

Action Research in Medical Education: The Neuroscience Laboratory Design

Samar Khirallah, MD & James J. Walker, PhD
Department of Basic Medical Sciences, Purdue University



Introduction

A Problem in the Neuroscience Lab
As instructors of the neuroscience course (LCME 507) at Indiana University School of Medicine, Lafayette (IUSM-L) we believe that the laboratory provides a valuable learning environment for medical students. Former students (2006-08) felt that the laboratory design was poorly organized and ineffective as a teaching tool. In response to student concerns we used action research methodology to develop highly structured laboratory activities that increased active learning and improved student attitude.

Stage One: Problem Analysis

The analysis of students complaints revealed specific problems in the design

Lab Component	The Problem
The Set-up	
Large group of students given only one tray with numerous specimens	Limited ability to visualize or manipulate specimens.
The Hand-outs	
Long list of structures to identify on numerous specimens with no assignment of related atlas figures	Complexity due to heavy cognitive load
Students' Role	
To look at the structures and appreciate their location and morphological features	Easy to make mistakes that can go undetectable by instructors



In the Old Design Students matched a long list of structures with multiple specimens all in one tray.

Stage Two: Taking Action

The study developed and implemented a new design

Lab Component	The Advantages
The Set-up	
Small group of students given one tray with only one specimen	Greater ability to visualize or manipulate specimens
The Hand-outs	
short list of structures to identify exclusively on each specific specimen	Simple manageable task
Students' Role	
To perform variety of tasks such as the ones in figure 3	Facilitate retention Provide instructors with opportunity to give students feed back

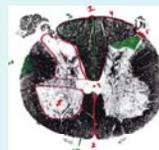


The New Design: Only one specimen in each tray with a short list of structures to identify.

Examples of students' tasks in the new design



Gross specimens: Students pin the structures listed in hand-out



Spinal cord slides: Students outline pathways and nuclei



Printed images: Students answer questions



Histological slides: students learn microscopic anatomy

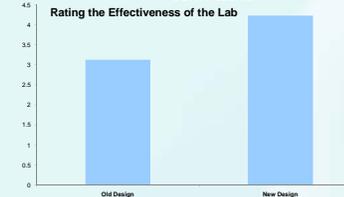
Stage Three: Assessment

The study used mixed research method to assess the effectiveness, efficiency, and the appeal of the new design.

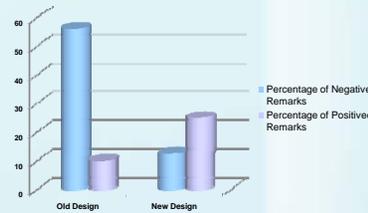
Data Resources:

- IUSM formal course evaluations
- Instructor designed surveys
- Class observations
- Interviews with students

Results:



Higher Rating for the New Design on IU School of Medicine Formal Class Evaluation (2005-2012)



The New Design Improved Students Attitude Comparing comments from (2005-2010)

"I learned the most from the -pin the structure- exercise."
"Those new hand-outs are irreplaceable."
"I would like to see more clinical cases in the lab"

Quotes From Students Interview (2010)

Conclusion

Action Research is a critical step on the bridge between theory and practice. Instructors used students' feedback in conjunction with learning theory techniques to solve their classroom problem and enhance their teaching effectiveness. Lab productivity and students attitude improved after three years of continued dynamic change.