Bridging The Learning Gap Between Cardiac Electrical Activity, Function and ECGs



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Background

- Electrocardiogram (ECG) interpretation is an important skill that can be difficult to learn. Graduating medical students lack confidence in this area. 1,2
- Lack of student confidence stems from challenges in understanding the foundations including anatomy, physiology, and basic ECGs.
- To bridge the gap, the use of an online learning simulation, in a blended learning environment, may improve knowledge, understanding, and confidence in the early learners. 4
- Currently, in the pre-clinical medicine course at Monash University, there is no learning simulation available that aligns with the curriculum, and that is specifically aimed at the early learners.

Research Aims

- 1. To explore students' and lecturers' perceptions of challenges when learning and teaching the foundational learning topics and basic ECG interpretation.
- 2. To design a learning simulation pilot targeted at the early learners in the pre-clinical years.

Lecturers:

Physiologists (n = 2)

& Clinicians (n = 3)

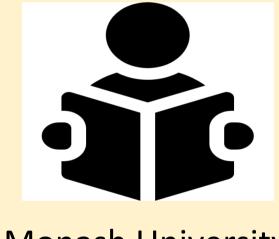
Interviews with

lecturers

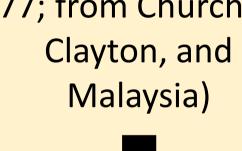
Interviews

transcribed

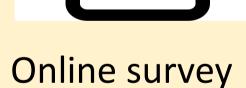
Methods:

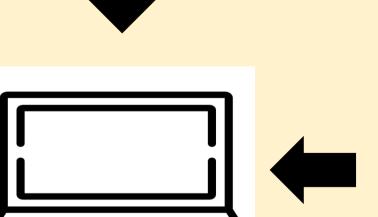


Monash University **Medical Students** in Years 1, 2, and A (Early learners; *n* = 77; from Churchill,



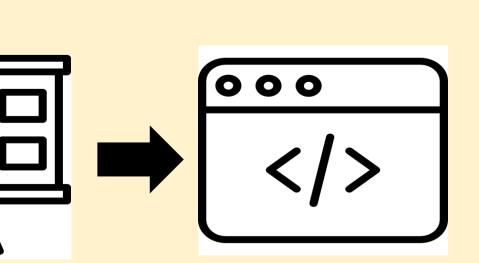








Descriptive and Thematic analysis ⁵



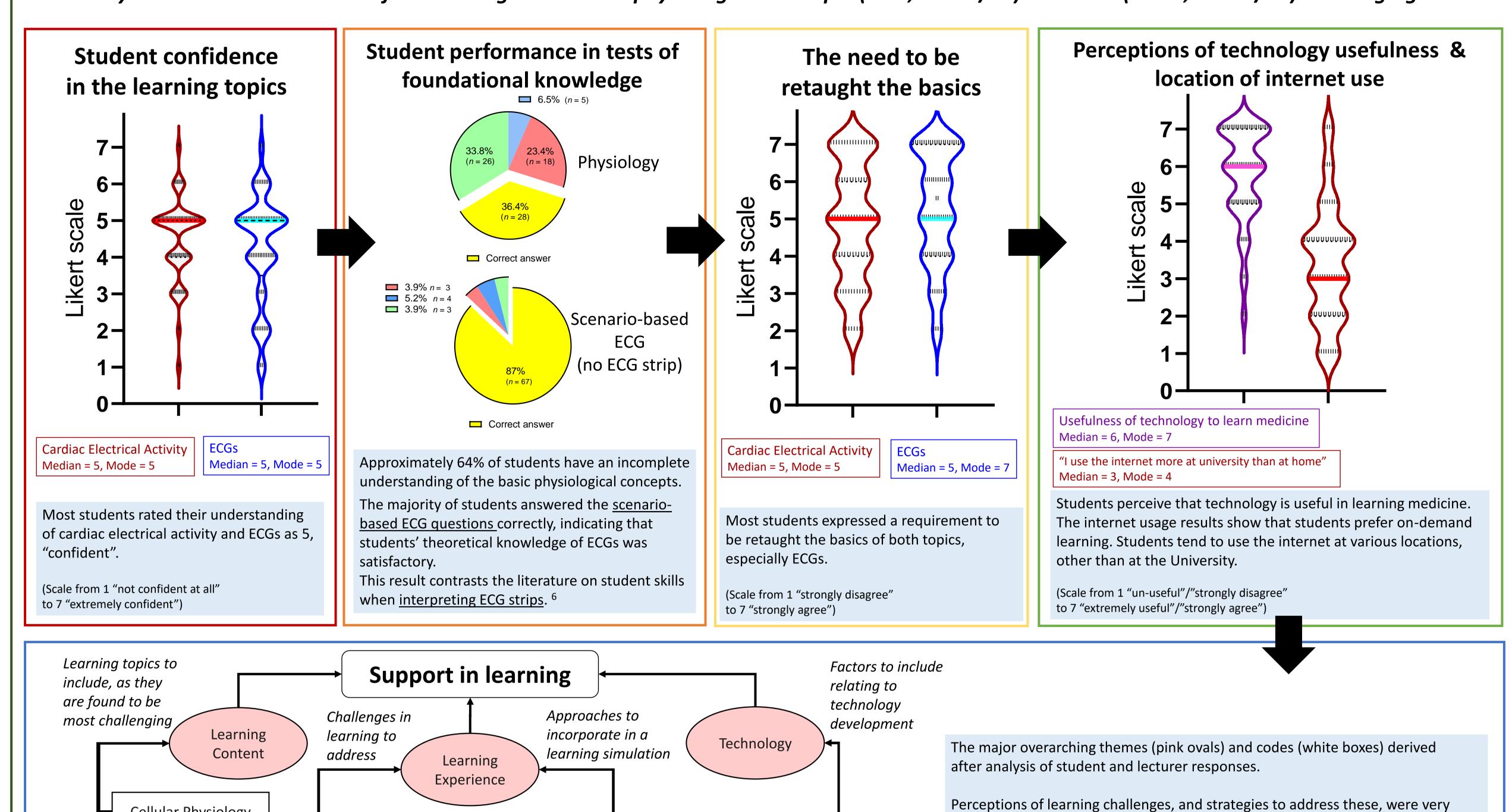
Storyboarding (simulation design)

Simulation development

(n = number of participants)

Results

Most early learner medical students find learning about basic physiological concepts (91%; n = 70/77) and ECGs (100%; n = 77/77) challenging.



Contains Additiona

Information

Accessible

User Friendly

Appealing

Interface

= Major codes emerging from the coding process

Sensory

Approach

Interactive

activities

Knowledge

Consolidation

Understanding

Memorising

) = Overarching themes

A snapshot of the storyboard The overarching themes and responses from students and lecturers were used to develop the look, feel, and flow for a computer-learning simulation designed for the early learners. The underlying pedagogy of the simulation design included: Programmed learning logic ⁷

Cellular Physiology

Anatomy, Cardiac

Electrical Activity, and

ECG Correlation

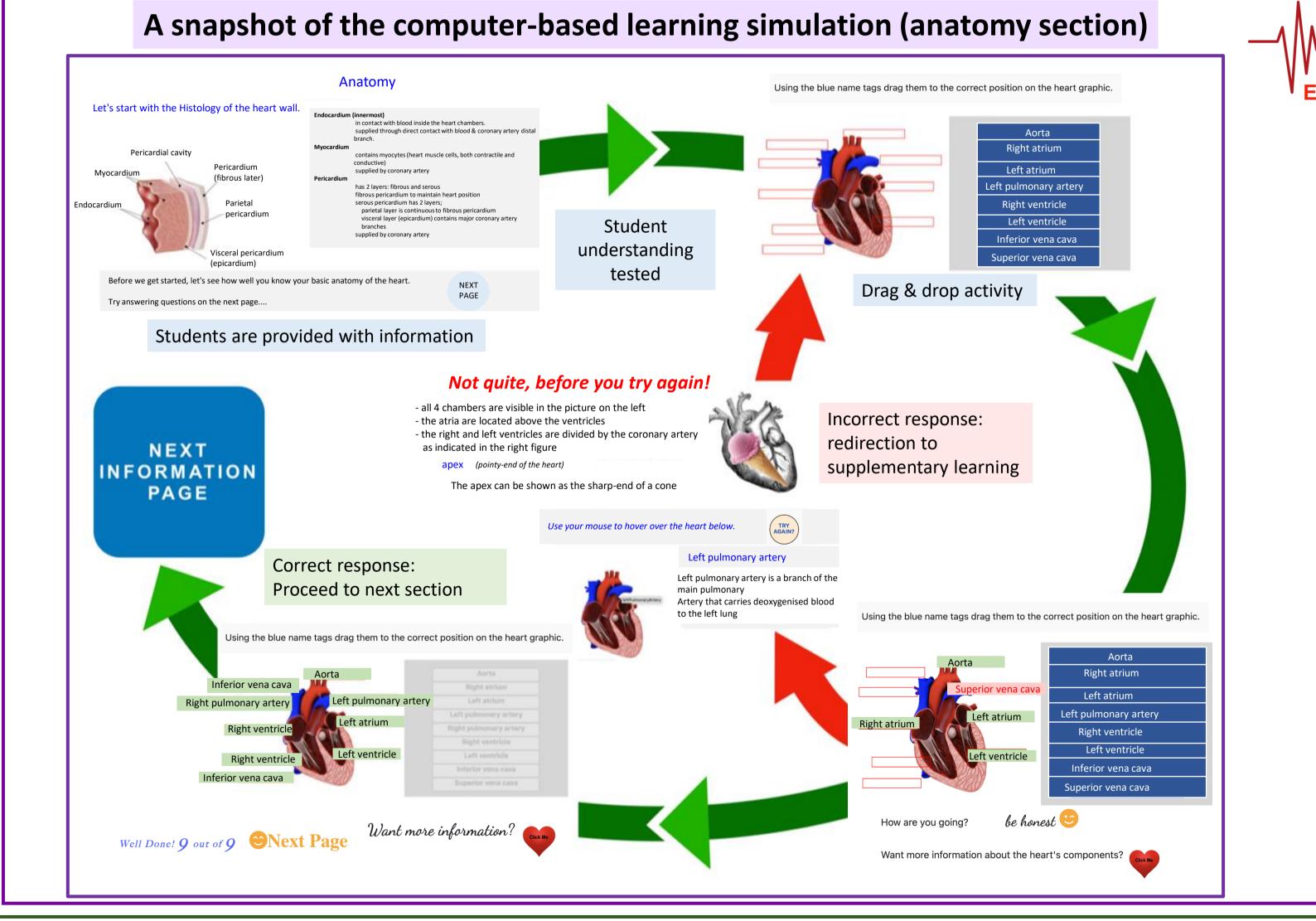
(Wiggers diagram)

ECG interpretation

Abnormal Cases and

Clinical Correlation

Knowledge application



Conclusions:

Experiential learning 8

(revised) Bloom's taxonomy ⁹

- The majority of early learners find learning about cardiac electrical activity, function, and ECGs challenging.
- There is a need for a computer-based learning simulation specifically for early learners, as an ondemand resource, to facilitate understanding and knowledge consolidation.
- Improving students understanding and confidence in the foundations of cardiology will likely benefit ECG interpretation skills.

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Future directions:

1. Complete simulation development

similar between students and lecturers. However, there was a tendency for

Foundational concepts found to be challenging to learn were identified, e.g.

students to focus on memorising content, while lecturers emphasised the

Factors such as animation and interactive activities were perceived as

The simulation needs to align with the curriculum and be user friendly.

importance of understanding concepts.

important in facilitating understanding.

Major findings:

cellular physiology.

- 2. Prototype testing & student survey post-interaction with simulation
- 3. Evaluation of the tool for promoting learning and knowledge consolidation in the early learners

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