Correlation between hands on activities and transfer skills on assessments

Sowmya Anjur. Science, Illinois Mathematics and Science Academy, Aurora, IL

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Abstract:
Students in the Physiology and Disease course at the Illinois Mathematics and Science Academy in Aurora are exposed to basic physiological concepts using novel hands on methods to help them understand the material better. Students made heart models to study the anatomy and physiology of the heart. Their scores on the heart unit assessment were evaluated for understanding by correlating their scores on heart model building with specific transfer questions on the heart unit. Preliminary results indicate that there was a significant correlation between heart model building and test scores.
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Introduction:
- Physiology and Disease (PAD) is a one semester Biology elective for juniors and seniors at IMSA, where the students design their own experiments.
- The objective of this experiment was to enable students to improve their transfer skills on assessments through building a heart model
- Student scores were correlated with the time spent on building their heart models.

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Materials and Methods:
- Students worked in threes to build a heart model
- Figures 1 and 4 show examples of student work.
- Students were required to label all the parts.
- Test scores were correlated with the time taken to build the heart models.

Results and Discussion:
- Figure 3 shows that there was a significant correlation between the heart test and the heart model assessment (P= 0.039049, df=6). (Vassar stats, http://vassarstats.net/)
- Figure 2 shows student scores over four semesters for various assessments.
- It was observed that students who scored higher on their heart model assessment also performed better on the heart test.

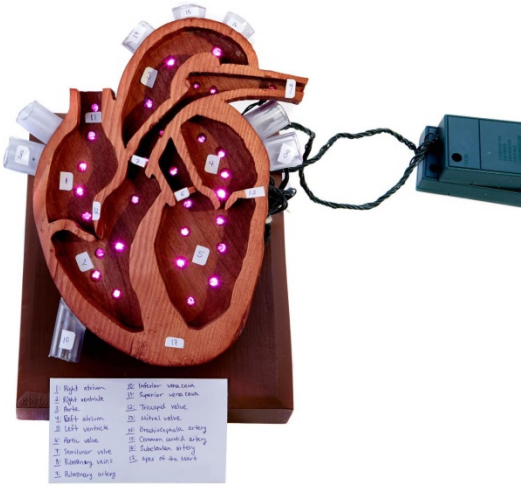

Figure 1. Student heart model with LED lights indicating the pathway of blood

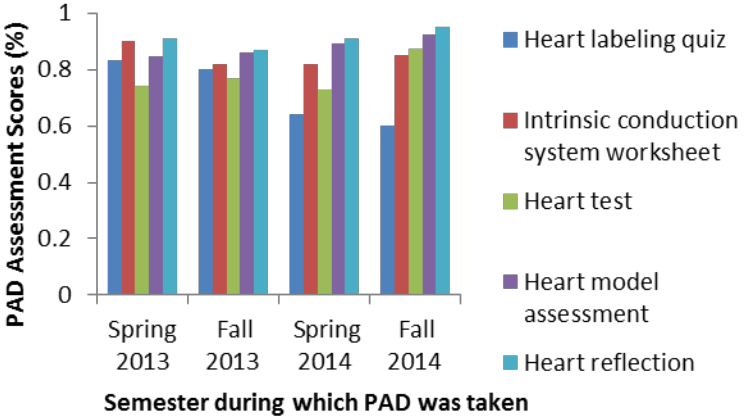

Figure 2: Graph showing various PAD assessment scores over a period of two years.

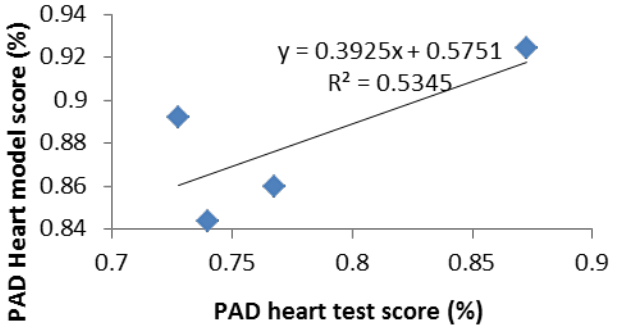

Figure 3: Graph showing correlation between heart model score and heart test score

Figure 4. Student heart model made of clay

Projected Outcomes:
- Further research is under way to make a significant conclusion between building heart models and transfer skills over the next two years.
- Since it is observed that more time spent on hands on model building seems to enhance test scores, more hands on activities will be incorporated into the course to enhance student understanding and application skills.