GERONTECHNOLOGY IN TAIWAN –
DESIGN TO FACILITATE THAT CARING EMBRACEMENT BETWEEN GENERATIONS

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The Sinophone (Chinese speaking) world is aging, fast

- Mainland China has the world’s largest aging population.
- Taiwan, Hong Kong, Macau, and Singapore are hit simultaneously by rapid population aging and extremely low birth rate.

<table>
<thead>
<tr>
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<th>2016</th>
<th>Hong Kong</th>
<th>Taiwan</th>
<th>Macau</th>
<th>Singapore</th>
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<tbody>
<tr>
<td>Crude birth rate</td>
<td>8.90 (208/226)</td>
<td>8.30 (219/226)</td>
<td>8.60 (216/224)</td>
<td>8.60 (214/224)</td>
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<tr>
<td>Fertility rate</td>
<td>1.19 (221/224)</td>
<td>1.12 (222/224)</td>
<td>0.94 (223/224)</td>
<td>0.82 (224/224)</td>
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The World Factbook — Central Intelligence Agency

- South Korea: crude birth rate 8.30 (220/226), fertility rate 1.25 (220/224)
- **Look into Gerontechnology** as a positive solution in maximizing the efficiency and effectiveness of manpower and resource put in elderly care.
Gerontechnology is about design

“Designing technology and environment for independent living and social participation of older persons in good health, comfort and safety”

International Society for Gerontechnology, ISG, established 1997

- Scope of gerontechnology: health, housing, mobility, communication, leisure, and work.
- ISG conferences and journal have a long tradition of using needs of older adults rather than technical fields to classify tracks of papers.

Gerontechnology, official journal of the ISG, was established in 2001

- Gerontechnology Research Center Yuan Ze University was established in January 2003, the pioneering research center in the field in Taiwan.
Traditional value shared across the Sinophone world

• Filial piety
  • Still an essential element of Chinese culture shared across the Sinophone world, where children growing up are constantly and emphatically taught to be filial to their parents and respectful to their elders.

“The young kid carries the older person on the back.”
“The young kid lends an arm to support the older person.”

“THE CARING EMBRACEMENT BETWEEN THE OLDER PERSON AND THE YOUNG KID”
Care needs of the older adults, proposed 2500 years ago

曾子曰：孝子之養老也，
【禮記，內則】

樂其心 不違其志
樂其耳目 安其寢慶

“To take care of the older parents, you should make them happy, and let them do what they will; help them see well, hear well, and provide them a safe and comfortable living environment.”
(Zeng, a disciple of Confucius, about 2,500 years ago)

THE PURPOSES OF GERONTECHNOLOGY…
One day when Zeng was out cutting wood among the mountains, there came a visitor to his house. After awaiting her son’s return in vein, his mother bit her finger.

Zeng felt heartache all of a sudden and knew there was an emergency. He rushed back home with a burden of wood, and on arrival, knelt down to asked his mother what happened. His mother replied, “Here is a visitor who needs you urgently. So I bit my finger to awake you to come back…”

From the “24 stories of filial piety”
ICT in healthcare: Home Telehealth

• 10 years after the major “Ubiquitous Care” project, home telehealth proved to be a failure in Taiwan…

WHO ARE MISSING IN THE PICTURES?

TELEHEALTH SOLUTIONS
PROF. BRANKO CELLER, AUSTRALIA
If the vital sign measurements are sent to children, family members, rather than medical doctors?

CARE, INTERACTION, CONNECTION, IN ADDITION TO HEALTH MONITORING
Are you wearing these wearable devices?

- Google Glass
- HTC Gluuv
- Microsoft Smartwatch
- Samsung Gear Fit
- Intel Smartshirt
- Sony SmartBand
- One More Thing – Apple Watch
- Whistle Activity Monitor for dogs
- Mi Band

Fitness wearables maker Jawbone goes into liquidation (07/11, 2017)
Smart Home / Smart Living?

- CHT Smart Home
  - Service controller, wireless gas detector, wireless motion detector, wireless smart plug, wireless temperature/humidity sensor, wireless smoke detector, wireless reed switch, wireless IP camera, wireless remote controller

- SERCOMM Smart Home Control

Are they really selling “living”?
Do you have a robot at home?

- Autonomous robot
- Telepresence robot
- Exoskeleton robot
- Cloud based intelligent personal assistant
- …
- robot@home?!

Paro – World’s Most Therapeutic Robot
certified by Guinness World Records
5,000 Paros in practical use?!

Olly

Asus Zenbo

Softbank Pepper

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Gerontechnology is about DESIGN

• There is a huge gap between users and products…
• “Need” may not necessarily turns into “motivation”
• “Enjoyment as a source of life”, more fun than functions!

Facilitating that caring embracement between generations!

• Not necessarily high tech, but Technology @ Home
  • Mobile device, social media, natural language processing, IoT, NB IoT …

• Gerontechnology is only valuable if the designs can be turned into products.

Creativity ➔ Prototype ➔ Products ➔ Sales
iPad Project by Anchor in UK

• Since 2014, iPad were distributed to the activity coordinators of 63 care homes.

• Use of iPads with residents: 44% a few times a week and 13% more than a few times a week.

• iPads were helping to enhance activities and further enrich residents’ lives by providing an extra dimension to an activity.

Supporting the caregivers / innovative service design
• Put “smart” into “living”: Transform artifacts commonly seen in everyday lives into Internet of Things (IoT)
Centered around the bedroom: WhizPad is a very comfortable mattress capable of motion sensing

• Special foam to reduce the risk of bed ulcer
• Leave bed alarm in 3 stages to reduce risk of fall
• In-bed activity / sleep quality monitoring
Localization is the fundamental technology for smart living

- Image processing, wearable device, floor sensors
- *WhizCarpet*: DIY assembly, flexibility in size, location and area
- Automatic mapping, real time location tracking from mobile devices

- Localization, mobility monitoring, **fall detection**, fall protection, leave bed alarm, rehabilitation, games…
WhizTouch: Two-way IoT call button in the form of a bed light

• IoT LED Light
  ♦ Set up and adjust through mobile phone App
  ♦ Machine 2 Machine control with WhizPad

• Two-way IoT call button
  ♦ Caregiver receives call from mobile phone
  ♦ Light changes from red to green when caregiver responds
WhizLocator: Localization using BLE devices

- **Location info.**
- **Alert messages**
- **Put BLE receivers on desired locations and connect to Wi-Fi**
- **Simple registration and set up**
- If the older adult is willing to wear a BLE device, such as Mi Band
IoT bedroom in Banciao dementia nursing home

WhizTouch/Light

Tablet

MiBand

WhizPad

WhizCarpet

Personalized info
Serious gaming: Physical exercise / cognitive training / multi-sensory stimulations
Banciao dementia nursing home

Life tree

Old theater

Interactive wall

Train station

Music corner

Old days

Activity room
Transdisciplinary learning / Real world problem and experience

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