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2012 AIA Education
Research Scholar

Innovative Learning Environments:
Design Awards Meets Research Evidence

Contents

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Introduction

The American Institute of Architects Committee on Architecture for Education (CAE) grants annual design awards to educational facilities that exceed expectations through innovation, exemplify quality design, and further the goals and missions of the clients. As the 2012 American Institute of Architects (AIA) Education Research Scholar, I selected four schools from the past three years of award winners to serve as case studies based on the stated project challenges and features, the success of those goals, and the impact on education. As a way to further examine the award-winning schools, my research attempts to understand the design qualities and features, how they are used by the building occupants, and combine the design information with research to support learning and teaching.

My investigations included visiting each of the four schools to conduct post-occupancy evaluations, experiencing the space firsthand and having conversations with the building's everyday users. I spoke with administrators, staff, teachers, students, and parents, about the experience of using the space on a daily basis. The architects and/or design team also shared their time and knowledge of the spatial features, planning process, and results of the building.

Through these experiences I was able to understand the meaning and importance of each of the schools, see where the proposed challenges and features excelled and could improve, and determine design lessons that could be shared with the educational design community. Though a picture can say 1000 words, stepping foot into these spaces and understanding the design led to a truly rewarding and educational experience.

The schools that I selected are diverse geographically, serve a spectrum of students ranging from birth to adults, and have specific programmatic elements that presented interesting design challenges and resultant features at the intersection of teaching, learning, and the physical environment.

Mothers' Club Family Learning Center in Pasadena, California, is a two-generation educational program serving low-income, at-risk families with children from birth to five years of age. The unique program stems from research demonstrating that increased parent education and involvement in a young child's life are critical to the development and future success of the child. The flexible, light-filled building features classrooms that open directly to an outdoor learning garden.

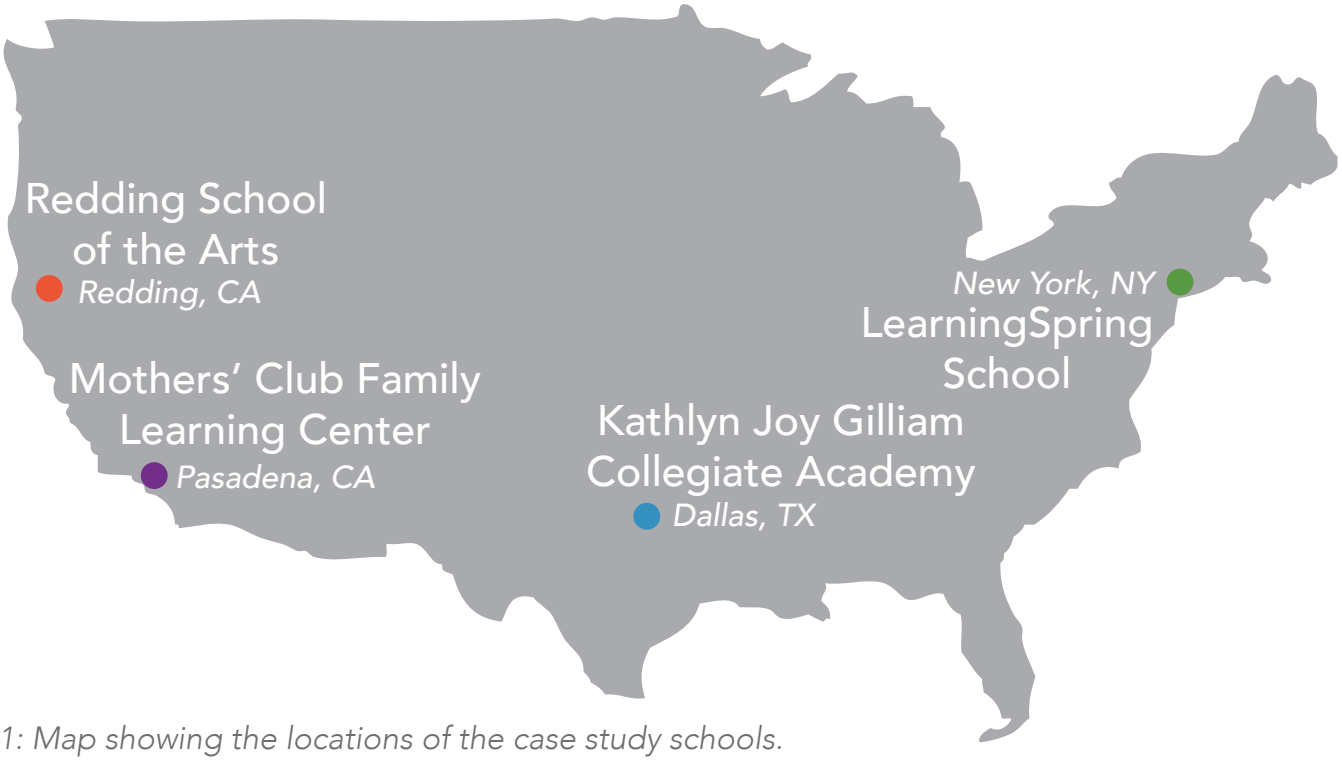

Figure 1: Map showing the locations of the case study schools.

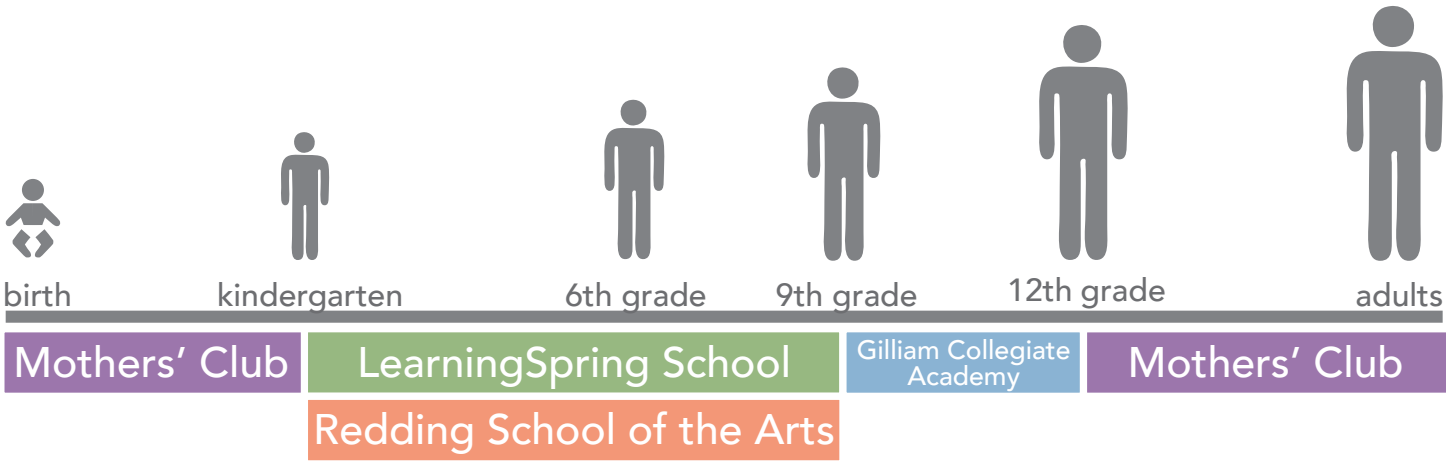

Figure 2: Diagram of the age range for the case study schools.

Introduction

The LearningSpring School, located in New York City, New York, serves children on the autism spectrum from K-8th grade. Children with autism have specific academic, development, and social needs, and LearningSpring School accommodates those needs in their new school with the building layout, lighting, and materials. Intimate learning settings with minimal distractions were among the design considerations featured in this urban Manhattan school.

Redding School of the Arts, in Redding, California, is an arts charter school for K-8th grade students who show an interest in visual and performing arts. The school features an outdoor theater and semi-conditioned spaces throughout the building, encouraging extended learning environments beyond the classroom. Color and traditional and contemporary material juxtapositions enliven the space and inspire the students.

Located in Dallas, Texas, the Kathlyn Joy Gilliam Collegiate Academy is an Early College High School (ECHS) for students in 9-12th grades. The ECHS premise is that students have an opportunity to earn up to 60 college credits while simultaneously completing requirements for their high school diploma. Early College High Schools are geared toward traditionally underserved students and aim to ease the transition from high school to college. Gilliam Collegiate Academy was the first ECHS in Texas designed and built specifically for its purpose. The environment emulates the college experience by including a large commons and spaces for collaborative work, encouraging different types of learning and time management skills.

Image 1: Mothers' Club Family Learning Center


Image 2: LearningSpring School


Image 3: Redding School of the Arts


Image 4: Kathlyn Joy Gilliam Collegiate Academy

Literature Review

The American education system has been through several major changes as well as continual adaptation to changing goals and ideas throughout the years. Understanding the history and current state of schools will inform the needs and goals of the present and future. The following questions were considered in the literature review:

What were the desired learner skills and outcomes?
What were the learning and teaching styles?
What were the learning environments and how did that affect the pedagogy?
Who were the stakeholders involved in designing the curriculum and the building design?

History of the Education System

Early education in the United States was largely apprentice based. Formal education was reserved for a few elite students, and most children learned from their parents or family members in the field or at home. Pedagogically, the apprenticeship model meant "modeling, observation, coaching, and practice" (Collins & Halverson, 2009, p. 96). In the 19th century universal education became commonplace, as the nation needed workers for factories and education for the nation's economic success (Lippman, 2010). The early colonial learning environments were one-room schoolhouses, where there was more individualized learning, smaller classes, and cross-generational learning as students helped teach each other (Seely Brown, 2009). In this setting, the teacher and the blackboard were at the front of the room, student desks were aligned in rows, and all furniture was bolted to the floor (Collins & Halverson, 2009; Lippman, 2010).

The Industrial Revolution (1830-1890) resulted in change for all aspects of society, including education. Efficiency, which characterized the Industrial Revolution, translated into school design through graded classrooms, modeled after the one-room schoolhouse. Multiple classrooms were housed in one building, specific tasks and tests for grade levels were assigned, and there was a greater overall structure, resulting in a factory model (Collins & Halverson, 2009; Lippman, 2010; Robinson, 2011).

As society has evolved, many would argue that the learning environment and style of instruction has not changed. Classrooms today largely reflect the notion of passive learning with the teacher at the front of the room and students sitting in rows of desks (Collins & Halverson, 2009; Pearlman, 2010; Robinson, 2011). Gradually, innovative learning environments are emerging throughout the United States, aiming to support the 21st century skills necessary for today's students.

Basic Human Needs for Learning

While the learning environments for 21st century learners are different than the "factory" model from the past, there are consistently basic human needs that must be met for students to learn to their greatest potential. In addition to core academic skills, these include engagement and motivation; safety, security, and attachment; and physical activity.

Students need to be personally connected and engaged (Gurian, 2011; OWP|P Architects, VS Furniture, & Bruce Mau Design, 2010). Passion and motivation are critical; without it students do not learn to their greatest potential, and innovation and creativity happen more readily when minds are engaged (Christensen, Horn & Johnson, 2011; Robinson, 2006). Children must be safe and secure in order to learn, so an environment should be nurturing, inspiring, and supportive (Cavoukian in OWP|P Architects, VS Furniture, & Bruce Mau Design, 2010). Personal attachment and bonding affects one's ability to learn (Gurian, 2011; Medina, 2008), and it even affects the physical structure of the brain (Shore, cited in Teaching Strategies, Inc., 2010). Maslow's hierarchy of needs supports this theory, in that basic elements must be met before one can progress to the next set of needs and development ("Maslow's Hierarchy of Needs" adapted in OWP|P Architects, VS Furniture, & Bruce Mau Design, 2010). Physical activity also affects the ability to learn. There is a proven connection between exercise and alertness, as the body is meant to be in motion (Medina, 2008). Dr. Dieter Breithecker states that studies have shown that elementary children can lose concentration after five or ten minutes, but by stimulating the vestibular system, concentration can then be regained (cited in OWP|P Architects, VS Furniture, & Bruce Mau Design, 2010). Physical activity is necessary for overall health. According to the Centers for Disease Control, childhood obesity has more than tripled in the past 30 years, and schools play a critical role in supporting and encouraging healthy behavior (2012).

Building Affects on Learning and the Building Occupants

Research has proven that the quality of educational facilities affects learning outcomes and the individuals within the building. Four fundamental categories are natural daylight, thermal comfort, acoustics, and indoor air quality.

In a study comparing daylight in classrooms from the least to the most amount of daylight, student performance was found to increase by 21% (Heschong Mahone Group, Inc. 2003). A well lit classroom consists of natural light, lighting fixtures, and minimal glare (Hatfield). A study of the Fresno school district in California found that "an ample and pleasant view out of a window, that includes vegetation or human activity and objects in the far distance, supports better outcomes of student learning" (Heschong Mahone Group, Inc., 2003, p. ix). Thermal comfort affects student health when there is natural ventilation by reducing asthma and allergy symptoms (Zuraimi, Tham, Chew, and Ooi, cited in Baker & Bernstein, 2011). Acoustics affect teachers' health concerning voice strain, and student achievement by what they are able to decipher, which in turn affects learning outcomes (Acoustical Society of America, cited in Baker & Bernstien, 2011). Indoor air quality has an affect on task rates and student health (Wyon and Wargochki; Frumkin, Geller, & Nodvin cited in Baker & Bernstein, 2011).

Designing sustainable buildings helps to ensure that these fundamentals are met. Sustainable buildings are now common, and programs like Leadership in Energy and Environmental Design (LEED) and the Collaborative for High Performance Schools (CHPS) have included minimum requirements for categories such as indoor air quality and acoustics in their rating systems (Collaborative for High Performance Schools, 2009; U.S. Green Building Counsel, 2009).

Literature Review

It is commonly agreed upon that having a positive learning environment boosts student and teacher morale. A study across 1100 schools in Canada yielded results showing a link between environmental quality and student commitment and morale, teacher commitment, disruption in class by students, and teacher expectations of students (Roberts, Edgerton, & Peter, 2008). In his doctoral research, Keller (2007) found that when award-winning schools were compared to corresponding schools that "utilized traditional or non-award winning designs," (p. 6), the award winning schools made greater gains in student achievement on standardized tests and college acceptance rates and displayed greater satisfaction and positive responses relating to spatial settings and juxtapositions. Keller proposed that "award-winning school architecture can be an effective education-enhancing tool when developed in a collaborative manner and used as a part of an ongoing educational plan of cultural transformation and personalized educational leadership" (p. 283).

Color can play a role in all learning environments, affecting factors such as student motivation and pride in the school (Kollie, 2004). Engelbrecht states the many ways in which color in schools can be beneficial: it "relieves eye fatigue...increases productivity and accuracy...aids in wayfinding...[and] supports developmental processes" (2003). The varied effects of color result in the need for different colors and shades depending on student age and academic activity (Daggett, Cobble, & Gertel, 2008; Engelbrecht, 2003; Kollie, 2004). Research states that bright, warm colors attract young students. As students get older, "preferences change from tints and pastels (elementary school) to bright medium-cool colors...(middle school) to darker colors (high school)" (Gale, cited in Daggett, Cobble & Gertel, 2008).

Along with basic human needs that must be fulfilled for all learners, specific user groups have additional requirements. To better understand the student needs for the four case study schools, specific environments were studied.

Early Childhood Development

The importance of quality early childhood education has been documented through the Abecedarian Project, a study running over 30 years. The project studied "the potential benefits of early childhood education for children from low-income families who were at risk of developmental delays or academic failure," (News Services, The University of North Carolina at Chapel Hill, 2012). Beginning as infants, children attended a year-round child care facility until

kindergarten. Follow up studies showed that compared to a control group, the participants in quality early education had more education, were more likely to be consistently employed, and less likely to receive public assistance (News Services, The University of North Carolina at Chapel Hill, 2012). Research has also shown a link between parental literacy and education rates, stating that this is one of the most influential factors determining a child's success in school (Benjamin, 1993). Additionally, the stability of home life affects one's ability to learn (Medina, 2008). For these reasons, it is important that parents be educated and involved in their child's life.
Understanding the needs in a child care facility can be understood by looking at theories of many early child psychologists and theorists, which still hold true today. Maria Montessori believed that learning environments should be beautiful and ordered because children learn from their environment (Mooney, 2000). John Dewey proposed that a stimulating environment is best for children to learn and Jean Piaget believed that students learn by interacting with the world around them (Teaching Strategies, Inc., 2010). Montessori also believed that furniture and fixtures that are child-sized and accessible to the children creates a positive learning environment (Mooney, 2000). Materials should be accessible so students can become responsible for their own learning.

Socialization is critical for children because they learn from each other and their environment. Dewey and Vygotsky explored social interactions and education, concluding that socialization is critical to learning (Mooney, 2000). Dewey believed that "children learn best when they interact in a rich environment with other people" (Mooney and Rushton & Larkin, cited in Teaching Strategies, Inc., 2010), and this includes peer and teacher relationships (Teaching Strategies, Inc., 2010).

Play is extremely important to children for socialization, cognitive development, and physical activity (Teaching Strategies, Inc., 2010). Brown reiterates that all people must engage in some form of play to be happy, sustain social relationships, and for creativity (Brown 2009). Play takes many forms, and outdoor play is especially important in today's society. In the book, *The Last Child in the Woods*, Richard Louv discusses what he calls "nature-deficit disorder," a term he created because of diminished time spent outdoors by the last several generations, and its adverse affects on the senses, attention, and physical and emotional well-being (2005). The benefits of the natural environment are reiterated in other texts which state that exposure to nature helps children emotionally, physically, and academically (Gurian, 2011; Medina, 2008). Nature allows one to explore, encourages engagement in activities, and stimulates the senses. Combined with the importance of physical activity and overall health, play and the outdoors are critical components to learning environments.

Environments for Students with Autism
Autism Spectrum Disorder (ASD) is a developmental disorder that affects functions of the brain. Some of the most common distinguishing characteristics of autism are difficulty in communication (verbal and non-verbal), socialization, and imagination. People with autism may exhibit repetitive or restrictive behaviors; resistance to change in routine; sensitivity to any of the five senses; unusual responses to people; or unusual attachments to objects (Fraser, 2011). Since it is a spectrum disorder, ASD affects everyone in a different way, and individuals have a range of abilities and challenges. Studies on individuals with autism are limited due to the range of abilities and needs. Many recommendations about the environment are based on personal experience from those living and working with people with ASD, however, with the prevalence of ASD on the rise, so to is the amount of research (Chalk Board Project, 2008).

Literature Review

ASD now affects 1 in 88 children in the United States (Centers for Disease Control, 2012), and the need for specialized schools and environments supporting those with ASD is increasing. Individuals with ASD have difficulty in everyday life, and sensory impairments can cause confusion and anxiety (The National Autistic Society, 2012).

Information from our five senses helps us understand and process that information, which in turn guides the way we think, feel, and/or behave. People with autism often have difficulty processing (organizing, prioritizing, and understanding) sensory information, which can cause stress and confusion (The National Autistic Society, 2012). Hyper (over-development) and/or hypo (under-development) sensitivity to the five senses is common among people with ASD and can make any environment challenging to experience (The National Autistic Society, 2012). Individuals with ASD often rely on visual cues to understand their environment since communication can be difficult, however, sensory impairments can make the environmental cues difficult to understand (Paron-Widles, 2008; The National Autistic Society, 2012). For example, individuals may have trouble blocking out background noise, or recognizing a room if something has changed, causing anxiety or confusion. For these reasons, literature on ASD emphasizes that environments be structured, clear, ordered, and predictable (Mostafa, 2008).

Building Organization, Layout, and Spaces

Mackenzie (2008) stresses the importance of a structured environment and its affect on learning when she writes:

> Without a well-organized learning environment, the child seems to feel like you or I would when walking alone down an unlit lane at midnight: our every sense is on hyper-alert in a 'fight-flight' mode. That is not a situation where learning can readily take place." (p. 61)

Structure and order in the environment can help individuals with autism predict events and avoid anxiety (The National Autistic Society, 2012). This can start with the building organization and layout. *Building Bulletin 77, Designing for People with Special Educational Needs and Disabilities in Schools*, published by the Department for Education and Employment, summarizes that the following should be considered in the building organization: The layout should be simple. It should reflect clarity, calm, and order. Clear wayfinding and good signage helps build independence. Providing a variety of large and small spaces helps accommodate a range of space sensitivities. Some students do not like large spaces, needing smaller volumes, while others do not like to be enclosed. Well proportioned space is recommended (2005).

Everything should have a purpose, and multi-use spaces should be avoided, as they can cause confusion. Workspaces within the classrooms can help minimize distractions and keep children focused on their work (Mostafa, 2008). Nature can have positive effects children with ASD, and providing areas to interact with nature is beneficial (Sachs & Vincenta, 2010).
The literature also recommends having a space for a child to escape if they are overwhelmed (Mackenzie, 2008; Mostafa, 2008). This can range from a large cardboard box to a separate room, allowing a child to regroup if overstimulated or anxious (Mackenzie, 2008; Mostafa, 2008).
Humphreys notes that proxemics, the amount of space that each person needs, can be greater for individuals with ASD. If the personal space is invaded it can be frightening, and thus, they need more space (2005).

Sensory Impacts on the Environment
An environment that does not overwhelm the senses is critical for learning. Visual and audio stimulation can be distracting, and to ensure the greatest potential for learning, spaces should be calming, low stimulating, and have minimal distractions. This includes everything from color choices and material patterns to background noise.
Too much visual stimulation can interfere with learning, making it difficult for a child with ASD to pay attention, and difficult to regain attention if it is lost (Paron-Wildes, 2004; Mostafa, 2008). It is largely agreed upon that walls should have minimal stimulation, including detailing, student work, and clutter, with the ability to add stimulation as necessary (Department for Education and Employment, 2005; Paron-Wildes, 2004). Providing ample storage allows visual distractions to be put away (Mackenzie, Flowers, cited in Henriksen, 2009).
Color palates should be low arousal. A study on color and children with ASD found that blues and greens are the most calming, while reds were the most arousing (Pauli, 2004). Paron-Wildes quotes a study in which researchers found that the rods and cones in the eye of a person with ASD "have changed due to chemical imbalances or neural deficiencies. Of the autistic children tested, 85% saw color with greater intensity than neurotypical children" (2004, p. 2). Therefore, to minimize visual stimulation, calming colors should be used. Muted and subdued colors are recommended, such as neutrals and browns, and patterns should be minimal as they can create visual complexity (Myler, Fantacone, & Merritt, cited in Henrickson, 2009).

Natural daylight is another important factor. Literature is inconclusive about the kind of natural light, as windows may allow too much visual distraction, and shifting sunlight patterns may be too distracting from clerestories or skylights (Henry, 2011). Fluorescent lighting can be distracting, as individuals with ASD often see the flicker in the light and hear its hum (Paron-Wildes, 2004; The National Autistic Society, 2012). However, the importance of natural light is agreed upon, and it provides the opportunity for natural ventilation, is also recommended (Humphreys, 2005).

In a study regarding architectural environments and the impact on children with ASD, acoustics were found to have the greatest influence (Mostafa, 2008). *Building Bulletin 77, Designing for People with Special Educational Needs and Disabilities in Schools* also recommended that noise distractions be avoided. This includes everything from the hum of some electric lighting to outdoor noise (2005).

Safety and Security, Observation, and Control
It is important to provide security for students without creating an institutional feel (Department for

Literature Review

Education and Employment, 2005). Observation opportunities are also important, as students may act differently when they are alone as opposed to when an adult is in the room (Humphreys, 2005).

There is a desire that by capitalizing on the characteristics of individuals with ASD, and creating a learning environment that is comfortable, students will gain essential skills that can then be transferred to less restrictive environments. Mostafa (2008) writes:

> By creating a predictable environment in the learning space and catering to the child's need for routine, he or she may be more open to learning essential skills that can be generalized outside the controlled space, making him or her ultimately less dependent on the routine" (p. 193).

Mostafa also recommends that the essential activities that need the most restrictive environments are necessary to gain essential skills. The spaces should be graduated with fewer restrictions to avoid the "greenhouse" effect, and prepare students to enter normalized environments.

In terms of stimulation within the environment, Paron-Wildes goes by the recommendation to plan for the worse, and that brighter colors or objects can be added as necessary (2004). From the literature review it may be summarized that learning environments should be calming, sensory friendly, and have minimal distractions.

Arts and Education

The importance of arts and education has been cited by numerous studies. One such example is a study stating that "students who are not exposed to arts and music in school score lower on standardized tests and have worse communication skills than those who do" ("Record Investment in Music, Arts and PE" cited in OWP|P Architects, VS Furniture, & Bruce Mau Design, 2010, p. 52). Creativity is important to all students, especially in the 21st century, and for these reasons, arts spaces within school buildings are valuable.

Early College High Schools

The achievement gap between minority students and low-income students has been documented for years (Education Week, 2004). Early College High Schools are an attempt to remedy the achievement gap and accelerate students who are least likely to attend college (TXECHS, 2012). Initial studies from Early College High Schools report that when challenged academically and given support and resources, minority and lower-income students can achieve as much or more than their peers across the same district (AIR & SRI, 2009).

21st Century Learning Environments

Technology, the global marketplace, and innovation skills needed for the current economy have resulted in necessary changes for educational pedagogy and schools. As aforementioned, motivation is critical for learning, and students learn better when they are engaged. Twenty-first century learning environments that use technology and different ways of customizing curricula to accommodate different learning needs can help students to be innovative and achieve academically. Howard Gardner's "theory of multiple intelligences" states that people learn in different ways, and when one engages with the intelligence that best aligns with their learning style, it can be more motivating (Christianson, Horn, & Johnson, 2011).

Skills and outcomes for students in the 21st century are changing. Creativity, collaboration, global awareness, technological competence, working in real life situations, and being able to interpret and evaluate resources are necessary skills for students (Pink, 2005; Wallis, 2006).

The Partnership for 21st Century Skills defines 21st century student outcomes as the following:

- "Core subjects and 21st Century Themes (including global awareness and literacy in the following areas: finance, economics, business, and entrepreneurship; civic; health; and environment),
- learning and innovation skills (creativity and innovation; critical thinking and problem solving; communication and collaboration),
- information, media, and technology skills (literacy in the following areas: information, media, information, communications, and technology (ICT)), and
- life and career skills (flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility)" (2006).

To support these varied skills, Pearlman quotes Schank, the founder of the Institute for Learning Sciences at Northwestern University, stating that "computer work, talk with others, and making something" are the three primary student work modes in 21st century learning. He goes on to state that these working modes "require three distinct environments for learning: focused work environments, collaborative work environments, and hands-on project work environment," (2009, p. 126). Learning in 21st century environments can happen everywhere, (Pearlman, 2009). It is recommended that buildings should be flexible and adaptable to future needs and technologies (OECD, 2006). Spaces within the site should include spaces for group collaboration and study, large and small group presentations, and individual study. Pearlman notes that typical distinctions such as "classroom" are changing to support varied needs, and it is recommended that there be open, multipurpose spaces in addition to specialized areas for activities such as art and media (2009).

To help ensure that needs of the building users are met, the role of building stakeholders is increasing. Involvement from the stakeholders, such as students and community members, aids in overall building design and creativity. Additionally, participation by building users creates a sense of involvement, attachment, and pride in the learning environment. The proven importance of sustainable design features must be included, as they can serve as a learning tool for the teachers, students, and greater community (Partnership for 21st Century Learning, "21st Century Learning Environments," 2009).

In summary, the literature indicates that while some learning environments are still maintaining the factory model, others are innovative environments conducive to 21st century learning. The importance of building factors that affect fundamental aspects of learning and teaching are evident, and many user groups have special needs to consider. Overall, environments that support basic needs are essential for all schools.

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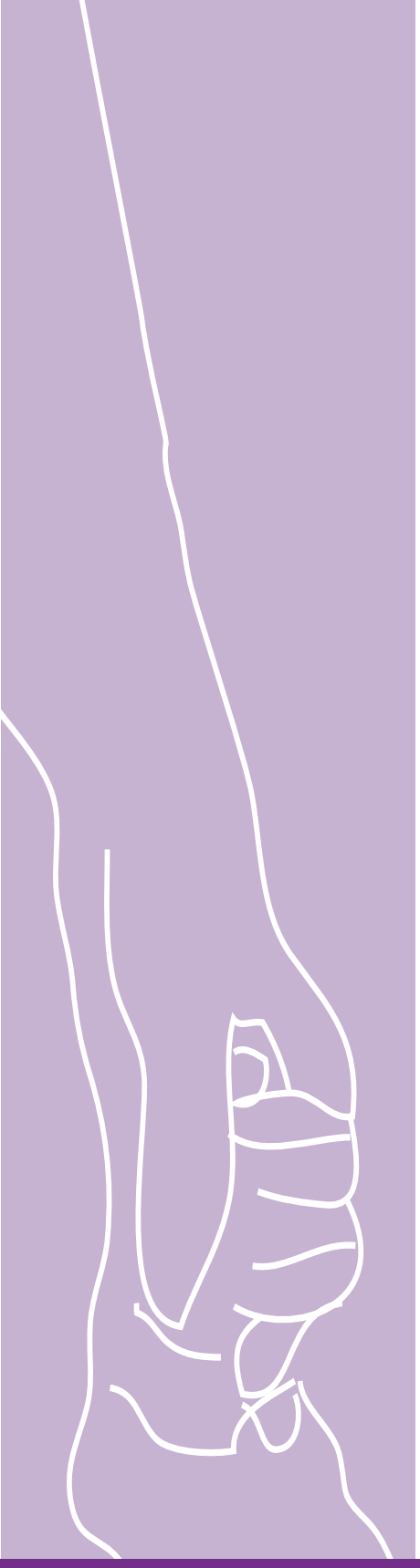
Mothers' Club Family Learning Center

Pasadena, California



Introduction

Mothers' Club Family Learning Center (MCFLC) in Pasadena, California, is an award-winning dual education program. For over 50 years Mothers' Club has been serving families living in poverty and isolation through its two-generation learning program, which focuses on simultaneously educating parents and children. As a non-profit organization, the mission of Mothers' Club is to help families in need to succeed in school and life by offering "free social services and educational programs to low-income, at-risk families with children ages 0–5" (MCFLC, 2012). The program helps nurture children and adults through the education and growth of the entire family. Children are most vulnerable and impressionable from birth to five years—making it the optimal time to educate the children and their parents (Kujawa, cited in Baines, 2007). Not only do the adults and children who participate in the daily curriculum benefit, but the skills and knowledge developed at Mothers' Club affects the extended family and larger community (MCFLC, 2012).

The physical environment influences children's development and social skills, and Mashburn argues, "High-quality physical environments may be especially important for children who experience social and economic risks and may serve as a protective factor for these children" (cited in Teaching Strategies Inc., 2010, p. 8). After renting space for 40-plus years, Mothers' Club bought their own property in northwest Pasadena in 2006. They worked with a design team from Harley Ellis Devereaux to completely gut and renovate an existing building. Completed in October 2007, the new Mothers' Club home provides the organization with a learning environment to support the mission and goals of the program. The building itself is a leader, being the first independent preschool in the nation to receive Leadership in Energy and Environmental Design (LEED) Gold certification. Staff commented that everyday functioning of the building, from the overall structure to the small details, has proven to be successful. Enthusiasm and gratitude were displayed by the staff for the way the building seems to fulfill their every need, accommodating everything from small student groups to large fundraising events.

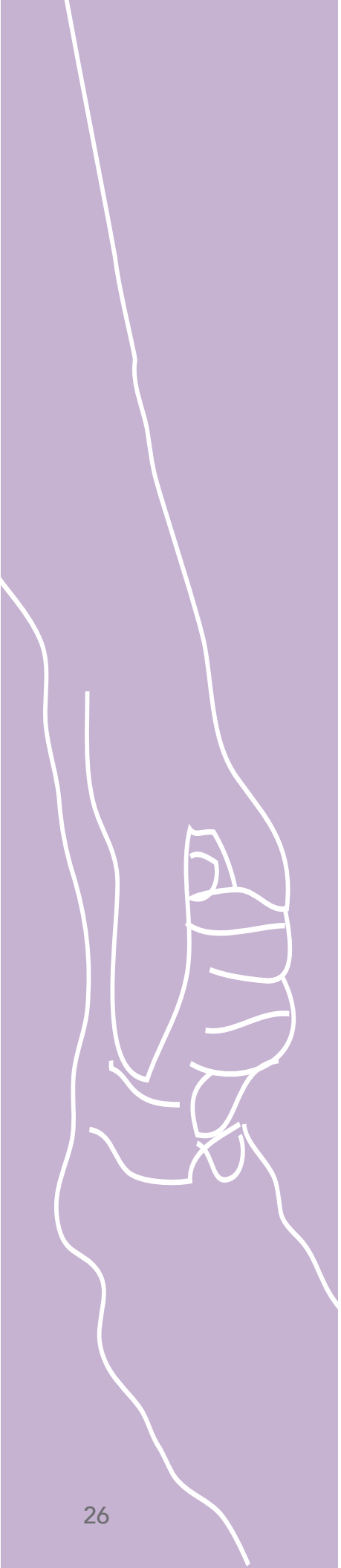
Mothers' Club Family Learning Center
Pasadena, California
Harley Ellis Devereaux

Ages
Birth–5 + Adults

Enrollment
120 children, 110 adults

Building Size
10,000 square feet

Year Opened
October 2007



Program and School Summary

Recently there has been mounting evidence that the years before a child enters kindergarten are the most critical times in child development, influencing one's ability and desire to learn, life preparation, and future success (Medina, 2008).
The feature that sets Mothers' Club apart from other early childhood development programs is the two-generation learning. Both parents and children are on-site, learning alongside each other and with their peers in separate curriculum tailored for their needs. Mothers' Club offers three different programs, each with a different focus to best suit the group of learners. While the children work on physical, social, emotional, and cognitive development, the adults focus on parenting, life, education, and literacy skills. In the adult education programs, Mothers' Club serves adult parents and teen moms.
The early child development programs are separated by age, with learning environments and curricula for infants, toddlers, two-year-olds, preschoolers, and pre-kindergartners.

Programs at Mothers' Club
Family Literacy - Morning Program - Currently 80 Families

- Greater focus on language skills for the adults
- Typically serves more people who are new to the country
- Adult Education Classes, Parenting and Life Management Classes, Assist in Children's Programs
- Goals - work on skills while building support and community networks

First Connections - Afternoon Program - Currently 20–24 Families

- Typically more new parents, works on parent relationship skills, helping with a new child, less focus on language
- Work on parenting and life skills, work on developing bond with child

Teen Parenting - 10-Week Program/3 Times A Year
Currently 10 Teens

- Support teen moms and provide education about parenting

Mothers' Club uses the *Creative Curriculum* as a guide for their preschool programs. The *Creative Curriculum* "highlights the important balance between applying a general knowledge of child development with the particular knowledge a teacher gains by forming a relationship with each child and family" (Teaching Strategies, Inc., 2010).

Mothers' Clubs Vision and Mission for its Adults and Children

Success in Life - Adults

- create and strengthen positive, healthy family, school, and community relationships
- act as positive role models and prepare children for future success
- contribute to community
- become life-long learners
- develop and strengthen personal, education, mental health, and life skills
- increase personal confidence

Educate - Adults

- English literacy and verbal fluency
- family literacy
- parenting skills (child development understanding and awareness, practical application, ability to develop strong and constructive bonds with children
- life skills (community outreach, nutrition)
- mental health support and stress reduction skills
- further education classes/resources (ESL, GED, vocational training)
- community and school involvement and leadership

Success in Life - Children

- create and strengthen positive, healthy family, school, and community relationships
- ability and desire to learn
- achieve state education standards
- age-appropriate development

Educate - Children

- development of language
- English literacy
- life skills
- cultural sensitivity
- English and Spanish fluency
- achieve California Guidelines and Early Childhood Development Guidelines
- prepare for future education

Nurture

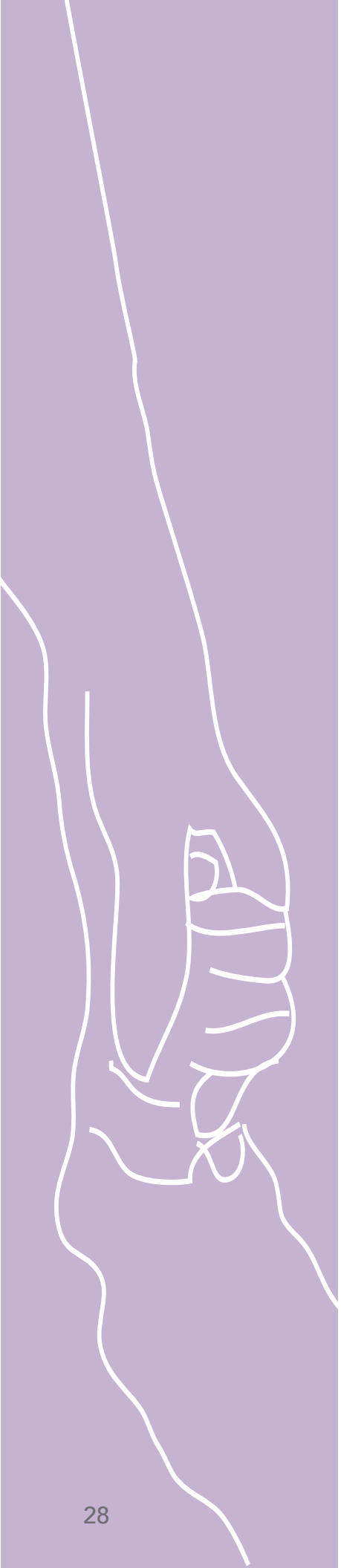
- provide tools for social, physical, emotional, and cognitive growth and development
- support healthy relationships
- provide physical and emotional safety
- non-judgemental atmosphere
- cultural sensitivity
- comfort
- encouragement
- respect

Mothers' Club by the Numbers

300 people	*Number of volunteers serving Mothers' Club each year*
2–3 years	*Average length of a family's stay at Mothers' Club*
5 years	*Maximum length a family can stay at Mothers' Club*
11 months	*Number of months per year Mothers' Club is open*
175 families	*Number of families on the Mothers' Club waiting list*

Source: Leong-Nichols, 2012

Number of Staff 22	Building Levels 1
Project Cost $6,500,000	Site Context Urban



Research Questions

Does the finished school fulfill the design submittal expectations?
Does the design exhibit a full understanding of the challenges?
How successful was the design in creating an empathetic approach to support the user needs?
How does the school design address different learning styles?
How do the lessons learned from design, planning, user satisfaction, and pedagogy inform future projects?

Operating Definitions: Challenges from Harley Ellis Devereaux:

Challenge 1

- "Create an Integrated Indoor/Outdoor Educational Environment:
  - A play atrium, porch and walled garden were carved out of a windowless factory and parking lot. Sliding, Folding and Overhead glass doors create flexibility and seamless connections between inside and outside age-specific learning spaces."

Challenge 2

- "A Seamless Learning Setting for Children and Adults:
  - An informal, domestic character and an open, flexible plan allow adults and children to co-exist within the single volume of the factory. An open kitchen and flexible play atrium form a natural intersection between the parallel education programs."

Challenge 3

- "Integrating Sustainability in the Core Curriculum:
  - The building has been programmed to maximize hands-on learning for children and parents alike. Flexible classrooms and work areas are provided for both. Here, topics like recycling materials and using biodegradable cleansers are demonstrated."

Operating Definitions: Goals and Features from Harley Ellis Devereaux:

Feature 1

- "Central Play Atrium:
  - Central to the classrooms is a top-lit play area. The corners of the classrooms intersect it with sliding glass doors. When the doors are open, a larger shared activity zone is created. When the doors are closed, it's a comfortable observation area for visitors, parents and staff."

Feature 2

- "Outdoor Learning Garden:
  - Large glazed overhead doors connect classrooms and outdoor play areas seamlessly. Incorporating a heritage oak tree, the outdoor classroom is subdivided for different age groups and includes art walls, hands-on gardens, sand and water play, trike paths, and climbing areas."

Feature 3

- "Sustainable Components:
  - The building is the first Gold LEED Certified CDC and has been designed to provide visible reminders of sustainable principals. For example the photovoltaic array is deliberately folded down the south façade as a playful, visual display of how alternative energy is saved."

Operating Definitions: Mission Statement from Mothers' Club Family Learning Center:

Mission Statement

- "Mothers' Club Family Learning Center prepares families living in isolation and poverty to succeed in school and in life through two generation learning programs" (MCFLC, 2012).

Operating Definitions: Literature Review Summary

- Quality preschool education makes a difference in the future success of a child (News Services, The University of North Carolina at Chapel Hill, 2012).
- Parent education levels have an impact on the academic success of their children (Benjamin, 2003).
- The stability of home life affects one's ability to learn (Medina, 2008).
- Play is incredibly important to children for socialization, cognitive development, and physical activity (Brown, 2009; Teaching Strategies, Inc., 2010).
- Furniture and fixtures that are child-sized and accessible to the children creates a positive learning environment (Montessori, cited in Mooney, 2000).
- A connection between school and home life impacts academic success (Gurian, 2011; Medina, 2008).
- Personal attachment and bonding affects one's ability to learn (Gurian, 2011; Medina, 2008; Teaching Strategies, Inc., 2010).
- Being exposed to nature helps children emotionally, physically, and academically (Gurian, 2011; Louv, 2005; Medina, 2008).

Site and Context

Mothers' Club Family Learning Center is located in the heart of the community they serve, in northwest Pasadena, California. For over 50 years the program has had a strong community presence, which was maintained when their new home was built only a few blocks from their previous location. Upon selecting a site for their new building, Mothers' Club knew they wanted to select a sustainable site, utilizing existing infrastructure and public transportation. Mothers' Club is located in an Enterprise Zone, which is a "California economic initiative that stimulates economic growth and business investments within economically disadvantaged areas that are in need of job growth and private investment" (Mothers' Club, 2007).

Community Connections: The urban location allows Mothers' Club to take advantage of surrounding community amenities. Students and staff regularly walk to two different community parks and the nearby library (Leong-Nichols, 2012).

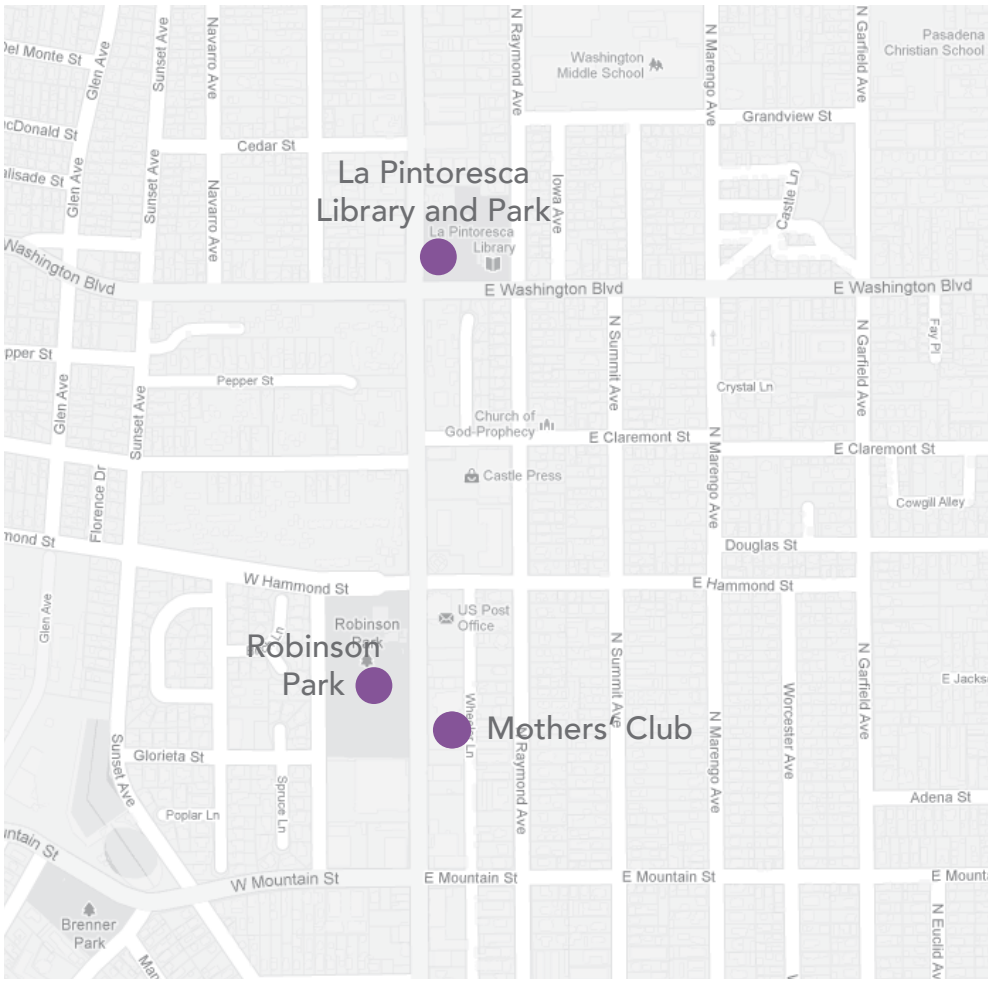


Figure 1: Mothers' Club stays connected to the community and benefits from nearby amenities such as a local library and parks. Map Source: Google Maps

Image 1

Image 2; Source: Harley Ellis Devereaux

Images 1 and 2: The before and after images show how the street facade remained intact. Over 75% of the site's existing walls, floors, and roof framing were maintained in the renovation (Harley Ellis Devereaux, 2011).

Materials and FFE

Building Reuse: Over 75% of the sites existing walls, floors, and roof framing were maintained in the Mothers' Club renovation (Harley Ellis Devereaux, 2011).

The parking lot is made of a light colored pervious paving, allowing the water to percolate the ground and recharge the water table.

Sustainability

The Community: Pasadena is one of several "Green Cities" in California. The city is instituting a variety of green practices and ordinances. Although the Mothers' Club building was not mandated to follow sustainability standards, going green fit with the mission and goals of Mothers' Club, so sustainable considerations, such as site selection, were taken right from the start. Mothers' Club has been a leader in the community for years through its programmatic influence. Building green was a way to capitalize on the opportunities and benefits of having a sustainable building: Mothers' Club serves as a leader in the community—they have an environment that is an example for teaching sustainable practices, and they see monetary benefits of their green features.

Transportation: Since Mothers' Club is located in the heart of the community they serve, many families walk to the building every day. The building is accessible by five public bus lines. The parking lot is small and gives preference to car pools and fuel-efficient vehicles.

Site and Context

Photovoltaic Systems

Feature 3: "Sustainable Components: The building is the first Gold LEED Certified CDC and has been designed to provide visible reminders of sustainable principals. For example the photovoltaic array is deliberately folded down the south façade as a playful, visual display of how alternative energy is saved." (Harley Ellis Devereaux, 2012).

The most prominent sustainable feature at Mothers' Club is the solar panel array that folds down from the roof to the side of the building along the parking lot. The 18 KW photovoltaic system is horizontal on the roof and vertical along the southern facade. The orientation was specifically chosen as a means of visual awareness and as a tool to get people talking about energy use. The solar panels are visible to those passing by from the street, and those who park in the lot or use the side entry can get an up-close look

Image 4: Storefront windows on the street facade fill the entry with natural light.

at the panels. The original 18 KW PV system provided more than 25% of Mothers' Club's power, and in 2011, Mothers' Club received a grant which allowed them to almost double their amount of PV panels by adding a 13.8 DC KW PV solar panel system (MCFLC, 2012). The newest system is installed on the roof at optimal sun angles, and with both PV systems, Mothers' Club sees an annual savings of $3,600. This monetary benefit is critical for a non-profit organization, as foundation and government grants often do not fund maintenance and utilities costs (MCFLC, 2012).

Image 3

Image 5: Mothers' Club seeks to be an oasis from the poverty the families experience every day (Harley Ellis Devereaux, 2011). The building is a comforting environment for the families, and one mother commented that it feels "like a house."

Mothers' Club serves a community in need.

Family demographics from the 2011-2012 school year:

91%
of the 100 children served lived in poverty

more than 1/2
of the 72 parents served did not graduate from high school

71%
of parents spoke a language other than English at home

over 1/4
of families lived in a household with multiple families because of economic hardship (MCFLC, 2012)

Building Organization and Circulation

The organization of the building is straightforward: the education and administrative areas are connected to a central circulation spine that runs the entire length of the building (Figure 2).

Challenge 2: "A Seamless Learning Setting for Children and Adults: An informal, domestic character and an open, flexible plan allow adults and children to co-exist within the single volume of the factory. An open kitchen and flexible play atrium form a natural intersection between the parallel education programs" (Harley Ellis Devereaux, 2011).

Since two-generation learning is the core of the Mothers' Club program, it was necessary to have a setting that allows the adults and children to benefit from their own separate environments while being in the same building. The building is bisected by the main hallway and has three main meeting nodes: the main entry, side entry and kitchen, and central play atrium. The clear distinction between administration, adult learning, and children's spaces allows the adults and children to focus on their own education and relationships with peers while maintaining close proximity to the other groups. The easy flow of the design enhances the way learning occurs. The groups are separated by age, when necessary, and close enough for easy interaction. The parents simply walk down the hall to partake in their own hands-on learning and activities with the children.

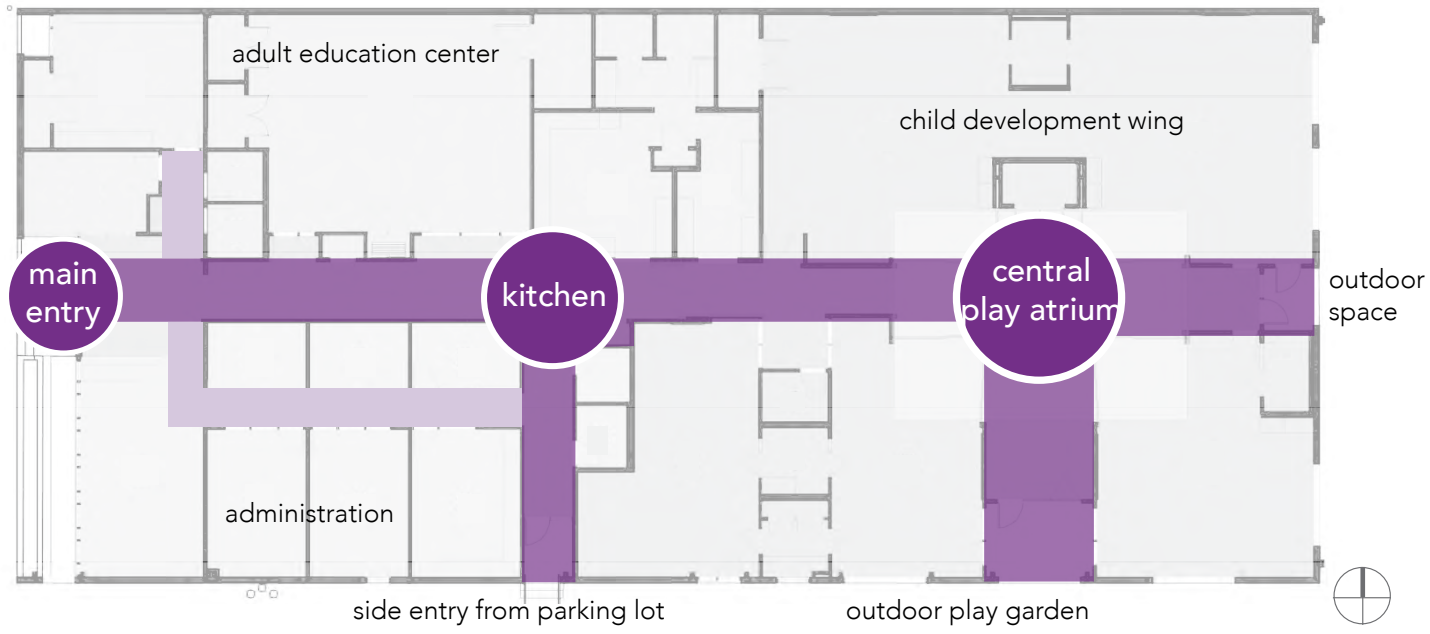


Figure 2: Circulation Diagram; The building is bisected by a central circulation spine and has three main meeting nodes: the main entry, kitchen, and central play atrium. Floor Plan Source: Harley Ellis Devereaux

Materials and FFE

Carpet made with recycled content comprises the entire circulation. As a way to add fun to the circulation, the design team conceptualized the blue path as a stream with a pond surrounded by a beach (Dale, 2012). The staff commented that the carpet is easy to maintain and clean, but it would be helpful to have a non-carpet surface at the side entry and kitchen. Large, black rugs have been added to help with the daily dirt.

Color: The entry alcoves for each of the classrooms has a different color as a means of identification.

Sustainability

The circulation is filled with natural light from skylights. There is a lightwall off the main entry that serves as a visual display of the beauty of recycled materials. The backlit wall is made of ecoresin panels —a co-polyester recycled content product (Mothers' Club, 2007), (Image 9).

Image 9: A lightwall made of recycled materials warms the building circulation and is a visual reminder of the beauty of recycled materials (MCFLC, 2012).

Flexibility

Mothers' Club staff commented how the circulation has also been used as an art gallery, displaying student work (Leong-Nichols, 2012).

The fire doors serve as a way to physically separate the adults and children, depending on the needs of the day. The layout itself provides separation for the groups, which the moms and staff appreciate. This way they can work on their own skills and bonding/socialization, while at the same time, the child area is easily accessible. According to staff, the adult and children's areas each have a great flow. When the entire building is viewed as one learning environment, the flow expands, and is just as successful. It allows for necessary separation and unity of the programs.

Entry

Mothers' Club strives to provide a welcoming environment for their families and visitors through the physical environment and support from staff. Families arrive in the morning and afternoon for their half-day programs, and the building comes alive with the parents and children each going to their respective learning environments.

Design Intent: "To provide an oasis from the poverty the families face on a daily basis" (Harley Ellis Devereaux, 2011).

There are two entries into the building—the main street entry and a side entry from the parking lot. The reception area and a lobby open to the main circulation path through the building. When entering from the side there is another small waiting area that opens to the kitchen.

Since each family enters and is educated in the same building, it helps to connect the home and school life, which is important to a child's development (Gurian, 2011).

Security: The only time the front and side doors are unlocked during the day is in the morning and afternoon when the families are arriving. There is a buzzer and intercom system for visitors throughout the day. Typically, the office manager lets people in the building, while also screening for security purposes (Leong-Nichols, 2012).

Image 6: The cushioned chairs in the front lobby offer a comfortable waiting area for visitors and families.

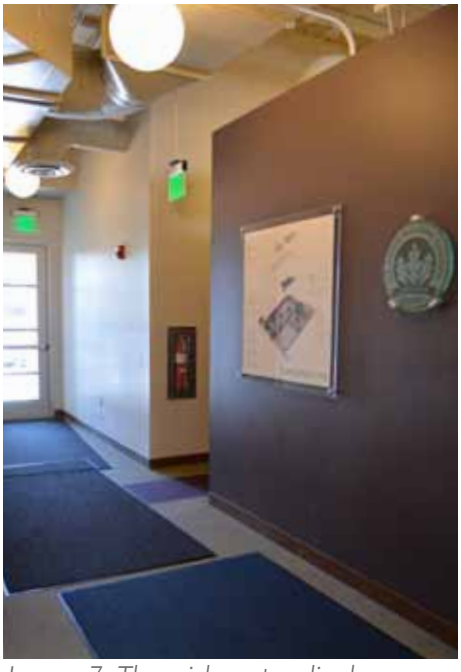


Image 7: The side entry displays a diagram of the building's sustainable features and the LEED certification plaque.

Image 8: The storefront windows on the street facade fill the entry with natural light.

Sustainability

Natural Light: The building renovation maintained over 75% of the existing building, and the windows along the front of the building fill the main entry and front office area with natural light, while providing a storefront for the building off the busy street.

While there is ample light in most of the building, staff commented that the administrative areas, just off the entry, could use more natural light.

Sustainability Awareness: There is a donor board with a slideshow of the construction process in the main entry, and the side entry has the LEED plaque and a diagram of sustainable building features.

Materials and FFE

As part of the welcoming environment, the goal was to create a relaxed, comfortable, and domestic atmosphere. The carpet throughout the main circulation, cushioned chairs and couches, and decorative lighting fixtures used in the entries and throughout the building help to create a welcoming environment. The natural light and brick material help to warm the entry (Dale, 2012).

Flexibility

A feature that the Mothers' Club staff really appreciates is the flexibility throughout the entire building. It begins in the main entry, where the lobby can serve as a welcoming spot, visitor waiting area, and meeting place for families.

Learning Spaces:
Parent Education Center

Research has proven the link between the level of parent education and their child's success in school (Benjamin, 2003). Reading to a child at home is also critical to a child's development, (Gurian, 2011) and therefore the education the adults receive at Mothers' Club enhances the entire family. English literacy is one of the main goals for the adults.

The classroom space for the adults is one large classroom, approximately 900 square feet, that has folding partitions to subdivide the area into two classrooms. Though the space currently works well, the classrooms do get tight at times, since the morning program can have up to 80 adults each day. In addition to the classrooms, the adults partake in many hands-on learning activities in the kitchens and children's classrooms.

Image 10: The south wall of the classroom is glazed, allowing borrowed light from the hallway and transparency into the learning space.

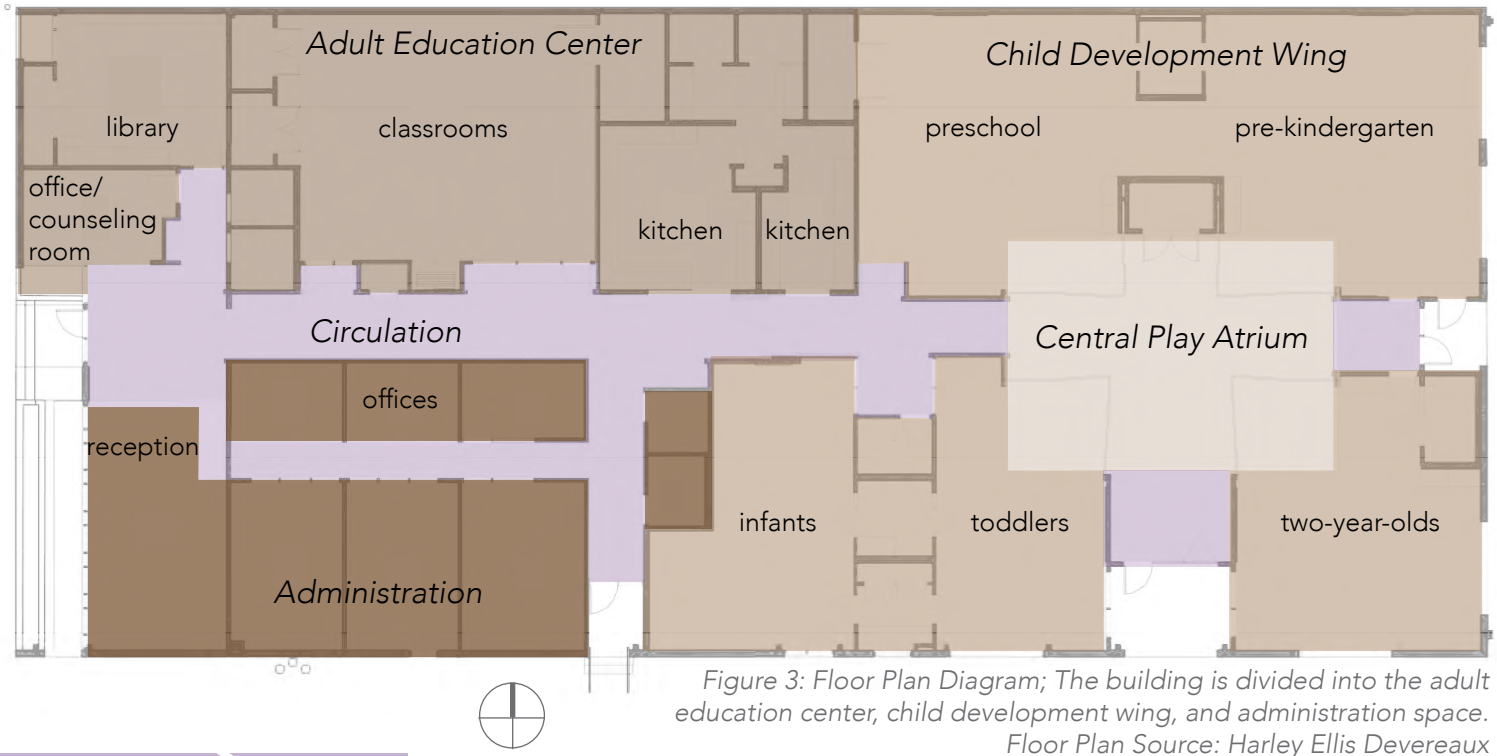


Figure 3: Floor Plan Diagram; The building is divided into the adult education center, child development wing, and administration space. Floor Plan Source: Harley Ellis Devereaux

Image 11: The adult classrooms are divided with a folding partition wall, allowing for flexibility depending on the number of users and activity.

Sustainability

The brick along the north side of the classroom was maintained from the original building. There are no windows on the north facade because it is a parti wall and they had to balance the punctures throughout the structure.

Materials and FFE

The classrooms have whiteboards attached to the wall, and moveable whitebaords for additional use. Since the classrooms change depending on events, the furniture had to be easily movable to allow for the flexibility. The glass along the south wall of the classroom allows for borrowed light from the hall.

Flexibility

The adult education center classrooms also serve as meeting places for board meetings, and the staff appreciates the flexibility of being able to serve two different groups of parents (for example, two levels of English language learners in the morning program) or have one large space (Casalegno, 2012).

Learning Spaces: Child Development Wing

The classrooms in the child development wing feature direct connections to the central play atrium and outdoor learning garden. It can be said that play and exploration are a child's work. The importance of play and sensory activities are critical to the intellectual and mental well-being of a child. For young children, play is associated with benefits such as logical thinking, social skills, and memory development (Teaching Strategies, Inc., 2010).

Challenge 1: "Create an Integrated Indoor/Outdoor Educational Environment: A play atrium, porch and walled garden were carved out of a windowless factory and parking lot. Sliding, Folding and Overhead glass doors create flexibility and seamless connections between inside and outside age-specific learning spaces" (Harley Ellis Devereaux, 2011).

The physical environment should provide a variety of opportunities for play and exploration. At Mothers' Club the goal is to provide a series of experiences for the children so they can experience and learn on their own path at their own time, which teaches independence and self-direction (Casalegno 2012). By creating the integrated indoor and outdoor environment, this goal was met because it provides several sensory activities for the students. Staff commented that the acoustics work well in each of the classrooms, except for the preschool and pre-kindergarten classrooms, which are connected via shared restrooms and a wide hallway. Due to the open connection, noise travels between the classrooms. The teachers have made the situation work by coordinating schedules, such as taking one class outside while the other has music, however, the acoustic situation is one that Mother's Club would like to get resolved soon. Fortunately, those two classrooms are currently only in use during the morning session (Leong-Nichols, 2012).

Image 12: A garage door connects the classroom to the outdoor play garden.

Image 13: Classroom furniture varies in size to fit the adults and children.

Sustainability

Natural Light: The classrooms are filled with natural light through the variety of glass doors, windows, and skylights. It was observed that there was often student work on the glass, but the natural light was not noticeably diminished. The three classrooms for the youngest children (infants, toddlers, and two-year-olds) have direct connections from the indoor classrooms to the porch and garden and the greatest amount of natural light.

Materials and FFE

To maintain the domestic, nurturing environment, each of the classrooms has couches as a comfortable seating option for the children and adults (Casalegno, 2012).

Scale: The scale of the furniture, bathrooms, and sinks was a critical detail for the staff at Mothers' Club, and makes everyday functioning much easier (Casalegno, 2012). Montessori, a child theorist, emphasized the importance of having furniture and tools to fit the small child to enhance the sensory experience (Mooney, 2000).

Flexibility

Flexibility was necessary throughout the child development center because of the variety of age groups in the building. The opportunity to support large group classes and small group meetings was important, and the proximity of the indoor and outdoor learning environments provides more options for the students and staff (Casalegno, 2012).

Learning Spaces: Child Development Wing

As part of the holistic education at Mothers' Club, the classrooms and curriculum focus on academic skills, play, and life skills such as nutrition and sustainability.

Challenge 3: "Integrating Sustainability in the Core Curriculum: The building has been programmed to maximize hands-on learning for children and parents alike. Flexible classrooms and work areas are provided for both. Here, topics like recycling materials and using biodegradable cleansers are demonstrated" (Harley Ellis Devereaux, 2011).

According to staff, Mothers' Club incorporates sustainable practices into their everyday curriculum, such as using recycled materials for art projects. Instead of traditional materials from big-box stores, the recycled pieces enhance the creativity, exploration, and sensory experience for the children because of the unique qualities of the recycled material.

Research has proven that children learn better when they are emotionally attached and have positive relationships with their instructors and environment (Gurian, 2011; Medina, 2008; Teaching Strategies, Inc., 2010). The students all have cubbies for their belongings, and the walls, windows, and garage doors are covered with student work. According to a Mothers' Club parent, the display of child work shows that the teachers really care about their students and gives the students pride in having their work on the walls.

Access to resources and materials is also important for students (Lippman, 2010; Mooney, 2000). Montessori believed that students learn from their environments, and having easy access to resources allows them to find and put away materials when they need them. This not only allows students the opportunity to use the resources at will, but to keep a clean and orderly environment from which they can learn (Mooney, 2000). The Mothers' Club classrooms provide open shelving and cupboards for books and toys in child-sized furniture.

Image 14: Cubbies for each child provide personal space and attachment to the learning environment.

Image 15

Image 16

Images 15–18: The classrooms display the children's work in a variety of ways. Child-sized furniture and fixtures allow the kids to access the resources and materials. This creates personal attachment and the ability to learn from the environment.

Image 17

Image 18

Social and Activity Spaces: Central Play Atrium

The central play atrium is an integral component to the building. Its mutli-purpose versatility serves the children and adults in many capacities.

Feature 1: "Central Play Atrium: Central to the classrooms is a top-lit play area. The corners of the classrooms intersect it with sliding glass doors. When the doors are open, a larger shared activity zone is created. When the doors are closed, it's a comfortable observation area for visitors, parents and staff" (Harley Ellis Devereaux, 2011).

Children use the space as a play area in inclement weather, and small group play activities. The space is large enough to provide an area for large group activities for the parents and children, which in the largest program is up to 80 families. An example shared by the staff was when the children put on plays for their parents and the other classrooms (Leong-Nichols, 2012). The administration and staff use the space for large events and fundraisers. It has direct access to the outdoor garden, which can serve as means of ventilation and/or an extension of the space (Leong-Nichols, 2012).

The open visibility serves the building users in many ways. Given the five-year age difference between the oldest and youngest children, the kids like to see what the other classrooms are doing, and the transparency allows them to observe without disruption. It also allows the parents to observe classroom activities, and lets visitors see the building without interrupting the classroom. Safety and security in the classroom are also important aspects of the transparency. Staff commented that parents feel more secure when many eyes can see into the classrooms.

Image 19: Central play atrium and the blurred boundaries from the classrooms.

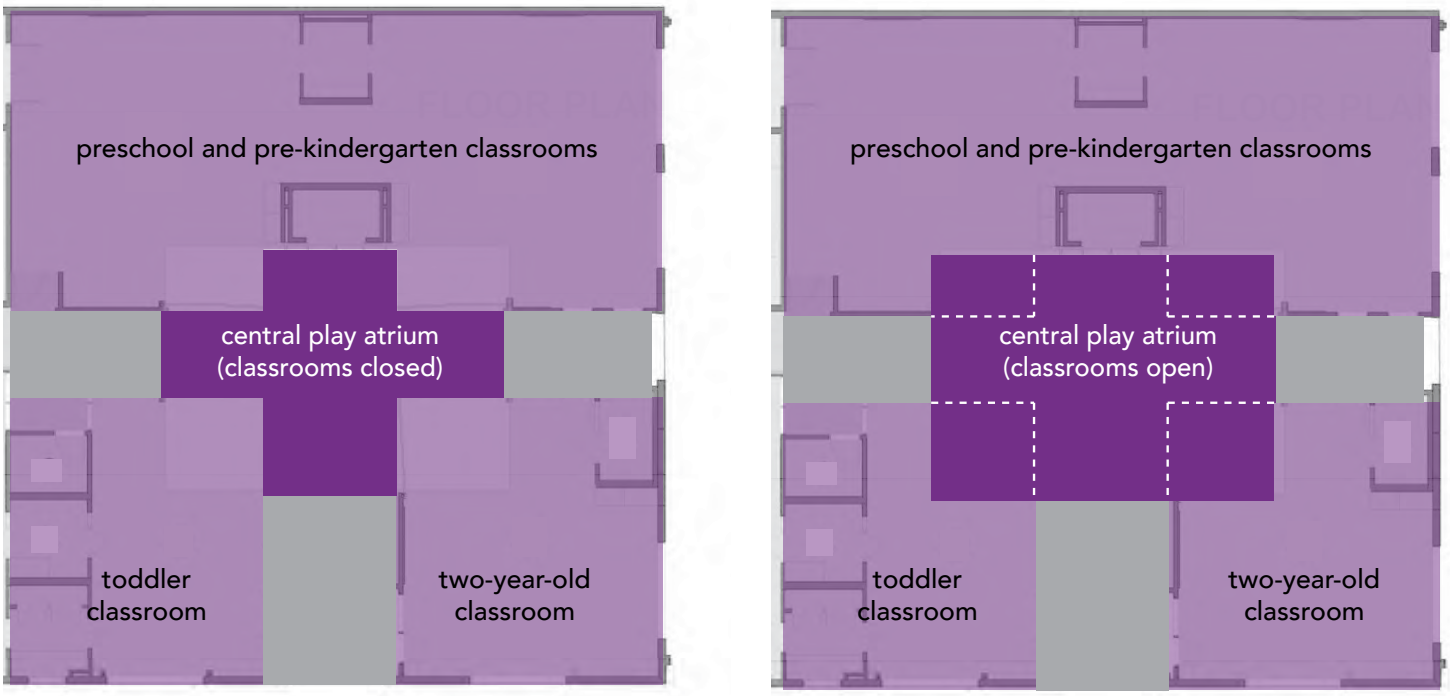


Figure 4: Central play atrium diagrams; Floor Plan Source: Harley Ellis Devereaux
Images 20 and 21: The central play atrium provides flexibility for small- and large-group activities and blurs the line between instruction and play. When the classroom doors are open, the area expands and becomes one large play area; when it is time for classroom instruction, they are closed off to minimize distractions.

Image 20

Image 21

Social and Activity Spaces: Central Play Atrium

In addition to blurring the boundaries between formal learning and play, the central play atrium serves as an entry to most of the classrooms.

At the time of observation, it was noted that three of the four classrooms appeared to be using the sliding glass doors from the central play atrium as the primary entry to the classroom. The toddler classroom had pushed a couch and toys up against the sliding glass doors and had created a reading corner against the entry. This may be due to the entry alcove that the infant and toddler classrooms share, which is a recessed, prominent entry. The other classrooms have singular door entries, and the pre-kindergarten and two-year-olds would have to walk past the central play atrium sliding doors in order to access the other entry. Since the toddler and infant alcove is closer to the main building entries, the closer access may also contribute to its more frequent use (Figure 5). The staff also indicated that the classrooms are flexible and are rearranged often.

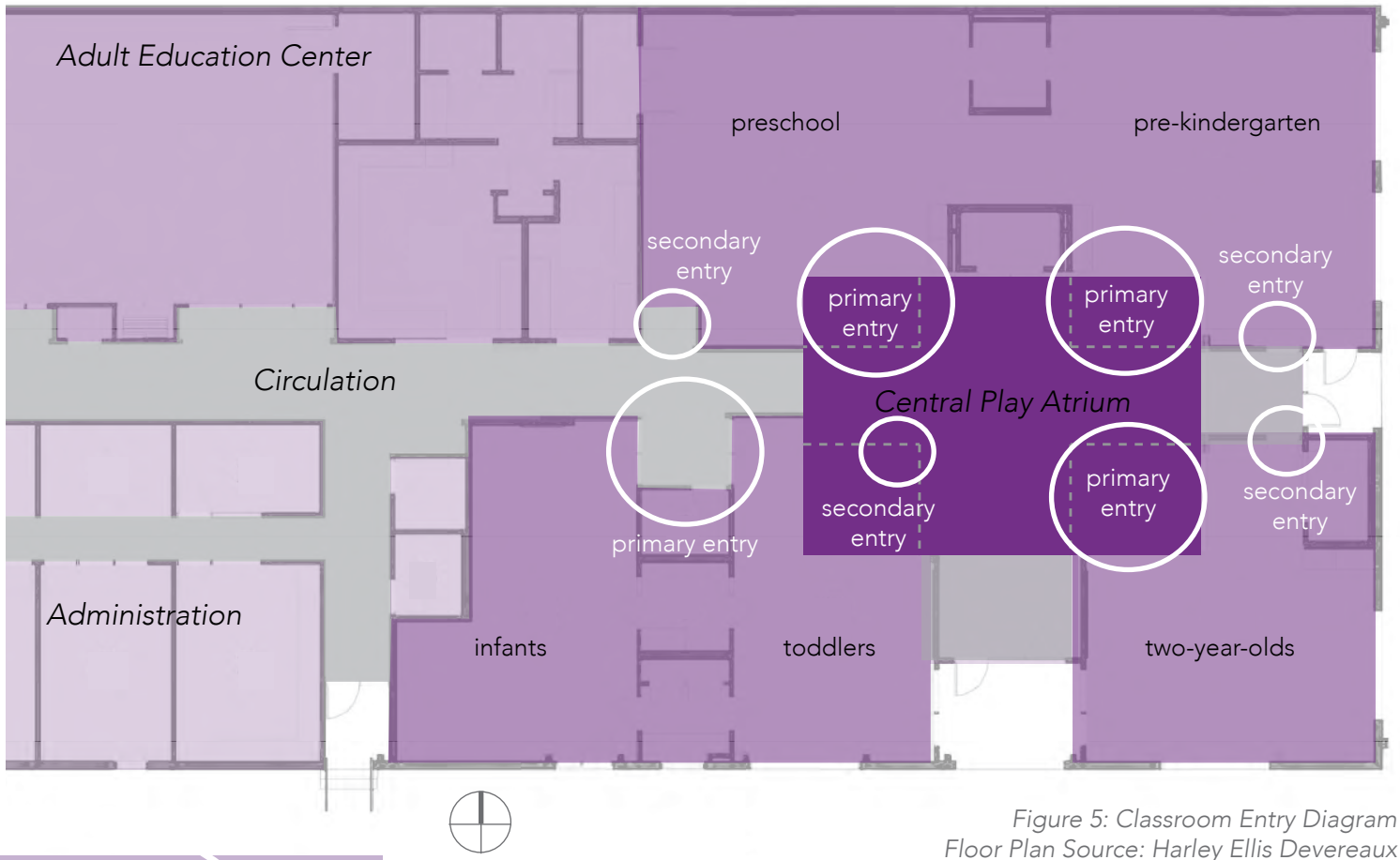


Figure 5: Classroom Entry Diagram
Floor Plan Source: Harley Ellis Devereaux


Image 22


Image 23


Image 24

Images 22–24: The central play atrium serves as an entry to most of the classrooms. The toddler classroom, above, has pushed a couch against the doors, and seems to be using the entry in the alcove, above right. The materials and mullions of the glass break down the scale for the children.

Sustainability

Since the central play atrium is filled with natural light from the clerestory atrium, the glass doors bring natural daylight into the classrooms.

Materials and FFE

The mullions on the sliding glass doors help reduce the scale of the panels for the small children. The bottom row has reeds in the glass to go along with the pond and sand theme with the carpet tiles, and it provides a small privacy screen for the children.

Flexibility

The flexibility of the central play atrium provides a variety of spaces for Mothers' Club. Staff commented that small- and large-group areas were desired for the learning space. The niches and recesses created within the central play atrium allow for small groups, and when all of the sliding glass doors are opened, the space becomes one large gathering area.

Social and Activity Spaces: Kitchens

The mothers enjoy having the opportunity to take a break from the children and concentrate on their learning while developing and nurturing friendships and support networks. The kitchen acts as the heart of the building, both physically and metaphorically. It is one of the favorite spaces among the adults.

The informal feel of Mothers' Club creates a space that is comfortable for its users. The building evokes a sense of pride for the users and enhances their sense of value and self-worth. A mother commented that it is desirable to learn in the space because it is clean and eco-friendly. The kitchens are a place for the mothers to become more comfortable in their skills and peer relationships.

Mothers work on life skills in the kitchen, where they learn about nutrition and help prepare the meals for the children. The main kitchen is used for the hands-on learning for the mothers as well as special events. The smaller side kitchen is mainly for meal and snack preparation for the children. All children are served one snack and lunch every day.

Image 25: The kitchen connects from the side entry and there is a small waiting area for families and visitors.

Image 26: The smaller kitchen is used daily for snack and meal preparation for the children.

Image 27: For some participants, the Mothers' Club family is their only family. Just as the kitchen is the social hub of most homes, it is the same at Mothers' Club. The kitchen is a social area that allows the mothers to bond, creating connections and friendships.

Image 28: The lighting fixtures in the kitchen provide a decorative, domestic feel to make the space as comforting and welcoming as possible.

Materials and FFE

The domestic feeling is maintained in the kitchen with the wooden table and chairs in the center of the space. In addition to the natural light, the lighting fixtures are more decorative to avoid an institutional feeling. The light fixtures are similar in the kitchen and lobby. Mothers' Club wanted to have an open kitchen, but didn't want the smells traveling too far, so the countertop was extended as a way to extend the kitchen while still enclosing it on three sides (Casalegno, 2012).

Supplemental Learning and Activity Spaces

Mothers' Club offers a library and counseling room for its families. There are two computers for the parents to use, which helps with job and education resources.
Literacy is critical to the Mothers' Club program, as well as any child's development, so the library serves as a place to reinforce the importance of reading.

Image 29: The library is a resource center and reminder of the importance of reading at home and school every day.

Image 30

Image 31

Image 30: The conference room can provide a respite for parents in need, or it can serve as a light-filled meeting space, providing the flexibility that Mothers' Club needs to best suit each parent, every day.
Image 31: The computers are a resource for parents to research education and job options.

Family Projects: At times families are given projects for the adults and children to work on together at home. Often, the adults will begin the project at Mothers' Club, using the computers in the library and their peer resources, to gather an information base to guide their children in the project at home.

Technology: The two computers in the library provide most of the computer technology at Mothers' Club. Staff commented that they are thinking of incorporating more technology into the children's classrooms in the future.

Flexibility

The conference room offers flexibility for the program. It is one of the most private rooms at Mothers' Club, and can be an escape for a mother in need. The room is filled with natural light from the windows, but the frosted glass door and shades allow it to be completely private for meetings. Or, as a staff member noted, sometimes one of the mothers simply needs a place to rest if it has been a long night with the children. The room can be an oasis within Mothers' Club (Casalegno, 2012).

Outdoor Learning Garden

Outdoor learning environments are critical to the health and well being of children (Louv, 2005). The outdoor learning garden at Mothers' Club provides the opportunity for play and exploration, both of which are essential to a child's growth and development.

Feature 2: "Outdoor Learning Garden: Large glazed overhead doors connect classrooms and outdoor play areas seamlessly. Incorporating a heritage oak tree, the outdoor classroom is subdivided for different age groups and includes art walls, hands-on gardens, sand and water play, trike paths, and climbing areas" (Harley Ellis Devereaux, 2011).

Indoor/Outdoor Connection: The outdoor garden gets used daily, and by staff estimates, about half of the children's time at Mothers' Club is spent outdoors on any given day. Two of the five classrooms have doors opening directly into the garden with garage doors, and a third connects directly with a glazed swing door. The interior classrooms connect to the garden by glazed doors, but the side garden, where they have direct access, has a gate separating it from the main learning garden. It was observed that students in the interior classrooms used the main vestibule to access the outdoor learning garden. Since the garden is secure, and teachers have sight lines in the garden and classroom, the need for extra staffing is minimized, promoting greater use of both spaces.

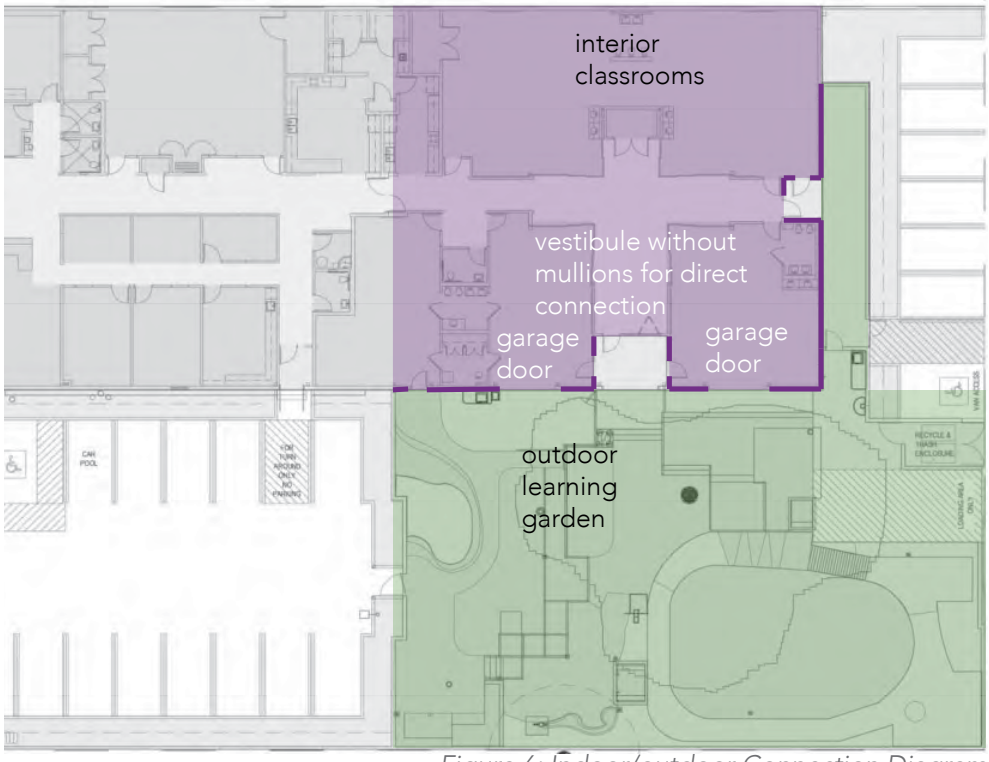


Figure 6: Indoor/outdoor Connection Diagram
Site Plan Source: Harley Ellis Devereaux

Image 32: The garage doors in two classrooms open directly into the outdoor learning garden so that the spaces become one.

Image 33: A variety of ground cover and paving materials provide a stimulating and safe environment for the children.

Sustainability

The south wall, which was retained from the original building, was punctured with two garage doors to allow for the direct connection to the outdoors. This allows for the interior and exterior to become one space.

Materials and FFE

There are many materials for the children to explore in the outdoor learning garden. Water, sand, mud, trees, and plants provide an environment in which the children can be stimulated. Careful consideration was taken in choosing the plants to ensure they were safe for children. The sensory experiences enhance learning opportunities and inspires the children.

Flexibility

The direct connection between the indoor and outdoor learning environments supports the Mothers' Club philosophy and *Creative Curriculum* teachings, which specify the importance of children having outdoor environments in which to play, and the opportunity to choose when they are inside or out. This builds independence and self regulation, critical skills for one's preparedness for school (Teaching Strategies, Inc., 2010).

Outdoor Learning Garden

The age division of the space allows for direct access from the classrooms and safety for each of the users since they range greatly in age, size, and abilities. Climbing restrictions and ground materials have different considerations for children who are just starting to crawl, to those preparing to enter kindergarten. Ground materials varied from a rubber safety surface, to sand, bark mulch, and engineered wood fiber, to ensure safety and engage students in different sensory experiences.

The art wall, trike paths, sand and water, and climbing areas for the older children provide opportunity for play and exploration. Activities such as collecting water from the pump enhance team building, cooperation, and socialization.

As Mothers' Club strives to provide a holistic education, the hands-on garden serves as another area to cultivate student skills. The garden is about 60 square feet, and the children get the opportunity to learn about growing vegetables. They get a full experience from planting and watching the vegetables grow, harvesting, preparing, and eating the food. Nutrition is another part of the curriculum, so the ability to experience locally-grown food educates them in many ways, culminating with the meal, in which students, teachers, and staff eat together in community settings.

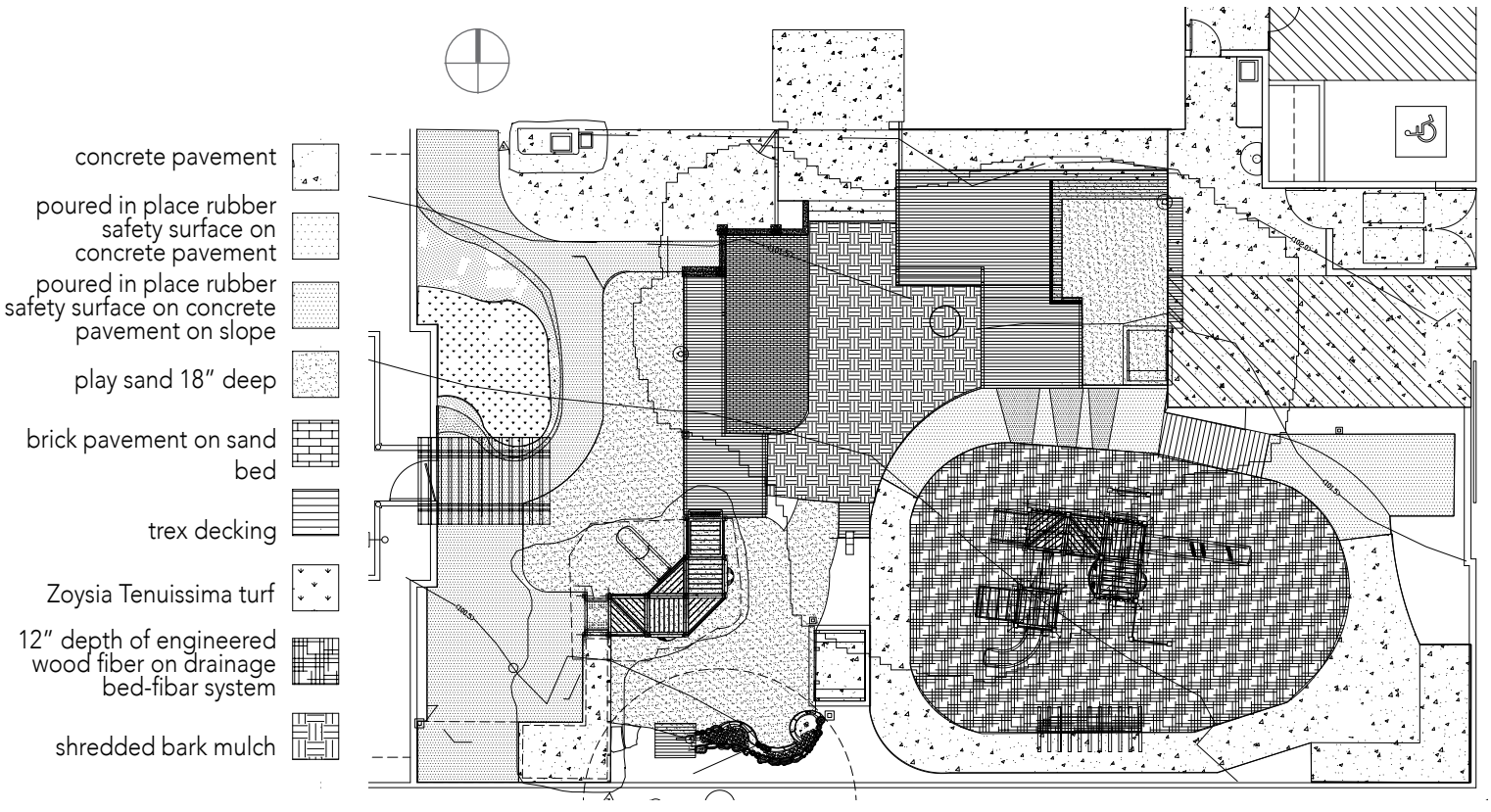


Figure 7: Outdoor Garden Plan Diagram; Source: Swire Siegel Landscape Architects

Image 34

Image 35

Images 34–36: The outdoor learning garden provides a variety of experiences for the children, from playground equipment and playing in the sand, to drawing under the shade of the large Heritage Oak.

Image 36

Outdoor Learning Garden

The Oak Tree

The Heritage Oak in the garden was the reason that the property was purchased, therefore, preserving it was a must (Casalegno, 2012). The tree provides shade in the outdoor play area, which was critical to the immediate use of the space. The deck around the tree provides a quiet reading areas under its canopy. Recently, the school used the oak tree as an advertising slogan for a fundraiser, inviting all to celebrate under the oak tree (MCFLC, 2012).

Image 38

Shading: The large oak tree provides the majority of the shade for the play garden. Additional trees have been planted, but they will take time to mature and provide shade. Currently, there is not enough shade in the garden, so temporary awnings have been installed to shield the young children from the sun. There is a variety of canopies and shading devices. The newest one is an arbor in honor of the past director of Mothers' Club. It was observed that the most problematic shade area is one for youngest children because the tent structure has poles that come down and are intrusive to the flow and circulation of the play area.

Image 40: A new arbor provides shading and seating for the children and adults.


Image 38

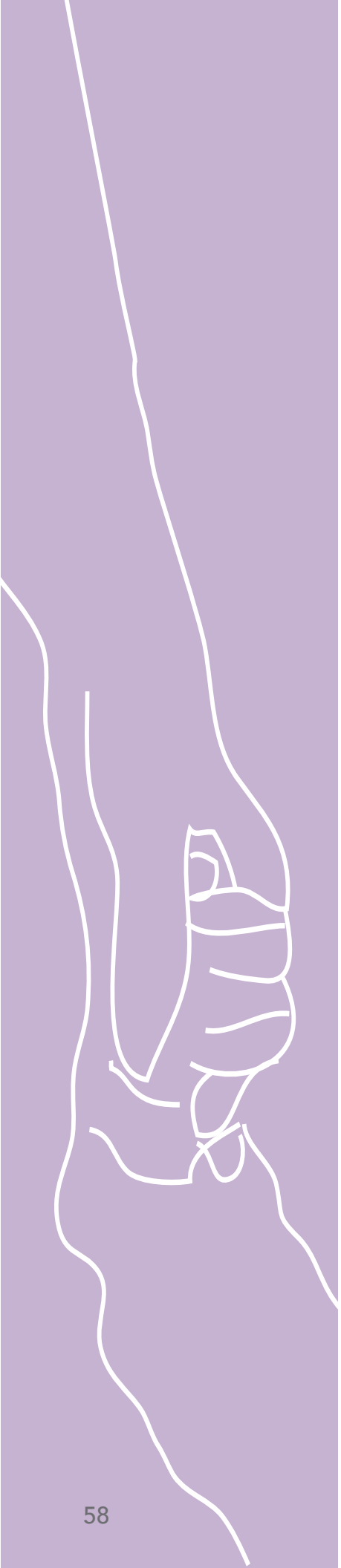

Image 39


Image 41


Image 42


Image 43

Images 41–43: A variety of canopies and tents provide additional shading from the California sun.



Conclusion

The reused Mothers' Club building creates a light-filled atmosphere that offers the flexibility to support a dual education program for children and their parents. According to observation, the literature review, and staff comments, the challenges and features as stated by the design team were addressed in the following ways:

Challenge 1: "Create an Integrated Indoor/Outdoor Educational Environment: A play atrium, porch and walled garden were carved out of a windowless factory and parking lot. Sliding, Folding and Overhead glass doors create flexibility and seamless connections between inside and outside age-specific learning spaces."

The direct connection between the classrooms and outdoor learning garden results in an integrated leaning environment. The previously windowless factory is now a light-filled space, and the original parking lot was minimized to create room for the outdoor garden. Staff commented that they are continually pleased with the flexibility throughout the building. The large garage doors allow the indoor and outdoor learning areas to become one. Instead of a 3 x 7 door, the majority of the classroom wall opens up, allowing children and staff to flow freely between the indoor and outdoor environments. The direct connection helps with staffing purposes since staff can see both spaces at once.
The age-specific areas of the outdoor learning garden considers the safety and development of the range of children. The design creates spaces for the youngest children and children two through five years.

Challenge 2: "A Seamless Learning Setting for Children and Adults: An informal, domestic character and an open, flexible plan allow adults and children to co-exist within the single volume of the factory. An open kitchen and flexible play atrium form a natural intersection between the parallel education programs."

The informal, domestic character is carried throughout the building in the furnishings, such as the light fixtures, carpet, and brick walls. Though the exposed mechanical systems above are reminiscent of the previous factory, the warm color of the brick and natural light create an open, welcoming atmosphere. A mother commented that the building "feels like a home."
The flexibility and open plan allows for unity and division between the programs when necessary. The learning spaces for each group are separate, yet simply walking down the small hall allows the mothers to participate in hands-on learning with the children.
The kitchen serves as the literal and figural heart of the building. It is the central connection between the adult and child education

programs.
The sliding glass doors connecting the central play atrium and classrooms blur the separation of the spaces. Staff commented that the space accommodates both small student-teacher groups, and it serves as a communal space for activities, such as plays that students may give for their peers and parents.
Research stresses the importance of the connection between the family and home life, and the connection between parent education levels and the overall stability of a home (Gurian, 2011; Medina, 2008). The opportunity for the parents and children to learn from each other, and separately in the same building, helps facilitate greater success in life for the parent and child.

Challenge 3: "Integrating Sustainability in the Core Curriculum: The building has been programmed to maximize hands-on learning for children and parents alike. Flexible classrooms and work areas are provided for both. Here, topics like recycling materials and using biodegradable cleansers are demonstrated."

Staff commented that the building creates an awareness of sustainability for the staff, families, and community. Hands-on learning occurs for the parents in the kitchen and in the children's classrooms. The outdoor play garden and classrooms provide numerous hands-on learning experiences for the children, with the outdoors providing experiences such as sand and water play.
Although the school itself is not currently using sustainable cleaning products due to the cost differential, they are incorporating recycled materials into program elements such as the children's art projects.

Feature 1: "Central Play Atrium: Central to the classrooms is a top-lit play area. The corners of the classrooms intersect it with sliding glass doors. When the doors are open, a larger shared activity zone is created. When the doors are closed, it's a comfortable observation area for visitors, parents and staff."

Play aids in cognitive development, socialization, and physical activity (Brown, 2009; Teaching Strategies, Inc. 2010), and the central play area offers a variety of play options. The flexibility of the space allows for interaction across the different ages of children and between the parents and children. Mothers' Club has many visitors, and the transparency allows people to see into the classroom without disrupting the actual class. The play area is also used during inclement weather. Staff commented that the transparency into the classrooms provides additional security and comfort for the parents, as many eyes can see the spaces and activities.

Feature 2: "Outdoor Learning Garden: Large glazed overhead doors connect classrooms and outdoor play areas seamlessly. Incorporating a heritage oak tree, the outdoor classroom is subdivided for different age groups and includes art walls, hands-on gardens, sand and water play, trike paths, and climbing areas."

Findings from the literature review emphasizes the importance of nature for exploration, imagination, and a full sensory experience (Louv, 2005; Medina, 2008). The direct connection from the indoors to outdoors helps promote the use of both spaces, which accommodates the Mothers' Club philosophy, which encourages the children to take direction of their learning.

Conclusion

The outdoor learning garden is a place for exploration and play for the children through the variety of materials and equipment. Children were observed riding trikes, playing in the sand, and doing art under the shade of the Heritage Oak.
Safety requirements and developmental levels were considered in creating the subdivision for the age groups. For example, the older children have higher climbing areas, and the slides are smaller for the younger children.

Feature 3: "Sustainable Components: The building is the first Gold LEED Certified CDC and has been designed to provide visible reminders of sustainable principals. For example the photovoltaic array is deliberately folded down the south façade as a playful, visual display of how alternative energy is saved."

Twenty-first century learning environments are encouraged to use the building as a tool for teaching (Partnership for 21st Century Skills, "21st century learning environments," 2009), and Mothers' Club provides that opportunity. The PV array is visible from the street, cannot be missed by those who use the side entry into the building, and is as a talking point for visitors. Pasadena is a Green City, and Mothers' Club is a leader in green design. Mothers' Club has since expanded its PV array, receiving a grant in 2011 to almost double the amount of PVs. This results in an annual savings of about $3600, which is helpful for a non profit, since foundation and government grants often do not fund maintenance and utilities costs (MCFLC, 2012).

Mothers' Club Family Learning Center provides a welcoming, domestic environment to serve families in need by providing the resources from which entire families can learn.
The building and outdoor learning garden provide flexibility to accommodate the variety of needs at Mothers' Club. The building expands and contracts to fit all of their needs, and has the details, such as child-sized fixtures, to make everyday functions as easy as possible (Casalegno, 2012).

The Mothers' Club facility enhances the value of its users. Having an exceptional building in which to learn every day helps build confidence in the families, reinforcing their individual value. The building provides a place for community, building friendships, and learning from each other in the kitchen, classrooms, and central play atrium. It is a place for holistic family learning.

Mothers' Club was successful by staff accounts and research in the following ways:

- Creating a flexible, seamless environment for both the adult and student learners.
- Providing a direct connection to the outdoors that accommodates the teaching methods of Mothers' Club by creating opportunities and experiences for the children to explore.
- Creating a sustainable environment that brings awareness to the families and community about one's impact on the earth.
- Using natural lighting and domestic materials, furniture, fixtures, and equipment to create a space that staff and learners are excited about attending on a daily basis.

There are many personal accounts from mothers in the program who have found happiness and hope at Mothers' Club. A particular story is from Ana, a mother with two children in the program. She says that her entire family looks forward to going to school, and that her husband attends the program for thirty minutes every day to learn from the teachers in the child classrooms. She writes, "I have friends, a safe place to learn and I feel happy" (MCFLC 2011 Annual Report, 2011).

There is an overwhelming sense of pride and excitement for the Mothers' Club facility. After being open for almost five years, staff and parents are enthusiastic to talk about their environment, and comment that it feels just like a home.

References and Credits

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Personal Interviews
Mothers' Club Family Learning Center:
Mara Leong-Nichols, Development Assistant
Silvana Casalegno, Director of Programs
Monica, Staff Member
A mother

Harley Ellis Devereaux
John Dale

Swire Siegel Landscape Architects
Ronnie Siegel (phone interview)

A special thank you to the staff and families at Mothers' Club Family Learning Center, John Dale from Harley Ellis Devereaux, and Ronnie Siegel from Swire Siegel Landscape Architects.
Your comments, insights, and hospitality were integral to the research.

All images and figures are the work of Kelly Martinez, unless otherwise noted.

Project Information

Mothers' Club Family Learning Center
980 North Fair Oaks Avenue
Pasadena, California 91103

Architect: John Dale, FAIA
Harley Ellis Devereaux

Type of Facility: Early Childhood Learning Environment
Age/Grade Range: Birth–5 years and Adults
Enrollment: 120 Children, 110 Adults

Date Complete: October 2007
Building Size: 10,728 square feet
Project Cost: $6,500,000
Type of Construction: Renovation

Collaboration Acknowledgements: G.L. Kaplan Construction Company, General Contractor; Swire Siegel Landscape Architects, Landscape Architecture; Eric Nelson, Child Development Consultant; Erkel / Greenfield & Associates, Inc., Structural Engineer; KPFF, Civil Engineer; Wade Webb, Photovoltaic System Supplier; Jaylene Moseley, J.L. Moseley and Company, Project Management.

Mothers' Club Family Learning Center
980 North Fair Oaks Avenue
Pasadena, California 91103

LearningSpring School

New York, New York

Introduction

LearningSpring School serves K-8th grade children diagnosed with autism spectrum disorder (ASD). Students with autism have a variety of abilities and needs, and LearningSpring School focuses on the social, academic, and developmental growth of high-functioning children with ASD.

Autism is a developmental disorder that affects functions of the brain, resulting in difficulty in communication (verbal and non-verbal), socialization, and leisure or play activities. People with autism may exhibit repetitive or restrictive behaviors, resistance to change in routine, sensitivity to any of the five senses, or unusual responses to people or attachments to objects (Fraser, 2011).

Hyper and/or hypo sensitivity to the five senses is common among people with ASD and can make any environment challenging to experience (The National Autistic Society, 2012). The goal of the architecture and design of LearningSpring School was to create an environment that would support the children and allow them to focus on their education with minimal environmental distractions.

Located in New York City, the school sits within tight site constraints, resulting in the need to build straight up on the urban site. The design team used the site size and height restrictions to develop intimate floor plates for small student-adult ratios and a secure outdoor play area. LearningSpring School is a Leadership in Energy and Environmental Design (LEED) Gold certified building, the first school in New York State to achieve the rating under the 2009 LEED for Schools Rating System. Using a material and color palette reminiscent of nature with green and brown hues, per the design team, the building is designed to be sensory-friendly with a consistently sophisticated and calming environment throughout each space.

LearningSpring School
New York, New York
Platt Byard Dovel White Architects

Grade Levels K–8	Building Size 34,000 square feet
Enrollment 98 students (108 maximum)	Year Opened Summer 2010

Program and School Summary

Autism rates have grown exponentially over the past several years (Figure 1). ASD now affects 1 in 88 children in the United States (Centers for Disease Control, 2012), and the need for specialized schools and environments to serve those with ASD is increasing. LearningSpring School serves high-functioning children with autism. The school was founded in 2001 by a group of parents who wanted different options for their children with ASD (LearningSpring School, 2012). The school moved into their new building in 2010. In addition to the September through June school year, there is a two-month summer program so the building is in use year-round. LearningSpring School was originally a K–5 school and began adding a grade every year in their new building, which is now K–8.

LearningSpring focuses on the social, academic, developmental, emotional, and physical growth of their students. This is achieved through a multi-disciplinary approach of education and therapies including:

- "An academic curriculum that adheres to the New York State Education Department Learning Standards.
- Social-Cognitive-Behavioral Curriculum that is taught and practiced throughout the entire school day.
- Speech/Language Therapy
- Occupational Therapy
- Physical Education
- Computer/Keyboarding
- Enrichment Classes in Drama, Music, Art, and Yoga
- Weekly read-a-louds in Library with opportunities to withdraw books" (LearningSpring School, 2012).

Based on the LearningSpring School mission, vision, and goals, along with research about autism and environments, the following is a summary of the needs for an educational environment:

Sensory Friendly Environment

One that does not overwhelm the senses, cause confusion, or anxiety

- Information from our five senses helps us to understand and process information, which in turn guides the way we think, feel, and/or behave. People with autism often have difficulty processing (organizing, prioritizing, and understanding) sensory information, which can cause stress and confusion (The National Autistic Society, 2012).

Calming Environment (The National Autistic Society, 2012).

- Provide a material and color palette that does not overstimulate
- Logical, intuitive, and ordered building layout
- Sensory friendly

Minimal Distractions (Paron-Wildes, 2004; Henrickson, 2009)
Limit environmental distractions for each of the five senses:

- Sight (visual activity, clutter, other people, patterns)
- Sound (noise from other students, mechanical systems, outside noise)
- Touch (materials or objects that may be too tactile)
- Smell (fragrance from food, flowers, air fresheners, perfumes/cologne)
- Taste (tasting food)

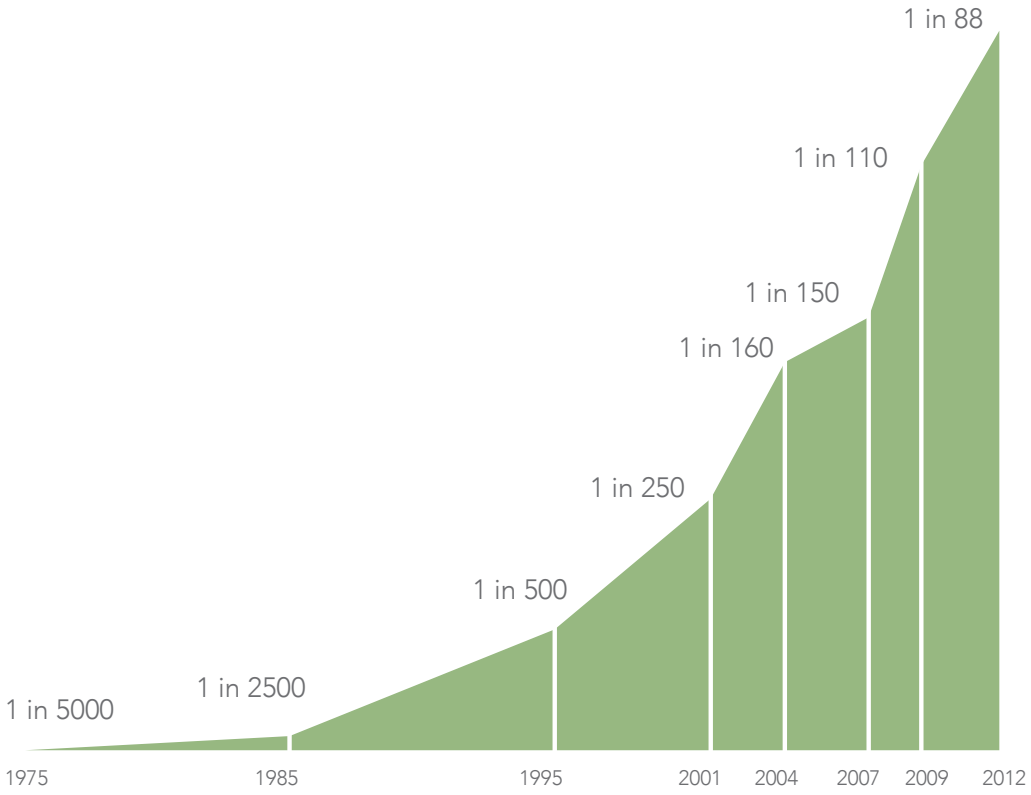

Figure 1: Rates of autism spectrum disorder in United States (Centers for Disease Control, 2012).

Number of Staff 70 full time, 3 part time	Building Levels 8 + Cellar
Total Project Cost $48,700,000	Site Context Urban

Research Questions

Does the finished school fulfill the design submittal expectations?
Does the design exhibit a full understanding of the challenges?
How successful was the design in creating an empathetic approach to support the user needs?
How does the school design address different learning styles?
How do the lessons learned from design, planning, user satisfaction, and pedagogy inform future projects?

Operating Definitions: Challenges from PBDW Architects:

Challenge 1

- "The school exclusively serves children diagnosed on the autism spectrum. Its highly specialized curriculum is geared to address the academic, emotional, social, and physical needs of its students and their families. The architectural solutions throughout have been tailored to address these needs."

Challenge 2

- "Small classrooms for 8 students and 3 teachers are paired in suites, sharing resource areas, quiet study areas and toilets. The upper and lower schools are separated by two floors of shared special instruction rooms."

Challenge 3

- "To promote opportunity for informal socialization, circulation areas are provided with numerous seating alcoves and are finished throughout as an extension of the classrooms with cork floors, bamboo case work and fabric wall coverings."

Operating Definitions: Goals and Features from PBDW Architects:

Feature 1

- "The school is pursuing gold certification via the LEED for Schools rating system. Key features include exterior mounted solar shades on the south and east facades, natural daylight in over 96% of regularly occupied rooms, and enhanced acoustical isolation between classrooms as well as the exterior."

Feature 2

- "Small floor plates limit the number of students per floor, creating intimate learning zones where students do not feel overwhelmed. A limited color palate and warm, natural materials help create a calm learning environment. Quiet rooms are available throughout when students need a sensory break."

Feature 3

- "Specialized classrooms include occupational therapy, drama, culinary arts, life skills, relationship development intervention, and an acoustically isolated music room. Ample storage minimizes clutter. Colors, textures, and patterns of finishes were selected to limit distractions to students."

Operating Definitions: Mission Statement from LearningSpring School:

Mission Statement

- "The LearningSpring School for children on the autism spectrum in grades K-8 is committed to advance the social, developmental and academic growth of its students through pioneering educational and therapeutic strategies in order to prepare each child to participate in the wider community."

Operating Definitions: Literature Review Summary

It should be noted that everyone responds differently to environments, and studies are limited because of the range of abilities and needs for those with ASD. Many recommendations are based on personal experience from those living and working with people with ASD.

- Building layout should be simple; it should reflect clarity, calm, and order (Department for Education and Employment, 2005).
- Clear wayfinding and good signage helps build independence (Department for Education and Employment, 2005).
- Providing a variety of large and small spaces helps accommodate a range of space sensitivities (Department for Education and Employment, 2005).
- To minimize sensory overloads, environments should be low-sensory stimulus, which can reduce stress and anxiety (The National Autistic Society, 2012).
- Plain, bare walls allow teachers to add stimulus according to student needs (Paron-Wildes, 2004).
- Provide a variety of spaces in the classroom for different teaching methods (Mostafa, 2008).
- Avoid noise distractions (Mostafa, 2008).
- Lighting - use indirect lighting, provide natural light, and avoid fluorescent lighting (Paron-Wildes, 2004).
- Robust materials should be used, along with safety precautions for doors, windows, glass, etc. (Humphreys, 2005).
- Class-base containment for safety, security and supervision, and balance security and independence while maintaining safety, eliminating risks, and avoiding an institutional feel (Department for Education and Employment, 2005).
- Reducing detail can help minimize stimulation and obsessive behaviors (Humphreys, 2005).
- Good observation opportunities help staff understand an individual's behavior when there is not an adult in the room (Humphreys, 2005).
- Individuals with autism require more personal space (Humphreys, 2005).

Image 1: the name of the school is displayed prominently on the 2nd Avenue and 20th Street awnings.

Site and Context

LearningSpring School is located at the corner of a bustling intersection in the Gramercy Park neighborhood of Manhattan. It is a mixed-use area with schools, parks, residential, and commercial buildings.

The goal of the building was to create an identity for the school while being a "good neighbor" and fitting into the surrounding context. The exterior envelope creates a strong corner presence, yet still blends with the overall street atmosphere (Gaswirth, 2012).

The tight urban site constraints dictated that the building would be built up. The building is composed of an eight-story mass at the corner on two-thirds of the site, with a three-story portion at the back of the site. Though the small area allowed for intimate floor plates, it was a challenge to fit the classroom and therapy spaces along with repeated services on each floor (Gaswirth, 2012).

Image 2: Detail of the exterior materials, including a custom-curtain wall system.

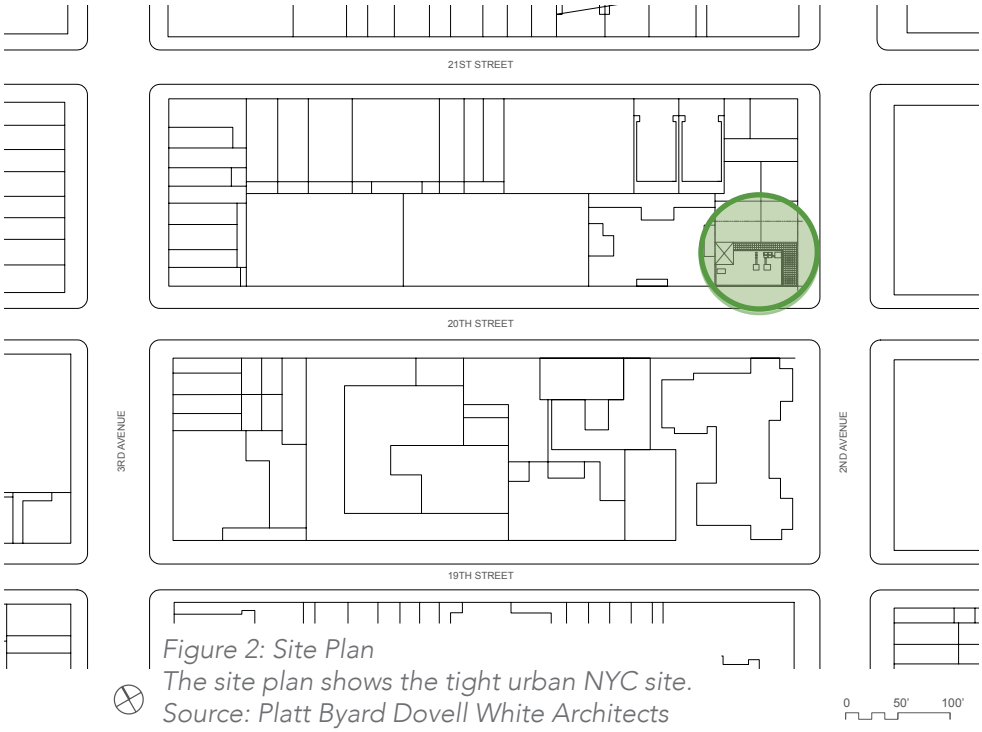

Figure 2: Site Plan
The site plan shows the tight urban NYC site.
Source: Platt Byard Dovell White Architects

Image 3: View of LSS from 2nd Avenue in the urban context.

Image 4: School logo

Image 5: LED lights provide a dynamic street level facade.

Sustainability

The insulated exterior cladding system minimizes interior and exterior heat transfer.
The custom, aluminum sun shading system on the south and east sides of the building limits solar heat gain in the warmer months and allows the heat gain in the winter.

Materials and FFE

The exterior cladding is composed of a terra-cotta rainscreen system, insulated zinc panels, insulated low-e glazing, and an aluminum sun shading system.
The exterior signage, including the school name and logo, elegantly identify the school on 20th Street and 2nd Avenue.
LED light panels add a dynamic to the street since there are no storefront windows at ground level.

Building Organization

The eight-story mass of the building stands tall on the corner, giving a strong sense of the multi-story school. The entry maintains a one-story height, which can be helpful for the students who may get overwhelmed with spaces that are too large (Department for Education and Employment, 2005).

The entry offers the stairs or elevator to access the other floors of the building. The upper school, grades 6–8, and lower school, grades K–5, are divided by special education and shared therapy spaces (Figure 3). The LearningSpring School logo is a tree, and instead of the classrooms being named by grades or numbers, each is named after a tree. The colors and materials continue with the natural theme throughout the building.

When the students arrive each morning, they are taken by hand into the building. Upon entering the first floor of LearningSpring School, the public space contains an open lobby with a staffed desk and visual cues to the circulation access to the upper floors. The stairs widen at the landing, opening up to the lobby (Image 6). There is a large window to the gym below, which is one of the few interior connections between floors. The second level incorporates a second waiting and lobby space for the administrative areas and library.

Image 6: The corner presence of the building, with signage to identify the school.

Image 7: The view upon entering LearningSpring School. The space serves as a student waiting area, provides access to the upper floors, and displays the green and brown color palette in the building.

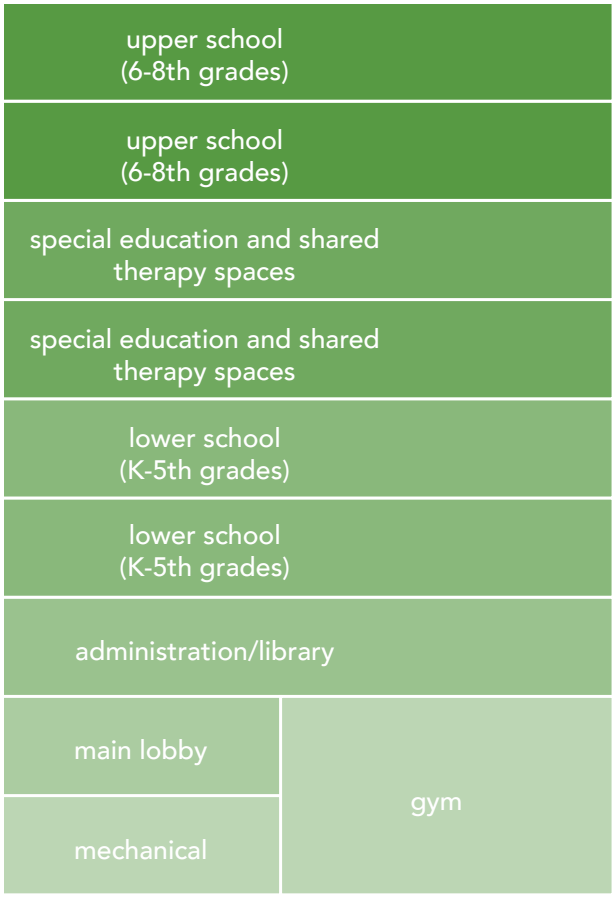

Figure 3: Vertical space layout diagram.

Materials and FFE

The color and material palette is immediately visible upon entering the building (Image 7). The green, brown, and beige colors and bamboo are reminiscent of a natural palette that is consistent throughout the LearningSpring School. Research has proven that green is a calming color for children with autism (Pauli 2004). Being outside in nature can have positive effects on children with autism (Sachs & Vincenta 2010). The design team worked closely with the school staff in choosing colors and materials, and based on personal experience of the staff and expert advice, the colors were selected.

The green in the lobby is the most prominent wall color in the school, as the classrooms are more subdued to minimize visual distractions for the learning environment.

The walls and bench seating in the lobby are bamboo, and the material is consistent throughout the school.

Entry

The school entrance has two sets of doors, but one is a fire escape from the gym. The views to the interior inform users which set to use (Image 8).

Lobbies and Security: The first-floor lobby reception desk acts mainly as building security, and the lobby is a waiting area for students as they arrive or are dismissed for the day (Gaswirth, 2012).

The second floor has another reception desk and lobby, serving the administrative offices, as well as the library and conference room. The second waiting area allows visitors to wait without disrupting the students.

Building levels three through eight, which primarily serve the students, are secured with key card access. There is a sense of layered security for all building users.

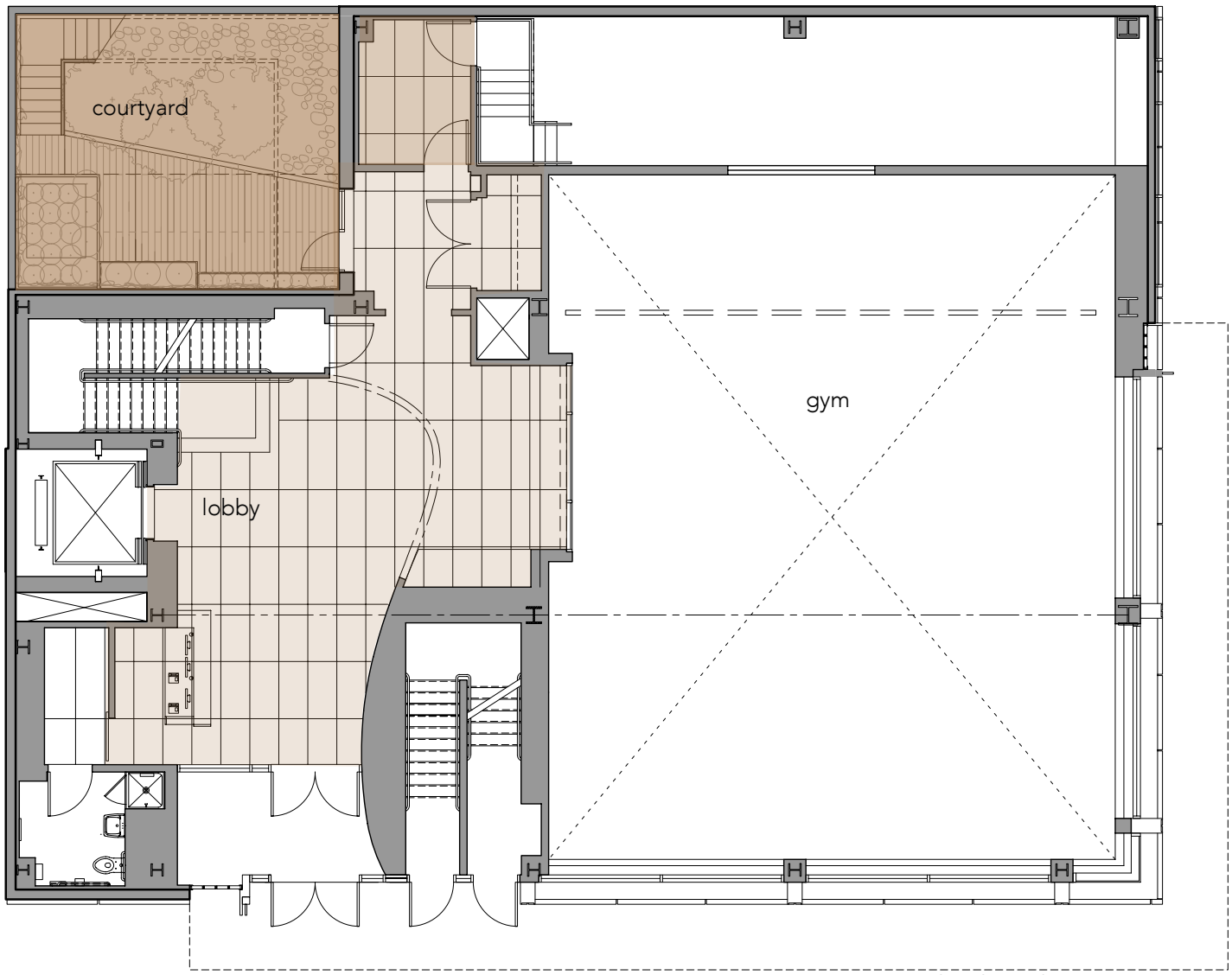

Figure 4: Level 1 Floor Plan Space Diagram
Floor Plan Source: Platt Byard Dovell White Architects

Image 8: LearningSpring School entry. The entry doors are next to a fire escape, but there is no confusion about which set to use because of the views to the interior from the main doors.

Figure 5: Level 2 Floor Plan Space Diagram
Floor Plan Source: Platt Byard Dovell White Architects

Learning Spaces

Providing a calm environment with minimal distractions is important to ensure that children with autism have the greatest potential to focus on classroom instruction. Sound, lighting, and materials are among the design elements that can contribute to a student's success in the learning environment (Humphreys, 2005; Paron-Wildes, 2004).

Challenge 2: "Small classrooms for 8 students and 3 teachers are paired in suites, sharing resource areas, quiet study areas and toilets. The upper and lower schools are separated by two floors of shared special instruction rooms." (PBDW Architects, 2012).

Classroom instruction at LearningSpring School is composed of a variety of academic and specialized areas. The floors with the academic classrooms have classrooms paired in suites that share a breakout area. The breakout areas are used often throughout the day, sometimes for small group work sessions or for speech therapy. The heavy use of the breakout rooms has warranted the desire for storage in the breakout rooms (N. Martinez, 2012). It was observed that currently things are being stored on the window sill, adding clutter and disorganization in an already small space, which can be a potential distraction for the students (Paron-Wildes, 2004).

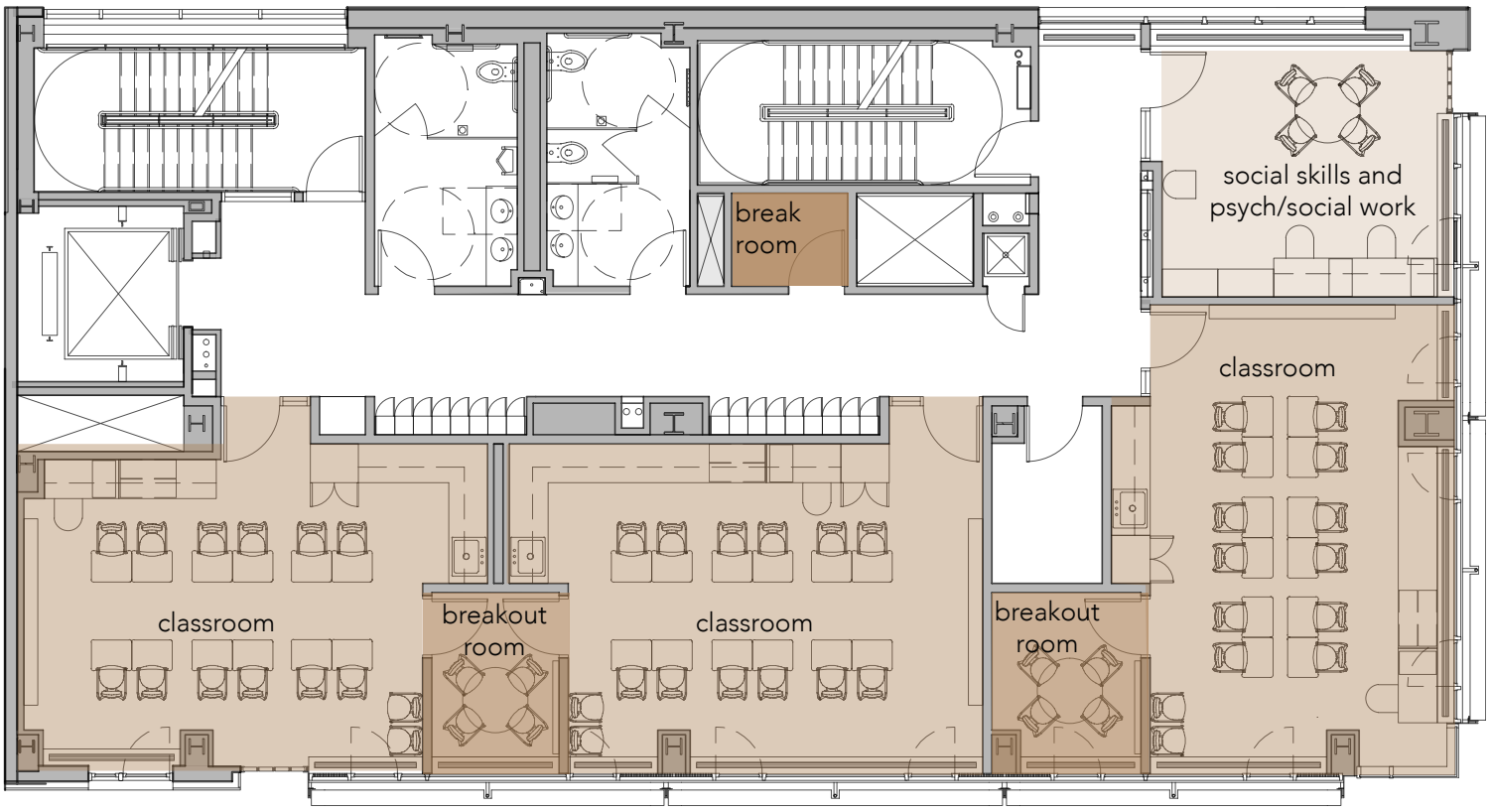

Figure 6: Level 8 Floor Plan Space Diagram
Floor Plan Source: Platt Byard Dovell White Architects

Image 9: Upper level classroom shows the smartboard technology use, lighting, and desk arrangement.

Image 10: KI Intellect Chair is designed to flex and support user movement.

Sustainability

The unique exterior curtainwall system provides large windows with shading to eliminate glare into the classrooms. The sunshading system is meant to help provide an interior focus for the classrooms while still providing ample light.

The classrooms have additional shades that the teachers can use for blackout shading, of which there was evidence of use (Image 9). It was observed that the classrooms were filled with natural light.

The classrooms and specialty rooms have Axis Lighting Cubic pendant fixtures that are equipped with the Lutron EcoSystem, which is a control system that has dimming ballasts, occupancy, and daylight sensors (Gaswirth, 2012). Administrative staff also noted that although the lights have dimming capabilities, the classroom lights are usually all on or off.

The classrooms are able to control the temperature—two degrees warmer or cooler from the main system.

Materials + FFE

The furniture is the same for the classrooms in both the upper and lower schools, with size adjustments as necessary. This allows for consistency and predictability.

Staff commented how the chairs work especially well for the students because many have difficulty sitting still during class (Lally, 2012). The chairs are the KI Intellect Chair, made of molded ABS plastic and attached to a steel tube frame. The seat and back are designed to flex as you move by relieving pressure points (KI, 2011). The chairs allow the students to fidget and move safely, without distracting the rest of the class. There is a handle built into the back for easy movement of the chair itself.

Learning Spaces

Acoustics: A study on learning environments for children with autism showed that "acoustics are the most influential architectural factor on autistic behavior" (Mostafa 2008). At LearningSpring School, classroom acoustics have been successful. Staff commented that since there is minimal audio feedback in the learning spaces, the students tend to be quieter. The acoustic designs meet LEED requirements for enhanced acoustic performance. The decibel levels for the classroom and specialty learning areas is 35, and the room criteria (RC) level is 27.

Space Requirements: Literature states that children with autism need more space (Humphreys, 2005). According to the *Building Code of the City of New York, Volume 1*, the net floor area per occupant for a typical classroom is 20 square feet (2008). District 75 serves students with autism. The New York City Department of Education *Instructional Footprint* states that typical District 75 classrooms, with six or eight students, range from 240–499 square feet (NYC Department of Education, 2011). Thus, classrooms for students with autism provide more space per student. At LearningSpring School, the upper school classrooms are approximately 375 sq. ft. for twelve students.

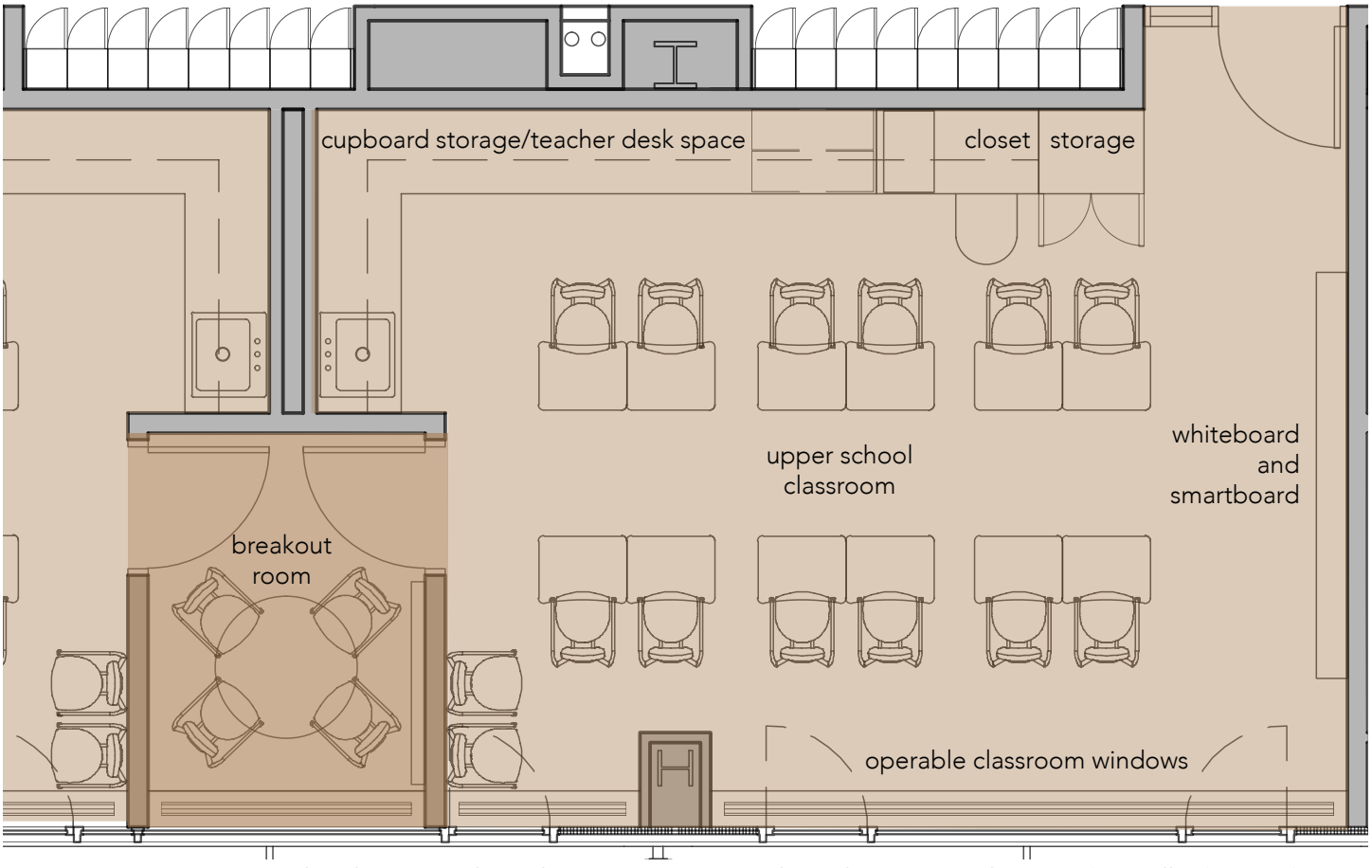

Figure 7: Level 4 Classroom Floor Plan Space Diagram; Floor Plan Source: Platt Byard Dovell White Architects

Image 10: An upper school classroom shows the desk arrangement and window shades.

Technology

All classrooms, except those for the youngest children on the third floor, are equipped with smartboard technology. To allow for varied teaching styles, the smartboards are behind typical whiteboards that slide to the sides, revealing the smartboard technology.

The original building design included cameras in each of the classrooms, hallways, and stairways for observational and teaching purposes. This allows staff to observe a child's behavior without being present, which can alter student behavior (Humphreys, 2005). The video system has recently been upgraded to an HD audio and video system, allowing both audio and visual recording of the areas. As situations arise with children, the staffing teams are able to review the videos and asses the situation.

Learning Spaces

Variety of Room Size

Literature suggests that a variety of room sizes can be beneficial for students—providing spaces to retreat when students need a sensory break, as well as options for different student, peer and instructor group sizes (Department for Education and Employment, 2005). The diagram at the right shows the different space sizes on the 7th and 8th floors. It was observed that the classroom is used for instruction for 12 students, the breakout rooms have space for about four students, and the break room is used by a student and staff member when the student needs a sensory break. The hallway is one of the long and narrow spaces in the building, which is creatively used by staff for energy-releasing activities, such as "push-box" where the students move a cardboard box up and down the hall (N. Martinez, 2012).

Image 13: An upper school classroom with a reading corner and storage.

Flexibility and Storage: The overall space does not accommodate much more than the student desks and a few bookshelves, however, desks were in various arrangements in the classrooms. Change can be stressful for the students (Fraser 2011), so consistency within each classroom is desirable. Each classroom has a movable bookcase that some have used to create a reading corner and subdivide the room (Image 13). More than one wall is dedicated to storage so that everything can be put away and clutter minimized to avoid visual distractions (Image 14).

Figure 8: Room size diagram.

Image 11: Break room

Image 12: Breakout room

Image 14: An upper school classroom shows the storage at the side of the room.

Supplemental Learning and Activity Spaces

The focus on academic, social, and developmental growth is a distinguishing feature of LearningSpring School. The interdisciplinary curriculum includes a variety of therapies for the students, so a building providing these opportunities was necessary.

Feature 3: "Specialized classrooms include occupational therapy, drama, culinary arts, life skills, relationship development intervention, and an acoustically isolated music room. Ample storage minimizes clutter. Colors, textures, and patterns of finishes were selected to limit distractions to students" (PBDW Architects, 2012).

A goal of the school is that students will be able to participate in the wider community and be prepared to enter less restrictive environments. The school environment prepares students with a variety of spaces that range from emulating mainstream schools as closely as possible, to those that are specific to the special needs and therapies for students with ASD. The gym and science lab are meant to be as close to typical environments as possible. Students can begin to be more comfortable in mainstream environments and avoid feeling like the design singles them out. Special structural considerations were taken in the occupational therapy room for equipment such as swings, which help with sensory deficits.

Figure 9: Level 5 Floor Plan Space Diagram; Floor Plan Source: Platt Byard Dovell White Architects

Image 15

Image 16

Images 15 and 16 show the science lab, featuring typical lab tables and ample storage in the room to minimize clutter. Even with a wall of storage, the room had several display boards and other materials sitting out.

Materials + FFE

Given the variety of spaces, there are many materials, furnishings, fixtures, and equipment used in the specialized areas. Where possible, the materials are consistent with the other learning spaces. The kitchen uses energy-efficient equipment to reduce energy use.

Technology

The library features a smartboard and Wii gaming center to work on the academic, social, developmental, and physical growth of the students.
The school also has a computer lab to enhance technology skills.

Supplemental Learning and Activity Spaces

Music Room

The music room was designed to be acoustically separate from the rest of the building so there would not be any noise distraction when students are using the room. The room is a box within a box, with double walls, ceiling, and windows, and a soundproof door. There are no hard connections between the music room and the surrounding building structure to eliminate noise transfer (Gaswirth, 2012). The staff is pleased with the quality of the space, however, they currently do not have a music instructor so the room is being used as a multipurpose space (N.Martinez, 2012). The only furniture in the room was one chair, and it appeared that students sat on carpet remnants.

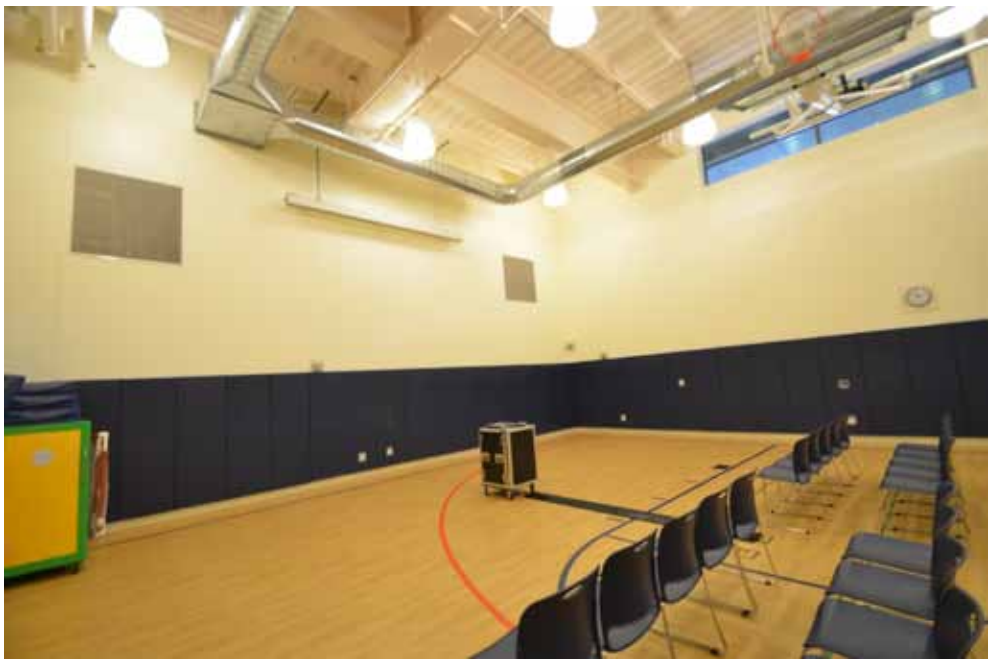

Image 17: The gym markings and materials mimic a typical gym.

Figure 11 shows the range of learning spaces throughout the building that meet the students' specialized needs, such as sensory deficits, and prepares them to be comfortable in typical learning spaces.

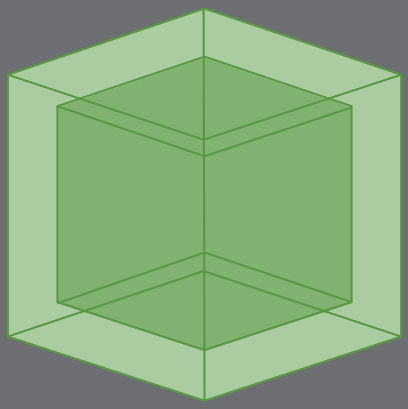

Figure 10: Diagram of the acoustic separation for the music room.

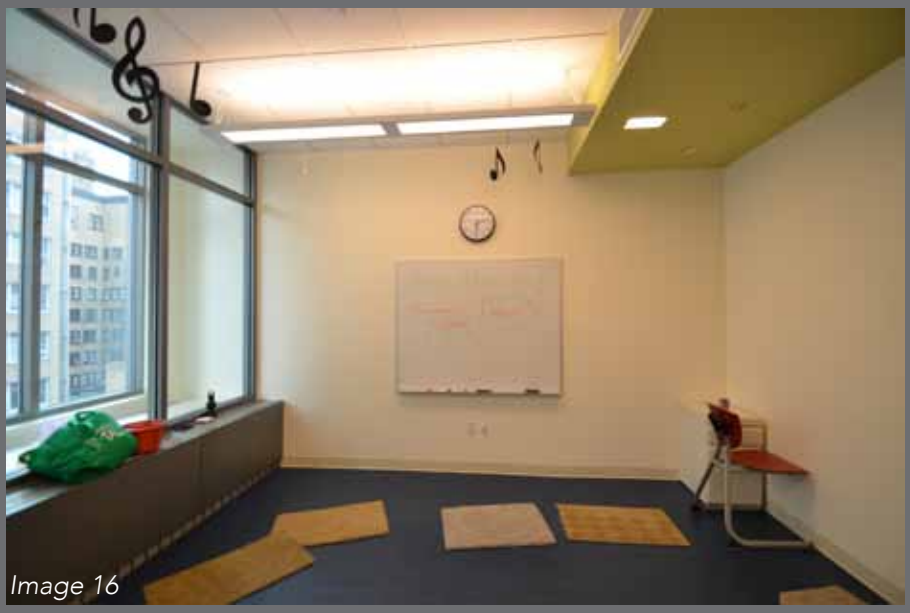

Image 16

Typical Learning Spaces

Library	*child-sized*
Gym	*regular floor markings*
Science Lab	*lab tables and equipment*
Music	*acoustic separation*
Kitchen	*used for culinary arts*
Art	*workspace*
Occupational Therapy	*structural support for swings*
Life Skills Apartment	*mimic an apartment environment*

Specialized Learning Spaces

Figure 11: Range of Learning Spaces

Image 18: The library mimics a typical library for children.

Image 19: The kitchen is a home-like setting and teaches life skills.

Circulation, Extended + Informal Learning, and Social Spaces

With an eight-story school, circulation is a critical component. LearningSpring School staff commented that it is successful, and the repetitive design of each floor plate yields circulation that is predicable and easy to navigate on each level. This is an important aspect for the students because it allows them to gain independence and avoids unnecessary confusion since the routes are easy to follow and it avoids unnecessary confusion.

The hallways have display cases and bulletin boards for student work, making the spaces personal and consistent for the students. Since too many things on the wall in classrooms can be distracting for students, the circulation display areas allow the visual stimulation to be in one place (Lally, 2012).

Acoustics: Though the acoustics throughout the entire building work well, the hallways are spaces with greater noise (Lally, 2012). Some students are quite vocal and seek out auditory feedback, so they find the spaces that produce the greatest feedback. The hallways are among those spaces, and since the students have discovered that fact, they tend to be a bit louder in the hallways (Lally, 2012).

In another effort to minimize noise distractions, there are extra vestibules added in the hallways at the entrances to the cafeteria and roof terrace, since students tend to be noisier at those times.

Image 20:
Double vestibule for acoustics.

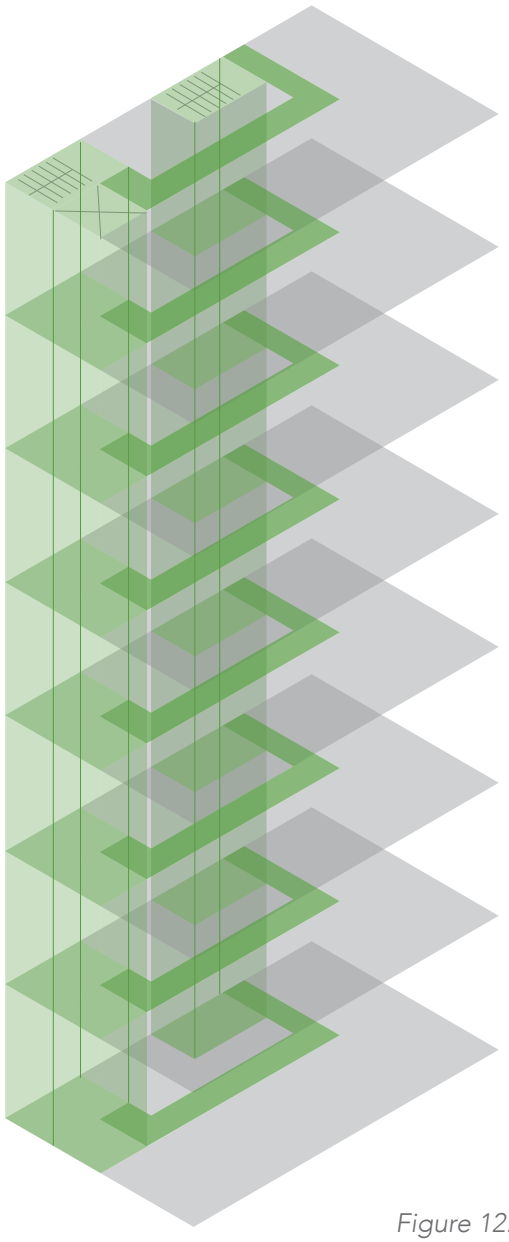

Figure 12:
Basic Circulation Diagram

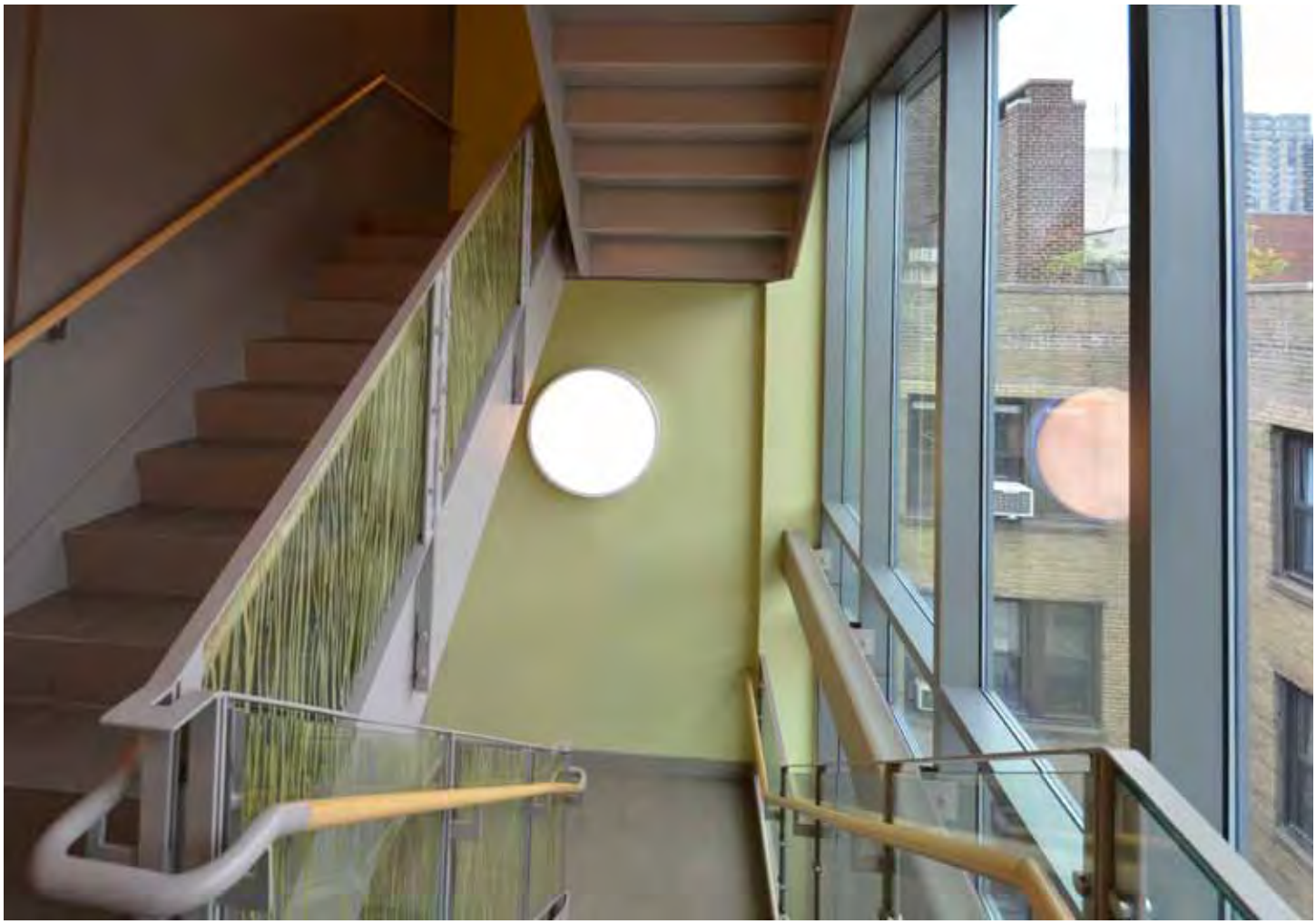

Image 21: Light filled main circulation stairway.

Sustainability

The main circulation stairway is filled with natural light—designed to serve the dual purpose of being inviting and helping to fill the interior hallways with light (Gaswirth, 2012). The goal was to encourage walking, which is both healthy for students and staff and low energy for the building, however, staff noted that the elevator has heavy use.

Materials + FFE

The main stairway is filled with natural daylight, and the material palette corresponds with the classroom spaces. The grass etched-glass stair partitions relate to the leaf etchings in the classroom, contributing to a cohesive, natural theme throughout the building. The seating alcoves are made of bamboo, another material consistent throughout the building. On the eighth floor, which serves the oldest students, the seating alcoves are replaced with lockers.
The bulletin boards on every floor have held up to heavy use and also serve as an acoustic buffer.

Circulation, Extended + Informal Learning, and Social Spaces

Informal Socialization Seating Alcoves

Challenge 3: "To promote opportunity for informal socialization, circulation areas are provided with numerous seating alcoves and are finished throughout as an extension of the classrooms with cork floors, bamboo case work and fabric wall coverings" (PBDW Architects, 2012).

Staff commented that though the seating alcoves are used, it is usually by student and teacher pairs. However, the students are slowly starting to use the seating for socialization between classes. The seating areas are also used by students who need a break from the learning space. The benches are adjacent to the classroom windows. The students can thereby step outside independently, but the transparency still allows for staff supervision.

Image 25: Large numbers in the stairwells identify each level. The simple and logical circulation makes it easy for the students to navigate (Department for Education and Employment, 2005).

Image 22

Image 23

Image 24

Image 26: Display cases and bulletin boards personalize the space while limiting classroom distractions.

Image 27: The seating alcoves were replaced with lockers for the oldest students on the eighth floor.

Outdoor Learning: Roof Terrace and Courtyard

With the tight urban site constraints, the building heights allowed for the opportunity for a roof terrace at the fourth level (Images 28 and 29). The terrace serves as a secure outdoor play area for recess and activities, and is one of the students' favorite features of the building (N. Martinez, 2012).

There is a playground across the street connected to another school, and a second city park that is also across the street. LearningSpring School uses both parks for outdoor activities, in addition to their roof terrace (Figure 13).

The first-level courtyard is another outdoor vista, however, it has very limited use. Staff commented that the space looks pretty, but rarely gets used. The space is small, approximately 300 square feet, so it is difficult for a teacher to bring an entire class (about 12 students and 3 staff) into the courtyard. Since people with autism generally need more personal space (Humphreys, 2005), that adds to the courtyard space limitations. Access is also an issue. The courtyard is at the back corner of the main lobby, and without knowing it is there, the space is easy to miss. The courtyard connects to the library, and the goal is to be able to use both spaces during fundraisers.

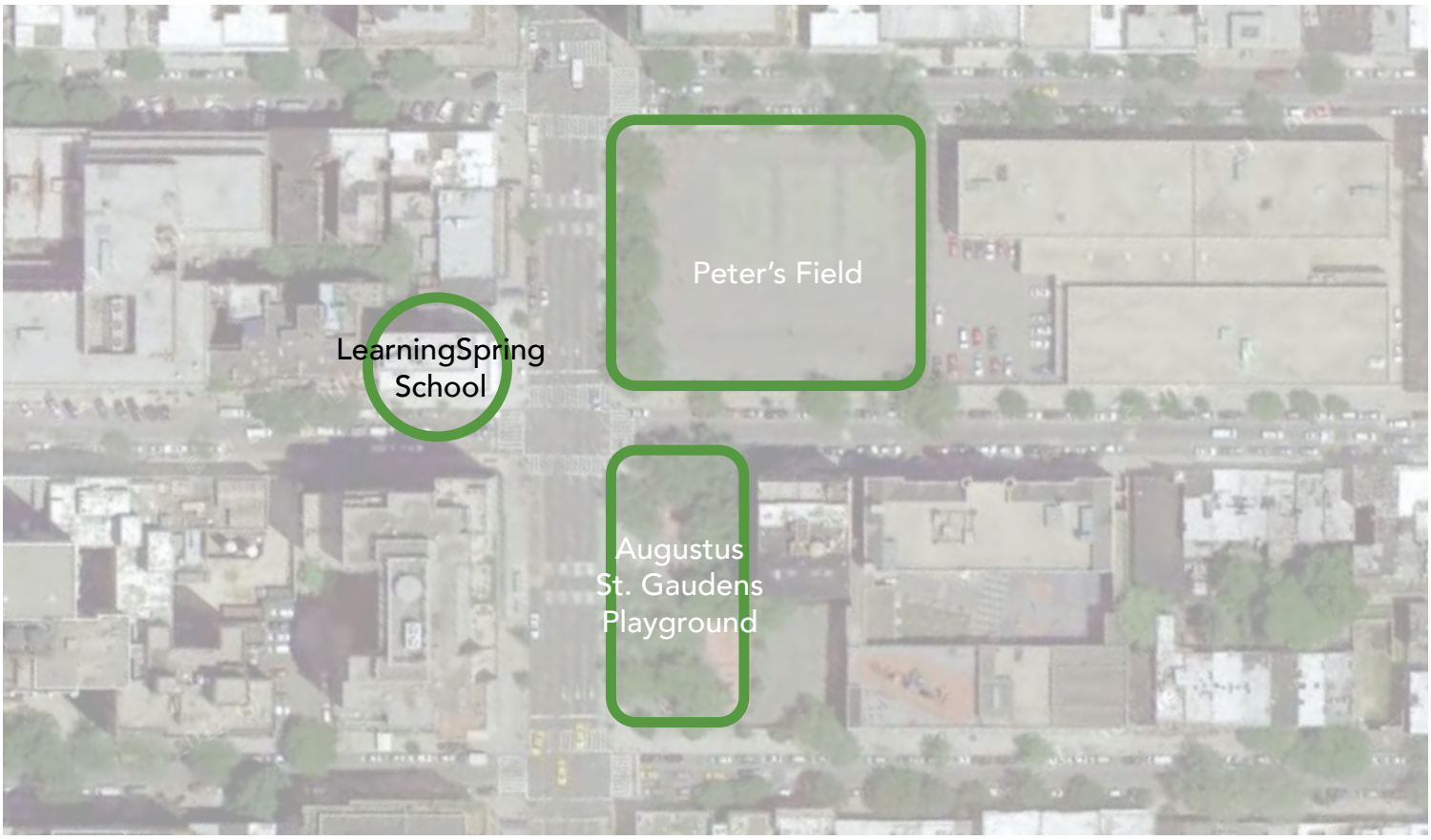

Figure 13: Map of nearby parks. Map Source: Google Maps

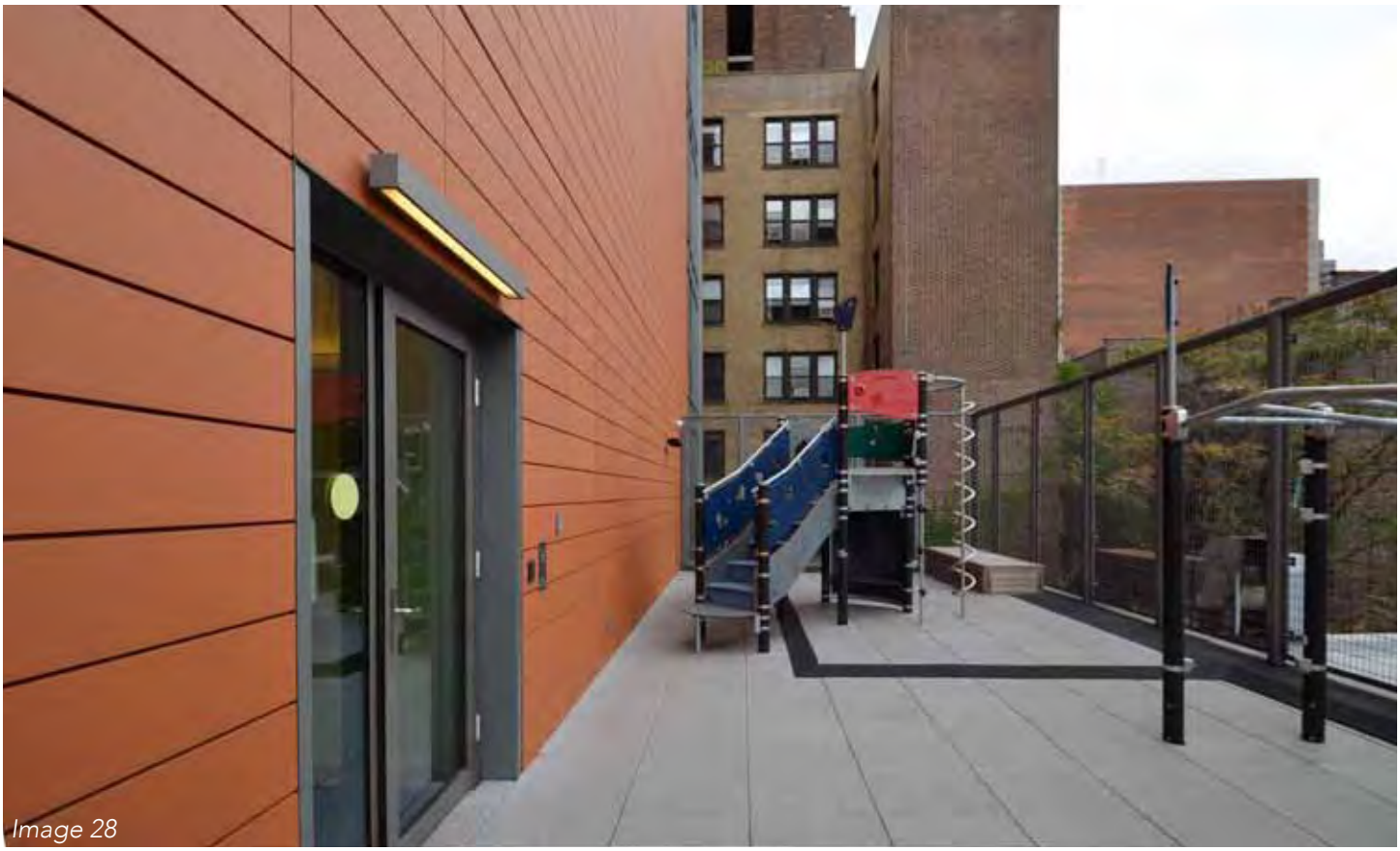

Image 28

Images 28 and 29: The roof terrace provides a secure play area for the students, and offers views to the parks across the street.

Sustainability

EcoSurfaces EcoMax floor tiles were used on the roof terrace. The tiles are light colored to reduce the heat island effect, and they offer water drainage. The surface provides cushioned support and is slip resistant for the children's safety (Ecore Intl. 2011).

Image 29

Technology

The roof terrace is connected to the main desk through an intercom and is only accessed by key card. The communication ability helps in emergency situations, and in case students or staff get locked outside. The area is also connected to the security cameras throughout the building.

Conclusion

The overall learning environment of LearningSpring School addresses the specific needs of the students with autism in an urban Manhattan setting. According to observation, the literature review, and staff comments, the challenges and features as stated by the design team were addressed in the following ways:

Challenge 1: "The school exclusively serves children diagnosed on the autism spectrum. Its highly specialized curriculum is geared to address the academic, emotional, social, and physical needs of its students and their families. The architectural solutions throughout have been tailored to address these needs."

Findings from the literature review emphasize the importance of structure and a low stimulation environment as a basis for learning to take place (Department for Education and Employment, 2005; The National Autistic Society, 2012). The building addressed the academic needs by creating small classrooms with minimal distractions by providing storage, natural light, and acoustic levels of 35 dBA or less.
Emotional needs were addressed by providing spaces to escape, such as the break room or benches outside the classroom, and areas for socialization and learning. By creating a calm and ordered environment, the goal was to reduce stress and anxiety.
Social needs are integrated into every part of the curriculum as part of the multi-discipline pedagogy. Seating alcoves in the hallways were additional measures to allow for informal socialization.
By providing areas for therapy and play (such as occupational therapy and the gym), students have the opportunity to work on physical needs. It was also observed that the cafeteria served as a place for gymnastics after school, thus providing another area for physical activity. The roof terrace offers a playground for the students and the site is across the street from two parks which LearningSpring School uses, in addition to their roof terrace.

Challenge 2: "Small classrooms for 8 students and 3 teachers are paired in suites, sharing resource areas, quiet study areas and toilets. The upper and lower schools are separated by two floors of shared special instruction rooms."

The layout worked well by creating small learning environments that were not too overwhelming for the students. The repetitive floor plan, though necessary from site constraints, was helpful for the students because it created more intimate floors and was predictable. Individuals with autism tend to find security and comfort in repetition, and therefore the consistent layout and circulation

made navigation throughout the school easy for the students. Staff commented that at a time of many tours, a student was able to lead his own tour, impressing both the staff and visitors.
Staff mentioned that the vertical organization has changed the way they work in that they send more emails to each other, as opposed to physically going to see each other.
The small breakout rooms adjoining the classrooms were used often according to staff, and because of their use, it was commented that the school could use additional storage in those spaces.

Challenge 3: "To promote opportunity for informal socialization, circulation areas are provided with numerous seating alcoves and are finished throughout as an extension of the classrooms with cork floors, bamboo case work and fabric wall coverings."

One of the characteristics of autism is difficulty in socialization (Fraser, 2011), and LearningSpring School incorporates working on social skills throughout the entire program. The seating alcoves are a way to promote socialization. Staff commented that the benches are typically used by a single student, or student and staff pair, but that slowly they are starting to see more students use the seating in between classes. The extension of the finishes from the classrooms to the hallways maintains a consistent material and color palette throughout the building, thus providing minimal additional stimulation and keeping a calm feeling throughout the building.
The fabric wall coverings provide a space to display student work. Staff commented that it is helpful to have the visual stimulation outside of the classroom, in a consistent place on every floor.

Feature 1: "The school is pursuing gold certification via the LEED for Schools rating system. Key features include exterior mounted solar shades on the south and east facades, natural daylight in over 96% of regularly occupied rooms, and enhanced acoustical isolation between classrooms as well as the exterior."

The LEED gold certification was achieved, and it was the first school in New York state to do so under the 2009 LEED for Schools Rating System.
It was observed that the classrooms were brightly lit by the south and east windows, and the sun shading system is meant to block the glare from the sun and keep an interior focus for the students. Staff commented that even with the daylight, the lights in the classroom were usually all on or off.
It was observed that the shades were partially drawn to minimize the light and glare. The architect noted that the design team was told that horizontal patterns are less distracting than vertical ones, therefore, the horizontal sun shading system should not be too distracting for the students. The classrooms acoustics were designed to be 35 dBA or less, and staff commented that the classrooms were very quiet.

Feature 2: "Small floor plates limit the number of students per floor, creating intimate learning zones where students do not feel overwhelmed. A limited color palate and warm, natural materials help create a calm learning environment. Quiet rooms are available throughout when students need a sensory break."

The small learning zones throughout each floor ensured that there would not be too many people in one area, which is helpful to keep the students from being overwhelmed.
Muted and neutral colors are recommended for children with autism to create a low stimulating

Conclusion

environment that encourages learning, and a study showed that greens (and blues) are calming for children with ASD (Pauli, 2004; The National Autistic Society, 2012). Outdoor experiences can benefit students with autism, and the LearningSpring School logo is a tree. Instead of the classrooms being named by grades or numbers, each is named after a tree. The colors and materials continue with the natural theme.

The literature recommends an "escape" room for individuals with ASD if they are overstimulated (Mackenzie, 2008; Mostafa, 2008). Staff commented that the quiet (break) rooms are a lifesaver and are used every day. The small rooms allow a student to get away if overwhelmed, and since the rooms are across the hall from the classrooms, they are close without disrupting the class.

Feature 3: "Specialized classrooms include occupational therapy, drama, culinary arts, life skills, relationship development intervention, and an acoustically isolated music room. Ample storage minimizes clutter. Colors, textures, and patterns of finishes were selected to limit distractions to students."

The staff were grateful to have the special instruction areas so that they could focus on specific skills with the students, such as fine and gross motor activities in occupational therapy.

An entire wall was dedicated to storage within each classroom. The breakout rooms did not have storage, and staff commented that it would be helpful. Overall, the school would like more storage. Staff noted that a large room would be helpful for things like gym equipment. LearningSpring School was originally a K–5 school and began adding a grade every year with their new building. The school will add another class of ten students next year. Staff said they did not anticipate how much they would acquire, thus resulting in the greater need for storage.

The colors, textures, and patterns of finishes followed recommendations about the calming colors in the use of neutrals and greens (Myler, Fantacone, & Merritt, cited in Henricksen, 2009; Pauli, 2004; The National Autistic Society, 2012). Textures should be minimized to avoid too much tactile stimulation. It was observed that the pattern of the carpet in the library was the most visible of the rooms visited, however, it maintained the same colors as the rest of the building. The library is not one of the most essential learning spaces, and literature recommends having graduated amounts of stimulus throughout the building, especially where focused instruction and learning is not as critical to avoid the "greenhouse" effect (Mostafa, 2008). In this way, the library can be viewed as a space to help ready the students for less restrictive environments.

The LearningSpring School was thoughtfully designed to accommodate students with autism and their particular needs. Since physical environmental factors can influence the amount of distractions and one's ability to learn, it is important that the color and material palette, furniture, fixtures, and equipment, and acoustics are all carefully considered (Scott, 2009, Mostafa 2008, and Paron-Wildes 2012).

LearningSpring was successful by staff accounts and research in the following ways:

- Ensuring that enhanced acoustic performance standards were followed, resulting in rooms with a 35 decibel level or less.
- Consistently using green and brown colors throughout the building, which are soothing and calming for the students.
- Maintaining similar floor plans on each level and providing a predicable layout that is easy for the students to navigate.
- Dedicating a space outside of the classroom to display student work, which allows for personalization of the school while minimizing distractions in the classroom. The staff is able to add visual stimulation to the walls as appropriate for the students.
- Providing the classrooms with ample natural lighting while still keeping an inward focus.

The LearningSpring School staff was pleased with the everyday functions of the building. Storage, which was one of the considerations from the beginning, is an area where more space would be helpful. The school grew into the building, and with that, their storage requirements grew beyond their current capacity.

Staff stated that 70% of students go to high schools that are less restrictive than LearningSpring School, and all continue in a special education program.

The staff remarked how the students enjoy the building and have commented on the environment. The students typically do not give feedback or make comments, so the staff thought it was a testament to the architecture that the students were voicing their joy. The lighting, materials and colors, and building organization offer a calm environment where students can focus on their education and prepare to be participants in the wider community.

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Personal Interviews
LearningSpring School
Margaret Poggi, Head of School
Jessica Lally
Neil Martinez (Tour of Facility)

Platt Byard Dovell White Architects
Erica Gaswirth

A special thank you to the staff at LearningSpring School and Erica Gaswirth from Platt Byard Dovell White Architects.
Your comments, insights, and hospitality were integral to the research.

All images and figures are the work of Kelly Martinez, unless otherwise noted.

Project Information

LearningSpring School
247 E. 20th St.
New York, New York

Architect: Ray H. Dovell, AIA
Platt Byard Dovell White Architects

Type of Facility: Alternative School or Innovative Learning Environment
Age/Grade Range: K–8th Grade
Enrollment: 98 Students

Date Complete: Summer 2010
Building Size: 34,000 square feet
Project Cost: $48,700,000
Type of Construction: New Construction

LearningSpring School
247 East 20th Street
New York, NY 10003


LEARNINGSPRING SCHOOL

Redding School of the Arts

Redding, California

Introduction

Redding School of the Arts is a public arts charter school serving K–8th grade students who show an interest in visual and performing arts. The school recognizes the importance in arts education to benefit all academic areas and enhance one's understanding of the world around them (Redding School of the Arts, 2011).

At a time when arts education programs are being cut due to budget constraints, the value of imagination and creative thinking is rising (Pink, 2005). Redding School of the Arts seeks to combine arts and education, stating:

> the mission of the school is to enable students to become literate, self-motivated, and life long learners who appreciate, enjoy and respect the visual and performing arts. By creating a learning environment rich in arts and culture that encourages connections in their learning environment students will learn." (2011)

The building itself aims to be an inspiration to its students, staff, family, and community, providing opportunities for arts performances and teaching about sustainability as a way of life. Located in Redding, California, Redding School of the Arts was completed in August 2011. The project was funded by the McConnell Foundation, a local Redding philanthropic organization. The partnership satisfied the needs of both the school and the Foundation: the McConnell Foundation was looking to create a large demonstration project about sustainability, and Redding School of the Arts needed a new home (Salter, 2012). Trilogy Architecture designed the first Leadership in Energy and Environmental Design (LEED) Platinum certified building in the nation under the 2009 LEED for Schools Rating System.

The school serves as a tool for teaching the students and staff about sustainability and offers a cheerful environment through its vivid interior colors and exposed structure. The building design focused on outdoor and semi-conditioned space, with its signature feature being an outdoor theater.

Redding School of the Arts
Redding, California
Trilogy Architecture

Grade Levels
K–8

Enrollment
540 students

Building Size
77,000 square feet

Year Opened
August 2011

Program and School Summary

Redding School of the Arts "believes when it comes to young minds, art enriches, expands and prepares them for a full life in useful and unexpected ways," (Redding School of the Arts, 2011). The school combines a multi-disciplinary approach to education, providing opportunities in visual and performing arts to support academic learning.

The school also offers a Mandarin Immersion Program and a nationally recognized innovative special education program. The school curriculum follows California State Frameworks for the basic concepts, content goals, and skills and offers a yearlong thematic approach based on the following themes: Africa, Asia, and Early European History; California and American History; and Ancient Civilizations (Redding School of the Arts, 2011). Students and parents noted that the interdisciplinary pedagogy allows students to make connections across academic subjects and arts to develop a full understanding of the topics. The students study math in groups according to academic level, not age and grade. Based on the different programs and electives offered, students often move to different classes often throughout the day.

The philosophy of Redding School of the Arts is described as a four-level pyramid (Figure1):

> Interdisciplinary units that contain well planned instructional lessons in academic subjects and which include activities in the arts enable children to develop initiative, creative ability, self-expression, self-reflection, thinking skills, discipline, a heightened appreciation of beauty and cross-cultural understanding." (Redding School of the Arts, 2011)

Founded in 1999, the charter school was originally divided among two campuses, sharing space with other schools before moving into their new building. Over the years, Redding School of the Arts has offered a successful academic education, and currently has a waiting list of over 500 students (Hatch, 2012).

Parents and staff commented on the value of the connection between arts and education, indicating that the school offers many different classes and ways to get excited about learning. Even if a student is not the strongest in academics, everyone has the opportunity to excel in the arts.

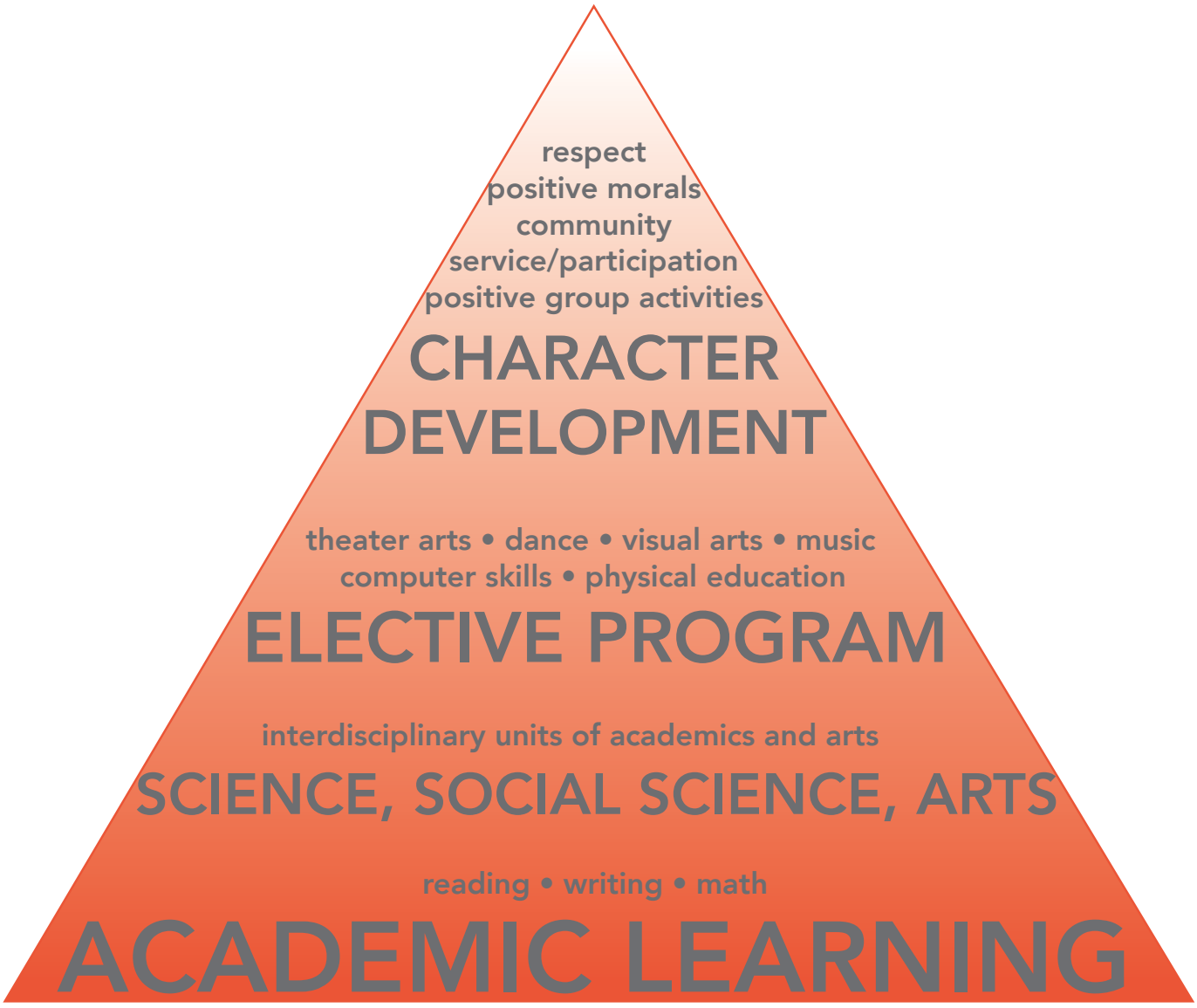


Figure 1: Diagram of Redding School of the Arts' educational approach, which focuses on academic learning, science, social science, and arts, an elective program, and character development. (Diagram based on text from Redding School of the Arts, 2011).

Number of Teachers 27	Building Levels 2
Project Cost $32,000,000	Site Context Suburban

Research Questions

Does the finished school fulfill the design submittal expectations?
Does the design exhibit a full understanding of the challenges?
How successful was the design in creating an empathetic approach to support the user needs?
How does the school design address different learning styles?
How do the lessons learned from design, planning, user satisfaction, and pedagogy inform future projects?

Operating Definitions: Challenges from Trilogy Architecture:

Challenge 1

- "50% of learning space located outdoors in a marginal climate 1) Outdoor theater at center of school 2) Semi-conditioned galleries 3) Translucent canopy for daylight AND protection 4) Operable garage doors to open interior space to nice weather."

Challenge 2

- "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space 2) Varied and flexible interior space, and 3) Technology wall with projection/sound and traditional whiteboard for different teaching styles."

Challenge 3

- "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements."

Operating Definitions: Goals and Features from Trilogy Architecture:

Feature 1

- "A centrally located outdoor theater with music classroom walls that double as stages opening up to the audience by way of large bi-fold hangar doors, with 1) large overhangs for excellent acoustical performance 2) Connection to circulation galleries for common informal social use."

Feature 2

- "Semi-conditioned space. Design of 50% of the learning space is located outdoors even though the climate is considered marginal for outdoor use, with 1) Summer cooling through evaporative cooling fabric ductwork 2) Winter radiant heating timed to occupant use 3) significant energy savings."

Feature 3

- "Juxtaposition of traditional building materials such as rammed earth walls and 120 year old recycled redwood against the framework of concrete, steel and glass, with 1) The use of color to accent material contrast and provide wayfinding."

Operating Definitions: Mission Statement from Redding School of the Arts:

Mission Statement

- "The mission of Redding School of the Arts, where education and the arts connect, is to educate K-8 students who have an interest in visual and performing arts and cultivate their knowledge and skills for the betterment of their local and global community. Utilizing an inter-disciplinary theme based approach, students will learn to read, write, speak, problem solve, use technology and sustainable practices. RSA seeks to accomplish its goal of high academic and behavioral standards through a student centered, multicultural and multi-lingual environment with an emphasis on the arts. This charter school will enable students to become literate, self-motivated and life-long learners who participate in the art of their community" (Redding School of the Arts, 2011).

Operating Definitions: Literature Review Summary

- Arts and music education are proven to increase scores in math and reading ("Record Investment in Music, Arts, & PE" cited in OWP|P Architects, VS Furniture, & Bruce Mau Design, 2010).
- 21st Century buildings should serve as teaching tools for the learning community (Partnership for 21st Century skills, "21st Century Learning Environments," 2009).
- 21st Century buildings should promote collaboration and flexibility (Partnership for 21st Century skills, "21st Century Learning Environments," 2009).
- Color has been proven to affect morale and school pride (Kollie, 2004).
- Color in schools can "increase productivity...and support developmental processes" (Englebrecht, 2003).
- A view to the outdoors has been proven to improve student outcomes (Heschong Mahone Group, Inc. 2003).
- A connection with nature helps students receive a full sensory experience (Louv, 2005).

Site and Context

Redding School of the Arts sits 600 feet from the road on a site with views of the surrounding trees and Cascade Mountains in Redding, California. Located on McConnell Foundation property, the school is situated amongst trees and has a sense of peaceful isolation, even though the site is nearby homes and other schools. The serene setting is separated from its neighbors but takes advantage of being connected to the community.

The ample space on the site allows the building footprint to sprawl, providing each of the general classrooms with northern light. The site also provides a large playground and athletic fields behind the building.

Feature 3: "Juxtaposition of traditional building materials such as rammed earth walls and 120 year old recycled redwood against the framework of concrete, steel and glass, with 1) The use of color to accent material contrast and provide wayfinding" (Trilogy Architecture, 2012).

The material juxtaposition is evident along the front facade, with the rammed earth walls and more modern materials.

FIgure 2: Redding School of the Arts Site Plan; Source: Trilogy Architecture

Image 1: The entry to Redding School of the Arts showcases the traditional building method of rammed earth walls. The materials and vegetation along with path complement the natural surroundings of the site.

Image 2: The traditional building material is juxtaposed with a more modern rainscreen system and a vibrant color palette that is visible throughout the interior.

Materials and FFE

The building exterior compliments the surrounding landscape through the materials. Rammed earth walls at the front of the building showcase the traditional building style. The landscaping requires minimal water, and the underground rainwater collection tank will provide the irrigation needs for all trees and plantings (Trilogy Architecture, 2012).

Site and Context

Challenge 3: "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements" (Trilogy Architecture, 2012).

As a charter school attracting students throughout the community, most students provide their own transportation to school every day. There is an arrangement with the municipal bus system to incorporate their routes into the schools hours (Theimer, 2012), and many students are close enough to walk or bike, and use the connecting paths from the neighborhoods and McConnell Foundation's Lema Ranch across the street.

There is plenty of parking, and though there is preferred parking for car pools and hybrid cars, parents commented that not all families respect the preferred parking. A school board member commented that since many students are driven every day, traffic congestion has been an issue at the school. Refined paving and the addition of bollards has increased the efficiency at the beginning and end of the day.

Image 3: The 24" rammed earth wall provides insulation from the sun for the music and dance rooms on the other side of the wall.


Image 4

Images 4 and 5: Redding School of the Arts offers preferred parking for carpools and fuel-efficient vehicles. Parents and staff commented that it is a work in progress to have all families respect the preferred parking spots. The parking lot includes mature and newly planted trees, which will eventually provide a canopy over the parking.


Image 5

Sustainability

The entire project places an emphasis on sustainability. There are preferred parking spaces for carpools and fuel-efficient vehicles. The trees near the parking lot (1 tree for every 2 parking spaces) (Trilogy Architecture, 2012), will provide a canopy as they grow and mature over the years.

For renewable energy, the building has a 120 + kW photovoltaic system and a wind turbine. Other sustainable measures include geothermal heat pumps, rainwater collection, and landscaping with minimal irrigation requirements (Trilogy, Architecture, 2012).


Image 6


Image 7

Images 6 and 7: The school roof includes a solar panel system, and the school has bike parking to promote sustainable transportation to and from school.

Building Organization

Redding School of the Arts is centered around its outdoor theater, which connects to the rest of the school through the semi-conditioned circulation spaces. The school is designed with 50% of the learning space outdoors, achieved through the semi-conditioned hallways, galleries, and the theater.

Learning spaces are on two levels: the younger students are on the first floor and older students are on the second. The learning spaces are composed of the following groups: general classrooms; dance and music; art, science, and cooking classrooms; the library, labs, and special education (Theimer, 2012). All general classrooms receive northern light.
In addition to the theater, outdoor learning spaces include: the playground that wraps the back of the building; courtyards; and the orchard, gardens, and chicken coop.

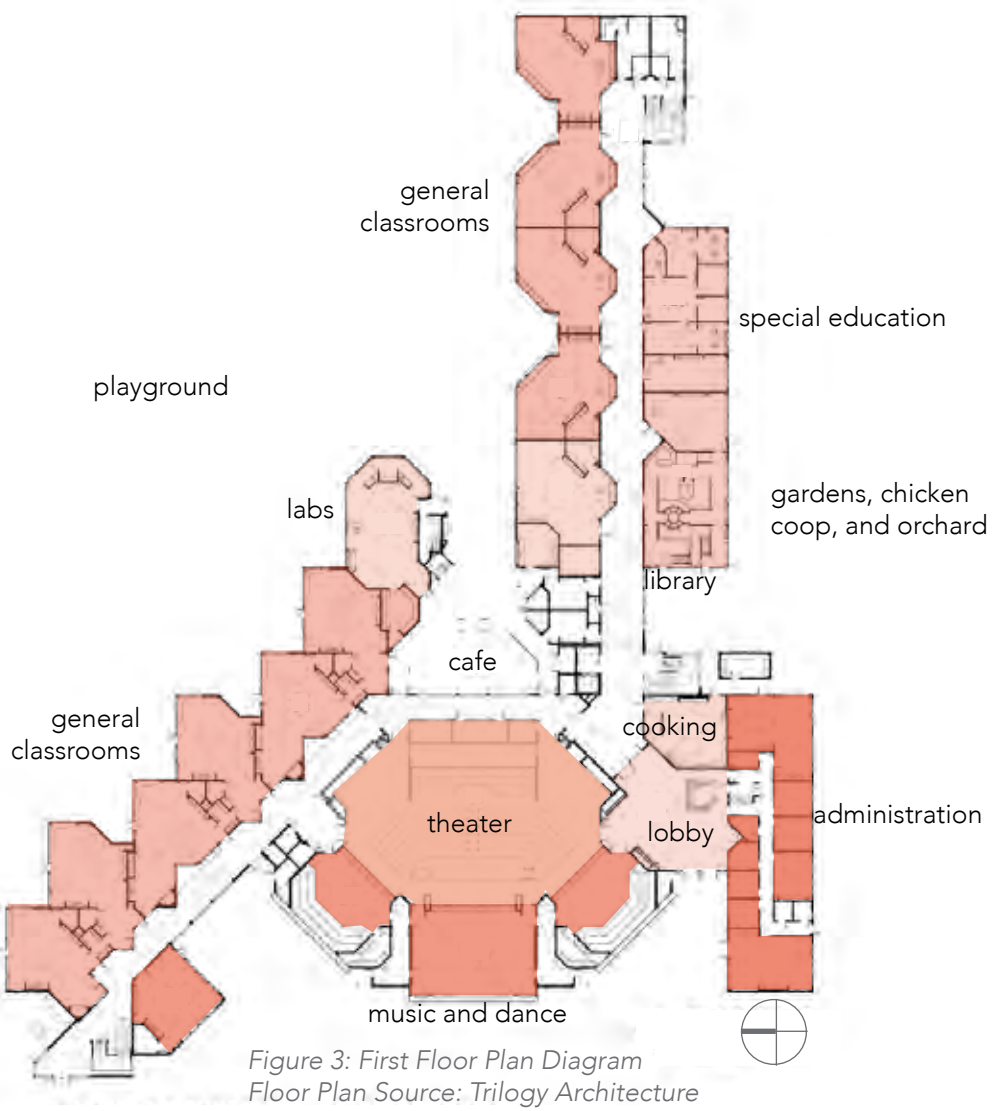


Figure 3: First Floor Plan Diagram
Floor Plan Source: Trilogy Architecture

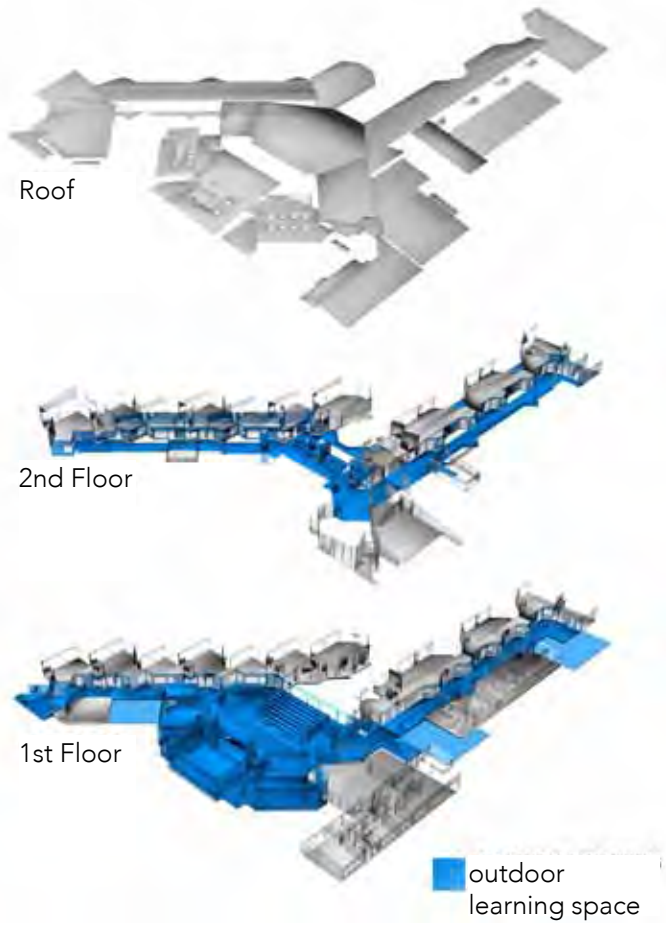


Figure 5: Outdoor Learning Space Diagram
Source: Trilogy Architecture

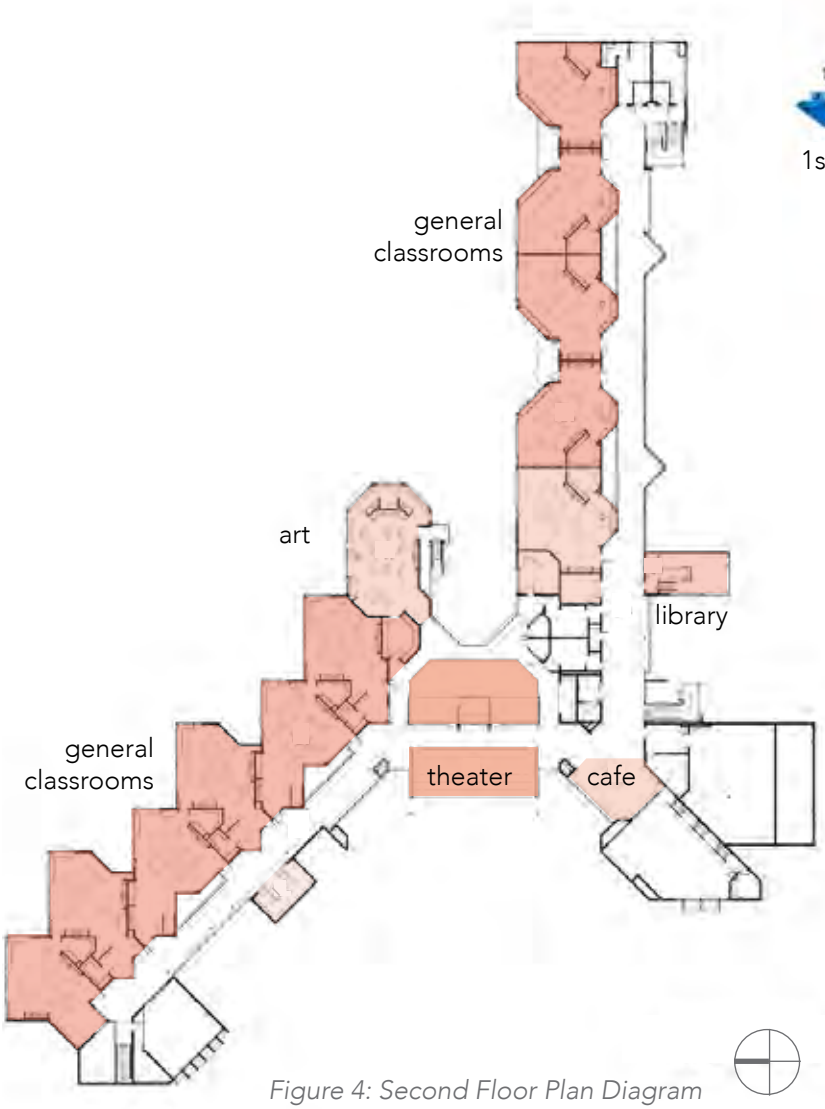


Figure 4: Second Floor Plan Diagram
Floor Plan Source: Trilogy Architecture

Entry

The entry at Redding School of the Arts is a large, double-story volume with access to the outdoor theater, a music classroom, main circulation, and the administrative wing. Windows at the second level provide visual access to one of the semi-conditioned galleries.

The lobby provides seating for parents, visitors, and students. It was observed that teachers and parents used the lobby for quick meetings about costume ideas for an upcoming play, and as a waiting area for students being picked up at the end of the day.

The administrative wing is accessed through locked doors from the lobby, and there is only one small window into the lobby. Staff commented that they feel visually and physically disconnected from the rest of the building, but they were pleased with the amount of space and light in each person's office.

Building security is maintained by the receptionist staff, and parents and visitors sign in at a separate table before entering the main school.

Challenge 3: "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements" (Trilogy Architecture, 2012).

Image 8: The lobby provides direct access to the outdoor theater, music room, and the school learning streets. Student artwork is exhibited in movable display cases and in permanent wall displays.

Image 9: The reception desk serves as the connection for parents and visitors to the administrative wing, which is accessed from the two doors next to the desk.

Image 10: The display dedicated to the building's dashboard, which measures water and energy consumption.

Sustainability

The lobby has a special three-screen display for the building dashboard, which measures the daily energy consumption and water use. A LUCID touchscreen displays the dashboard and the other screens provide school information (Theimer, 2012). In addition to being on display at school, the dashboard is meant to be a live internet site for constant measure of the building's water and energy use, as well as facts about living green.

Image 11: The windows at the front entry fill the lobby with natural light.

Materials and FFE

Student work is shown in wall display cases, wheeled display cases, and pictures of the school plays adorned the walls. The display of student work brings a sense of personalization for the students.

Learning Spaces

The general classroom learning spaces at Redding School of the Arts are comprised of different configurations based on an L shape, and offer a variety of outdoor connections and flexible furnishings.

Challenge 2: "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space 2) Varied and flexible interior space, and 3) Technology wall with projection/sound and traditional whiteboard for different teaching styles" (Trilogy Architecture, 2012).

It was observed that the classes take advantage of the different outdoor connections, flexible space, and technology. For example, some used the "hearth" as a reading area, while others made it into a small stage. Desks were in different configurations and the smaller areas at the back of the classroom provide opportunities for group learning.

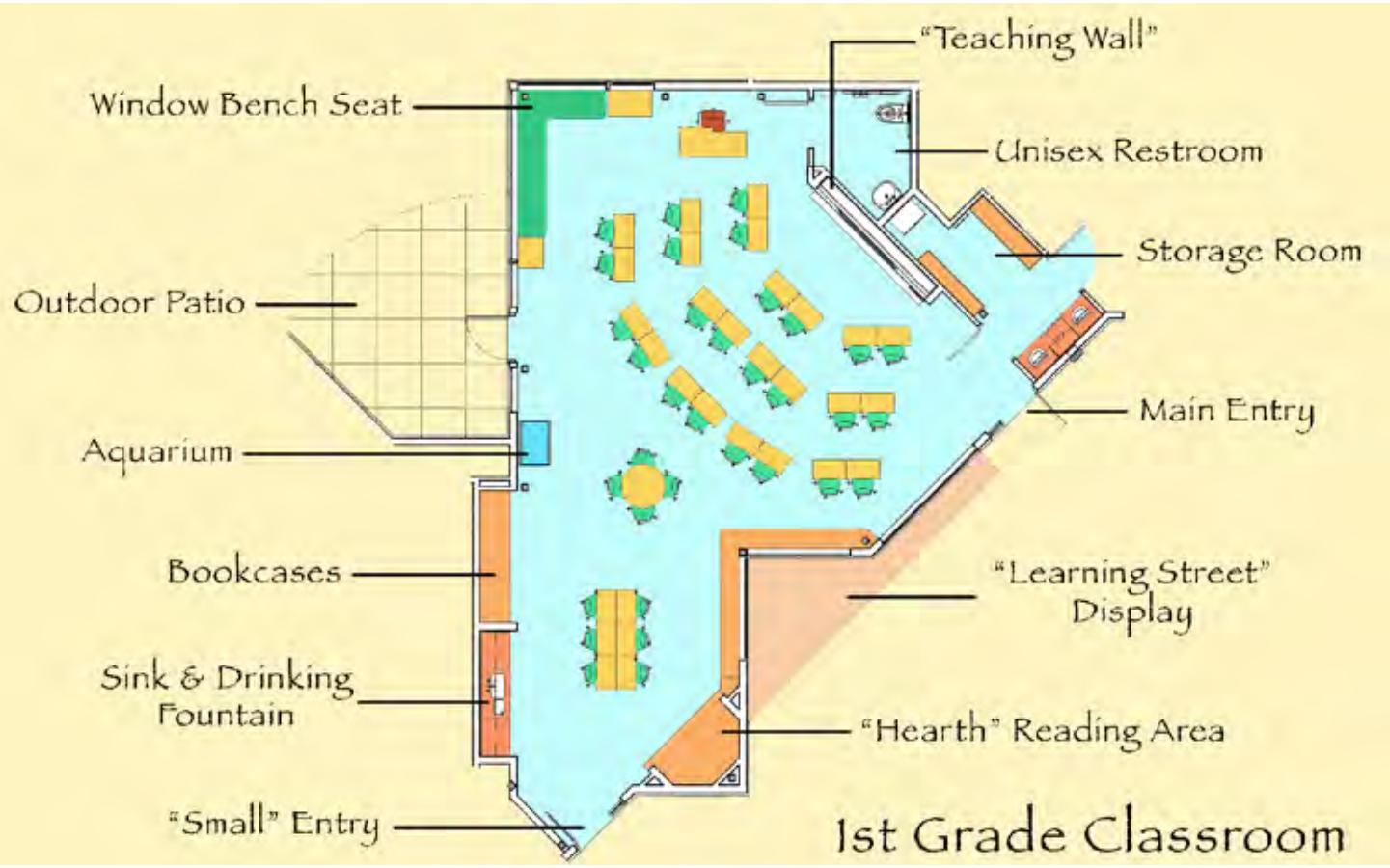
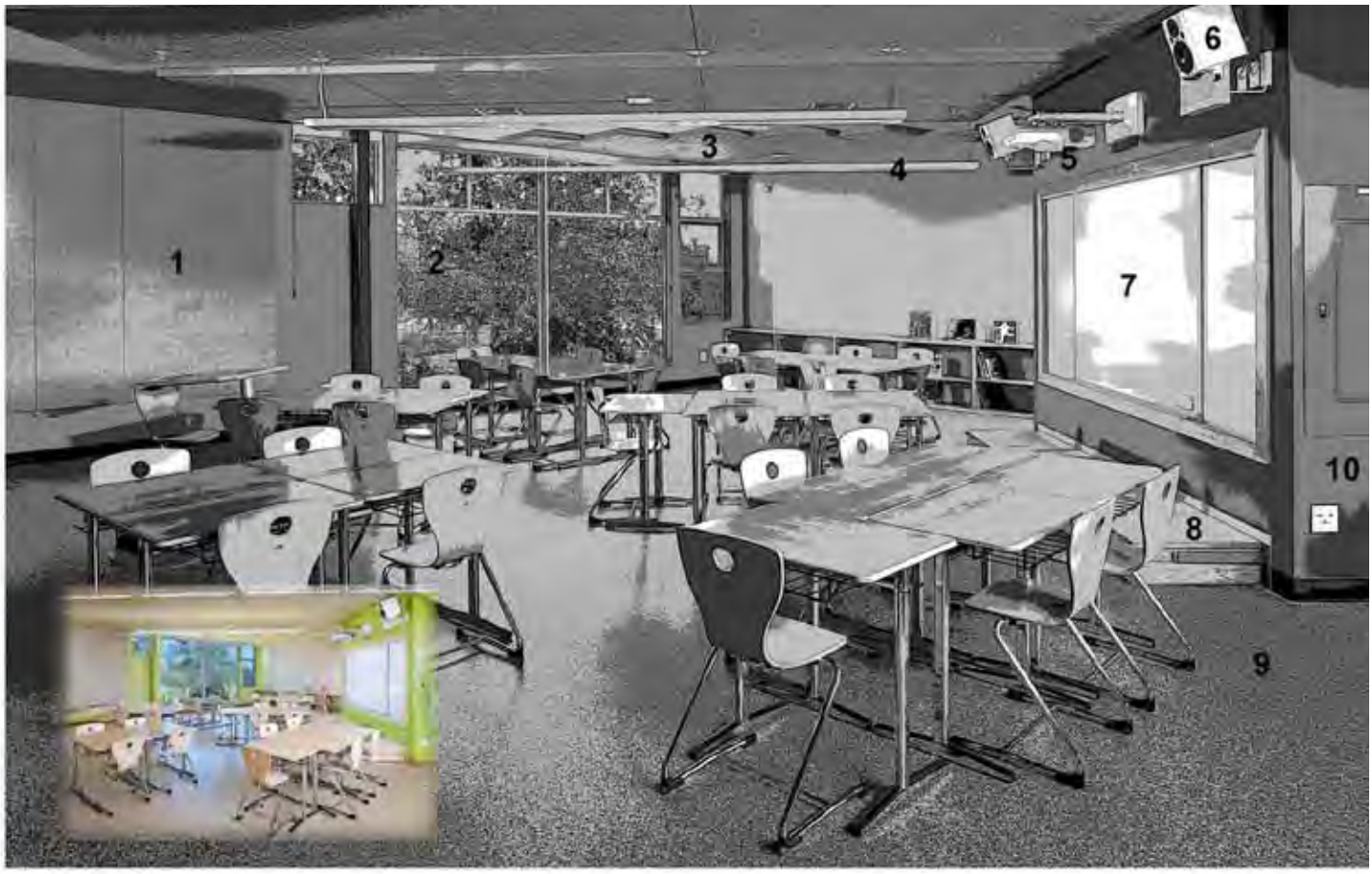


Figure 6: First Grade Classroom Diagram; Source: Trilogy Architecture



LEGEND

1. ACOUSTIC WALL TREATMENT
2. NORTH FACING GLAZING
3. ACOUSTIC CEILING TREATMENT
4. AUTOMATED LIGHTING SYSTEM
5. SHORT THROW PROJECTION SYSTEM
6. SOUND SYSTEM
7. LEARNING CENTER WITH STORAGE BEHIND
8. RETRACTABLE SPEAKING / PERFORMANCE PLATFORM
9. RUBBER FLOORING
10. LOW VOC PAINT

Figure 7: Classroom Diagram
Source: Trilogy Architecture

Image 12: The red HOKKI Stools by VS are favorites among the students because they promote movement and play.

Materials and FFE

The various classroom shapes yielded different furniture arrangements, which all centered around the technology/ teaching wall.

All of the student desks and chairs were provided by VS. KI provided the teacher desks, file cabinets, and bookcases. The rolling cubbies, technology wall, and window seats were custom designed by the architecture team for fabrication (Theimer, 2012).

The VS HOKKI Stools (Image 12) were a favorite among the students, and students were observed sitting on them during small group breakout sessions. The stools allow students to wiggle and move around.

Learning Spaces

Technology

The school incorporated technology around the idea of "designing for the future we don't yet know" (Trilogy Architecture, 2012). There is 100% wireless connectivity in all classrooms, and K-2 classrooms have Ncompute computer stations and upper grades have student laptops provided at a ratio of 1 computer per 2 students. Each classroom has an Epson Brightlink "smart" projector, document camera, and a wireless tablet for use with the projector (Theimer, 2012). The classrooms can also be used as a sound studio, with the ability to broadcast over the internet and to the other classrooms (Trilogy Architecture, 2012).
Technology in the classroom has been embraced by the teachers. Teachers commented that it has been fairly easy to learn and convenient to use. The teachers received training before the move into the new building, however there was so much information

Natural Light and Ventilation: There are many windows in every classroom, which allows for northern light and views into the hallways, playground, and surrounding landscape. Research has proven that windows with a view of nature or people in the distance can improve student outcomes (Heschong Mahnoe Group, Inc. 2003).

Shades are provided to darken the room, if necessary, and teachers commented that if the shades get drawn, they often get wrapped up in their teaching and forget to open them after the technology use is done, thus increasing the need for electric lights. The classrooms use a Lutron lighting system which automatically adjusts light levels to the amount of natural light entering the room, and automatically shuts off when there is no one in the room (Theimer, 2012).

Though the windows provide natural light and views, they also take away wall space for teachers to display classroom information, posters, and student work. It was observed that several classrooms covered the windows, thus blocking natural light.

The windows provide natural ventilation, opening to the playground and semi-conditioned hallways for cross-ventilation. Teachers enjoy being able to open the windows, however, the breeze can be too strong for loose papers, so they usually only open both sets of windows in the morning before students arrive. It was observed that many of the windows on either the north or south side of the classroom were open throughout the day.

that it was hard to absorb it all. Though the teachers have been able to use the technology and explore its potential, they agreed another training session would be useful.
One teacher commented that the technology is very easy to use, provides flexibility for her movement around the classroom, and opens up more teaching options with the internet. She indicated that since she does not have to be at the front of the room the students can focus on the content, and she is less of a distraction. The mobility also allows her to walk around the room and help students more easily.

Image 13

Image 14

Image 15: The classrooms have visual and physical connections to the outdoors through picture and operable windows, doors, patios, and balconies.

Image 16: Students read in pairs on the classroom balcony.

Outdoor Connection

Classrooms on the ground level for the elementary students open directly to the playground. It was noted that after recess the students line up at their respective classroom doors and go straight into their classrooms. Teachers commented that the direct connection is beneficial for messy things like treats and art activities.
Several classrooms on the second level have shared balconies with a neighboring classroom. It was observed that students were outside on the balconies reading, and teachers commented that students like to use it as an area to practice skits or presentations, away from the large group. Teachers noted that because there are four or five recess periods throughout the day, there are kids outside for a few hours every day, which can lead to visual and audio distractions for the students in the classroom.

Learning Spaces

Challenge 3: "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements."
Feature 3: "Juxtaposition of traditional building materials such as rammed earth walls and 120 year old recycled redwood against the framework of concrete, steel and glass, with 1) The use of color to accent material contrast and provide wayfinding" (Trilogy Architecture, 2012).

Acoustics in the classroom meet the LEED exemplary performance credit of 35 dBA. The rubber floor material and acoustic panels on the ceiling helped achieve the acoustic goals.

Teachers enjoy working in the classrooms. They commented that it is comfortable: the amount of natural light, the colors, and the amount of space make it an enjoyable working space. They are not seeking to "get out" at the end of the day, and as a result, teachers are spending more time working in the building after school hours as opposed to doing the work at home. The architect noted that when measuring building energy use, it was more than originally expected. It is believed that the extended occupancy hours by the teachers may contribute to the increased energy use.

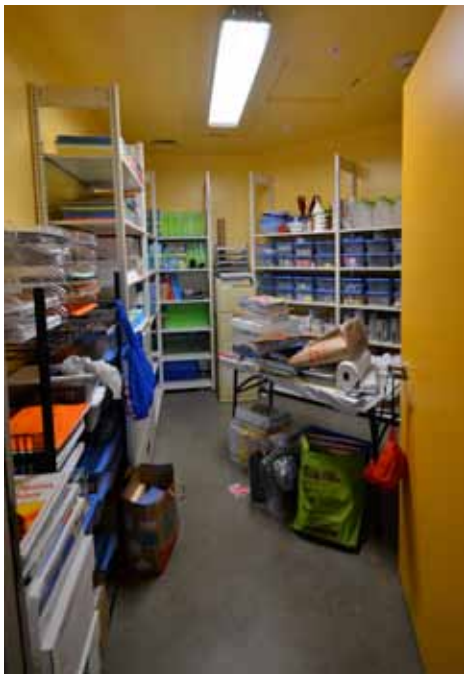


Image 17: Each classroom has its own storage room.

Image 18: There is a sink and mini refrigerator in each classroom.

Image 19: A sixth grade classroom on the second level displays the prominent use of color and exposed structure.

Materials and FFE

Each classroom has its own sink, refrigerator, and storage room. Storage is especially important for the teachers at Redding School of the Arts because of the theme curriculum. The themes rotate through a three-year cycle, so as opposed to teaching the same material every year, teachers have more content to store. Special features were provided for the kindergarten and first grade students, such as bathrooms in the classrooms and small, child-sized doors. The students enjoy having something their size, and it was even observed that parents use the small doors, though regular-sized doors are provided.

Color is prominent throughout the entire school, and the classrooms had some of the most vivid hues in the building with orange, yellow, and green walls. Students and staff commented that it was cheery and enlivened the space. Administration noted that it took time for some of the teachers to adjust to the bright colors in the classrooms. The teachers may or may not have been used to teaching in such bright environments, and no one was able to choose their room, however, have adjusted over time. Research states that as a general rule, elementary students are attracted to tints and pastels, and bright medium-cool colors attract middle school students (Gale, cited in Daggett, Cobble, & Gertel, 2008). Specific classroom color recommendations vary by subject and age.

Image 20: The kindergarten classrooms have child-sized doors for the students.

Learning Spaces: Music and Dance

A combination of music and dance learning spaces are directly connected to the outdoor theater, providing space for everyday learning and practice, as well as an area for performances. There is a separate, smaller music room for the younger students that connects to an outdoor courtyard.

Challenge 2: "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space 2) Varied and flexible interior space, and 3) Technology wall with projection/sound and traditional whiteboard for different teaching styles."
Feature 1: "A centrally located outdoor theater with music classroom walls that double as stages opening up to the audience by way of large bi-fold hangar doors, with 1) large overhangs for excellent acoustical performance 2) Connection to circulation galleries for common informal social use" (Trilogy Architecture, 2012).

The rooms are used on a daily basis for instruction and also after school hours for play and music rehearsals. Staff commented that the music and dance spaces get used daily from about 8 a.m. - 6 p.m. Skylights provide natural light in the learning space, and the hangar doors open up to the theater.
When the doors are closed to the rooms it was observed that sound did not travel beyond the walls of the classrooms. Staff commented that when the hangar doors are open, music can be heard from the parking lot and throughout the hallways. This was viewed as a benefit, adding to the atmosphere of the arts school.

Image 21: Students practice dance routines for an upcoming performance.

Image 22: The music room opens to the theater.

Image 23: The rammed earth wall provides thermal protection for the music and dance rooms.

Image 24: The music and dance classrooms open to the theater. Image source: Trilogy Architecture

Outdoor Connection

The dance and music rooms that are connected to the theater open directly to the outdoor stage via bi-fold hangar doors. This allows the theater to expand into the music rooms, and vise versa.

Learning Spaces: Science, Art, and Cooking

The science, art, and cooking classrooms provide learning spaces for academic and elective courses.

Challenge 2: "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space 2) Varied and flexible interior space, and 3) Technology wall with projection/sound and traditional whiteboard for different teaching styles."
Challenge 3: "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements" (Trilogy Architecture, 2012).

The classrooms provide views to the exterior, such as an oak tree within a few feet of the window in the art classroom, and direct connections to the outdoors. For example, the science room opens directly to the playground, and the cooking room connects to the outdoor gardens, orchard, and chicken coop.
The art room features extra storage and sinks for the students, as well as a kiln. The science room has a small room to the side for group work and research.

Image 25: Custom designed benches in the science and general classrooms provide additional storage and seating.

Image 26: Students line up outside the science classroom after lunch.

Image 27: The art classroom provides extra storage for artwork and has a kiln for student work.

Sustainability

As a way of using the building as a tool for teaching green, sustainable ideas are incorporated throughout the school, and staff noted that students are picking up on various aspects just by being in the building (such as the dual flush toilets). Teachers expressed a desire to incorporate more building information into their daily lessons. The design team has created a "Tools for Teaching Green" handbook which is still in its finalization process. The teachers are aware of some of the content, and eager to use it to aid their curriculum.

Students noted that they have been able to use the building as a tool for learning. After studying ancient building materials, for example, they went outside and drew the rammed earth walls.

Image 28: A tree only a few feet from the building was preserved.

Materials and FFE

Bench seats, provided in learning spaces such as the general classrooms and science room, serve as additional storage and seating. Since Redding School of the Arts is a charter school, parent involvement is required, and the benches provide seating for the parents when they are in the classroom.

The structure is visible in all of the classrooms serving as a constant visual reminder of the building's construction.

The table tops of the desks in the art room tilt and can be lowered or raised to accommodate students.

Learning Spaces:
Library, Labs, and Special Education

The library, labs, and special education learning spaces provide students with additional resources. The library is brightly colored and features a "reading spaceship" with small alcoves for student use (Image 30). The computer lab offers technology for the students, in addition to the laptops available and wireless connectivity available in the classrooms.

The special education rooms are on the first level, across from the general classrooms. Administration commented that it is helpful to have the space within the main building circulation, to avoid stigma that may come with a separate location for the special needs students. Staff commented that the arts program works well for special needs students because it gives the kids additional opportunities to excel.

Image 29: A group reading space in the library.

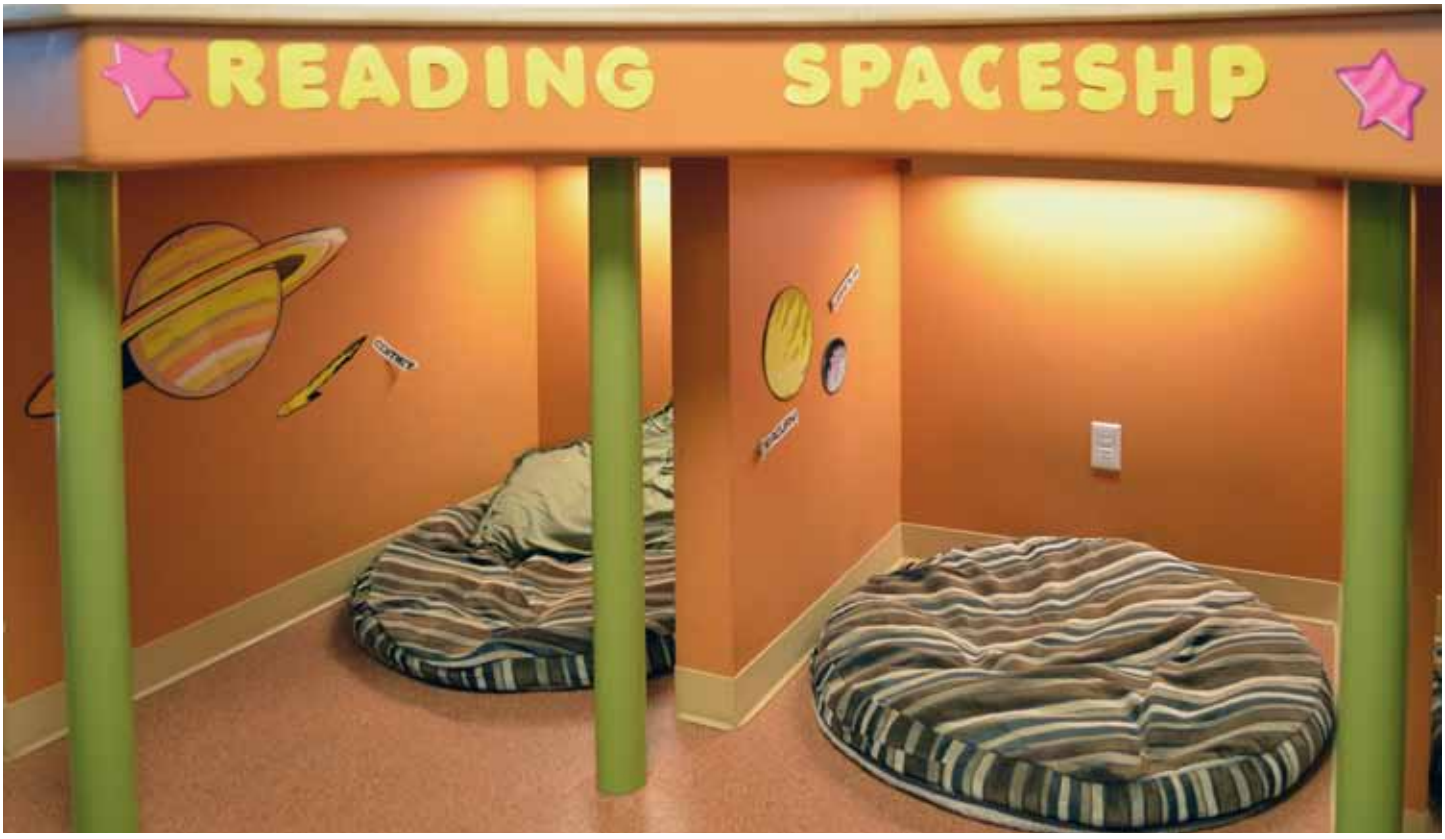


Image 30: Small alcoves in the "reading spaceship" provide spaces for students to read.

Image 31: The library shelves leading to the "reading spaceship."

Materials and FFE

The library is a beige color, with bright greens and oranges to accent structure and the "reading spaceship." Research is inconclusive on which colors are best for a library. Light green is recommended to enhance quietness, concentration, and restfulness (Daggett, Coble, & Gertel, 2008; Mahnke cited in Engelbrecht, 2003). Another source notes that using bright, warm colors in libraries encourages students to read (Thompson, cited in Kolli, 2004). The colors in the library fit with the bold colors throughout the rest of the school, and overall, student and staff commented on the cheerful effect of the colors.

Outdoor Connection

The library has a direct connection to one of the outdoor courtyards. There is a visual connection through glazing on the west wall, but the warm sun causes the shades to often be drawn. Therefore, the visual connection tends to be lost.

Informal Learning and Activity Spaces: Galleries and Cafes

The design intent was to eliminate the traditional "cafetorium" and provide the outdoor theater and four semi-conditioned dining galleries in its place (Theimer, 2012).

Challenge 1: "50% of learning space located outdoors in a marginal climate 1) Outdoor theater at center of school 2) Semi-conditioned galleries 3) Translucent canopy for daylight AND protection 4) Operable garage doors to open interior space to nice weather"
Feature 2: "Semi-conditioned space. Design of 50% of the learning space is located outdoors even though the climate is considered marginal for outdoor use, with 1) Summer cooling through evaporative cooling fabric ductwork 2) Winter radiant heating timed to occupant use 3) significant energy savings" (Trilogy Architecture, 2012).

The semi-conditioned galleries and cafes have resulted in some challenges due to the outdoor conditions. Cold weather, rain, wind, and air from wildfires have all caused trouble. Staff and administration commented that at times it gets too cold for the students to be eating outside. The wind tunnel affect has been greater than anticipated. Rain also poses a problem, and in the fall of 2012, smoke from severe wildfires required people to stay inside.
Another issue is the size and spacing of the cafe galleries. Staff and parents commented that there is not enough staff to supervise the students when they are spread across many spaces, so the schedule had to be reworked, requiring more lunch periods with fewer students. Therefore, not all of the gallery spaces are used for lunch every day.
While the majority of building users appreciated the ability to be outdoors most of the time, several parents and staff noted that it would be beneficial to have one large area where the entire school could gather that was completely protected from the elements. When it is not possible for the students to eat outside, the only other option is to eat in the classrooms, which creates extra work and time commitment for the teachers.

Image 32: Students enjoying lunch in the semi-conditioned galleries.

Image 33: An upstairs gallery has views to the lobby and outdoor theater.

Image 34: One of the dining galleries with garage doors to open to the hallways.

Circulation, Extended + Informal Learning, and Social Spaces

The semi-conditioned circulation and galleries serve as an extension of the classroom (Figure 8).

Challenge 1: "50% of learning space located outdoors in a marginal climate 1) Outdoor theater at center of school 2) Semi-conditioned galleries 3) Translucent canopy for daylight AND protection 4) Operable garage doors to open interior space to nice weather"
Challenge 2: "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space..."
Feature 2: "Semi-conditioned space. Design of 50% of the learning space is located outdoors even though the climate is considered marginal for outdoor use, with 1) Summer cooling through evaporative cooling fabric ductwork 2) Winter radiant heating timed to occupant use 3) significant energy savings" (Trilogy Architecture, 2012).

Students and staff commented on the pros and cons of having outdoor circulation. They noted that the rain makes the floors very slippery, and when the weather is cold (average lows go to 36°F in January), there is a significant difference between the conditioned classrooms and semi-conditioned hallways. The varied schedules between the programs, ages, and classes has made it difficult to time the heating to accommodate the students since there is not one schedule to follow. The radiant heating has not been working as expected, and the design team is working on replacing some of the heaters to improve the conditions (Theimer, 2012).

The translucent canopy provides shade for the students who use the upper areas as study space. The outdoor furniture has a mesh surface, which staff noted is not conducive to writing. Teachers commented that it is necessary to use clipboards or other backing if the students want to use the tables as workspace. The lower level garage doors allow a breeze when they are closed, and greater connection to courtyards and spaces when they are open. It was observed that when the garage doors are closed, the lower level hallways can be somewhat dark. The locker alcoves for the middle school students provide socialization in a colorful environment.

Acoustics: The design team provided a custom exterior sound panel to reduce noise in the hallways. This went beyond LEED requirements, and since there is no requirement for sound mitigation in the hallways, no measurements were taken of actual sound levels. The acoustic panels also provide a space to display student work (Theimer, 2012).

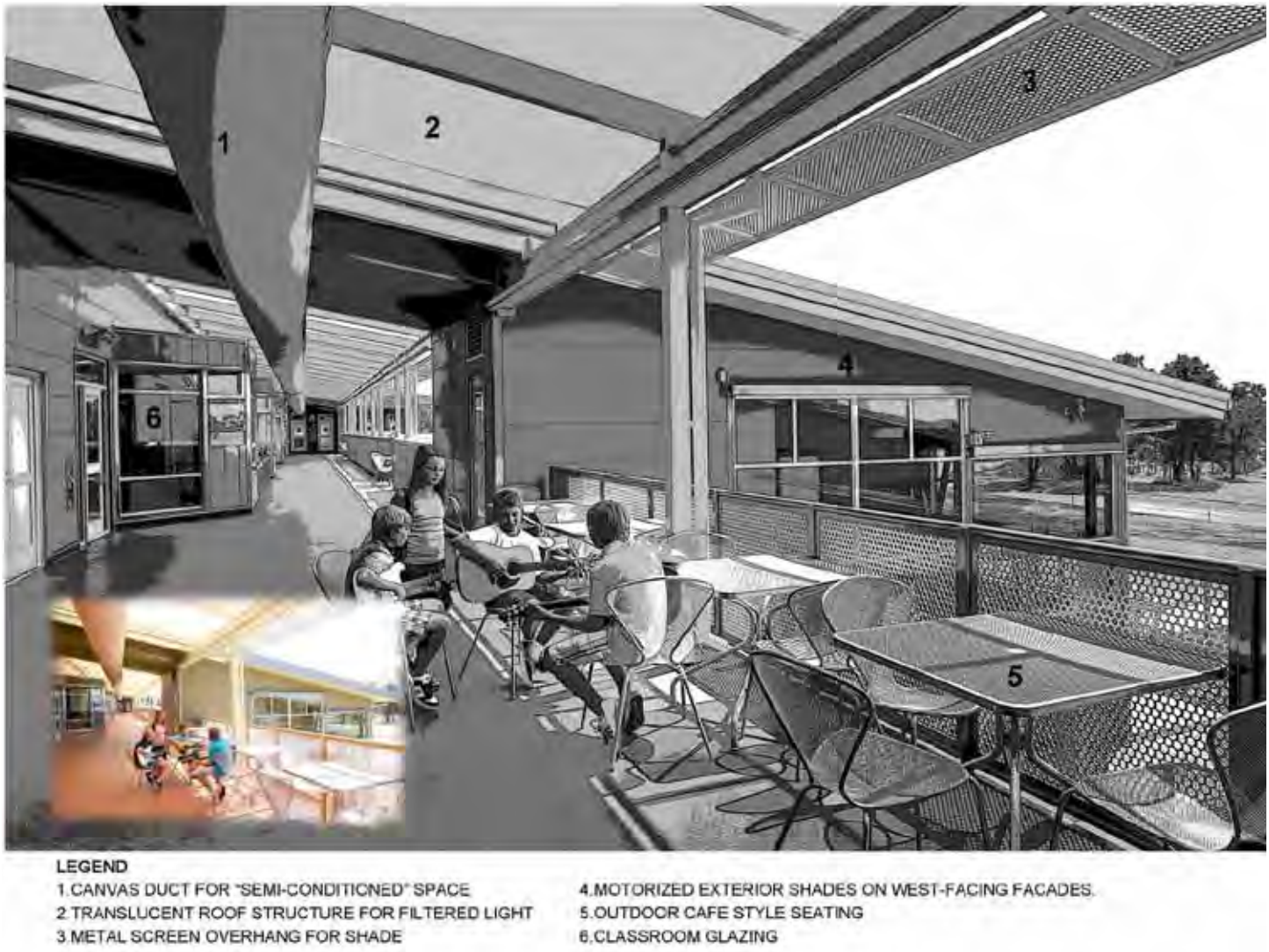


Figure 8: Diagram of circulation and systems on the second level. Source: Trilogy Architecture

Image 35: Operable garage doors and the semi-conditioned space allow the classrooms to take advantage of natural ventilation.

Image 36: Brightly colored lockers continue the bold color theme and provide a socialization area for students.

Circulation, Extended + Informal Learning, and Social Spaces

The circulation provides an opportunity for the students to learn from the building through its materiality and connections. Color and material juxtapositions enliven the space.

Challenge 3: "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements"
Feature 1: "A centrally located outdoor theater with music classroom walls that double as stages opening up to the audience by way of large bi-fold hangar doors, with 1) large overhangs for excellent acoustical performance 2) Connection to circulation galleries for common informal social use"
Feature 3: "Juxtaposition of traditional building materials such as rammed earth walls and 120 year old recycled redwood against the framework of concrete, steel and glass, with 1) The use of color to accent material contrast and provide wayfinding" (Trilogy Architecture, 2012).

The visibility into the interior workings of the building serves as a reminder of the energy and resources required for a building to function. The windows into the mechanical rooms are in a prominent location, across from the main eating gallery. The structure is exposed so that students may begin to have a sense of how the building is put together.
The circulation connects to the outdoor theater, promoting connections to everyday activities.

Image 37: Students using the hallway for small group reading.

Image 38: Circulation provides views to recycled materials, a variety of color, and the structure.

Image 39: Views into the mechanical rooms.

Materials and FFE

The prominent color serves as a means for wayfinding, however, staff commented that the areas are usually referred to according to grade level, and not color.

There is a "river" that flows from the stairs along the first floor hallways. Staff said that the young students like to walk along the pattern.

Circulation also features 120-year-old recycled wood as a way to complement the colors and increase sustainability awareness.

Outdoor Learning: Theater

Redding School of the Arts is centered around its outdoor theater.

Feature 1 : "A centrally located outdoor theater with music classroom walls that double as stages opening up to the audience by way of large bi-fold hangar doors, with 1) large overhangs for excellent acoustical performance 2) Connection to circulation galleries for common informal social use."
Feature 2: "Semi-conditioned space. Design of 50% of the learning space is located outdoors even though the climate is considered marginal for outdoor use, with 1) Summer cooling through evaporative cooling fabric ductwork 2) Winter radiant heating timed to occupant use 3) significant energy savings" (Trilogy Architecture, 2012).

Throughout the design process and still today, there is contention on whether or not the theater should have been covered. Parents and staff are mixed on their feelings of the outdoor theater.
According to staff, parent, and student accounts, the acoustics for the performance space are superb. It was noted that the sound is of excellent quality, and because of it, professional musicians have performed at the school.
Parents commented that it is incredible to watch a performance under the stars, describing it as reverent and magical. Experiencing an outdoor performance is something that cannot be replicated indoors.
The three stages and orchestra pit create a sophisticated performance venue.
However, the big play for the school is in February, and last year it had to be performed at a different location because it was too cold outdoors.
Being outdoors, the school has had to work around some logistical issues with the theater. The space is used for bi-weekly Monday assemblies with the entire school, but there were issues with the sun and the space being so bright that the projection screens could not be seen. As one administrator described it, they simply adjusted to fit mother nature's schedule. Luckily, throughout the first year only a few Monday assemblies had to be rescheduled because of the rain. The weather in Redding can get into the low 40s in the winter, and having everyone outside for the assemblies can be an issue, especially with students needing to remember coats and winter clothing. For this reason, staff commented that it would be useful to have a space where the entire school could gather and be completely out of the elements. Pigeons have also taken a liking to the theater, and often the seats need to be cleaned before use.

Images 40 and 41: The outdoor theater with three music and dance rooms that open to the theater.

Outdoor Learning: Courtyards

As a way to extend the classroom and socialization areas, there are three themed courtyards. One of the courtyards includes a labyrinth with space to display student work. When discussing the personalization of the school, a student commented that "it is like a scrapbook...it comes blank and you can personalize it." The student said the labyrinth courtyard is one such space, since it has spaces for student work.

Challenge 1: "50% of learning space located outdoors in a marginal climate 1) Outdoor theater at center of school 2) Semi-conditioned galleries 3) Translucent canopy for daylight AND protection 4) Operable garage doors to open interior space to nice weather."
Challenge 2: "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space 2) Varied and flexible interior space, and 3) Technology wall with projection/sound and traditional whiteboard for different teaching styles" (Trilogy Architecture, 2012).

Teachers and administration commented that the use of the courtyards is minimal; the courtyard with the most use is the one adjacent to the music room. Teachers commented that the infrequent use is a result of several factors: convenience, schedules, and shade. To plan an activity and bring the materials out to the space requires extra work and time. Additionally, some of the teachers only have 45-minute blocks with the students. Especially when located on the second floor, the travel time takes away too much of the class period. Most of the courtyards do not have shade, and without being able to have respite from the sun, the use is limited. It was observed that the wall joining the courtyard to the library receives hot western sun, and shades cover the windows, thus limiting the visual connection.

Image 42: A labyrinth themed courtyard.

Image 43: The courtyard opening from the music room for younger students.

Image 44: The courtyards open by way of garage doors and connect to upper level circulation.

Image 45: The windows visually connecting the library to the courtyard are often closed from the western sun.

Outdoor Learning: Playground; Gardens, Orchard, and Chickens

The playground wraps the entire back of the building, offering a variety of ways to explore, exercise, and socialize. Part of the planning process included asking students for ideas of what they wanted in the playground. One desire was to simply have large grassy areas to be able to run and play, and other requests resulted in a teeter-toter and zip line (Salter, 2012; Theimer, 2012). The playground offers basketball courts and areas for wall ball, where the greater community was engaged by asking alumni to paint the walls. Literature emphasizes the importance of full sensory experiences from being outdoors (Louv, 2005) and the playground encourages exploration with water spouts, sand, and climbing structures for the students.
Staff commented that one of the benefits of the playground is the play that it promotes across students of all ages. The outdoor area also provides a space for their annual "Theme Days" in which family and community members gather together to celebrate.

Image 46: The gathering circle in the playground.

Gardens, an Orchard, and Chickens

As a means of promoting sustainability as a way of life, the school has an orchard of 40 species of fruit trees and 20 raised bed gardens for student use.
There is also a chicken coop, home to five chickens.
The cooking classroom has direct access to the gardens, orchard and chicken coop, allowing students to gather garden materials, bring them inside, and learn how to cook. In this way students get to see the entire life cycle, providing another method of hands-on learning.

Image 47


Image 48

Images 47–50: The playground offers wall ball with art from alumni, climbing structures, sand, and musical instruments.


Image 49


Image 50


Image 51

Conclusion

The overall learning environment of Redding School of the Arts address the specific needs of the students in an arts program. According to observation, the literature review, and staff comments, the challenges and features as stated by the design team were addressed in the following ways:

Challenge 1: "50% of learning space located outdoors in a marginal climate 1) Outdoor theater at center of school 2) Semi-conditioned galleries 3) Translucent canopy for daylight AND protection 4) Operable garage doors to open interior space to nice weather."

The literature review states that the connection to nature helps students with full sensory experiences (Louv, 2005). The formal learning environments are conditioned spaces, while the outdoor spaces allow the students to be outdoors or in semi-conditioned spaces. The overall concept has been successful, but natural elements have provided some challenges for the school.
The central location of the theater highlights the space as a gathering area for performances and assemblies, as well as everyday music and dance instruction.
The semi-conditioned galleries serve as cafes and group work spaces, however, the wind and cold make their use difficult during the winter months. Staff commented that it would be helpful to have a space in the school where all students could gather and be out of the elements. The separation of the galleries requires greater staffing, and Redding School of the Arts does not have enough staff to supervise all the galleries, so typically, they do not most of them for lunch, which has resulted in many lunch periods.
The translucent canopy allows protection for the open upper level circulation, and students were observed using the space for small group reading. It was observed that the garage doors are not always open, but when they are, they provide increased ventilation and daylight.

Challenge 2: "Classroom as an extended learning environment, with 1) Visual & physical connection to outdoor space with windows and adjacent protected outdoor study space 2) Varied and flexible interior space, and 3) Technology wall with projection/sound and traditional whiteboard for different teaching styles."

The connection to the outdoors from the classrooms is evident in many ways, ranging from classrooms with balconies to those on the first floor that open directly to the playground. The classroom windows offer views to the outdoors, and students commented that the natural light lessened eye strain in the classroom. Studies have

proven that windows with a view of nature or people in the distance can improve student outcome (Heschong Mahnoe Group, Inc., 2003). The classrooms vary in layout, offering amenities such as group work space and restrooms within the classroom for kindergartners and first grade students. The furniture is all flexible, allowing for different arrangements. It was observed that in general, desks and chairs were all centered on the technology and whiteboard at the front of the room.
Teachers were excited about the technology options in the classroom and the opportunities it opened for the curriculum. One teacher commented that being able to move around the classroom enables her to help students more easily, and that she is less of a distraction when she is not at the front of the room.

Challenge 3: "Building and site as a tool for teaching green, with 1) Transparency into interior building workings 2) Minimal removal of existing mature trees 3) Exposed interior structure 4) Internet-based "dashboard" showing real time energy use 5) Interpretive signage for building elements."

Twenty-first century buildings should be sustainable and serve as a means of education for students and the community (Partnership for 21st Century Skills, "21st Century Learning Environments," 2009). Reddding School of the Arts serves as a tool for teaching green in many ways. Students commented that they have greater awareness of conserving energy and water, and are bringing those lessons home to their family. A parent commented that being able to see into the mechanical and electrical rooms is a great way to begin to inform students, staff, and visitors of the systems necessary for buildings to function. It was observed that the openings into the interior workings are in a prominent location so that they are an everyday reminder to students.
The minimal removal of trees was evident in the second floor art room where a tree is just feet from the window. It was noted that not every tree survived construction, but most were not disturbed.
The interior structure is evident throughout the building, in the classrooms and circulation, again serving as a visual reminder of the way a building is put together to function.
The internet dashboard was not up and running at the time of the site visit, but it has since been incorporated into a display in the lobby. A visit to its internet site showed ways to monitor energy use, comparing daily, weekly, and monthly usage.

Feature 1: "A centrally located outdoor theater with music classroom walls that double as stages opening up to the audience by way of large bi-fold hangar doors, with 1) large overhangs for excellent acoustical performance 2) Connection to circulation galleries for common informal social use."

The central location of the theater enables a connection to the everyday functions of the school through the building's circulation, and the music and dance classrooms are used on an everyday basis for instruction and extracurricular activities. Parents and administration varied on their opinions of the theater being completely outdoors. Some commented that it is difficult to use the space in the cold months, while others described the space as magical, saying that the school is lucky to have a unique performance venue, one that could not be replicated indoors.

Conclusion

Feature 2: "Semi-conditioned space. Design of 50% of the learning space is located outdoors even though the climate is considered marginal for outdoor use, with 1) Summer cooling through evaporative cooling fabric ductwork 2) Winter radiant heating timed to occupant use 3) significant energy savings."

According to comments from various building users, most people appreciated the outdoor space and were excited about its opportunities for ventilation, energy use, and the connection to the outdoors. The winter radiant heating has not been working as planned, making daily tasks, such as switching classes and eating lunch, difficult when the weather is cold. The design team is aware of this issue and is working to replace ineffective radiant heating.

Feature 3: "Juxtaposition of traditional building materials such as rammed earth walls and 120 year old recycled redwood against the framework of concrete, steel and glass, with 1) The use of color to accent material contrast and provide wayfinding."

When walking toward the building entry, the rammed earth walls provide a view of traditional building materials, which complement the surrounding landscape. Throughout the building, the material juxtaposition is also evident. Students commented that they have used the rammed earth construction to supplement lessons about traditional building elements.

Color is vibrant throughout the building, especially the classrooms. Research states that color preferences change as students get older, going from tints and pastels in elementary school to bright, medium-cool colors in middle school (Gale, cited in Daggett, Cobble, & Gertel, 2008). Though color was not mentioned as a means of wayfinding, students and staff commented that the colors enlivened the space and created a happy and cheerful atmosphere.

Redding School of the Arts provides a building that focuses on sustainability, extending the learning environment beyond the classroom, and an outdoor theater as a central gathering place for the school.

Redding School of the Arts was successful by staff accounts and research in the following ways:

- Creating an environment with an equal focus on arts and education.
- Using the building as a tool for teaching about sustainability through a greater connection to the outdoors, visual reminders about monitoring energy use, and materiality.
- Using color to enliven and brighten the arts school.
- Outdoor theater providing a venue with "superb" acoustics.
- Using passive energy strategies such as northern light and cross ventilation in the classrooms.
- Extending the learning environment beyond the classroom into collaborative spaces in the hallways, and the dance and music rooms opening to the theater.

Redding School of the Arts connects arts and education through pedagogy and the building. The central location of the theater serves as a formal and informal gathering place for students and the larger community. Staff, students, and parents commented on how happy they were to have a building filled with natural light, and that the colors throughout the building provided a happy and cheerful atmosphere. There are several ways in which the building serves as a tool for teaching green, and parents, students, and staff commented that they were learning from the building and incorporating its lessons about energy and water conservation into their everyday lives.

References and Credits

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Sophia Zaniroli
Parents and Board Members
Eighth Grade Students

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All photos and diagrams are the work of Kelly Martinez, unless otherwise noted.

Project Information

Redding School of the Arts
955 Inspiration Place
Redding, California 96003

Architect: James E. Theimer, AIA
Trilogy Architects

Type of Facility: Elementary
Age/Grade Range: K–8th Grade
Enrollment: 540 Students

Date Complete: August 2011
Building Size: 77,000 square feet
Project Cost: $32,000,000
Type of Construction: New Construction
Collaboration Acknowledgements: Design Architecture: Trilogy Architecture Urban Design Research James E Theimer, Owner & Principal Architect; Architectural Support: K2A&E Shelly Kibler, Principal Architect; Civil Engineering: SDS Frank Sawyer, Principal; Landscape Architecture: Shapiro Didway Steve Shapiro & Blair Didway, Principals; LEED Building Commissioning, Energy Modeling & LEED Consulting: Green Building Services Katrina Shum Miller, Principal Tom Hudson; CA Structural Engineering: K2A&E Robert Kibler, Principal; Electrical Engineering: PACE Tony Bowser, E.E.; Lighting Design: Benya Lighting Design James Benya, Principal; Mechanical & Plumbing Engineering: M/E Systems Keith Ritter, Principal; Acoustical Engineering, Audio Visual & Telecommunications Design: Charles M. Salter Associates Jason Duty, Principal; Building Enclosure Consulting: The Facade Group Stanley Yee; Water Systems Consulting: Natural Resources International Erin English; Technology Consulting: Varsity Technologies Patrick Ciccarelli, Principal; Furniture Consulting: Whalen Berez Group James Whalen, Principal; Traffic Engineering: Omni Means, LTD. Russ Wenham, P.E.; Photovoltaic & Wind Systems Design: Solar Design Associates E. Robert Erb, Project Manager.

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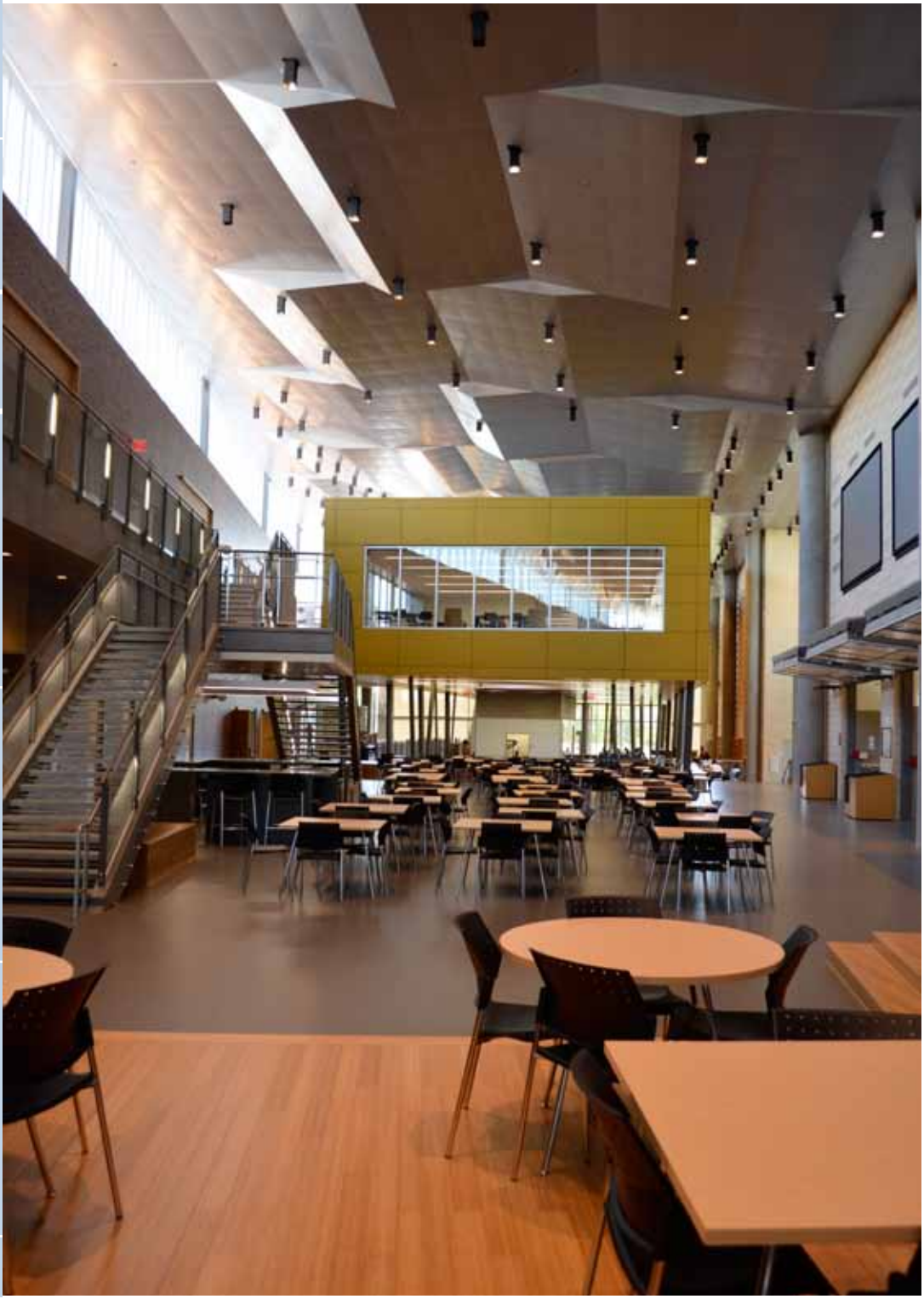

Kathlyn Joy Gilliam Collegiate Academy

Dallas, Texas

Introduction

Kathlyn Joy Gilliam Collegiate Academy is an Early College High School (ECHS) for 9–12th grade students in southern Dallas. ECHSs provide traditionally underserved students the opportunity to simultaneously earn a high school diploma and up to two years of college credit. The schools offer small, supportive environments designed to ease the transition from high school to higher education (TXECHS, 2012).

Gilliam Collegiate Academy is designed to support the rigorous academic curriculum and help students gain skills critical for college success, such as group collaboration, learning to seek guidance, and managing unstructured time (SHW Group, 2012). The campus emulates the college experience through a commons that acts as a college plaza, the "perch," which houses offices for teachers, professors, and counselors, and a range of informal learning and social spaces.

"Kathlyn Joy Gilliam Collegiate Academy is a result of the community's desire for a program that would help close the achievement gap and improve college success across the community." (SHW Group, "CEFPI MacConnell Award Submission," 2012)

The school is unique in the fact that it was the first ECHS in Texas designed and built specifically for its program. The innovative campus combines a collegiate feel with the supervision and support structure necessary for high school students. The design integrates several sustainable features, resulting in certification from the nation's first green building rating program especially designed for K-12 schools, the Collaborative for High Performance Schools (Texas CHPS) (SHW Group, 2012). The academic program and physical environment work together to support students as they prepare for their high school education and beyond (Ferguson Smith, 2012).

Kathlyn Joy Gilliam Collegiate Academy
Dallas, Texas
SHW Group

Grade Levels
9–12

Enrollment
400 students

Building Size
111,000 square feet

Year Opened
August 2011

Program and School Summary

"The overall goal of Early College High Schools is to create a seamless transition between high school and college by compressing the timeline for and increasing opportunities to obtain a college degree" (TXECHS, 2012). Texas is one of the states pioneering the Early College High School Initiative (ECHSI), with 49 Early College High Schools (TXECHS, 2012). Launched in 2002 by the Bill and Melinda Gates Foundation, the ECHSI is:

> based on the assumption that engaging underrepresented students in a rigorous high school curriculum that is tied to the incentive of earning college credits will motivate them and increase their access to and success in additional postsecondary education after high school."(ARI & SRI, 2009).

There are currently over 240 Early College High Schools in 28 states and the District of Columbia (The Early College High School Initiative, 2007).

Early College High Schools serve students who are least likely to attend college, and aims to ease the transition from high school to higher education. First-generation college goers, low-income students, students of color, and English language learners comprise the target population for Early College High Schools. The opportunity to simultaneously earn a high school diploma and up to two years of college credit is at no cost to the student, making the academic, social, and economic feasibility of college a greater reality (TXECHS, 2012).
Typically, ECHSs are located on the site of a college campus, as they are a partnership with the colleges to provide the classes and ease the transition, however, Gilliam Collegiate Academy is a standalone ECHS. "Our unique arrangement with the Dallas County Community College District and the University of North Texas at Dallas provides students a seamless transition from high school to community college, a four-year institution, and a bachelor's degree" (Gilliam Collegiate Academy, 2010).

The original school intent was that students would take more classes off-campus at Cedar Valley College as they advance to the next grade (Nayak, 2012). Currently, the school principal would like to have the students stay at Gilliam Collegiate Academy instead of going off-campus. Since the course content is not watered down at Gilliam Collegiate Academy, the principal believes that her group of students would benefit more from having the support offered at Gilliam Collegiate Academy as opposed to going off-campus (Ferguson Smith, 2012).

Gilliam Collegiate Academy was founded in the fall of 2008, with 100 students in 9th grade. They added a new cohort of 100 students every year, with the first class graduating in 2012. The school was housed in a temporary home for three years until the new building opened in the fall of 2011. The first class showed academic promise, with each of the students graduating and 14 of the students earning both a high school diploma and an associates degree (Ferguson Smith, 2012).

Image 1: The yellow "perch" houses teacher collaboration and student resource areas. It is suspended above the second floor, adjacent to the academic classrooms.

Number of Teachers 19 Teachers/9 College Professors	Building Levels 2
Project Cost $23,519,576	Site Context Suburban/Urban

Research Questions

Does the finished school fulfill the design submittal expectations?
Does the design exhibit a full understanding of the challenges?
How successful was the design in creating an empathetic approach to support the user needs?
How does the school design address different learning styles?
How do the lessons learned from design, planning, user satisfaction, and pedagogy inform future projects?

Operating Definitions: Challenges from SHW Group:

Challenge 1

- "The school is specifically tailored to students who are underrepresented in higher education by providing opportunity and support for college success. The architecture emulates the collegiate experience as a means to introduce students to the rigors of higher education."

Challenge 2

- "Students learn to manage and utilize unstructured time imperative to college success. Spaces for collaboration outside of the classroom, spaces for learning during unstructured time, and preparing students for the 21st century skills drove the design of the common spaces."

Challenge 3

- "The architecture responds to creating a student centric learning environment that supports small learning communities. Student teacher interaction, peer interaction, and active community involvement to encourage formal and informal learning."

Operating Definitions: Goals and Features from SHW Group:

Feature 1

- "The commons is treated as plaza between collegiate buildings that accommodates a number of functions. It supports individual and collaborative learning, also supports daily functions of dining, reading, and gathering. The main commons transitions from noisy public space to quiet private space."

Feature 2

- "The professors and advisors are housed in the 'perch' to encourage vertical teaming and easy access at student's unstructured time. The perch engages the nature preserve on the outside and the commons on the inside. Location provides direct access to 9-10 grades and sought access to 11-12 grades."

Feature 3

- "Transparency of function enhances passive supervision and encourages college like behavior among students. Flexibility of the space support varied learning and teaching styles. Environments created to support intramural activities."

Operating Definitions: Mission Statement from Gilliam Collegiate Academy:

Mission Statement

- College Access And Success For All! The Gilliam Collegiate Academy is an Early College High School in partnership with Cedar Valley College. This small school is designed to blend high school and college with intensive supports to increase college-readiness and academic success for students.

Operating Definitions: Literature Review Summary

- There is an academic achievement gap between minority students and their non-Hispanic, white peers (Education Week, 2012).
- There is an achievement gap between low-income families and those who have more money (Education Week, 2012).
- Initial studies from Early College High Schools report that when challenged academically and given support and resources, minority, lower-income students can achieve as much or more than their peers across the same district (AIR & SRI, 2009).
- Physical activity is an important part of a daily routine and important for education (Medina, 2008).
- Collaboration is a key component to 21st century learners (Wallis, 2011).
- 21st century buildings should serve as teaching tools for the learning community (Partnership for 21st Century skills, "21st Century Learning Environments," 2009).
- 21st century buildings should promote collaboration and flexibility (Partnership for 21st Century skills, "21st Century Learning Environments," 2009).
- A view to the outdoors has been proven to improve student outcomes (Heschong Mahone Group, Inc. 2003).

Site and Context

Kathlyn Joy Gilliam Collegiate Academy is located in southern Dallas on a site that backs up to a nature preserve. The natural setting is juxtaposed with a view of the Dallas skyline to the north. As an Early College High School, Gilliam Collegiate Academy partners with local colleges, and lies within the Cedar Valley College precinct of the Dallas County Community College District. Gilliam Collegiate Academy has the unique situation of also being located adjacent to the University of North Texas (UNT) at Dallas, and the ECHS has a working partnership with both colleges.

Gilliam Collegiate Academy is a community effort, and they wanted to be sure that the building portrayed a traditional sense of education (Ferguson Smith, 2012). The facade along the main road is brick with many windows to take advantage of the northern light and display a prominent notion of education to the community.
For daily transportation to Gilliam Collegiate Academy and Cedar Valley College, students use public transportation, a school bus system, and personal vehicles. The school is located within a few blocks of a public transportation stop.

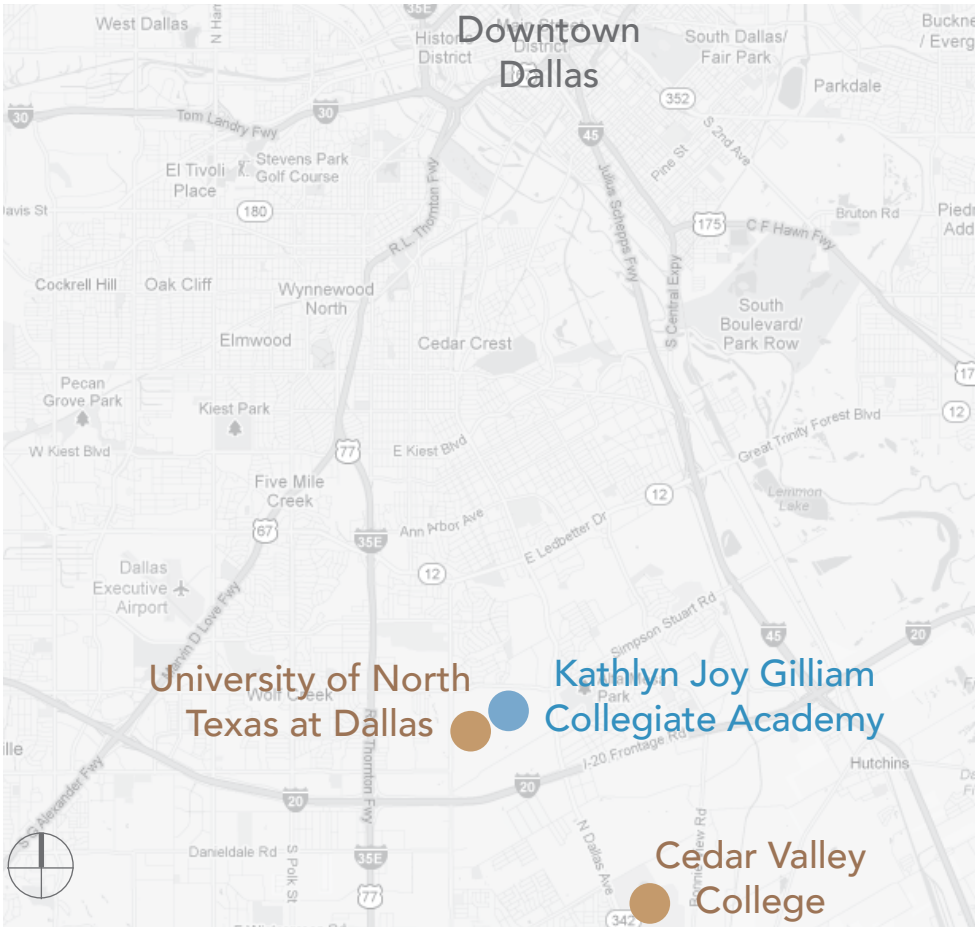

Figure 1: Map showing Gilliam Collegiate Academy and its proximity to downtown Dallas and its partner colleges. Map source: Google Maps, 2012

Image 2: The entry to Gilliam Collegiate Academy is prominent, opening to the students, staff, and visitors.

Image 3: The view from the street offers the notion of a strong, traditional education facility.

Building Organization

The school building is composed of three basic programmatic areas: academics, a social commons, and activities (Nayak, 2012). Focal points in the commons are the yellow "perch," housing teacher and counseling offices, and a blue GO Center with college resources. To maintain the strong educational presence to the community and provide views of the Dallas skyline from the interior, the academic functions are aligned along the street. The activities area opens up to athletic fields, and the entire east portion of the building is bound by a nature preserve.

The building was designed to provide flexibility. At the time of design, the principal knew the current student needs, however, she also wants to accommodate the needs of future students, five or ten years down the road. Since those needs are currently unknown, multipurpose spaces were included throughout the design (Ferguson Smith, 2012; Nayak, 2012). The design team's approach to ensure maximum flexibility was to provide only the essentials (Nayak, 2012).

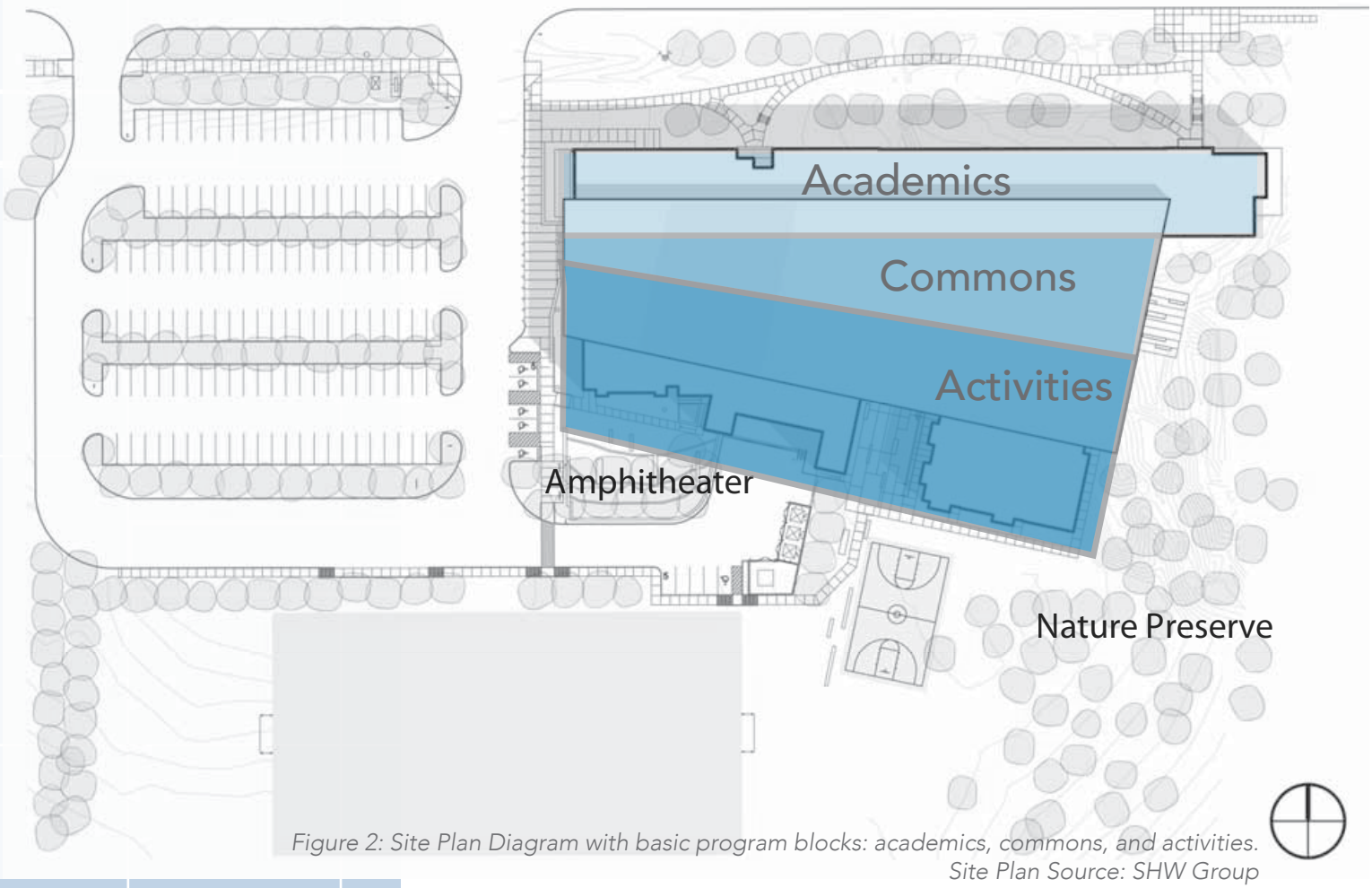

Figure 2: Site Plan Diagram with basic program blocks: academics, commons, and activities. Site Plan Source: SHW Group

Image 4: The building extends out on the site to engage the nature preserve.

Image 5: The three programmatic blocks of the building: academics, the commons, and activities are represented in the front elevation when approaching the building.

Materials + FFE

The visioning process and budget analysis at the beginning of the project resulted in more multi-purpose areas and less square footage, which allowed for greater resources to be spent on high quality materials and furnishings (SHW Group, 2012). All of the furniture throughout the building is flexible and maintains a similar aesthetic. The furniture ideas were provided by the design team and the actual furniture was procured by the Dallas Independent School District (Nayak, 2012).

Entry

The benefit of having a small school, where there is a strong sense of community and most people know each other, is evident the moment students walk in the door. There are currently fewer than 400 students at Gilliam Collegiate Academy, and it was observed that students are personally greeted every morning by a staff member who is visually screening everyone that enters the school. Students enter the building and gather in the commons before class, and visitors are directed to check in at the office. Comparatively, in many middle and high schools in the Dallas Independent School District, students must pass through metal detectors upon entering the building. Staff and students commented that it can be a noisy, chaotic, and time consuming start to the day. GIlliam Collegiate Academy students have a calm sense about them, which staff believes stems from the community atmosphere upon entering the school and carries throughout the day. (Ferguson Smith, 2012).

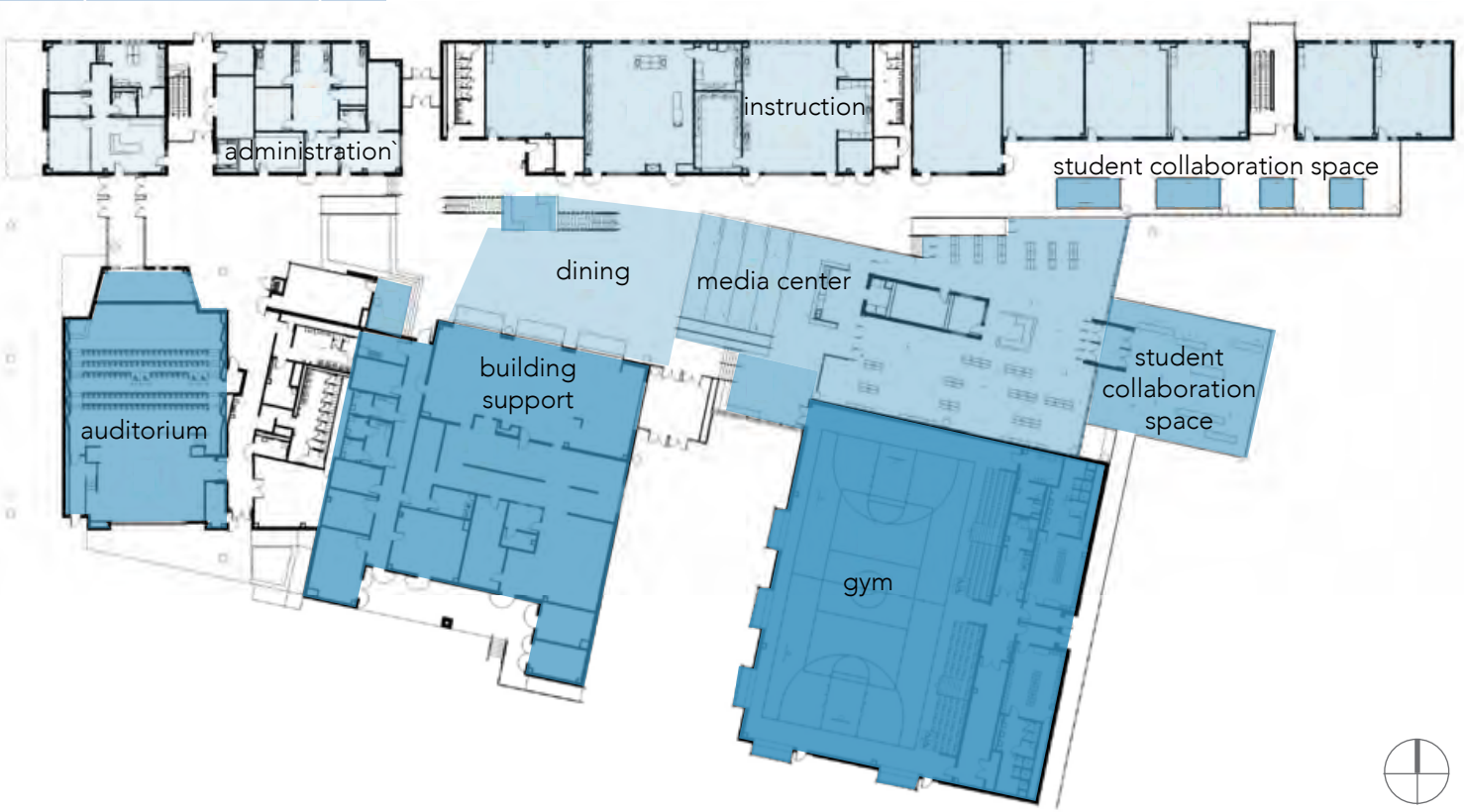

Figure 3: First Floor Plan Diagram
Floor Plan Source: SHW Group

Image 6: The view of the commons area, yellow "perch," and blue GO Center upon entering the building. The building is centered around the commons, which mimics the student union of a college or university.

Collegiate Environment

Upon entering Gilliam Collegiate Academy, the building opens up to the commons. The design intent was to eliminate double loaded corridors, typical in high schools, and provide a single loaded space that feels more like a college union (Nayak, 2012). The commons is an open and flexible space, and one has a sense of the activity or time of the school day by what can (or cannot) be seen and heard.

Materials + FFE

The materials from the exterior carry through to the inside, and are punctuated by the bright yellow and blue spaces. The yellow "perch" is a teacher collaboration and student resource area, and the blue space is home to the GO Center, which has college resources. The colors are meant to act as beacons, drawing the students to the spaces for access to resources and support (Nayak, 2012).

Learning Spaces

The academic portion of the building is designed to house the formal learning areas along with breakout spaces for informal learning. The design intent also called for a separation between the younger students in grades 9 and 10, and the 11th and 12th graders. As the students get older, the environment is meant to be structured with increased freedom and flexibility (SHW Group, 2012). It was observed that the vertical separation of grades between the two floors is not fully maintained. The academic spaces are organized in groups according to grade level and course, but in reality, students are mixed throughout both floors (Ferguson Smith, 2012).

Challenge 3: "The architecture responds to creating a student centric learning environment that supports small learning communities. Student teacher interaction, peer interaction, and active community involvement to encourage formal and informal learning." (SHW Group, 2012).

The staff feels that the building provides them with a great opportunity to offer the education and support necessary for the students to succeed. Having the college professors and high school teachers in the same building, with a variety of teaching and learning spaces, is a benefit. For example, staff commented that many current Texas Early College High Schools are housed in trailer buildings on an edge of the college campus. The learning conditions are not ideal, and there is minimal interaction between teachers and professors.

Currently there are about 400 Gilliam Collegiate Academy students, 19 teachers, and 9 college professors. Students commented on the sense of community in the school. They also feel that teachers really care about them and know about their work and progress.

Image 7: A science classroom on the second level.


Image 8

Natural Light: Each of the academic spaces is oriented to receive northern light, which also provides views to the Dallas skyline. The lighting systems are on dimmers to increase energy efficiency. Natural light benefits one's ability to learn (Heschong Mahnoe Group, Inc. 2003), and it was a goal of the design team to maximize natural light in the learning spaces (SHW Group, 2012).


Image 9

Images 8 and 9: The classrooms for grades 9 and 10 have smaller windows (Image 8) than the classrooms for grades 11 and 12 (Image 9). This allows for greater transparency between the classrooms and commons space, and greater structure for the younger students.

Materials + FFE

The classrooms are furnished with tables and chairs for the students. All of the furniture is flexible (Nayak, 2012). The interior classroom walls have bulletin boards, that are being used, however, some teachers commented that since the building is so nice and new they are afraid to put anything else on the wall for fear of "messing up" the space for future classes. Bulletin boards are outside the second floor classrooms (Image 10) and provide another opportunity for posting messages or student work. Upon observation, the exterior pinup spaces were not yet being used.

Transparency and Passive Supervision

A distinction between the classrooms on the first level, for grades 11 and 12, and second level, grades 9 and 10, is seen through the interior fenestration. Classrooms for grades 11 and 12 have windows that are seven feet tall, almost the entire wall height, and the grade 9 and 10 classrooms have windows that are about half the size. This allows for greater passive supervision when the students have more unstructured time and may be in the commons adjacent to the classrooms. Grades 9 and 10 are more structured, and the classroom fenestration reflects that through less transparency.

Learning Spaces

Technology

The classrooms are equipped with white boards, smart projectors, and gooseneck document cameras. Based on conversations with teachers, they are excited about the technology and are embracing the options it brings to teaching. The use varies depending on subject and personal preference, however, from observation it appeared that each teacher was using at least some technology. Having the technology attached to the wall and ceiling dictates the classroom layout. Although there was slight variation on the arrangement of the desks, the technology and size of the classroom didn't allow for much variation from the traditional model of desks in a row, facing the front of the classroom. The architectural intent is that students and teachers will use the breakout spaces and other informal learning areas for different teaching and learning methods (SHW Group, 2012).

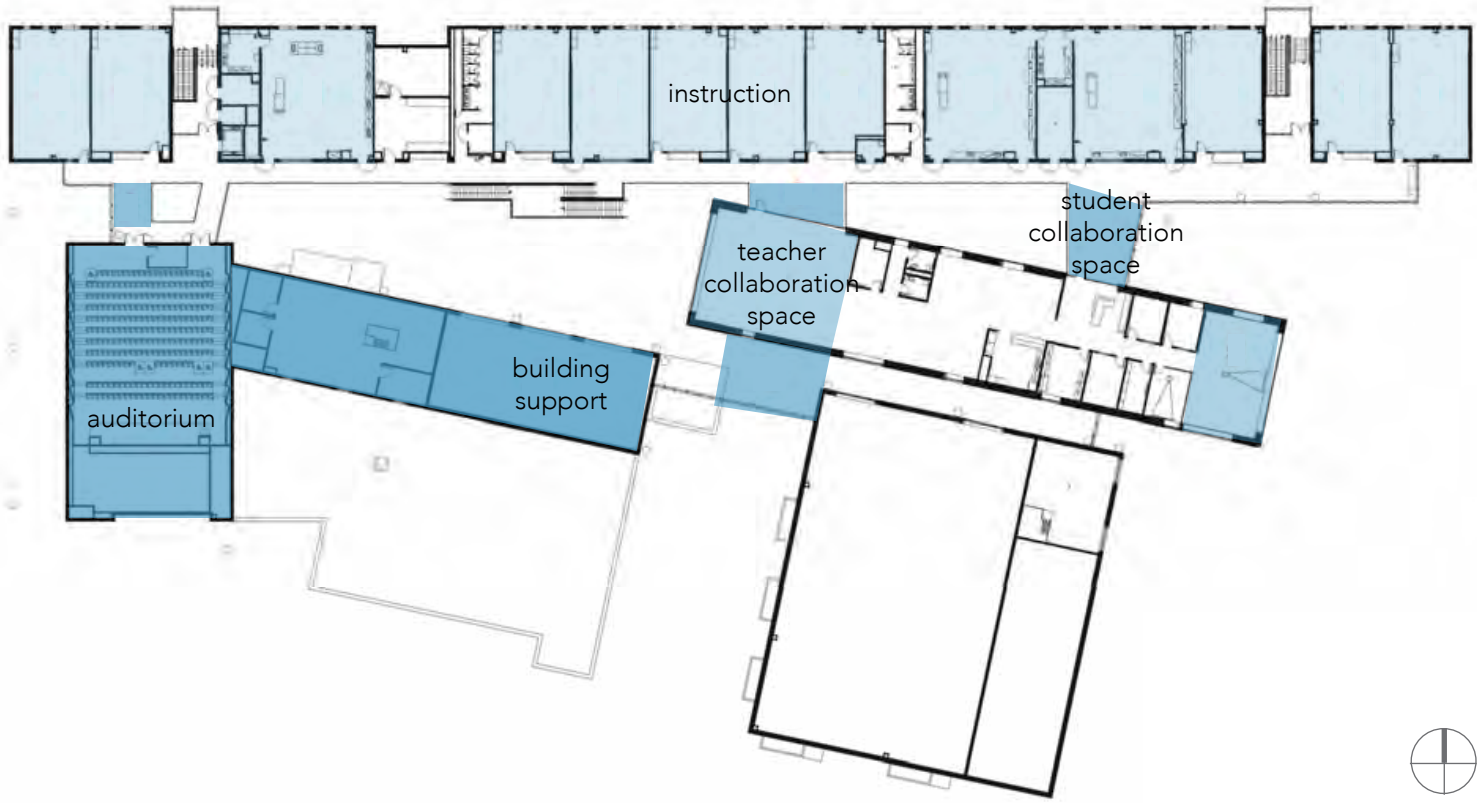

Figure 4: Second Floor Plan Diagram
Floor Plan Source: SHW Group

Image 10: A class using the smart projector.

Acoustics: The classroom acoustics are very successful. They meet the CHPS minimum of background noise not exceeding 45dBA, and reverberation time of a 0.6 second maximum reverberation time (CHPS, Inc. 2009). The classrooms are adjacent to the commons, which is occupied at various levels throughout the day by students who have unstructured time, but noise is not an issue. Staff have been pleased with the acoustics, and even when all the students are at lunch and the commons is noisy, the classrooms are quiet.

Image 11: The classrooms are in close proximity to the commons, social, and collaboration areas. The acoustics in the classrooms achieved Texas CHPS minimum standards and limit nearby distractions.

Circulation, Informal Learning, Collaboration, and Social Spaces

On the first floor, the commons acts as a plaza with central circulation alongside and through the open area. It is the primary activity and circulation zone, and most spaces blend into the commons. The areas immediately adjacent to the classrooms provide circulation and serve as a transition from the loud, public commons to the more private classrooms (Nayak, 2012).

The main, central stairway connects the first and second levels, and is the primary vertical circulation for staff and students, opening into the heart of the commons. The second level circulation provides access to the classrooms, with bridges connecting to the perch and large lecture hall. The balcony allows for the open feeling to be maintained, however, it was observed that it is small, and it can be difficult to move through the hallway in between class periods. Staff commented that they have had issues with traffic jams and moving all the students through the space. Teachers tend to go out into the hallway and help shuffle students on to their next class.

There are many seating options throughout the balcony circulation, providing space for small group work during class, or places to study during unstructured time.
The circulation is filled with natural light from the clerestories and glazing that opens up to the building entry and the nature preserve.

Image 12: The second floor hallway is filled with natural light from the facade glazing and clerestories, and a bridge connects the perch to the second floor classrooms.

Image 13: The second floor hallway provides bench seating adjacent to the classroom entries, and student collaboration space.

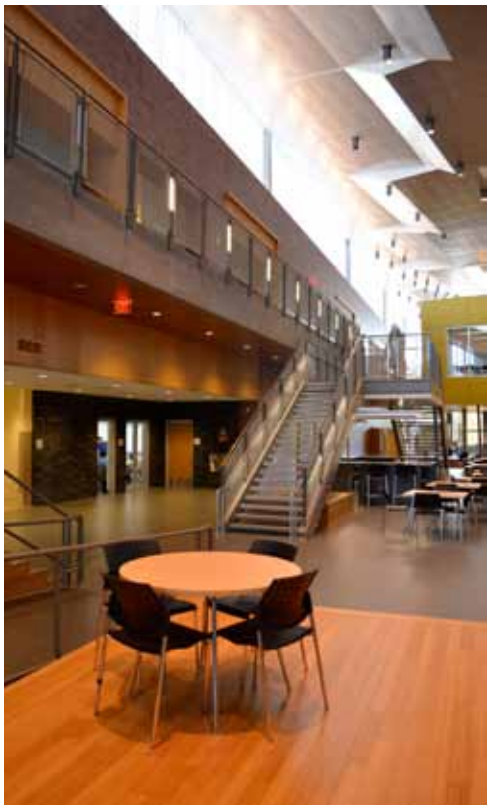

Image 14: The main stairway opens to classrooms and the first level commons.

Collegiate Environment

The college feel is emulated because there are no student lockers and there are no bells denoting the class times, two traditional elements in high school circulation. Clocks are prominently placed throughout the hallways so students are aware of the time and when they need to be at their next class. Students commented that after a small adjustment period, they are used to, and prefer, the no bell system, saying that it adds to the college feel.

Materials + FFE

The furniture in the hallways is all flexible, ranging from soft seating to wooden tables and plastic chairs. The design team gave suggestions for the furniture, and it was procured by the Dallas Independent School District (Nayak, 2012). The furniture is all of a similar language because it tends to move throughout the building (Ferguson Smith, 2012, Nayak, 2012). Wooden seating alcoves were built into the second-level hallways.

Transparency and Passive Supervision

The single loaded corridor that serves as the main circulation allows eyes on all activities. Whether moving about, working in a group, or studying independently, the transparency throughout the school allows students and staff to constantly be watching out for each other.

Informal Learning, Collaboration, and Social Spaces: Breakout Spaces

A majority of one's time in college is spent outside the classroom. Independent and group studying, meetings, and socialization provide learning and idea stimulation. The physical environment at Gilliam Collegiate Academy is designed to allow and support collaborative and collegiate behavior so the students can learn how to manage their time.

Challenge 2: "Students learn to manage and utilize unstructured time imperative to college success. Spaces for collaboration outside of the classroom, spaces for learning during unstructured time, and preparing students for the 21st century skills drove the design of the common spaces."
Feature 3: "Transparency of function enhances passive supervision and encourages college like behavior among students. Flexibility of the space support varied learning and teaching styles. Environments created to support intramural activities." (SHW Group, 2012).

Located across from the 11th and 12th grade classrooms on the first floor, the breakout spaces allow small groups of students to work together. Students and staff commented that there are often students using the collaborative spaces. Students said the use is usually student initiated, as opposed to being for breakout sessions during class.

Image 15: Students typically initiate the use of the breakout rooms and use them as an area for group work.

Image 16: Breakout rooms across from the 11th and 12th grade classrooms offer collaborative work spaces for students.

Collegiate Environment

The space allows groups of students to meet and study together. Students commented that they enjoy working in the breakout rooms—it can be less distracting than working at home and the views of the nature preserve are calming.

Materials + FFE

The breakout spaces are enclosed boxes with magnetic whiteboard writing surfaces. The rooms themselves are modular and can be moved if the need arises. Inside the rooms are tables and chairs for student work, and outside there are other seating options for group or individual study.

Transparency and Passive Supervision

The breakout rooms are across the hall from the 11 and 12th grade classrooms on the first floor. Teachers on the second level commented that they do not use them very much because they want to be able to always see their students and know what they are doing.
The breakout rooms offer views to the circulation, classrooms, nature preserve, and perch courtyard.

Informal Learning, Collaboration, and Social Spaces: The Commons

Gilliam Collegiate Academy is centered around a commons area, with academics and activities spilling into the multipurpose space.

Feature 1: "The commons is treated as plaza between collegiate buildings that accommodates a number of functions. It supports individual and collaborative learning, also supports daily functions of dining, reading, and gathering. The main commons transitions from noisy public space to quiet private space" (SHW Group, 2012).

The commons is truly multipurpose. In the school's first year of operation it served as a cafeteria, theater overflow, small group study area, and the prom location (Ferguson Smith, 2012). Currently, the flexibility works well for the school, and it is the goal that it will also serve the unknown needs of future students (Ferguson Smith, 2012; Nayak, 2012).

The three projection screens along the commons are not yet working, as they are waiting for final parts to be installed. The students and staff are excited about the opportunities when the screens are up and running—they envision being able to broadcast important events like election results, and think they will help build community among the students..

Image 17: The cafeteria opens up to the commons with garage doors.

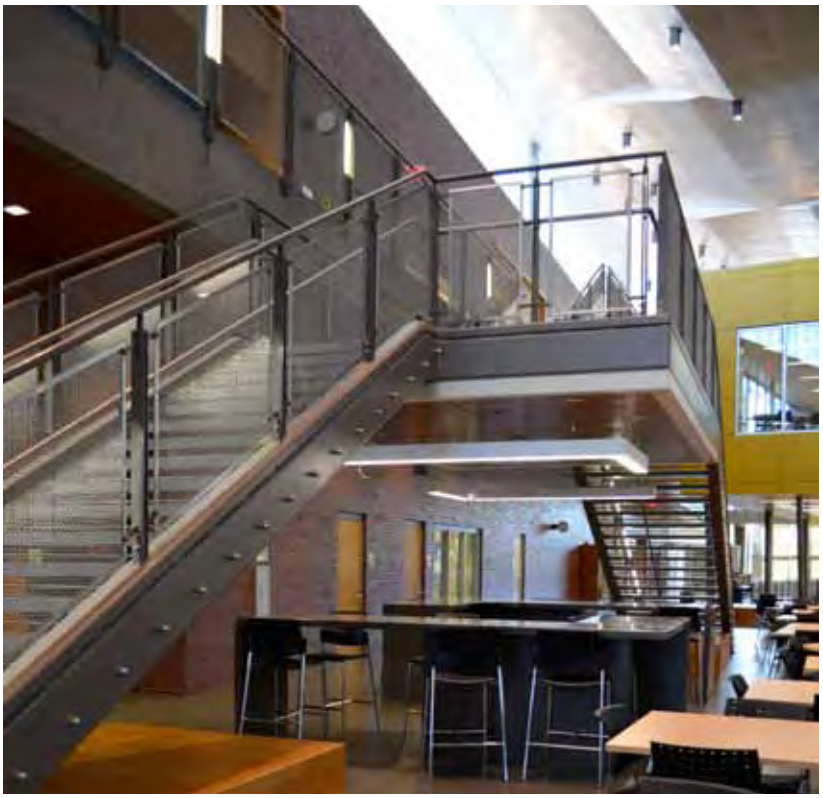

Image 18: High table seating provides a family-like atmosphere (Ferguson Smith, 2012).

Image 19: The cafeteria opens to the main commons.

Collegiate Environment

An outdoor plaza is often the heart of a college campus, and the design team wanted to provide a similar type of environment for Gilliam Collegiate Academy. Since it was necessary to have the building enclosed for supervision and security, the commons is an interior space that is reminiscent of an outdoor plaza. The walls are composed of exterior materials, the undulating metal ceiling panels mimic a cloud, and the cafeteria garage doors open up like sidewalk cafe awnings. (Nayak, 2012).

Materials + FFE

Seating options in the commons range from tables and chairs to high-top tables giving students a variety of seating, studying, and socializing areas. The high tables are reminiscent of a family dining area (Ferguson Smith, 2012) and promotes community among the students.

Transparency/Passive Supervision

Students are very aware that throughout most of the building, especially in the main commons, somebody is always watching. They commented that the staff, especially the principal, is very involved. The principal knows their classes and what assignments or scholarships they should be completing. Students know that if they are not behaving properly in the commons, someone will comment right away.

Informal Learning, Collaboration, and Social Spaces: Media Center

The library is unique because it is not enclosed by four walls. It is treated as a continuation of the commons, adjacent to a kitchen island space for senior students and a multi-use stage.
The stage is large enough to hold an entire grade of students, and has a projection screen for presentations.

The library is staffed with one person, and though there are security detectors at two sides of the entry, one side has been blocked off by bookcases because staff can visually only see one entrance. So, instead of two entrances into the library there is only one. With these measures in place, security for library materials has not been an issue thus far (Ferguson Smith, 2012). The students are respectful of the property and do not take advantage of the open concept.

Image 20: The media center stage accommodates small groups and presentations for an entire grade level.

Image 21: The library is open, with visual access to the commons and academic areas.

Image 22: Book stacks are adjacent to a row of computers and breakout rooms providing resources for different learning styles and needs.

Image 23: There is a row of book cases that closes off what would have been a second entry to the library. There is only one librarian, with visual access to one entry, so the other was blocked off.

Collegiate Environment

As students enter the upper grades at Gilliam Collegiate Academy they have more unstructured time, and managing unstructured time is essential to college success (SHW Group, 2012). The library has areas to accommodate group and individual study, and the students begin to have a sense of time management when using the space. Having the open library as an extension of the commons makes it easy to find, and students commented that its visibility serves as a constant invitation to the space.

Materials + FFE

The library incorporates magnetic whiteboard walls for student group work and collaboration.

There is a variety of seating, ranging from tables and chairs to cushioned seats. It was observed that students used the soft seating for independent study or napping.

A row of computer terminals lines the media center as part of the circulation, and are next to breakout rooms for group work.

Informal Learning, Collaboration, and Social Spaces: The Perch

The "perch" is a bright yellow box suspended on the second floor as a resource for students and staff.

Feature 2: "The professors and advisors are housed in the 'perch' to encourage vertical teaming and easy access at student's unstructured time. The perch engages the nature preserve on the outside and the commons on the inside. Location provides direct access to 9-10 grades and sought access to 11-12 grades" (SHW Group, 2012).

Since counselors, teachers, and professors are in one location and all students enter through the same door, the intent is to reduce the stigma of going to see the counselor or a teacher (Ferguson Smith, 2012, Nayak, 2012).

The eastern portion of the perch is only for teachers—a space for meetings, planning, and work. The space projects out from the building towards the nature preserve. Nicknamed "the room with a view," the teachers find this space a calming respite from the daily activity (Ferguson Smith, 2012). The natural view provides a calm area to think and clear the mind. The option of translucent or blackout shade and a projection screen along the east window wall accommodates presentations. It was observed that the walls and whiteboards were covered with ideas and planning material.

Figure 5: Perch Sight Lines Diagram: The diagram shows how the perch provides passive security throughout the building. Floor Plan Source: SHW Group

Image 24: "The Room with a View": The perch provides views to the nature preserve.

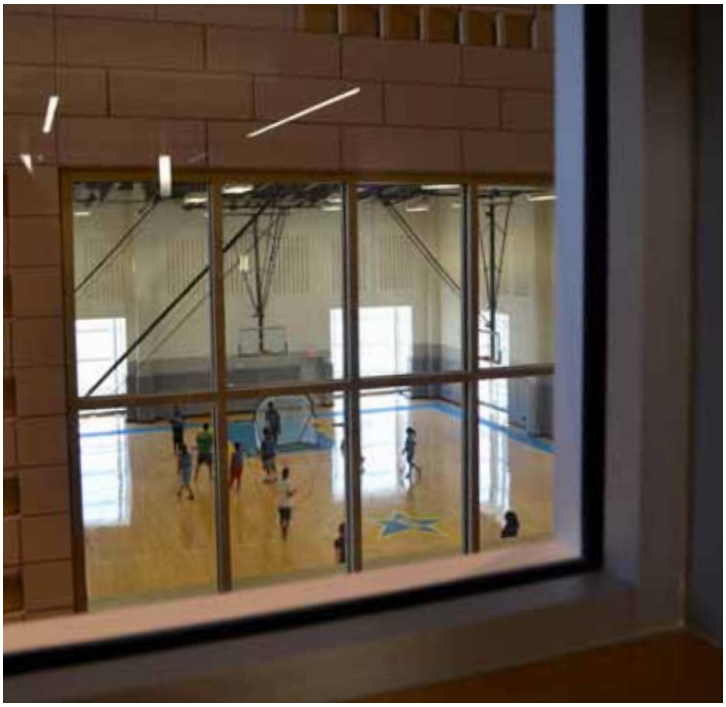

Image 25: A teacher looks down into the commons from inside the perch.

Image 26: A view into the gym from the kitchenette in the perch enhances passive supervision.

Transparency and Passive Supervision

The perch is visually open to the rest of the building. Floor to ceiling windows are juxtaposed with small window slits. The variety enlivens the facade of the perch and offers views to the building, providing passive supervision. Students and staff in the perch have views to the gym, commons, classrooms, and circulation (Figure 5). This allows staff to supervise the students and encourages college-like behavior (SHW Group, 2012), and also lets the students see who is working in the perch if they are looking to talk with a teacher.

Informal Learning, Collaboration, and Social Spaces: The Perch

The perch allows for collaboration between the teachers and professors. They have open desks which are arranged by grade and subject teams.

The use of the perch is currently a work in progress (Ferguson Smith, 2012). It has been an adjustment for the teachers to get used to working in the space, and many are not yet comfortable with it. Though the acoustics eliminate almost all outside noise, some teachers find it difficult to work when students are meeting with another teacher and they can hear the conversation. Staff noted that having all teachers in one space, moving about, working, and talking with each other and students, is difficult for those who are accustomed to doing their work in the quiet privacy of their own classroom. Another staff comment was about the perch entry. There are two doors, but the primary, staffed entry is at the far end of the perch. The secondary entry has been locked to keep students from entering, but teachers would find it more convenient if both doors were always open.

Both college professors and high school teachers have a desk in the perch. However, the lack of teachers using the perch to work is evident by walking through, as many have not moved into their desk space in the perch. According to the principal, teachers and professors are gradually starting to move into the perch, and use has increased from the first year.

Teachers commented that the ability to communicate with the college professors is quite beneficial. It helps create community among the staff and they can discuss the curriculum. As one teacher described, typical teacher lounges are a break space, where you go to eat lunch and leave. The space in the perch allows more of a collaborative community among the staff. In the first year of the new building the teachers did not have a planning hour, but it is now back in the schedule. Staff commented that the planning hour provides a better opportunity to work in the perch.

Conversations with students resulted in mixed understanding about the perch. Many thought it was only for teachers or counselors, however, others knew it as the place to go for academic help. Some students commented that using the perch was useful for seeking academic help since the teacher desks are grouped according to subject and grade. If a particular teacher is not at their desk, for example, the students know they can go to another math teacher who may be in the perch at the time.

Image 27: Desks for teachers and professors in the perch, along with different seating options for collaboration.

Image 28: The main entry into the perch.

Collegiate Environment

The perch emulates the college experience by having one area to reach the professors—in college, professors have office hours and are not always in the same classroom. This encourages the students to seek meetings with the teachers in their offices.

The perch allows for collaboration between the teachers and professors. They have open desks which are arranged by grade and subject teams.

Materials + FFE

The perch serves as the teacher lounge, collaboration, and lesson planning area. Each teacher has their own desk in the perch, and only a table in the classroom to encourage use of the perch.

Some of the college professors have found the amenities and atmosphere of the perch so user friendly that they prefer to work at the high school (Ferguson Smith, 2012).

Activity and Social: The Gym

Students at Gilliam Collegiate Academy have an extended lunch hour, 1 hour and 20 minutes, providing them with time for socialization, studying, recreation, and meetings (Dallas Independent School District, 2010).

Feature 3: "Transparency of function enhances passive supervision and encourages college like behavior among students. Flexibility of the space support varied learning and teaching styles. Environments created to support intramural activities" (SHW Group, 2012).

According to students, the gym is the greatest part of the building, and during the lunch hour the students flock there for open gym. Some play basketball, or other activities on the sides of the court, and many are in the bleachers socializing. The music from the audio system adds to the lively atmosphere.

The staff recognizes the value of the physical activity and socialization. The students work hard during the day, and they need the time for activity to exercise, release some of their energy, and be prepared to concentrate for the rest of the school day (Ferguson Smith, 2012).

Image 29: Students play basketball in the gym during their extended lunch hour.

Image 30: The student collaboration space outside the gym creates an easy flow between the commons, gym, and exterior courtyard.

Image 31: Students use the window alcoves as an area for jumping rope, The windows provide transparency to the courtyard outside.

Collegiate Environment

The rigorous academic schedule at Gilliam Collegiate Academy does not allow the school to have varsity sports, but students can participate in intramural sports. Through the intramurals and activity during the lunch hour, the staff wants to instill the idea that in college, there is usually a recreation center and that physical activity is an important part of a healthy lifestyle (Ferguson Smith, 2012).

Image 32: Students use the gym as a social and spectator area, in addition to physical activity.

Transparency and Passive Supervision

The gym is filled with natural light and has views to the basketball court and courtyard. The visibility to the outside areas enhances passive supervision for the students, both inside and outside.

Activity and Social

The GO Center is staffed by University of North Texas at Dallas students and offers guidance and college resources. It is currently open every day during school hours (Image 33).

Since the school was a community effort, the design intent is that the community will be able to use features such as the GO Center and lecture hall. To accommodate this use, the lecture hall and GO Center can be closed off from the rest of the school and provide after-hours access for the community (Nayak, 2012), (Figure 6).

Image 33: The GO Center provides college resources for the students.

Lecture Hall and Amphitheater

The lecture hall holds 250 students and opens up to become an outdoor amphitheater. The outdoor space is a benefit because the lecture hall does not hold all of the students (currently 400). The amphitheater can also serve as a reception area for intramural activities. The rest of the school can be closed off, but there is still access to bathrooms and drinking fountains.

Figure 6: Diagram showing public building access for after-hours events. Floor Plan Source: SHW Group

Image 34: View of the entry with the GO Center and lecture hall.

Image 35: Outdoor amphitheater that connects to the large lecture hall.

Outdoor Learning: Athletic Fields, Theater, and Courtyards

The site provides two outdoor courtyards, a basketball court and athletic fields to promote outdoor activity and areas for studying and socializing.

Feature 2: The professors and advisors are housed in the 'perch' to encourage vertical teaming and easy access at student's unstructured time. The perch engages the nature preserve on the outside and the commons on the inside. Location provides direct access to 9-10 grades and sought access to 11-12 grades"
Feature 3: "Transparency of function enhances passive supervision and encourages college like behavior among students. Flexibility of the space support varied learning and teaching styles. Environments created to support intramural activities" (SHW Group, 2012).

A courtyard connects the commons, gym, and basketball courts, which open up to the athletic fields. It was observed that even in the hot Texas September sun, with temperatures in the mid-90s, students were out on the soccer fields during the lunch hour, although others commented that they only use the gym for athletics when the weather is cooler.

All doors to outside areas are locked throughout the day, except during the lunch time for security purposes.

It was observed that the courtyard under the perch was not used during the lunch hour, and students commented that its typical use is minimal.

Image 36: Courtyard under the perch that extends to the nature preserve.

Image 37: Courtyard connecting the commons, gym, and basketball court.

Image 38: The athletic fields are wide open and provide a space for intramural sports.

Conclusion

Gilliam Collegiate Academy's site and building provides exposure to a college environment while offering the support for the students to be successful in higher education. According to observation, the literature review, and staff comments, the challenges and features as stated by the design team were addressed in the following ways:

Challenge 1: "The school is specifically tailored to students who are underrepresented in higher education by providing opportunity and support for college success. The architecture emulates the collegiate experience as a means to introduce students to the rigors of higher education."

The school models itself on the college experience through its commons, the perch, and providing space for intramural sports. Colleges typically have a student union or outside plaza that is considered the heart of campus, and the commons represents that experience for Gilliam Collegiate Academy. The cafeteria, GO Center, presentation stage, gym, library, classrooms, and collaboration spaces are all a part of or blend into the commons. The individual and group study and collaboration spaces within the commons provide students places to work in their unstructured time, and the openness and transparency provides passive supervision to encourage proper behavior by the high school students. The perch emulates the college experience by having one area to reach the professors—in college, professors have office hours and are not always in the same classroom. This encourages the students to seek meetings with the teachers in their offices. Colleges typically have intramural sports for students to participate and maintain a healthy life style. Due to the rigors of the academic curriculum at Gilliam Collegiate Academy, the school does not have varsity sports, but intramural activities are encouraged.

Challenge 2: "Students learn to manage and utilize unstructured time imperative to college success. Spaces for collaboration outside of the classroom, spaces for learning during unstructured time, and preparing students for the 21st century skills drove the design of the common spaces."

Unstructured time is built into the schedule of students at Gilliam Collegiate Academy, and the commons provides spaces for them to work and study during that time. Some of the most important skills for the 21st century are collaboration, technology, and flexibility (Partnership for 21st Century Skills, "21st century learning environments," 2009) and this space allows students to work on those skills. It was observed that during the unstructured time students

were often using computers (laptops or the desktops adjacent to the library), and sitting in groups throughout the library and commons. Students commented that the breakout spaces are used often, and that it is typically the students who initiate the use, as opposed to teachers for classroom activities. The marker board finish in the breakout areas and the library helps to facilitate collaborative student work.

Challenge 3: "The architecture responds to creating a student centric learning environment that supports small learning communities. Student teacher interaction, peer interaction, and active community involvement to encourage formal and informal learning."

The classroom learning spaces have flexible furniture, enabling different configurations of the classroom depending on need. It was observed that since the smart projectors and whiteboards are at the front the room, the tables and chairs were focused at the front of the room as well. Though flexibility is important for 21st century learning environments (Partnership for 21st Century Skills, "21st century learning environments," 2009), upon observation, the flexibility was not used to its greatest potential. Aside from different angles and spacing, the classroom layouts were similar. The breakout spaces offer areas for the students to work together, both during class and unstructured time. Staff commented that they are not yet using the building to its full potential, and would like to do more with the large lecture hall in opening it up for community activities.

Feature 1: "The commons is treated as plaza between collegiate buildings that accommodates a number of functions. It supports individual and collaborative learning, also supports daily functions of dining, reading, and gathering. The main commons transitions from noisy public space to quiet private space."

The variety of spaces, from the main commons that transitions for cafeteria dining to group or individual work tables, provides flexibility for informal and formal learning opportunities. It was observed that the commons is both literally and figuratively the heart of Gilliam Collegiate Academy, and students are always there. There may be just a few students with an unstructured block working on an assignment, or during lunch the space comes alive with students dining and socializing. The variety of seating, such as the high tables to the lounge chairs in the library, provide students different spaces depending on their needs. The transition from the noisy to quiet private spaces works—even when the main commons is filled with students, the perch and classrooms are quiet.

Feature 2: "The professors and advisors are housed in the 'perch' to encourage vertical teaming and easy access at student's unstructured time. The perch engages the nature preserve on the outside and the commons on the inside. Location provides direct access to 9-10 grades and sought access to 11-12 grades."

The yellow finish on the perch stands out from all areas of the building, as the goal was to draw students to the space so they learn to seek help from teachers and counselors. Vertical teaming is encouraged among the professors, and their desks are grouped to support the collaboration. It was noted by teachers that it is quite helpful to have the college professors in the building so that they can see each other, maintain relationships, and collaborate on material. Other teachers commented that it is too hard to work in the perch since the space is so open and there are too many distractions.

Conclusion

The distractions range from the general activity of having all teacher functions in one area (the lounge, workroom, offices), to difficulty concentrating when students come in to get help from other teachers. Thus, there are still many teachers who do not use the perch as their primary work space.
Teachers are very excited to have the view of their nature preserve, and use it not only as teacher workspace, but as a respite from the activity of the school.

Feature 3: "Transparency of function enhances passive supervision and encourages college like behavior among students. Flexibility of the space support varied learning and teaching styles. Environments created to support intramural activities."

Conversations with students revealed that they are very aware of the passive supervision throughout the building. Though they were not always favorable about the fact, they commented that if they were not doing what they were supposed to, someone would be there to check up on them. The passive supervision happens on both a macro and micro level. The open quality of the building allows most activities and people to "see and be seen," and at a smaller scale, the school is personalized and staff and administration know what assignments, scholarships, or applications the students should be completing.
The flexibility within the learning environment allows the teachers to use a variety of technology, such as the whiteboards or smart projectors, and to work as a whole class or in smaller groups. The athletic fields provide space for soccer, and the outdoor basketball court and gym provide areas for other physical activities.

Gilliam Collegiate Academy's physical environment mimics that of a college while still providing the support and structure necessary for high school students. Students who are underrepresented in higher education need to be challenged academically and supported in the road to further education (Jobs for the Future, 2009). Gilliam Collegiate Academy presents a college environment that exposes students to the rigors of college (Ferguson Smith, 2012).

Gilliam Collegiate Academy was successful by staff accounts and research in the following ways:

- Emulating a college union or plaza through the commons, which provides study and collaboration spaces for students during their unstructured time.
- Providing an open plan and transparency throughout the building to allow for passive supervision among students and staff, which is a constant reminder for students to exhibit appropriate behavior.
- Creating a variety of small collaboration spaces, such as the breakout rooms to the tables in the cafeteria, allowing students to work together in small groups.
- Providing a range of independent study spaces throughout the building that allow students to develop time management skills.

Gilliam Collegiate Academy staff and students feel that the building offers small learning communities through the classrooms, breakout areas, and size of the student population. The commons allows passive supervision so that students can receive structure when needed, and seek guidance from teachers in the perch.

The principal at Gilliam Collegiate Academy referred to the building as having a Cadillac as your vehicle when you are just excited to drive. She noted that there are many features in the building, such as the patio, amphitheater, perch, and breakout spaces that have capabilities that the school will grow into (Ferguson Smith, 2012). The flexibility of the building fits the current needs of Gilliam Collegiate Academy, and she is excited about the possibilities in the future.

The building presents students with a college environment, giving them support and guidance to encourage and ease the future transition to higher education.

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Personal Interviews
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Teahers:
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Ms. Kingman
Ms. Maddox
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All images and figures are the work of Kelly Martinez, unless otherwise noted.

Project Information

Kathlyn Joy Gilliam Collegiate Academy
1700 East Camp Wisdom Road
Dallas, Texas 75241

Architect: Vandana Nayak, AIA
SHW Group

Type of Facility: Alternative School or Innovative Learning Environment
Age/Grade Range: 9–12th Grade
Enrollment: 400 Students

Date Complete: August 2011
Building Size: 111,000 square feet
Project Cost: $23,519,576
Type of Construction: New Construction

Collaboration Acknowledgements: Terry Hoyle, AIA (Principal in Charge); Vandana Nayak, AIA (Project Manager); Konrad Judd, AIA (Designer); Jennifer Deng, AIA (Project Architect); Dan Fletcher (Visualization); John Forisiepi, AIA (Specifications); Gwen Morgan, IIDA (Interior Designer); AG&E (Structural Engineering); Linda Tycher & Associates (Landscape Architect); Pachaco Koch Engineering (Civil Engineering); DP Acoustics (Acoustical Designer); Balfour Beatty (Cost Estimation); AACE (Plumbing Engineer); JMK (Food Service Consultant); Drytech (Roof Consultant); Texas Scenic (Theater Consultant).

Kathlyn Joy Gilliam Collegiate Academy
1700 East Camp Wisdom Road
Dallas, Texas 75241

Conclusion

For a school environment to be successful, it is essential that the design supports the program. The specific challenges and features as stated by the design teams addressed the needs of each case study school. Table 1 highlights the most essential ways that the designs support the programmatic delivery of each school. Comments from building users yielded high praise for the way each school was tailored to its specific needs. Stakeholders from each school were included in the planning process, and administrative comments were always positive about the working relationship, stating that they were involved and understood. Thus, the result is seen in the successful programmatic delivery through the design.

Image 1: The Giliam Collegiate Academy provides areas for group work and college resources for high school students..

Table 1: Programmatic Delivery

Mothers' Club Family Learning Center	The ability to have both mothers and children in the same building with separation and unity when needed allows the learner groups to focus on their individual curricula, engage in hands-on activities, and build relationships. The flexibility of the spaces supports small group work areas and the ability to host fundraisers, critical to non-profit survival. The outdoor play area provides sensory experiences and exploration.
LearningSpring School	The multi-disciplinary approach to educating children with autism is supported by the specialty rooms and classroom floors. Having space designed for life skills and occupational therapy provides the staff with the resources to provide the multi-discipline curriculum. Staff noted that the small break rooms are "lifesavers" for helping students get away when they need to, with minimal disruption to the other students.
Redding School of the Arts	The outdoor theater and dedicated art, music, culinary, and dance classrooms create an environment that integrates arts with academics. Arts are a part of the everyday curriculum and the outdoor connections and specific amenities in the classrooms allow for varied teaching and learning styles. Staff commented that an area where all students could gather at the same time, completely out of the natural elements would benefit the school.
Gilliam Collegiate Academy	The commons acts as the center of the school and provides students with areas to study independently and work collaboratively. The constant passive supervision throughout the building holds students accountable and encourages responsible behavior. The perch accustoms students to seek help from teachers and counselors.

Image 2: The open kitchen at Mothers' Club serves as a spatial transition from adult to child programs.

Conclusion

Studies have proven the affects that learning environments can have on academics and the everyday building users. Therefore, it is critical that fundamentals such as thermal comfort, acoustics, natural lighting, and indoor air quality are met. Each of the four schools achieved these goals for the classroom in accordance with the programmatic needs and site conditions. (Tables 2 and 3). When possible, northern light is given to classrooms to provide natural daylight and views. Minimum standards were met for acoustic performance for LEED and CHPS ratings, and often, additional acoustic measures were taken for common areas and circulation.

Image 3: The custom exterior shading system provides light and thermal comfort for LearningSpring School.

Table 2: Teaching and Learning Fundamentals

Mothers' Club Family Learning Center	
thermal comfort	The garage doors and operable windows provide control and access to the outdoors.
acoustics	Acoustics in the classrooms were designed to meet the NC 25–30 range. Staff noted that the only issue is in the joined preschool and pre-kindergarten classrooms, where noise travels between the two rooms. The classes adjust their schedules to fit the adjoining classroom, such as alternating music and outdoor time.
natural lighting	The natural and borrowed light from the garage doors, sliding doors, skylights, windows, and window walls fills the entire building with natural light. When necessary, domestic light fixtures supplement the natural light.
indoor air quality	The school uses low Volatile Organic Compound (VOC) materials. Operable windows provide natural ventilation.
LearningSpring School	
thermal comfort	The custom exterior shading system blocks southern and eastern light. Classrooms have operable windows and control of the thermostat up to two degrees warmer or colder than the main system.
acoustics	Classrooms were designed with a decibel level of 35, and are successful by staff accounts. The hallways and gym are louder and could improve. Special measures were taken for an acoustically separate music room.
natural lighting	Classrooms are filled with natural light and electric light is used to supplement. The electric lights have dimmers, but staff commented that they are usually all on or off. Interior shading systems are used.
indoor air quality	The school uses low VOC materials. Operable windows provide natural ventilation.

Images 4 and 5: The variety of windows and doors in Mothers' Club is essential to the thermal comfort, lighting, and indoor air quality.

Conclusion

Image 6: The light-filled commons at Gilliam Collegiate Academy

Table 3: Teaching and Learning Fundamentals

Redding School of the Arts	
thermal comfort	Classrooms have windows allowing cross ventilation from the playground to semi-conditioned hallways. The classrooms are conditioned, though a teacher noted that some upstairs classrooms get warm. The semi-conditioned hallways can be an issue with heat, cold, and wind, so adjustments are underway.
acoustics	Acoustics achieved the exemplary performance credit by LEED standards, and extra acoustic measures were taken in the hallways.
natural lighting	All general classrooms receive northern light. Lutron lighting systems allow user control and reduces energy use.
indoor air quality	The school uses low VOC materials. Operable windows provide natural ventilation.
Gilliam Collegiate Academy	
thermal comfort	The challenge was to balance the amount of glazing, and heating and cooling loads. It was observed that the upper hallways got warm in the September afternoons.
acoustics	Acoustics in the classrooms, the perch, and administrative areas are successful by staff accounts. Circulation serves as a transition from loud to quiet spaces.
natural lighting	Classrooms have northern light and the commons is glazed on the east and west facades. Transparency between the classrooms and commons allows for borrowed light, and clerestories bring northern light into the commons.
indoor air quality	The school uses low VOC materials. Operable windows provide natural ventilation.

Images 7 and 8: The learning spaces at Redding School of the Arts provide windows for natural light and ventilation.

Conclusion

In conducting interviews with school administration, staff, teachers, parents, and students, the satisfaction and appreciation for each school building was evident. The users took pride in their building and were eager to discuss the features and amenities. A resounding message across each of the schools was the appreciation for the natural light. Almost every individual commented on the daylight and the way that impacted their everyday use, from providing calming views to being easier on the eyes.

Image 9: LearningSpring School's light-filled main circulation stairway.

Table 4: Educational Dignity

Mothers' Club Family Learning Center	Mothers' Club serves those living in poverty, and the new, clean, light-filled environment gives the families a sense of value, purpose, and hope. One mother commented that the learning environment feels just like a home. Families and staff are proud to be in the building every day.
LearningSpring School	Administration stated that the building is a great place to work, and the light-filled environment makes long days manageable. Staff are grateful for the building amenities, and when they give tours, people are in awe of the building. Students also commented on the school, and staff noted that any statement is a testament to the building, since the students do not typically comment on their environment.
Redding School of the Arts	Students and staff expressed pride in the building, saying that it is a happy and cheerful place. Students also commented on positive reactions from friends at other schools, noting how lucky they are to be in the school. Parents said that the outdoor theater is magical and reverent.
Gilliam Collegiate Academy	Teachers commented that the building gives the students a sense of value and motivation. The school serves students who may be at risk for "falling through the cracks" in a typical high school, but Gilliam Collegiate Academy is a community environment that gives them a sense of pride and support. Students commented that the building inspires them and is a great place to study and attend school.

Image 10: Natural light fills a classroom at Redding School of the Arts.

Conclusion

The specific program requirements for each of the four case study schools, along with the diversity of age and location, provided a distinct set of learning environments from which to make comparisons across building spaces and features. While each school had its own challenges and features, there were areas in which the schools overlapped, such as the basic learning spaces.

The learning spaces for each of the schools largely follow the pattern of standard classrooms, with student desks and tables in rows, facing the whiteboard at the front of the classroom. The layout of the adult learning spaces at Mothers' Club, and classrooms for LearningSpring School, Redding School of the Arts, and Gilliam Collegiate Academy appeared to be dictated by the technology. As long as the whiteboard and/or projector were at the front of the room, the layout did not seem to change from the typical model.

The child learning spaces at Mothers' Club varied the most from the other schools, as play is one of the most important learning methods for young children. The classrooms were large and flexible, with areas for play, instruction, and dining.

In creating learning environments for students with ASD, literature recommends that the space have minimal distractions and low stimulation so that the focus is on learning (The National Autistic Society, 2012). Color, material finishes, and minimizing clutter in the learning room are important factors to create a calm environment. As seen in Image 12, the walls and cupboards are neutral, with a green accent. Green is found to be a calming color for children with autism (Pauli, 2004), and beiges are also recommended (Myler, Fantacone, & Merritt, cited in Henrickson, 2009).

Comparatively, at Redding School of the Arts (Image 13), color is used in the classroom to motivate students and draw attention to the front of the classroom. The classroom colors at Redding School of the Arts are vivid, such as orange, green, and yellow.

Images 11–14: The child classrooms at Mothers' Club (Image 11) varied the most from the other schools. LearningSpring School classrooms (Image 12) provided little color on classroom walls to minimize distraction for its students, while Redding School of the Arts used vivid colors to attract student attention and create a lively atmosphere (Image 13). The classrooms at Gilliam Collegiate Academy were fairly standard, and seemed to rely on areas outside the learning space for collaboration and student-centric learning (Image 14).

Table 5: Learning Spaces

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
adults: 2 flexible classrooms; children: large flexible rooms with areas for play, instruction, and dining	standard classroom layout; small learning zones; minimal distractions	classroom is a morphed "L" shape; allows primary learning area and breakout space for flexible use; strong color	standard classroom

Image 11


Image 12


Image 13


Image 14

Conclusion

The extended learning spaces (Table 6) range from seating within the circulation to separate learning areas. At Mothers' Club, the kitchens and central play atrium provide additional space for extended learning opportunities (Image 15).

It was observed that extended learning spaces often included seating in the circulation areas for informal learning or socialization. LearningSpring School, Redding School of the Arts, and Gilliam Collegiate Academy provide the extended learning spaces as an opportunity for individual or group study as well as socializing. Images 16–18 show how benches and flexible seating are adjacent or across from the classrooms for small group work or informal learning.

The connection to nature is evident in the extended learning spaces at Redding School of the Arts and Gilliam Collegiate Academy. At Redding School of the Arts, the spaces are outside in the semi-conditioned hallways with views to the natural surroundings. Views to the nature preserve are prominent at Gilliam Collegiate Academy.

Images 15–18: The kitchen and small waiting area are an extension of the learning spaces at Mothers' Club. The seating alcoves at LearningSpring School promote informal socialization for the students (Image 16). At Redding School of the Arts (Image 17) and Gilliam Collegiate Academy (Image 18) seating in the hallway provides spaces for small group or individual work.

Table 6: Extended Learning Spaces

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
kitchens; central play atrium	hallway seating alcoves	galleries for collaboration and dining; balconies; breakout spaces in circulation	collaborative learning areas; circulation seating; commons

Image 15

Image 16

Image 17

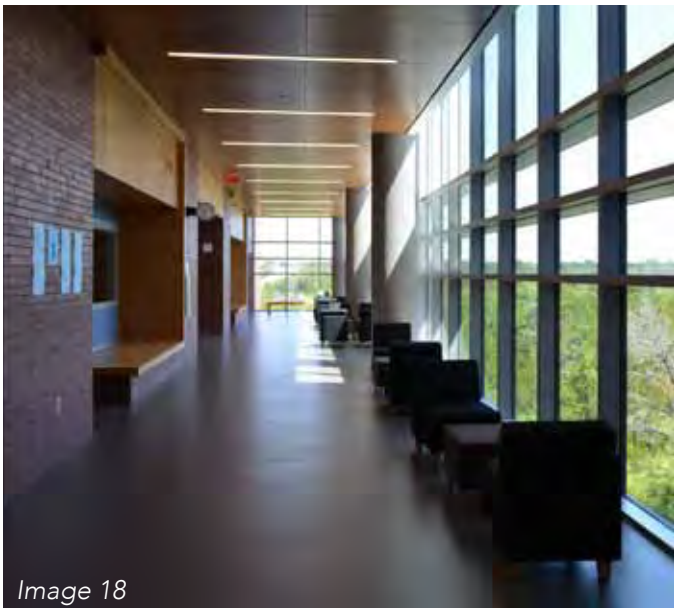

Image 18

Conclusion

Though the specialized learning spaces depended largely on the programmatic needs of each school, there are similarities among each school. For example, at Mothers' Club, the library serves as a resource center for the adults to research education and job opportunities. The GO Center at Gilliam Collegiate Academy is a focal point for providing college resources.

It was necessary to include specific spaces to accommodate the multi-disciplined pedagogy at LearningSpring School and Redding School of the Arts. For example, incorporating music into the curriculum was important at both schools. However, for students with autism, audio distractions can make learning especially difficult (Paron-Wildes, 2004), so the music room at LearningSpring School is acoustically separate from the rest of the building (Image 20). On the other hand, at an arts school, the opportunity for music to spread from the music rooms through the halls and general classrooms was seen as enhancing the atmosphere (Image 21).

Images 19–22: The library provides resources for the parents at Mothers' Club. The acoustically separate music room at LearningSpring School (Image 20) is different from the music and dance rooms at Redding School of the Arts, which open up to other areas of the building (Image 21). The amphitheater at Gilliam Collegiate Academy fits the programmatic need of having a large space in which they can involve the community (Image 22).

Table 7: Specialized Learning Spaces

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
library; counseling room	occupational therapy; relationship development intervention; music; culinary arts; drama; life skills; art; science; computer lab	music; dance; science; art; special education	lecture hall/ amphitheater; GO Center; perch

Image 19

Image 20

Image 21

Image 22

Conclusion

The importance of outdoor learning and a connection to nature was critical for each school (Table 8), and the outdoor spaces were always a favorite with the students. Through observation and feedback, it was found that with all of the schools, the outdoor areas had greater use if there was a direct connection from the learning space, if the outdoor learning environment was large enough for an entire class, and if there was ample shading.

For children, play is important for socialization, cognitive development, and physical activity, and nature supports physical and emotional well-being (Teaching Strategies, Inc., 2010). At Mothers' Club, outdoor learning is integral, and students spend about half their time in the program outdoors. The direct connection from the classrooms to the outdoor learning garden provides sensory experiences and opportunities for children to explore their interests and curiosity. Mothers' Club's urban location allows the school to benefit from nearby parks, and staff commented that they use the community parks at least once a week.

Comparatively, LearningSpring School is in an even more dense and urban setting, and they too, take advantage of neighboring parks. Nature can be beneficial for individuals with ASD (Sachs & Vincenta, 2010). The main outdoor learning environment is the rooftop terrace on the fourth level that is used daily for recess. There is also a courtyard, but staff commented that it is too small for an entire class, so it has minimal use.

Redding School of the Arts also places a strong emphasis on the outdoors, with 50% of the learning spaces located outdoors. In addition to the semi-conditioned hallways and galleries, the courtyards, gardens, and playground were emphasized. The first level general classrooms provided direct access to the playground, while the courtyards were not as easily accessible for all classrooms, and therefore not used very often. Teachers commented that it was hard to take time away from the lesson to travel to an outdoor learning space.

At Gilliam Collegiate Academy, students commented that the courtyards were not used very often either. The outdoor athletic fields, however, were used daily, as high school students also reap the physical, social, and cognitive benefits of play and an outdoor connection.

Table 8: Outdoor Learning

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
outdoor learning garden; nearby community parks	rooftop terrace; courtyard; nearby community parks	theater; galleries; circulation; courtyards; playground; gardens; orchard; chicken coop	courtyards; athletic fields; amphitheater


Image 23


Image 24


Image 25


Image 26

Images 23–26: Outdoor space is integral to each of the schools. The children's classrooms open directly to the outdoor learning garden at Mothers' Club (Image 23) and Redding School of the Arts (Image 24). LearningSpring School has a rooftop terrace for an outdoor play area in urban Manhattan (Image 25), and Gilliam Collegiate Academy used the outdoor fields on a regular basis (Image 26).

Conclusion

Multi-purpose and large group spaces were articulated in different ways with each of the schools (Table 9). At Mothers' Club, the central play atrium was the gathering space, as it allowed for the flexibility and outdoor connection to support the program. The commons is at the heart of Gilliam Collegiate Academy, as it is the central space from which all activities flow. The large group spaces at the other schools followed the same logic—providing an area for the entire school to gather, helping to accommodate program needs, and creating a sense of community.

As the physical layout and structure of a room is important to individuals with autism, confusion or disorientation may occur when a room or space changes (Humphreys, 2005; Paron-Wildes, 2004). A change as seemingly small as pulling chairs out from a table may make the space unrecognizable for someone with autism (Paron-Wildes, 2004). Therefore, it is recommended that multi-purpose spaces are limited throughout the program, and that each space has its own recognizable purpose.

It was noted at LearningSpring School, however, that the library is meant to be used for meetings and fundraisers, the gym was used for parent functions in the evening, and the cafeteria holds after-school activities for the students, such as gymnastics.

Redding School of the Arts uses its outdoor theater as the primary large group space. It was the only school that did not have a large, interior multipurpose space, which can be a challenge with the weather. It was a frequent comment from staff that it would be beneficial to have a multi-purpose space where the entire school could gather inside, out of the elements.

Images 27–30: Large gathering spaces provide flexibility and a sense of community for each school. This is done through the central play atrium at Mothers' Club (Image 27), the LearningSpring School library (Image 28), the outdoor theater at Redding School of the Arts (Image 29), and the commons at Gilliam Collegiate Academy (Image 30).

Table 9: Multipurpose/Large Group Spaces

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
central play atrium into the outdoor learning garden	library; gym; cafeteria	outdoor theater	commons

Image 27

Image 28

Image 29

Image 30

Conclusion

Highlights of the furniture at each of the schools is shown in Table 10. Almost all of the furniture is flexible, allowing movement to accommodate varied teaching and learning needs.

In discussing environments for young children, Montessori emphasized the importance of child-sized furnishings. She believed that the environment should fit the students and that materials should be easily accessible (Mooney, 2000). Mothers' Club provides child-sized tables, chairs, and shelving to accommodate the small children. To provide a comfortable and nurturing environment between adults and children, Mothers' Club staff included sofas in each classroom.

Furniture that allowed for student movement drew the attention of staff at LearningSpring School and Redding School of the Arts. The KI Intellect Chair is used throughout the classrooms at LearningSpring School, and staff commented that the chairs allow the students to safely fidget and move without being disruptive. Similarly, the VS HOKKI Stool at Redding School of the Arts is a favorite among students because it is designed to support movement.

At Gilliam Collegiate Academy the mix-and-match furniture, including a variety of tables, chairs, and soft seats, provides students with many seating options during their unstructured time throughout the day.

Images 31–34: Furniture varied depending on the size, age, and needs of students. Child-sized furniture is important at Mothers' Club (Image 31). Furniture that allows or promotes movement, such as the KI Intellect Chair at LearningSpring School (Image 26) and the VS HOKKI Stool at Redding School of the Arts (Image 33) was beneficial. The soft seating at Gilliam Collegiate Academy offers space for individual or collaborative work (Image 34).

Table 10: Furniture

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
flexible; child-sized; sofas	flexible; chairs allow for movement; specific furniture for specialized learning areas	flexible; desks and chairs; stools; outdoor furniture; cafeteria tables	flexible; mix-and-match tables and chairs; soft seating; high tables

Image 31

Image 32

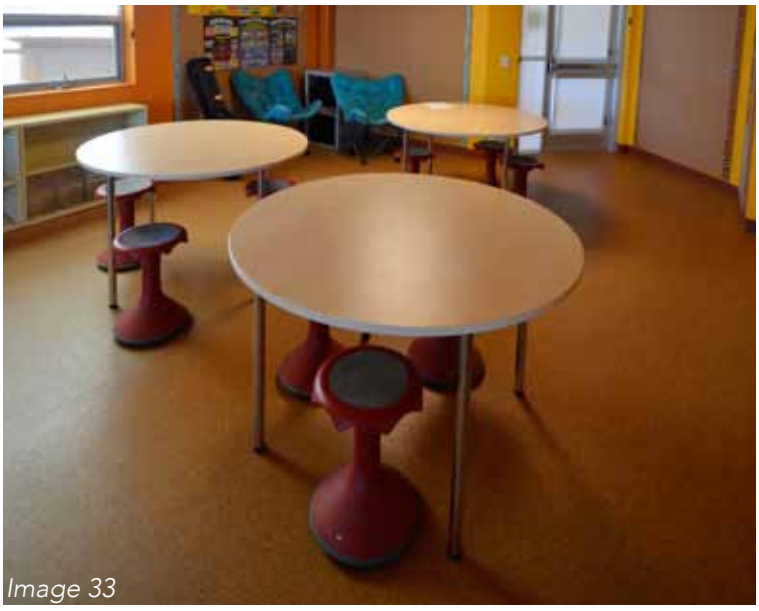

Image 33

Image 34

Conclusion

Students today need specific skills for the 21st century, such as communication and technology competence. Literature states that critical factors for 21st century learning environments include: flexibility; adaptability; areas for collaborative group work; specialized learning environments; multi-purpose and commons spaces; using the building as a teaching tool; and providing technology resources and access (Partnership for 21st Century Learning, "21st Century Learning Environments," 2009; Pearlman, 2010). Table 11 shows highlights of the spaces in each school that support 21st century learning.

While the classrooms are more traditional at each of the schools, the buildings offer options for collaboration and group work, with the hope that learning extends beyond the classroom. Students were observed using hallways and group study spaces for informal learning, but user comments were that most of the instruction time was spent in the classroom.

At Mothers' Club and LearningSpring School, there was less focus on 21st century learning environments, and greater emphasis on the programmatic needs for the students.

Redding School of the Arts and Gilliam Collegiate Academy incorporated flexible and collaborative spaces throughout the school, and used the building as a teaching tool with visual reminders of green building elements. At Gilliam Collegiate Academy, the commons acts as a college plaza and serves to prepare the students for higher education through the development of 21st century skills with space for collaborative group work and support from teachers and counselors.

Images 35–38: Spaces that promote collaboration, flexibility, and technology are important for 21st century learning environments. Multipurpose spaces for play and group work are shown at Mothers' Club (Image 35) and Gilliam Collegiate Academy (Image 38). The classroom technology at LearningSpring School (Image 36) and the collaborative space in the science lab at Redding School of the Arts (Image 37) are other examples of 21st century learning environments.

Table 11: 21st Century Learning Environment

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
flexible space; building as teaching tool	technology	flexible and collaborative space; building as teaching tool	flexible and collaborative space; building as teaching tool


Image 35


Image 36


Image 37


Image 38

Conclusion

Each case study school included many sustainable features. All of the buildings are certified under a national program, either LEED or CHPS. The standard has been set that fundamental aspects of design, such as thermal comfort and acoustics (Tables 2 and 3), must be met. Table 12 shows some of the highlights of the sustainable features at each school.

Designing green aligned with many of Mothers' Club's core values. As a non-profit organization that wanted to remain in the heart of its community it serves, the building renovation was a way to add vitalization to the urban area in which it is located, in addition to reusing over 75% of the existing building materials. Opening the building to natural light was one of the most important factors for the everyday users. Also, the amount of money saved from alternative energy from the solar panels allows Mothers' Club to put about $3600 per year back into the program instead of putting it toward energy costs (MCFLC, 2012).

Approaching sustainable design for students with autism is similar to accommodating the needs of all students: natural lighting, acoustics, thermal comfort, and indoor air quality are fundamental. These critical factors affect student health and learning outcomes. While LearningSpring School and Gilliam Collegiate Academy maintained focus on the academic programs, staff commented that simply being in the building was a way to raise student and staff awareness on sustainability.

Redding Schoool of the Arts incorporated many sustainable features on the site and within the building. With 50% of the learning spaces outdoors, the school is able to minimize heating and cooling costs, as well as enjoy the benefits of natural views and ventilation. They too incorporated alternative energy through solar panels and a wind turbine.

From site selection to building details, the schools include a variety of green features that enhance building and student performance.

Images 39–42: Each school provided numerous sustainable features throughout the building and site. Some of the highlights include the building renovation of Mothers' Club (Image 39), the exterior shading system at LearningSpring School (Image 40), the outdoor learning spaces at Redding School of the Arts (Image 41), and the minimal site disruption at Gilliam Collegiate Academy (Image 33).

Table 12: Sustainable Features

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
building renovation; alternative energy; efficient systems; natural daylight; low VOC materials	exterior shading system; natural daylight in 96% of regularly occupied spaces; acoustics; low VOC materials	alternative energy; outdoor learning spaces; natural light; acoustics, low VOC materials	minimal site disruption; natural daylight; acoustics; low VOC materials

Image 39

Image 40

Image 41

Image 42

Conclusion

The building is used as a teaching tool in varying degrees at each school (Table 13). Using the building and site as a tool for teaching about sustainability was a focus for Mothers' Club and Redding School of the Arts. Highlights to this approach at Mothers' Club include the large solar panel display on the exterior of the building, as well as including recycled materials into art projects. Comparatively, at Redding School of the Arts, there are visual reminders such as the PV panels and windows in the mechanical rooms.

The design team for Redding School of the Arts also created a "Tools for Teaching Green" handbook, highlighting the sustainable features throughout the school. Teachers intend to use this to incorporate the green lessons into their curriculum, and there is a building dashboard on display at the school entry, showing energy and water use at the school.

The LearningSpring School design approached the building as a teaching tool more from the standpoint of learning through the means of easy navigation as a way to build independence in the students.

At Gilliam Collegiate Academy, signage was included to inform students and visitors of sustainable features throughout the building and site. Due to the rigor of the academic program, academics are the focus of the curriculum, but the information about the building posted throughout the school informs students about green building features.

Images 43–46: The building as a teaching tool is shown in several ways: the PV array at Mothers' Club (Image 43), windows into the mechanical rooms at Redding School of the Arts (Image 45), and signage throughout Gilliam Collegiate Academy (Image 46). At LearningSpring School, the building helps students with clear navigation and a calming material palette (Image 44).

Table 13: Building As a Teaching Tool

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
solar panel display; integrate sustainability into curriculum	easy navigation; minimal distractions and environments for learning	Tools for Teaching Green handbook; building dashboard; interpretive signage throughout school	signage throughout school

Image 43

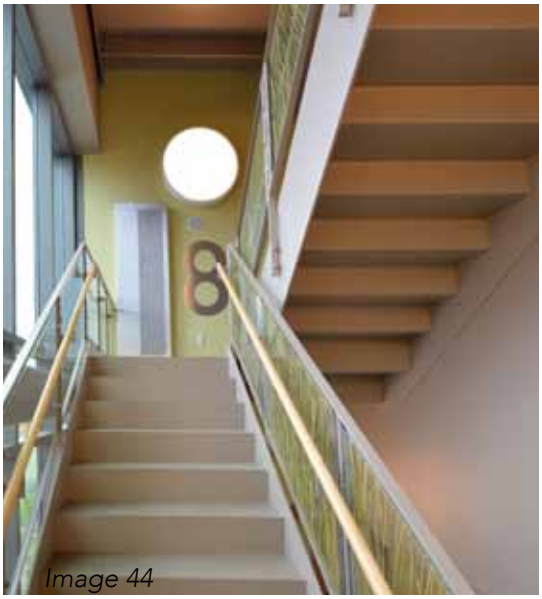

Image 44

Image 45

Image 46

Conclusion

Twenty-first century learning environments should provide students with access to technology. Table 14 includes highlights of how technology is incorporated in the case study schools. At LearningSpring School, Redding School of the Arts, and Gilliam Collegiate Academy, technology is used in the learning spaces with a whiteboard and smart projector or smartboard. It was observed that the technology mounted to the wall or ceiling largely dictated the layout of the learning spaces. The arrangements varied slightly, but student desks/tables were always focused on the technology at the front of the room.

The adult learning spaces at Mothers' Club follows a similar pattern with whiteboards on the wall in the classrooms, but technology is less a focus of the school. There are computers provided in the library as a resource for the parents.

Technology in the learning spaces includes additional features for LearningSpring School and Redding School of the Arts. At LeraningSpirng School, the classrooms, hallways, and stairways are equipped with a video and sound recording system to observe student behavior. This is also helpful if issues arise in the classroom. For students with autism, it is recommended that there be observation of student behavior when an adult is not around, as having an adult in the space may influence the child's behavior (Humphreys, 2005).
For Redding School of the Arts, technology allows the classrooms to act as a sound studio, with the capability to broadcast to the internet and the other classrooms.

Gilliam Collegiate Academy has three large screens in the commons that will be used in the future. Staff and students are excited about the possibilities to use the screens for information and to build community within the school.

Images 47–50: Computer access at Mothers' Club provides resources for the parents (Image 47). The smart boards and smart projectors at LearningSpring School (Image 48) and Redding School of the Arts (Image 49) show the learning space technology, and large screens at Gilliam Collegiate Academy offer many possibilities for the students and staff (Image 50).

Table 14: Technology

Mothers' Club Family Learning Center	LearningSpring School	Redding School of the Arts	Gilliam Collegiate Academy
building systems minimize energy use; computer access in library as resource for adults	smartboards in classrooms and library; media center in library; HD video and sound recording in hallways, stairways, and classrooms for educational observation	wireless access in learning spaces; student laptop access; smart projectors and whiteboards; classrooms with sound studio capabilities	wireless access; smart projectors and whiteboards; 3 screens in commons


Image 47


Image 48


Image 49


Image 50

Conclusion

Each of the buildings was innovative in their approach to design and pedagogy. At Mothers' Club, a previously windowless factory and parking lot is now a light filled space that opens directly to an outdoor play area—critical when play can be called the work of a child. To ease stress and create a calm environment for individuals with autism, LearningSpring School used tight site constraints to create order, repetition, and small learning environments. Redding School of the Arts used the building as a tool for teaching green and centers around an outdoor theater, intermixing arts and academics. Gilliam Collegiate Academy provides flexible space for students to enhance their 21st century skills and ease the transition to college.

In summary, the design of each facility accommodates the pedagogy and programmatic needs of the school. Staff, students, and parents are excited about the new buildings, especially the connections to the outdoors and natural light in the learning spaces. The designs created learning environments that support basic learning fundamentals and inspire the parents, staff, and students.

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For more information, please visit www.aia.org/cae

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