Cloudy with a chance of ECGS

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Introduction

Understanding physiology is vital for both Medical and Biomedical students at Warwick, however, it is often seen as a 'dry' and 'difficult' subject, where appreciating the relevance and applicability of the subject is often be lost in the mechanistic approach to teaching of the topic.[1] Making the material more accessible and applicable through use of a blended case-based approach, combining practical laboratory-based sessions and multi-media teaching materials, enables students to see how relevant the principles are to real-life situations, and embeds the knowledge through experiential learning.

With funding from IATL, WMS and SLS have piloted the use of a cloud-based learning platform (Lt, AD Instruments), developing learning packages to aid physiology teaching to both medical and biomedical sciences students. The flexibility of the packages enabled a more personalised approach to the learning experience and encouraged deeper learning of the material. The packages were also significantly enhanced by the capacity for incorporating multi-format formative self-assessment and components that could contribute to summative assessment available within the learning platform.

The Lt System

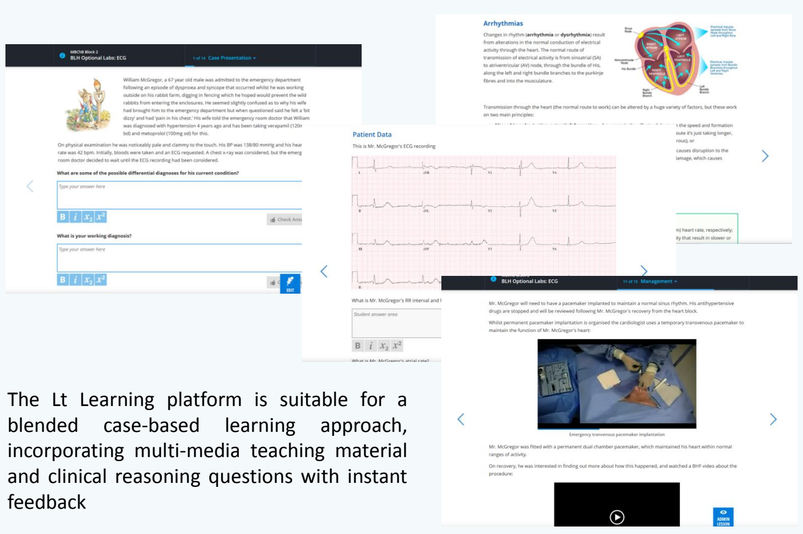
Lt was developed from the PowerLab data acquisition systems (ADInstruments) used experimentally by researchers for over 25 years. Adapted and streamlined for use in teaching labs, previous incarnations often required significant student input and time to complete physiology experiments. LabTutor was designed and enable a more blended approach to teaching, incorporating capacity to include self-taught and interactive elements to aid embedding of experimental material. The recent release of Lt has enhanced this system by utilising a cloud-based platform enabling students to personalise their learning experience, combining engaging blended learning material with streamlined methods for data acquisition and analysis as well as incorporating capacity for both formative and summative assessment.

Aims

- To develop packages to aid learning of basic physiological principles for both WMS and SLS – including cardiac physiology and the ECG
- To make the packages engaging, relevant and realistic; to enable smooth incorporation into the case-based teaching in WMS
- To determine appropriateness and capacity for use in summative assessment in SLS

Case-based Learning

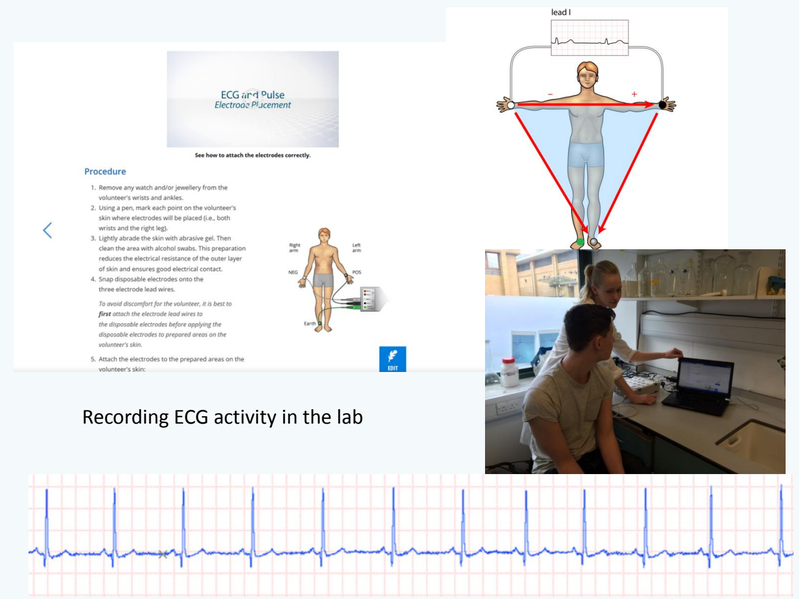
In the MBChB, case-based learning is used to develop an integrated, holistic approach to learning medicine; embracing multiple levels of Bloom's taxonomy(fig).
By incorporating the basic physiological experiments into realistic clinical-case scenarios we aimed to make them more relevant, accessible and applicable,[2] enabling the student to engage with tests that they will encounter during their clinical training and beyond.



The Lt Learning platform is suitable for a blended case-based learning approach, incorporating multi-media teaching material and clinical reasoning questions with instant feedback

Experiential learning

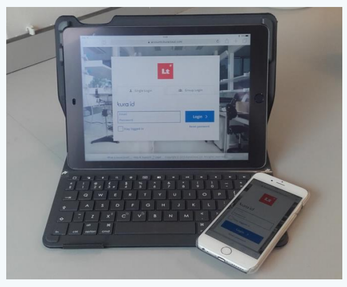
Clinical scenarios and questions encourage application and reasoning. Students determine the tests required by patient, then perform the same test in the lab to obtain their own 'normal' data for comparison with patient data. This aids development of competency as student practice their communication and clinical skills and gain insight into the 'patient experience.'



Recording ECG activity in the lab

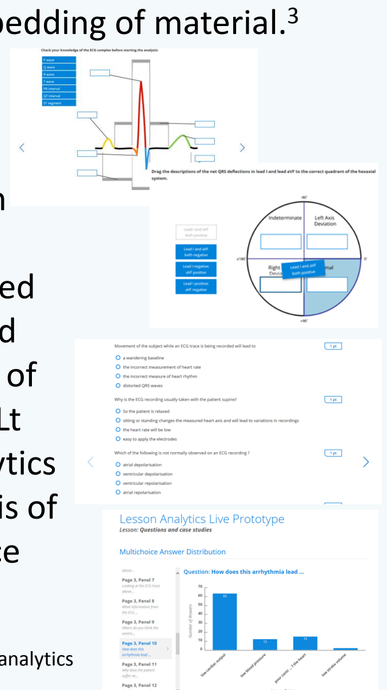
Personalised Learning experiences

Once data is obtained students are able to access their data on and off-site on a variety of operating systems, enabling a more personalised approach to the learning.
This also reduces time spent in the laboratory as work can be completed outside of the lab environment.



Integrated Assessments

Multi-format recognition (e.g. MCQ, EMQ) and production tests (e.g. SAQ, fill-in/label questions) could be integrated throughout the learning package to enhance learning and embedding of material.[3]
For WMS students instant feedback was provided, enhancing learning through reinforcement and correction of inaccuracies.[4]
In SLS, multi-format case-based questions tested learning and were developed to form part of the module summative. The Lt system also contains an analytics feature allowing rapid analysis of assessments and performance within the lessons.



Student Feedback

Feedback obtained on completion of the lessons was mainly positive, students appreciated the experiential approach and application to real-life scenarios.

Feedback sheet and a sample comments

SLS students found the interactive learning packages beneficial for learning, with only 16% of students preferring to have the material delivered in a more didactic manner. 77% of students enjoyed the assessed analysis element, preferring this approach to the usual written lab report.
WMS students also found the material useful for revision purposes, enabling them to practice application of knowledge, developing their capacity for clinical reasoning in preparation for both clinical and written summative examinations.

Conclusions

Overall, the Lt system appears to be a viable option for delivering physiology teaching materials to both WMS and SLS students.
The learning packages developed allowed a more experiential and blended approach to teaching basic physiology that students found engaging and challenging.
The ability to access the material across a number of platforms, on- and off- campus allowed personalisation of the learning experience, which was highly valued by our students.
We are looking to integrate additional subjects into the packages to create holistic learning experiences for topics.

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