

Edison High School iSTEM Club: A Model for Educational Excellence in STEM

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Abstract:

Currently, STEM education is a necessity for students at all levels. The iSTEM club represents a model for engaging and teaching students the necessary. Through excellent leadership, intensive programs to educate students, and opportunities to motivate students, the iSTEM club provides enhanced STEM education to students. With these methods, the iSTEM club has benefited the community through book drives, educational programs from elementary school students, and field trips to expand the student body's knowledge. By participating in this club, students are able to reinforce knowledge with hands-on experiences and build up experience in order to perform well in society. As a result, the beneficial interaction between STEM clubs and STEM education structure is revealed.

Introduction:

Science, technology, engineering, and mathematics are unequivocally necessary for the progress of humanity's collective knowledge and standard of living (Hira, 2010). As such, society relies on the effective education of the emerging workforce through well-designed, inclusive STEM programs. Achievement and career planning in high school have been linked to success in college and beyond, proving the societal need to introduce STEM from a young age (ACT, 2009). Amidst the recent push for STEM education at the high school level, there is a rise in inequality in the educational resources available to students. These unequal resources include early college-level coursework, real-world STEM partnership, innovative technology use, and informal STEM learning beyond the school day (Lynch, 2017).

Thus, these circumstances provide an exigency for iSTEM club at Edison High School. This club is fundamentally a community outreach organization that serves to promote STEM education and community service across the globe. Granted, this mission is lofty, the advisers and officers of this club strive to fill the deficiencies in the STEM education offered by the high school

administration. To date, research on STEM clubs is limited in scope, with most research being conducted on the collegiate level. In essence, iSTEM club provides a model for STEM club creation and implementation on the high school level, especially as a career and college preparatory service for the community. iSTEM club provides students with opportunities to create and participate in projects that range in scope from the township to the world, expanding the horizons of Edison High School students.

Methods:

The key to a successful STEM club is, first and foremost, strong and passionate leadership. The leader and founder of iSTEM club, Sunrit Panda, saw the educational deficiencies at Edison High School and decided to implement change. Before any activities were planned, academically strong and dedicated club officers who resonated with the core ideals of STEM and community service were recruited. The officers were experts on topics ranging from writing and presenting to computer programming and advanced mathematics, yet, more importantly, they shared the larger vision of advancing STEM in the community. Having created a goal and recruited dedicated officers, iSTEM club was ready to succeed through innovative activities and events.

Educational equity is a common problem in STEM education that also presents itself at Edison High School. Most opportunities are given to students enrolled in the Science and Engineering Academy, approximately 4% of each graduating class. As a result, we structured our events to match and exceed those of the S&E academy: exposure to high-level colleges, integration into the professional community, and commitment to educational community service. Thus, the second step to a successful STEM club is addressing inadequacies in the current education system and designing a plan to supplement that curriculum.

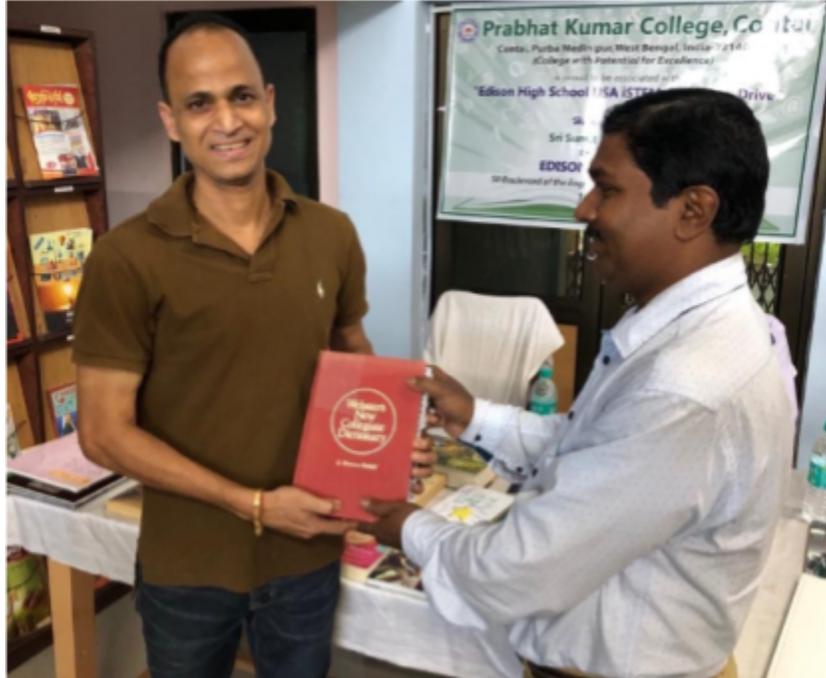
Results:

Ultimately, iSTEM club's goal is to harness the power of STEM, with a heavy focus on STEM-based community service throughout the community, and internationally. At school, iSTEM club mentors students applying to summer programs in STEM research, exposing them to possible careers and assisting in developing their resumés. iSTEM club also sponsors STEM-related field trips, such as Liberty Science Center, Columbia University, Princeton

University, and more. For example, students have the opportunity to network with professionals at conferences, tour world-class collegiate STEM departments, view live kidney surgery, etc. The club also plays a role in the local community as well. iSTEM club members are teaching the basics of HTML and web design at an elementary school to foster an early understanding of computer science.

Moreover, iSTEM club's impact extends beyond the community, and across the world. Recently, iSTEM donated over 200 books to schools in New York City as well as rural India through a school-wide book drive, facilitating literacy in some of the most disadvantaged parts of the world. Additionally, the club has submitted an

IEEE-in-epics proposal to alleviate a water crisis in Paushi, West Bengal, India, allowing its residents to focus on education. Through these multifarious and far-reaching activities, this club inculcates STEM into the minds of students, cultivating their interest in technology-based careers and community service.



Top: iSTEM club donation event at Prabhat Kumar College West Bengal, India. In partnership with Shikshaa NGO

Bottom: iSTEM club donation event at PS002 Meyer London New York, USA. In partnership with Reading Partners USA

Discussion:

iSTEM club and STEM clubs, in general, have a profound impact on the existing educational structure and, in turn, students. Specifically, by providing opportunities for hands-on experience and real-world applications, quality STEM education can be provided to a larger demographic. Club activities are helpful in reinforcing concepts discussed during lectures, developing a deeper understanding of STEM. In essence, participation in a STEM club extends the impact of STEM classes. While students discuss physics concepts in class, a club might have students put those concepts to use in a design competition. A computer science class can teach the basics of a programming language, but a club provides the opportunity for students to use their creativity to build an application or website to suit their needs. By hosting these kinds of events and workshops, STEM clubs help students engage with the concepts they are learning in a practical and meaningful way.

In conclusion, students should be able to use their knowledge to help the community as well. Giving students opportunities to go out into the “real world” and see the practical application of their education motivates students to work hard and inspires them to come up with creative ways to utilize their knowledge to benefit their community. By allowing hands-on research and real-world application, STEM clubs build technical skills and foster creativity in students so that the next generation of innovators and entrepreneurs can push the envelope and improve the lives of their communities as well as the world at large.

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