



**Trinity College Dublin**

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

## **TECHNOLOGY ENHANCED REMOTE ASSESSMENT**

**Marie Morris, PhD**



# Collaborators

Ms Amy Gillis

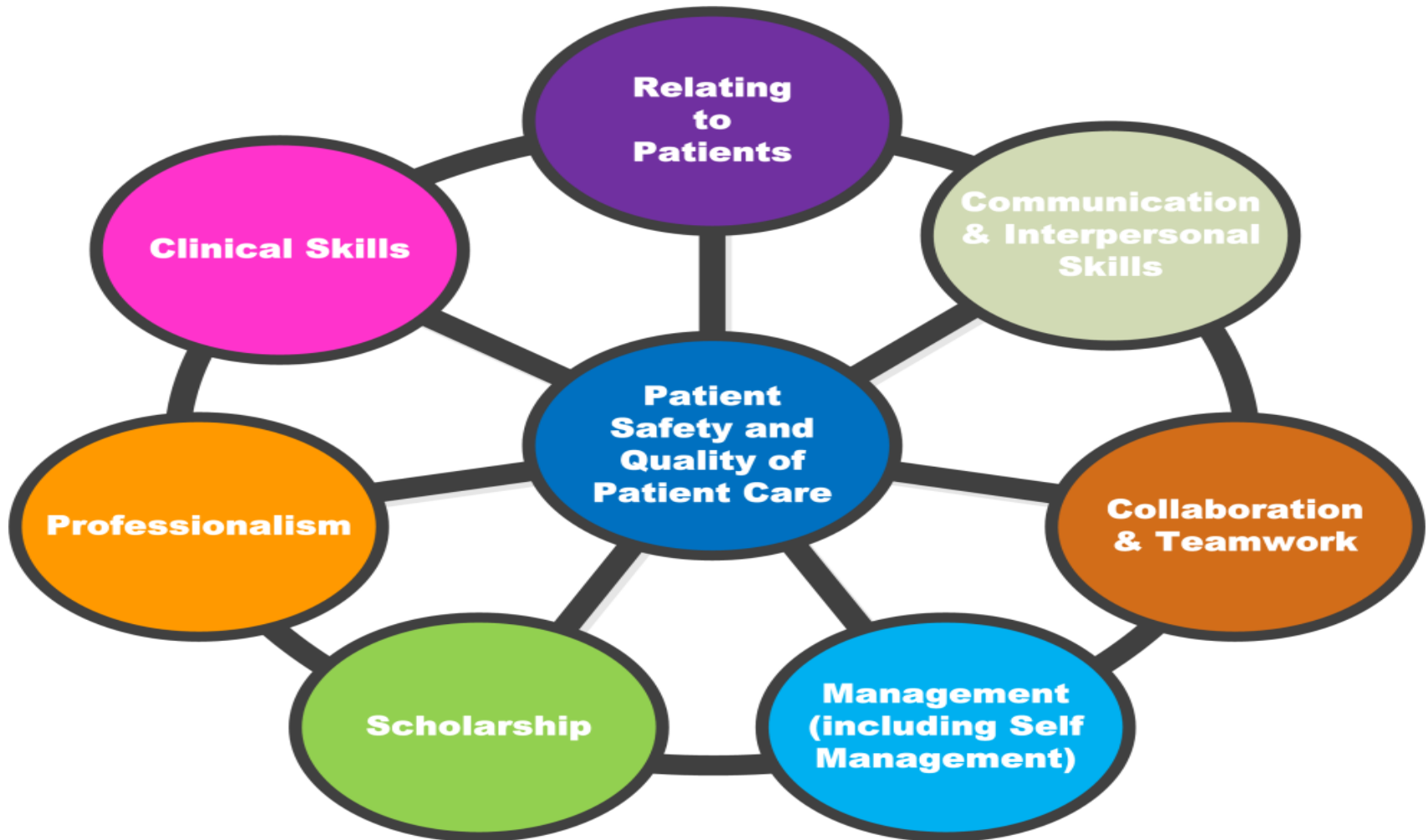
Mr Donal O` Connor

Professor Paul F Ridgway

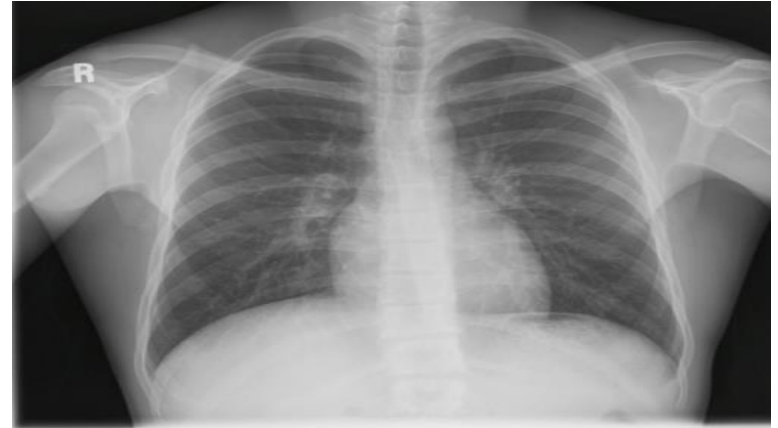
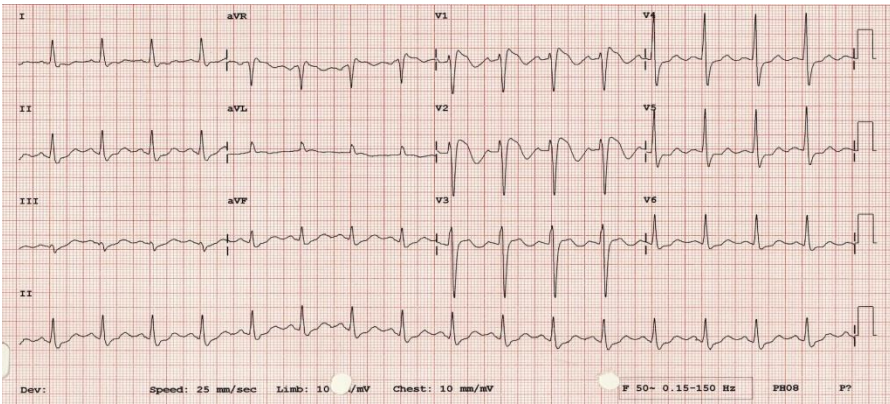
## Ethical Considerations

The School of Medicine, Faculty of Health Sciences Research and Ethics Committee University of Dublin Trinity College approved this project. Written informed consent was gained from all participants to utilise the data collected for research and publication.

# Assessment Governance



**Domains of Professional Practice (Adapted Irish Medical Council, 2014)**

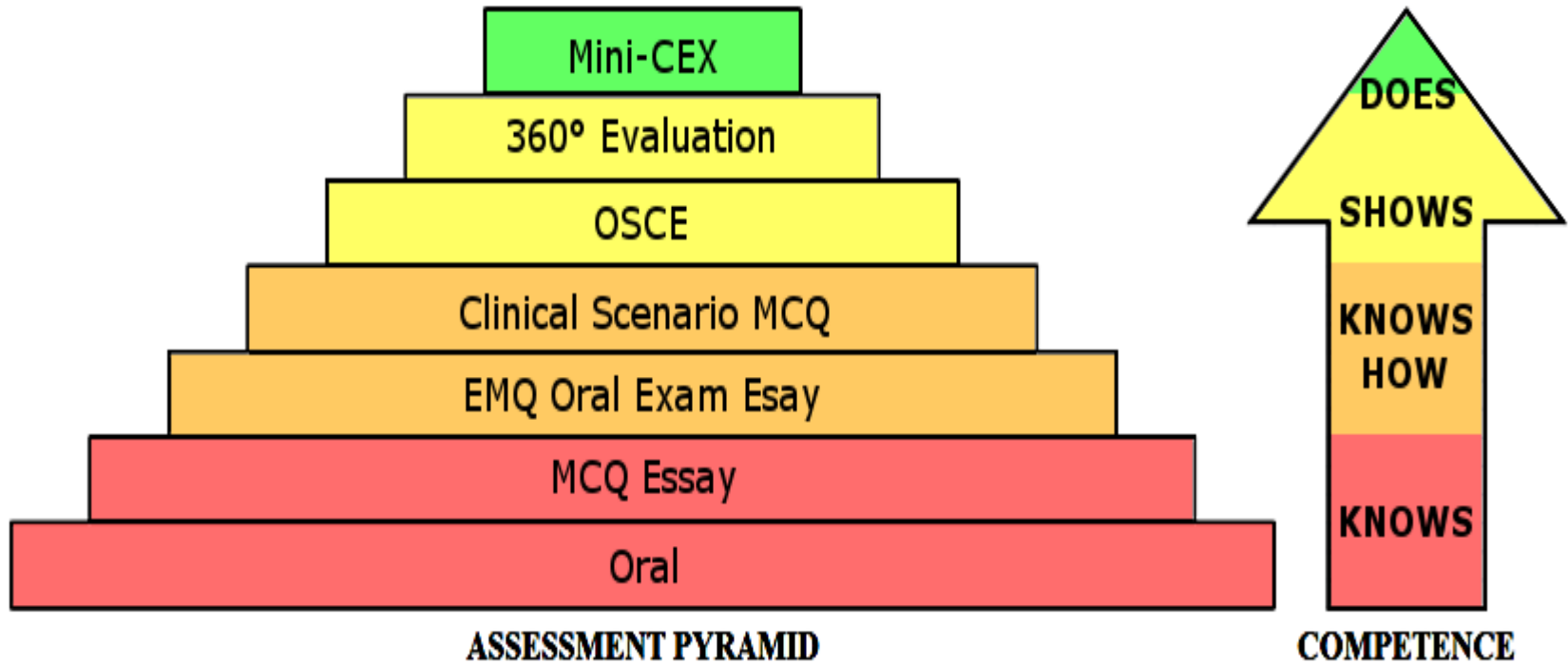


## Tuning Project, 2008



**Tuning Project , 2008**

# Assessment Model

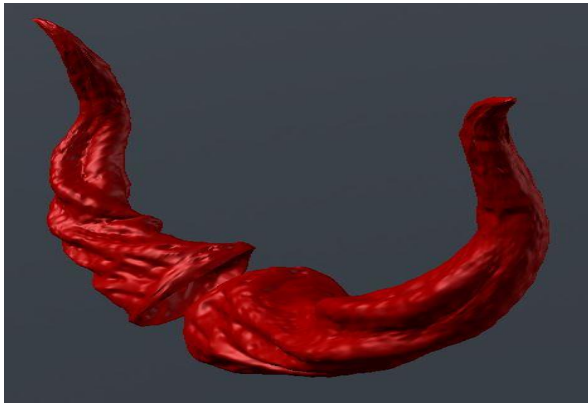


Millers pyramid of assessment (Miller, 1990)

# Assessment Challenges – Assessors



**Hawk**



**Horns Effect**



**Central Tendency**



**Dove**



**Halo Effect**

# Assessment – Students Perspective

- Accept direct observational is a core course requirement
- Desire for a fair assessment
- Passing should not be down to “luck”
- Transparent process
- Feedback should be timely
- Accept dual examiners superior but report that multiple examiners increases anxiety and stress



# Why use Technology in Assessment ?

- Technology savvy millennial generation students
- Promotes student engagement
- Facilitates student centred learning
- Promotion of non-traditional modes of assessment
- Embeds 21st Century assessment modalities into the curriculum



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# Undergraduate Setting



**Double Robotics™**  
**Telepresence Device**  
**Five-foot tall tablet  
computer on wheels  
via Wi-Fi**

**R.I.T.A**

**Remote Interpretation  
of Technical Ability**

<https://www.doublerobotics.com/education/>

## iPad Air 2

or iPad Pro (not included)

## Camera Kit

720p Adaptive HD

## Audio Kit

Be heard.

## 6-8 hr Battery

Recharges in 3.

## Lateral Stability Control

Smooth ride.

## Self-Balancing

Magical.

## Charging Dock

Always on.

## Dual Kickstands

Park anywhere.



# Logistics - Double Robotics™

- Controlled by the absent examiner via their mobile phone
- Remote assessor appears on the screen
- Conducts a face-to-face interaction with the student
- Student and patient can be seen up close
- Examiner can check for levels of competence in the students' performance
- Remote assessor can quickly travel around the exam room

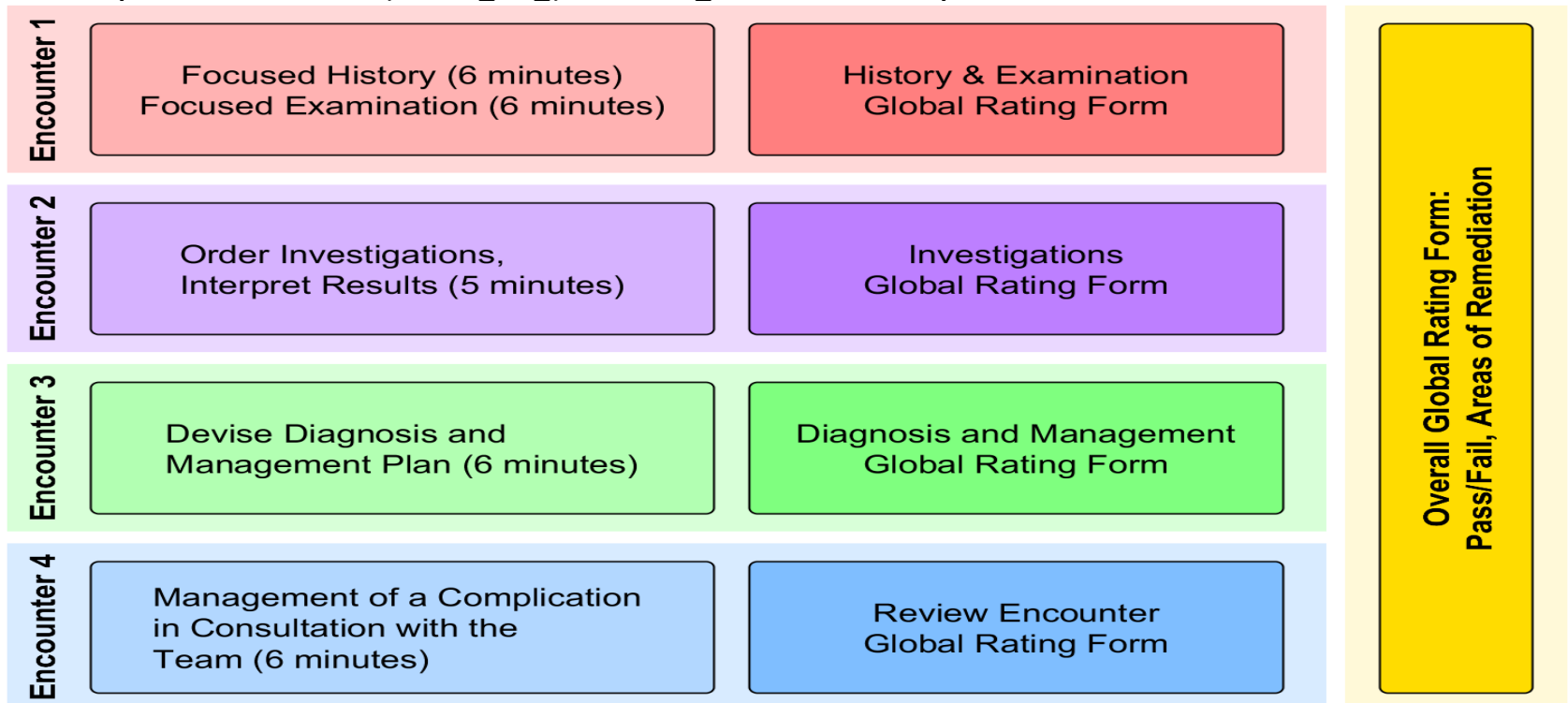


# Feasibility Study

- Mixed methods approach – quantitative and qualitative
- An investigation into the levels of agreement (correlations) between two examiners assessments – one present, one remote
- Remote assessment via a tele-presence device
- Examiner, student and simulated patient evaluations

# Alternative Clinical-Skills Examination “ACE”

- Common cases (0.5 hour per station);
- Observed by examiners with GRS raters, standardised patient and materials (referral letters, imaging, investigation results)



# Standardisation

- Content experts within the medical school developed the cases ensuring comparable complexity across cases.
- Each case was reviewed further by content experts and pilot-tested.

## Data preparation and analysis

- Krippendorff's Alpha - Inter-rater reliability tests - (Greene, 1999) to examine levels of agreement between independent examiners.

**Low correlation = < 0.6**

**Medium correlation = 0.6-0.79**

**High correlation = 0.8-1.0**

- Free text comments were analysed using the **“cut and paste”** technique (Richie, 2000)

# Methods

- 48 - Year 3 medical students volunteered to participate in November 2016.
- The "ACE" format consisted of 4 sequential patient encounters observed by two independent examiners. One present and one remote.
- Examiners and students evaluated "RITA" using free text comments.



# RESULTS – Quantitative

| <b>Skill</b>                          | <b>Result</b> |
|---------------------------------------|---------------|
| History taking                        | 0.487         |
| Physical Examination                  | 0.458         |
| Communication Skills                  | 0.0714        |
| Privacy/Dignity                       | -0.182        |
| Time Management                       | -0.182        |
| <b>Procedural Skills - Phlebotomy</b> | <b>0.711</b>  |
| Data Interpretation                   | 0.425         |
| Response to Patient queries           | 0.593         |
| <b>Over all Performance</b>           | <b>0.795</b>  |

Krippendorrf's Alpha

# RESULTS – Quantitative

- 100% agreement between both Examiners regarding Pass/Fail grades.
- Where marks differed one examiner marked a 4 and the other 5.
- The remote examiners reduced grades according to the amount of prompting required. This was reflected in the wide variation in grades for time management.
- The remote assessor reduced grades where the patient was over exposed and exposed for longer periods than required for the physical examination. This was reflected in the wide variation in grades for privacy/dignity .

# RESULTS – Qualitative

## Themes and Issues Identified by Remote Assessor

- Need good Wi-Fi Access
- Battery
- Occasional screen freezing
- Student needs to talk to screen
- Practice required to move around bed
- ? Observer v` s participant
- Consider a mounted device

# RESULTS – Qualitative

## Themes and Issues Identified by Present Assessor

- Picture Good
- Occasional screen freezing – short lived
- Little interaction with remote assessor
- Awareness of device location - not to obstruct view
- ? Remote assessor observer v` s participant

# RESULTS – Qualitative

## Themes and Issues Identified by Students

- Non- intrusive
- Better than 2 Examiners in the room
- Benefit of feedback from 2 Examiners
- Unsure re talking to the remote assessor

# RESULTS – Qualitative

## Themes and Issues Identified by Simulated Patients

- Didn't take much notice of device
- Remote assessor more about watching the student rather than interacting with us
- Need to ensure enough room around bed for device to move quickly

# Costings

***Purchase cost of double robotics device***

***= 2,600 Euro per unit***

- Includes Double 2,
- Charging Doc,
- Audio and Camera Kit,
- Driver Apps,
- AC Adapter
- 1 Year Warranty.

# Conclusion

- Technology enhanced assessment is feasible.
- It is a non traditional assessment method.
- It addresses the issue of limited access to subject experts.
- It may reduce the cost of external examiners.
- A larger study is needed with more examiner pairings.



# Future

- Larger study week commencing March 2018
- Inter-rater reliability between examiner pairings
- 4 Telepresence devices
- 8 Examiners – 4 Remote, 4 Present
- Year 3 Students post OSCE
- Checklists and procedural skills

# Acknowledgements

**Dean of Health Sciences Award 2015 – “ACE” Project**

**Dean of Health Sciences Award 2016 – Remote Assessment Project**

## **Facilitators**

Ms Olive Killoury

Mr Damien O` Connor

Class of 2017 and 2018