# COVID and aged care: Gamification of infection control training
WHO CC Webinar 2022
18 March 2022

Angela Y. M. Leung, PhD, MHA, BN, RN

Professor, School of Nursing (SN), The Hong Kong Polytechnic University (PolyU)

Deputy Director, WHO Collaborating Centre for Community Health Services, SN, PolyU

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

School of Nursing 護理學院

World Health Organization Collaborating Centre for Community Health Services 世界衛生組織社區健康服務合作中心

World Health Organization Collaborating Centre for Community Health Services
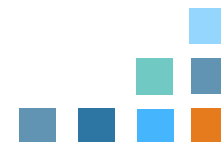
Project Team

- Prof. Alex Molasiotis, Director of WHOCC, Chair Professor, School of Nursing, PolyU
- Dr. Doris YP Leung, Associate Professor, School of Nursing, PolyU
- Dr. Justina Liu, Associate Professor, School of Nursing, PolyU
- Dr. Daphne Cheung, Assistant Professor, School of Nursing, PolyU
- Dr. Eliza Wong, Associate Professor, TWC
- Dr. Simon Lam, Professor, TWC
- Dr. Mimi Tse, Professor, MU
- Mr. Terence Lau, PhD Student, School of Nursing, PolyU
- Dr. Stephanie Szeto, Research Associate, School of Nursing, PolyU
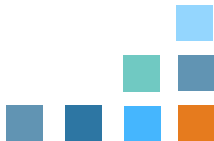
World Health Organization Collaborating Centre for Community Health Services

Presentation outline

1. Infection control in Residential Care Homes
2. Blended Gaming COVID-19 Training System (BGCTS)
   - Rationale for developing this system
   - System design/ development
3. Pilot test
   - Arrangement of the pilot test
   - Results of the pilot test
4. The way forward

Background

- Training the staff in residential care homes (RCHs) is crucial because they are the gatekeepers of the safety of the residents.

- In Hong Kong, a registered nurse is designated as an Infection Control Officer (ICO)
  - coordinate matters related to the prevention and handling of infectious diseases in each RCH.

- Many RCH staff have difficulty to understand the written guidelines.

- Gamification refers to "the use of game design elements in non-game contexts". (Deterding et al., 2011)
  - short video clips
  - interactive video games in the form of quizzes

- non-game environments (RCHs) within non-game contexts (infection control training)

- Gamification is widely used as an educational tool in different disciplines (Vlachopoulos & Makri, 2017)
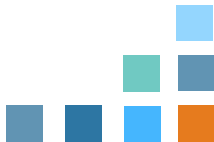
Blended Gaming COVID-19 Training System (BGCTS)

- The BGCTS is **the first of this kind training**, addressing the diverse **health literacy** and helping RCH staff to comply with **WHO infection control guidelines**.

- It brings benefits to the society in terms of knowledge development and practice improvement.
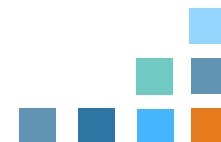
BGCTS - Design

The contents are based on WHO guideline (WHO, 2020)

There are 8 posters:
- 1 poster = 1 game/story

Stories were set with referent to usual practices in RCH.

Hosted by the secured web server

The COVID-19 Risk Communication Package For Healthcare Facilities

This package provides healthcare facility management and healthcare workers with an overview of the key actions required to keep safe and healthy in the workplace.

Updated March 10, 2020.

This toolkit is designed to be easily edited, printed and shared. The layout is suitable for any ISO-sized paper (A4, A3, A2).

Images and text have been separated so the layout can be adjusted depending on the requirements.

To print, export the files as PDF or PNG and send to the printer. For borderless printing, the image may be scaled to fit the printable area and trimmed along the edges.
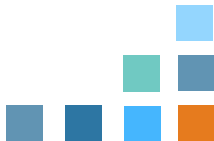
BGCTS - Login Page

- Unique username and password will be assigned to each RCH staff

- Progress checking

- System features:
  - Implementation of check-point: users can continue where they have stopped
  - Allows repeated attempts on the games
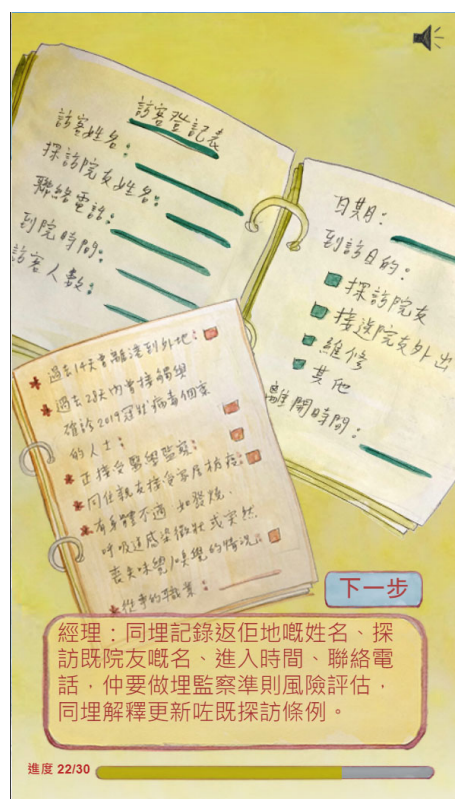 - Compatible with PC/ IOS & Android system

BGCTS - Introduction, Story 1-3

- How to facilitate learning
  - With voice-over
  - Progress bar to indicate progress
- Introduction
- Story 1
  - Preparing for COVID-19 at your healthcare facility
  - Highlighted areas:

  Triage procedures, social distancing and suggested policy for visiting hours.

BGCTS - Introduction, Story 1-3

- **Story 2**
  - Managing patients with suspected or confirmed COVID 19 at your healthcare facility
  - Highlighted areas:

  Handling of suspected or confirmed cases of COVID-19 and environmental cleaning

- **Story 3**
  - Protecting yourself at work from COVID-19
  - Highlighted area: Proper use of PPE

BGCTS - Story 4

Personal Protective Equipment (PPE) According to Healthcare Activities

- To introduce the appropriate use of PPE in the context of COVID-19

  - 5 scenarios
    1. Points-of-entry screening personnel
    2. Collecting respiratory specimens
       - Caring for a suspected/confirmed case of COVID-19 with
    3. NO aerosol generating procedure
    4. Aerosol generating procedure
    5. Transport and involve direct care

BGCTS - Story 5

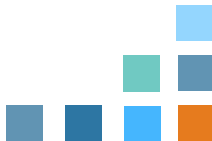Communicating with patients with suspected or confirmed COVID 19

- To introduce appropriate communication techniques when communicating with patients with suspected or confirmed COVID 19

  - Visual novel-based adventure
    - Being the RCH staff, the participant chooses the best response to communicate with others in 3 different scenarios
    - Various communication techniques will be introduced if answered incorrectly

BGCTS - Story 6
Information sheet about COVID-19

- To enhance participants' knowledge towards COVID- 19
  - 40 MC questions
    - Wrong answers: increase number of Coronaviruses by 1
    - Correct answers: Protagonist would fence off Coronaviruses
  - Aspects of COVID-19 covered:
    1. Sign and symptoms
    2. Environmental cleaning
    3. Preventive measures
    4. Means of transmission
    5. Hand and respiratory hygiene

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

World Health Organization Collaborating Centre
for Community Health Services
世界衞生組織社區健康服務合作中心

School of Nursing 護理學院

BGCTS - Story 7
Coping with stress

朋友傾偈　　足夠睡眠　　聽音樂

破壞物件　　找輔導員求助

大叫　　靜觀

在家運動　　均衡飲食　　勤洗手

在家瑜伽　　大吃大喝

吸煙　　戴口罩　　呼吸練習

- To introduce appropriate ways of stress coping
  - Each bubble represent one stress coping technique
    - Drag appropriate bubble to "feed" protagonist
    - Correct answers would:
      - increase marks
      - brighten the facial expression of protagonist
  - Goal: obtain as many marks as possible in 120 seconds

BGCTS - Story 8

My 5 Moments for Hand Hygiene

Story 8

- To introduce different Hand Hygiene opportunities and its techniques
- Videos appraisal & Point and click adventure

  - Incorporated all 5 moments into 4 scenarios
  - Participants are required to properly perform hand hygiene before advancing the story

Pilot Test of BGCTS

- Using Zoom to go through the pages one by one.

- RCH healthcare personnel involved:
  - 2 Health workers
  - 1 Enrolled nurse
  - 2 Registered nurse
  - 1 Nursing Officer

Pilot Test of BGCTS

- Cognitive interview was used to:
  - Explore & gain insight on participants' cognitive process upon using BGCTS
  - identify possible improvements

- Techniques were used:
  1. Retrospective probing (questions asked after the trial)
  2. Concurrent verbalization (think aloud)

(Pepper et al., 2018)

- Probing questions:
  - How effective would you think BGCTS can improve your (COVID-19) infection control knowledge?
  - Which function/ story do you like the most? Why?
  - To further enhance RCH staffs' infection control knowledge, how can BGCTS be improved?
  - Is there any difficulties you have encountered? How can the system be modified?
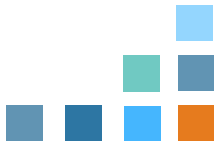
BGCTS – User Acceptance Test

- System Usability Scale (SUS)
  - John Brooke (1995)
  - An addition adjective-anchored Likert scale item has been added by Bangor et al. (2009)
  - Chinese version translated by Wang and colleagues (2020)
  - Scoring of pilot test:
    - Mean score of usability scale= 67.1/100
    - Mean score of user-friendliness (7-point Likert scale) = 5.5

System Usability Scale

® Digital Equipment Corporation, 1986.

	Strongly disagree				Strongly agree	
1. I think that I would like to use this system frequently	1	2	3	4	√ 5	4
2. I found the system unnecessarily complex	1	2	3	√ 4	5	1
3. I thought the system was easy to use	1	√ 2	3	4	5	1
4. I think that I would need the support of a technical person to be able to use this system	√ 1	2	3	4	5	4
5. I found the various functions in this system were well integrated	1	√ 2	3	4	5	1
6. I thought there was too much inconsistency in this system	1	2	√ 3	4	5	
7. I would imagine that most people would learn to use this system very quickly	1	√ 2	3	4	5	1
8. I found the system very cumbersome to use	1	2	3	√ 4	5	1
9. I felt very confident using the system	1	2	3	4	√ 5	4
10. I needed to learn a lot of things before I could get going with this system	1	√ 2	3	4	5	3

11. Overall, I would rate the user-friendliness of this product as:

☐ Worst Imaginable	☐ Awful	☐ Poor	☐ OK	☐ Good	☐ Excellent	☐ Best Imaginable

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

Results of the pilot test

- More than 30 suggestions have been identified

- Notable comments:
  - Consider to add a story before answering the MC questions
    - -> Story 3: MC questions should be added at the end of each session
  - Too many visual cues on Story 8
    - -> Decreased frequency of visual prompting, allowing users to identify appropriate Hand Hygiene opportunities

- Other improvements on BGCTS:
  - Enhance user-friendly features and presentation format
    - Increase volume of voice over & font size
    - Add user instructions while the users navigate the system

- In general, users described BGCTS as:
  - This system is 'Informative and motivational' for learning infection control practices
  - Refer animations as 'attractive'
  - Consider the games as 'interesting and educational'
  - Describe the experience as "fun and engaging"
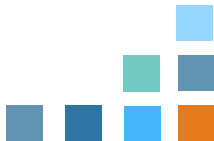
The Way Forward ….

A Cluster RCT

邀請參與研究
提高安老院員工對感染控制措施的知識和能力

我們正研製一個感染控制培訓系統（BGCTS），以遊戲及面授混合模式指導安老院員工學習感染控制措施，防止COVID-19的傳播、提升感染控制的知識和應對能力。現在我們邀請您來測試這個系統。

參與研究的人士：
任何**直接提供護理程序**的員工均可參與，包括:
專業人士：醫生、註冊護士、註冊精神科護士、登記護士、物理治療師、職業治療師等
前線員工：醫護支援人員、保健員、個人護理員、照顧員、物理治療助理、職業治療助理

項目主要研究員：
梁綺雯教授
香港理工大學護理學院
世界衛生組織社區衛生服務合作中心副主任

整個培訓計劃費用全免

查詢或註冊，請掃描:

如有興趣或任何查詢 ：
請聯絡 劉先生
電話：3400 8295
電郵：terence.lau@connect.polyu.hk

該項目由香港特別行政區政府食物及衛生局衛生及醫學研究基金 - 新型冠狀病毒病（COVID-19）委託研究資助（參考編號：COVID190218）。

Aims: To assess the effect of the Blended Gaming COVID-19 Training System (BGCTS) on infection control practices among all staff in RCHs.

Intervention:
2-week blended training = Eight 15-min e-learning (total 120 min.) + two 30-min face-to-face group sessions with Infection Control Officer

Reference

- Au, J. K. L., Suen, L. K. P., & Lam, S. C. (2021). Observational study of compliance with infection control practices among healthcare workers in subsidized and private residential care homes. *BMC Infectious Diseases*, *21*(1), 1-11.

- Bangor, A., Kortum, P., & Miller, J. (2009). Determining what individual SUS scores mean: Adding an adjective rating scale. *Journal of usability studies*, *4*(3), 114-123.

- Brooke, J. (1996). SUS-A quick and dirty usability scale. *Usability evaluation in industry*, *189*(194), 4-7.

- Deterding S, Khaled R, Nacke L, et al. Gamification: Toward a Definition. CHI 2011, Vancouver 2011.

- Wang, Y., Lei, T., & Liu, X. (2020). Chinese system usability scale: Translation, revision, psychological measurement. *International Journal of Human–Computer Interaction*, *36*(10), 953-963.

- World Health Organization (WHO) Western Pacific Region Office (WPRO). The COVID-19 Risk Communication Package for Healthcare Facilities. *The COVID-19 risk communication package for healthcare facilities.* March 2020. https://apps.who.int/iris/handle/10665/331140 (accessed 30 Apr 2021)

- Vlachopoulos D, Makri A. The effect of games and simulations on higher education: a systematic literature review. Int J Edu Tech in Higher Edu 2017;14. doi:10.1186/s41239-017-0062-1
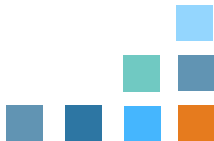
Thank you

Angela Y M Leung, School of Nursing, PolyU

Angela.ym.leung@polyu.edu.hk