Introducing Multidisciplinary Engineering Technology and Programing for High School Students Through Summer Program

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***Abstract*—This innovative practice full paper introduces the design, organization, and evaluation of two one-week summer camps to introduce multi-disciplinary engineering technology and programming to high school students. This program is designed to increase students' interests and knowledge of multi-disciplinary engineering and computing, foster collaboration, and build community. By engaging in our program, students not only think critically and enhance their problem-solving skills but also develop foundational proficiency in engineering and computational thinking. This crucial skill set is recognized as essential in the 21st century, opening doors to enriching engineering capabilities and creating diverse opportunities for pursuing careers in multiple engineering fields. This paper introduces the organizational structure, coordination strategies, core curriculum instructions, and the program assessment result which demonstrates a substantial improvement in knowledge and increased interest in computing and engineering across all participant cohorts. The primary objective of this paper is to furnish a detailed guide, equipping institutions with the essential information required to successfully host similar summer programs. Furthermore, it aims to catalyze endeavors geared towards enhancing young students' participation in the fields of computing and engineering.**

Keywords— multidisciplinary engineering technology, summer camp, programming, MATLAB, SparkFun inventor's kit, python, C++

I. INTRODUCTION

According to the United States Bureau of Labor Statistics, the U.S. economy is projected to add almost 4.7 million jobs from 2022 to 2032 [1]. Computer and mathematical occupations are projected to experience 15.2% growth [1]. Engineering and architecture occupations are projected to increase 5.2% [1]. The demand for jobs in computing and engineering underscores the importance of aligning education and training with employer needs. To address the growing workforce requirements in these fields, we must actively encourage more students to study and participate in computing and engineering. Research has shown that introducing engineering and computing concepts to students at an early age can foster their interest and engagement in these disciplines, leading to future career paths [2]. However, despite the significance of computing and engineering education, opportunities in K-12 settings remain limited. Rural schools, urban schools, and those serving economically disadvantaged students are less likely to offer robust computer science and engineering programs. To bridge this gap, we need to prioritize creating more learning opportunities at the K-12 level. Moreover, by equipping students with engineering knowledge, computational skills, and problem-solving abilities, we can better prepare them for college and future careers.

Across the nation, numerous initiatives aim to ignite interest in engineering and computing disciplines among K-12 students. One powerful avenue for achieving this goal is through summer camps, which have gained popularity for introducing young learners to essential skills, scientific principles, and programming concepts. In the summer of 2023, our institution, in collaboration with regional school districts, organized two one-week summer camps specifically designed to engage high school students in multiple disciplines of engineering and computing. The goal of our program is to improve high school students' familiarity and experience with educational opportunities that lead to engineering and computing careers.

By providing a holistic experience, we aim to spark their interest and inspire them to consider engineering and computing as viable career paths. Our camp curriculum is dynamic and engaging. Students delve into hands-on activities using various tools and platforms such as SparkFun Inventor's kit, C++, Python, and MATLAB. We conduct pre-post evaluation surveys to gauge our program's effectiveness. We receive invaluable support from the Texas Workforce Commission (TWC), emphasizing the importance of bridging the gap between education and workforce needs. By nurturing curiosity, fostering skills, and broadening horizons, we believe that initiatives like ours contribute to a brighter future for both students and the fields of engineering and computing.

The rest of this paper is organized as follows. Section 2 discusses the related work in the literature and highlights the uniqueness of our program. Section 3 explains the essential components of our program curriculum. It includes a concise description of the instructional materials and outlines the key concepts taught in each hands-on session. Section 4 explains how our program is assessed and presents the analysis of the assessment results. Section 5 explains our best practices and challenges. Finally, we conclude by summarizing our findings and discussing potential future directions in Section 6.

II. Related work and contribution

In recent years, numerous institutions and organizations have offered educational summer camps designed to spark curiosity and lay the groundwork for future exploration in the computing and engineering fields for middle school and high school students. Those summer camps provide valuable opportunities for academic enrichment, skill-building, and personal growth. However, many programs require a fee, which automatically creates a barrier for students from families with limited financial resources. For example, the IEEE Try Engineering Summer Institute offers a nine-day engineering camp for students aged 13 to 17 at three locations— the University of Pennsylvania, Rice University, and the University of San Diego [2]. There are few free summer programs in the United States. Girls Who Code offers two online summer programs: a two-week summer immersion program to learn game design in live virtual classrooms; and a six-week self-paced summer program to explore some of the biggest topics in tech independently [3]. Kode With Klossy provides a two-week free online coding camp for girls aged 13-18 [4]. Both programs are for female students only. Koneru et al. from the College of Engineering at the University of Texas Permian Basin took a unique approach by organizing a virtual engineering summer camp in the summer of 2020. Students received project kits shipped to their homes and participated in hands-on activities remotely. Step-by-step instructions guided them through the projects, allowing them to explore engineering concepts virtually during the pandemic [5]. Southeastern Louisiana University offered a STEM-focused summer program virtually in the midst of the COVID-19 pandemic to a diverse underrepresented population of 9 - 12th graders in rural Louisiana [6]. Online summer camps allow participants to join from anywhere with an internet connection, eliminating the need for travel and making it accessible to a wider range of students, including those in remote areas or with mobility constraints. However, online programs lack opportunities for social interaction and building friendships as participants interact primarily through digital platforms.

A group of faculty members at the University of Nevada, Reno, organized introductory-level engineering summer camps for middle school and high school students in 2019 [7]. The camp aimed to introduce students to the exciting world of engineering. Faber et al. from Wartburg College conducted weeklong STEM summer camps in July 2017, 2018, and 2019 [8]. These camps were specifically designed to ignite curiosity and passion for STEM among middle and high school. The University of Austin also organizes the Longhorn Engineering Summer Camp 2024 (LESC 24). It is a free, interactive learning experience that will engage rising 8th and 9th graders in activities that promote engineering [9]. It is a very competitive program.

We are dedicated to fostering inclusive education opportunities by offering two free one-week in-person summer camps at our institution. Our program is designed to empower high school students, particularly those from low-income families, by providing them with opportunities for enriching educational experiences they might not otherwise have. Another goal of our program is to break down barriers to education and inspire students to reach their full potential, regardless of their socioeconomic background. Compared with other programs, ours stands out in several unique ways:

- Holistic Learning Experience: we offer a holistic learning experience and immerse students in a diverse range of engineering and computing disciplines such as programming, Electronic Engineering, Computer Engineering, and Chemical Engineering.
- Industry-Specific Field Trips: our program integrates industry-specific field trips. Participants visit local industries and research facilities.
- University Interaction: Participants interact with university experts to foster networking, mentorship, and a glimpse into higher education pathways.
- College and Career Preparation: Our program includes college and career preparation sessions. Students explore career paths, learn about college admissions, and gain valuable insights into professional growth in engineering and computing.
- Multidisciplinary Exploration: Unlike programs that focus solely on one discipline, we encourage a dynamic exploration of multidisciplinary engineering technology and computing.
- Hands-On Engagement: Daily hands-on activities and projects form the core of our program. Students work alongside their peers, enhancing teamwork and problem-solving skills.
- Cutting-Edge Tools and Software: we leverage a variety of tools and software such as SparkFun Inventor's Kits, MATLAB, Python, and C++.

Our program is free. Students were not charged any fee. It is designed to foster curiosity, creativity, and a passion for technology. It is a vibrant blend of creativity, technology, and hands-on learning to inspire the next generation of engineers, programmers, and innovators.

III. Core Curriculum Design

The core curriculum design of our program is meticulously crafted to provide high school students with a dynamic, multidisciplinary, and hands-on learning experience that fosters both technical skills and creative problem-solving abilities. Our program adopts an innovative approach that integrates principles from various fields to provide students with a comprehensive learning experience. Through a series of engaging modules and project-based activities, students were immersed in the exciting realms of robotics, software development, and engineering. School teachers are invited to participate as volunteers to receive professional development hours. Camp participants also visit several departments at our institution, which offer degree and certificate programs in various areas such as Advanced Engine Technology, HVAC, Computer Drafting, Instrumentation, Process Operating, Welding, and more. Camp participants also participate in hands-on experiences in state-of-the-art facilities led by highly qualified industry-experienced faculty. Fieldwork opportunities and industry-specific field trips are integrated into the daily program. These field trips provide opportunities for

students to learn about future development in industry and current environmental sustainability activities. Training is also provided to all staff and instructors in risk management, child protection, safety procedures, emergency management, and professional development in curriculum and instruction. Our program offers several distinctive features:

1. it provides a holistic and diverse learning experience, allowing participants to engage with a wide range of engineering and computing disciplines for a well-rounded educational adventure such as electronic engineering, chemical engineering, and computer engineering, distinguishing our program from others that typically concentrate on a singular topic;

2. our program integrates several industry-specific field trips to provide opportunities for students to learn about future development in industry and current environmental sustainability activities;

3. participants utilize university facilities and interact with university faculty, staff, and students. We also introduce several college and career preparation sessions for students to learn and explore;

4. participants engage in daily hands-on activities and projects with their age/peer group to foster collaboration;

5. our program leverages a variety of tools and software, such as SparkFun Inventor's Kits, MATLAB, Python, and C++, to seamlessly integrate diverse topics into a comprehensive curriculum covering multidisciplinary engineering technology and programming.

We provide a brief introduction to Python, SparkFun Inventor Kit, and MATLAB, rather than covering all modules of each programming language. Our goal is to introduce basic programming concepts to middle and high school students with no prior experience. This approach aims to spark their interest, build their confidence, and equip them with foundational skills, enabling them to pursue further learning independently or feel prepared to take computer-related courses at school.

We created a webpage for our camp that includes detailed information and an application link. Students submit their applications online, and acceptance is on a first-come, first-served basis to ensure equal opportunity for all. Each camp is limited to 36 participants due to the constraints of our computer lab.

Every day, students start to check in at 8:45 am. Class starts at 9:00 am until 5:00 pm from Monday to Friday. Table I lists a detailed camp schedule. From 9:00 am to noon, we introduce 3D modeling/printing and Python programming. Lunch break is from 12:00 pm to 1:00 pm in the dining hall. From 1:00 pm to 3:00 pm, we introduce the SparkFun Inventor's Kit and engineering simulation using MATLAB. From 3:00 pm to 5:00 pm, we arrange team building activities, campus tours, STEM lab and research center visits such as High-Performance Super Cluster Center, Integrated System Engineering lab, college readiness tools introductions, and program pre-post assessment. Students check out at 5:00 pm. On Friday of each camp, students also visit local industries such as BASF, Exxon Mobile, and computing companies.

TABLE I. CAMP DAILY SCHEDULE

	Mon	Tue	Wed	Thu	Fri
8:45 am	Check in	Check in	Check in	Check in	Check in
9:00 am	Python 3D	Python 3D	Python 3D	Python 3D	Python 3D
noon	Lunch	Lunch	Lunch	Lunch	Lunch
1:00 pm	Spark Fun	Spark Fun	MAT LAB	MAT LAB	Industry Visit
3:00 pm	Team Building	Camp Tour	Lab Visit	Lab Visit	College Readiness Assessment
5:00 pm	Check out	Check out	Check out	Check out	Check out

A. Curriculum for SparkFun Inventor's Kit

This core curriculum provides a structured progression from basic electronic concepts to more advanced projects, allowing students to gain hands-on experience with the SparkFun Inventor's Kit and Arduino platform while fostering creativity and problem-solving skills. Adjustments can be made based on the specific interests and skill levels of the students participating in the camp. Sample curriculum outline for high school students using the SparkFun Inventor's Kit is listed below:

Module 1: Introduction to Electronics and Arduino

- Introduction to the SparkFun Inventor's Kit (SIK) and Arduino platform
- Overview of basic electronic components (LEDs, resistors, capacitors, etc.)
- Hands-on activity: Building simple circuits and understanding breadboarding
- Introduction to Arduino IDE (Integrated Development Environment)
- Basics of coding with Arduino: Syntax, variables, functions
- Hands-on activity: Writing and uploading a simple "Hello World" program to blink an LED

Module 2: Sensors and Inputs

- Introduction to sensors: Light, temperature, sound, and motion sensors
- Understanding analog and digital inputs
- Hands-on activity: Wiring and experimenting with different sensors
- Interfacing sensors with Arduino
- Reading sensor data and using conditional statements
- Hands-on activity: Building a light-controlled LED circuit or a temperature sensor-controlled fan

Module 3: Outputs and Actuators

- Introduction to outputs: Servo motors, DC motors, buzzers, and displays
- Understanding PWM (Pulse Width Modulation) for motor control
- Hands-on activity: Controlling motors and buzzers with Arduino
- Interfacing actuators with Arduino
- Writing code to control motors and displays
- Hands-on activity: Creating a simple robotic arm or a motorized vehicle using servo motors and DC motors

B. Curriculum for Python

Python is one of the most popular programming languages in the world. Python's easy-to-read syntax makes it more beginner-friendly than other languages. This simplicity can help students grasp programming concepts more quickly. This curriculum for Python provides a structured approach to introducing high school students to Python programming over one week, covering essential topics and culminating in a practical project-based learning experience.

Module 1: **Introduction to Python and its Standard Library**

- Introduction to Python (dynamic, interpreted (bytecode-compiled) language, no type declarations of variables, parameters, functions, or methods in source code).
- Description of the Python standard library, a collection of script modules accessible to a Python program to simplify the programming process and remove the need to rewrite commonly used commands.

Module 2: Using IPython and Jupyter Notebooks

- The IPython Notebook (a.k.a. the Jupyter Notebook) - an interactive computational environment, combining code execution, rich text, mathematics, plots, and rich media.

Module 3: Variables and Assignment Statements

- create, initialize, and update variables throughout the Python code

Module 4: Function Print and Getting Input from the User

- the input() function for taking input from a user, and
- the print() function for displaying output on the screen

Module 5: Conditional Statements (if, else, elif)

- Use if-else statements when the alternatives are mutually exclusive.
- Use if-elif-else statements when the alternatives are not mutually exclusive.

Module 6: Loops (for loops, while loops)

- for - iterate a predefined number of times.
- while - keep on iterating until the condition is false.

Module 7: Writing Functions in Python

- A Python function can return data as a result – defined using the def keyword.

Module 8: Sequences, Lists, and Tuples

- Tuples are immutable - a heterogeneous sequence of elements.
- Lists are mutable - their elements are usually homogeneous.

Module 9: Dictionaries and Sets

- Sets are an unordered collection of unique elements.
- A dictionary is an ordered collection of key-value pairs.

Fig. 1 shows an example of a Python program for calculating the greatest common divisor of two integers. It uses Python function definition using a single recursive call.

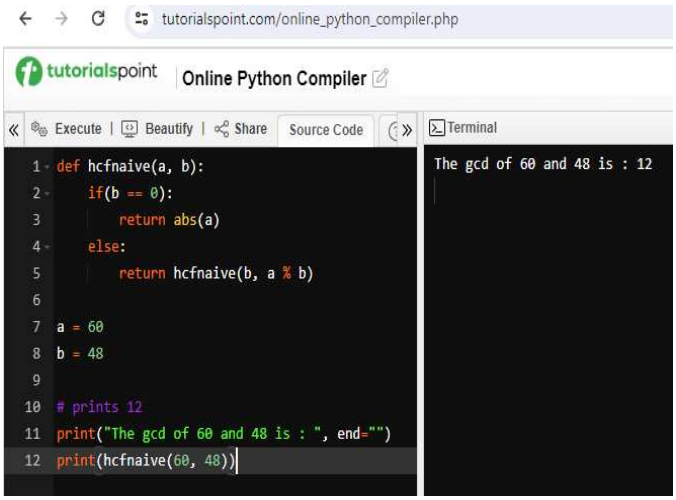

Figure 1: Calculating the `gcd()` *of two integers*

By the end of the camps, students improved their programming skills and gained a deeper understanding of high-level programming languages.

C. Curriculum for MATLAB

MATLAB is a high-level programming language and environment designed for numerical computing, visualization, and programming. It's very popular in engineering for its powerful built-in functions and toolboxes tailored for various

engineering applications. We cover several topics over the course of one week. We cover several topics over the course of one week.

Module 1: Introduction to MATLAB for Engineers Overview

- MATLAB Interface: the command window, workspace, current folder, and editor.
- Basic Commands: Learn how to execute simple commands and navigate the environment.
- Use MATLAB as a calculator.

Module 2: Basic MATLAB Operations

- Variables and data types
- Arithmetic operations
- Built-in functions (sin(), sqrt(), exp())

Module 3: Define vectors or a data series and vector-based calculation.

- Creating and manipulating vectors
- Element-wise operations
- Vector dot and cross products

Module 4: **Plotting Data and Visualization**

- Customizing plots (titles, labels, legends, and color schemes)
- Creating various plot types such as scatter plots, bar graphs, and histograms.
- Introduction to 3D plotting

Module 5: **Control Structures**

- If, else, and elseif statements
- For loops
- While loops

Module 6: **Handling Data**

- Import from various formats like CSV, Excel, or text files.
- Export data

Students are very interested in MATLAB animation. Fig. 2 shows an example of the 3D animation figure generated by MATLAB.

IV. Program Evaluation

Our program outcomes and measures are listed in Table II. A pre-post evaluation survey is utilized and directed towards participants' pre-post knowledge and interests acquired for all objectives. All participants completed an online evaluation using the Qualtrics platform. The evaluation encompassed several key objectives, gauging the acquisition of knowledge in workforce skills, technical expertise, engineering and computing education continuation, career aspirations, and overall program benefits. The pre-post evaluation survey consisted of a Likert five-point scale of knowledge acquired where "1" is the lowest score and "5" is the highest score. The average rating for each intervention method was based on the net gain value: where 1.00-1.24 Meets Standard, 1.25-1.49 are good; 1.50-1.74 are Excellent, and 1.75 and above are Outstanding. Furthermore, the questionnaire featured thought-provoking inquiries, inviting participants to highlight their most and least favorite aspects of the summer camps, offer suggestions for enhancing future iterations, and share their unique experiences of acquiring new computing and engineering skills. A sample pre-post evaluation questionnaire is shown in Table III.

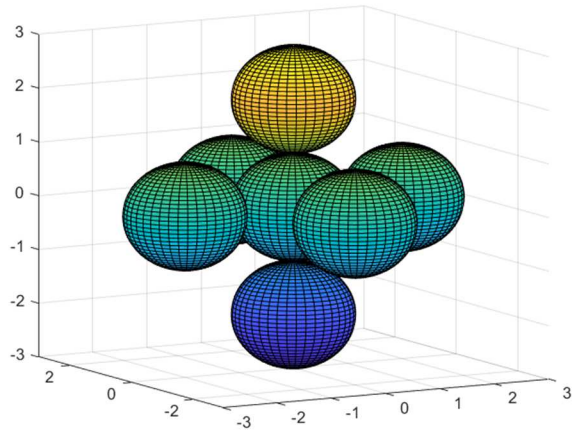

Figure 2: 3D animation using MATLAB.

TABLE II. *Outcomes and Measures*

Outcomes	Measures
(1) expose students to computing and engineering technology with hands-on projects to increase their interest	(1) the pre- and post-assessments will assess students' knowledge of computing and engineering technology and interests
(2) introduce computing and engineering field careers with industry partners	(2) the pre- and post-assessments will assess students' knowledge of computing and engineering careers
(3) explore college readiness tools that allow students to explore engineering and computing pathways as their major	(3) the pre-and post-assessments will assess students' perceptions of their ability to evaluate college readiness tools that allow students to determine if a computing and engineering pathway is a viable career option for them

TABLE III. *SAMPLE PRE-POST EVALUATION QUESTIONNAIRE*

Statement		Response				
		Low		***Average***		***High***
Knowledge of computing	Before	1	2	3	4	5
	After	1	2	3	4	5
Knowledge of college readiness tools	Before	1	2	3	4	5
	After	1	2	3	4	5
Knowledge of engineering	Before	1	2	3	4	5
	After	1	2	3	4	5
Knowledge of computing and engineering careers	Before	1	2	3	4	5
	After	1	2	3	4	5
Interests in preparing for computing careers	Before	1	2	3	4	5
	After	1	2	3	4	5
Interests in preparing for engineering careers	Before	1	2	3	4	5
	After	1	2	3	4	5
The confidence level of your ability to succeed in computing	Before	1	2	3	4	5
	After	1	2	3	4	5
The confidence level of your ability to succeed in engineering	Before	1	2	3	4	5
	After	1	2	3	4	5
Would you recommend this camp to a friend?				Yes		No
What suggestions do you have for improving the camp?						
What did you like most about the camp?						
What did you like least about the camp?						
Please comment about your experience of learning new /programming/engineering skills.						
Please write any other comments you may have.						

The assessment results of the scale-based questions are shown in Table IV. A numerical increase in knowledge and interest is noted in students' assessment reports. All results are excellent and above.

TABLE IV. *GAIN VALUE*

Question	Gain	Rating
Knowledge of computing	2.9	Outstanding
Knowledge of college readiness tools	2.1	Outstanding
Knowledge of engineering	2.9	Outstanding
Knowledge of computing and engineering careers	2.5	Outstanding
Interests in preparing for computing careers	1.5	Excellent
Interests in preparing for engineering careers	1.6	Excellent
The confidence level of your ability to succeed in computing	1.8	Outstanding
The confidence level of your ability to succeed in engineering	1.6	Excellent

The following section is the student's feedback on the post-evaluation open questions.

The percentages correspond to participants' responses of 'YES' to the following question:

Question: Would you recommend this camp to a friend? – 94% 'Yes'

Question: Please comment about your experience of learning new programming/engineering skills.

- It was definitely something new to me because I've never work with coding, programming, and computer science skills.
- This new skill in coding was very fun to do and very enjoyable.
- I may need to relearn everything because some information didn't really stick. Overall it was a great experience.
- I have enjoyed the experience of programming and am look forward to it when I go to college.
- I feel comfortable in computer science and I like learning new things
- I had a lot of fun, made memories, learned new things...etc...
- It was fun and complicated.
- It was an ok experience I did learn lots of stuff and actually found it fun.
- I enjoyed it because challenges are fun to me but I ended up with severe headaches after the Python lectures.
- I enjoyed learning about these things though at some points they were very challenging for me.

- My experience was good because I learned more about the Arduino coding language.
- The camp was fun and I learned a lot.
- it was interesting and cool
- I had improved on all
- My experience was really good.
- They taught it very well and broke it down so I could understand.
- I learned how to make a cartoon move.
- I managed to learn more about these skills than back in Middle School or Elementary School
- I learned more about coding with the spark fun kits
- I learned how to create a Scratch program and how to use in more.
- it was very eye-opening
- It was great to learn about some people that are going to the same school as me
- I love it, at the beginning I thought I was not going to like it but I will be back next year for sure
- I learned many new things about coding, programming, and computer science skills.
- I learned that I am not a big fan of computer science but I have learned a lot, I just don't know how to put it in words.
- It was a fun experience.
- it was fun and entertaining

Question: What did you like the most about the camp?

- I liked building different codes with help of the counselors.
- the counselors and students also the whole experience since I've never really done something like this before but above all it was launch.
- matlab
- the consolers
- MatLab
- Coding with Python
- python coding
- the spark fun projects .
- I liked that there were multiple counselors and teachers to help us and I enjoyed the lessons
- I the robotic kits parts
- The attentiveness and MatLab
- all aspects
- Learning new coding techniques and understanding more about python coding.
- many different options of choices about what you want to learn about.
- sparkfun kits
- I liked writing code in Python

Question: Please write any other comments you may have.

- Shirshack was a very ice and loving person if you see this tell him ridge said thanks
- its was fun
- Thank you for everything.
- very cool camp
- wish the camp will be longer.
- staff were good
- Very fun.

All camp instructors and staff contributed to creating the survey. In this context, 'knowledge of computing' refers to programming skills in any language. 'College readiness tools' include resources related to the college application process and academic preparation, such as online admission information. We recognize the limitations of our current survey instrument and will work to improve it for future use.

Based on the survey responses, it is evident that the camp was well-received, with 94% of participants indicating they would recommend it to a friend. Many students found learning new programming and engineering skills to be an exciting and enjoyable experience, despite some challenges. Participants appreciated the hands-on learning approach and the support provided by counselors, often highlighting specific tools such as Python, MATLAB, and SparkFun Inventor kits as valuable components of their learning. The majority expressed a positive overall experience, with comments suggesting that the camp was both fun and educational. The positive outcomes from our program evaluation survey, coupled with the constructive feedback provided by participants, validate the success of our program in effectively imparting fundamental computing and engineering concepts. These results not only bolster participants' knowledge but also ignite their interest in computing and engineering fields.

V. Best Practices and Challenges

Our team has extensive experience delivering engineering and computing summer camps. Below is a compiled list of best practices for effective summer camps based on our experience:

- Collaborative Community Partnerships
  Teaming up with organizations such as independent school districts, Court-Appointed Special Advocates (CASA) organizations, and local industries, is a great way for maximizing resources and enhancing services. School districts helped in identifying and recruiting students who would benefit the most from our camp, particularly those with limited access to similar opportunities. Professionals from local industries volunteered their time to guide camp tours, give guest lectures, lead workshops, and provide hands-on training sessions.

- Parent/Student Orientations
  Our team has organized parent/student orientations to inform parents and students about a wide variety of available engineering and computing careers. The familiarity with and perception of engineering and computing as a career with diverse applications and broad

potential for positive social impact are important for both parents and students.

- Small class sizes make for big gains
  Our team has divided the camp into multiple sessions with small class sizes to make significant one-on-one time between instructors and students and effective personalized instruction to provide meaningful summer educational and team-building opportunities for students.

- Buddy system
  Students work in pairs on all projects and camp activities, collaborating to enhance learning. It encourages peer support and shared problem-solving, allowing students to learn from each other's strengths and perspectives. At any time, they can rely on their partners for assistance, motivation, and feedback, which helps build a sense of mutual respect.

- Established processes:
  Environmental health safety, risk management, fire evacuation, driver safety, food safety, etc. create a safe and supportive environment to protect students. We implement rigorous standards and protocols to maintain clean, healthy, and hazard-free camp facilities. By establishing and rigorously maintaining these processes, we create a secure and supportive environment that prioritizes the health and safety of our students. This foundation of safety allows students to focus on their learning and development without concerns about their well-being.

Our challenge was promoting and recruiting community collaborative partners. We addressed this by developing a robust public relations recruitment model that also secured funding for the sustainability of the camps. Another major challenge experienced was the recruitment of low-income students. School counselors seldom "flag" low-income students as students with high potential, nor do they recommend them for our program. Our best recruiters were former program participants who could see the potential in their younger classmates, and their parents who advocated for our program in community organizations.

VI. Conclusion and Future Work

Our two one-week summer camps are designed to increase participants' interest and knowledge in engineering and computing. The positive evaluation results indicate that our participants were highly engaged and experienced substantial learning gains throughout the program. Our program's core curriculums include hands-on projects, interactive workshops, information sessions, and industry field trips. The survey results show promise in sparking curiosity and potentially fostering a deeper understanding of those subjects. Participants have reported increased confidence in their abilities and a strong motivation to pursue further studies and careers in engineering and computing. Given these results, we are committed to continuing and expanding our program. Future camps will feature more advanced topics, collaborations with industry professionals, and opportunities for students to showcase their work.

Acknowledgment

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