Tested Studies for Laboratory Teaching
Proceedings of the Association for Biology Laboratory Education
Vol. 36, Article 58, 2015

The Complete Student Workout! – Boosting Physical and Mental Fitness in a Human Biology Laboratory Course

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Extended Abstract

A student's life can become extremely busy during a university career. There is often insufficient time left to eat right, maintain a regular workout regime, and keep up with academic responsibilities. More often than not, spending too much time on any one of these activities leads to another being neglected. However, what if there was an opportunity for a student to succeed and excel at performing all of these activities? In HMB314H1F, Laboratory in Human Biology, a practical and lecture based course offered through the Human Biology Program (University of Toronto), students are given such an opportunity. Under the umbrella of a dedicated lab fitness module (structure shown in Table 1), students were asked to introduce a lifestyle change (meditation, yoga, Zumba classes, weight-lifting or jogging routine, diet change, etc….) and measure their subsequent performance at a selected fitness station (their experimental component) available in lab through the course of the semester. In addition, students were asked to choose and monitor themselves on a fitness station where they expected to see no change in their performance (their control component). Students were highly encouraged to be creative and innovative with their lifestyle change, however, their experimental proposal had to be scientifically sound. Students were required to describe in detail their new regime/lifestyle change while supporting their proposed performance improvement at their chosen experimental fitness station with the scientific literature.

Table 1. Starch standard curve.

Week(s) of Semester	Description of Activity
1 & 2	Students take baseline measurements at ALL fitness stations*
2	Students submit a 350 word proposal describing their lifestyle change and identify their experimental and control fitness components
3	Students introduce their lifestyle change**
3, 5, 7 & 10	Students monitor their performance at their selected experimental and control fitness stations only
12	Student prepare and present a research poster on their fitness experiment

*Taking baseline readings at all stations gives the student more flexibility when coming up with their final proposal**students receive feedback on their proposals. If their proposal needs re-working, week 3 becomes another set of baseline readings.

Fitness stations were arranged and assembled using readily available standard fitness equipment or BIOPAC based fitness recording devices and covered various fitness categories with defined routines. Table 2 summarizes the fitness stations and categories that were available to the students and quickly describes key measurements that can be taken at each station. See the Supplementary Materials for more detailed information on protocols.

At the end of the semester students prepared a research poster describing and analyzing the results of their fitness project providing information on the effects of their lifestyle change on fitness performance and its associated impact on their physiology. The use of the literature to support a feasible physiological and/or biological mechanism behind any observed improvement in fitness performance was also required. As shown by post course survey data student response to this project was overwhelming positive as 79% of the class agreed or strongly agreed that the project encouraged them to live a more healthy and active lifestyle. When asked how well the fitness project improved their understanding of experimental design, the scientific process and data in

analysis methods, 90% of the class responded very well or extremely well. Additional survey data showed that students developed a deeper understanding of human physiology and the body's response to a physical stressor such as exercise. Overall the project kept the students engaged and motivated for the entire semester and most importantly taught them that healthy lifestyle changes no matter how small can often lead to an overall reductionchronic stress which in turn increases one's ability to perform at both a physical and mental level (Hollowell, 2010).

Table 2. Fitness station descriptions.

Fitness Station(s)	Category	Equipment	Key Measurements*
3 Minute Step Test	Aerobic	12 " step bench, stopwatch, metronome	BP and HR
Astrand Physical Fitness Test	Aerobic	cycle ergometer, stopwatch, metronome	HR, MVO2
Vertical Jump Test/Standing Long Jump	Anaerobic	Axon Squat Jump Mat with computer software developed by Axon Bioingeneiria, tape measure, landing mat	jump height, take off speed, leg power
Hand Grip Strength/Endurance	Anaerobic	BIOPAC hand grip dynamometer with Acknowledge software	1RM (kg), time at 50% 1RM
Push-Up/1 Minute Sit-Up Test	Anaerobic	handheld counter, stopwatch	max reps
Bioelectric Impedance/Girth (Calipers)	Body Composition	Omron Healthcare HBF-510W Full Body Sensor, skin fold calipers	% fat, BMI, skeletal muscle %, Durnin & Womersley density
Bioelectric Impedance/Girth (Tape Measure)	Body Composition	Omron Healthcare HBF-510W Full Body Sensor, tape measure	% fat, BMI, skeletal muscle %, Durnin & Womersley density
Flexibility (Reach, Shoulder, Trunk, Groin)	Flexibility	FlexTest unit box, tape measure,	flexibility ranking percentile for different body areas measured

*BP = Blood Pressure, HR = Heart Rate, MVO2 = Maximal Oxygen Uptake, 1RM = 1 Rep Max, BMI = Body Mass Index

Link to Supplemental Materials
http://www.ableweb.org/volumes/vol-36/dias/supplement.htm

Keywords: Fitness, Experimental design, stress

Literature Cited

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Citing This Article

Alistair, VD. 2015. The Complete Student Workout! - Boosting Physical and Mental Fitness in a Human Biology Labo-ratory Course. Article 58 in *Tested Studies for Laboratory Teaching,* Volume 36 (K. McMahon, Editor). Proceedings of the 36th Conference of the Association for Biology Laboratory Education (ABLE), http://www.ableweb.org/volumes/vol-36/?art=58