

A close-up photograph of a woman with dark, curly hair, looking down at a laptop screen. She is wearing a light-colored, vertically striped button-down shirt. The background is a plain, light-colored wall. The overall tone is professional and focused.

Microsoft

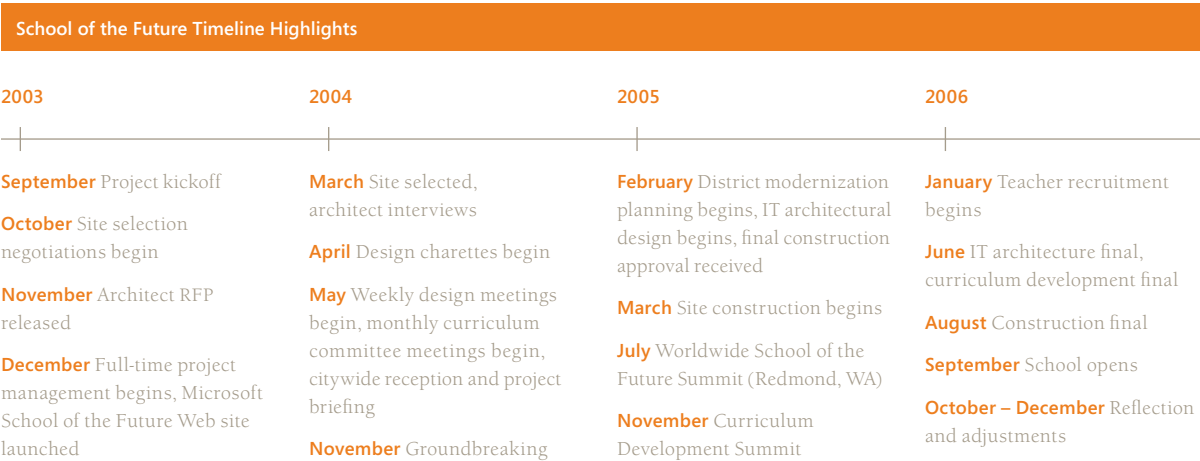
realize

Building the School of the Future
A Guide for 21st Century Learning Environments

Over the last three years, the School District of Philadelphia and Microsoft have collaborated on the ambitious task of imagining and constructing a “School of the Future.” Bringing together the best of what industry and education have to offer, our mission was to create a living blueprint for learning environments in the 21st century.

Throughout our journey, we have captured our learnings, outlined key steps, illustrated critical insights, articulated obstacles, and shared the methodologies and innovations behind this living blueprint. We’ve done this so that what we’ve accomplished in Philadelphia can be replicated anywhere in the world.

Part of the Microsoft® Partners in Learning initiative, the School of the Future is an important example of our commitment to addressing the digital inclusion issues facing education today by providing tools and support that enable educators and schools to deliver on the promise of technology in education.

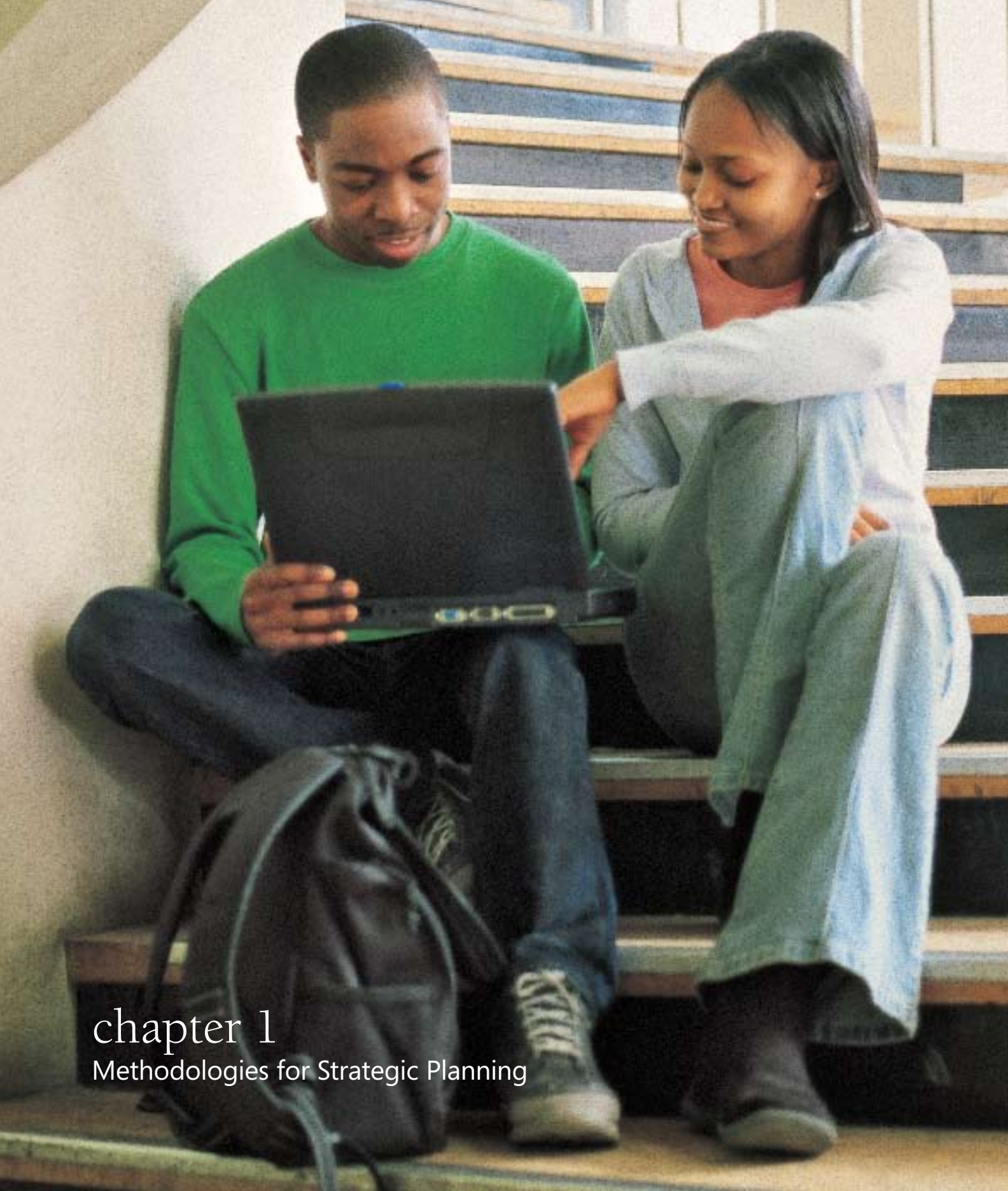




"Teaching, learning, and education are great places to bring our contributions, beginning with the foundation that the most successful solutions of any kind start with a well thought-out planning process."

Anthony Salcito, General manager for Education, Microsoft U.S. Public Sector





chapter 1

Methodologies for Strategic Planning

6i development process

Step one in building the School of the Future was creating a process that would guide the development team and provide a framework for decision making. The 6i Development Process outlines our methodology and focuses on the six major stages of the project.

Introspection. Establishing pedagogy, culture, project benchmarks, and overall success metrics. Based on objective self-analysis and focused on identifying existing assets and future requirements.

Investigation. Researching and identifying best practices, as well as innovations within other educational models. Fueled by an advisory council of industry experts tasked with reviewing and validating strategies and key decisions.







Inclusion. Engaging community leaders, key stakeholders, government officials, and other partners. Designed to foster support and promote concept evangelization.

Innovation. Pushing forward new ideas in everything from building design and information technology architecture to personnel selection. Engaged with developing novel approaches and critical insights.

Implementation. Constructing the actual building, training selected educators and other personnel, and, ultimately, opening the doors to a new generation of students. Grounded in the complex task of creating tangible experiences from visionary ideas.

Introspection. Reflecting and reviewing outcomes, as well as formally creating a plan to adjust and continually move forward. Focused on returning to initial concepts and reflecting on their execution and ongoing implementation.

Key Learning: Establishing a strong foundation of ideas and priorities before engaging with the community at large is essential. Involving community members too early in the process risks losing sight of key objectives.

Stages	Duration (36 months)
1] Introspection: 1-3 months	
2] Investigation: 4-6 months	
3] Inclusion: 30-36 months	
4] Innovation: 2-6 months	
5] Implementation: 1-4 months	
6] Introspection: 4-12 months	

These overlapping timelines were developed specifically for the School of the Future and map directly to the Fall 2006 opening.

Vision and mission

The School District of Philadelphia has created a system-wide Declaration of Education. The vision and mission of the School of the Future support the principles of the declaration. At its core, the vision of the School of the Future is to create an empowered community, where learning is continuous, relevant, and adaptive. To deliver on this vision, we have developed a mission statement: The School of the Future applies research and development to generate educational practices, creating an environment involving all members; ignites them to take a passionate, personal responsibility for learning; and inspires a commitment to active citizenship.

Key Learning: Innovation doesn't end with the latest technology. Ensuring the constant evolution of instructional practices requires a commitment to ongoing research and development.

Stakeholders

As a segment within the Inclusion development stage, we have developed a community inclusion plan that is spearheaded by five key groups tasked with nurturing school development and providing organizational support.

School Planning Team. This team, formed as part of a pre-existing district practice, serves as an advocate for various constituencies within Philadelphia neighborhoods and helps present the vision and approved plans for the school to the community at large.

Community Advisory Board. This board, comprising key community leaders within West Philadelphia, advises the School District of Philadelphia and Microsoft. Offering a unique perspective that is specific to West Philadelphia, this group augments the School Planning Team's citywide viewpoint.

Curriculum Working Committee. Consisting of education experts from the local district and around the world, this committee works to define and develop the school mission in support of district goals, drives curriculum development, and ensures that all aspects of the school—from professional assets to physical spaces—support curriculum goals.

District Planning Team. Made up of Cabinet-level district officials, this team sets policy and actively governs the implementation of school development—including budget allocations and final design plan recommendations—while also serving as a liaison to the School Reform Commission and Pennsylvania's Department of Education.

School of the Future Advisory Board. Led by national education leaders and organizational experts, this board reviews and offers commentary on strategic plans, provides feedback and insight on design and development activities, and participates with community inclusion teams.

"This relationship between the School District of Philadelphia and Microsoft will not just change education in Philadelphia, but it will change the way that we educate tomorrow's leaders throughout the nation."

Jim Nevels, Chair of the Philadelphia School Reform Commission

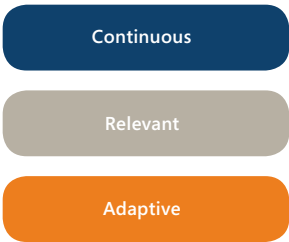
Learning environment principles

The School of the Future is focused on creating a learning environment with three critical attributes: continuous, relevant, and adaptive. [figure 1]

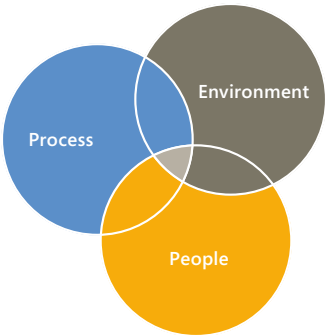
Continuous. Teachable moments should not be limited to the classroom alone. We will create environments powered by 1:1 access to the tools of the digital age to nurture anytime, anywhere learning.

Relevant. Learners are inspired by the connections they make between curriculum and the real world, so the School of the Future will leverage community interaction and the latest instructional tools to increase relevancy.

Adaptive. Individual students learn in individual ways. The School of the Future will not be a one-size-fits-all offering. Instead, we will use technology and adaptive instructional models to effectively and efficiently offer learning opportunities to every student.



[figure 1] These new principles are redefining optimal learning environments.



[figure 2] These interconnected factors influence aspects of organizational development.

Analysis

To develop a highly actionable plan for bringing to life the vision of the School of the Future and achieving the goals outlined in our mission statement, we conducted an in-depth examination of factors influencing development. This essential process included an organizational analysis, identification of success factors, and SWOT (Strengths, Weaknesses, Opportunities, and Threats) assessments—all of which helped inform a comprehensive plan for asset development.

Organizational Analysis. For each goal outlined in our mission statement, we analyzed three core factors: environment, process, and people. Examining the organization through each of these critical lenses both focused our analysis and broadened our perspective. The exercise allowed us to identify critical—and specific—success factors from a much more comprehensive “whole system” point of view. [figure 2]


Critical Success Factor Identification. During a daylong facilitated retreat, the Curriculum Working Committee and other team members identified the five critical success factors that would need to be addressed to achieve our mission.


SWOT Assessments. The Curriculum Working Committee spearheaded a systematic SWOT analysis, and then sub-committees shared their assessments with other team members who provided additional feedback and helped adjust the findings. The team identified the strengths and weaknesses within the organization and extended community that will impact achievement of the critical success factors. The team then identified the opportunities the critical success factors could create, as well as the weaknesses that could potentially create an opportunity for failure.


Asset Development Plan. Following the organizational analysis, critical success factor identification, and SWOT assessments, the team was comprehensively informed and prepared to move forward with strategic planning. Specifically, the team was able to identify desired assets that will mitigate challenges and threats and optimize strengths and opportunities. Also, the team was able to map asset allocation according to particular teaching and learning goals.

Key Learning: Clearly defining internal and external threats is imperative to success. Though process-centric, these activities are essential to developing actionable strategies.


Five critical success factors


 **Involved and connected learning community.** A learning community that is involved and connected acknowledges that all stakeholders—students, parents, community organizations, higher education, businesses, and others—must participate if we are to succeed. The learning community is a dynamic, vibrant society that incorporates and represents the voices of all constituents. Multiple means for communicating, sharing information, and soliciting input must be established. Digital tools and electronic and print media must support inclusion, eliminating language and socioeconomic barriers. Finally, the learning community must provide opportunities that promote learning as a lifelong process.

 **Proficient and inviting curriculum-driven setting.** The physical setting must support and be conducive to the continuous and changing needs of the learning community. The technical infrastructure must support current and future wireless and fixed technical equipment, and should enable the sharing of all data types. All learning spaces must provide the necessary elements that allow for instruction and learning at all times, and be mobile and flexible to adapt to changes in teaching and learning activities.

 **Flexible and sustainable learning environment.** A truly effective learning environment is one that is fluid and responsive to the ever-evolving needs of community members. Such an environment is adaptable, differentiated, and focused on student-centered instructional models, and allows all students to realize their full potential. The learning environment must limit the dependency on time and place for instructional opportunities to occur and must

demonstrate instructional relevancy for students. Also, the environment created must be systemic and independent of changes in faculty and administrative personnel.

 **Cross-curriculum integration of research and development.** To ensure a continuously evolving integrated curriculum, the professional staff, led by the director of research and innovation, must actively incorporate the latest findings in research and development from business, technology, and institutions of higher learning. In addition, the school must act as a learning laboratory where staff and students can design, carry out, and evaluate appropriate projects to enhance the teaching and learning process.

 **Professional leadership.** Professional leadership for the entire community encompasses the abilities to:

1. Positively impact instruction
2. Think strategically
3. Motivate and engage stakeholders
4. Engage technology at every appropriate opportunity
5. Design and present professional development to address identified needs
6. Interact and communicate with the community
7. Demonstrate fiscal responsibility
8. Continuously evaluate and revise instructional programs in a collaborative manner

Key Learning: Understanding critical success factors from the outset is irreplaceable for accurately and effectively supporting the mission during the planning stages.

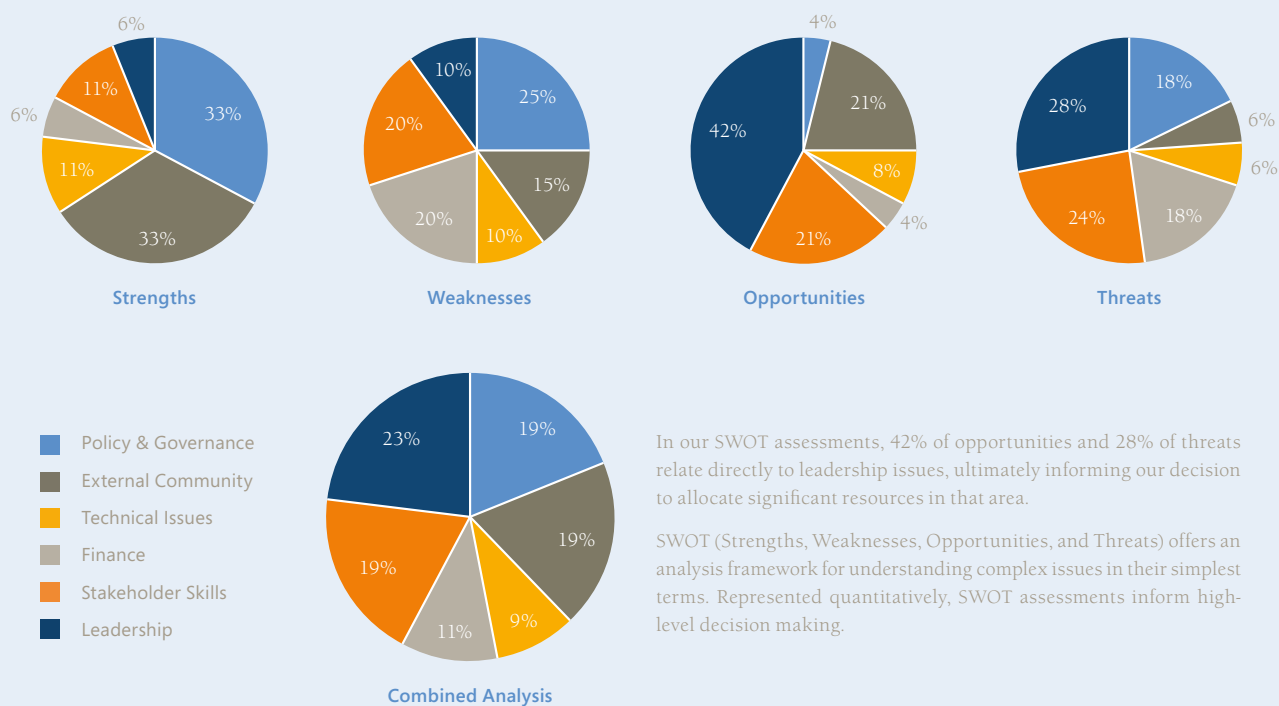
“Every student deserves access to the best educational programs and partnerships that we can provide. The School of the Future is our model for community-based magnet programs, and we are excited about its impact in Philadelphia and how it will revolutionize education through technology and cutting-edge initiatives for generations to come.”

Paul Vallas, CEO, School District of Philadelphia

SWOT assessments

The SWOT assessments set the stage for critical insights that would ultimately help inform our next steps in asset development planning. Many of the assessments revealed a common theme. For example, an identified strength within the “Involved and Connected Learning Community” success factor is the proximity of community partners to the school itself. However, a related weakness is the need for creative leadership to develop academic programs that link the school with community members. Similarly, one of the key opportunities within the “Flexible and Sustainable Learning Environment” is sharing best practices with other learning institutions as we develop the school. The corresponding

threat—making high-profile mistakes, since the School of the Future has no precedent—is also fundamentally a leadership challenge. Within the “Cross-Curriculum Integration of Research and Development” success factor, a core strength is our ability to develop unique partnerships with industry, colleges, and universities. That said, realizing the promise of that strength relies on dynamic leadership to overcome resistance among educators from more traditional models and push them towards innovative cross-curriculum efforts. Put together in a combined analysis, the area with the greatest influence on our success and, therefore, the area requiring the greatest support is clearly evident: leadership.



In our SWOT assessments, 42% of opportunities and 28% of threats relate directly to leadership issues, ultimately informing our decision to allocate significant resources in that area.

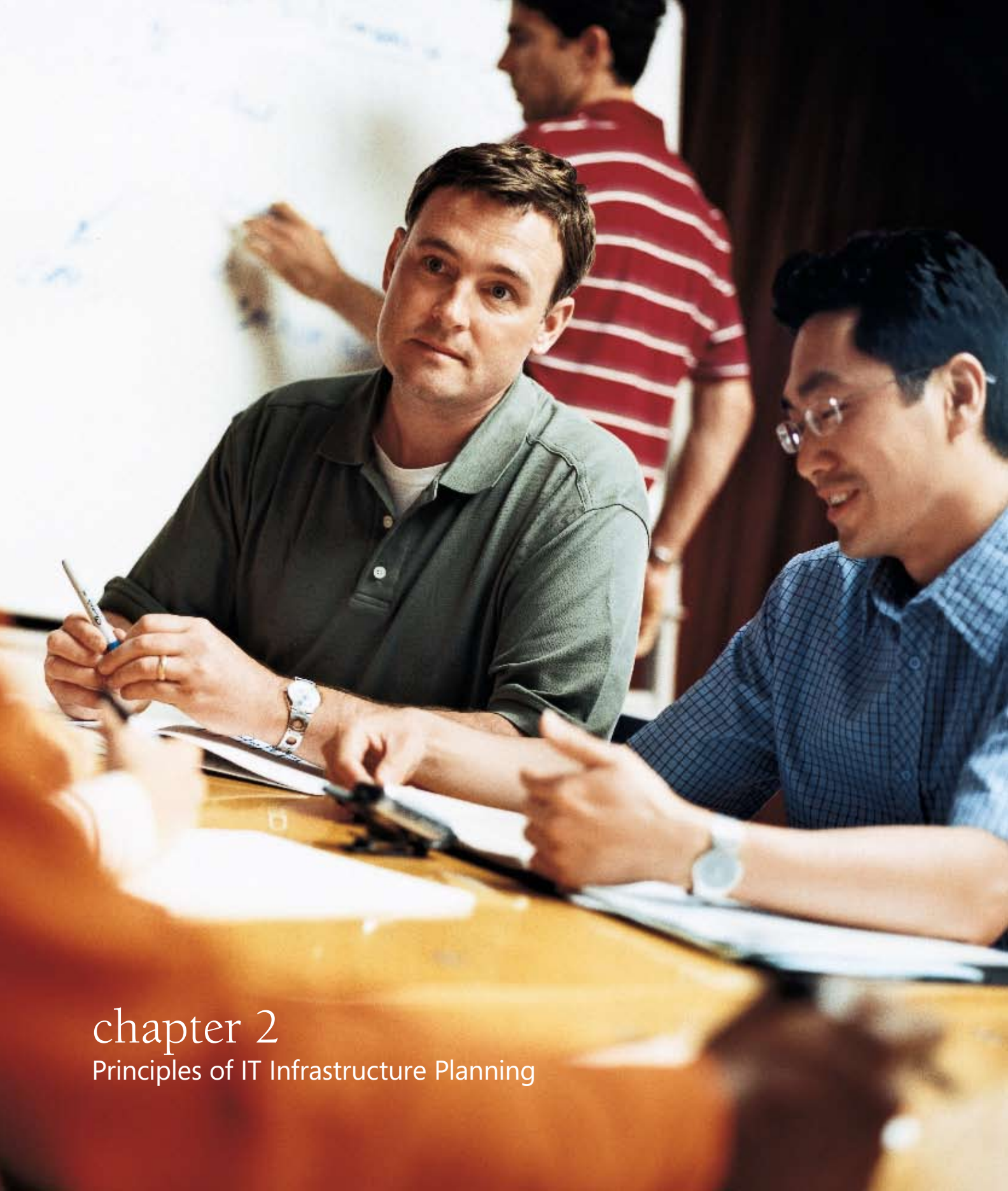
SWOT (Strengths, Weaknesses, Opportunities, and Threats) offers an analysis framework for understanding complex issues in their simplest terms. Represented quantitatively, SWOT assessments inform high-level decision making.

Asset development planning

Results of the organizational analysis, identification of success factors, and SWOT assessments clearly illuminated what areas of asset development required the greatest support. Professional leadership topped the list, with other key areas also represented. Breaking down the combined analysis in quantitative terms has allowed the teams to more easily understand the various development needs of the project—policy and

governance, community relations, technical infrastructure and support, financial issues, and skill-based requirements—and improve decision making within strategic planning.

Key Learning: Using the analysis process to describe issues qualitatively, then breaking down the qualitative findings into quantitative terms, provides clarity for making complex strategic planning decisions.



chapter 2

Principles of IT Infrastructure Planning

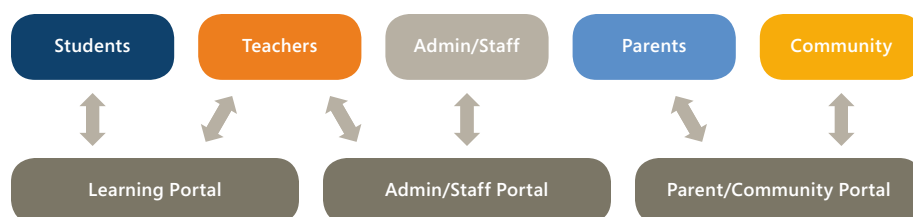
No school is an island

When the technology services team at the School District of Philadelphia first set out to imagine, concept, and specify the School of the Future's IT infrastructure, they knew it would need to be "future-proof." Engineers and educators alike recognized they were designing a school that would open in 2006—but be ready for 2016. The team effectively needed to plan 10 years into the future of networking and computing. At the same time, the team also realized that the school could not exist in a vacuum. The technologies at work in the School of the Future would have to marry with standards established for all new schools in the district if they were to realize the vision of testing and evaluating new ideas in the new school and then replicating them everywhere. Also, the technologies would need to successfully interface with legacy systems at the district level—hardware and software that is, frankly, definitively not from the future. So the team's approach to IT infrastructure needed to balance a vision for technology and education in 2016 with how the School of the Future is interconnected with past and present district assets. The team focused on keeping maintenance, support, and daily operational costs in check wherever possible. At the same time, the team carefully inserted "next-generation" systems and infrastructure into the existing legacy environments. Several important aspects of the technical infrastructure helped the team successfully execute the balancing act between the promise of new technologies and the limitations of legacy environments, including:

- High-bandwidth Internet connectivity (2000 Mbps) over metropolitan fiber
- Gigabit-switched access to every network access point
- Standardization of high-maintenance infrastructure (PBX systems, networking equipment, end-user devices such as telephones, printing/imaging, projection systems, etc.)
- Modular and expandable WLAN infrastructure
- Existing services—voicemail, e-mail, parental telephone notification service, remote access

Key Challenge: The School of the Future features a collection of interconnected e-systems and Web-enabled services to facilitate student records, classroom management, electronic curriculum, point-of-sale systems, procurement, inventory, environmental management, security, parental portals, and more. All these new systems will require interfacing with key existing legacy systems that are characterized by archaic data access and organizational structures. The lack of an effective data warehousing repository, the use of under-powered and "closed" database platforms, problems with database connectivity (e.g., ODBC) and data cleansing, and district-wide difficulties with data entry and ownership create a complicated backdrop for the insertion of new technologies.

Key Learning: Creating an IT infrastructure plan for a new school isn't just about plugging in the latest and greatest—it's about balancing competing forces. Educators and technologists need to reach for the possibilities of the future, plan for the realities of the present, and account for limitations created by the past—all at the same time.



Continual Access Web-based portals will enable better interactions between students, teachers, and administrators, as well as encourage and inform more involvement from parents and community members.

"We believe in technology by example. If we can demonstrate safe computing practices with results that will engage the students and demonstrate how to replicate them, teachers will use them."

Rob Stevens, Lead Technical Architect, Microsoft Consulting Services



"Flexibility is the most important attribute of an IT infrastructure. An infrastructure that's successful today—but inflexible—won't be successful tomorrow."

Bob Westall, Executive Director, Technology Services Team, The School District of Philadelphia



Function drives form

One of the original precepts of the School of the Future is that we're building a space focused on teaching and learning, not technology. Yes, technology is an integral part of our mission to create a living blueprint for learning environments in the 21st century. And technology, particularly in the last decade, has become as famous for its form as its function. So given the opportunity to build a school from the ground up, it would have been understandable if the technology services team dreamed up a school shimmering with plasma screens and glittering with LEDs. Instead, the team emphasized using technology to fuel a continuous, relevant, and adaptive learning environment and believed that enabling technologies in their purest form should be nearly invisible. That belief guided decision making on everything from Internet access to security and will ultimately result in several defining features. For instance, wireless technologies will offer flexible access to the Internet and intranet throughout the building and extended campus—

moving instruction beyond the end of a cable. Also, safety and security functionality will be embedded in architectural elements—removing the ominous presence of metal detectors while delivering the same benefit.

Key Challenge: From a technology standpoint, the School of the Future offers an enormous opportunity—and temptation. From the first brainstorm meeting, the team understood that one of the central challenges of imagining and implementing next-generation technology is being faithful to the idea of technology as an enabler of teaching and learning and resisting the allure of the shiny and the new.

Key Learning: The best IT infrastructure is deliberately designed to advance teaching and learning. Educators and technologists should see technology through the lens of how it solves real problems and furthers the educational experience.

Architectural decisions matter

The design and deployment of IT infrastructure needs to occur collaboratively alongside the design and construction of the building itself. To that end, the technology services team worked closely with the architects commissioned to build the School of the Future, exchanging ideas and understanding the implications of each group's design solutions. However, architectural sketches and drawings don't reveal the intricacies of the building until the school is actually constructed. So though technical infrastructure and building architecture are ideally planned collaboratively and concurrently, the IT team is tasked with the significant challenge of imagining a fully finished building while it is still in the planning stages. Knowing as much as possible about how wireless technologies are going to perform in a planned space, for instance, reinforces the absolute importance of understanding and taking into account architectural decisions.

Key Challenge: The significance of shape, size, and location in building architecture is no secret to network engineers. However, other people involved in the design process may not share that awareness. The team needed to collaborate closely with everyone involved in building design to communicate the impact of architectural decisions. Specifically, the team needed to create awareness around three issues:

- Wireless networking is sensitive to the composition of wall and ceiling materials, given that materials affect the absorption and reflection of signals differently. Metallic ceiling grids, metal studs, concrete, and glass surfaces will all have varying effects on signals and require careful consideration in the design of a high-density wireless space.
- Wireless environments in newly designed facilities require far more design diligence and attention to building architecture than those in a retrofitted facility. New facility design becomes more art than science since the potential signal patterns and fields are entirely theoretical (versus a retrofit where an actual analysis can be easily conducted in each existing learning space).
- Wall and ceiling clearances dictate the potential spectrum of recessed fixtures, such as audio-visual centers, telephone enclosures, security/locking mechanisms, and others.

Key Learning: IT infrastructure and building architecture are both design processes. Technologists and architects need to work collaboratively and concurrently to inform each other's decision making, integrate technical performance with physical space, and bring to life the power of design across both disciplines.

Flexibility is critical

Technologies—and the application of technologies—must account for external factors such as legacy systems at the district level and internal factors such as the ramifications of architectural decisions. For these reasons, flexibility is imperative when developing an effective IT infrastructure. The School of the Future technology team understood that the only way to realistically design a future-proof IT infrastructure was to put a premium on flexibility. Hardware systems and software applications will always evolve and change. Best practices for implementing technologies will continually advance alongside changes in instructional strategies. Building in the ability to go where technology will go is the only way to effectively create a physical space that isn't behind the times the day it's completed. And building flexibility into an IT infrastructure starts from the very beginning, not after it's become outdated.

Key Challenge: Imagining new technologies and how those technologies will be used in the future is a challenge shaped more by the unknown than the known, making a focus on flexibility essential.

Key Learning: Technologies evolve with the forces that shape their implementation within the teaching and learning experience. School facilities will always be faced with changing and evolving instructional models. Building a successful

infrastructure for tomorrow means building a flexible infrastructure today. To build an infrastructure that is as “future proofed” as possible, keep in mind:

- An adequate and uniform density of copper, fiber, and electricity throughout all learning and administrative rooms will permit future repurposing without resorting to major construction.
- Industry standards are the way to go. Proprietary solutions only limit flexibility. They may not be supported by other vendors, which further limits choice.
- Strong partnerships with technology companies allow you to see new technology in development and give you the opportunity to provide feedback about attributes and features that are important in your environment.
- Hardwire infrastructure should always be included in all network infrastructures. Any device—from a server to an access point (AP) to a wireless device—must sit upon a wired network.
- Scalability is essential. The School of the Future's IT architecture is designed to scale from support for the high school to support for every school in the district. Functionality can be extended to additional schools easily and cost-effectively simply by adding servers to the existing configuration.

Cost is always a factor

The first meeting of the technology services team was a two-hour brainstorm culminating in a wish list of 100 items for the School of the Future. During the next meeting, the team anticipated cost concerns and set out to trim any non-essential items from the wish list. The result? One item—an Internet-enabled television for the teachers' lounge—was scratched from the list, effectively designating the other 99 as essential. Over the next few months, as the realities of budget constraints emerged more clearly, the team weighed the complexities of up-front costs and long-term operational costs—an exercise that forced them to focus on elements of the IT infrastructure that were irreplaceable to their vision. In the beginning, there was a blurry line between what the team wanted and what the team needed. In the end, the budget helped them focus more clearly on the components of the infrastructure that are essential to the mission of the school.

Key Challenge: Budget constraints are always a challenge. And as with any other school, the technology team found themselves competing with advocates for other interests—from athletic facilities to landscape architecture to kitchen and dining areas. Given the inevitable budget constraints, the central

challenge was not protecting their interests as technologists but understanding and communicating how each attribute of their technology plan aligned with the core functionalities of the school (instructional, operational, and environmental). The team defined three areas where attributes could be removed with the least impact on the overall environment.

- “Reserved” infrastructure—excess networking drops, empty conduits, and other pieces of infrastructure that would not be put to immediate use.
- Complex systems that would require very large investments to interface or incorporate into existing legacy infrastructures and processes.
- Reduced scope applications—“wish list” casualties such as classroom surveillance cameras, flat panel marquees, high-end voice/video communications, and other nice-but-not-necessary amenities.

Key Learning: What's most important is always more clearly recognizable than what's least important. Technologists and educators should expect budget constraints to force cost tradeoffs and embrace them as a way of aligning around the most critical components.



chapter 3

Key Attributes of Architecture

Designing spaces that perform

It sounds so simple: teachers and learners need great spaces for teaching and learning. In the same way an opera sounds clearer and more powerful in a concert hall with superior acoustics and an athlete runs faster and jumps higher on a surface made for sport, students and educators perform better in schools whose physical spaces are designed to foster collaboration, discovery, and inspiration.

Designing these spaces—whether from the ground up or within existing facilities—requires an understanding of how learning happens and a clear perspective on how physical spaces can make it happen better.

As the educators, technologists, and architects started to design the tangible form of the School of the Future—its unique physical characteristics, spatial relationships, and the materials and infrastructure that will bring it to life—they outlined six key attributes that these spaces will need to deliver. Together, these attributes form the cornerstone of our cornerstone. As the building takes shape, they serve as con-



stant reminders of the school's mission and help us anticipate the real students who will eventually walk its halls. We're building more than a building. And designing a School of the Future means designing the future of teaching and learning.



Main elevation of the School of the Future as rendered in a drawing by the architect.

General classroom



Classroom space is at the heart of any school. However, the general classroom spaces inside the School of the Future reject the rows-of-desks-facing-forward standard. All the classrooms are designed with a premium on flexibility. Unlike traditional classrooms, they will liberate teachers and students from fixed seating configurations, supporting a variety of instruction methods and allowing a single room to quickly and easily change from a lecture hall setting to a circular discussion group format. Even the walls in some classrooms will be moveable so educators can configure large instruction spaces or create special project rooms for individuals or group collaborations.

Averaging 800 square feet, each classroom features controlled daylight, consisting of sufficient natural light from windows and supplemental artificial lighting to reduce computer glare. Windows are equipped with screens that can be easily raised and lowered to prevent sun glare and diffuse the controlled daylight. These investments in optimal lighting are well spent. Studies demonstrate student performance on math and language tests increase more than 25% simply through the implementation of natural lighting.

Flexibility is also realized via wireless technologies. Each classroom provides every student with immediate and untethered access to the Internet. Combined with one-to-one access to notebook computers and other digital devices, these technologies will enable students to complete schoolwork whenever and wherever learning happens.

How it's replicable: Within existing facilities, modular furniture can transform traditional classrooms into flexible environments capable of responding to changing needs. And wireless technologies are often simple to add as “last mile” solutions on top of existing hardwire infrastructure. For example, the School District of Philadelphia, concurrent with developing the School of the Future, is completing over 50 renovations of individual classrooms throughout the district using wireless technologies.

Even lighting, perhaps the hardest design feature to retrofit into an existing footprint, can be optimized through updated LED fixtures and window screens that gently diffuse daylight and reduce glare.

“From a design perspective, the school is really the result of dynamic collaboration. The School District of Philadelphia brought insight about curricular needs. Microsoft helped us imagine how the spaces and their featured technologies will serve teaching and learning in the future. And as architects, we brought these ideas to life through the structure.”

Mayia Entcheva, Architect, The Prisco Group



[5] Gymnasium

Two gymnasiums serve the needs of high school athletics and physical education curricula while also providing community-use space.

[3] Streetscape

Designed to resemble an outdoor corridor, the streetscape extends from the lobby through the length of the building, forming the school's social spine.



Floor Plan

Underground

1. Performance Center

1st Floor

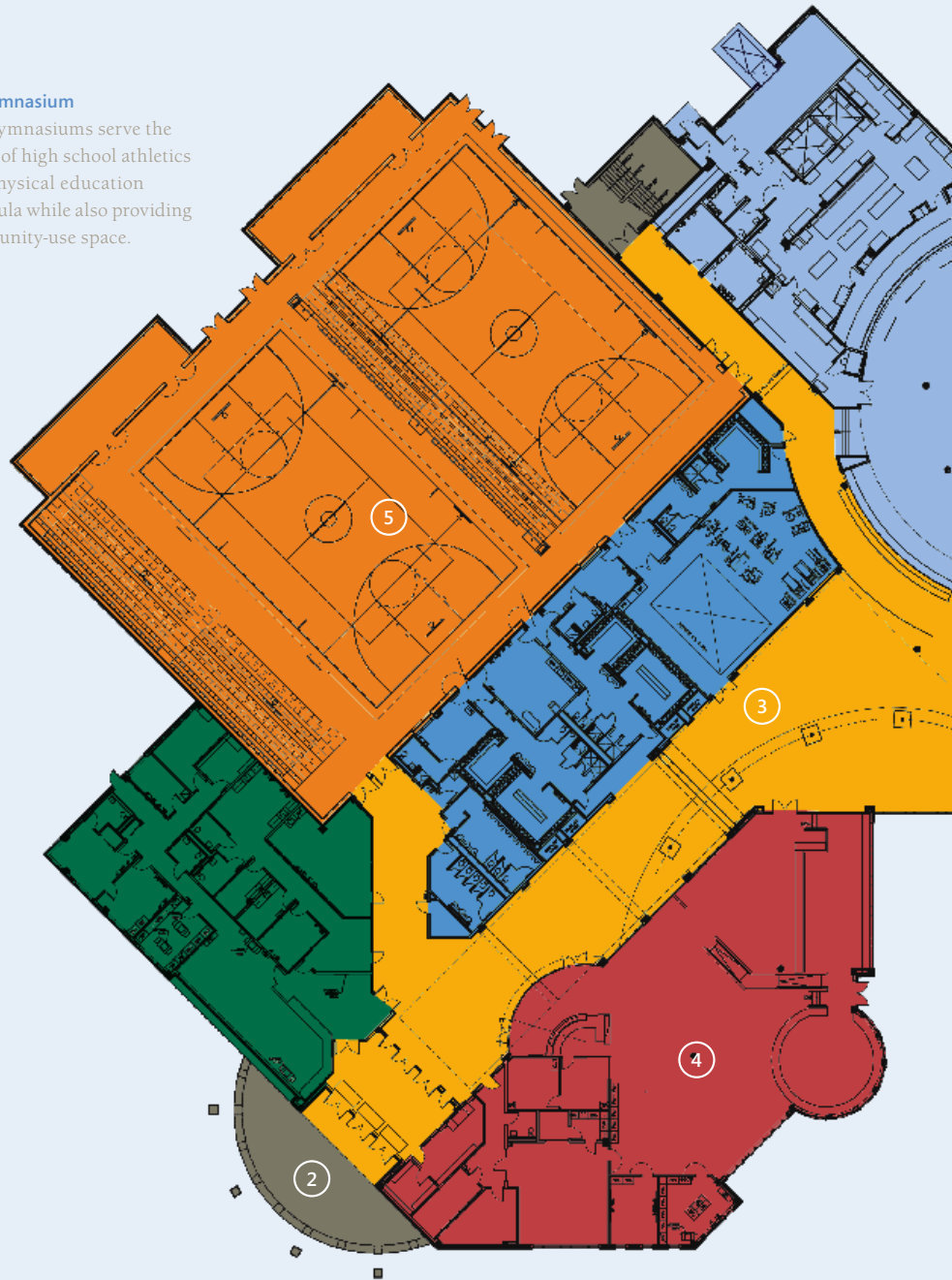
2. Main Entrance
3. Streetscape
4. Interactive Learning Center
5. Gymnasium
6. Food Court
7. Science Lab

2nd Floor

8. Art Studio
9. IT & Web Design Lab

3rd Floor

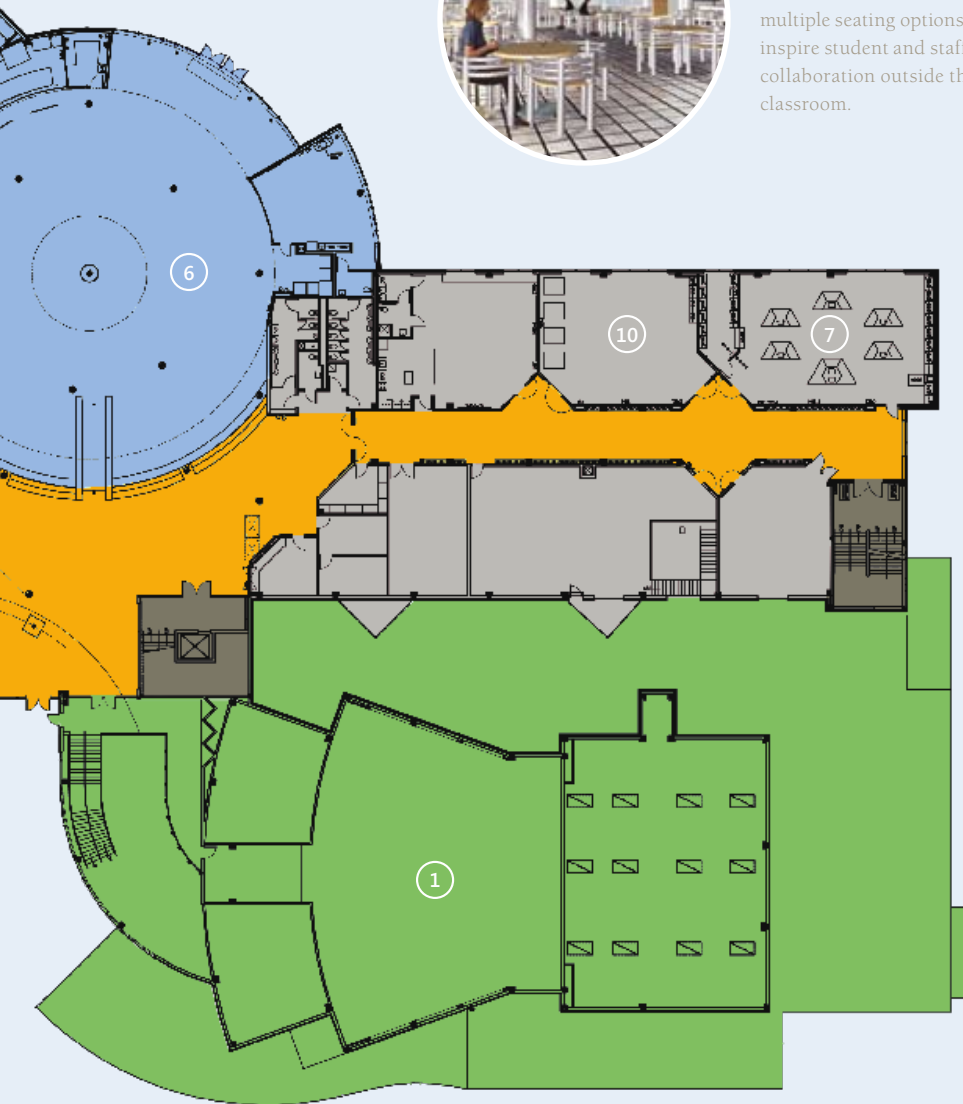
10. General Classrooms



[4] Interactive Learning Center

Created to invite the community into the educational experience, the ILC provides local residents with group instruction and technology training.





[6] Food Court

The Food Court features multiple seating options to inspire student and staff collaboration outside the classroom.



[7] Science Lab

Even in an environment that must include fixed elements, moveable furniture creates flexibility and encourages student collaboration.



[10] General Classroom

Designed for flexibility, all classrooms feature moveable furniture and wireless technologies.

[1] Performance Center

Rotating hydraulics allow the space to be configured for recitals, lectures, readings, and community meetings.



Interactive Learning Center

The community at large is a vital participant in the School of the Future. As part of the school's mission to invite members of the community to engage with the educational experience, the School of the Future features an Interactive Learning Center (ILC), where local residents can hone their technology skills and take advantage of individual and group instruction. Located adjacent to the main entrance, the ILC is designed for shared use by students, faculty, and the surrounding community. Inside, the ILC faces the streetscape, separated by glass panels while still offering a visual connection to the school. A technology lab delivers both wired and wireless Internet access. And a literacy nook provides a reading area and small group discussion space. All of these elements are focused on creating an inviting space where students and community members share in the educational experience—linking students with the community and the community with new opportunities.

How it's replicable: Schools are an essential part of every community's social fabric. Studies show that community support is a significant factor in student performance. Expressed through everything from support for school arts and athletics to fundraising, an engaged community sponsors an engaged student. That said, most school buildings actually oppose this critical relationship through designs that focus on keeping kids in and community members out. Happily, creating a safe and welcoming environment that is dedicated to connecting with community members doesn't take new construction. Existing structures offer opportunities for schools to use physical spaces to embrace their communities. Lobbies, main entrance atriums, and classrooms are all areas where schools can leverage the power of design to safely invite community participation. Bringing the community into the educational experience delivers win-win opportunities, emphasizes the importance of education, and reminds all participants of their accountability and responsibility to one another.

Performance Center

Auditorium spaces are an invaluable asset for schools. From plays and forums to readings and recitals, performances expose students to powerful expressions of the human condition and promote self-analysis. By infusing opportunities to publicly share and communicate ideas into multiple curricular areas, students experience new ways of thinking and are encouraged to make connections between different disciplines.



However, most schools have a common space problem: an auditorium that's large enough to seat the whole school but that's rarely used. School of the Future architects addressed this problem early on, imagining a large space capable of easily transforming into smaller rooms. The Performance Center delivers on that vision through a system of hydraulics that rotate modular walls and sections of seating. According to need, the Performance Center can turn from a traditional auditorium into a smaller lecture hall and adjacent classroom. Lights on flexible hoists solve the problem of lighting a space that changes shapes. Through a more flexible space, the School of the Future's Performance Center provides a dynamic setting for the development and exchange of ideas among students.

How it's replicable: Apart from infrequent all-school assemblies and other special events, most school auditoriums are vastly underutilized. Innovations in modular furniture—including seats and walls—are changing how schools are able to use large auditorium spaces. Flexible and efficient, movable architectural elements help schools do more with less and add new value to the traditional auditorium. These solutions create new possibilities for both existing and future facilities.

Streetscape

Social interaction is an irreplaceable facet of high school. The School of the Future's unifying structural element is a "streetscape" that extends from the lobby through the length of the building, forming the school's social spine. Designed to resemble an outdoor corridor, the streetscape physically connects the Interactive Learning Center, Administration, Gymnasiums and Locker Rooms, Fitness Center, Food Court, and the lower level entrance to the Performance Center, and delivers access to the upper floors. In addition to its role as an access point, the streetscape is deliberately designed to be an intensely social space, nurturing a sense of community among students, faculty, and staff. So the streetscape connects the spaces within the building itself by serving as a vibrant thoroughway while socially connecting participants with each other.

Encompassing almost 10,000 square feet, the streetscape includes interior finishes that further accentuate its outdoor-like atmosphere and features a skylight comprised of translucent panels above its entire footprint. The massive skylight, equipped with retractable sunshades to control light and temperature, runs the length of the streetscape until it ultimately transitions into a two-story volume with a glass wall overlooking Fairmount Park and Girard Avenue. The two-story volume is constructed of photovoltaic glass panels that generate electricity for the school. Furthering the school's community-centric focus, a plasma screen near the main entrance provides information to students and visitors.



How it's replicable: As a unique architectural element, it may seem that the streetscape is impossible to replicate within existing structures, particularly in older buildings. However, the ideas behind the streetscape are definitely replicable even if a duplicative physical space is not. Using furniture, artwork, and other architectural elements to transform a central atrium or series of hallways into a social hub gives students an important connection point within a school. Students can socialize in empty hallways lined with lockers, but that kind of environment does not achieve the same level of emotional connection or active engagement with the school experience as a space specifically designed for that purpose.



Construction Challenges While working with a site design covering seven acres in West Philadelphia's Fairmount Park section, construction teams faced several challenges, including dramatic price escalations in building materials, and the environmental sensitivity requirements involved with working on a site adjacent to the Philadelphia Zoo, residential neighborhoods, and wetland areas. Additionally, the teams had to stare down the pressures of an 18-month construction period.



chapter 4

Strategic Leadership Selection

Employing a deliberate process

Great leaders define, shape, and inspire the human experience. From MLK and JFK to local community activists and business entrepreneurs, our leaders propel us forward and guide our reason. In a world of ideas, we are adrift without the leaders who realize them. For this reason, effective leadership is critical to the success of any organization. But how should organizations select their leaders? How should a school built on bold new ideas in education go about finding its principal—the person who will ultimately be responsible for bringing those ideas to life?

Too often, search processes involve a limited call for applicants, straightforward reviews of resumes, a handful of interviews, and then a leap-of-faith hiring decision. But this

type of selection process usually finds the leader it deserves. Avoiding such a pitfall and finding the right leader for the right organization requires employing a deliberate process. Successful leadership selection doesn't happen by accident or through luck. Selecting leaders with the appropriate competencies and skills requires a strategic process informed by critical thinking.

When the School of the Future set out to select its principal, the School District of Philadelphia used the opportunity to rethink its historical approach to hiring personnel. Together with Microsoft, the district articulated its hiring philosophy and laid out a process for identifying candidates with the right talents.

Identifying success factors

Articulating the attributes and key characteristics of the ideal candidate was our first step in the leadership selection process. Creating powerful and specific language to describe these attributes provided a vivid portrait of what we were looking for—and a vital tool for evaluating the merits of individual candidates. Ultimately, we identified six success factors to be embodied by the School of the Future's principal.

Critical Thinking. Someone who learns new concepts and content quickly and puts them into action. A person who is emboldened to take informed risks, seek out new challenges, and create inventive approaches to difficult problems.

Results. A person who relentlessly pursues amazing results. A candidate who stays focused despite distractions and remains passionate despite setbacks.

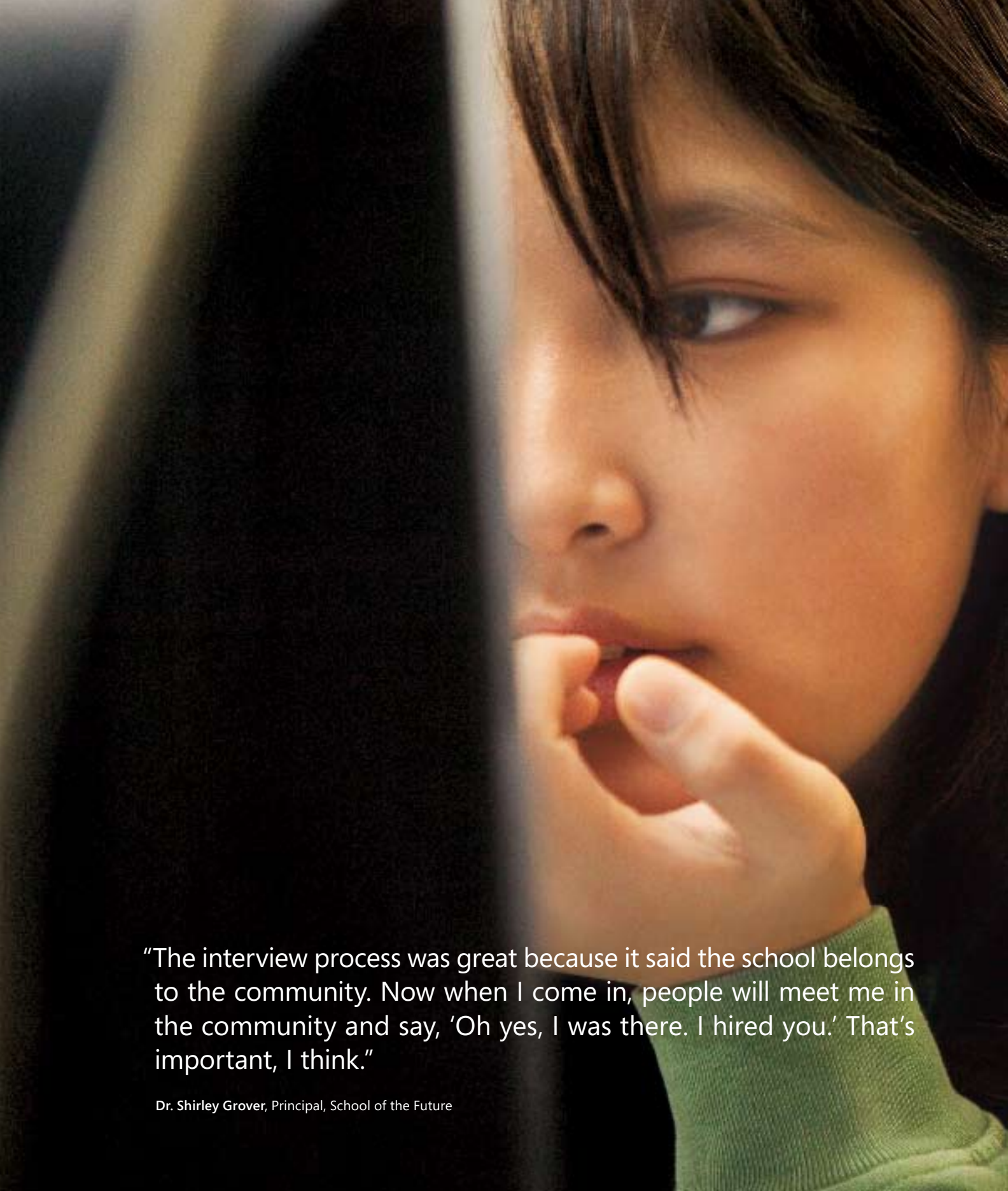
Customer Feedback. An individual who actively builds open and constructive feedback loops by listening, asking questions, and adapting to the needs of parents, students, and staff. Someone who gives priority to activities that deliver value to the school's customers.

Teamwork. A candidate who works hard to achieve group goals. A respected and trusted leader who meaningfully accounts for the interests of other people and groups when making decisions or taking actions. An individual who works efficiently with others, collaborating to achieve a common purpose.

Long-Term Approach. A person with the vision to grasp the big picture. Someone who defines, communicates, and expands our understanding of what is possible and who aligns high-level strategies with the efforts and tactics needed to bring them to life over the long-term.

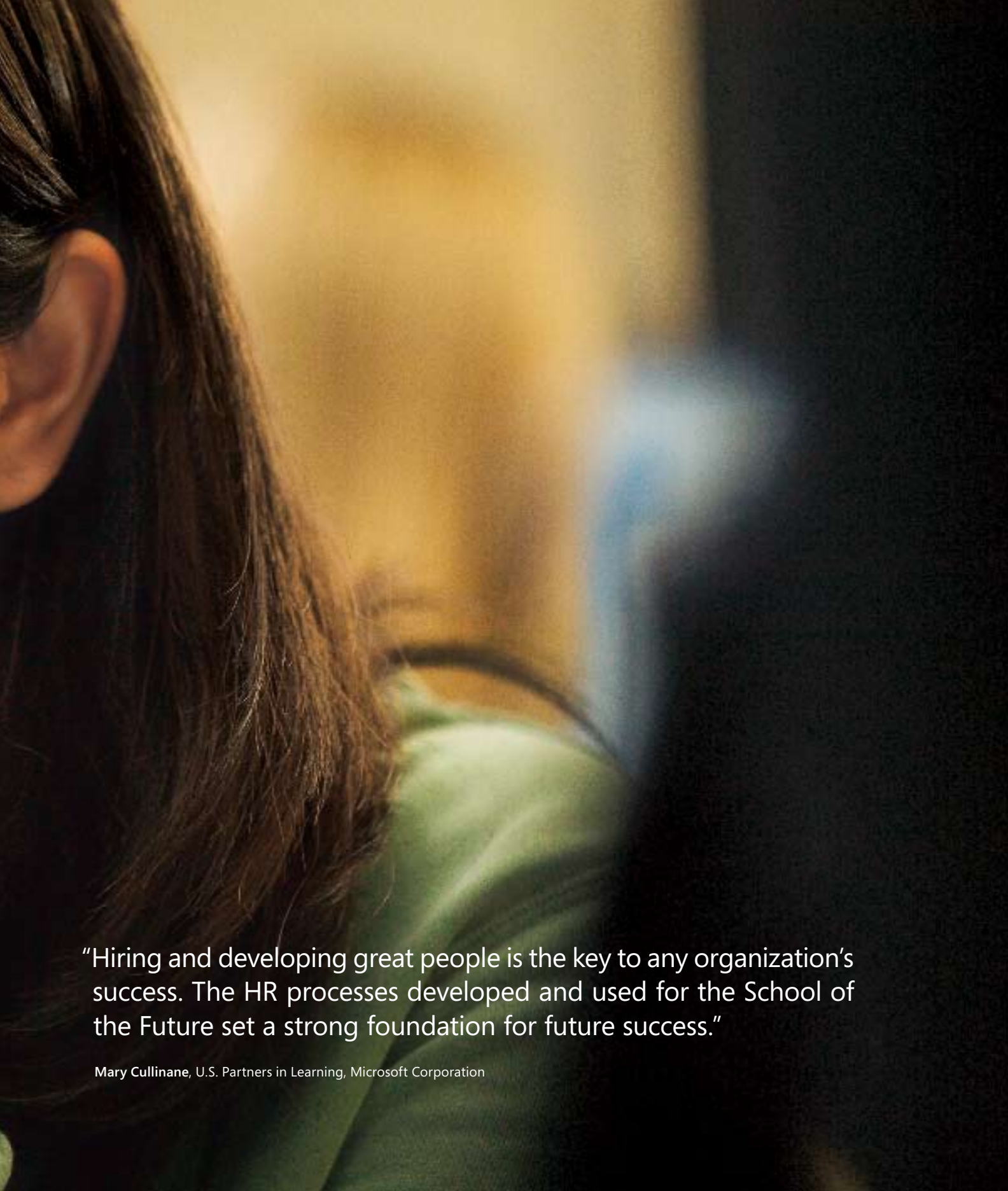
Passion for Education. An individual with a demonstrated passion for creating great learning environments. A candidate with a well-versed understanding of educational theory and practice coupled with an enthusiasm for new ideas. Someone who interprets current trends in education and understands their implications for the purpose of continually improving the teaching and learning experience.

Key Learning: It's imperative to identify the success factors that will define the ideal candidate before the selection process begins. Knowing what you're looking for beforehand enables organizations to evaluate individual candidates against agreed-upon criteria instead of wrestling with disparate factors that emerge during interviews.



"The interview process was great because it said the school belongs to the community. Now when I come in, people will meet me in the community and say, 'Oh yes, I was there. I hired you.' That's important, I think."

Dr. Shirley Grover, Principal, School of the Future



"Hiring and developing great people is the key to any organization's success. The HR processes developed and used for the School of the Future set a strong foundation for future success."

Mary Cullinane, U.S. Partners in Learning, Microsoft Corporation

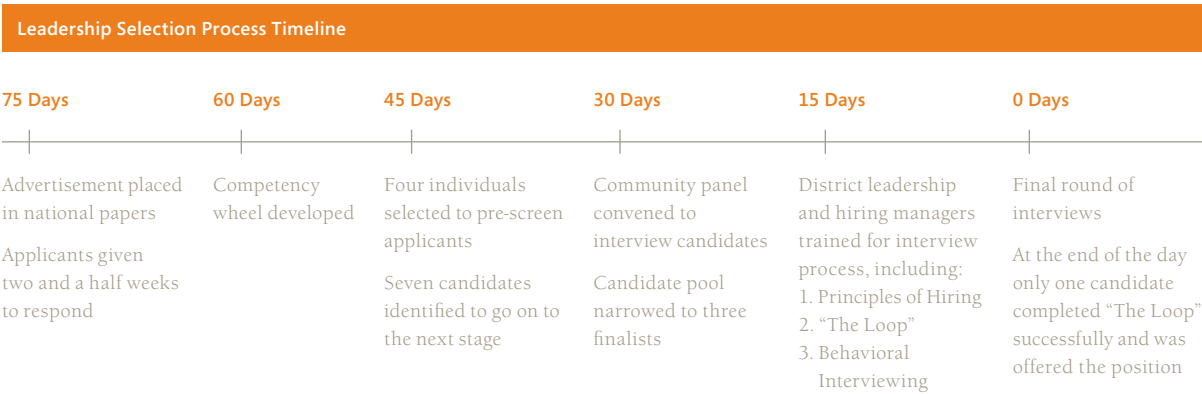
Putting the process in motion

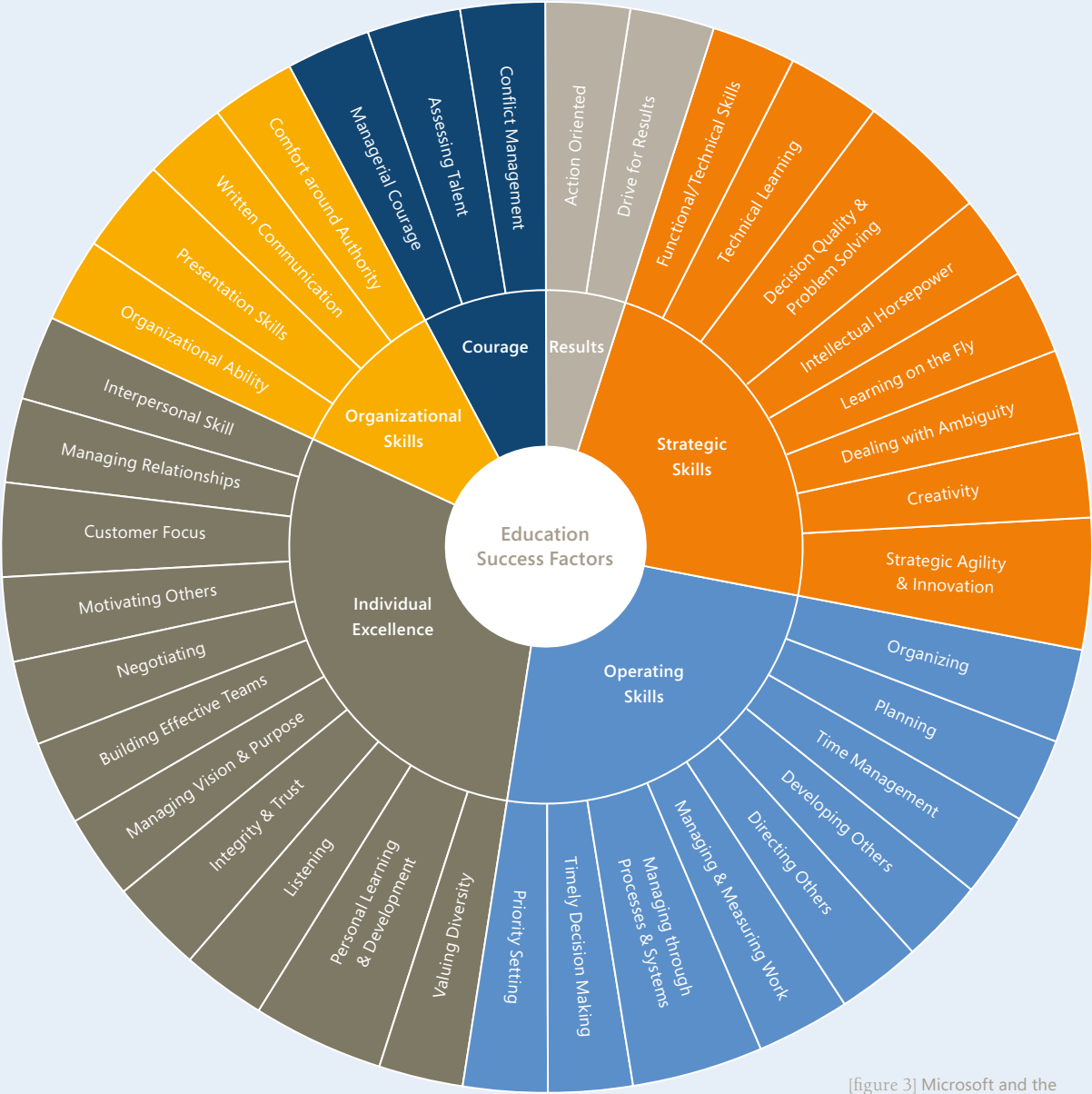
This is a play-by-play of the search process used by the School District of Philadelphia and Microsoft to select the School of the Future’s principal. The timelines are flexible, of course, but this outline is prototypical of a deliberate, strategic process.

T - 75 days: Getting the Word Out. Seventy-five days prior to the desired start date for the principal, an advertisement for the position was placed in national and local publications, including *Education Week*, *The Chronicle of Higher Education*, *The Philadelphia Inquirer*, and *The Wall Street Journal*, as well as on CareerBuilder.com. The advertisement was crafted to automatically filter applicants that did not possess the necessary skills. Respondents were asked to electronically submit a response to three questions posed within the advertisement, forcing applicants to demonstrate their passion, communication skills, technological savvy, and creativity. The advertisement also pointed applicants to a URL, requiring individuals to demonstrate research skills and ability to successfully maneuver within a digital environment. Additionally, the submission requirements featured a short timeline. Successful leadership involves conviction and action, so the short timeline allowed candidates to demonstrate preparation and decisiveness.

T - 60 days: Competency Wheel Development. Competency wheels are a mainstay of successful organizations and provide a roadmap for the active nurturing of a specific kind of culture (e.g., sales-oriented, collaborative, inventive, etc.) and developing an organization’s most valuable capital—talent. Microsoft employs this model and has subsequently benefited from consistently hiring great people and having low employee turnover and renowned professional development. Together, Microsoft and the School District of Philadelphia developed a competency wheel for the School of the Future to guide the principal hiring process. [figure 3]

T - 45 days: Initial Screening. Within the search committee, four individuals were selected to pre-screen all of the submissions (resumes and requisite essays) received. This initial screening was done to eliminate candidates who did not meet the minimum requirements for the position, including appropriate certifications, experience with adolescents, and demonstrated understanding of education and passion for learning environments. As a result of the initial screening, seven candidates were identified to go on to the next stage.





[figure 3] Microsoft and the School District of Philadelphia developed a competency wheel for the School of the Future to guide the principal hiring process.

T - 30 days: **Community Engagement.** To ensure appropriate community involvement and stakeholder buy-in, a community panel was convened to participate in the interview process. Each candidate was interviewed for an hour by the community panel. Each panel member was given a specific competency to explore with the candidates. Following the interviews, panel members ranked each candidate on a scale from 1–6, with 1 representing superior performance. Feedback from the community panel narrowed the candidate pool to three finalists.

T - 15 days: **Process Training.** Before conducting interviews with the three finalists, Microsoft and the School District of Philadelphia conducted a briefing with district leadership to outline the process involved in the final interview day. After receiving approval, a half-day training session was conducted with individuals who would be actively participating in the interview process. At this training session, participants were instructed on the district’s hiring philosophy—hire for Philadelphia first, the job second; seek out talent and potential, not just experience; commit to diversity in the workplace; and hire the best. Participants were also briefed on the hiring methodology and the specifics of utilizing a behavioral interviewing model.

Training content is available at the School of the Future Web site.

T - 0 days: **Final Interview Day—“The Loop.”** The centerpiece of the final interview day was “The Loop.” This hiring model is built around a vigorous interviewing experience wherein the candidate’s ability to successfully adapt and react to the environment is part of the screening process. Here’s how it works: Each finalist completes seven interviews conducted by different people in a single day. Using a wide variety of behavioral interviewing questions, individual interviewers focus on one or two identified competencies and functional skills and bear the responsibility of assessing each candidate’s ability to perform those skills. Collectively, the interviewers address all of the desired success factors comprehensively. At the end of each interview, each interviewer enters a “hire” or “no hire” decision.

The three finalists completed “The Loop” during the final interview day. At the end of the day, only one candidate completed the loop successfully—receiving 100% “hire” decisions from all interviewers. This individual then interviewed with Dr. Greg Thornton, Chief Academic Officer. Upon completion of this interview, the position was offered to the candidate and was accepted. The candidate officially started as principal of Philadelphia’s School of the Future on September 1, 2005, a full year before the school’s opening.

Community Roles The community panel was a vital part of the leadership selection process. Because of its diverse composition, the panel brought different perspectives on specific competencies required by the position. Collectively, the panel also offered an objective outlook from outside the inner workings of the school district. A community panel offers the opportunity to evaluate candidates in ways that educators alone could not. Also, the panel essentially acts as a proxy for the community-at-large, aligning the interests of the school with the community it serves.

Stakeholder Roles	Number of Representatives	Area of Questioning
Student	2	Customer Focus
Community	4	Teamwork
Political	2	Teamwork
Educator	5	Individual Success & Long-Term Approach
Union	3	Teamwork & Results
Business	1	Results

Introducing Dr. Shirley Grover

For the past 11 years, Dr. Grover served as director of the American School in Milan, Italy, a school with an international, multi-cultural student body gathered by circumstance, but united in its desire to build a community of learners capable of taking their places in a rapidly evolving world.

Before joining the American School, Dr. Grover served as Superintendent of Schools in Scarborough, ME, and had a long career as a teacher and administrator. She is a member of Phi Beta Kappa, has served on the International Advisory Board for Middle States Accreditation, and has been a member of the American Association of School Administrators. Her son, Jonathan, is a freshman at Brandeis University.

Behavioral interviewing questions

Behavioral interviewing is a specific style and approach to evaluating candidates. Fueled by open-ended questions (versus questions that require a yes or no answer), behavioral interviewing illuminates a long-standing pattern of behavior and performance. This offers a richer portrait of a candidate's ability to perform a job, because the best predictor of future performance is past performance under similar circumstances.

Within behavioral interviewing, there are five key kinds of questions.

1. Probing questions allow interviewers to ask for more information until the full answer emerges. Though probing questions address why, what, and how, the most important probing questions deal with why. A good example of a probing question is “**Why did you solve the problem the way you did?**”

2. Situational questions provide an opportunity to gauge a candidate's ability to handle a situation that is similar to those they are likely to encounter in your work environment. These questions typically involve asking the candidate to solve a problem presented by the interviewer or, alternately, recount a similar challenge the candidate has faced in the past. For example, “**Tell me about a time when you had to solve a very difficult problem and then walk me through how you handled it.**”

3. Scenario and role-play questions give candidates the opportunity to demonstrate essential skills and interviewers the opportunity to evaluate how a candidate thinks critically and performs under pressure. That said, the question should be sufficiently general in its context. The candidate should reveal skills that map to the job—not actually do the job during the interview. A popular example of a scenario and role-play type of question: “**You are leading a year-long project. Only two months into the project, you see the work is going to take considerably longer and require additional time and materials, which will increase overall costs. How do you handle this situation?**”

4. Functional and problem-solving questions are highly varied and multilayered, and enable candidates to outline how they approach complex problems and interviewers to understand a candidate's ability to utilize multiple strategies and create unique solutions. Functional and problem-solving questions should utilize real-world problems that relate directly to the job.

5. Self-appraisal questions provide candidates a forum for self-reflection and analysis and interviewers the chance to understand how individual candidates assess their past performance and make comparisons. “**How would you have handled the conflict differently?**” and “**Why were you able to achieve the results you did?**” are both good examples of self-appraisal questions.

We started this project with a single question: If we could collaboratively design and build a high school from the ground up, using research-inspired learning principles and best-in-class technology, what would we create?

We're hoping that the process we've used to answer that question—the decisions we've made across all stages of the development process, from construction to curriculum—will provide a model for building a School of the Future anywhere around the world. And yet our specific answers are less important than the potential insights our story provides for others taking on similar challenges. The ideas and cumulative wisdom we've gained along the way will be valuable to others engaged in answering the same question—even though their answers may be different. So now we have a new question: Armed with this knowledge, how will you create the next School of the Future?

For additional information, tools, and resources about the School of the Future, including a virtual tour and blog entries, visit: www.microsoft.com/education/sof

Partners in Learning

Technology is a powerful tool that can help people, communities, and nations realize their potential. But for millions, the promise of technology is still unrealized. Microsoft Corporation has made a comprehensive commitment to digital inclusion—helping individuals, communities, and nations gain access to the technology tools, skills, and innovation they need to realize their potential in the changing economy. Microsoft's flagship digital inclusion initiative is Partners in Learning.

Despite real improvements in accessing and using information and communication technology in education, many students and teachers still lack basic access to technology and training. The result is a widening skills gap that contributes to disparities in quality of life, competitiveness, and economic development.

Part of the Microsoft® Partners in Learning initiative, the School of the Future is an important example of our commitment to addressing the digital inclusion issues facing education today by providing tools and support that enable educators and schools to deliver on the promise of technology in education.

For more information on Microsoft Partners in Learning, go to:
www.microsoft.com/uspil

www.microsoft.com/education/sof