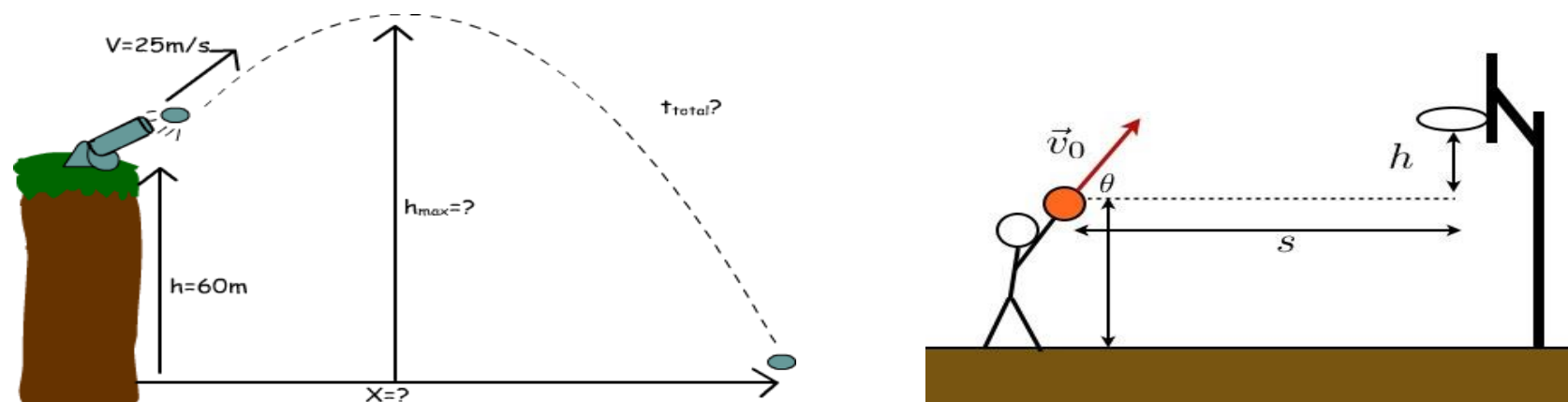


From Sports to Science: Using Basketball Analytics to Broaden the Appeal of Math and Science Among Youth

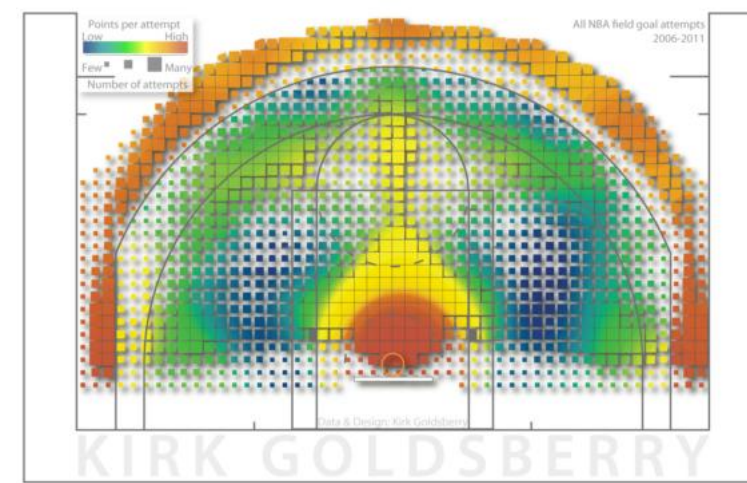
John F. Drazan, Amy K. Loya, Benjamin D. Horne, & Ron Eglash / Rensselaer Polytechnic Institute / john.drazan@gmail.com

The STEM career path is inaccessible to members of society who are most in need.

- As the value of STEM degrees has increased due to economic forces, minority underrepresentation in STEM is now a matter of social equality.
- Universities and schools use traditional STEM topics, such as robotics, to engage students in the STEM fields.
- Most youths without a preexisting interest are not inclined to enroll in STEM intensive programs, thus perpetuating underrepresentation.
- Basketball and other sports are much more popular among the youth than STEM activities; however, creating authentic, accessible connections between the youth and STEM through sports analytics is difficult.



Present attempts at using Sports Science in STEM educational curricula are grade level-appropriate, yet decontextualized and thus inauthentic.

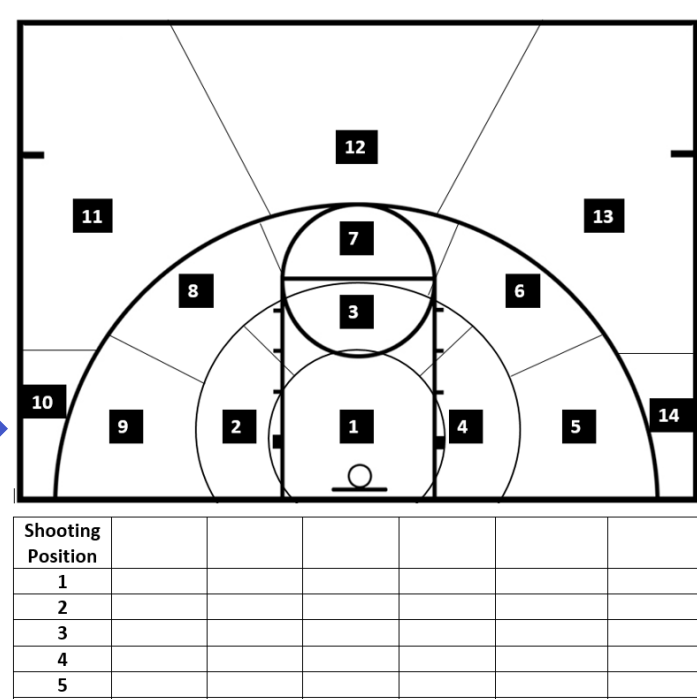


Sports Science at the professional level is authentic, yet inaccessible because it is technically deep and relies on proprietary data and techniques.

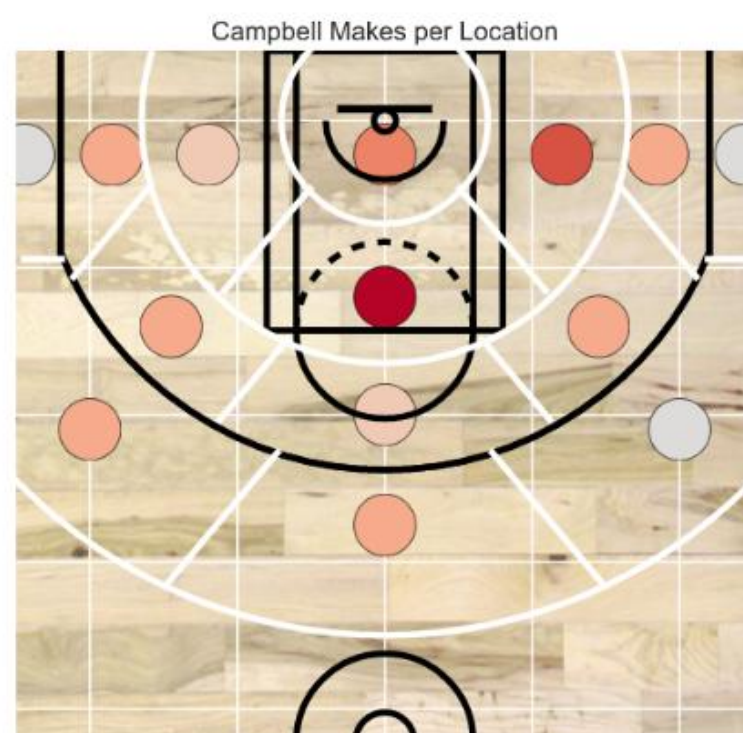
Motivation and Goals:

- Basketball's popularity among marginalized youth, coupled with the analytics revolution, will provide a novel venue for STEM outreach.
- Analytics provides a tangible application of math and statistics, in which students gather and process data directly linked to their individual basketball performance and training.
- We have designed a scalable approach that creates an avenue for scientific inquiry, within a venue at which students are intrinsically motivated to improve: **the basketball court.**

Collect Pre-Intervention Data

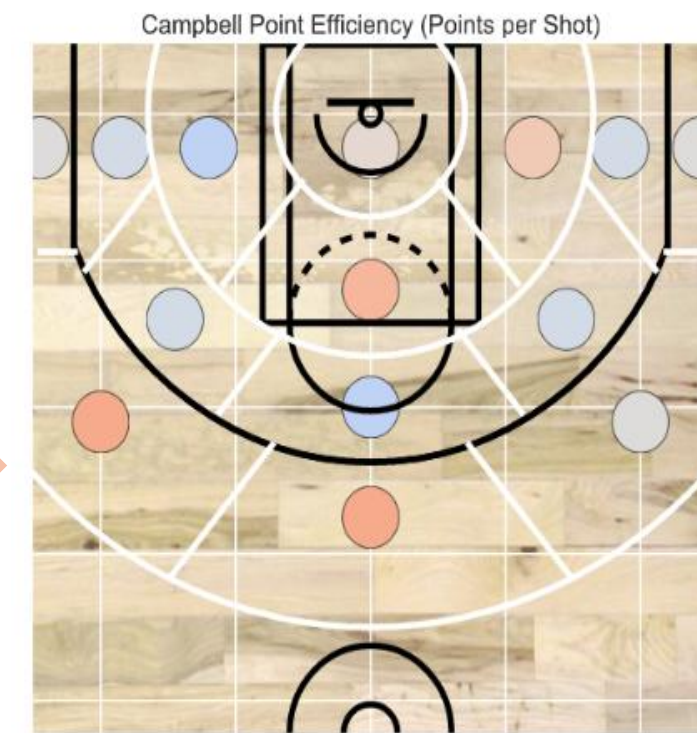


Students Performed Shooting Data Collection



Analysis and Discussion of Shooting Percentages

$$\% = \frac{\# \text{ Makes}}{\# \text{ Total}}$$



Analysis and Discussion of Scoring Efficiency (S.E)

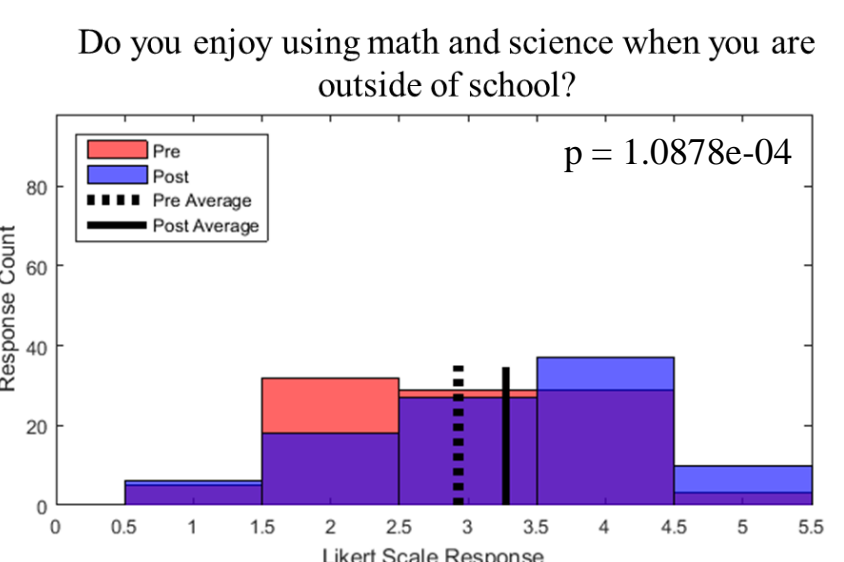
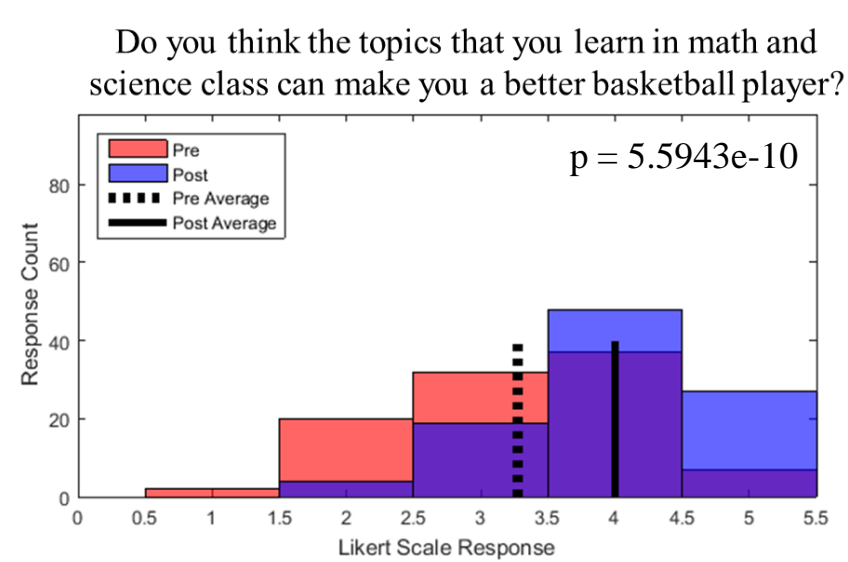
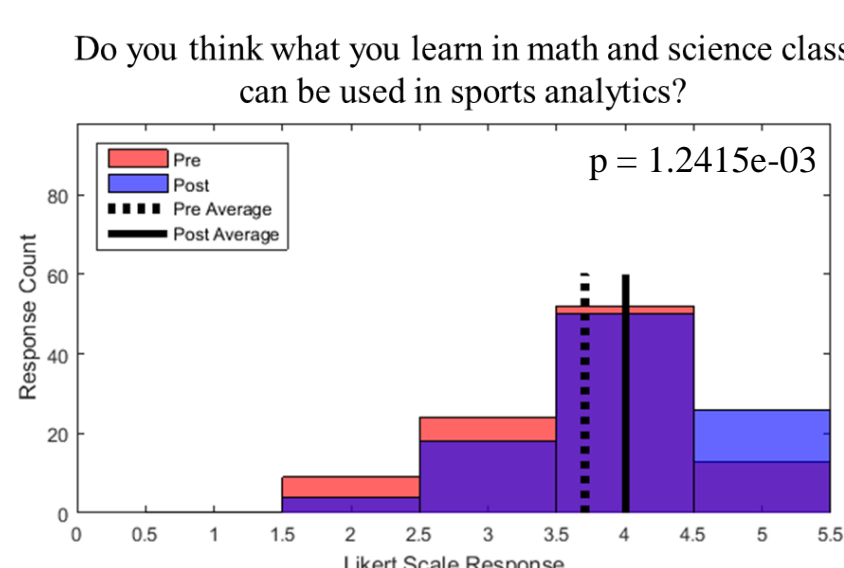
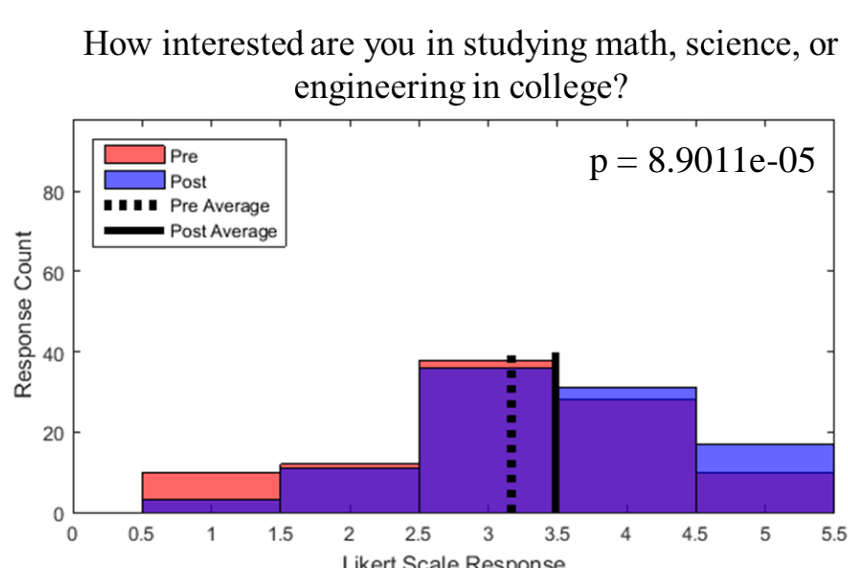
$$S.E = \frac{\# \text{ Makes} \times \text{Point Value}}{\# \text{ Total}}$$

Collect Post-Intervention Data

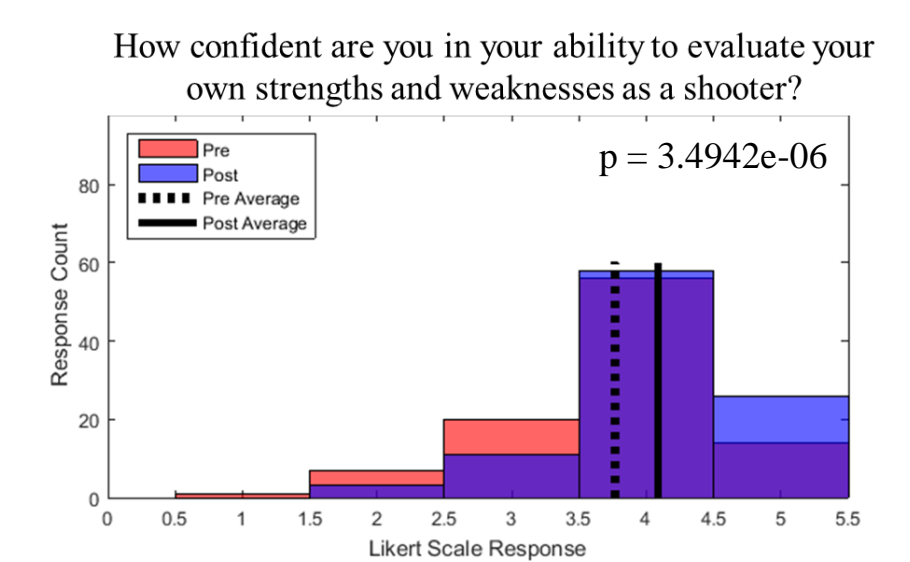
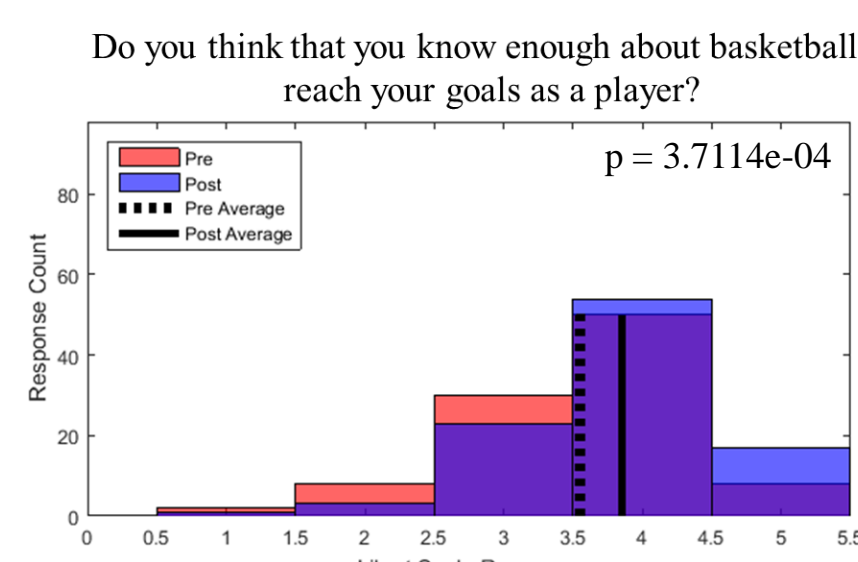
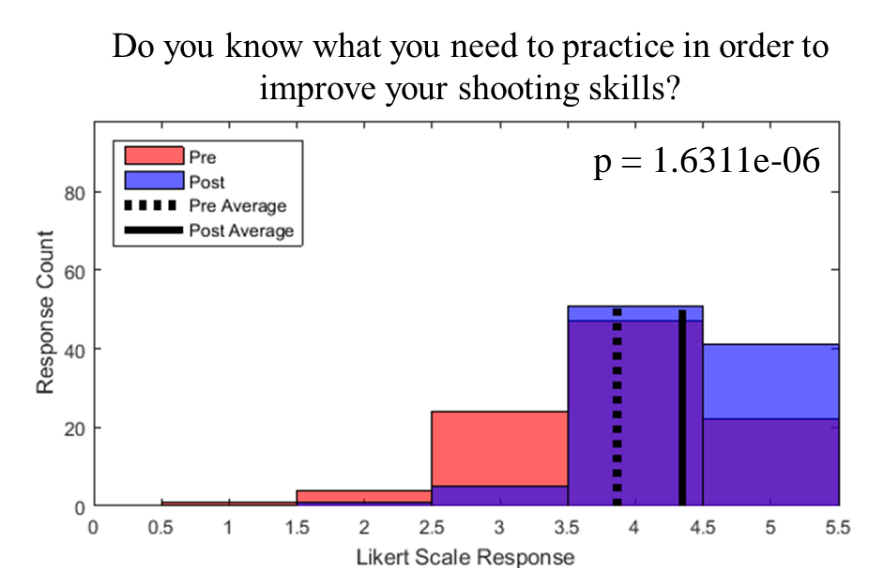
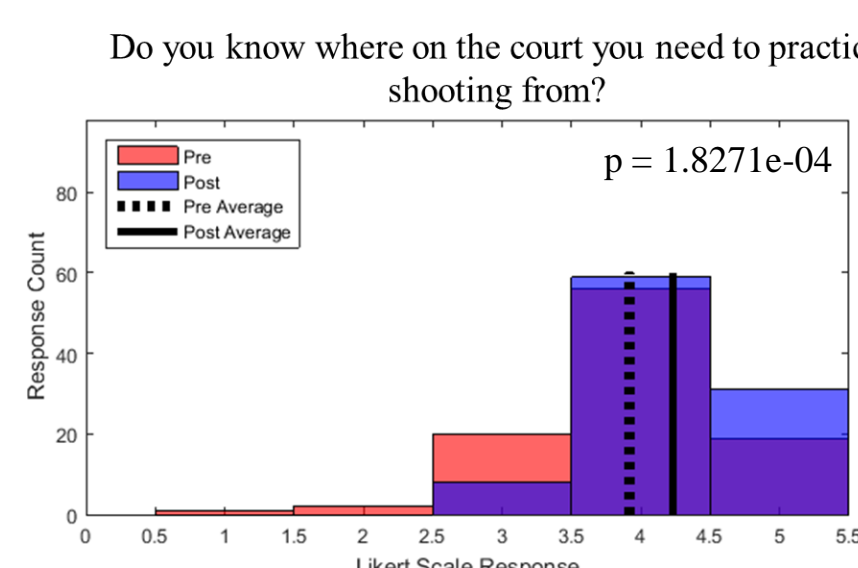
Survey Analysis and Results

- Use Wilcoxon Sign Rank to show significant shift in question answers ($p < 0.05$) between Pre- and Post- Tests
- Use Chronbach's Alpha to show internal consistency in Likert Scale Concepts

STEM Concepts



Training Concepts



Conclusions

- We have shown evidence that sports analytics provides a venue for authentic STEM engagement for youth presently underserved by the STEM educational pipeline.
- Participants reported an increased confidence in sports training, an increased interest and awareness of applications of sports analytics, and an increased enjoyment and interest in pursuing STEM in college.
 - We have shown that the impact of sports analytics extends far beyond wins and losses in professional sports; it can also address systematic inequalities within our educational system.