photos/mother-daughter-together-loss-joy-1327186/

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Privacy was Respected

"She can see on her log when I log in…I asked her at first, I said, 'We'll have a follow-up and sit down together, and I'll show you the things I'm looking at. You have to let me know if you think it's an invasion of privacy that I'm paying attention to how often you're going to the bathroom, and we'll have to talk about what's important to you.' But we haven't had that meeting because whenever I ask her about it, she just loves that I'm looking at it so far…I think she likes this."

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Technology Provided Peace of Mind

"She's extremely anxious about her health and her safety...That would be a reason why it would be worth continuing, because it gives her this peace of mind that is a little beyond the technology...She definitely looks at it as an extra safety net."

"She likes these sensors because they're helping her feel... My view is she seems to feel a little more secure having the sensors, that if something would happen, somebody would know right away."

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Greater Benefit if Poor Memory or Health Decline

"But...to this point, she hasn't had any issues. Like she doesn't have memory problems...But if her memory wasn't so good then it would be great...If I was seeing...the front door alarm is, then I would be even much more apt to tell this thing to say, okay, I want to know if the front door opens between this and this time. I don't want to just get a little note. I want to get a ding...Like I say, if she was mentally failing I would definitely. And if she was physically in worse shape."

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Influenced Activity Changes

"She's slowing down, and she has her habits of...when she sits in a chair. She did say to me one day, though, 'Oh, that means you can tell how long I'm sitting in a chair.' Yeah, I can, mom. Enough said. She brought that up, and I said, 'You know, mom, it's just...Get up and just move. Kind of get up and shake it out...' because she would sit for hours in the chair... She is moving. She is making sure she is moving on a daily basis."

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Influenced Activity Changes

" I learned that she was still getting up so much at night [to go to the bathroom], and I encouraged her once again to switch a diuretic pill to earlier in the day, which I had been urging her to do for years, but finally I showed her the evidence and said, 'Look, if you switch it earlier...' Now she's switched it earlier, and she's sleeping all night."

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Family Member as Point of Contact

"I'm the one my siblings ask, 'How's mom doing? How's mom doing?' Call mom. Mom'll tell you how she's doing…See, it's my role. I'm used to this. This has been my role for years, and I'm fine with it... It's how we are as families…And they all know that I'm doing this, and none of them have asked, 'Can I do this too?' I think they're just basically happy I'm dealing with it, so it's fine. I'm the one that would have to jump in the car and run over anyway."

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Interested in Specific Sensor Data Information

"What I do look at is I look at when she went to bed and when she got up and how many times she gets up and down during the night."

"Anything that would be related the fall or her being real sick...If she falls, that would be a big one for me."

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**8-Months
Post-Installation of
Smart Home Technology:
Participant Themes**

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8-months Post-Installation Interviews: Overview of Themes

Participants

- Thought activities stayed the same
- Don't need the technology
- Use Alexa
- Could see technology being beneficial for others
- Felt data information are comforting to family
- We're watched over

http://tr2.cbsistatic.com/hub/i/r/2016/08/09/e9e5c503-cdb3-4b2e-a70c-1dfa20ebbeaa/thumbnail/770x578/2aa8b8d6cce16858bec44c486d338178/older-woman.jpg

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Thought Activities Stayed Pretty Much the Same

"I don't' think..I don't think anything changed in my activity. It was just that somebody else was watching."

"I think it's [communication with family member] gone on pretty much as it had."

"I don't think it's had a lot of impact [the technology]."

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Don't Need the Technology

"But I'm afraid of the frustration of it not working and my not being able to figure it out, and it wasn't worth it to me. Now, if it was something that I really wanted and really needed..."

"It wasn't necessary for here because we already have technology to watch over us."

"We realized we weren't personally going to benefit from any of the equipment."

"It just complicates my life, and I'm trying to get things simplified now."

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Use Alexa

"The most interesting thing of all was Alexa."

"Alexa was kind of exciting in the beginning."

"It was much faster to ask Alexa then it was to go to the computer or my iPad..."

"I always tell her good morning, and then she tells me something."

"I quite often have her [Alexa] set an alarm."

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Could See Technology Being Beneficial for Others

"This would be beneficial to seniors, particularly seniors living alone."

"She has a very caring family, but you know they all have their own lives. And I see her falling, and I think who would know?"

"It would be helpful for people living alone or people living in a home, say where they didn't have a close neighbor,"

"I think in rural areas..."

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Data Patterns & Notifications are Comforting

"She'd [family member] be wondering what the heck was going on."

"Oh, we would just laugh...she was a spy."

"My daughter was my, what do you call the person on the other end with the iPhone that checked on me. And she got quite a kick out of that, that she would see what I was doing."

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Watched Over

"If they don't hear from us by 11 every day we get a phone call...and the bathrooms have the emergency pulls and that kind of thing."

"We're watched over."

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Why Participated

"I wanted so badly to help the students from St. Catherine's."

"I'm interested in studies."

"I love to learn new things."

"My daughter thought it was a good idea...everybody I talk to about it thought it was a good idea..."

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Conclusion

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Summary of Themes Across Interviews

- Older adults feel well cared for

- SH technology is nice to have, not necessary in their current setting

- They think it would be good for others who live alone or those in declining health

- Participated in study to help researchers

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What St. Kate's Learned from this Project

- Expect the unexpected in community research

- Coordinating personnel is challenging

- By working with partners in community, changes in process can be made in real time

- Value of OT in working with older adults in the community adopting smart home technology

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What Best Buy Learned from this Project

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What Benedictine Health Learned from this Project

- Value of limited scope in new technology testing in world of senior services -

- Capacity to support product ongoing knowledge and training

- Need to recognize value of independence and privacy to seniors

- Value of partnership and content expertise -- Best Buy and St Kate's

- Assured Living has its place in the continuum and we will continue to share its value and use to our customers

- Technology continues to be integrated into the work and lives of our seniors and those who care for them--we will continue to prioritize our role in innovation.

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Questions?

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