Centre for
Data Analytics

Insight

Progress with Data Analytics
in Dementia Care

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Dementia *Interventions*

- **Non-pharmacological**
- **Slow the onset of the disease**
- **Enhance Well-being & Quality of Life**
- **Person-Centred**
- **Stimulating**

- Simulated Presence Therapy, Validation Therapy
- Acupuncture, Aromatherapy, Light, Massage/Touch, Music, Snoezelen and electrical nerve stimulation
- Other Psycho-social, including animal, exercise
- … and … **Reminiscence Therapy**

Reminiscence Therapy (RT)

- Stimulates cognitive activity using near or distant memories as triggers for dialogue and social interaction … generally spontaneous and uncontrollable involuntary memory
- Structured group meetings or one-on-one
- Aim to improve mood, well-being, communication, stimulate memory and strengthen a sense of personal identity
- Triggers can be personal scrapbooks, artifacts from the past, almost anything.
- But .. whether 1-on-1 or in a group **its expensive**

Marcel Proust—Proustian memory [edit]
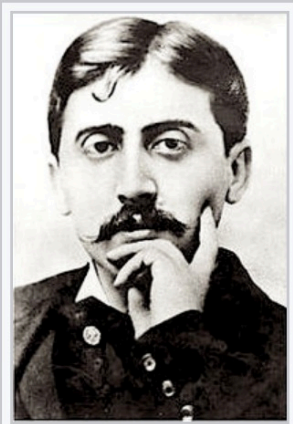
Proust in 1900

Marcel Proust was the first person to coin the term involuntary memory, in his novel *À la Recherche du Temps Perdu* (*In Search of Lost Time* or *Remembrance of Things Past*). Proust did not have any psychological background, and worked primarily as a writer. He was considered sickly as a child.[3]

Proust viewed involuntary memory as containing the "essence of the past", claiming that it was lacking from voluntary memory. In his novel, he describes an incident where he was eating tea soaked cake, and a childhood memory of eating tea soaked cake with his aunt was "revealed" to him.[1] From this memory, he then proceeded to be reminded of the childhood home he was in, and even the town itself. This becomes a theme throughout *In Search of Lost Time*, with sensations reminding Proust of previous experiences. He dubbed these "involuntary memories".

One idea that has recently become the subject of studies on involuntary memory is chaining. This is the concept that involuntary memories have the tendency to trigger other involuntary memories that are related. Typically, it is thought to be the contents of involuntary memories that are related to one another, thereby causing the chaining effect.

What kind of memories recalled ?

- Flashbulb memories - Proustian moments, vivid, of personal significance, emotional impact
- Shared public events e.g. first man on the Moon, MLK "I have a dream", Pope visits Ireland in 1979…
- Local events e.g. bailing hay in August, postmen on bicycles, bread vans, the glimmer man…
- Personal events of significance e.g. your wedding, child's first steps …
- Events of no significance at all

Data-Driven ?

- "It is expensive" … that's familiar !

- "Data-Driven" is a panacea ... commerce, advertising, education, entertainment, healthcare, political elections, ...

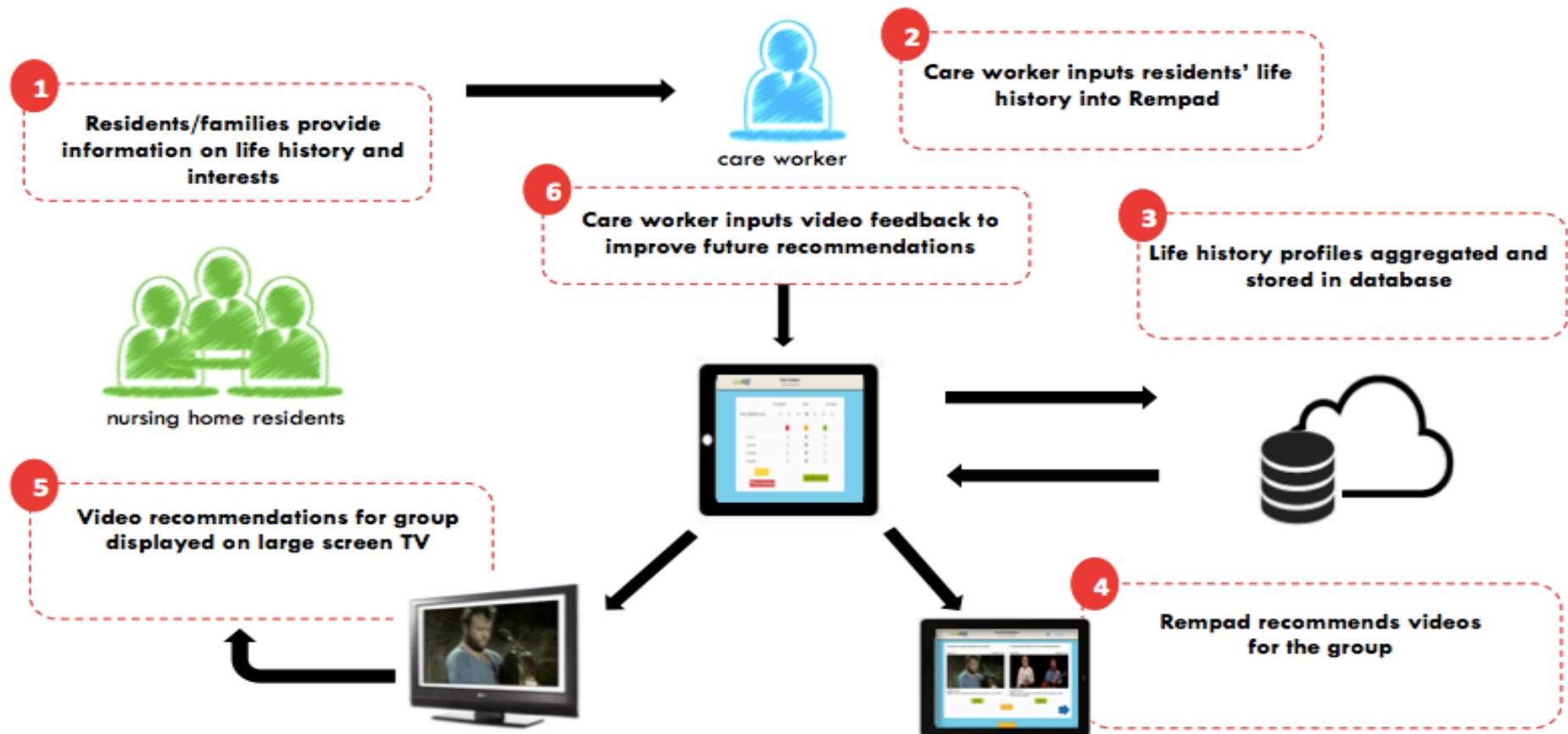- How could we bring *data driven* into Reminiscence Therapy ?
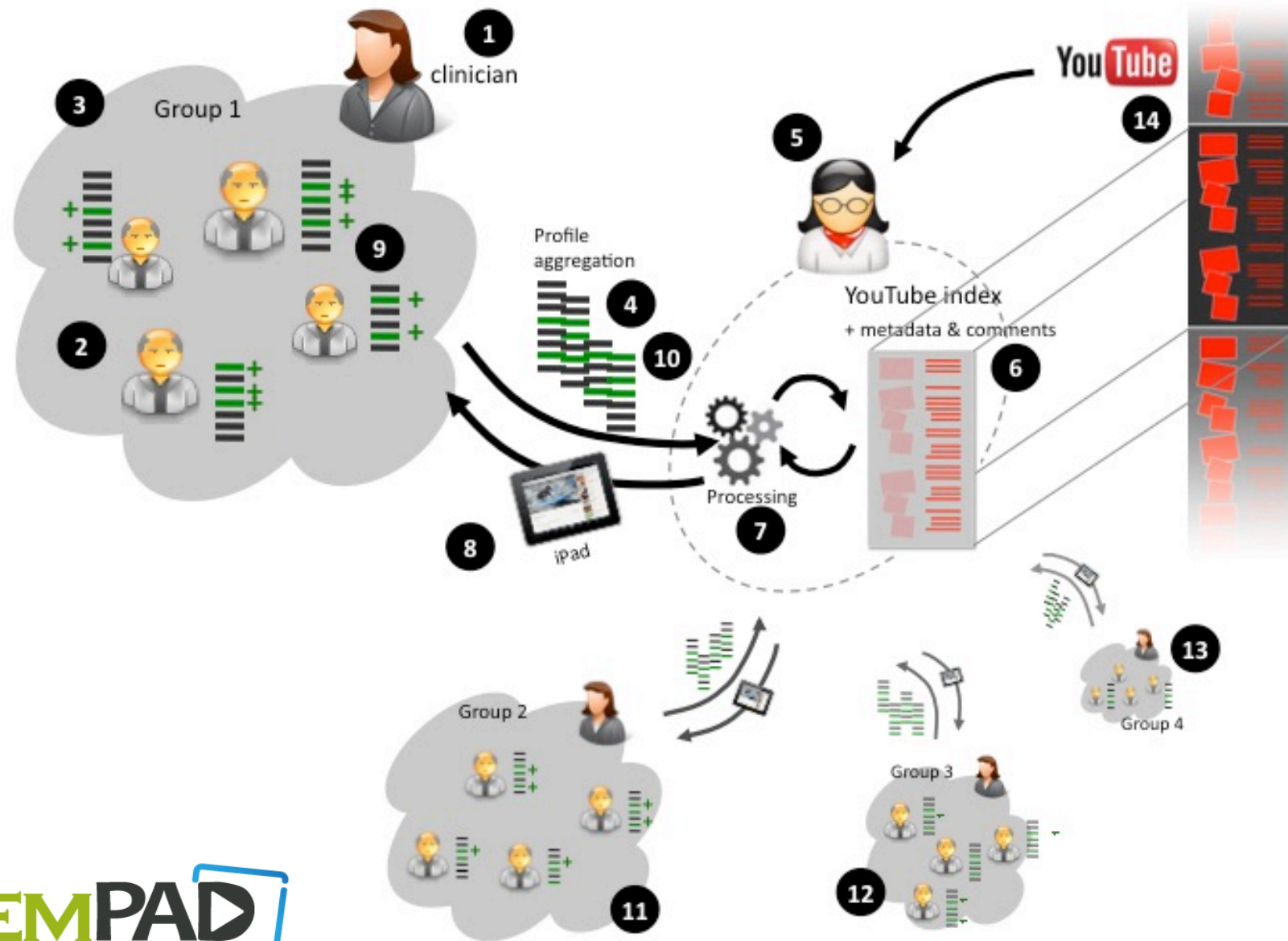
Three Systems for Reminiscence Therapy

1. Group-based recollection of shared public events from the distant past … REMPAD

2. One-on-one recollection of private, personal events from the recent past … SenseCam Recollections

3. Private or shared recollection of places of personal significance from the distant past … HomeRunBus, a.k.a *the number 53*

1. We built a system … REMPAD

- In group-based RT (up to 6 people), in care homes, finding a common stimulus across the group is challenging.
- Requires session planning to find personalised material or artifacts.
- We used a custoded/managed library of YouTube videos as the stimulus but dynamic mid-session searching for next video is distracting and stressful for session coordinators

We built a system … REMPAD

1 Residents/families provide information on life history and interests

nursing home residents

2 Care worker inputs residents' life history into Rempad

care worker

6 Care worker inputs video feedback to improve future recommendations

3 Life history profiles aggregated and stored in database

5 Video recommendations for group displayed on large screen TV

4 Rempad recommends videos for the group

And then we deployed it

- We measured all kinds of engagement levels, QoL levels, cognitive activity levels, etc.

- Significant improvement in QoL and lots of anecdotal evidence

- Trialled in a dozen care homes throughout Ireland

- Won several awards, e.g. from Cleveland Clinic

- We have now licensed the technology to a spin-out

Competitors ?

	Reminiscence Therapy	Digital RT	Web based	Hardware independent	Educational Component	Based on academic research	Customisable	Automatic Personalisation	Designed for use in Groups
REMPAD	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cogknow	no	no	no	no	no	yes	yes	no	no
SONAS	no	no	no	no	yes	no	no	no	yes
My Life	yes	yes	no	no	yes	yes	yes	no	no
Memory Box Network	yes	yes	yes	yes	no	yes	yes	yes	no
Video Time Machine	no	no	yes	yes	no	no	no	no	no

Marketability/Stakeholders
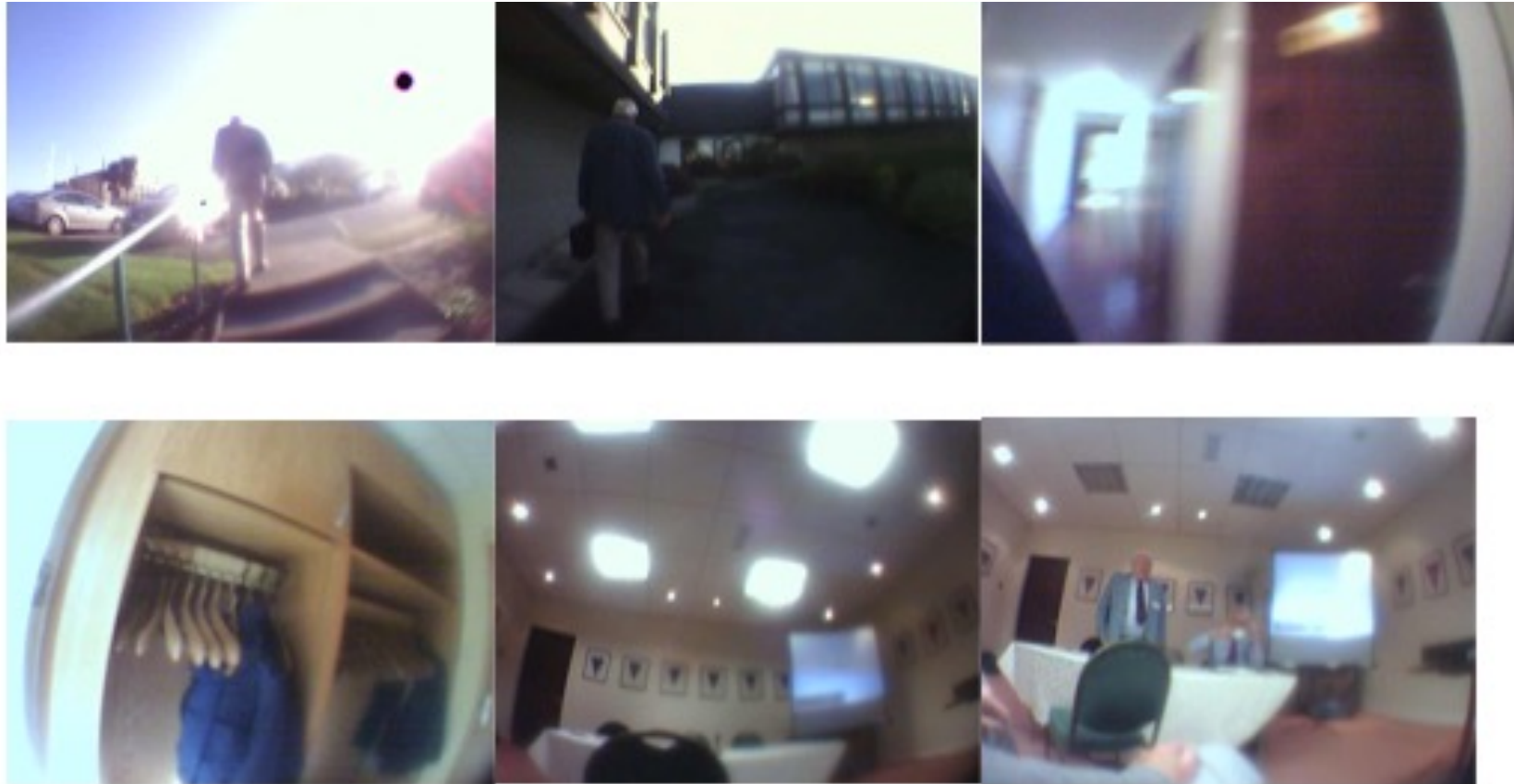

Crucial were the following:

1. **Clinical** endorsement – consultant geriatrician
2. **Commercial** feasibility – market validation
3. **Technical** abilities – fast, agile, scalable, robust
4. **User**-centric, and person-centered
5. **Partnerships** with service providers in homes

6. **Data-driven** … it worked, it found good videos

2. SenseCam Recollections: Wearable Cameras

Wearable camera images

Wearable camera images



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Wearable Camera: Autobiographical Memory

- Three individuals with early stage dementia who have a carer wore SenseCam in everyday life
- Therapist/researcher visits twice a week, 45 minutes, for RT.
- During sessions the therapist views the images and engages the participant in discussions about them.

- Data-driven software automatically structures the images into discrete "events", allowing quick summarisation and navigation of a day.

Study design
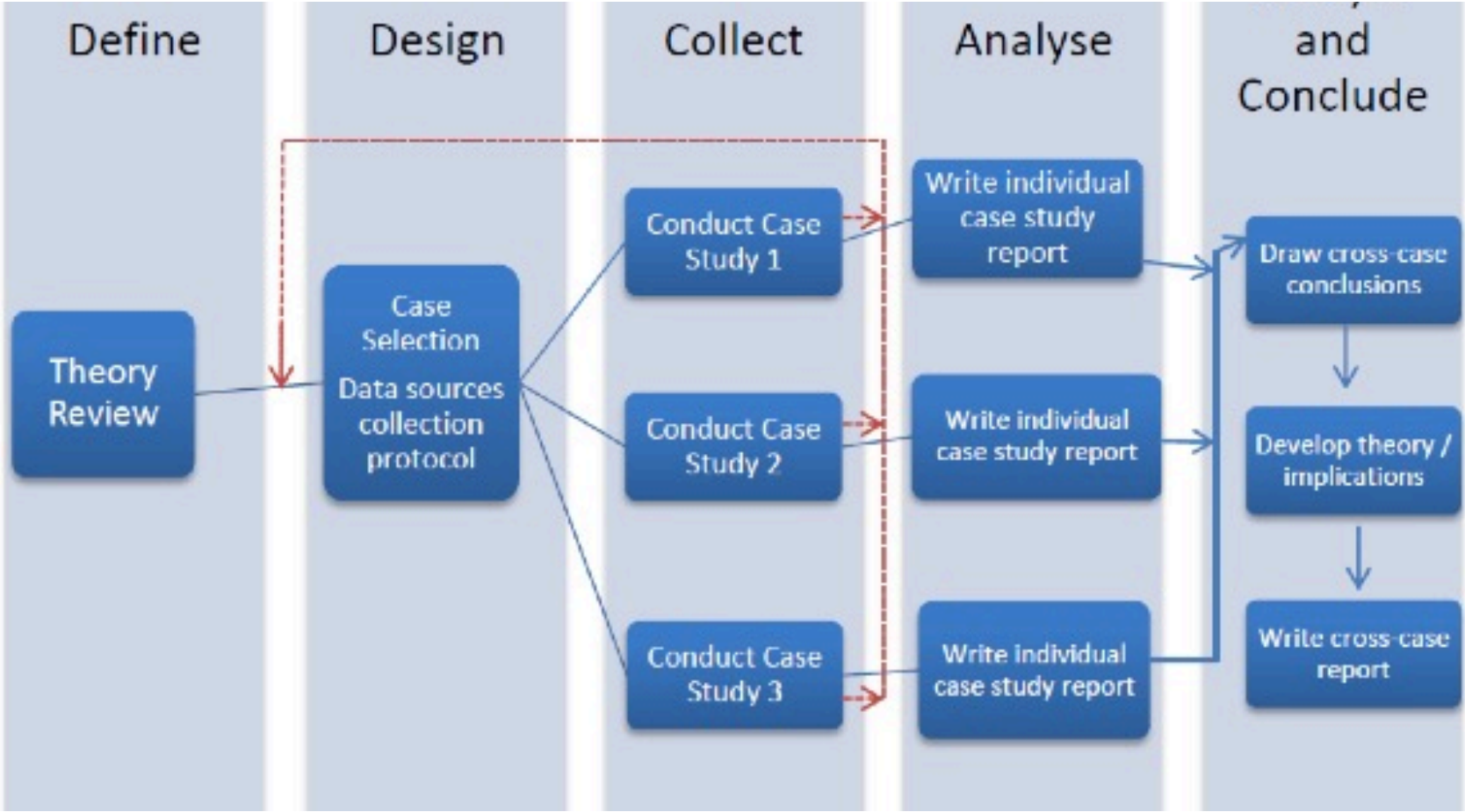
SenseCam Recollections: Conclusions

- SenseCam RT helped construct more holistic versions of the identity of participants, references to both distant and recent past.
- Constructed identities are not a chronological life story but created by the interaction between subject therapist.
- SenseCam RT enriches the details participants share about their lives – exposes a more holistic identity, with distant and recent past.

HomeRunBus ... a.k.a. Number 53

- An indoor driving simulator, with no control on playback, with fixed routes, no immersive technologies
- PC, 3 screens, steering wheel, a seat
- RT can be solo or with visiting loved ones
- Many anecdotal examples of real reminiscences
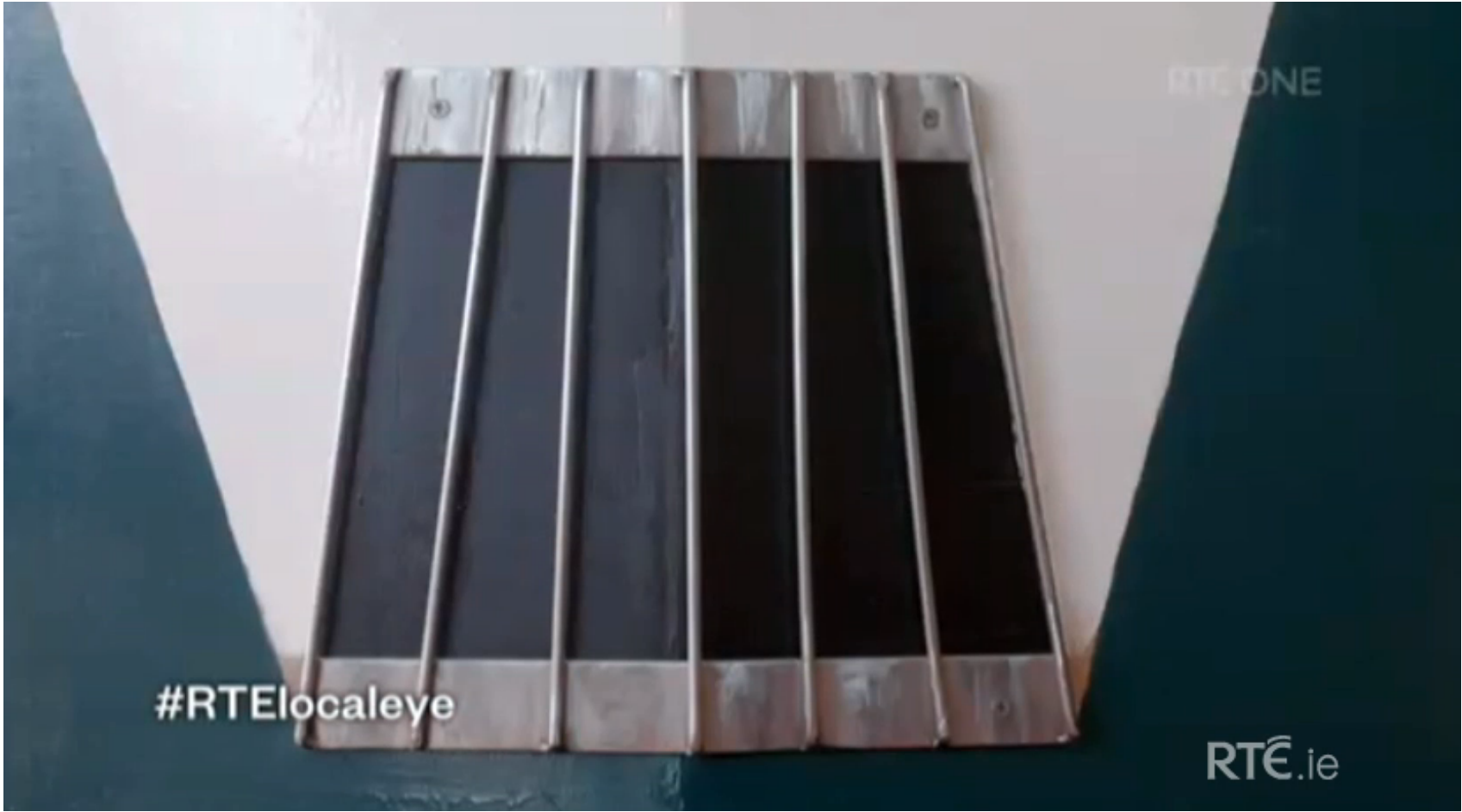
Enhancements ...

- Playback now has a stop pedal
- 170° dashcam now allows loved ones to record their own footage for residents which we split into 3x video streams
- Residents now have their own personal routes yielding richer RT interaction
- Currently under evaluation for impact

Re-Cap ...

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Data-Driven ?

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Being *data-driven* can (only) <u>sometimes</u> help

Thank you