Using the Kinect to Engage People with Dementia

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Engagement means “to occupy, attract or involve someone’s interest or attention”

- Engaging in meaningful activities increases positive emotions and improves quality of life (Cohen-Mansfield et al., 2009)

- Engaging activities are important to well-being, but people with dementia have reduced opportunities
Motion-based technologies can provide cognitive, physical and leisure activities to people with dementia (Dove & Astell, 2017a)

People with dementia can learn to use motion-based technologies with training and support (Dove & Astell, 2017b)

Implementing motion-based technologies in adult day programs is feasible (Dove & Astell, 2018)
Engagement and its Measurement

Engagement in people with dementia is often measured through:

1. Direct observations
2. Behavioral observation scales
3. Focus groups
4. Interviews
5. Satisfaction surveys
6. Self-report (e.g. asking directly)
Challenges of Measuring Engagement

1. Impairments in cognitive function can impact ability to provide descriptive feedback in focus groups or interviews

2. Impairments in speech can impact ability to express opinions towards activities

3. Direct observations and observation scales are time-intensive

4. Measures can be subjective, with questionable accuracy (e.g. rating positive engagement on a 5-point scale)
Study Objectives

1. To examine the use of motion-based technology as an engaging group activity for people with dementia

2. To explore ways in which engagement can be measured in group motion-based activities for people with dementia
Methods

- Participants (n=38) were recruited from three adult day programs in Durham Region

Table 1. Demographic Summary

<table>
<thead>
<tr>
<th></th>
<th>Mean=75.4</th>
<th>Range=58-93</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Male=18 (47.4%)</td>
<td>Female=20 (52.6%)</td>
</tr>
<tr>
<td>MoCA score (out of 30)</td>
<td>Mean=12.43</td>
<td>Range=0-25</td>
</tr>
<tr>
<td>Use of a Mobility Device</td>
<td>Total=16 (42.1%)</td>
<td>No device=22 (57.9%)</td>
</tr>
<tr>
<td></td>
<td>• Cane=4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Walker=10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wheelchair=2</td>
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</table>
Methods

- Participants played a digital bowling game on Xbox Kinect in a group setting
- One-hour sessions were held at each site, twice per week for 10-12 weeks
- A member of the research team supported participants during the sessions
Methods

- Sessions were video-recorded to thoroughly capture the participants, the facilitator, the group dynamic and the activity
Methods

- A framework adapted from two existing engagement measures for dementia (Cohen-Mansfield et al., 2017; Judge et al., 2000) was trialed with the video-recorded data.

- Both measures are tally-based, featuring discrete categories that behaviors (e.g. smiling) fall into.

- Group engagement was examined at session 1 and 20.
The group dynamic in action:
Engagement Framework

- This includes examining the different types of engagement and how these change over time

Table 2. Overview of Engagement Framework

<table>
<thead>
<tr>
<th>Type of Engagement</th>
<th>Examples</th>
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<tbody>
<tr>
<td>Active Engagement</td>
<td>- Reminiscing, laughter/enjoyment, conversing, celebrating</td>
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<tr>
<td>Passive Engagement</td>
<td>- Responding, eye contact, nodding/agreement, listening to others</td>
</tr>
<tr>
<td>Non-Engagement</td>
<td>- Looking away, sleeping/dozing, walking away/leaving, negative comments, indifference/apathy</td>
</tr>
</tbody>
</table>
Results: Active Engagement

Active Engagement: Session 1
- 59%
- 33%
- 8%

Active Engagement: Session 20
- 57%
- 35%
- 8%
Example: Active Engagement
Results: Passive Engagement

Passive Engagement: Session 1
- 59% Passive Engagement
- 33% Active Engagement
- 8% Other Engagement

Passive Engagement: Session 20
- 57% Passive Engagement
- 35% Active Engagement
- 8% Other Engagement
Example: Passive Engagement
Results: Non-Engagement

Non-Engagement: Session 1
- 59%
- 33%
- 8%

Non-Engagement: Session 20
- 57%
- 35%
- 8%
Example: Non-Engagement
- Motion-based technology can provide engaging group activities to people with dementia
- Framework captured 92% engagement at both pre- and post
- Frequent conversing, smiling, laughter and celebrating/cheering
- Frequent looking/eye contact, responding and listening to others
Group Motion-Based Engagement
Limitations of the Framework

1. Does not illustrate different behaviors within the three categories, and how these behaviors interact with one another

2. Does not truly illustrate how engagement changes over time

3. Does not illustrate how participants interact individually or as a group

4. Captures frequency, but not duration or context
Future Directions

- Video-recorded data will be analyzed using behavioral coding software (Observer® XT 12; Noldus Information Technology, 2018)
- Captures a rich and detailed understanding of the group dynamic, and how it changes over time
- Captures frequency, duration and context
- Captures individual and group interactions
Behavioral Coding Example
Conclusions

- Motion-based technologies can be used to provide engaging group activities to people with dementia

- For technologies to be successfully integrated in dementia care settings requires a simple way for staff to measure engagement

- Development of an efficient and reliable measure of engagement for people with dementia is required
Our Funders:

CCNA
Canadian Consortium on Neurodegeneration in Aging

AGEWELL
Canada's technology and aging network
Our Partners:

OSHAWA SENIOR
OSCC
CITIZENS CENTRES

Community Care Durham
Supporting People, Strengthening Community
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References


