WEO-PET Singapore

Digital Health and Distance Training Initiative

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Outline

- Objective
- Telegastroenterology - training for flat adenoma screening/detection
- Pilot projects
- Demo – Virtual MultiHead

Objective

- Establish digital health platform/virtual CoE to promote collaboration between WEO member societies
- Identify WEO colleagues to join O.C.
  - Education/distance training
  - Clinical services
  - Research

Telemedicine – types

- Interactive (Synchronous)
  - two way video
  - real time
  - high-bandwidth telecommunication
- Store and Forward (Asynchronous)
  - images, audio or video files stored and transmitted, like e-mail
  - usually not real time
  - lower bandwidth telecommunication

Digital Health - Telemedicine

Tele-radiology

Tele-dermatology

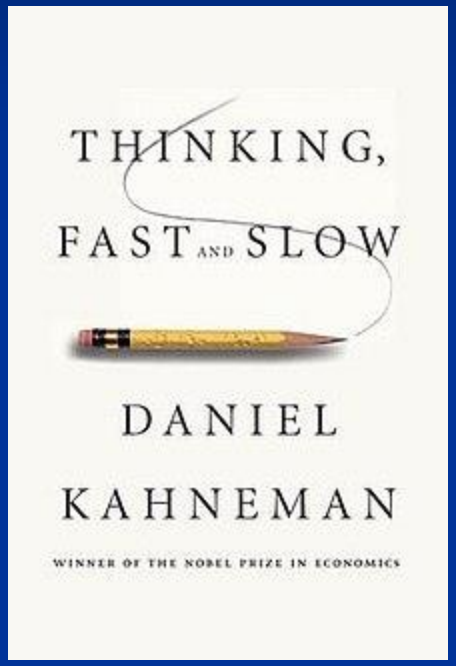
Tele-pathology

Cell phone microscopy

How do you learn/teach detection of flat adenomas?

- Must be visual (not auditory)
- Repetitive exposure, form memory, then recall
- Pattern (facial) recognition - Innate ability
- Current practice
  - Clinical experience (>>>400 cases for basic competency)
  - Static images - Text books/atlases
  - Videos – CD→DVD→BlueRay→streaming

Thinking, Fast and Slow*



- explains the two systems that drive the way we think.
- System 1 is fast, intuitive, emotional.
- System 2 is slower, more deliberative, more logical.

* best-selling book published in 2011 by Daniel Kahneman (Nobel Prize in Economics)

Doing, Fast and Slow Colonoscopy*

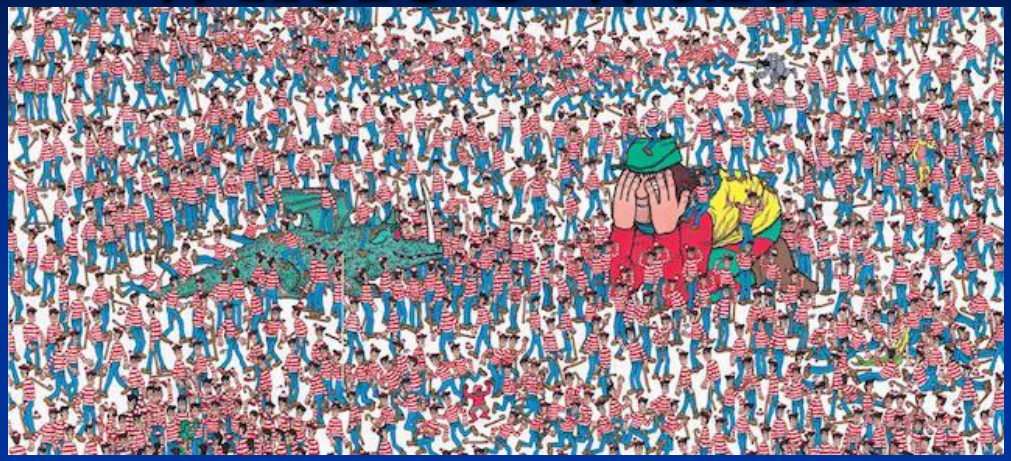
- explains the two methods GI expert vs. trainee perform colonoscopy to detect Flat Adenomas.
- Soetikno -fast to reach cecum, intuitive, can detect F.A. in his sleep.
- Novice – slow, often can't reach cecum or detect flat adenomas

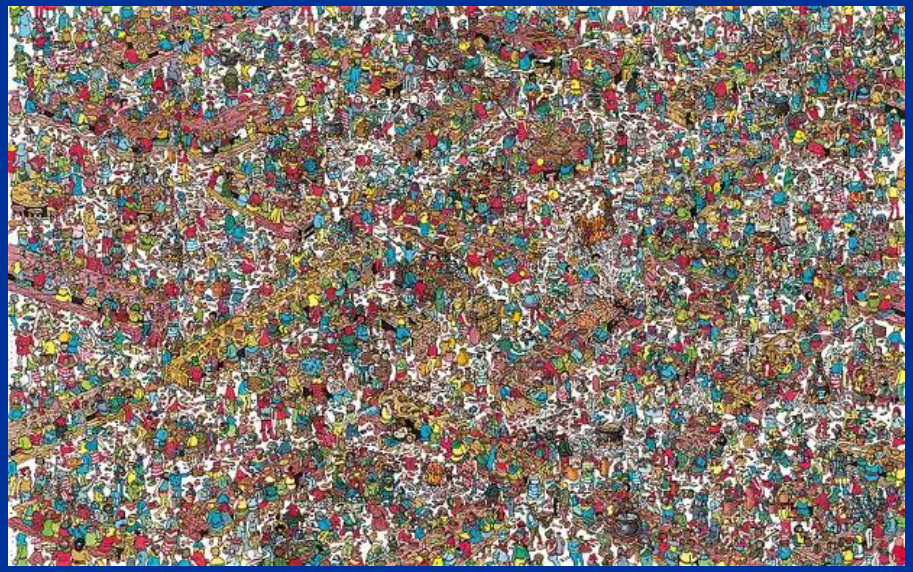
* Possibly best-selling book that may published by Roy Soetikno, MD (Nobel Prize in Colonoscopy TBD)

Challenges w/ Traditional GI Training

- Labor intensive, time consuming, expensive
- Requires one-on-one interaction
- Relatively slow/flat learning curve (>3 yrs)
- Memory degradation/fatigue
- Need to correlate endoscopic findings with pathological dx
- Knowledge base is lost with retirement
- Difficult to scale & sustain - e.g. mass screening

Where's Waldo





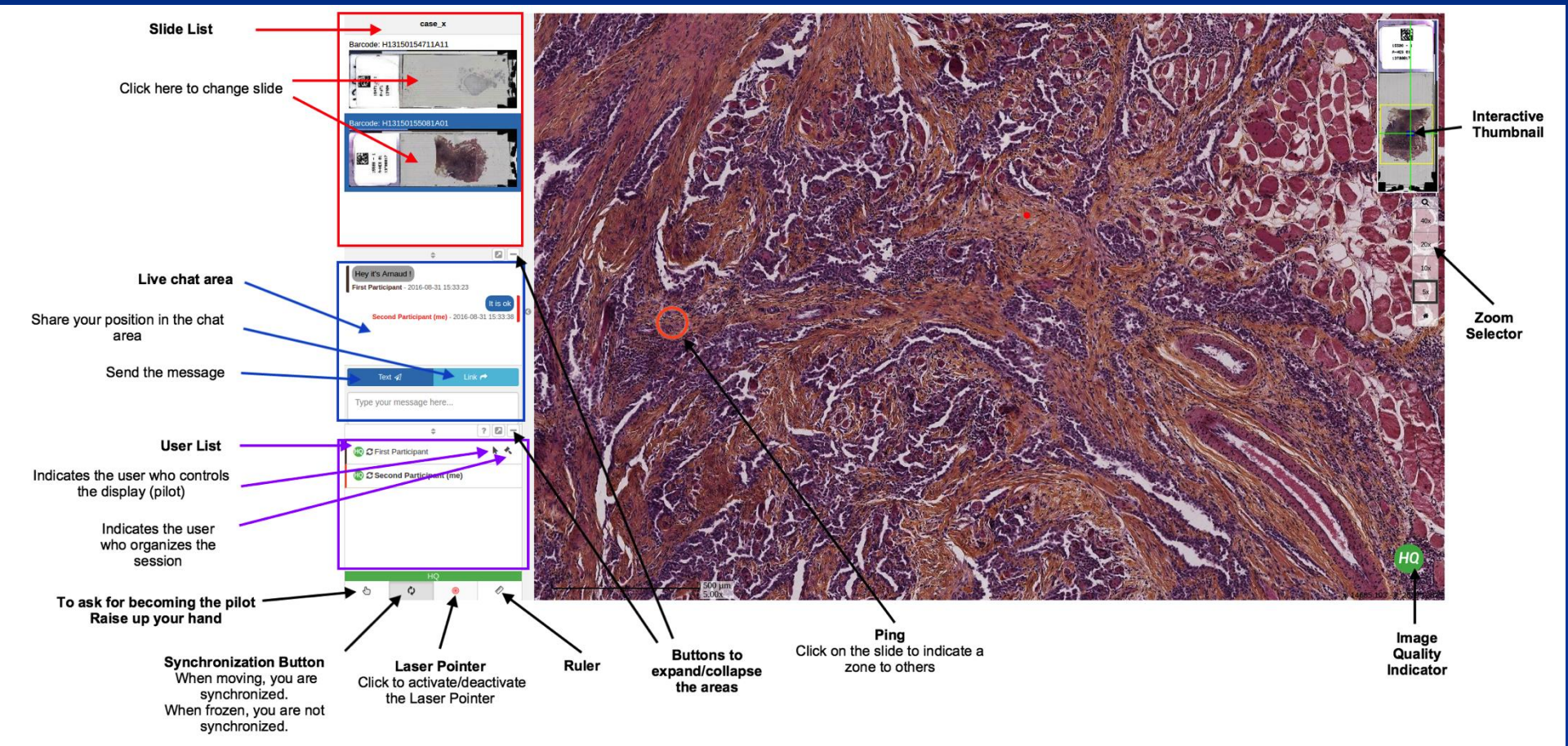
Future- "Visual Training" Strategy

- Big Data – digital images, video, sensor data
- Data Analytics
  - Artificial intelligence/neural networks
  - Machine learning
  - Deep learning
- Big Players: IBM Watson, Google DeepMind, FaceBook
- Small startup AI companies: hundreds/thousands

WEO Outreach Committee Pilot Projects

- Tele-GI Pathology/tumor board conference utilizing web-based platforms
- Telepathology - Automated image analysis versus standard light microscopy for assessing EUS-FNA sample adequacy
- Telegastroenterology – Web-based platform for remote analysis and reporting of capsule based studies

VirtualMultihead™: Telepathology conference tool

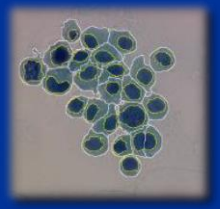


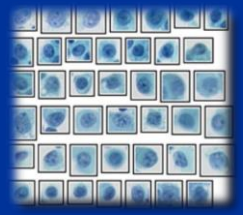
CytoProcessor™: Digital cytology screening tool

Sample Preparation → Digitization Slide Scanner → **Automated Analysis** → Diagnosis On screen

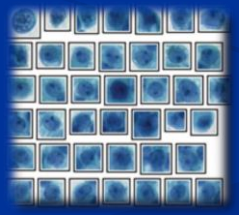
CytoProcessor™

Slide Digitization → Nucleus extraction → Cell classification → Visualization





Normal



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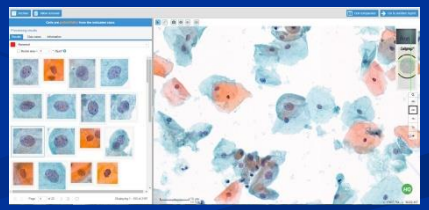

Capsule-Based Technologies

Web-based Telemedicine Platform

Digital Health platforms
Ideal Features (7-F's)

- Functional – addresses a clinical need
- Flexible – works with any manufacturer/data sets (need industry standards, e.g. DICOM)
- Friendly – user friendly, intuitive (child-enabled)
- Fast – easy to learn, master, remember
- Fun – not tedious
- Freedom – automated/reliable so GI can do other tasks
- Free – low cost/affordable

Pilot Projects in Tele-Gastroenterology

1. WEO Tele-PET
2. Tele-GI/telepathology conference - Virtual MultiHead
3. Telegastroenterology (e.g. capsule-based)
   - R&D – web-based platforms, AI, machine learning
   - Training
   - Certification