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# CPCE Health Conference 2017
## HEALTHCARE DELIVERY AND FINANCING REFORM

# Breaking the Digital Divide for the Elderly through Service Learning and Data Analytics: A proposal

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# Agenda

- Background
- Objective
- Methodology
- Moving Forward…

# Background
## Aging Population

- Government prioritises elderly care (Lam, 2016)
- "In 2014, Hong Kong's elderly population, now defined as those aged 65 or above, stood at 1.07 million, representing 15% of our total population."

- "By 2034, the elderly population will double to 2.28 million, accounting for 30% of the population."



Source: Lam., C (2016). Gov't prioritises elderly care. *Remarks at the Golden Age Expo & Summit 2016 opening ceremony.* Retrieved from http://www.news.gov.hk/en/record/html/2016/01/20160130_160323.shtml

# Background
## Social Isolation, Mental Health

- Cornwell & Waite (2009) found indicators of social isolation that pose health risks:
  - Living alone; Having a small social network; Infrequent participation in social activities; and Feelings of loneliness

Cornwell, E. Y., & Waite, L. J. (2009). Social Disconnectedness, Perceived Isolation, and Health among Older Adults. *Journal of Health and Social Behavior*, *50*(1), 31–48.

- World Health Organization (2016) reported that mental health has an impact on physical health and vice versa:
  - For example, untreated depression in an older person with heart disease can negatively affect the outcome of the physical disease.

World Health Organization. (2016). *Mental health and older adults*. Retrieved from http://www.who.int/mediacentre/factsheets/fs381/en/

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# Background
## Digital Literacy

- It is the ability to understand, evaluate and integrate information from the Internet through various digital devices.

- It is crucial for the mental health of the elderly in this modern information society. It is needed for the elderly to:

  - Expand their social network

  - Receive timely information

  - Engage in online activities

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# Background
## Digital Divide

- Helping the elderly to integrate in an increasingly digital world is important.

- The society should provide an Age-friendly Environment.

- Digital Divide
  - It refers to the issue of the difference in the amount of information received through digital channels between those who have effective access to the Internet and those who do not.

- The digital divide among the elderly is larger in HK than in other developed countries.

**TABLE 1**

The rates of personal computer use (including desktop computer, laptop, notebook, netbook, tablet, palm top, and personal digital assistance) and Internet use in Hong Kong

| Year | Personal computer use rate (%) | | | Internet use rate (%) | | |
|---|---|---|---|---|---|---|
| | Age 15 to 24 years | Age ≥65 years | Mean | Age 15 to 24 years | Age ≥65 years | Mean |
| 2003 | 94.3 | 2.2 | 56.2 | 91.9 | 1.9 | 52.2 |
| 2004 | 95.8 | 4.0 | 59.5 | 94.0 | 3.0 | 56.4 |
| 2005 | 97.2 | 3.2 | 58.8 | 96.2 | 2.6 | 56.9 |
| 2006 | 98.1 | 5.3 | 62.9 | 97.4 | 4.2 | 60.8 |
| 2007 | 98.9 | 6.7 | 66.4 | 98.6 | 5.8 | 64.8 |
| 2008 | 99.2 | 7.8 | 68.2 | 98.8 | 7.0 | 66.7 |
| 2009 | 99.4 | 9.4 | 70.2 | 99.1 | 8.8 | 69.4 |
| 2010 | - | - | - | - | - | - |
| 2011 | - | - | - | - | - | - |
| 2012 | 99.3 | 13.7 | 72.8 | 99.5 | 13.1 | 72.9 |
| 2013 | 99.5 | 18.4 | 74.9 | 98.2 | 18.0 | 74.2 |

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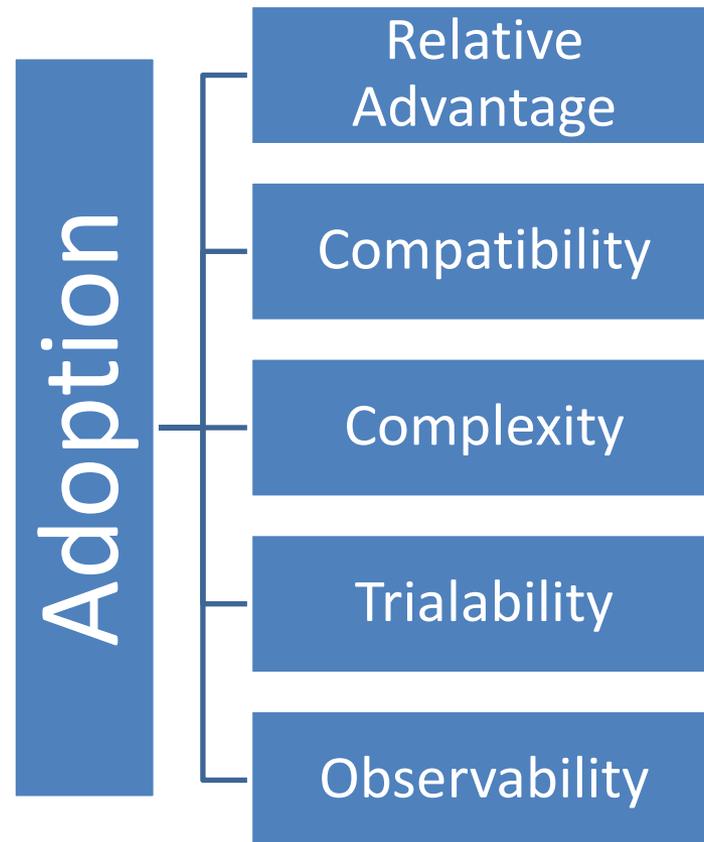and Executive Development
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## TABLE 2
## Reasons for not having personal computer at home in Hong Kong

| Reason | No. (%) of households |
|---|---|
| Not knowing how to use computer | 338 700 (70.4) |
| No specific application | 213 200 (44.3) |
| Can access computer at other places | 56 200 (11.7) |
| Lack of interest in using computer | 30 200 (6.5) |
| Cost too high | 34 300 (7.1) |
| Not knowing how to select suitable computer model | 19 600 (4.1) |
| Already having plan to purchase computer | 7 200 (1.5) |
| Others | 6 500 (1.4) |

# Objectives

- To bridge the digital divide for the elderly through <span style="color:red">service learning</span>

- To identify elderly with special needs with <span style="color:red">data analytics</span> methods

- To help more elderlies become digital literates through <span style="color:red">diffusion of innovation</span>.

# Diffusion of Innovation
## (Rogers, 1995)

Rogers Everett, M. (1995). Diffusion of innovations. New York, 12.

# Methodology

- In a service learning subject, students will design and delivery training programs specially designed for older adults
  - Identifying the needs of the Elderly
  - Understanding their abilities and limitations
  - Preparing the teaching and learning materials
  - Delivering IT classes to the Elderly
  - Uniqueness: When one student is delivering the class, others can act as the facilitators.

Sara J. Czaja and Joseph Sharit. (2012). *Designing Training and Instructional Programs for Older Adults (Human Factors & Aging)*. CRC Press.

# Possible Training Contents

- Internet surfing: entertainment (online TV programs), newspaper, search engine, transportation, government services, healthcare information, hospital services and email

- Social media and instant messenger: basic functions, privacy and safety issues, netiquette and information literacy

- Mobile and tablets: communications, basic privacy settings, photo-taking, video-shooting. apps download and use of apps (leisure, newspaper, transportation, government, and emergency services)

- Web and multimedia authoring: use of free online apps to design personal web, photo- and video- editing

- Chinese processing: Chinese typing

# Methodology

- Data are collected through observations and surveys during training:
  - Number of typing errors made
  - Time needed to complete a task
  - Ability to follow instructions to operate the digital devices
  - Attitude in the learning process
  - Emotional expression in the learning process
- Data analytics can be used to identify those elderly with special needs

# Processing of Data

- Examples of data collected:

| No. of errors made | Time needed to complete task | Ability to follow instructions (1 − 5) | Attitude (1 − 5) | Emotion (1 − 5) | … (other measurements / observations) |
|---|---|---|---|---|---|
| 5 | 10 min | 5 | 3 | 2 | … |
| 2 | 7 min | 3 | 2 | 4 | … |
| 12 | 25 min | 1 | 4 | 5 | … |

- Clustering of the data can be performed
- Outliners (special cases) can be identified

Dubes, R. and Jain, A.K. (1979). Validity studies in clustering methodologies. *Pattern Recognition*, vol. 11, pp. 235-254,

# Moving Forward…

- We have:
  - proposed the Service Learning subject to the PolyU SPEED for approval in Oct 2016.
  - obtained agreement from a centre for the elderly
- What we will do (if approval obtained):
  - Deliver course contents to students using a blended approach
  - Supervise the students in training the elderlies
  - Analyse data and apply findings

# References

Cornwell, E. Y., & Waite, L. J. (2009). Social Disconnectedness, Perceived Isolation, and Health among Older Adults. *Journal of Health and Social Behavior*, *50*(1), 31–48.

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