Title: Empower High School Student Research in BioTech

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Abstract: BioTech is an emerging and promising field in this technology-driven economy. Yet, limited opportunities are available for students at the high school level, especially with an inquiry-based approach. The proposed research is to study how the student’s attitude and knowledge/skills will evolve as a result of an intensive participation in Biotech science fair project. A combination of qualitative and quantitative method will be used in this project.

Rationale: As a high school teacher, it has been quite a challenge in embedding inquiry-based approaches in teaching while meeting the accountability demand of state-wide and district-wide assessment such as FCAT. As a consequence, students are less likely to participate in self-initiated science projects which would further their career interest in science-related field. Western High School (WHS) is a school with increasing student diversity. Today we have more than 50 percent of minority students—many of them are eligible for the free- or reduced-lunch subsidies.

Pre-college Biotech education has faced different challenges in meeting curriculum rigorousness and integrating existing school science sequence (Steele & Aubusson, 2004). WHS has started offering Genetic Honor classes as an elective science course as well as Forensic Science. Yet, the debate of the effectiveness of these courses is continuing due to a lack of formal evaluation of the program. Due to the nature of Biotech as a discipline is constantly evolving and changing, student’s participation in research projects in the field of Biotech is naturally fitting. Nevertheless, virtually none of the science research projects are aimed at Biotech. From the perspective of science curriculum design, how can we have done a better job in promoting student inquiry relevant to Biotech?

MORE TO COME

Action Research Intervention:

This research will be implemented in a large urban high school environment with a diverse student population during the school year of 2010-2011. The proposed intervention strategy is to promote student’s active participation in Biotech research projects with faculty mentoring. A curriculum module that entails the protocol in conducting science projects has been developed over the last two years. The research protocol is consistent with the format of Intel International Science and Engineering Fair (ISEF). We still need to design a procedure that we as a group of faculty can use as a guide in mentoring the progress of student’s research project.

Connections to UF-NIH : UF-NIH Summer Institute, Bench to Bedside. During the two-week intensive summer training, ideas about how BioTech can be infused in high school science curriculum start emerging.

Data Collection and Analysis:
The proposed research will include a very small number of students who will conduct Biotech research projects as a part of the Physics course requirement. A continuing in-depth study will be implemented in this research. A combination of qualitative indicators (i.e., Journaling, Interview, and Observation) and quantitative indicators (i.e., Survey, FCAT Score, GPA, Science Fair Outcome) will be used in this study. Descriptive statistics (i.e., mean and standard deviation) will be used to analyze the quantitative data while the qualitative data will be analyzed through a triangulation method in examining the validity of existence of a particular situation.

**Literature Cited:**


**Budget and Budget Justification:**

Supportive Materials for Science Fair Project: $200

The proposed budget is to support to the students who needs financial support in conducting their science projects. We intend to provide a support for 10-15 students.

**Permission:** I will speak to my Principal, Mr. Fiske and Assistant Principal, Mrs. Kefford about the needs in securing IRB approval from the School District Office.
EMPOWER STUDENT RESEARCH IN BIOTECH

Western High School
Broward County School District
Limited research in high school biotech curriculum (Dawson and Soames, 2006; Klop et al, 2010; Steele and Aubusson, 2004).

Students generally hold favorable/positive views toward Biotech after experiencing module-based Biotech curriculum (Klop et al, 2010)
RESEARCH QUESTIONS

- How will student’s attitude and knowledge/skills in Biotech evolve as a result of an intensive participation in Biotech science projects?
Intervention Strategy: Student’s participation in biotech research projects with faculty mentoring/advising

Participants: physics students in an urban high school.

Timeline: September 2010 - January 2011
Data Collection and Analysis

- Student Data: Attitude toward Biotech, Knowledge and Skills as indicated by FCAT Scores, Grade, Science Fair Project Outcome.
- Data Collection Method: Survey, Scoring Guide for Science Fair Project, Interview, Journaling, Reflective Science Logs
- Data Analysis:
  Quantitative: Mean, Standard Deviation, Graphing, Correlational Analysis
  Qualitative: Pattern Analysis, Triangulation Analysis
Unlimited opportunities and support from the staff, presenters, and teachers at the UF NIH-NCRR *Bench to Bedsides* Program.