Blended learning for teaching human cell culture

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What problem was addressed?
The acquisition of laboratory skills critical for medical disciplines which are of increasing global importance need to be urgently addressed in situations where teaching status is being eroded due to curriculum and time restraints. One such example is the multi-disciplinary science of parasitology, with parasite infections of global public health concern due to increasing globalisation and climate change. Cell culture is fundamental in parasitology to support areas such as culture of obligate intracellular parasites or testing drugs that target these pathogens. Thus, a strategy to successfully impart theoretical and practical knowledge of this potentially challenging technique was developed using a blended learning approach (Stockwell et al., 2015).

What was tried?
The Human Cell Culture e-learning unit (HCCU) from the DMU e-Parasitology package’s virtual biomedical laboratory module was used in a blended learning approach to teach human cell culture. DMU e-Parasitology is a novel virtual learning package developed through collaboration between De Montfort University, Leicester (DMU) and the Spanish Universities of San Pablo CEU, Alcalá and Miguel Hernandez, in conjunction with UK National Health Service’s biomedical scientists and technicians from cell and parasite culture laboratories. The HCCU provides a detailed description of: a) how to work in a cell culture laboratory; b) consumables/equipment needed; and c) videos of an academic performing all the different steps and procedures in human cell culture; and is equipped with formative assessments and mini-quizzes.
The HCCU was tested with a focus group consisting of 25 second year BSc Biomedical Science students at DMU, which were engaged in a voluntary cell culture training in 2018. Prior to attending the laboratory session participants were asked to view and complete the HCCU. At the end of the practical session, students were provided with a validated feedback-questionnaire with Likert scale and open-questions to collect their impressions/opinions. Ethical approval was provided by the Research Ethics Committee at DMU (Ref. 1851).

What lessons were learned?

The majority of participants completing the questionnaire (n=16), 81.3% (56.3% agreed, 25% strongly agreed), indicated that the overall design of the HCCU was appropriate and interactive. Participants reported high levels of enjoyment (87.5%) and satisfaction (87.5%) with the unit. No negative responses were received. Additionally, overall satisfaction with the HCCU was reflected by the fact that 81.3% of the participants recommended the development of similar resources for other subjects. Students reported that the diagrams and videos embedded in the HCCU describing the different steps of working with cells facilitated their learning. Analysis of the participants’ performance in the practical activity in the laboratory after completing the e-learning unit and their feedback (37.5% agreed, 43.8% strongly agreed) indicated that the HCCU facilitated the acquisition of basic cell culture skills.

The results indicated the application of blended learning to be a potentially effective pedagogic strategy for learning cell culture and other biomedical laboratory techniques addressed in DMU e-Parasitology. Though promising, our results should be considered carefully due to the small number of students involved and the short duration of this pedagogic intervention.
1 **Reference**

Blended learning for teaching human cell culture

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