eSTEM ACADEMY

EASTVALE, CALIFORNIA

"The eSTEM Advisory Committee worked with the architects and began profiling what a 21st century learner looked like. We saw a future-ready student who had the skills to collaborate and communicate effectively with others."

– Dr. Kim Lu Lawe | eSTEM Director

Outdoor Engineering Lab

Executive Summary

Expanding a Modest Vision

At its inception, the objective of this public-school project was to support a new Career Technical Education (CTE) program, in addition to relieving overcrowding within Corona-Norco Unified School District with the addition of 40 new classrooms to an existing 4,500-student Eleanor Roosevelt High School site. This modest vision evolved quickly and significantly as the District engaged the broader community of Eastvale. After identifying a strong need in the health science, medical technology, engineering and architecture professions, the District decided this STEM Academy would have two pathways: Health/Medical and Engineering/Design.

Better Planning for Better Results

During the Programming Phase, the District's goals shifted from capacity increase to an educational experience that would create and support student passion and perseverance, allowing learners to become inquisitive problem solvers and purposeful contributors. This two-month schedule allowed the design team and robust stakeholder group adequate time to explore the relationship between ERHS and the new Academy, tour built facilities to see how spaces were being used firsthand, and help define the Learner Profile of an eSTEM student to understand the ideal environment to support their growth.

Transforming the Traditional

eSTEM Academy's design intentionally redefines the organization and configuration of traditional learning and teaching spaces. Established during Programming, overarching themes of collaboration, flexibility, access and partnership lead to unique design achievements. Designing with the student in mind lead the stakeholder group and design team towards several educational innovations, without compromising the program offerings. A variety of classroom (studio) sizes and typologies, collaborative group and peer spaces, decentralized dining and media resources, as well as leveraging the outdoors for learning, all guided the design from the inside out.

Today's Learner is Tomorrow's Leader

The impacts of this new facility can be seen at every scale. The student is given power of choice and the freedom of agency day to day, hour to hour. Staff are empowered by professional learning. The campus moves from traditional and expected to innovative and boundless, attracting the interest of many more prospective students within the District. The community of Eastvale gains socially responsible citizens, equipped with the skills for personal success and to enrich society. This transformational campus is only the beginning of a robust STEM education.

Scope of Work & Budget

Eastvale STEM (eSTEM) Academy

Project Location: Eastvale, California
District: Corona-Norco Unified School District
Project Type: New Construction
Occupancy Date: June 01, 2019
Current School Enrollment: 864
School Capacity: 924
Floor Area: 105,500sf
Gross Area (Per Occupant): 105,500sf (129.5sf/occupant)
Site Area: 168,493sf | 3.86 acres (168v493sf)
Delivery method: Lease Leaseback
Project Budget: $50,000,000
Project Final Cost: $52,460,500
Site Development Cost: $7,344,500
Building Construction Cost: $45,116,000
Fixed Equipment Cost: $656,453 (kitchen only)
Predicted Energy Utilization Index (EUI): 49
Actual EUI: 62

Eleanor Roosevelt High School

Year Built: 2006
School Enrollment: 4,532
Site Area: 54 acres

Grab & Go Catalyst Cafe

Community Engagement

“The original goals established became a blueprint for what the STEM team would set out to accomplish once the building was finished. Over the past 5 years, the STEM team has put forth an outstanding effort learning about STEM education by attending conferences, workshops, and participating in hours of collaboration.”

- eSTEM Teacher

Health Medical Lab and Simulation Studio

School & Community Engagement

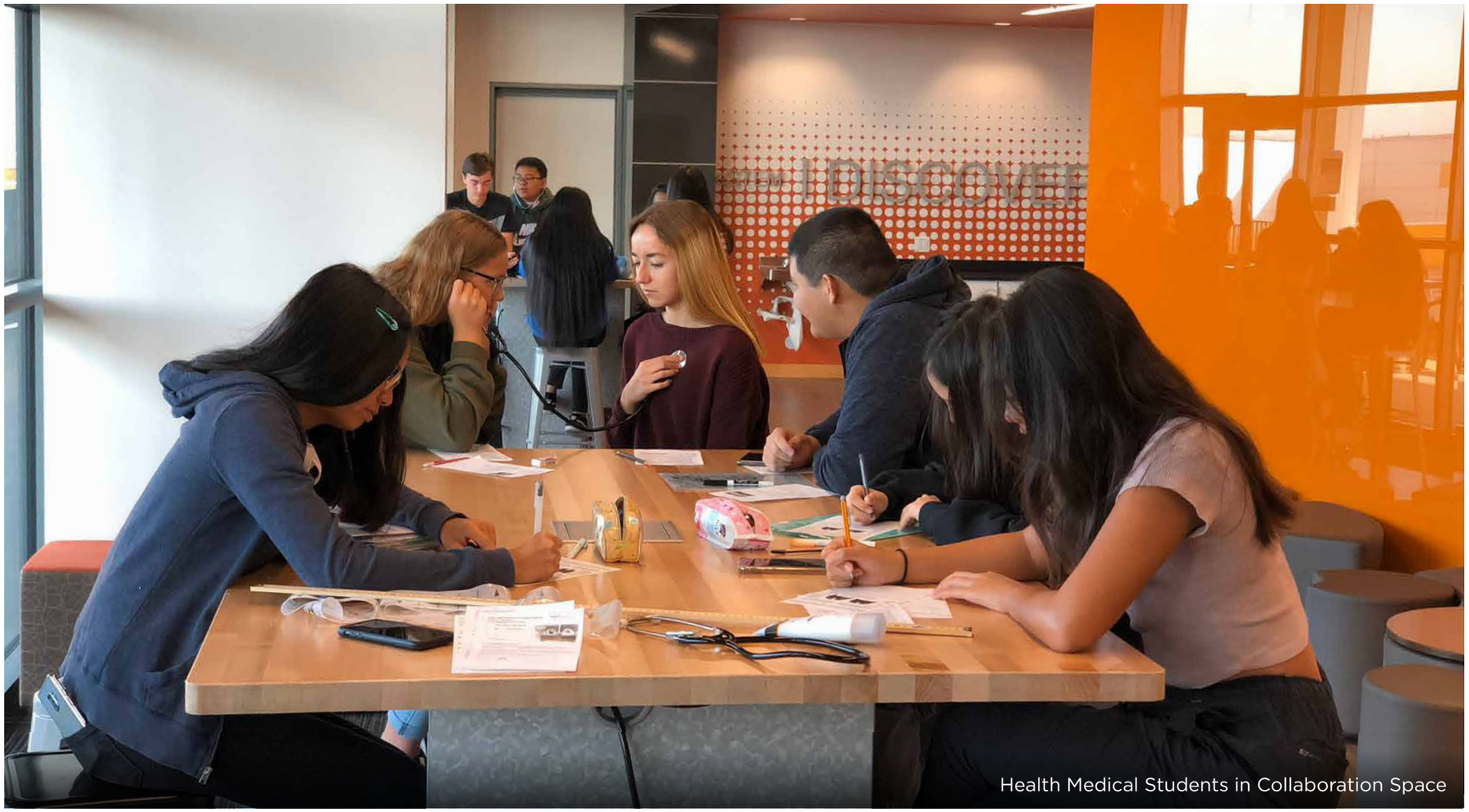
Invested Community

Eastvale, a newly established city in Riverside County, is one of the fastest growing cities in California. Predominantly dairy farms and agricultural land until just the late 1990s, the city has seen huge development—now a thriving suburban oasis with great schools, public sports parks and a network of involved residents who take pride in building a strong community.

Corona-Norco Unified School District, serving the cities of Corona, Norco and the newly incorporated Eastvale, is the largest public school district in the Inland Empire and was named the California Exemplary School District of 2019. Of its 8 high schools, Eleanor Roosevelt is the largest and ranked better than 78% of California high schools in 2019.

Broad Range Of Voices

CNUSD based their decision to build a state-of-the-art STEM learning facility on strong community need in the medical and engineering professions. The district engaged local colleges and universities, and prominent professionals in these fields early on to gain a better understanding of the skills a graduating student needs to succeed in both higher education and work placement. The outreach did not end there. A stakeholder committee of more than 50 participants was created to help inform the program and design vision.



Health Medical Students in Collaboration Space

Stakeholder Workshop Session

Challenges Inspiring Change

Building Consensus Among 50+ Stakeholders

Richness of representation brought different perspectives and different priorities. The project and program were constantly evolving as stakeholders enumerated what they believed would make eSTEM Academy successful. The design team choreographed a two-month long Planning Process to give everyone a platform to share their voice; an opportunity to participate in activities, round-table discussions and tours to help identify, prioritize, and align goals; and allowed everyone to co-author a shared vision.

Robust STEM vs. Siloed STEM:

Stakeholders were still developing a shared vision and understanding of what a robust STEM learning environment looks like – both in terms of pedagogy and supportive spaces – as the design process was underway. The educators had been in the process of moving from a **Culture of Schooling to a Culture of Innovation**.

eSTEM stakeholders were deep in the process of making this shift. The type of learning environment that supports an innovation ready experience requires a shift in mindset by all stakeholders. Moving from a Culture of Schooling to a Culture of Innovation is an adaptive challenge — an ongoing challenge that requires an organizational shift in attitude and the acquisition of new expertise. It is a change initiative that requires leadership at all levels of the organization to succeed and be sustained. This project provided a means for the District to discover and test how they could move beyond their existing standards based on the Culture of Schooling to create a robust STEM, learning environment.

Culture of Schooling vs Culture of Innovation

Individual Achievement vs **Collaboration**
Specialization vs **Multi-disciplinary Learning**
Risk Avoidance vs **Trial and Error**
Consuming vs **Creating**
Extrinsic vs **Intrinsic Motivation**
Play, Passion, Purpose

Beyond District Standards

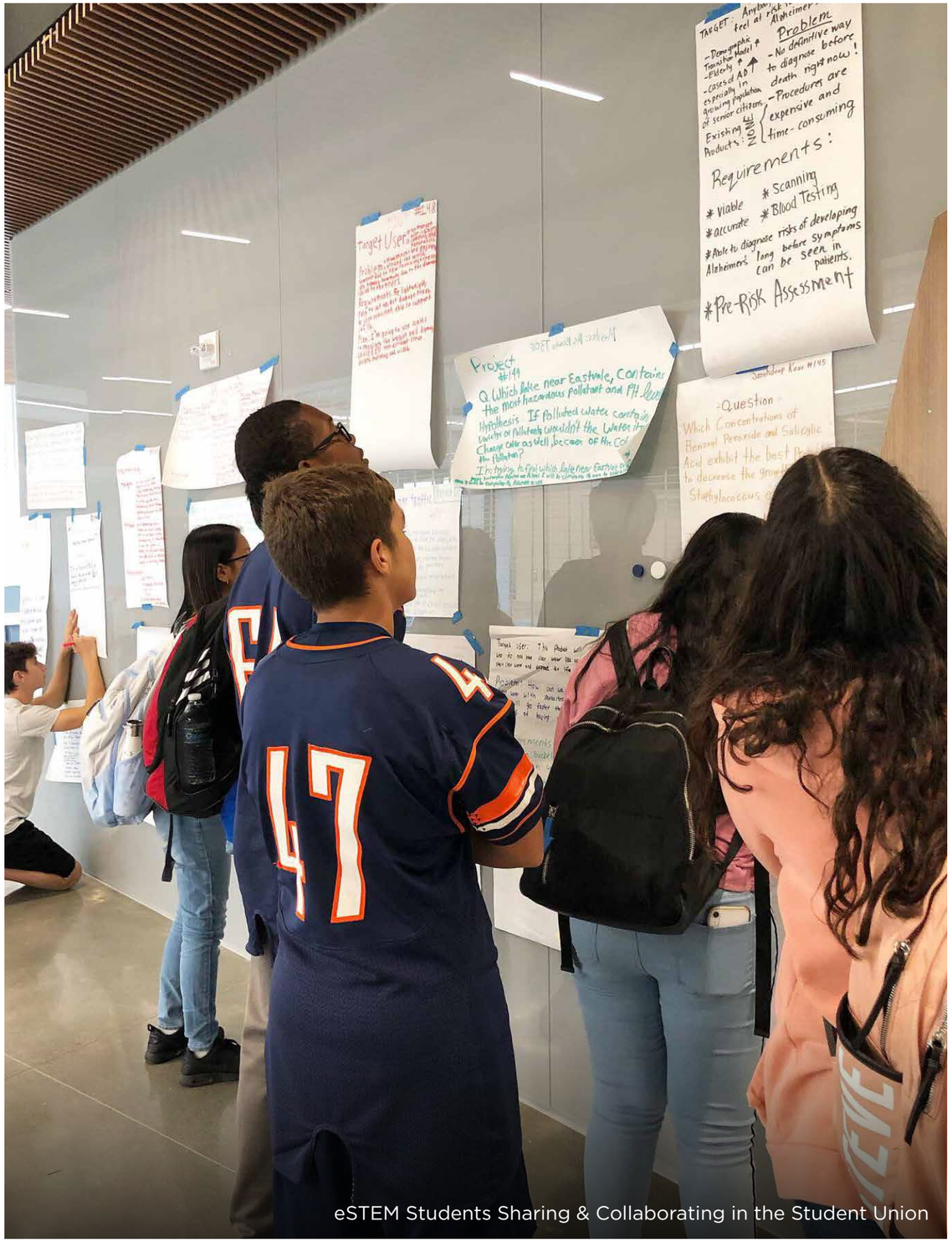
The nature of eSTEM Academy calls for learning spaces to be both highly flexible and highly specific/outfitted. Shaped by the Learner Profile developed during Planning, the program and spatial organization influenced an activity-based design versus program-based design, creating this dichotomy. Traditional spaces such as Library, Cafeteria, Faculty Lounge were re-purposed into activity-based spaces (i.e. Research Lab and Professional Learning Center) that allow free and flexible collaboration between student and teacher and encourage an innovative campus culture. The District's standards for finishes, materials, products, equipment, and even mechanical systems could not support this type of innovation. With a truly transformational mindset the District accepted alternatives with a commitment to educate both M&O and teaching staff about how to use and care for their space.

Co-Location

The physical challenge of building this "school within a school" called for finding the balance between creating a strong sense of identity for this specialized new campus and fostering an inclusive environment where eSTEM and ERHS students alike feel welcome. Location was driven by the connection of shared program between campuses, the physical distance students must travel between them, and by creating a distinct identity for a school within a school. A three-acre practice field provides an ideal location for pedestrian connection and gives the Academy frontage to Citrus Street with no reduction of parking. A multi-story building solution proved to be a strong program fit, buffering against neighboring residences and opening connections to ERHS while providing the new campus with an outdoor quad.

Being a Good Neighbor

Once the location for eSTEM was established, there was understandable nervousness from the adjacent homeowners in the Stanford Grove neighborhood. While accustomed to noise associated with sports, the idea that students might have visibility into second story bedrooms was of great concern. An L-shape building footprint maximizes distance between learning spaces and homes, providing areas on site for storm water management and opportunities for students to engage with nature. Clerestory windows, vertical louvers and fritted glass provide visual privacy at upper floors while still providing natural daylight and visual interest for students. Mature trees were planted along the campus perimeter, to further comfort neighbors.



eSTEM Students Sharing & Collaborating in the Student Union

Planning Assets

Time

The Planning Phase was two months dedicated to exploring the relationship between eSTEM and the community of Eastvale as well as with Eleanor Roosevelt High School; to understanding who the eSTEM Learner would be and what they would need to succeed; and experiencing different built learning environments to see firsthand how they function. This time allowed for early and deep engagement to develop an appropriate robust STEM program that address all the stakeholders' passion points.

Engagement

Understanding so many perspectives was hugely beneficial. Corona-Norco Unified School District supported a truly authentic engagement process, encouraging anyone interested in having their voice heard to be at the table, and seeking out those whose opinion and insight they valued in shaping the project's outcome. Stakeholders committed many hours to activities, round-table discussions, and field trips lead by the design team, and many more hours were spent educating the design team about the community, the campus, the students, and local industries.

Open-mindedness

Every participant in the planning process was not only heard, but they actively listened. The group was receptive to new ideas as they talked through concepts, concerns, and clarifications. The District was willing to challenge convention, allocate square footage to collaborative space, and abandon district standards that would not be able to support robust STEM learning. Everyone was aligned in wanting to establish a Culture of Innovation.

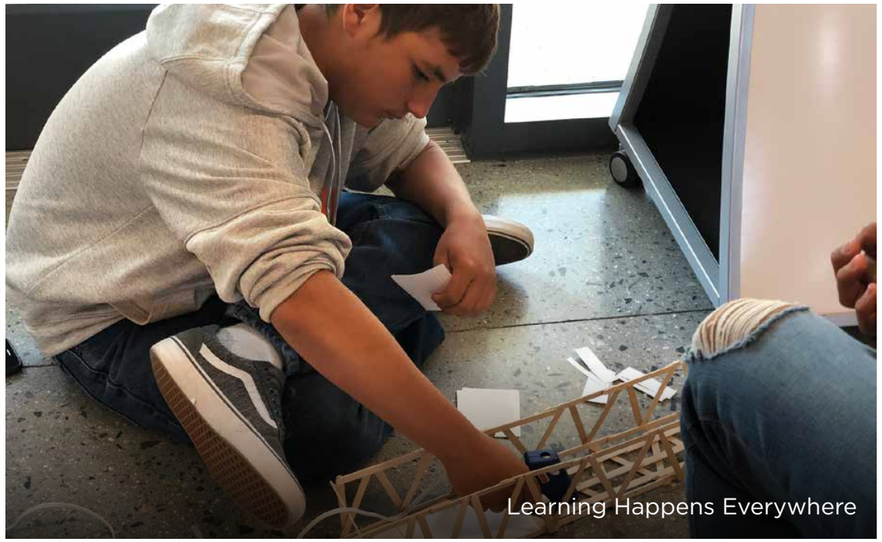
Concurrent Professional Learning

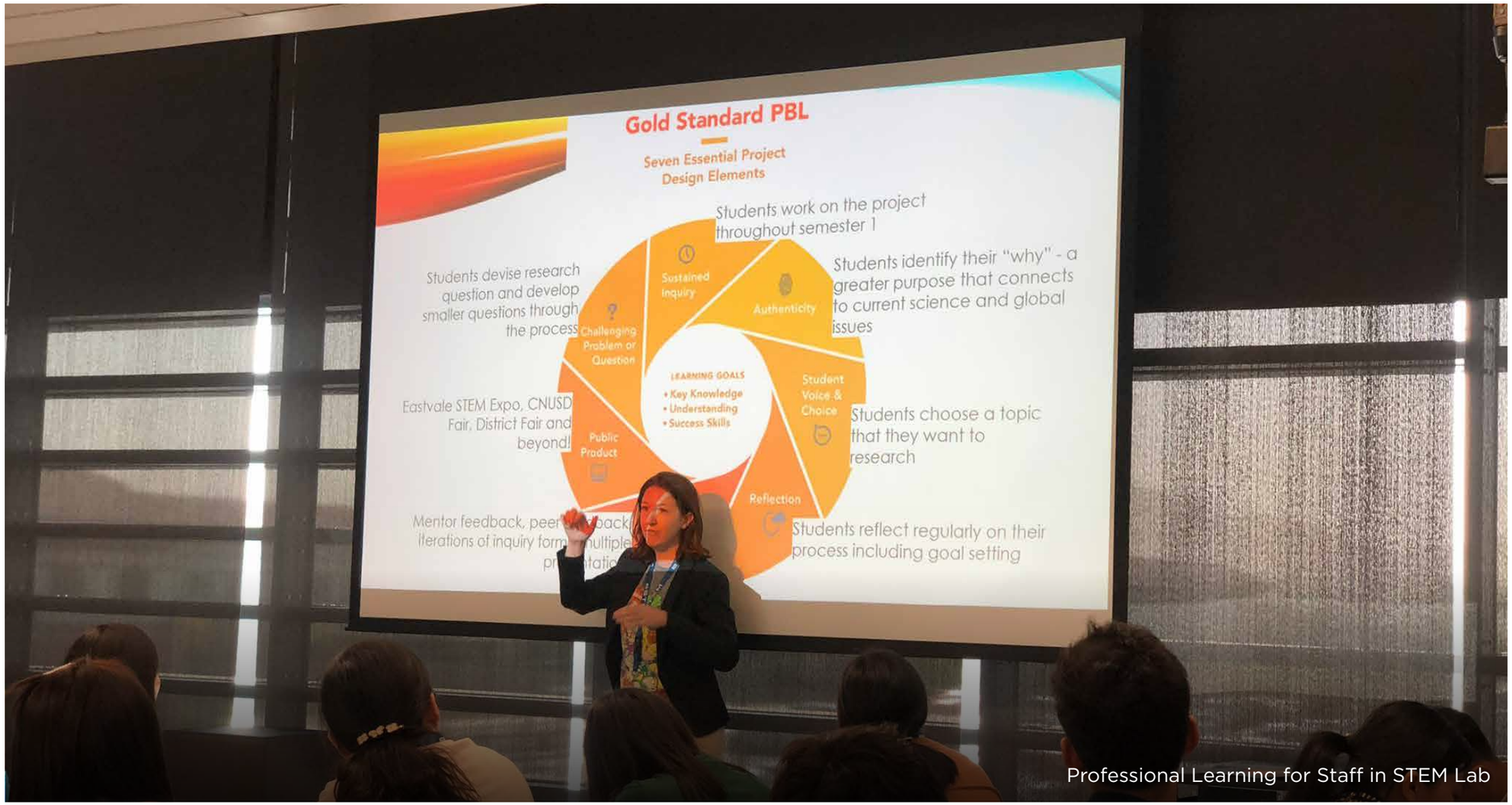
CNUSD provided professional learning for staff to grow their competencies in a project-based learning approach. This informed understanding of how to best utilize spaces that support Project Based Learning. Professional Learning was happening in real time, alongside the development of the program and Educational Specifications.

Co-Location of Campus

While defining the relationship between the existing campus and the STEM Academy proved challenging, sharing amenities with another school allowed program square footage at the Academy to concentrate on STEM needs. eSTEM students benefit from comprehensive high school amenities, specifically athletics and performing arts on the ERHS campus.


Technology Paired with Hands-On Learning


Learning Happens Everywhere



Professional Learning for Staff in STEM Lab

Project Process & Value

Flexible Spaces Require Flexible Thinking

The process was shaped early in the planning stages to support the District's goals for an inclusive and expansive community engagement. The greater the engagement early on in the project, the greater the ability to influence the direction of the project. The Planning Process was instrumental in shaping the outcome. Through a two month process, the design team designed and facilitated a process that discovered goals, collaborated with the existing campus, researched real-world and higher educational environments and explored the opportunities for a robust STEM teaching and learning environment.

Modeling Collaboration in Planning

The value of the process to the project and to the community at large is that the process itself modeled the desired learning experience of the future eSTEM Academy. This narrative highlights the bookend of the project with planning and post occupancy engagement. In reality, the stakeholder voice continued throughout the design and construction process. During workshops and meetings, participants followed group norms to 'step up and step back', always keeping the project goals and Learner Profile at the center of the decision. Trust and relationships were built between the District, users, the City, higher educational institutions and industries. Having those voices at the table in the early stages enabled the conversation to continue; there was a co-authored vision that everyone understood and fought for through the life of the project.

PLANNING WORKSHOPS

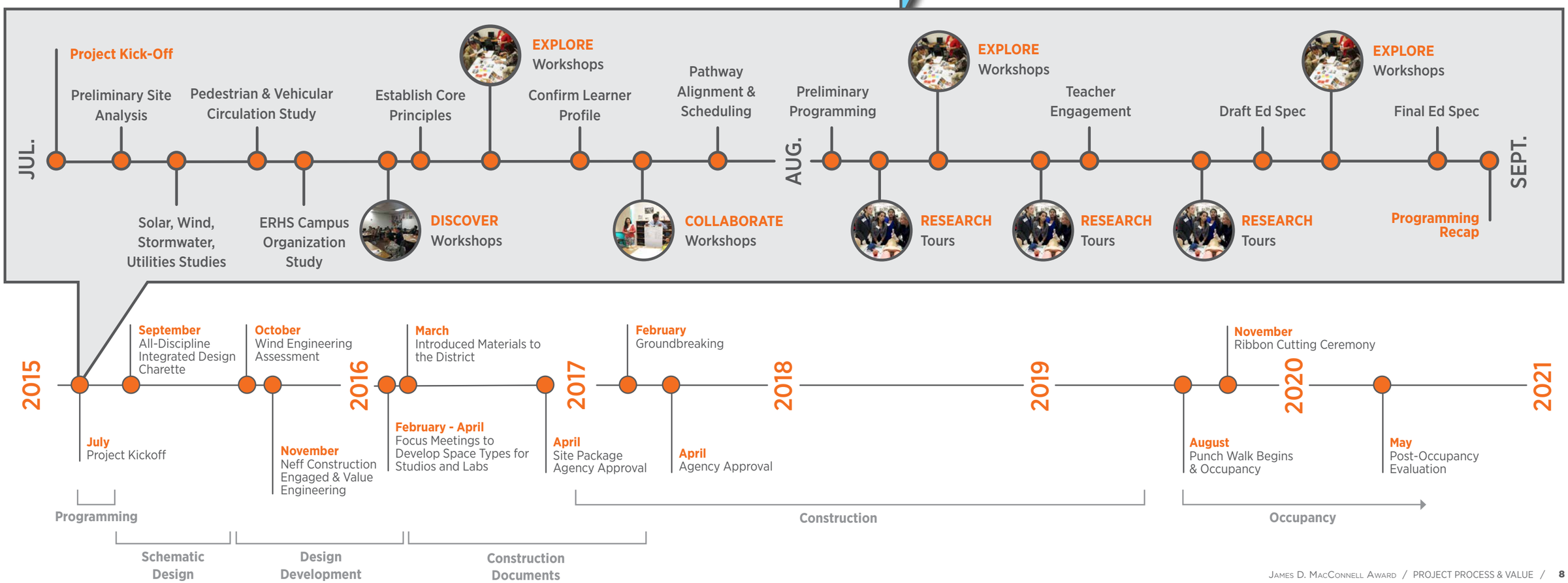
DISCOVER
Goals & Vision

COLLABORATE
With ERHS Campus

RESEARCH
Industry Trends

EXPLORE
People, Pedagogy & Place

PLANNING STRATEGY



01 Discovering

Defining Success

The 'Discover' planning sub-committee was tasked with defining the STEM pathways to ready students for in demand careers in the medical and engineering industries. The opportunity was to bring together all voices of the community (District, parents, industry and the City) to define programs for success. Unique to some projects, this discussion had begun well before the planning and design process started; therefore the design team's commitment was to catch up and coordinate these conversations into applicable outcomes. Through a series of round table discussions, the group discussed the importance of STEM within the community of Eastvale, identified relevant pathways and considered the opportunities for both higher education and work placement. The design team facilitated discussions that recognized the passion points of the stakeholders and ultimately defined four themes to drive design: **Collaboration**, **Access**, **Partnership** & **Flexibility**.

Passion Points

Providing 21st Century Learning Environment

Access For All Students

Training + Manufacturing

Growing Regional Economy

Making a Difference

Hooking + Engaging Students with Science

Lifelong Learning Pathways

Proactive

Student Centered

Community Engaged

Amazing Educational Experience

Responsible

Student Success Program for Development

Meet Community Needs

Character Education

Community Pride

Opening Doors to Future

Mechanical Engineering + Robotics

Community Engaged

Real World

Pathway + Career + University

STEM Innovative integration

Supporting Staff + Students

Local + Regional

All Things Eastvale

Equal Opportunity for All Students

1: Stakeholder Perspectives

Sharing perspectives and defining the priorities of the stakeholder group was an important first step in the process. The 'Discover' Workshop began with one simple question: 'How will you define success?'

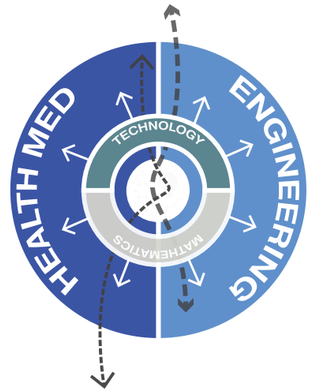
Through this round-table discussion, the participants shared everything from providing a 21st century learning environment for eSTEM learners to connecting with the community for the life of the program, select passion points include:

- Alignment between pathways to career and university
- Creating amazing educational experience
- Providing access for all students with equal opportunity
- Establishing partnerships and growing the regional economy

2: Why STEM?

A portion of the motivation for constructing the new academy is to address the capacity needs for the school, but the eSTEM academy aims to provide more than additional classroom with this expansion. The committee expressed particular desire for the new STEM school to:

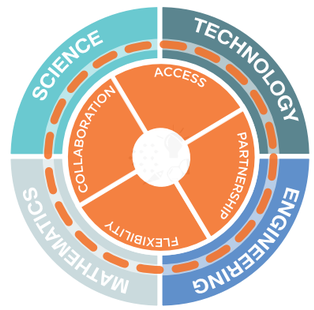
- Grow interest in engineering and science at a younger age
- Enable college/career readiness for students
- Help equalize opportunities in career field
- Provide students with skills to lead their industries



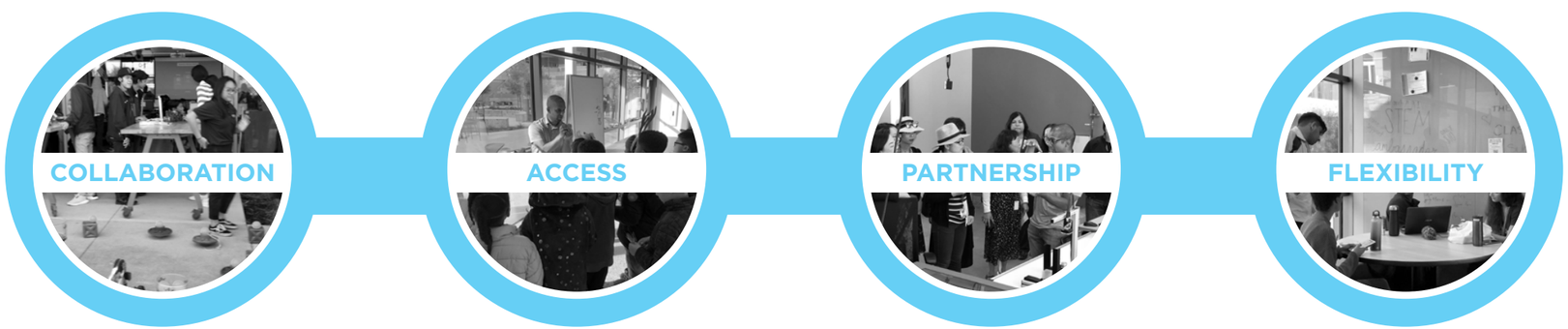
3: Why Engineering/Design & Health/Medical Sciences?

With all the directions a STEM school could move in, the committee selected these two pathways, Engineering/Design and Health/Medical Sciences, to be the focus of the school to:

- Align with local job market needs and the focuses of nearby colleges
- Work with the current health-med programs in the CNUSD intermediate school and the recently approved ERHS ROP
- Address the fields of science and engineering with integrated math and technology components



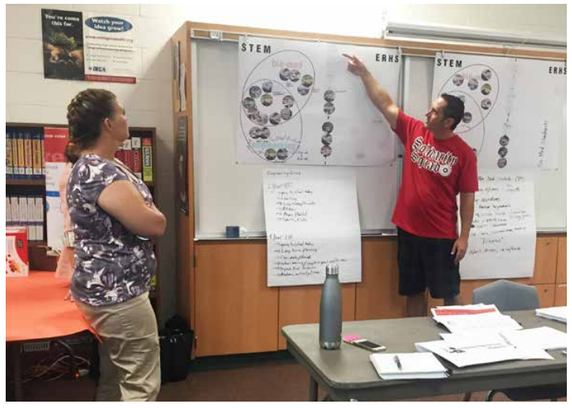
CORE PLANNING PRINCIPLES



02 Collaborating

Defining Culture Between eSTEM & ERHS

The ‘Collaborate’ planning sub-committee’s role was to define the relationship between eSTEM Academy and Eleanor Roosevelt High School, the existing 4,500 student comprehensive campus on the same site. Unchartered territory for CNUSD, the group worked through activities to establish what resources, programs and amenities would be shared with ERHS and what would be repeated on the new eSTEM campus. The program had only, at this point, defined the number of teaching stations. Each adult committee member took on the identity of either a STEM student or a ERHS student. Through this empathy exercise, groups of mixed ‘students’ and actual students were asked to build their ideal campus and determine where they felt the Academy should sit, on a spectrum from separate to connected. The concept of a School Within a School emerged from these discussions; eSTEM Academy is autonomous with a distinct identity, although they have access and use of larger amenities (theater, athletics, etc.) to provide a comprehensive experience when desired.



Empathy Building

Design Thinking Methodology of Empathy Building was implemented to have stakeholders think from the perspective of a different user. Each participant selected a persona, developed their background and learning preferences and continued the exercise through that lens.

Persona: 9th Grade Student

Name: Haley

Age: 15

Background Love animals, excels in biology, has a sister in 11th grade, struggles in math, is boy crazy

Persona: Assistant Principal

Name: Ms. Thomas

Age: 42

Background 17 years teaching math, devoted to obedience & agility dog training, volunteers for ASPCA

Persona: 10th Grade Teacher

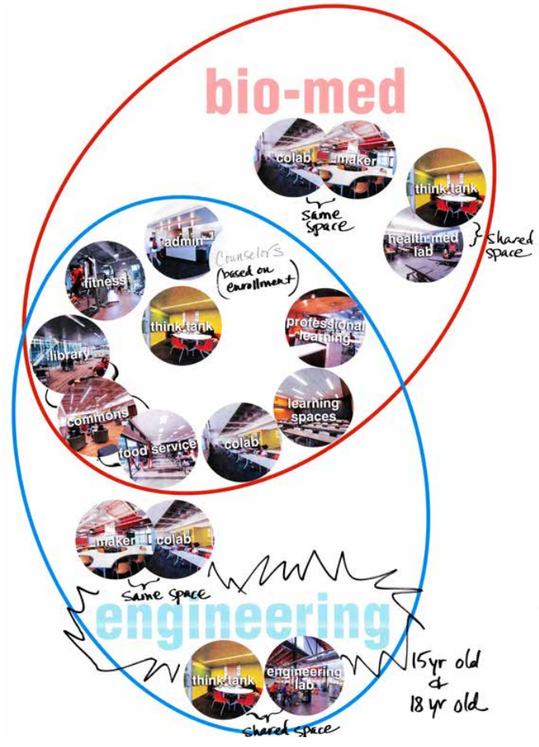
Name: Mr. Lieberman

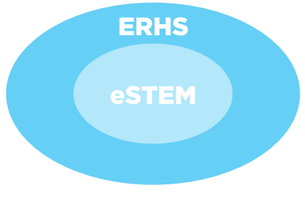
Age: 29

Background Three years teaching math, plays soccer and is interested in coaching, is a bachelor originally from Chicago

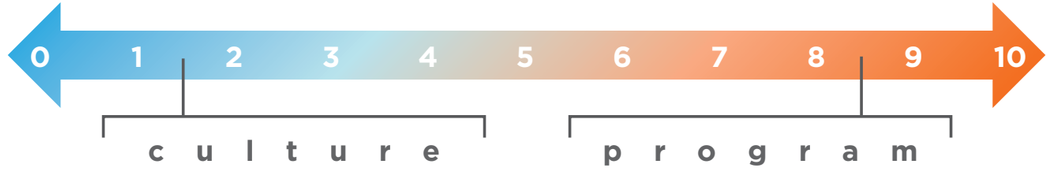
Experience Mapping

Collaborative activity to capture key relationships between the engineering and bio-med programs. This exercise explored interactions between user and their STEM ecosystem.





School Within a School

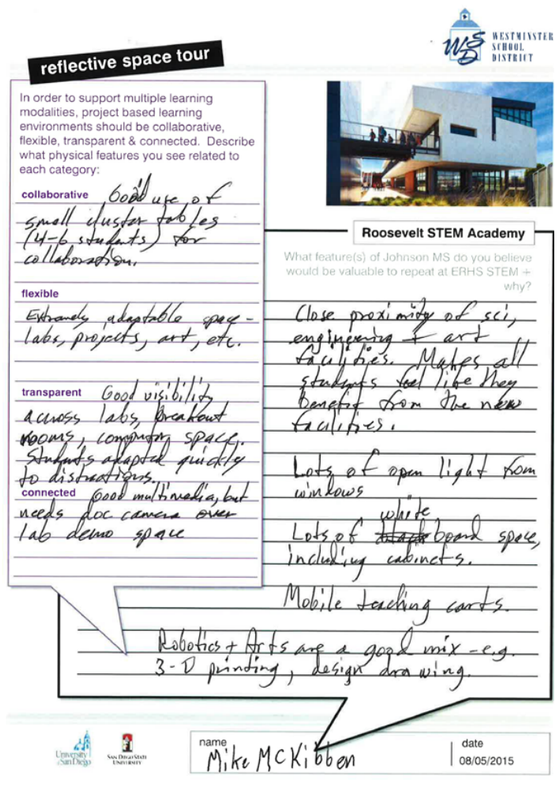


Two Schools

03 Research

Research-Guided Lessons & Tours

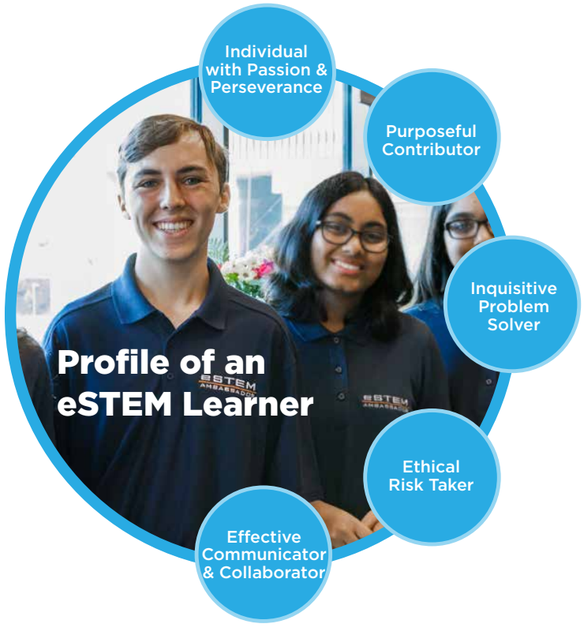
Research from USD Learning Space Design Project and the SDSU National Center for 21st Century School House inspired engagement sessions and influenced discussions. Grounding the tours in research deepened experiences as the 'Research' sub-committee collected knowledge from existing STEM programs. Local colleges and regional real-world industry settings were toured as this group reflected on how features support physical attributes around a robust STEM environment: collaborative, flexible, transparent, and connected. The design team facilitated these tours through the use of 'reflective-space-tour' handouts, prompting stakeholders to ask users additional questions, overcome legacy notions and ultimately walk away with a greater understanding of what their students needed to know, do and be. The committee's "ah-ha" moment was realizing that a robust inter-disciplinary STEM experience was significantly different than a siloed program with science and engineering courses. This became critical in later discussions as stakeholders now knew firsthand the opportunities for the eSTEM campus.



04 Explore

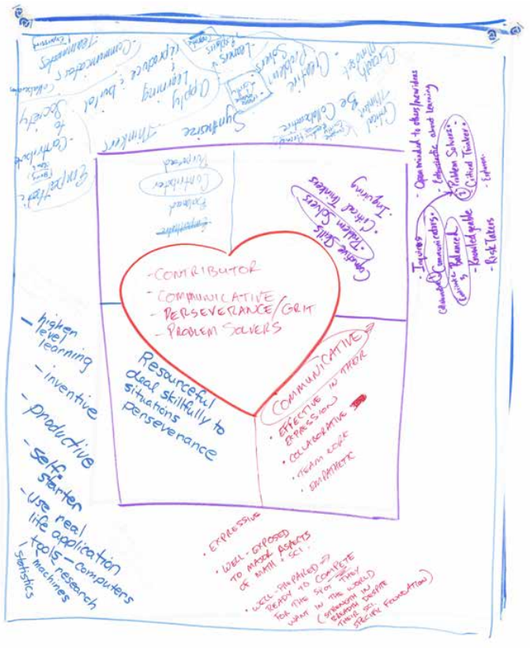
Defining the People, the Pedagogy & the Place

Through three Explore Workshops the committee engaged in activities that were designed to first establish the learner profile for the eSTEM graduate, second to identify teaching and learning activities that qualified the physical space and finally, to create adjacency and relationship diagrams that support the educational vision and program.



People

This workshop was designed to understand people and their place of impact in the world. To design for future learners, it was important to first define future learners. This exercise leveraged the guidance of professional development experts from The University of San Diego Center for Education Policy and Law as a part of their Learning Space Design Project. First as an independent exercise, than paired-and-shared, and finally group consensus to get to the heart of the eSTEM Learner.



Sample Group Work:
Getting to the heart of the learner

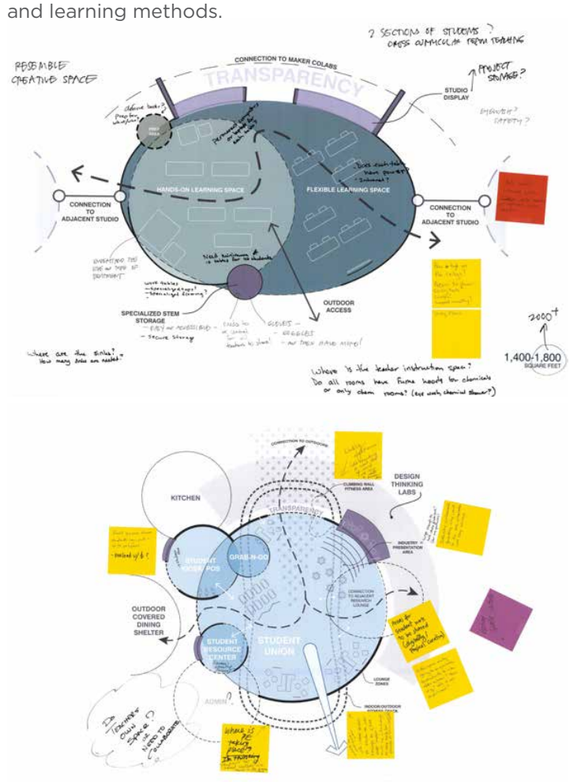
Pedagogy

A goal to deconstruct conventional thinking influenced the second workshop to realize the purpose and the planned pedagogy within any given space. Programmatic spaces were emerging from the Research Tours and Collaborate Workshops and this activity helped frame not just “what room” but why and how it might be used. Participants were guided in Visual Listening and Rapid Brainstorming exercises in stations around the room, rotating to address each space type.

Sample Group Work:
Establishing teaching and learning methods

Place

Finally, with teacher and student engagement underway, concepts and ideas became sketches and adjacency diagrams. Scale was, for the first time, overlaid onto the various spaces. The same working group reviewed draft Educational Specifications in a gallery style pin-up where they were encouraged to add notes and sketch suggested improvements. This format encouraged discussion, comments, corrections and further thinking on space use and learning methods.



Sample Group Work:
Adjacencies & Connections: space supports learning

Educational Environment

“Having multiple writing walls gives us the flexibility to have students share their process from multiple walls... the flexibility of the furniture and operable walls also helps with collaboration between student teams and also between multiple rooms”

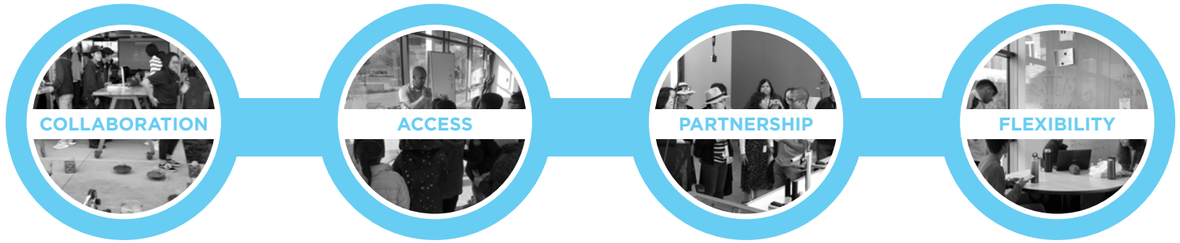
- eSTEM Teacher

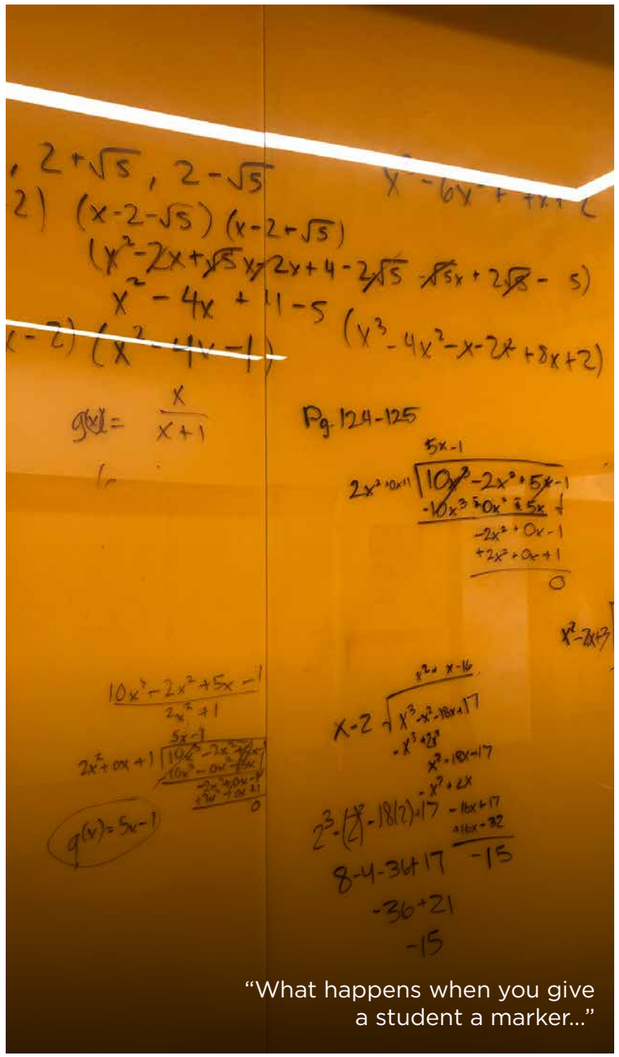
Collaboration Space Adjacent to Learning Studio and STEM Labs

Vision & Goals

Vision for Student Innovation & Agency

eSTEM Academy believes all students should have access to a rigorous curriculum. Collaboration is encouraged at all levels: students-to-students, staff-to-staff, school and district to industries and educational institutions. eSTEM focuses on preparing students to be college and career ready in the STEM fields upon graduation through partnerships. When enrolled in the STEM program, students can expect a learning experience that takes the processes of critical thinking, problem solving, innovation, and collaboration and integrates them into the curriculum of real-world science, technology, engineering, and mathematics. The first priority of the community engagement process was for the integrated group of stakeholders and professionals to identify the core principles that characterize success for both the project and the design process: collaboration, access, partnership and flexibility. These values defined the design process for eSTEM and resulted in innovative learning spaces that promote student ownership, provide for flexible learning through multiple teaching modalities and allow for adaptable spaces that can evolve to accommodate future unknowns.

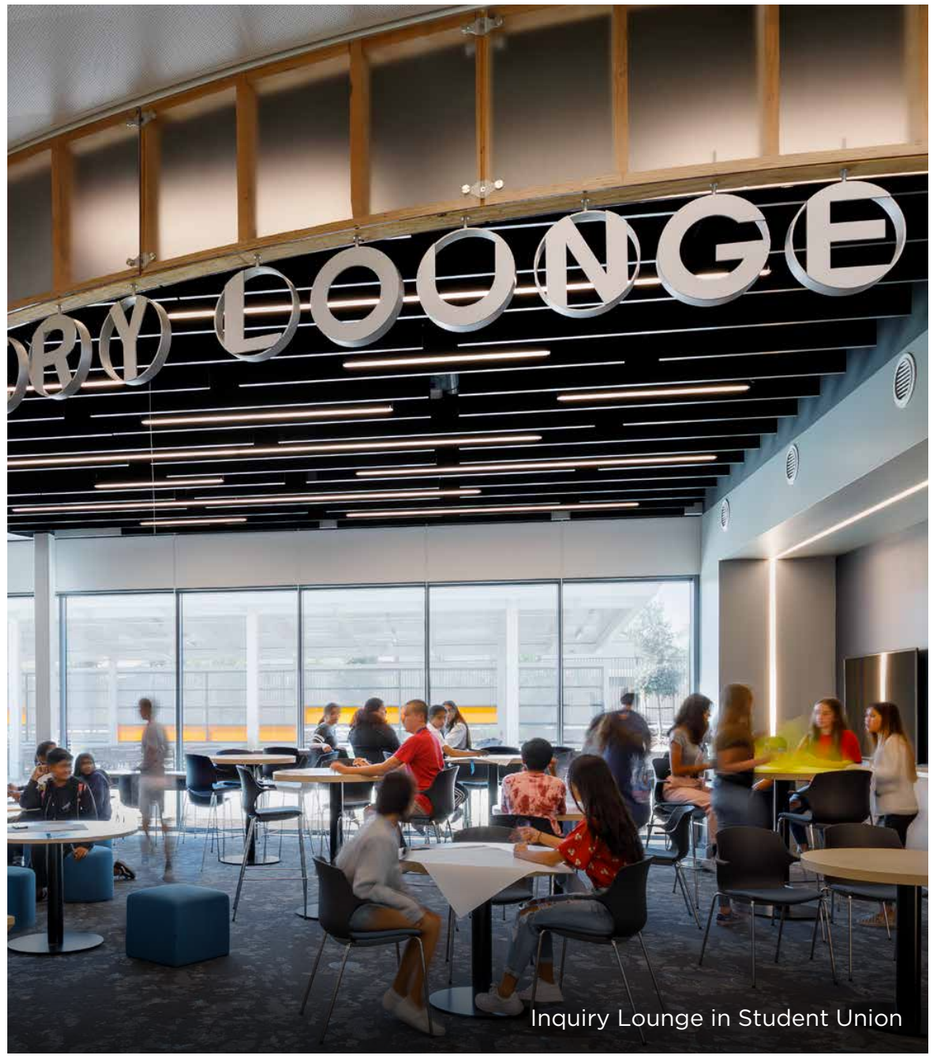




"What happens when you give a student a marker..."

Medical Pathology Students

Flexible Innovation Center in Student Union



Inquiry Lounge in Student Union

Environment Supports Curriculum

Relevant & Real World-Setting

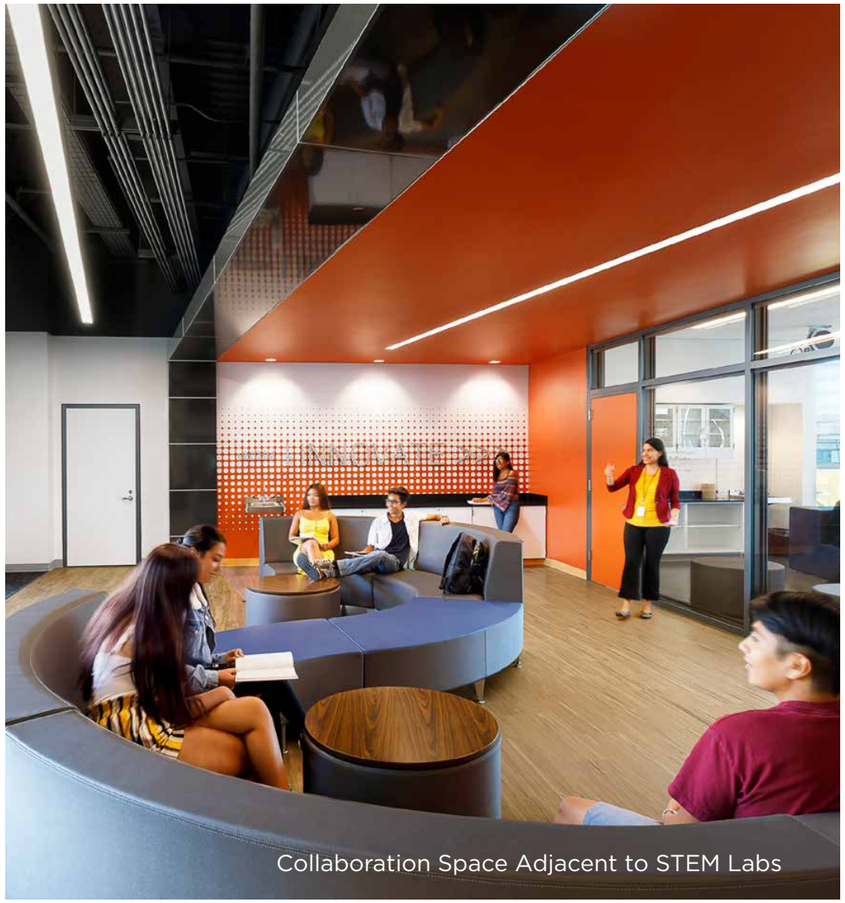
Learning in a real-world environment gives students the opportunity to explore their passion in the fields of Health/Medical and Engineering/Design. The scale of teaching spaces support team teaching and interdisciplinary instruction, open flexible collaboration spaces support student choice and access, and the connectedness throughout campus effectively builds energy and passion around learning. The physical space equips learners with the skills to succeed in learning and life. Complex learning and teaching calls for an aligned space that transforms the old school linear rows of front facing desks into an inspired and innovative environment for today's students.

Diverse Learning Systems

Aligned learning spaces are built at the intersection of physical space and core values of the educational organization. As the design team engages the learning community to understand the school or district's guiding principles and educational approach, mapping the learning and teaching activities follow. The diversity and nuance of these activities drive the space design and, ultimately, empowers the use of the space by students and teachers. But "instruction driving construction" is only part of the conversation.

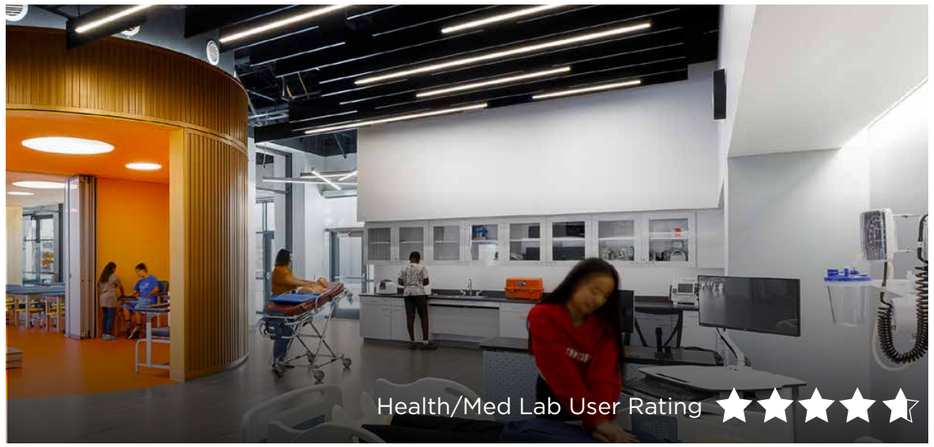
STEM Ecosystem

The challenge in creating aligned spaces is to ensure the process also includes a larger contextual understanding of the learning ecosystem. To ensure full alignment, space design is grounded in the cultural story of people — the lived experience of students, teachers, staff, parents and community over time — that brings the learning space to life. Well-aligned learning spaces structurally support not only the innovative pedagogy, but also a sense of belonging; places in which a student can bring their full self, develop their own visions, and grown their identity as a successful learner in an academic environment. These are spaces designed with the student in mind.



Collaboration Space Adjacent to STEM Labs

Engineering/Design Lab User Rating



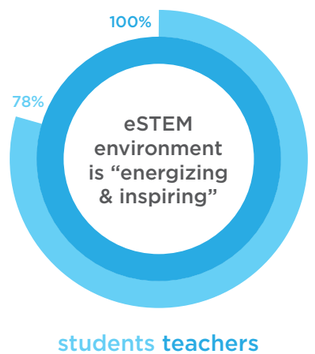
Health/Med Lab User Rating

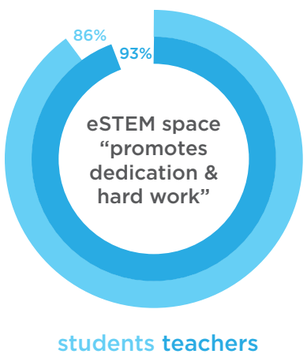
The environment is designed to support a wide range of teaching and learning activities. The process to design decisions began with a deep understanding of the students and their community, everything space and every surface is designed to support the curriculum and inspire students on campus in STEM fields.

- The Students & Their Community
- Education Vision & Values
- Educators' Approach
- Learning & Teaching Activities
- Drive the Design
- Empowering the Use of Space

Both students and teachers mentioned collaborative workspaces and labs as the top feature supporting STEM teaching/learning.

Teachers specifically mention "inquiry-based learning" and "project-based learning that is implanted into the STEM curriculum and evident in the space."





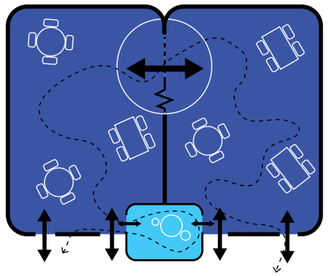
Environment Supports Variety of Learning & Teaching Styles

Variety of Learning Studios

Learning Studios: Three flexible Learning Studio types, offering different amenities, were established as plug-and-play building blocks. Type A provides movable, writable walls connecting two Learning Studios and direct access to a spark tank. Learning Studios in Type B are linked to each other and to outdoor CoLabs with sliding glass doors. STEM Labs share a large indoor CoLab and dedicated spark tank. The Health/Medical and Engineering Labs are more fluid spaces with organic forms subdividing spaces and providing amenities and breakout.

SHARED STUDIOS

The whiteboard walls, larger size and openness and movable furniture make it simple to configure the room in many ways for easy collaboration (including ability to join two classrooms) ample windows & natural light, plus having tables instead of desks supports our multiple teaching and learning styles.



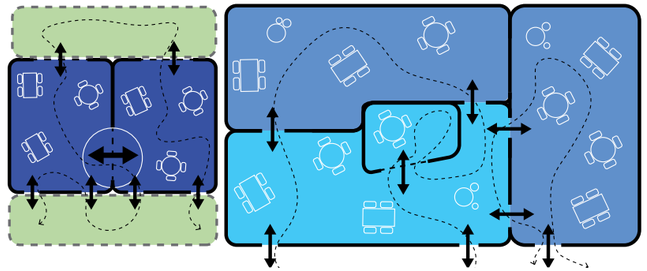
(A) 1200sf Learning Studio
150sf Spark Tank

User Satisfaction Rating

★★★★½

PAIRED STUDIOS

Digital Technologies and multiple writing surfaces support teaching and learning styles. These studios are flexible and are used for variety of lesson structures and student grouping sizes.



(B) 1000sf Learning Studio
500sf Spark Tank

User Satisfaction Rating

★★★★½

(C) 1500sf STEM Lab
1500sf Colab + 200sf Spark Tank

User Satisfaction Rating

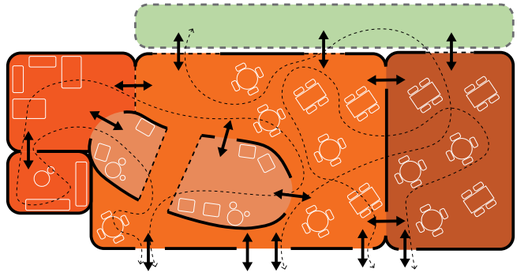
★★★★½

COLLABORATIVE STEM LABS

Multiple large spaces allow students to move around more easily for project work, these spaces are very easy to reconfigure for different activities, particularly for STEM labs. The space is comfortable and the large dual screens allow easy viewing access from anywhere.

HEALTH/ MEDICAL LABS

The whiteboard walls are everything, this emerged multiple times in the Post Occupancy Evaluation. The students also commented on the real-life nature of the tools and technology they have which contributes to their engagement and interest.



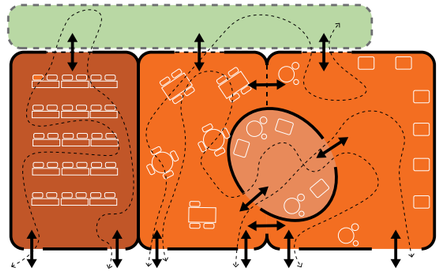
(D) 1200sf-1500sf Health/Med Lab
Ground Floor Outdoor Lab

User Satisfaction Rating

★★★★★

ENGINEERING/ DESIGN LABS

The most frequent feedback was on the space for equipment and the flexibility of these labs. Again the whiteboard walls emerged as strongly supporting modes of teaching and learning.

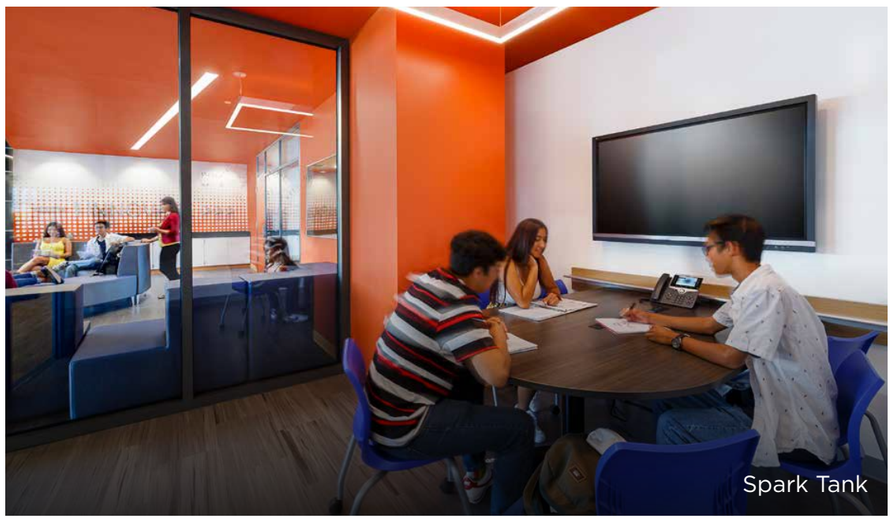


(E) 1200-1500sf Engineering/Design Lab
Ground Floor Outdoor Lab

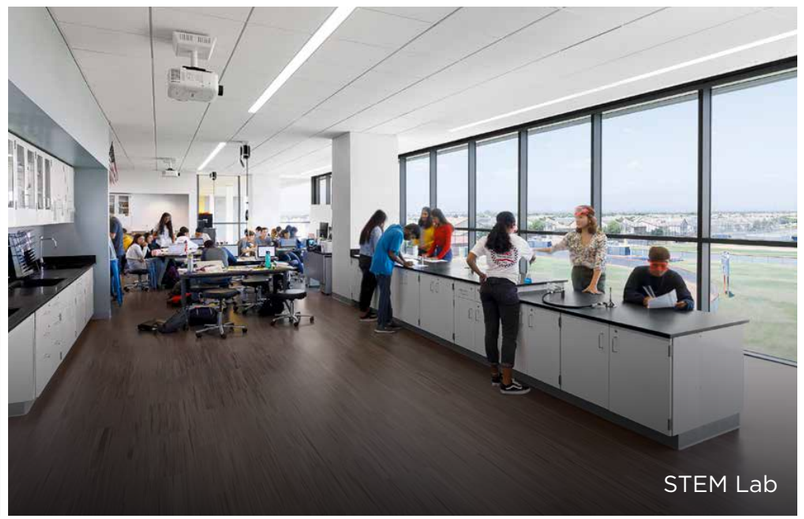
User Satisfaction Rating

★★★★½

Learning Studio



Spark Tank



STEM Lab

Physical Environment

"I love how the middle of the campus is open so wherever you're standing you can always see everything. It makes everything feel connected. I also like how there are a lot of windows for natural light to enter. It makes zero period better when I can see the sunrise through the windows. I also really like the Amphitheater because it's cool to see how many students sit and eat in that area every day at lunch."

- 11th Grade eSTEM Health/Medical Student

Campus Quad

Adaptable & Flexible

Supporting Competency of Risk-Taking

Students at eSTEM are being poised to address and take leadership for some of the biggest challenges we have (solving problems we don't yet know exist). Being innovative means taking risks, taking risks requires space that is flexible and adaptable to physically support the innovators mindset. The team applied research from Carl Bass' New Rules of Innovation and from George Couros, "8 Characteristics of the Innovator's Mindset" to design spaces that develop intelligence, talent and abilities leading to the creation of better ideas.

Spatial Features that attend to Innovation at eSTEM are designed to support Flexibility, Collaboration, Visibility, Connectedness and Wellness.

Flexibility

Flexible and adaptable spaces keep up with changing technology and support the wide variety of learning activities needed to foster future-ready learners.

Collaboration

Communally-oriented spaces help to cultivate a collective spirit of student and teacher collaboration and team building.

Visibility

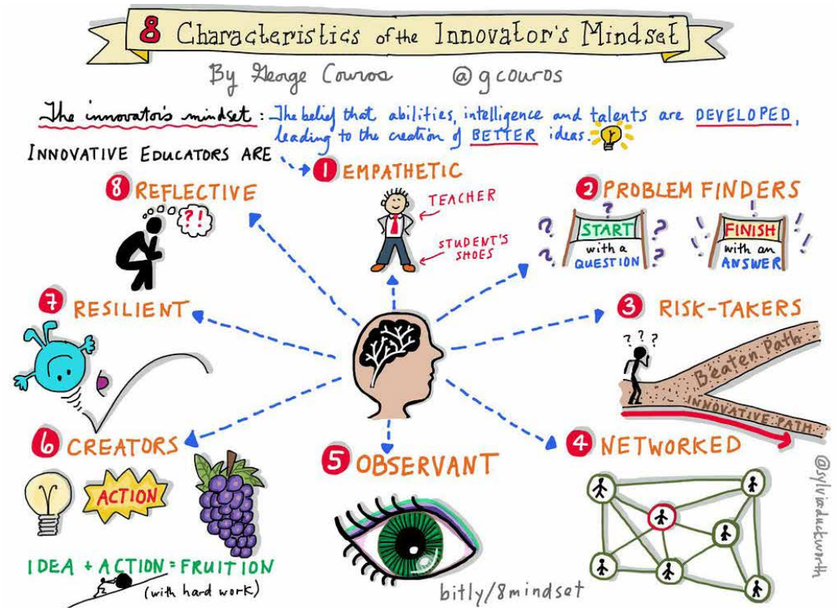
Spaces that are visually connected to one another foster the sharing of practice among teachers and students.

Connectedness

Spaces that are physically adjacent to one another foster interdisciplinary learning and teaching. Spaces reflect a connection to the students' community, culture, and the world of work to bring real world context into the learning environment.

Wellness

Spaces that attend to the basic needs of physiological, emotional, and social well-being allow students and teachers to focus on the learning and thrive.



Environment Supports Variety of Learning & Teaching Styles

Connected to STEM, Inside and Out

The eSTEM Academy provides multiple types of flexible learning spaces that will allow students to work and learn in a variety of environments as they progress through their STEM pathway. Various lab typologies, design think labs and STEM labs, provide different experiences for students in their STEM coursework. Interconnected engineering and health/medical design think labs provide students with the opportunity to engage in project based learning by simulating real-world environments. Paired STEM labs provide space for students to learn fundamentals, practice technical skills and engage in collaborative group work.

These STEM labs are connected to, and integrated with, both learning studios (flexible 21st-century classrooms) and shared colabs (student collaboration areas) to allow for interdisciplinary collaboration. Think or “spark” tanks can be found sprinkled throughout campus to offer opportunities to do the same on a smaller, more intimate scale. Outdoor labs take many forms, including floating learning pods, and can be found on each floor of this three story campus. The combination of numerous, dispersed, and varied learning spaces, coupled with visibility and access, encourages learning and collaboration to happen everywhere.

PRIMARY MODALITIES FOR eSTEM

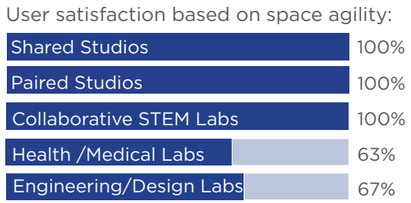
- Peer-to-peer tutoring
- Team collaboration
- Project based learning
- Learning with mobile technology
- Round-table discussion
- Interdisciplinary study
- Design-based learning
- Team teaching and learning
- Place-based learning
- Teacher-led small group discussions
- one-on-one learning with teacher

SECONDARY MODALITIES FOR eSTEM

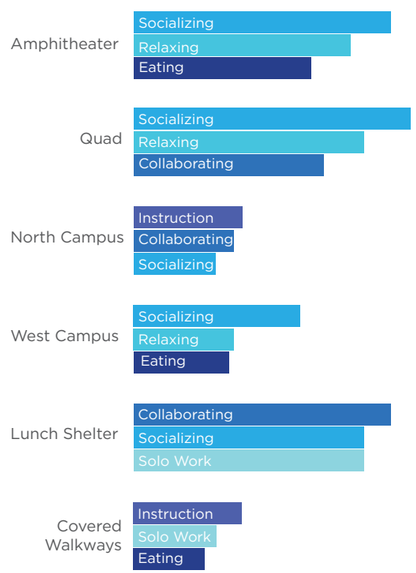
- Teacher lecture
- Distance learning
- Student presentation
- Internet based learning
- Performance based learning
- Naturalist learning
- Art-based learning
- Social-emotional based learning
- Story telling
- Play and movement based learning
- Reflecting & independent learning

Variety of Teaching Modalities & Activities

User satisfaction based on space agility:



Top Three Activities Occurring in Outdoor Space:



Engineering Shop

West Campus Outdoor Area

Physical Attributes of the Environment

Distinct Identity, Shared Culture

eSTEM is simultaneously an addition to the Eleanor Roosevelt High School campus and a separate STEM-based Academy, creating a unique “school within a school” condition. Location was driven by two main factors established during planning: first, the connection of shared program and the physical distance students must travel during a passing period to access them; secondly, by creating a distinct and authentic identity for this robust STEM environment.

After studying different areas of campus, stakeholders agreed that a three-acre practice field provided the best location, supporting both autonomy and the opportunity for a comprehensive high school experience. The chosen site has strong and convenient pedestrian connection for students traveling between campuses and gives frontage to Citrus Street with no reduction of parking.

Everyone is a Mustang

Although eSTEM’s design is a clear departure from the aesthetic of ERHS, favoring highly machined building materials, expansive glass and bold color, the site design welcomes free student flow between the two campuses. The two schools not only share program, but also have shared culture and values—everyone is a Mustang.

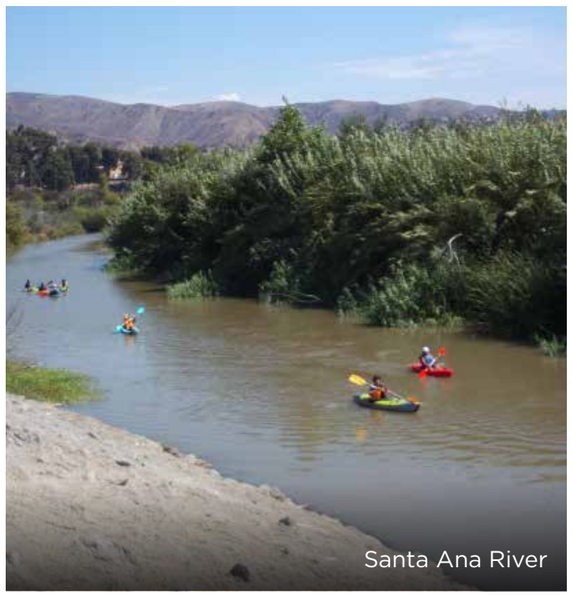
Aerial View Facing South

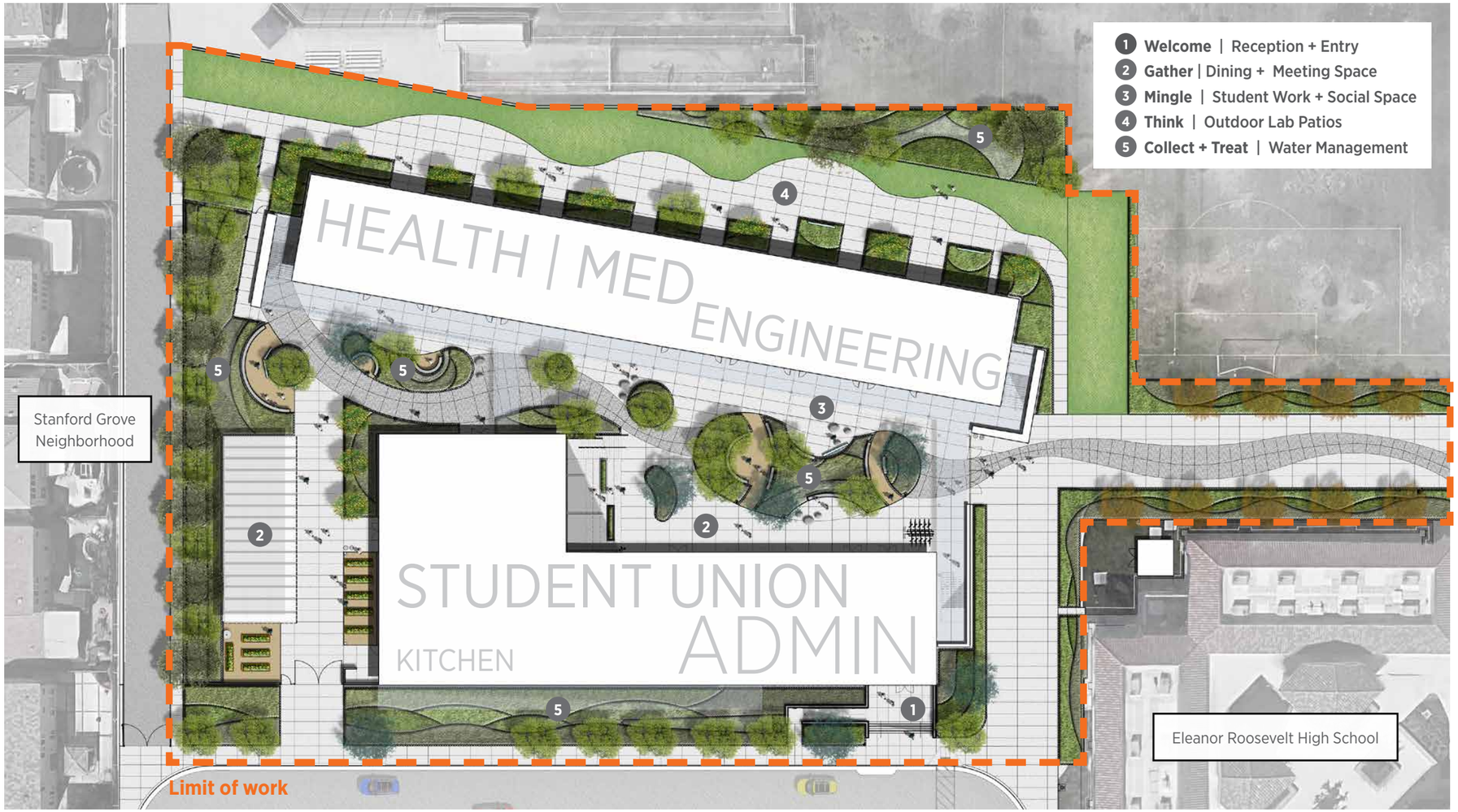
Site Influences

The Building Takes Shape

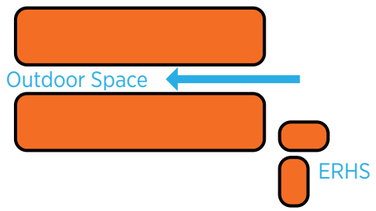
A condensed three-acre site locked in between residences, playfields, and straddled by two fire roads, establishes very clear site parameters. To maximize outdoor learning space, allow for a “heart of campus” courtyard quad and to create as much site buffer from houses as possible, the team explored multi-story design solutions.

The final two bar campus design responds to student connection between campuses, sun, wind, privacy for neighboring homes and takes inspiration from the nearby Santa Ana River. The north building’s slight rotation and windscreens shield the quad, making conditions comfortable year-round, even with severe inland winds. The L-shaped south building footprint keeps learning spaces farther from homes while clerestory windows, vertical louvers and fritted glass prohibit visibility. The organic landscape design weaving through the quad, and its ripple effect in the first floor labs, celebrate the concept of water bringing life to surrounding areas.



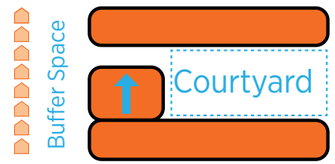


01. Initial Shape of Site



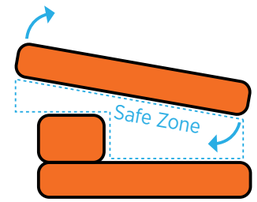
02. Connection to ERHS

Divide the mass in half to create a clearly defined entry way from ERHS into eSTEM academy



03. Shield Residential

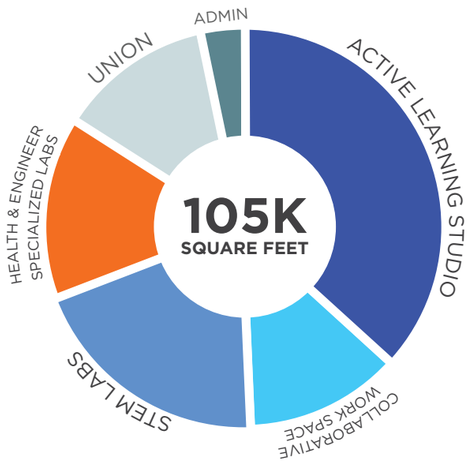
Adjust the divided mass into a more U-like shape to provide more privacy to the adjacent Standford Grove Neighborhood



04. Protect from Winds

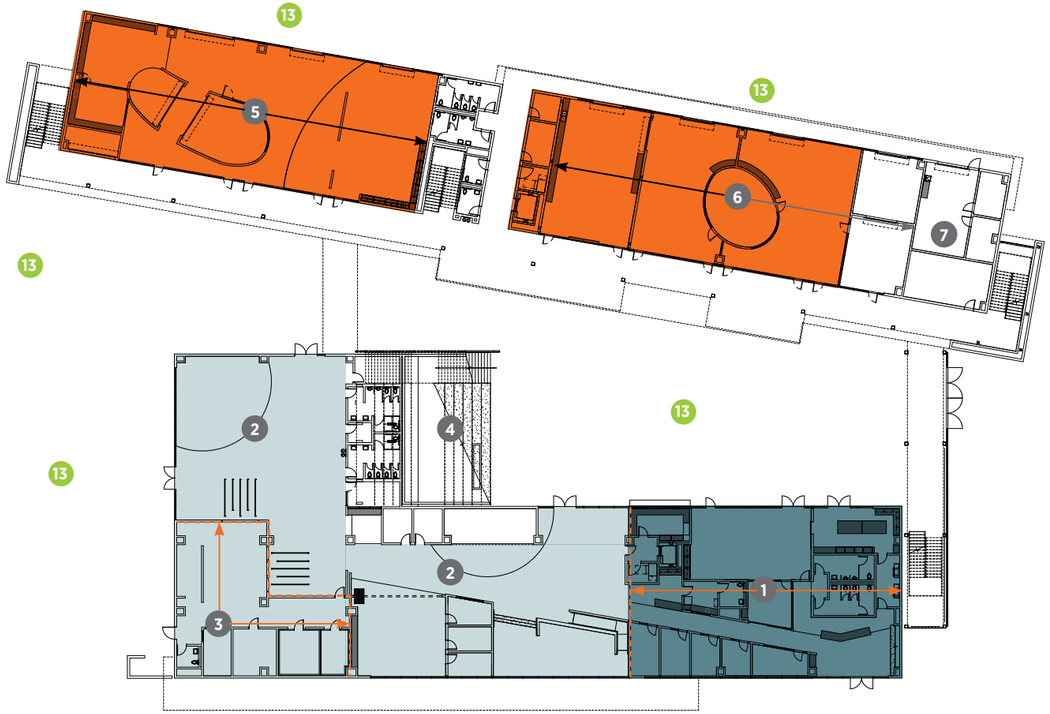
Rotate the north building by 10° to shield the courtyard from the harsh Santa Ana winds.

Building Program & Floor Plans

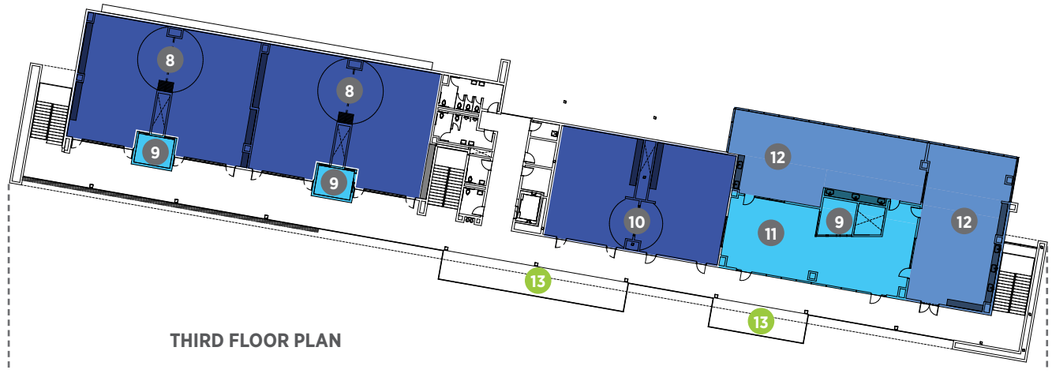


1. Administration — 5,068 sf
2. Student Union — 8,051 sf
3. Kitchen — 2,338 sf
4. Amphitheater — 2,263 sf
5. Health/Medical Specialized Labs — 1,372 sf
6. Engineering / Design Specialized Labs — 1,410 sf
7. Maintenance + Operations — 324 sf
8. Active Learning Studio A — 14,657 sf
9. Spark Tank (CoLab Work Space) — 1,400 sf
10. Active Learning Studio B — 6,770 sf
11. (CoLab Work Space) — 4,219 sf
12. STEM Labs — 8,917 sf
13. Outdoor Lab — 2,486 sf

0 ft. 500’



FIRST FLOOR PLAN



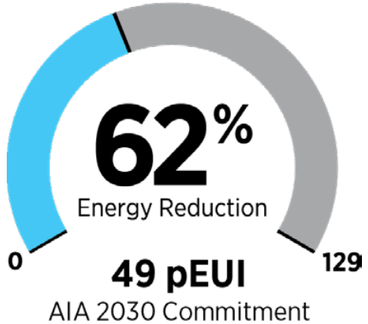
THIRD FLOOR PLAN

SECOND FLOOR PLAN

High Performance

Engineering on Display

eSTEM aims to foster STEM education by allowing the building in and of itself to act as teaching tool. The idea that its architecture responds appropriately to sun, wind, and surrounding context; its building systems are exposed and celebrated; and its site clearly and elegantly demonstrates its response to storm water treatment is service that must be paid to the bright minds dedicated to learning in it. These real-world examples complement the concepts the students are learning daily.



1 South Overhang

2 Exterior Louvers

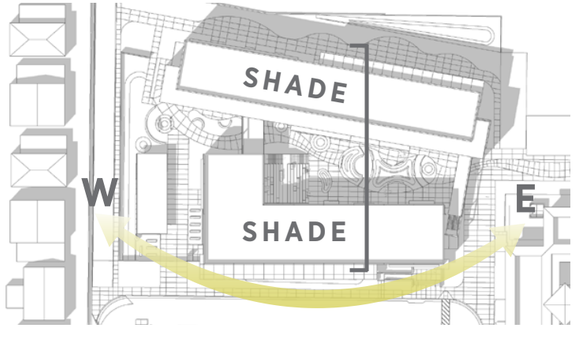
3 Prevailing Breeze

4 Cross Ventilation

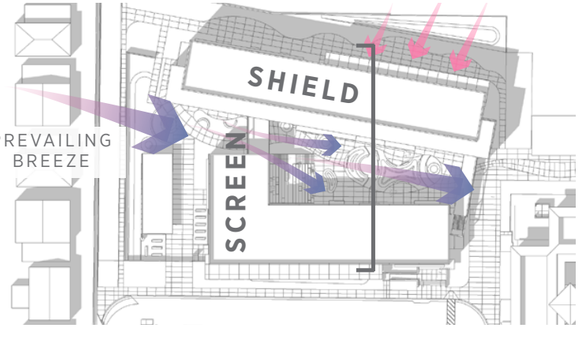
5 Santa Ana Winds

6 Roof Water Collection

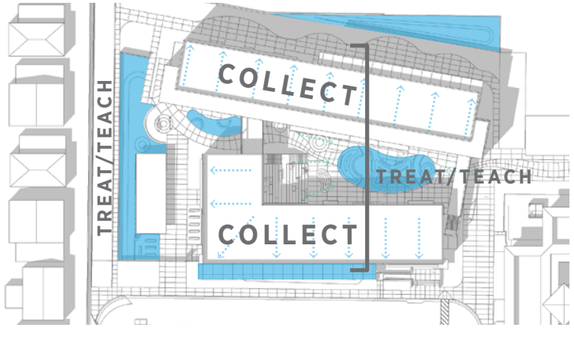
7 Water Teaching + Treatment



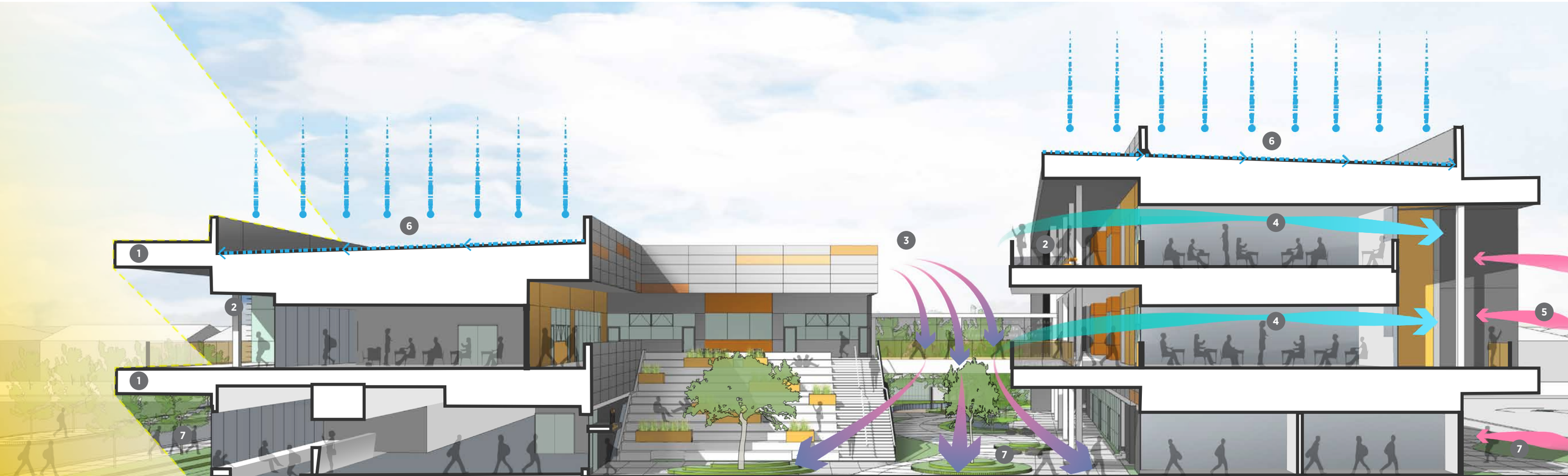
Wind Protection



Solar Orientation



Water Treatment



Outdoor Spaces

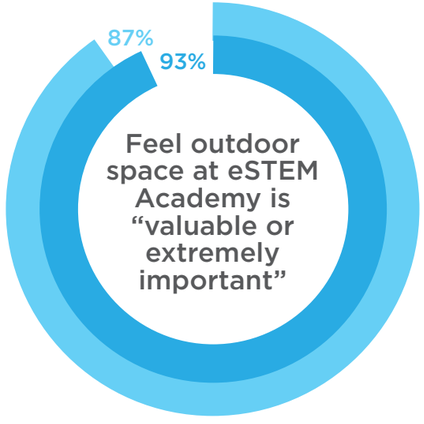
Supporting a Campus Culture

Through collaborative development and design, the campus exterior supports a variety of teaching and learning modalities, as well as opportunities for socializing and relaxation. Varying in scale and location, these spaces are equipped with flexible seating, writable surfaces, elements of shade, power and data. The lighting design also accommodates the extension of the school day from early morning classes into evening events.

Often sited proximate to a classroom or colab, these spaces allow for the interior learning environment to easily transition from inside to outside with the simple opening of doors. At the ground floor, by simply opening the roll-up garage doors, students are able to transition their classroom outside by using their movable chairs and tables on casters. This ability to expand the learning environment trickles up each level of the building with **exterior labs** facing both the interior of the campus and the fields on upper floors. Fixed and movable seating is dispersed throughout the campus allowing students to create their own personalized learning space.

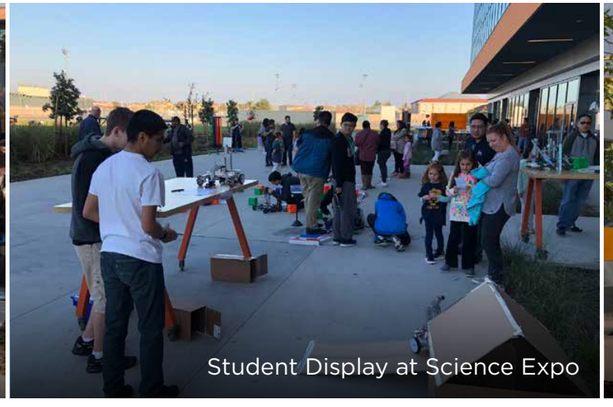
The **amphitheater** and the **lunch shelter** allow for larger group gatherings, while the **quad** and **riparian** area allow for more intimate scaled meetings sprinkled throughout a more natural landscape. The **covered walkways** are multi-purpose, providing weather-protected circulation, student work area during class time, display walls for events, and both physical and visual connection for all those on campus.

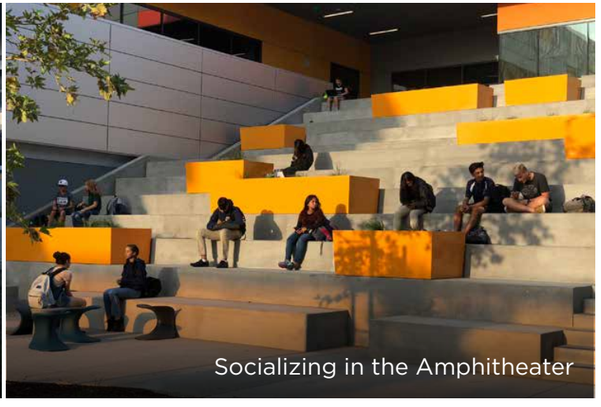
Bringing functionality and flexibility to the exterior campus design has expanded the learning footprint at eSTEM beyond its three acres.




Students Collaborating in an Outdoor Lab

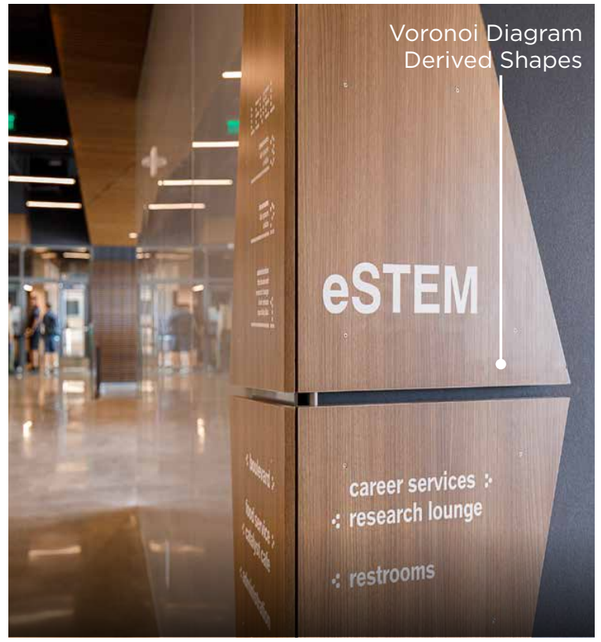

Classroom Expanding into the Quad

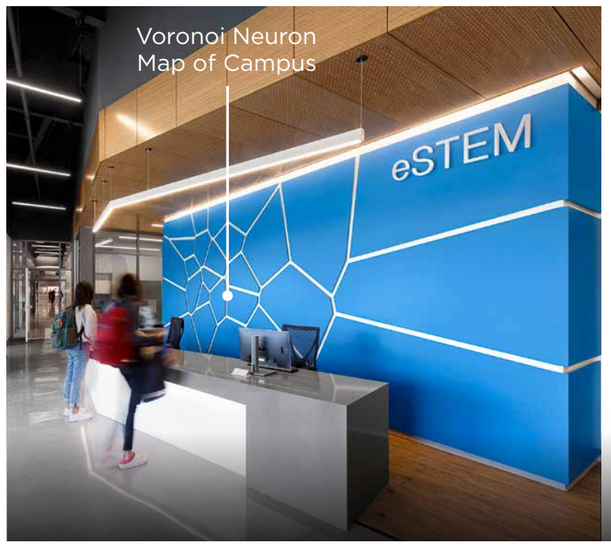

Student Display at Science Expo

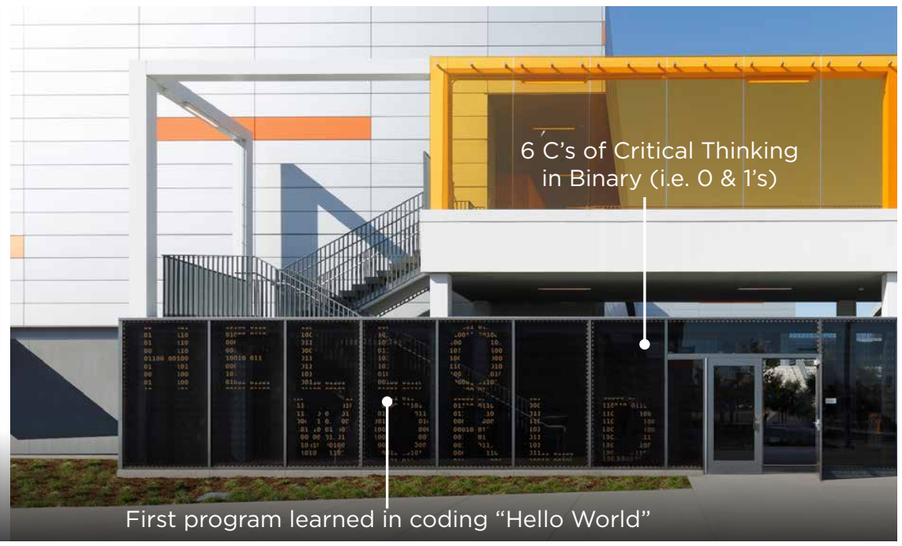

Socializing in the Amphitheater

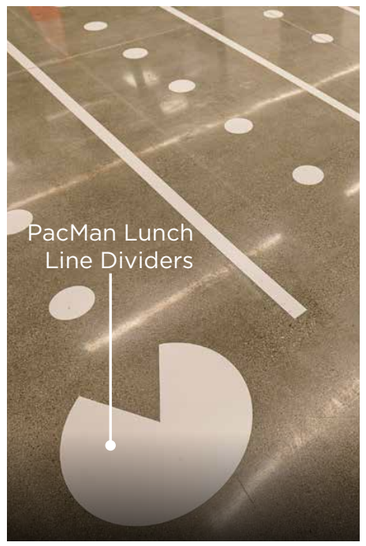
Inspiration

Inspiration from each pathway helped guide design decisions and provide **'hidden treasures'** for students to find as they gain knowledge in their fields of study. These hidden messages are designed to provoke and inspire thought while creating strong school identity and sense of pride.









Project Results

“In my 15 years as a teacher, I have never seen such a positive energy in the classroom and around the campus. The students at Eleanor Roosevelt High School are proud to have access to such a beautiful facility, which makes them more eager to learn and perform to the best of their abilities.”

- eSTEM Computer Science Teacher

Student Union Inquiry Lounge

Achieving Educational Goals & Objectives

Robust STEM Environment

The physical features of the new campus supporting STEM learning drew on research and promising practice that was brought to the engagement sessions from the National STEM Ecosystems Project and from TIES Teach. The District's Goals are realized as eSTEM Academy is a robust STEM ecosystem that provides learning opportunities that reflect students' lives, seeks out historically under-represented students to participate, equips educators with professional development to lead and encourages students to develop a "STEM Identity."

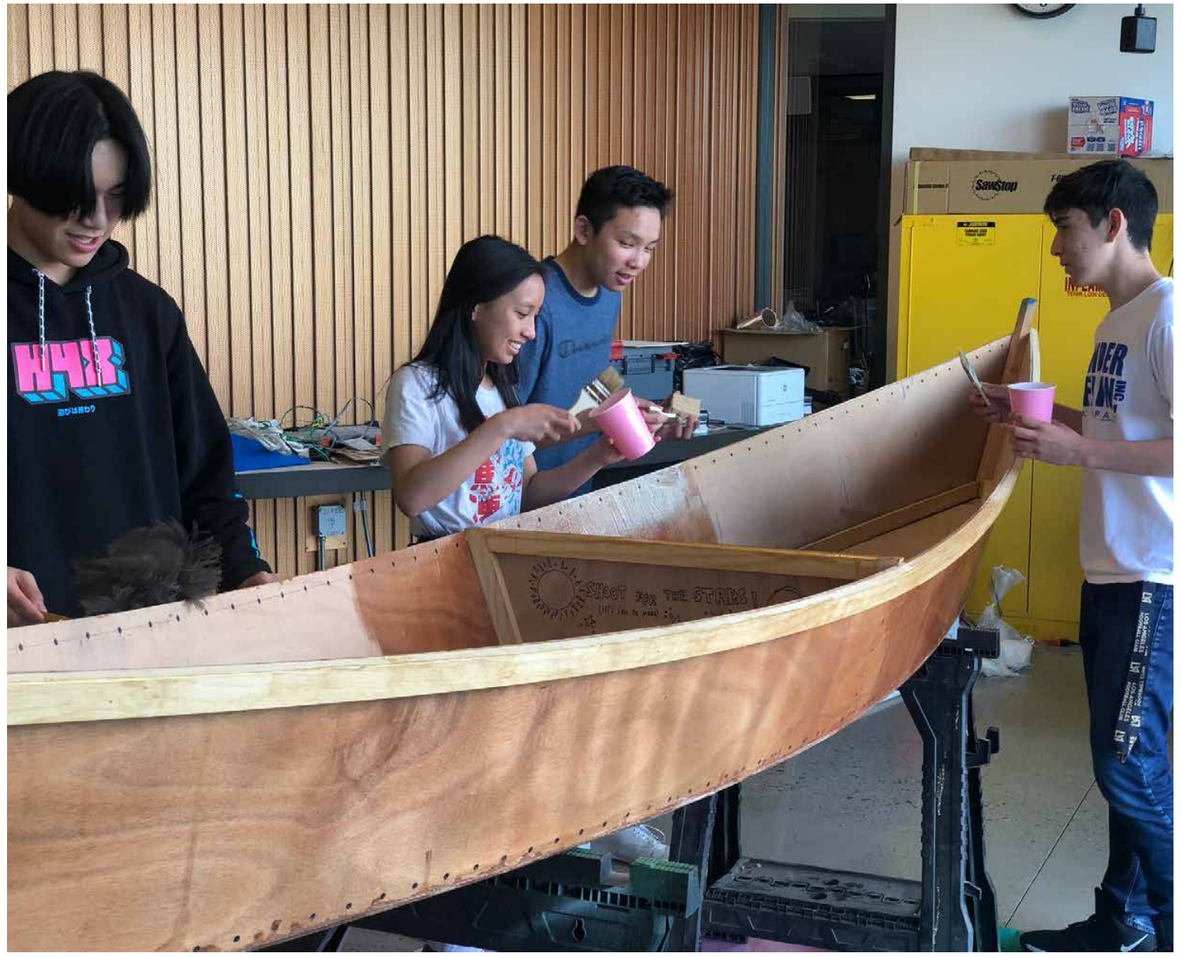
Visitors to the campus are often surprised by how much agency the students have and the engagement on campus. *"What I love about the campus is the fact that everything is a writing surface, even walls you wouldn't think you can write on - you can!'*

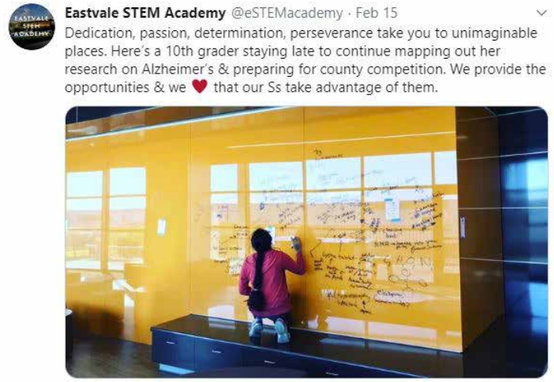
Achieving Student Aspirations

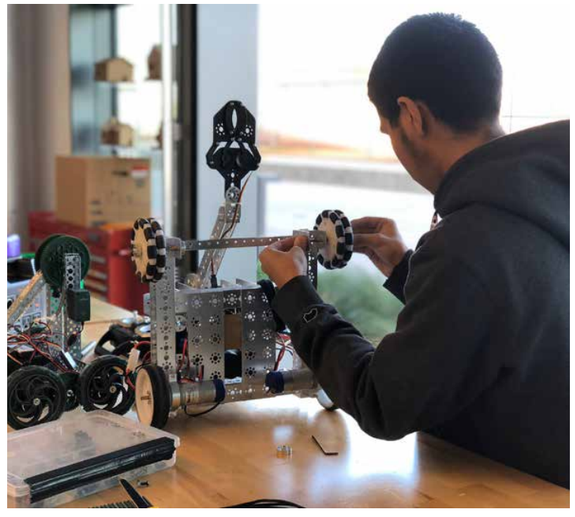
From the Student Perspective, the process and project achieved an environment that is 92% more effective and engaging than other school facilities they have attended. This satisfaction is, in part due to the amazing leadership and educators at the Academy, as well as the facility itself. At eSTEM Academy, students demonstrate mastery through competency-based assessment. Opportunities are created to build mentoring relationships. Campus tours for Middle School students and/or Community Expo allow for others to see how the students are learning, collaborating, problem-solving, creating and making. The eSTEM students are engaging in a more non-traditional classroom setting and this is transformational for visitors to see. The value is realized as eSTEM influences students and educators beyond their own doors.

Attributes of an eSTEM Learning Environment

- Active & student centered
- Supports spontaneous questioning and planned investigation
- Center for innovation and invention
- Classroom, laboratory and engineering lab are physically one
- Supportive of teaching in multiple modalities
- Furniture is easily reconfigured
- Electricity is accessible from the ceiling and floor
- Serves students with a variety of learning styles and abilities







Achieving District Community Goals & Objectives

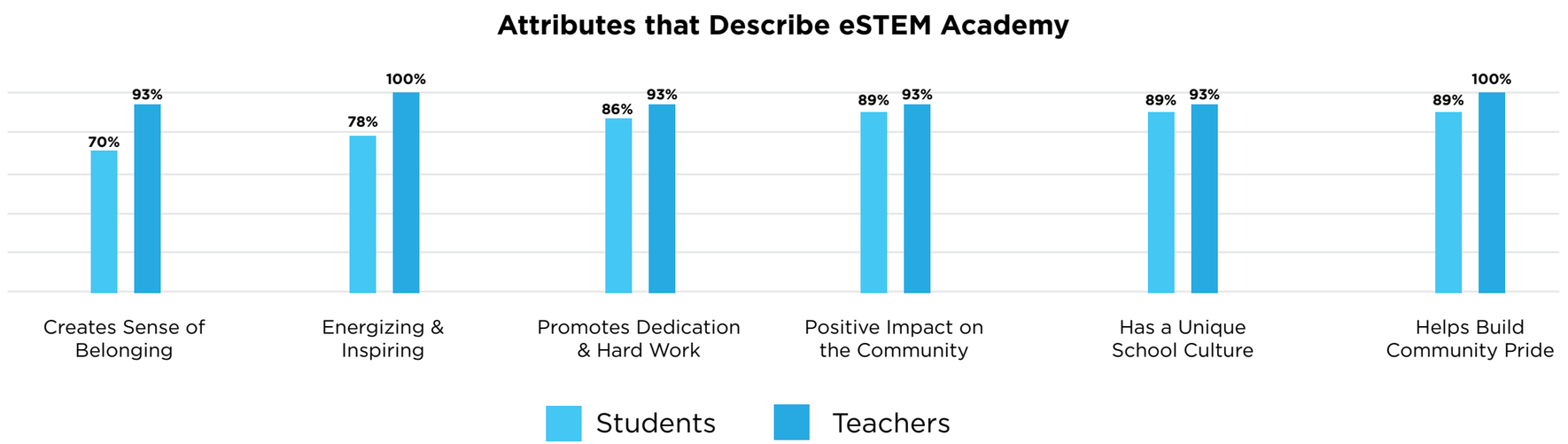
Shaping a Growing Community

"eSTEM Academy is the jewel of the community." This is the message teachers, students and administrators have heard from their neighbors, parents and visitors. Community inclusion during the Planning Process greatly impacted programming and design and the results have resonated well. The relationships formed early on have strengthened and created opportunities for students to partner with the local businesses, medical programs and universities serving Eastvale.

The community of Eastvale and CNUSD recognize that there is a great value in preparing students for life early on. eSTEM aims to help create socially responsible citizens — helping them become contributors equipped with the skills for both personal success and the ability to enrich society.

"I like the way we can step into what a working environment might be like in a moment's notice. For me when teachers talk about the real world and what working at a lab might be like, it was always hard for me to imagine so I didn't really care as much, but seeing it in person keeps me interested in different fields and makes me want to learn more about the various parts of the STEM program.

- 9th Grade eSTEM Health & Med Student

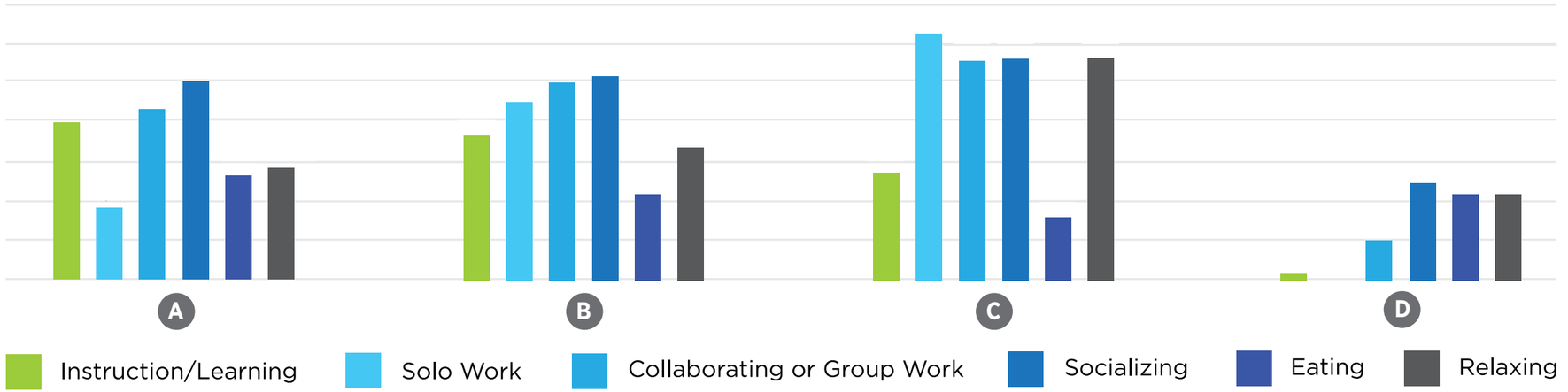


Project Achievements

Measuring Success, Continuing to Learn

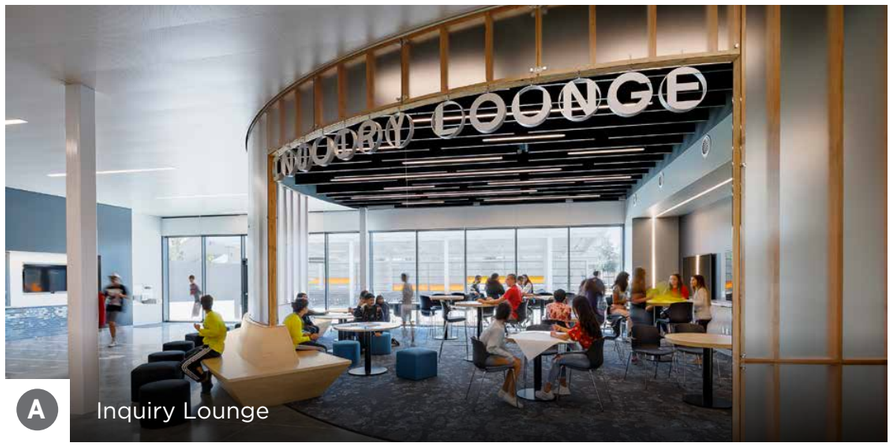
A global pandemic cut short the first academic year on the eSTEM campus. Even through these uncharted waters of chaos and uncertainty, with at-home AP testing and drive-through graduation, a remarkable number of dedicated students and teachers took the time to complete a Post-Occupancy Evaluation. The survey was open for one week at the end of May, the results of which can be found throughout this submission.

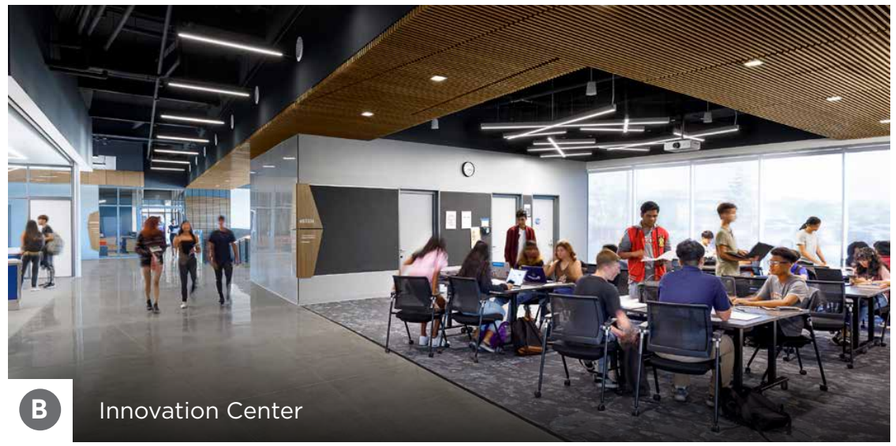
Q19: % of Respondents Reporting Type of Use by Type of Space (in Student Union)



How flexible zones of the Student Union compare to traditional spaces like a dedicated Library or Cafeteria (top responses):

1. More flexibility to use/fewer rules/easier to collaborate
2. More comfortable and relaxing environment to hangout and socialize
3. More open/inviting feel





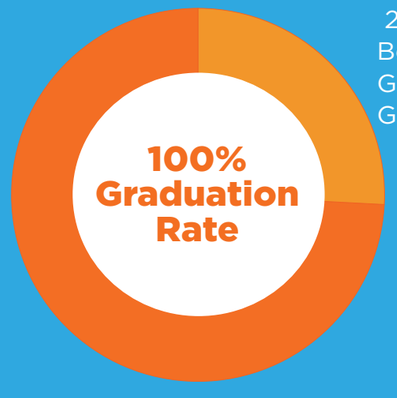
Project Achievements

Meet eSTEM Learner Eric, Class of 2020

The design team met Eric in 2016 when reaching out to the school for help with signage and graphics inspiration. Instead of being met by an email exchange with a teacher or administrator, we were encouraged to speak with Eric, an enthusiastic Freshman with a passion for Computer Science. He joined the team for a design charette where he helped come up with an idea that the bridge windscreen would host way-finding signage, written in code. Eric authored the script, indicating which direction to go “if hungry” and that “learning happens everywhere.”

Eric went on to become an eSTEM Ambassador—volunteering to be the face and voice of the school to current students, community and guests—and is attending Cal Poly Pomona as a Computer Science major in the Fall. He was the only student allowed on campus after shelter-in-place orders were issued to commemorate his legacy on the eSTEM campus with a photo.

The First Graduating Class of eSTEM Academy 2020 Statistics



26% Being First Generation Graduates

$336,529 Earned in Private Scholarships

Represents 4 Graduates

69% Attending a 4-year University

27% Attending a 2-year College

1 Graduate Attending Trade School
2 Graduates Service in the Military
1 Graduate Entering the Workforce