

Section IV: Description of Project

The purpose of this action research study is to evaluate the effectiveness of problem-based learning (PBL) in a blended learning environment to increase concept attainment in high school anatomy and physiology students at a private high school on O‘ahu. The expected outcome for this study is that PBL will help students gain an understanding of the human cardiovascular system while working collaboratively in a team to solve a series of tasks culminating in solving a given medical case. Students will be role-playing as “newly hired medical assistants” with the instructor/researching acting as a “training supervisor” at a fictitious cardiology clinic. Students will work in a team of three to four to complete a set of tasks relating to the cardiovascular system.

This cardiovascular unit is normally part of the existing Anatomy and Physiology curriculum. Existing already in the curriculum is a sheep heart dissection to help students visually see the heart anatomy and differentiate between the types of blood vessels in the cardiovascular system. Also existing in the current curriculum is a hands-on laboratory exercise in collecting heart rate, blood pressure, and electrocardiogram data to help students make sense of cardiovascular vital signs.

The main difference in this study from the existing curriculum is taking away the lecture portion introducing new materials and concepts regarding the anatomy and physiology of the heart and circulatory pathways. Instead, students will be working in teams to gather necessary information in a step-by-step basis.

The learners in this action research study will be high school students ranging from grades 10 - 12 at Punahou School, an independent K-12 school on O‘ahu. All students have laptops connected to the school’s wireless network. They are digital natives

with prior experience navigating through the school's course management system. There are 36 students in two sections of my Anatomy and Physiology class. I plan on presenting my research project to the students and sending home a consent form for completion to participate in the study.

The methodology involves students working collaboratively in a problem-based learning project in a blended learning environment while learning the basics of the cardiovascular system. Students will use a variety of web 2.0 tools throughout the project to help plan, design, and develop their ideas and understanding. The course is hosted on Haiku LMS and will require the use of several web 2.0 tools, such as Popplet.com, Google Docs, and VoiceThread. In addition, students will also be using Microsoft Excel to create tables and graphs for their project. This action research project will take eight 1.5-hour classes over a month's time to implement in the classroom.

Artifacts such as students' Popplets, Google Docs, and VoiceThread presentation, will be gathered to evaluate the effectiveness of the PBL project in meeting its goals. Other data will include classroom observations and test scores. Additionally, students will complete a pre-module survey and a post-module survey to compare attitudes and concept attainment before and after the PBL module. Classroom artifacts will be rated manually before analysis. The students' responses on surveys and test results will be analyzed using Microsoft Excel. This data analysis portion will take approximately one month. Students' real names or other personally identifiable information will not be used in any report. Instead, a pseudonym/fake name will be used when needed to reference student's work or comments on surveys and tests. During this project, data collected will be kept in a secure location.

Problem-based learning has been shown to have positive effects on students' motivation, engagement, and concept attainment. As many science teachers are still struggling to deliver content effectively, this action research study will determine whether PBL is an effective method in helping high school students with concept attainment in content heavy science courses.