Intergenerational Technology Codesign in Deprived Coastal Regions

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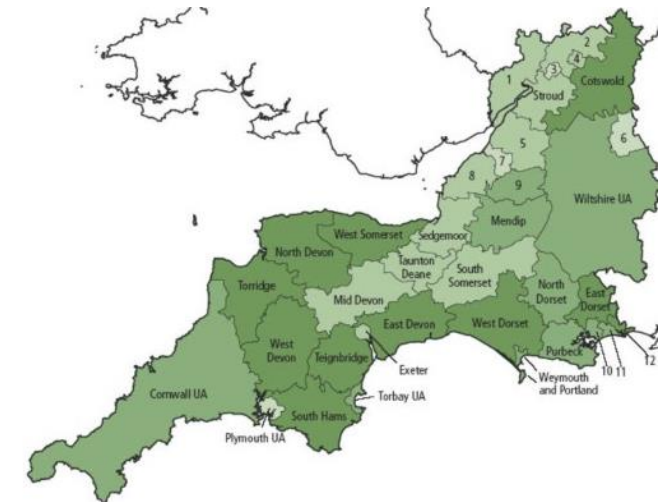**Professor of Intelligent Electronics Systems**

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Background

- Many coastal and rural areas in Britain are deprived. This regional aspect multiplies the effect of digital exclusion for older people. Younger people in these regions can also be digitally excluded.

Digital exclusion is leaving coastal communities behind
We need investment into connectivity or inequalities will only widen

- Codesigning digital technologies, using the natural and heritage resources of such regions would address this, but is rarely done.

- The ICONIC project (Intergenerational Co-creation Of Novel technologies to reconnect digitally excluded people In Coastal communities) is a 30-month project at the Centre for Health Technology University of Plymouth, funded by the UK's Engineering and Physical Sciences Research Council (EPSRC).

- We are taking an intergenerational co-design approach to address digital exclusion in older people and digital economic/employment exclusion of younger people.

Four novel technologies

- 30-month project to develop novel technologies to use these assets to tackle digital exclusion.
  - extended reality,
  - underwater telepresence,
  - digital social games, and
  - artificial intelligence voice interfaces
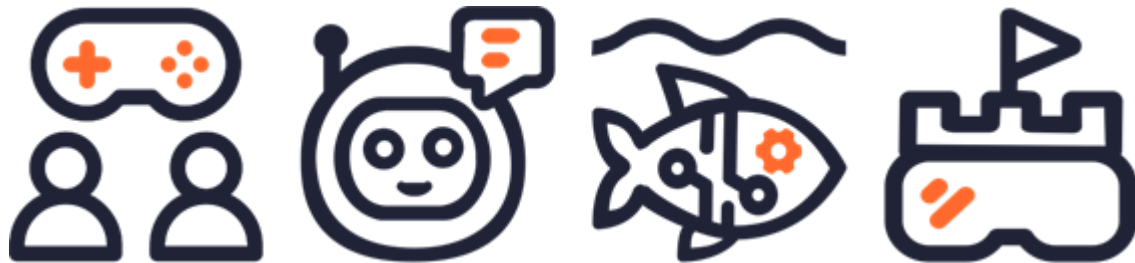
Intergenerational approach

Participants are either older (50+ years old)
or younger (16-30 years old)

35 partner organisations
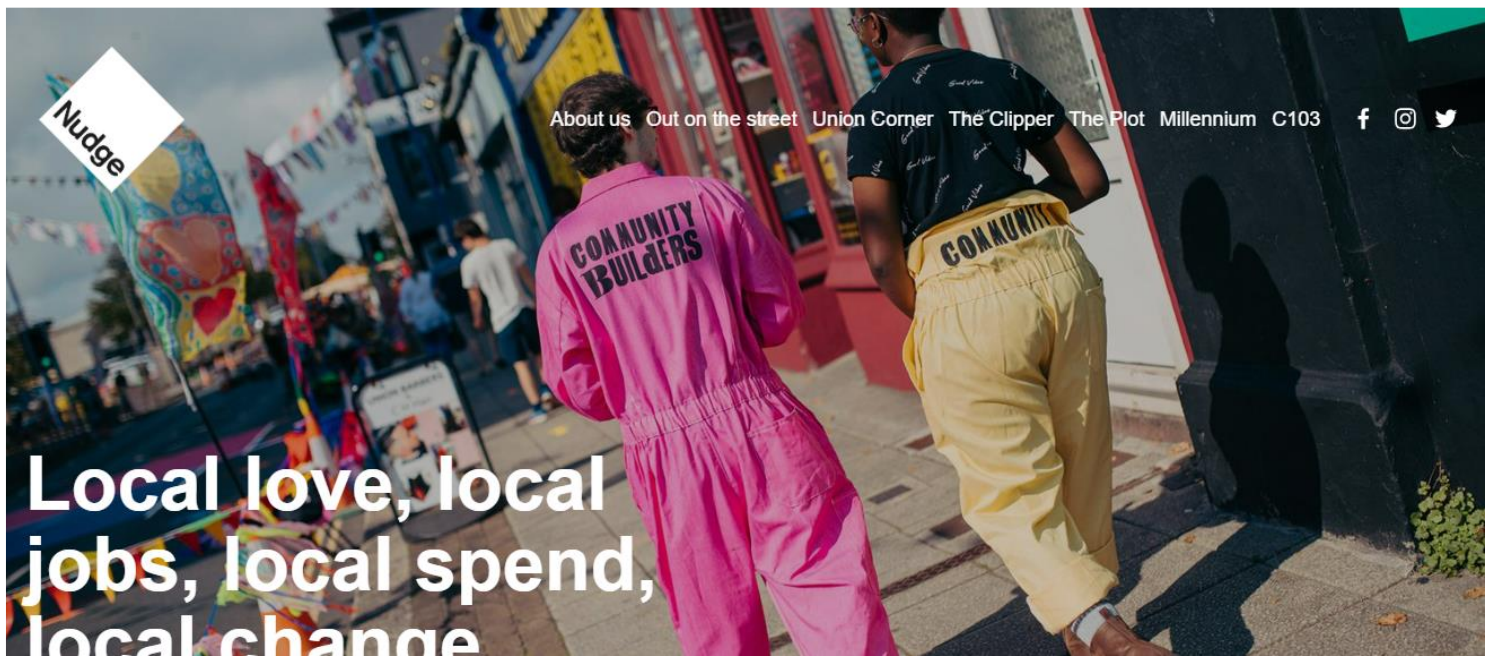## Such as tourist attractions, heritage and environment....
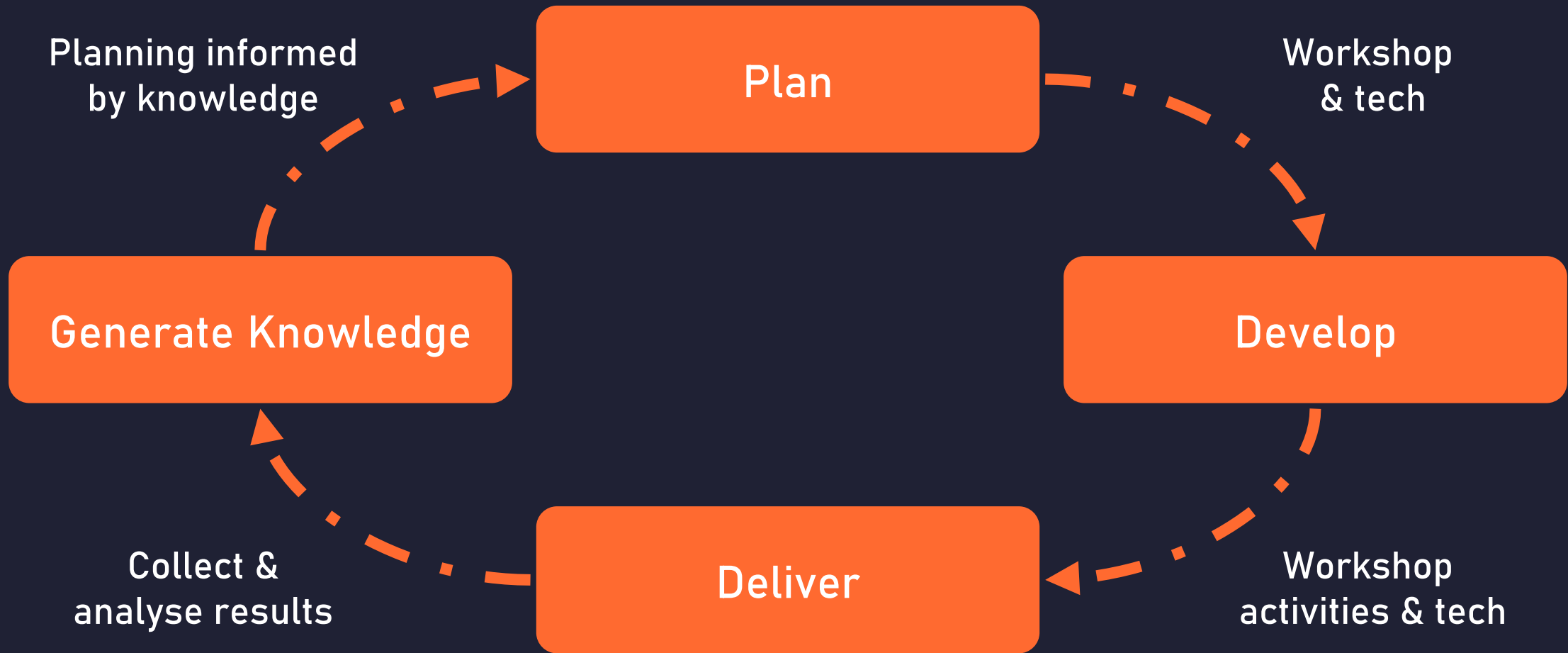

Eden Project

Cotehele National Trust house

Community groups such as those for physical conditions or local regeneration

Further education colleges to help recruit younger people

The ICONIC Codesign Process

Codesign workshops

Intergenerational codesign workshops: numbers and participants

Workshops so far
- 8 extended reality
- 6 underwater telepresence
- 4 social games
- 2 voice interaction

Aim is for 120 participants.

So far, we have, 62 (43 older and 19 younger).

Extended Reality (XR)

Aims to give older people with mobility impairments access to experiences in sites of cultural and historical significance, addressing the limitations of commercially available VR systems while creating bonds with specific places and communities.

Partnered with Cotehele in Cornwall part of the National Trust UK, creating a multimodal experience in VR of the Great Hall.

Extended reality

Activities included testing of ergonomics of XR hardware for older users. This resulted in the development of bespoke controlling and handling functionalities for the Quest 2 headset.

Using Low and High fidelity co-design approaches we explore immersive spatial design and integration of narrative in the experience. This includes the integration of 3D scans of local historical artefacts.

Underwater telepresence

- Give people feeling of being underwater while onshore

- Originally considered remotely operated vehicle but scoping review identified other approaches allowing trade-off between accessibility, interactivity, as well as the complexity of installation and maintenance

Underwater telepresence

Heading towards…

- immersive, real-time experience of a local underwater environment with on-demand access to information about the surroundings

- live video streaming from a static 360 camera with a backend marine life classification engine

- simple user interface delivered over the head-mounted display with interactive controllers.

Social Games

Aim is to develop a new digital social game creation framework that will provide co-creation groups with the technology for understanding, exploring, and creating games while not having access to more expensive computing hardware.

Social Games

In discussion with National Marine Aquarium "Blue Meadow team" we are focussing development on seagrass and its growing process.

AI supported voice interaction

- Nearly 40% of those 75+ in the UK had never used the internet in 2020.

- Providing them with phone access to the Internet is one way to address such digital inequality.

- Even among those with internet access, older people may abandon voice assistant services on smart speakers after unsuccessful attempts

AI supported voice interaction
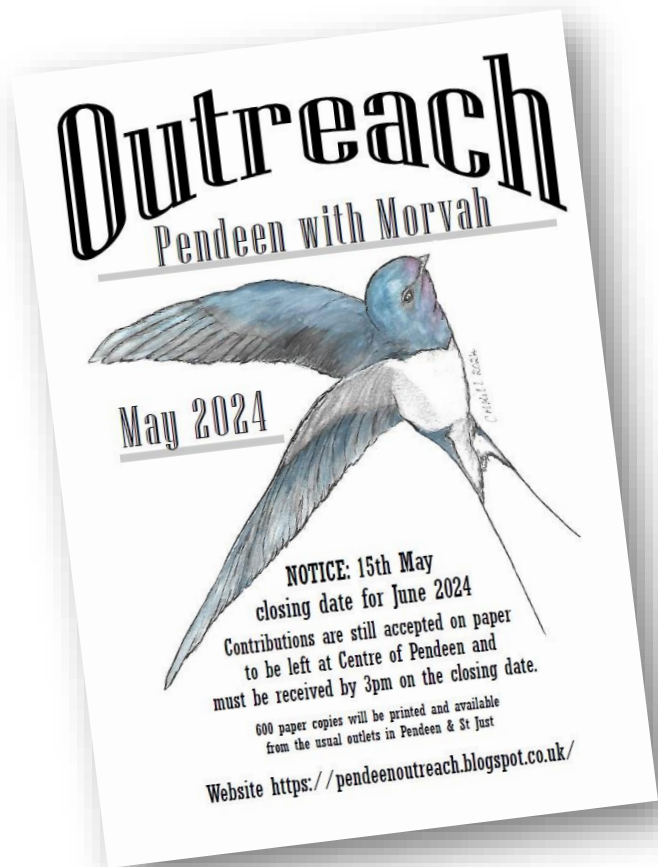
- Objective - to create an interface to access information about local events and services through phone calls.

- Context - 'social prescribing' connecting people to community activities, groups, and services for their health and wellbeing in primary care.

- Working with two communities: St Austell (via Help@Hand) and Pendeen (via community newsletter "Outreach")

- Workshops employ common conversational interaction design tools like Wizard-Of-Oz.

Four novel technologies

- extended reality,
- underwater telepresence,
- digital social games,
- artificial intelligence voice interfaces

Impact on participants

- Participants interviewed on entry and leaving the study.

- Used to assess whether participation in codesign workshops improved
  - digital access, wellbeing and sense of community and environmental connection for older people
  - digital involvement and digital employability for younger people

Learning about intergenerational codesign

- Workshop recordings and notes looking for patterns of how generations work together or if there are specific technical preferences associated with either age group.

- Preliminary observations suggest older people tend to take the role of 'directors' and let the younger people do the hands-on design activities/idea presentation.

Continuity

- We will discuss with education providers how to sustain opportunities and embed these processes into curricula for their students

- We aim to set up a social enterprise with our many partners to continue the development and implementation of the new technologies

Academic outreach

- We would be pleased to have a 1-1 meeting online with any other group around the world where we again described our project, we heard about your work, and we discussed possible collaboration

- See ICONIC website for examples of other meetings

Thank you from ICONIC

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