Teaching and learning pulmonary auscultation – the Computerized Lung Auscultation – Sound Software (CLASS)

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Background: Respiratory sounds (RS) are directly related to movement of air, changes within the lung tissue and position of secretions within the tracheobronchial tree, which make them valuable indicators of respiratory health. Respiratory sounds acquired through auscultation are nearly universally available, inexpensive, non-invasive and comfortable (no need to tolerate a facemask or seal around a mouthpiece), cost-effective, can be repeated as often as necessary and require minimal patient co-operation. Nevertheless, the mastering of auscultation requires complex acoustic skills to distinguish between different types of RS with similar frequencies, intensities and timings. Currently, health students are taught these skills by repeatedly listening to recordings of typical RS and visualizing their waveforms. However, these methods offer limited interaction and provide students with a narrow representativeness and usefulness of RS. Due to the subjectivity associated with the auscultation and inadequate training, the mastering of pulmonary auscultation has been decreasing and therefore, innovative teaching/learning methods to contribute for the detection/discrimination and interpretation of RS are warranted. The new era of Computer-assisted learning tools offer an exciting opportunity for self-directed learning and problem-solving, providing students with complementary activities on a computer, related with the material being taught. Such tools show great potential to be used in the teaching of pulmonary auscultation, as they would allow students to interact with a diversity of RS recorded in clinical environments, from patients with different conditions and ages, and test the knowledge acquired. However, few Computer-assisted learning tools have been developed for this purpose and they do not integrate simultaneously all the required features to enhance health students’ skills on pulmonary auscultation, i.e., record, storage, playback and analysis of RS, knowledge testing and tutorials about RS.

Aim: Thus, Computerized Lung Auscultation – Sound Software (CLASS), developed for enhancing the teaching/learning of pulmonary auscultation to health professionals, will be presented.

Method: CLASS is open-source and was designed using a User-Centred Design process. This process facilitates users’ workflow throughout the application as it supports their current