Project BE A Mathematician (BEAM)

University of Hawaii at Manoa

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A Summary of Project BEAM

Goal: To increase the number of middle school indigenous and Hispanic students, identified as 'mathematically promising.'

Students:

- ✓ In Grades 7 or 8
- ✓ Currently enrolled in Algebra 1 OR planning to enroll in Algebra 1
- ✓ Native Hawaiian, Native American, Pacific Islander, Hispanic or Filipino
- ✓ in Hawai'i, Arizona, and the Commonwealth of the Northern Marianas Islands (CNMI)
- ✓ A or B in previous math course
- ✓ Having high aptitude in mathematics by student, parent, and/or teacher survey

The BEAM Math Program (50 hours) includes:

- Math exploration activities and role model presentations
- Culturally responsive, hands-on math activities
- Individual or small group math project development and presentation
- Self-paced algebra acceleration computer program
- Field trips to college campuses and service learning

- We served 715 students, and among them 650 consented to participate (353 in the intervention and 297 in the control group).
- Compared with the control group students, after participating in the program, the intervention group showed statistically significant growth in:
  - their attitude toward math
  - sense of place
  - behavioral characteristics of mathematically gifted students
  - engagement in math
  - math achievement
  - willingness to join a gifted or advanced math class, math club, or math competition

Successes

- When COVID-19 forced all instruction to shift to a fully virtual platform, our project was quickly able to transition the in-person lesson components to a virtual environment.
- Utilizing ready-made online educational programs and apps, changing materials with those that people can find at home easily, and creating a digital version of activities.
- Strategies useful to ensure students' engagement and learning during online math instruction
  - Assess access to the internet and computers
  - Watch students complete class assignments in real time
  - Encourage students' regular attendance and engagement
  - Increase communications with parents
  - Provide accommodations virtually

Challenges

- School closures, public health measures taken, and travel restrictions during the global COVID-19 pandemic (e.g., social distancing)
- Motivating students to participate in our comparison group options after-school
- Reaching parents/guardians of potential students
- Scheduling conflicts with sports or other after-school activities (such as math club, science Olympiad, robotics team practices and competitions)

Strategies for Implement the Project

- Maintaining relationships with participating schools and school staff
- Flexible implementation options
- Incorporating a culture-based hands-on activity
- Implementing community building activities at the beginning of the program
- Creating relationships with the parents/guardians of participant students

Strategies for Sustaining the Project Model Beyond the Grant

- For most of our lessons, the required materials were common items that could be locally sourced as well as inexpensive.
  - This allows teachers to utilize our lesson plans without added expense or burdening their budgets.
- Each of our hands-on math lessons come with a short video tutorial on how to implement the lesson and/or prepare lesson material(s).
- Each of our hands-on math lessons are differentiated to reach advanced math learners.
  - These lessons are built so that students can be split into proficiency/mastery level groups using similar materials but covering more advanced math content within the same topical strand.
- Each of our hands-on math lessons are built on CCSS standards.
  - Teachers can substitute BEAM lessons or specific activities to replace their own to cover the same content-area standard.

- Ready-made math worksheets
  - One of our participating teachers shared with us that she uses our worksheets (both available in paper or Google Sheets/Docs/Slides format) on a regular basis. She explained that having ready-made math problems with solutions covering the same content she typically delivers to her students has been helpful to her.

Strategies for Managing the Project and Grant More Efficiently

- Continued partnership and relationship building
- Starting with their needs
- Understanding the culture
- Following the local protocols
- Creative problem solving
- Dedicated team members

Final Year of Performance Including the No Cost Extension

- In the no-cost extension period, we will
- Hold a symposium of indigenous gifted education and math (March 4, 2023)
- Hold parent/teacher/community member workshops in AZ and CNMI
- Create an accessible resource repository
- Finalize and disseminate the products
- Analyze the final data and make publications

Other Information that You Wish You Had Known at the Beginning of the Grant

- No one could predict the COVID-19 pandemic and its impacts on education and people and communities we serve.