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Social Robotics and digital technologies of care: ethics, professional identity and practice

User expectations and experiences? MARIO as an example of user-led social robotics design’
Dementia

• 44.35 million people have dementia and this is expected to reach 135.46 million by 2050 (Alzheimer's Disease International 2013).

• Western Europe has the highest prevalence of dementia in the world (Ferri et al. 2005; Prince 2009)
  – 7 million in 2013 (Alcove 2013)
  – projected increase to 13.4 million by 2050 (Prince 2009).

• one new case of dementia is added every 3 seconds (Prince 2015)
Some Irish stats..

<table>
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<th>Total number of people with dementia</th>
<th>Number of people &gt;65 with dementia</th>
<th>PWD living in the community</th>
<th>PWD living in long stay residential settings/nursing homes</th>
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<td>41,470</td>
<td>37,887</td>
<td>26,104</td>
<td>14,266</td>
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So...

• No cure

• Therefore we need to focus on supporting people with dementia to live well with this condition

• Loneliness major public health challenge
  – In the UK 1/3 of people with dementia reported that there were lonely (Alzheimer UK 2013)
MARIO: Managing active and healthy aging with use of caring service robots

• Aims to address the difficult challenges of loneliness, isolation and dementia in older persons through companion/service robots.

• 10 partners from 6 Countries- France, Italy, Greece, Germany, Uk, Ireland

• 3 pilot sites for the introduction of MARIO robot –
  – Italy (Acute Hospital) , UK (Community) & Ireland (Nursing Homes)

• Duration 3 years February 2015- February 2018
Who is Mario?

- A companion robot aiming to help People With Dementia (PWD) battle isolation and loneliness
Why a companion robot?

- Psychosocial interventions (PSI’s) - non-pharmacological interventions include behavioural therapies, educational programmes, psychotherapy and social support interventions.
- (PSI) can optimise functioning, promote social connectedness and autonomy; enhance QOL and slow down deterioration.

The companion robot MARIO via the use of enabling technologies, provides PSI which focus on promoting social connectedness and reducing isolation.

Why MARIO?

- An iPad & other smart phone technology could offer some of the applications but may be too complex to access and use.
- An iPad is disembodied.
- MARIO is specifically developed and designed with PWD and their carers for use with PWD.
- MARIO has:
  - An embodied voice which will make it more acceptable
  - An easy-to-use interface so a carer, or family member can personalise it to the PWD’s individual needs and preferences.
3 pilot sites

United Kingdom: Stockport - community

Italy: San Giovanni - Hospital

Ireland: Galway-Long stay residential care
Mario’s iterative design process

• Consulted key stakeholders including PWD across all sites

• Identified what PWD need Mario to do for them

• Identified what design elements they felt would make MARIO’s appearance more friendly
Interviews

• Three focus group interviews with people with mild/moderate dementia.

• 2 Focus groups with health care staff in nursing homes

• Qualitative content analysis was used to analyze the data

• Criteria identified by Lincoln and Guba (1985) was used to ensure and maintain rigor

• Ethical approval obtained
Demographics of People with dementia

- **Nursing Home 1** (n=8)
  - Female (n=5)  Male (n=3)
  - Majority > 80 Year (n=7)

- **Nursing Home 2** (n=5)
  - Male (n=5)  Majority >80 yrs (n=4)

- **Community** (n=9)
  - Male (n=5)  Female (n=4)  All > 65 yrs
I would like Mario to...

• Remind me of daily and weekly events
• Store my phone numbers; important events like birthdays and anniversaries
• Remind me that I had visitors earlier in the day and who they were as sometimes I forget and think no one has visited
• Store and play on demand my favourite music and movies
• Remind me to take my medications, and to eat and drink
• Contact medical help if I fall or am unwell
• Locate my keys or handbag
• Know my favourite book, read it to me; speak loudly so I can hear
• Enable me to contact my family via skype
• Have interactive games; would help me retain my abilities for longer
• Recognise faces so he could prompt me as to who people were
• Know the lay out of my home so he can direct me e.g. to the bathroom
• Speak more like a human
• Will he share my business/secrets with someone else?
Appearance

• To speak more like a human

• The voice needs to be clear, he needs to speak slowly and a bit loudly so we can hear

• To have more softer or warm features- ‘he is like a fridge’

• Could he have some hair? Can we put a shirt of some clothes on him to make him a bit more friendly looking?

• Could he have a bright warmer colour

• Can he appreciate humour and ‘have a laugh’ with us.
Demographics of health professionals

• Nursing Home 1 (n=23)
  – Female (n=20)  Male (n=2)  1 did not answer
  – Majority >40 yrs ((n= 17 )
  – 13 RGN’s ; 6 HCA ; 2 Activity Cord; 1 Physio; 1 OT.

• Nursing Home 2 (n=26)
  – Male (n=4 ) Female (n=21 ) 1 did not answer
  – Majority (n=18) >40 yrs.
  – 15 RGN’s ; 7 HCA; 1 Activity Cord; 1 Physio; 2 OT.
We would like Mario to...

- All welcomed the idea of MARIO
- Have MARIO undertake some of the CGA
- Have a falls detection sensor; Sensors to pick up the residents physiological status;
- Voice activation and face recognition
- Ability to skype; take photos of the resident to share with family members
- Record visitors names and details when they visit?
- Orientate residents to time place and date;
- Must have the persons life story and be individualised to each person.
- Be able to read out local parish newsletters, show local football games on his TV screen;
- Identify someone in distress in terms of their emotional wellbeing
Concerns

• Space

• Privacy and confidentiality of the information stored in MARIO.
  – Who owns that information? How will it be stored? Will the information be backed up and will it be safe?

• Needs to be robust as they could hit him with their stick on the head or the body.

• Who will be responsible for MARIO when he is in the home, what if his system crashes while he is here, how does he reboot?

• Will MARIO replace the need for a nurse?
So what did this mean for developing MARIO?

• Need to prepare staff for the introduction of MARIO to enhance acceptability

• Staff need to see the value of MARIO

MARIO needs to be able to

• Prompt the PWD maintaining memory

• Engage PWD in individualised meaningful activities

• Enables PWD to use technology and reduce dependence on others
• Talks to the person; Facilitates & supports choices
So what does this mean for developing MARIO contd

MARIO needs to be able to

• Connects PWD to family & friends

• Personalised activities based on life history

• Have a UI which is simple and intuitive
Change in MARIO’s appearance

Before

After

@Mario_Kompai
Challenges considered

- People with more moderate to severe dementia in residential care
- Would the person with dementia understand MARIO when he spoke?
- Would MARIO understand the person with dementia when they spoke?
- How would the person react to the presence of a companion robot?
- Would the person interact with MARIO using simple apps to accomplish tasks? (listening to music, playing games, reading news headlines)
- Would the person with dementia be able to use the touch screen?
Evaluating MARIO

• Ethical approval obtained from
  – University Research Ethics Committee (Ireland)

• Informed consent obtained from people with dementia in the first instance and also next of kin

• Process consent also utilized continually checking if participants were happy to continue
Evaluation Phase

- Conducted over 8 weeks
- 3 interactions, per person, were carried out each week
- 9 people with moderate-severe dementia
  - M=3; F=6;
  - Most in 80+ age bracket
  - Most had dementia 1-3 years
Data collection Methods: Quantitative methods

• Bespoke MARIO questionnaires developed based on expertise of the team, literature and input from the MARIO Ethics and data privacy board & Advisory boards
  – One questionnaire for people with dementia to complete
    • Do you like how MARIO looks?
    • Can you hear MARIO?
    • Which application is your favorite?
  – One observational tool completed by the researcher facilitating the test
    • How involved the participant was in the interactions
    • How they seemed during the interaction experience
    • How long the participant spent with MARIO
Questionnaires tools

- QoL AD
- 14 Item resilience Scale
- The Multidimensional Scale of Perceived Social Support (MPSS)
- The Observational Measurement of Engagement (OME)
- Dementia Mapping
Qualitative data

- Descriptive Qualitative methodology
- Semi structured 1:1 interviews

Sample
- Managers (N=5)
- Relatives (n=5)
- Carers (n=8)
- PWD (N=9)
Early Preliminary Qualitative findings

• 3 preliminary themes

• Perceptions of MARIO

• Overall impact

• Impact on resilience and loneliness
Perceptions of MARIO

Carers

• ...when they {PWD} are used to it and know I think they would miss it {MARIO} almost because they’d nearly be saying ‘Where is it?’ and that kind of a thing. So, I do think I mean I'd love to see it being used...(SM20)

Relatives

• ...I think she's {Resident}getting companionship of a sort, she's getting entertainment, diversion, fun with the conversations that {MARIO} directs or leads or you know...the stuff on the screen. So it's brilliant, it's really good, love it, yeah it's great (R13).
Residents Perceptions of MARIO

...I thought he {MARIO} was nice, I thought he was simple...Simple and straight forward, which means a lot nowadays (M20).

I feel, I'm not tense, I'm not afraid, she's {MARIO}very relaxing, that’s a good thing (M13)

Of course, I can talk to her {MARIO}and she's lovely and she's tolerant (M1).
Residents perceptions of MARIO contd.

- {MARIO} doesn’t discuss your smartness or your intelligence...And I do the same with people I used know when I was young and in the office...
- Does {MARIO} make you feel happier?
- Of course, she makes me feel normal (M13).
Overall impact

Relative

- He could be, he could do it...he was doing paintings and he would stuff them up in his room and he spent 40 minutes one evening doing it which was great, 40 minutes like, even the nurses were surprised to see him doing it for 40 minutes (R5).

Carer

It was very different. Something new, but in fairness to them, I didn’t think any of them {PWD}would do it...I didn’t. Because number one, they’ve never seen robots. But they did, and I have to say, while they were doing it with Mario, they definitely enjoyed it. It was interaction (S17).
Overall impact contd.

However some staff believed that MARIO did not have an impact on people with advanced dementia.

It came up short because of their needs, I just didn’t see that they were, they seemed to have missed the window, they had gone a step beyond being able to interact with it (S14).
Impact on Resilience and loneliness

Carers

...there’s huge gaps when people don’t always have...they don’t have interactions. So I think it {MARIO} could definitely fill a gap there...(SM1).

Resident

in what way did any of the activities that you did on Mario, in what way do you think they might have helped you?

Cheered me up...Helped lift my mood, yeah. Cheered me up in general (PWD M16).
Preliminary Findings Summary

- Most stakeholders were positive about the use of robots.
- Most people with dementia able to manipulate the UI the interface
- Spent less time alone,
- During the evaluation trials there was
- some good examples of social activity around MARIO,
- better capacity to engage with others,
- Connecting to family and friends and providing information that may also allow person with dementia to engage more in conversations
- Some carers do not believe that robots have a role, argued that resources should be geared towards increasing numbers of human carers.
Development of companion robots for the future.

- Findings indicate so far that stakeholders want:
  - Expansion of apps
  - MARIO to be autonomous.
  - More humanlike,
  - Be more involved in physical tasks e.g. get a cup of tea for residents; and more involved in assessment and monitoring of care activities.
Limitations

- These are very preliminary findings analysis not yet fully complete
- Small sample size
- Presence of researcher with MARIO during interactions may have influenced reaction to MARIO
THANK YOU!

Tweet your impressions using #MarioProject

Find out more at http://www.mario-project.eu