#### Flinders Assistant for Memory Enhancement (FAME)

Professor Anthony Maeder, PhD

Co-Director, Flinders Digital Health Research Centre College of Nursing and Health Sciences Flinders University, Adelaide SA, Australia

November 2018



#### Overview

Consumer health informatics approach to support ageing well independent living

Development of a tablet-based digital solution for older persons experiencing early stage memory loss

Applying Living Laboratory methodology and how it performed in this real world situation





## **Social Ecological Model**





### **Health Service Co-production**



Batalden et al, (2016), "Coproduction of healthcare service", BMJ Quality & Safety 2016;25:509-517.



## Aged Care IT Roadmap



- Aged care reform is founded on the twin principles of choice and control and this applies equally to the use of technology designed to enhance older people's quality of life.
- •Technology must be applied with sufficient **flexibility** to support varying consumer needs and preferences, in line with reform directions of choice and control.
- Technology for use in private homes must integrate into individual homes, and be personalised to achieve this.
- •The development of technologies specifically for application in providing care and support must be based on **co-design**, that is, involving end-users.
- •The effectiveness of technologies developed to support quality care and individual wellbeing must be evaluated over time, preferably through **co-evaluation** with end users.
- •Technology must be **integrated into aged care policy and processes** (rather than added separately to daily care and support).

# **IT design for Ageing Consumers**

- Physical limitations sensory perception and dexterity
- Cognitive limitations reduced language and IT literacy
- Complexity limitations functionality and representation of features
- Cultural limitations technology perceptions and social conventions
- Utilitarian limitations ability to integrate with other activities





#### **TAM Tech Acceptance Model**



Davis, Bagozzi, Warshaw (1989), "User acceptance of computer technology: A comparison of two theoretical models", Management Science, 35: 982–1003.



#### **UTAUT Tech Acceptance Model**



Venkatesh, Morris, Davis, Davis (2003), "User Acceptance of Information Technology: Toward a Unified View", MIS Quarterly, 27 (3), 425–478

#### Systems Development Life Cycle





University of Pittsburgh

INFSCI 1024: Information Systems Analysis and Design



# **Living Laboratories - Concept**

"Living labs are defined as user-centred, open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life **communities and settings**. In practice, living labs place the citizen at the centre of innovation, and have thus shown the ability to better mould the opportunities offered by new ICT concepts and solutions to the **specific needs and aspirations** of local contexts, cultures, and creativity potentials."

enoll.org

#### **Living laboratories - ENoLL**

 Image: Addition on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  +

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  +

 Image: Constraint on the program  $N \times X$  +
 Image: Constraint on the program  $N \times X$  +

 Image: Constraint on the program  $N \times X$  +

 Image: Constraint on the program  $N \times X$  +

The European Network of Living Labs (ENOLL) is the international federation of benchmarked Living Labs in Europe and worldwide. Founded in November 2006 under the auspices of the Finnish European Presidency, the network has grown in waves' up to this day.

The European approach to Living Labs was created in the Unit "Collaborative working environments" of the DG INFSO (now DG CONNECT) in close collaboration with an industrial advisory group on Open Innovation (Open Innovation Strategy and Policy group – OISPG) which was founded by Bror Salmelin. The original concept was updated to open innovation environments attracting inwards investment, both intellectual and financial one. ENoLL counts today over 150 active Living Labs members worldwide (409 historically recognised over 11 years), including active members in 20 of the 28 EU Member States, 2 of the candidates and it is present in 5 continents in addition to Europe. Directly, as well as through its active members, ENoLL provides co-creation, user engagement, test and experimentation facilities targeting innovation in many different domains such as energy, media, mobility, healthcare, agrifood, etc. As such, ENoLL is well placed to act as a platform for best practice exchange, learning and support, and Living Lab international project development.

History







#### **Living laboratories - ALLiN**





## **Living Laboratories - Characteristics**





Figure - Common Elements of Living Labs. Adapted from "Living Lab Methodology Handbook," USER ENGAGEMENT FOR LARGE SCALE PILOTS IN THE INTERNET OF THINGS, 2017-19, retrieved from https://u4iot.eu/pdf/U4IoT\_LivingLabMethodology\_Handbook.pdf.



# **Living Laboratories - Characteristics**

- active user involvement (i.e. empowering end users to thoroughly impact the innovation process)
- real-life setting (i.e. testing and experimenting with new artefacts "in the wild")
- **multi-stakeholder participation** (i.e. the involvement of technology providers, service providers, relevant institutional actors, professional or residential end users)
- a **multi-method approach** (i.e. the combination of methods and tools originating from a.o. ethnography, psychology, sociology, strategic management, engineering)
- co-creation (i.e. iterations of design cycles with different sets of stakeholders)



### Living Laboratories – Involvement

COHORT / STAGE	LANDSCAPE SURVEY	PROBLEM & NEEDS	SOLUTION CONCEPT	REQUIREMENTS SPECIFICATION	SOLUTION DESIGN	PROTOYPE SOLUTION	REFINED SOLUTION	VALIDATED SOLUTION	DEPLOYED SOLUTION	REVISION & RETIREMENT	FUTURE OPTIONS
PROJECT											
MEMBERS											
STAKEHOLDERS											
STAKEHOLDERS											
MARKETING											
STAKEHOLDERS											
USER COMMUNITY											
STAKEHOLDERS											
POPULATION											

# Living Lab Approach for FAME

Associated Principles	Activity
Co-creation	Cl team Cl team – Stakeholder team Geriatrician Alpha testing Beta testing
Multi-stakeholder participation	Focus group 1 Focus group 2 Useability & Accessibility testing
Active user Involvement	Pilot phase 1 & pilot phase 2
Real-life setting	Pilot phase 1 & pilot phase 2
Multi-method approach	All phases



#### **FAME Project Team**

#### Welcome

We are a group of researchers and developers from Flinders Digital Health Research Centre at Flinders University. We have a shared interest in exploring digital technologies and how they may support and empower people to age in in their own communities.

Backed by a Research and Innovation Grant from Dementia and Aged Care Services Fund, we are developing an app to support people living with mild cognitive impairment and early stage dementia to age in place. The app can be personalised to the unique needs and interests of the person using it.



#### The Team

#### Dr Lua Perimal-Lewis

Research Fellow, FDHRC lua.perimal-lewis@flinders.edu.au

#### Professor Anthony Maeder

Chair, Digital Health Systems and Codirector, FDHRC. anthony.maeder@flinders.edu.au

#### Professor Jennifer Tieman

Dean of Research, College of Nursing & Health Sciences, CareSearch jennifer.tieman@flinders.edu.au

#### Professor Sue Gordon

Chair of Restorative Care in Ageing, College of Nursing and Health Science sue.gordon@flinders.edu.au

Dr Tamara Agnew Research Associate, FDHRC. tamara.agnew@flinders.edu.au

Mr Martyn George Software engineer, FDHRC. martyn.george@flinders.edu.au



## **FAME Project Scope**

- **Disorientation** remembering place, time, events etc.
- People remembering names, relationships and contact details
- Activities remembering appointment times and places
- Interventions understanding and managing memory loss



#### **FAME Functions**

- Disorientation clock and weather
- People phone contacts calling list
- Activities interactive calendar
- Interventions brain training and physical activity



#### **Stakeholder Sources**



## **Refining User Interface Design**



#### Focus group no 1

- - Useability
  - Accessibility
- Gather specific content information

#### Focus group no 2

• Validate development based on focus group no 1

# Family caregivers



#### **User Interface Progression**





## **Support Functions**







#### **Enhancement Functions**







# **Prototype Refinement**

#### Alpha testing

• Alpha testing – last week, this week, 5 Flinders university staff

#### Useability testing

- Tuesday, 26 June
- Recommended sample size: 5 people
- •/65+
- No prior exposure to the app
- Participants recruited by Salisbury council
- Two groups (moderator, observer)
- Results: very positive, people liked it, found it easy to use, liked the colour scheme, main take away (calendar)

![](_page_24_Picture_11.jpeg)

Stakeholder acceptance testing

#### **FAME** Pilot

- 75 subjects reporting mild memory loss
- Screening via cognitive and mental health tests
- Deployed preloaded iPad (with Sim card) and user training
- Up to 3 months usage with weekly monitoring and analytics

![](_page_25_Picture_5.jpeg)

Flinders Assistant for Memory Enhancement

![](_page_26_Picture_1.jpeg)

#### Are you aged 65+?

Are you having trouble remembering people, appointments, events or tasks?

Are you available to participate in research for 12 weeks?

![](_page_26_Picture_5.jpeg)

If so, you may be eligible to enrol in our study. For more information, please contact Dr Lua Perimal-Lewis: Jua-perimal-lewis@flinders.edu.au or 08 8201 2069

#### Pail

You will be provided with an iPad and any receivery maxing to use our preloaded research app. The app will enable you to create appointments using an inbuilt calender, make phone cals using an image based contact kit and undertake daily 'brain training' activities.

#### Attandance

After an initial telephone interview, you may be invited to attend an appointment for slightliny screening, health data collection and training. The pilot study will start in September 2018. At the end of the 12 week study period, an appointment will be reade for final data rollection and iPad handows.

![](_page_26_Picture_11.jpeg)

![](_page_26_Picture_12.jpeg)

#### **Recruitment Sources**

Partners • Active Ageing • Active Elders Association • Aged and Community Services (ACSA) Blackwood Uniting Church
 Box Factory Community Centre
 Brighton Uniting Church Burnside City Uniting Church • Carers SA • Church of Christ – Marion & Noarlunga • City of Mitcham Council • City of Norwood Payneham & St Peters • City of Prospect Library • City of Salisbury • COTA • Council of Tea Tree Gully • Dementia Australia • Distinctive Lifestyle • Faith Lutheran Church • Fiji Seniors • Five Good Friends • Fulham Community Centre • Glandore Community Centre • Goodwood Community Services • Grenville Hub • Group Social Support • Holdfast Bay Council • Jack Young Centre • James Brown Memorial Trust • Junction Community Centre • Kalyra Communities • Lockleys Bowling Club • National Seniors • North Adelaide Community Centre • O'Brien Street General Practice • Onkaparinga Council • Our Saviour Lutheran Church • Payneham Community Centre • Pilgrim Church • Playford Council • Saint Martin's Anglican Church • Salisbury Council • Southern Cross Care • St Barnabas Anglican Church • St Elizabeth's Anglican Church • St Joseph's Catholic Church • St Jude's Anglican Church • St Martins Glenelg Parish • St Peter's Cathedral • The Pear, Alberton • Toorak Burnside Bowling Club • Trinity Place • Unihealth • Unitarian Church of SA • Uniting SA • Unley Council • View Club • West Torrens Council • Women's Community Centre SA

![](_page_27_Picture_2.jpeg)

#### **Project Exposure**

	Study	Research	Engage	Alumni	About	Quick links	م				
Flinders Digital Health	Flinders Digital Health Research Centre										
Research Centre About Us	Flinders Digital Health Research Centre										
+ People	The Flinders Digital Hea	The Flinders Digital Health Research Centre is a newly formed multidisciplinary research entity,									
Publications	established as a cornerstone in Flinders University's expansion in the health technology domain. The Centre will provide expertise, innovation and leadership to ensure that Flinders University achieves national and international recognition as a premier institution for digital health systems and technologies research. It will also foster digital health university-industry alliance relationships										
Research											
News & Events	benefiting South Australia and the nation. Projects which provide commercial opportunities will be nurtured through close collaborations with business and industry, and with the government and health sectors.										
Resources											
Study with us	Latest News										
Contact us					Flinders	researchers are hoping	a new app will				

Flinders Assistant for Memory Enhancement (FAME) Study

help keep older minds sharp and fend off the early stages of dementia

![](_page_28_Picture_4.jpeg)

![](_page_28_Picture_5.jpeg)

![](_page_28_Picture_6.jpeg)

W: http://www.flinders.edu.au/digitalhealth/

# Conclusion

- Successful solutions must be sympathetic to the user and usage ecosystem
- Solutions for Aged consumers must address additional limitations of the user
- Creating sympathetic solutions relies on iteration throughout the development process
- Living Laboratory methodology provides a consistent mechanism to achieve this

![](_page_29_Picture_5.jpeg)

### Thank you

#### **Questions/Discussion**

![](_page_30_Picture_2.jpeg)

![](_page_30_Picture_3.jpeg)

![](_page_31_Picture_0.jpeg)

P