

Using the cARdiac ECG Augmented Reality Application

Acknowledgements:

School of Medicine, Deakin University

- Dr Karen D'Souza
- Sarah Burgess
- Peter Bright



Deakin eSolutions

- project management and
- funding \$\$\$

EON Reality

- software programmers



Our transition...

Endeavour to help pre-clinical students understand the complex relationship between a 2D ECG trace, and the 3D cardiac cycle...

from

- ECG of the week online
- to

- In-class tutorials (clinical skills sessions)
- to
- Development of the cARdiac ECG app

- ♥ What's the **problem** we're trying to solve?
- ♥ What will the **AR experience** be like?
- ♥ Is there enough overlap with existing **resources / learning activities**?
- ♥ What **value** does it provide to students?
- ♥ Will it have broad **applicability**?
- ♥ Is there **scope** for project across disciplines?
- ♥ Make it **mobile**, anytime / anywhere.

STUDENT EXPERIENCE & FEEDBACK

What they liked 

Students ranked these as the best features of the cARdiac ECG app:

1. 3-D presentation of concepts
2. the correlation of anatomy/physiology with ECG trace; and
3. sufficient realism.

Students reported an increase in their confidence in applying and understanding ECGs after using the cARdiac ECG app (highly significant increase, $p=0.000$ on paired T testing).

Intrinsic and / or extrinsic motivation to use the app

STUDENT EXPERIENCE & FEEDBACK

Reflective comments



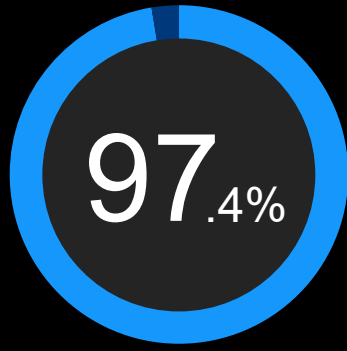
“My understanding majorly improved - I had felt extremely incompetent before this app - now I feel I know far more and actually understand what I'm looking at in relation to the leads and what they're assessing on the heart”

“I am very much a visual learner and being able to have learning that corresponds to my needs is amazing. Being able to move the heart and orientate it truly adds the understanding as does the ability to see it all happens at the same time”

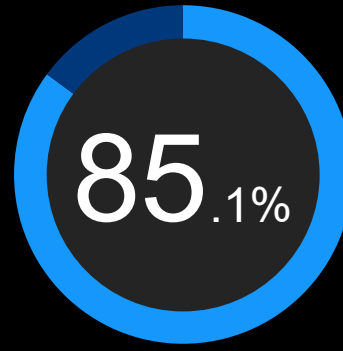
Very positive feedback, but not from everyone...

YEAR 1 WORD CLOUD

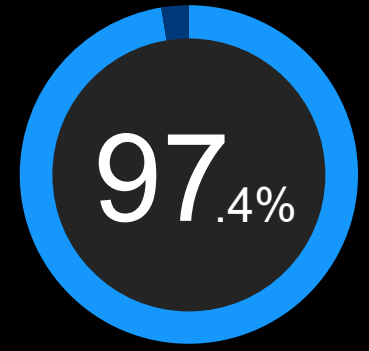




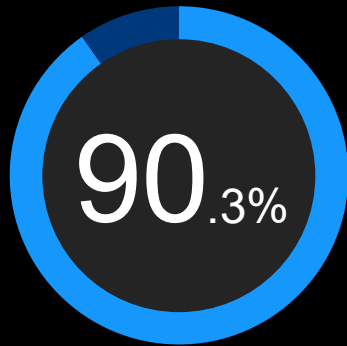
Incorporating cARdiac ECG into the teaching on ECG helped me to learn this material in a new way



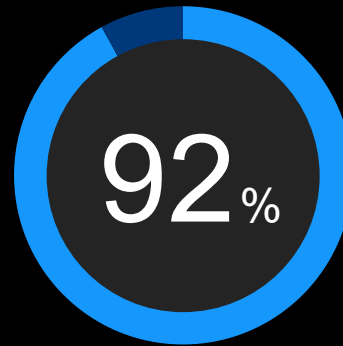
cARdiac ECG contributed to my understanding in a way that would not have been possible by attending a lecture or reading a textbook



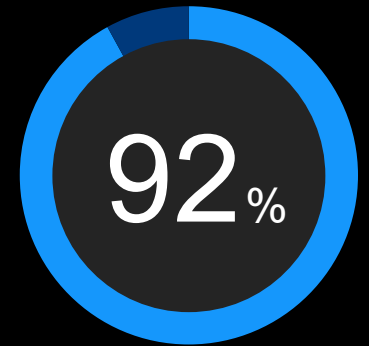
I would like similar applications to be implemented into other topics/ teaching



cARdiac ECG was easy to use and understand



I found the cARdiac ECG app motivated me to learn more about the ECG



I would like to use cARdiac ECG again

STAFF EXPERIENCE & FEEDBACK



What I liked

- ★ Great opportunity to get close to students (intimate = one-on-one)
- ★ Ability to address student questions / issues at point of need
- ★ Provision of explanations in context
- ★ Peer support in using devices and the app
- ★ Collaborative engagement in assessment task



STAFF IMPLICATIONS

- ♥ Significant investment time & effort
- ♥ Develop a storyboard / project scope
- ♥ Resources, people, time, cost, (SMEs, UI design, project manager, developers, reviewers, hardware?)
- ♥ Costs of development will vary depending on the resource/experience
- ♥ Get into the detail and talk to people
- ♥ What's the pedagogy?
- ♥ Intended student outcomes?



PEDAGOGICAL IMPLICATIONS

- ♥ Impact on the curriculum - an extra?
- ♥ What will it replace?
- ♥ Where will it fit?
- ♥ Formative / summative?
- ♥ Stand alone, or scaffolding required?
- ♥ What delivery mechanism (platform)
- ♥ Anytime / anywhere
- ♥ Device centric / AR / or single application



THINGS TO CONSIDER

- ♥ How will it improve student outcomes?
- ♥ Know what you want to do
- ♥ Have a good team with the right people
- ♥ Appreciate a great learning opportunity
- ♥ Say, “How fascinating!” when you make a mistake
- ♥ Evaluate and test

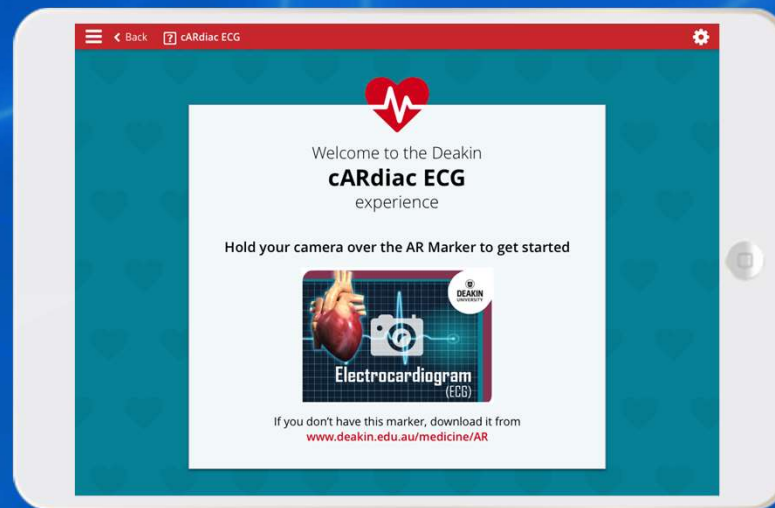
WHAT WE LEARNT

- ♥ Assessment needs feedback
- ♥ Indicate what is correct and incorrect
- ♥ Provide enough questions (randomly)
- ♥ Consider grading system (differential) and database
- ♥ Use marker-less augmented reality
- ♥ **Scope everything and get it documented
- ♥ Will there opportunity for a version 2, or another app?

SHOW & TELL

Let's try a cARdiac ECG demo

- Need an iOS mobile device (iPad or iPhone),
- Download the app from iTunes App store and,
- A print-out of the marker/target...





Thank you

Questions?

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