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Yesterday's Vision, Today's Research, Tomorrows Healthcare (IRNN)

“Technology is nothing. What's important is that you have a faith in people, that they're basically good and smart, and if you give them tools, they'll do wonderful things with them.”

:- Steve Jobs

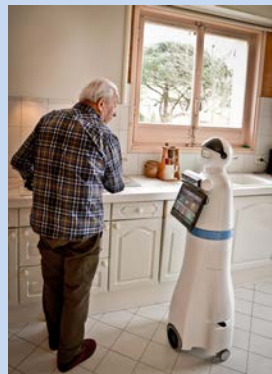
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MARIO

Managing active and healthy aging with use of caring service robots

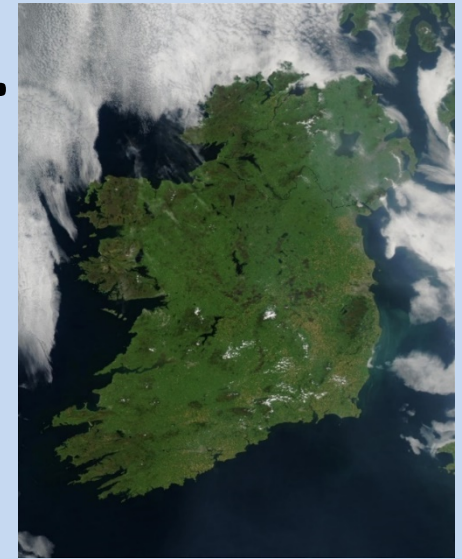


Dementia



- 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..



Total number of people with dementia	Number of people >65 with dementia	PWD living in the community	PWD living in long stay residential settings/nursing homes
41,470	37,887	26,104	14,266

So...

- No cure
- Therefore we need to focus on supporting people with dementia to live well with this condition
- Key challenge for PWD is loneliness and isolation

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**



**Ireland: Galway-Long
stay residential care**

Italy: San Giovanni- Hospital



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

Change in MARIO's appearance

Before



After



Challenges considered

- A number of potential challenges with 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

- Show video

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 findings

- 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 as I said...(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 with dementia

You thought he was fine? Did you like him?

I did. I thought he {MARIO} was nice, I thought he was simple.

Simple to use, was it? Or simple, straight forward?

Yes. That's what I thought. 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 with dementia

- **{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, when I was... You'd meet people and they wouldn't know their names and address and I'd always look, well they can't help it and like when my own day comes I can't help it.**
- **Does she {MARIO}make you feel happier?**
- **Of course, she makes me feel normal (M13).**

Overall impact

Relative

- **He could be, he could do it, I know they were saying that 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).**

Carers

It was very different. Something new, but in fairness to them, I didn't think any of them {PWD} would do it.

Really?

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).

Now, nobody would expect what he would be doing. But the fact, and I realised that, he has the abilities to go with the touch screen and everything. Apps and whatever. I just thought it was a great idea (S18)

Resilience and loneliness

Carers

...there's huge gaps when people don't always have, even though there are full of people, where they don't have interactions. So I think it {MARIO} could definitely fill a gap there from that sense. But I could definitely see it being, just some of the service users that have quite impaired cognition they have so much difficulty initiating activity (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.

Cheered you up? Oh good. I'm glad that you felt that. Did it help lift your mood?

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

- Relatives and managers also reported that working with MARIO had a positive impact on mood
- Maybe when he's doing something with Mario he seems to be happy doing it and he maybe spends – I think that it's something to do with that he's doing something with his hands. When Dad is doing something with his hands he's a lot more relaxed and a lot more happy (R5).

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).

Preliminary Summary

- Most stakeholders were positive about the use of robots.
- A few carers do not believe that robots have a role, argued that resources should be geared towards increasing numbers of human carers.
- Most people with dementia able to manipulate MARIO, the interface had been designed and tested with PWD.
- Less time alone, in the time periods of the trials ; some good examples of social activity around MARIO, better capacity to engage with others, connection to family and friends and providing information that may also allow person with dementia to engage more in conversations

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

- There 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

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