Virtual physiological laboratories: The impact of team work as a new learning tool

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Introduction
Although the use of virtual laboratories in medical education has been shown to improve learning (1), laboratories in general have not been consistent in educational objectives and their pedagogical values have been difficult to assess. From a comparative review of hands-on versus simulated laboratories, Ma and Nickerson (2) proposed a framework of educational goals for laboratory learning. It encompasses three major facets:

1) Conceptual understanding: to assist students in understanding key concepts taught in the classroom
2) Design skills: to assist students in their ability to design, investigate, and understand the nature of science thereby increasing their ability to problem-solving
3) Social skills: where team behaviors are enhanced through communication, team interaction, problem-solving, and leadership skills.

The project aims at addressing those three goals by developing virtual laboratories that can be used in groups based on the simulation program "web-Human" which offers a user-friendly interface but which is limited in terms of controllable facilities:

Furthermore, they were based on the simulation program "web-Human" which offers a user-friendly environment but which is limited in terms of controllable and measurable variables. The present project also aims at developing entirely new laboratory protocols from the more powerful and versatile simulation program QCP, Quantitative Circulatory Physiology (4).

Objectives
1. To assess the feasibility of using the simulation program QCP as a virtual lab environment.
2. To design laboratory protocols that promote teamwork in order to encourage students to discuss their own experimental observations, assumptions and conclusions among themselves.
3. To compare the interest and performance of the students with students from previous years.

Methodology
This research involved the creation of virtual laboratories targeting the metabolic, cardiovascular and respiratory systems, to be accomplished in groups. This entirely new approach should encourage students to get a more in-depth understanding of the theory taught in class.

Step 1: Development of a user guide

Step 2: Development of a lab manual

Step 3: Setting up team work

Step 4: Elaboration of a survey

Results
The results have not yet been collected. The benefits of group work in physiology labs will be collected once both labs are completed.

1) Surveys: Students will be invited to answer a paper-based survey at the end of the session in order to evaluate their interest and the knowledge gained regarding the group work.
2) Analysis of evaluations: The students exams, which include theory seen in the labs, will be analyzed and compared with students fits of group work in physiology in previous years, who submitted lab reports individually.

Conclusion
Future considerations
The data from both the surveys and the analysis of the evaluation will facilitate an analysis of the impact of group work on the potential long-term retention of knowledge gained through the laboratories in comparison to individual work. In addition, we will be able to determine the interaction that the students had amongst each other.

References

Acknowledgements
I would like to thank the UROP for giving me the incredible opportunity to do this project and explore the research world. Also, I would like to thank my supervisor, Dr. Michel Désilets, for guiding me in this research, and highlighting the importance of both group work and integrated labs as educational tools, as well as helping me expand my physiological knowledge.

We also thank Mona Allan, RN, MSNc, for her invaluable help in setting up the framework for team work and students surveys.