

CURATED PATHWAYS TO INNOVATION™

Broadening and diversifying the STEM+C talent pool



2023-2024 Academic Year Impact Report



The Curated Pathways to Innovation Model

Curated Pathways to Innovation (CPI™) is a web-based personalized Science, Technology, Engineering, Mathematics and Computer Science (STEM+C) learning platform which acts as a “virtual guidance counselor.” It uses new technologies like machine learning, artificial intelligence (AI), and gamification to inspire, instruct, and incentivize students — emphasizing skills in STEM overall, with focus on math, and computer science. The platform enables students’ agency to select activities that engage and motivate them while building their unique STEM+C pathway from high school to college and future careers.

The CPI™ platform helps broaden student participation in STEM+C learning by providing the following:

- Access and dissemination to learning they may not otherwise get where programs are not available
- A personalized learning pathway which builds their skills, awareness, and self-efficacy in STEM+C curriculum and careers
- Self-paced tools to practice, learn and master
- Integration into formal classroom or informal learning settings, with hybrid activities

CPI™ empowers and encourages students to discover their passion in STEM+C fields, build their expertise, and ultimately succeed in their academic and professional career choices. With CPI™, students have the tools and resources they need to chart their own course to innovation and success.

CPI™ has reached 6,208 students across 9 states, and 2 countries to date.

Our Purpose

With focus, but not exclusion, on underrepresented populations, those who are African American/Black, Latine, American Indian/Alaska Native, and female students in STEM+C pathways, the CPI™ platform builds inclusion for the digital economy of the future. CPI™ has a proven impact on immediate preparation for high school, college, and re-skilling for jobs.

The underrepresentation of underserved students and women in STEM+C professions greatly impacts U.S. competitiveness. There are thousands of STEM-focused educational programs, typically found online and outside of school curriculum. However, there is no common unifying platform to identify, integrate, measure and amplify the impact of these programs and content consistently. CPI™ serves as a single platform providing students one place to build their STEM+C pathway to college and career - allowing accountability throughout the journey.

Reflections on the Past Year

CPI™ Academic Year 2023-24 priorities were to scale out through expanded student usage, improved teacher support, continued transparent and consistent measurement of impact, and organizational growth of CPI™ to support these goals.

1) Student Expansion

More than 6,200 students have now participated in CPI™. In the academic year 2023-2024, the CPI team built on its successful pilot with middle schoolers to reach high school and community college aged students. This necessitated updating the CPI™ user experience to add an age-appropriate interface and new accelerated content.

Total Students	Total Badges Total	Total Activities
6,208	56,293	148,184

STEM Content Addition

CPI™ content is rich and abundant and students have earned over 56,000 badges and completed over 148,000 STEM+C activities cumulatively. **Individual learners** outside the classroom, such as homeschoolers or those interested in additional learning, are now also supported in CPI™. **New content for older students** includes activities and badges to support additional career paths on data science, robotics, artificial intelligence, entrepreneurship, music science and financial literacy.

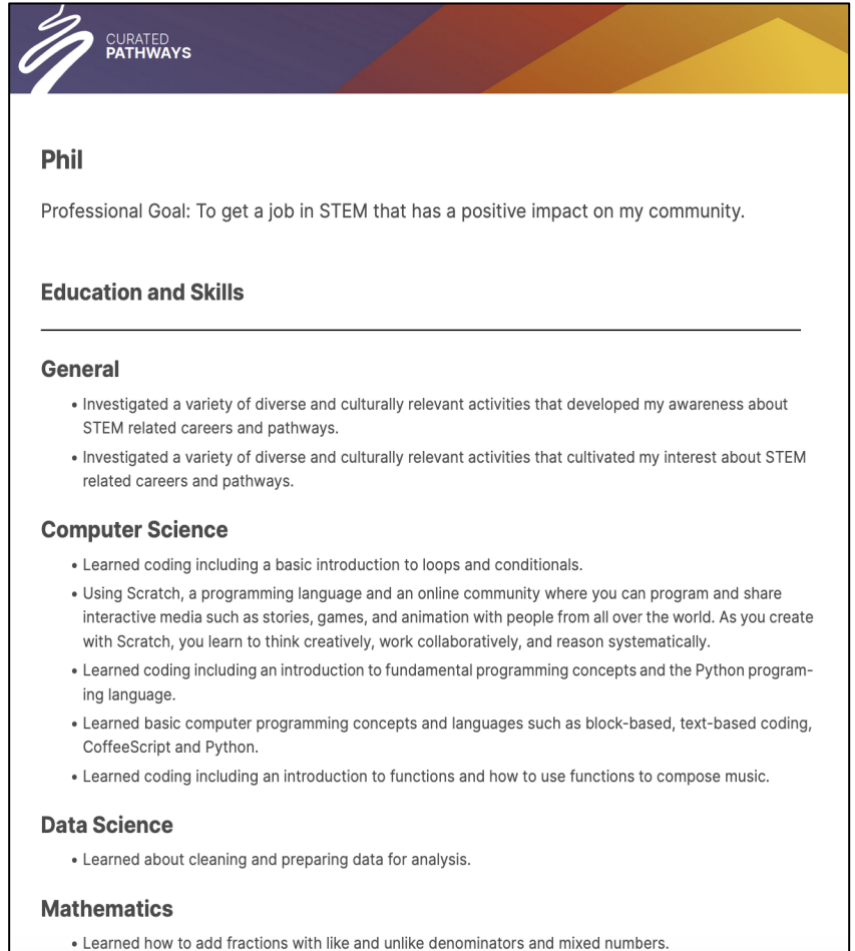
Secondary school-aged students also now have an ability to create an “**e-portfolio**” to summarize their achievements and acquired skills in CPI™ learning, and can use it as a basis for a modifiable personal resume and a reflection of their STEM achievements.

After completing a certain amount of pre-work, students may select the very popular **CPI Hackathon** badge. Students work as teams to develop technology solutions (which must include websites and apps) to self-selected community problems and then present their proposals to members of industry on-site at local companies.

Students provided positive feedback on the Hackathon experience:

“It was a good experience to work with my team. I think it gives us opportunities to learn more about STEM especially because I never did anything with STEM before.”
Emelina – Middle School Student

E-portfolio example:



Phil

Professional Goal: To get a job in STEM that has a positive impact on my community.

Education and Skills

General

- Investigated a variety of diverse and culturally relevant activities that developed my awareness about STEM related careers and pathways.
- Investigated a variety of diverse and culturally relevant activities that cultivated my interest about STEM related careers and pathways.

Computer Science

- Learned coding including a basic introduction to loops and conditionals.
- Using Scratch, a programming language and an online community where you can program and share interactive media such as stories, games, and animation with people from all over the world. As you create with Scratch, you learn to think creatively, work collaboratively, and reason systematically.
- Learned coding including an introduction to fundamental programming concepts and the Python programming language.
- Learned basic computer programming concepts and languages such as block-based, text-based coding, CoffeeScript and Python.
- Learned coding including an introduction to functions and how to use functions to compose music.

Data Science

- Learned about cleaning and preparing data for analysis.

Mathematics

- Learned how to add fractions with like and unlike denominators and mixed numbers.



"I think it was really good practice just for your future depending on what you want to do in life. Just participating and talking in big groups."

Jonathan – Middle School Student



Technology professionals from 5 different companies and one University served as mentors and judges to the students at this Hackathon.

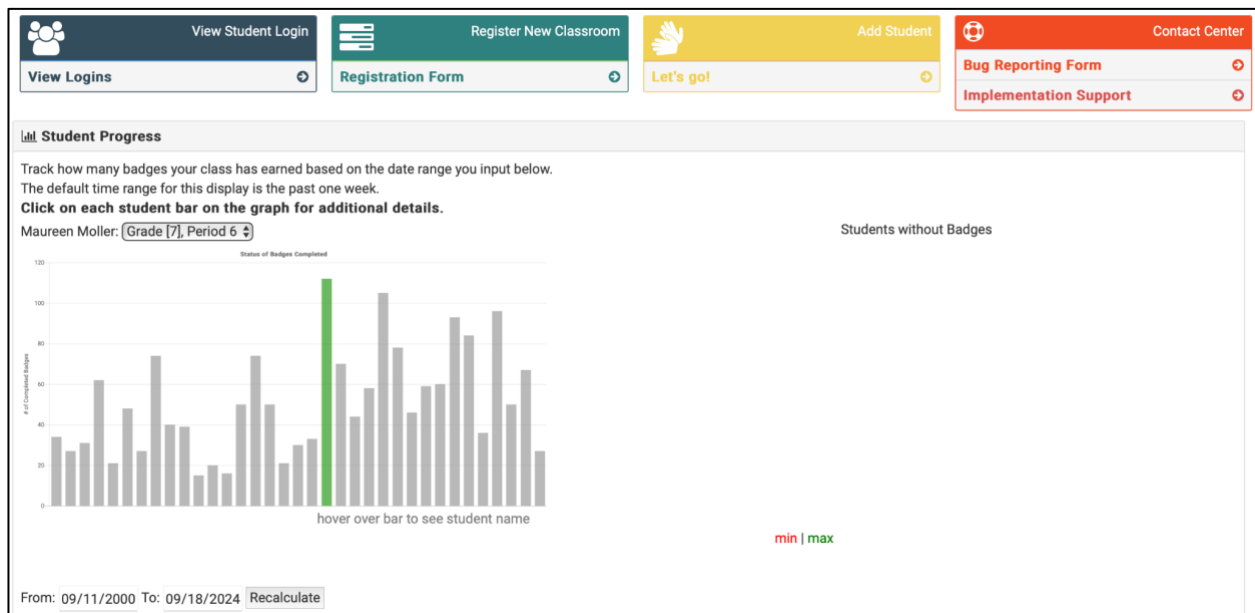
[Click here to watch the Hackathon 2024 video](#)

2) Improved Teacher Support

As CPI™ continues to grow, it was necessary to provide teachers the ability to directly monitor student progress, interests, and engagement.

CPI™ developed a data dashboard for use by teachers showing student achievements and academic standards alignment for badges completed.

Sample teacher dashboard:



Support of easy and fast onboarding of teachers regardless of their specific STEM+C content knowledge is a differentiated advantage of CPI™.

Standards Reporting

An additional strategic feature of CPI™ is that all student learning is mapped to state and national STEM standards for computer science, mathematics and science. It is important for educators to know what standards are being taught and which standards students are being exposed to and how using CPI™ adheres to these standards.

Standards mapping example:

Badges to Standards table			
Search the table by Badge, Activity, Standard, or Description: <input type="text"/>			
■ CSTA Computer Science Standards ■ Common Core Mathematics Standards ■ Next Generation Science Standards			
Badge	Activity	Standards	Description
Advanced JavaScript	Blockly Maze Levels 8-9	1A-AP-10 1B-AP-10 1B-AP-15 2-AP-14	Use drag-drop blocks and JavaScript to program a character through a maze. Complete levels 8-9 to earn an Advanced JavaScript badge.
Advanced JavaScript	Growth Mindsets: Famous Failures	1B-IC-18	"Anyone who has never made a mistake has never tried anything new." - Albert Einstein. Watch this video to see more motivational quotes from famous people who understood that to be successful you cannot give up!

3) Measuring CPI™ Impact Transparently and Consistently

Demonstrating and measuring impact consistently and with integrity is a key value of the CPI™ program. Our partnerships with University of Notre Dame and Purdue University provide academic integrity in analysis of our data collection and impact measurement. University of Notre Dame and the CPI™ team published the impacts and research findings observed in the [Computer Science Education Journal](#).

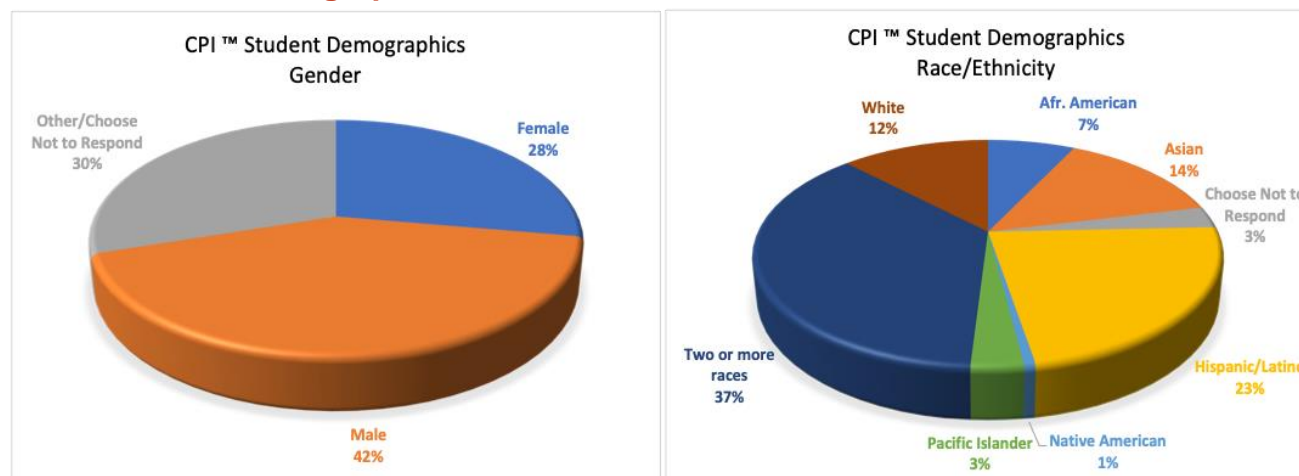
In addition, CPI™ automated the generation of research data which enables the reporting of key findings and results to our stakeholders regularly and as requested.

Our research findings are important to the continued development of STEM+C educational practices and approaches because we have identified which specific content is most engaging for individual students. CPI™ is able to provide specific content to individual students through a personalized AI recommendation engine. Our findings have shown that using CPI™ has *increased* the interest and self-efficacy of underserved students in STEM+C content. This result is noteworthy because national research indicates most girls' and underrepresented students' interest, self-efficacy and aspirations in STEM+C *decline* after 5th grade nationally. This early and ongoing exposure through CPI™ will lead to a broadened and diversified STEM+C workforce in the future.

Research Data Findings

CPI™ is broadening and diversifying participation in STEM learning to students who have historically not participated in digital careers or declared STEM+C majors in college. Of the students served by CPI™, 73% self-identify as African American, Latine/Hispanic, American-Indian, Pacific Islander, or multi-racial.

CPI™ Student Demographics:



Student Engagement Continues to Grow

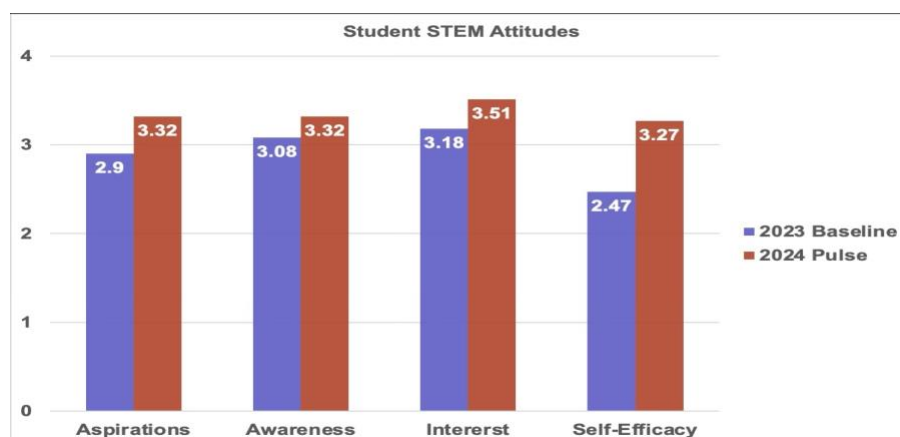
Students enjoy using CPI™ and stay engaged with the platform. Of the students using CPI™, 98% stay engaged throughout the school year and have completed over 148,000 activities. Engagement in Curated Pathways to Innovation drives confidence, interest, and self-efficacy in STEM+C.

Total Students	Confidence Rating*	Interest Rating*	Rating*
6,208	4.069	3.768	4.000

*Ratings out of 5

Student attitudes towards STEM+C improve through the use of CPI™. STEM attitudes are measured across the four domains of Aspiration, Awareness, Interest and Self-Efficacy.

In the 2023-2024 academic year, like in prior years, there was statistically significant improvement in student STEM attitudes.



4) Organizational Growth of CPI™

CPI™ has now been established as a 501(c)(3). This was key for deepening the focus on our mission to broaden and diversify the student pipeline for STEM+C education and careers. CPI™ is grateful for the early support, education on non-profit best practices, and financial training provided by the YWCA Golden Gate team throughout our pilot.

This change has also enabled a lower cost of overhead and more efficient cost-per-student delivery.



Curated Pathways to Innovation (CPI) is an invaluable resource for both teachers and students. CPI is easy to use and allows my students to individually explore all areas of STEM at their own pace.

EDGAR MONROY, Engineering Teacher at Hayward High School

Recognition

CPI™ is immensely appreciative of the pro bono support from Covington & Burling LLP for guiding and managing the team through the legal and administrative requirements for establishing the 501(c)(3) status. CPI™ appreciates the support from 2023-2024 funders, corporate volunteers, and individual supporters from: founding companies Hewlett Packard Enterprise Inc., HP Inc., Hitachi Vantara, Adobe, Intuit, Covington & Burling LLP, YWCA Golden Gate Silicon Valley, Dr. Emmanuel Dorley, University of Notre Dame CRC, Purdue University, Dr. Bruno Ribeiro, Dr. Judy Miner, Dr. Mayank Kakodar, Shishang Wu, Dr. Teresa Ober, Sheryl Morgan, South Bend Community Schools, Ocala STEAM Academy, Bret Harte Middle School, and Foothill-De Anza Community College District.

Looking Forward

As we enter the new academic year, it is more important than ever to ensure students are exposed to and able to participate in the emerging artificial intelligence era. New AI activities, badges and pathways with career exploration information will be sourced and added into the CPI™ platform.

Additional scale to new students, schools, teachers and programs is a key goal and will be supported as funding permits through new partnerships with other NGO's and companies local to schools using CPI™.

Continuing to offer CPI™ to students for free will require accelerated fundraising support from grants, foundations, companies and government agencies.

Please consider making a tax-deductible donation to Curated Pathways to Innovation to support our continued growth and success and to build a viable STEM+C workforce for the future. To make a donation, [CLICK HERE](#)

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