Background

Computer-assisted learning (CAL)

Pedagogical research suggests that CAL empowers students by giving control of learning and simplifying visually intensive subjects [1], whilst providing an additional route to achieving curriculum-defined learning outcomes (LOs) [2].

Endocrinology & Diabetes (E&D) CAL in Edinburgh’s MBChB

A suite of staff-authored E&D CAL packages has been well received by University of Edinburgh (UoE) medical students. A new CAL package was created by a UoE medical student (CJG), supervised by faculty staff, to promote understanding of the thyroid gland in health and disease during the MBChB2 E&D module. The thyroid CAL package has since acted as a template to create new student-authored calcium CAL (RM-M, SV, MB).

Student evaluation of E&D CAL and lessons learned

Student evaluation of the E&D CAL suite, including the thyroid CAL package, was sought via on-line questionnaires (in 2015, 2016, and 2018) comprising Likert scale questions and free text responses. The experience of the student and staff CAL co-creators will also be discussed.

Methods

CAL Production

- **Content**: Synthesised from MBChB2 E&D module core materials, following UoE MBChB [3] and UK Society for Endocrinology [4] LOs with student and staff peer review
- **Questions**: Integrated throughout the CAL to stimulate user attention and promote self-assessment
- **Animations**: Student-designed anatomical and biochemical animations and graphic design images (e.g. Figure 1) were implemented by the UoE Interactive Content team
- **CAL Software**: Edinburgh Reusable Object Sequencer (EROS) [5]

Software was used to create each CAL tutorial, hosted on Edinburgh Medical School’s (historical) intranet, EEMeC [6].

Assessment of the CAL suite

- **Ethical approval for audit was granted by the UoE MVMSEC Educational REC**: 2015/4 and 2016/10
- **Questionnaires were hosted on Online Surveys [7]** (formerly Bristol Online Survey) in 2015 and 2018; and EEMeC in 2016

Results

The cumulative results of the audits in 2015 (n=22), 2016 (n=45) [8] and 2018 (n=21) regarding thyroid CAL are presented here:

- All student user respondents (N=88) rated the thyroid CAL package as ‘Good’ or ‘Very Good’
- Students reported that the CAL package is interesting, logically organised, user-friendly, and helpful for reinforcing key LOs
- Since 2017, the Edinburgh MBChB has included a clinical E&D attachment in Year 4. Year 4 students support the use of MBChB2 E&D CAL for revision of basic biomedical sciences material on clinical rotation (n=4, 2018 audit)

In addition to high student user satisfaction, student CAL authors and staff supervisors benefit from CAL co-creation (Figure 2).

Conclusion

- The student-authored thyroid CAL package was equally well-received as its faculty-authored counterparts
- Students benefit from both using and creating CAL content
- Staff enhance their teaching skills in CAL co-creation, and learn which taught areas require extra focus and clarification
- Although our student-authored CAL is firmly rooted within the Edinburgh MBChB, the integral CAL principles of breaking down complex subject material, allowing student control of the pace of learning, and providing additional routes to achieving core LOs are likely to be applicable across the UoE

References


Acknowledgements: Dr Geoff Beckett and the student and professional peer reviewers for their guidance. Jacqueline Aim from Interactive Content Service for the animations and graphic-design images. Brendan Owens from Information Services for technical support. Sheila Patel from the Centre for Medical Education for questionnaire support. Dr Michael Ross for comment and guidance on questionnaire design. Financial support from: Edinburgh Fund Innovation Initiative Grant (GR001706) and University of Edinburgh CMVM Undergraduate Summer Vacation Project Bursary – both awarded to CJG. All responders for their time and consent to use their responses.

Figure 2: Student and staff comments regarding CAL co-creation

Figure 1: Example of graphic-design image

Image later animated and used in ‘drag and drop’ question

External carotid artery
Superior thyroid artery
Thyroid pleura of vessel
Superior thyroid vein
Internal jugular vein
Thyroid isthmus
Thyroid tips
Thyroid vesicle
Left subclavian artery
Left common carotid artery
Middle thyroid vein
Right subclavian artery
Thyrooesophageal trunk
Brachiocephalic trunk
Right brachiophelial vein
Arch of aorta
Superior vena cava

Figure 2

In addition to high student user satisfaction, student CAL authors and staff supervisors benefit from CAL co-creation (Figure 2).