Architecting a Kindergarten to Workforce (K–W) Talent Pipeline:

A Framework for Developing Skills for the Future

Executive Summary

The American economy is undergoing a rapid transformation driven by artificial intelligence (AI), automation, and evolving global markets. In this climate, business and industry leaders are raising urgent concerns about current and future "skills gaps." The skills gap discussion dates back to the 1980s, but today's central concern is how fast skills are changing within the workplace. If this is not a new concern, then why do we continue to face this persistent problem?

The answer lies in how we define the problem. The skills gap discourse collapses multiple, distinct challenges into a single, ill-defined problem. Workforce preparedness depends on three interconnected types of skills—technical, durable, and functional—as well as a dimension of workplace readiness, which reflects an individual's ability to navigate entry into the labor market and continually demonstrate professional norms and expectations. While workplace readiness is not a category of skills, it serves as the mechanism through which individuals channel their skills into employment opportunities, entrepreneurship, and long-term career success. When skills are treated as a monolith, systemic misalignments in the education-to-workforce pipeline remain invisible. By untangling skills into distinct categories, policymakers, funders, and system administrators can target the right interventions and aptly prepare learners for a future-ready workforce.

This paper deconstructs the skills gap into a three-skill typology and shows how they are integrated into workforce experiences, offering a more precise diagnosis of the needs and challenges facing the field. Higher education builds strong foundations; the deeper challenge is that the pipeline from K–12 to the workforce remains fragmented and misaligned with the economy's rapidly changing needs (Education Strategy Group & Charles A. Dana Center, 2025). The most critical durable skills are now evolving into meta-skills—like learning how to learn and navigating ambiguity—that are essential for individuals in a rapidly changing world.

To address this challenge, the Charles A. Dana Center presents three integrated commitments: convening cross-sector partners to solve the technical skills gap; scaling evidence-based pedagogy to cultivate the durable meta-skills critical for the future; and developing industry-informed curriculum to bridge the functional skills gap. When implemented together, these three commitments address the full scope of the skills challenge—equipping individuals for continuous adaptation and offering policymakers and funders a roadmap for investments critical to the nation's economic future.

Introduction:
Education's Role in Creating an Agile Workforce

Every year, billions of dollars flow into workforce training programs, postsecondary readiness initiatives, and corporate upskilling efforts, yet employers still report a persistent shortage of workforce-ready talent. The challenge is one of diagnostic precision. The term skills gap has become a catch-all phrase that obscures more than it reveals, lumping together fundamentally different challenges that require fundamentally different solutions. When policymakers, system administrators, and funders can distinguish between the types of skills that are lacking, as well as where in the pipeline those gaps form, the investments they make become far more effective. This paper offers a framework to do exactly that.

The U.S. workforce is amid a seismic shift. Driven by the explosion of generative AI and other advanced technologies, the rise of the gig economy, and emergent global competition, the skills required for a good job are changing faster than ever.

A recent PricewaterhouseCoopers (PwC) survey found that 91% of CEOs cite workers' skills as a top business challenge, reflecting a pervasive anxiety about talent readiness (PwC, 2024). This has reinvigorated a decades-old debate about the "skills gap" and whether America's educational system is adequately preparing the next generation for an increasingly uncertain future.

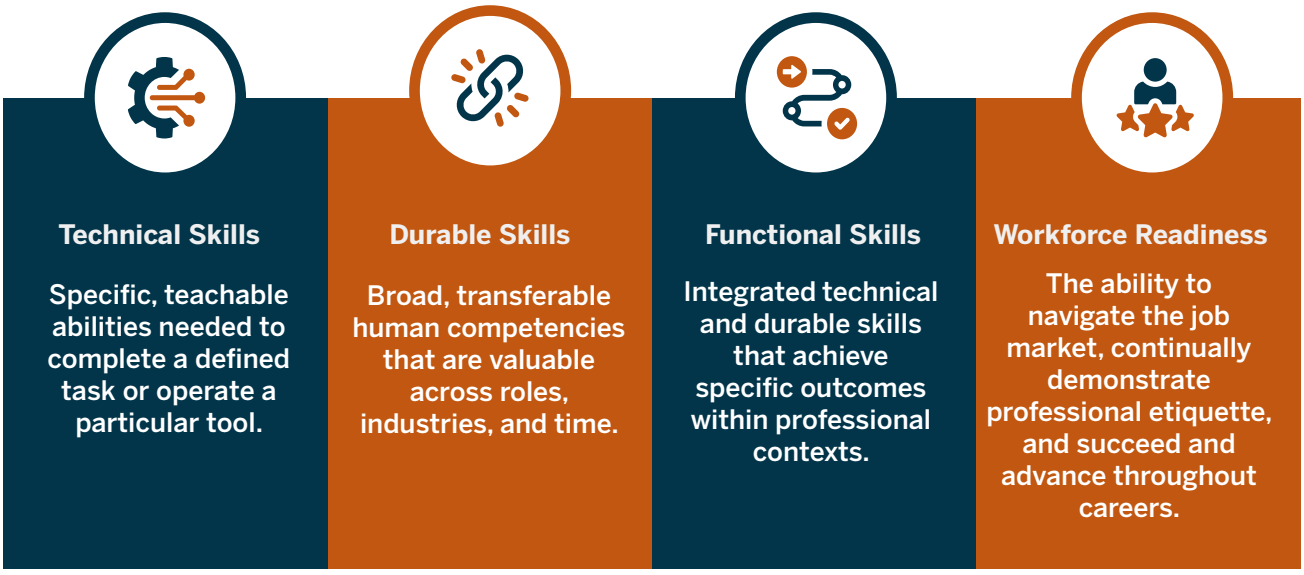
To build more agile and future-ready workforces, companies are increasingly restructuring around skills rather than credentials. Deloitte (2022) found that organizations are moving away from degree requirements in favor of granular, demonstrable skills. This shift creates strategic advantages, including the ability to pivot workforces quickly in response to market demand. Employers are using AI-powered human resources (HR) tools to infer and automate skills identification across people, roles, and learning pathways, while state governments are investing in their own data systems to track skill trends across regional labor markets. Together, these efforts are generating unprecedented insight into which skills are emerging, which are waning, and where talent pipelines need to be strengthened—but only if the underlying data on labor market demands and workforce capacities remain accurate and current.

Beyond supporting skills-first hiring, this framework could strengthen alignment between education and workforce systems, helping educators better prepare learners for employment and creating new opportunities for productive partnerships between education institutions and employers. Such alignment could shift workforce development toward a model in which education serves as the primary engine for developing current and future talent, allowing employers to

invest less in remediating skills and more in advancing innovation and growth. Educators, in turn, would be better positioned to demonstrate the labor-market relevance of their curricula, ensure that learners acquire the skills and experiences employers value, and prepare graduates to not only enter their roles in the workforce ready to contribute but also to continuously build their capabilities, innovate and create future job markets, and thrive throughout increasingly dynamic careers. Realizing this vision at scale will increasingly depend on how well emerging technologies, particularly AI, are equipped to support it.

While AI has the potential to accelerate a skills-first hiring movement that benefits both recent graduates and mid-career workers seeking rewarding, well-paying opportunities, realizing that potential requires a more precise understanding of the relevant skills and their interconnectedness. Large language models are only as effective as the structures used to organize and interpret information. As a result, a critical first step is to move beyond treating the "skills gap" as a singular phenomenon and instead reconceptualize it as the interaction of three distinct skill types and a related workplace readiness dimension, through which those skills are demonstrated, recognized, and applied in professional settings.

This paper defines these three skill types and the Workplace Readiness dimension as follows:



Untangling these skill types will allow employers, educators, policymakers, system administrators, and funders to identify core problems more clearly and tailor interventions accordingly.

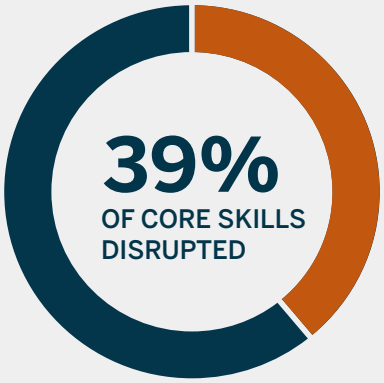
This framework defines and differentiates these three skill types and the workplace readiness dimension, traces the history of the skills gap debate to reveal the true nature of the challenge, and presents a strategic path forward. Through this lens, the paper focuses specifically on mathematics pathways, which represent an essential prerequisite for jobs spanning nearly every sector from healthcare and skilled trades to technology, finance, and advanced manufacturing. When properly designed and aligned, mathematics serves as a gateway rather than a gatekeeper for education workforce success.

A 40-Year History of the Skills Gap Debate

Understanding how we arrived at this conflated view requires examining the evolution of the skills gap debate itself. The skills gap argument is not a new one; in fact, this debate has evolved significantly over time. It began in earnest with the seminal 1983 report, "A Nation at Risk," which framed educational underperformance as a direct threat to national security and global competitiveness, warning of a "rising tide of mediocrity" (National Commission on Excellence in Education, 1983). The focus was on developing foundational academic skills, and the solution was to raise academic standards and rigor.

By the 1990s, it was clear that one could do well academically and not be able to perform in the workplace. This conversation was driven by the U.S. Department of Labor's Secretary's Commission on Achieving Necessary Skills (SCANS) report (1991). The SCANS report was groundbreaking for codifying "foundational skills," which are also referred to as soft skills and, in this report, as durable skills. The SCANS report further developed five workplace competencies: the ability to use resources, interpersonal skills, information, systems, and technology (SCANS, 1991). This marked a significant evolution in education to workforce alignment, establishing that academic knowledge alone is insufficient and durable skills are increasingly important.

Now, in the 21st century, an explosion of technology is underway and is shifting the focus yet again. Automation and AI are best suited to handling routine tasks, which means that high-demand, durable skills that harness uniquely human abilities are increasingly needed. Research from institutions like the World Economic Forum argues that skills like analytical thinking, creativity, and technological literacy will become the in-demand skills of the future (World Economic Forum, 2023). Moreover, experts interviewed as part of this research shared that the ultimate skills for the future are meta-skills: the ability to learn and unlearn rapidly, to navigate increasingly ambiguous problems, and to lead cross-functional teams with a wide range of expertise.



AS OF 2025

The World Economic Forum projects that an average of **39%** of an individual worker's core skills will be disrupted by **2030**—

Meaning that a **third to a half** of one's skills today may be rendered ineffective and outdated within just **five years**.

This sobering reality makes clear that we can no longer prepare students for jobs and skills that may soon be obsolete. The central task is no longer to fill a known skills gap, but to cultivate the capacity to identify, adapt to, and overcome the unknown gaps that an evolving world and economy will inevitably create—equipping learners with the resilience, adaptability, and creative thinking needed to thrive amid continuous change.

Reconceptualizing the Skills Problem for a Future-Ready Workforce

This research suggests the need for a framework that goes beyond simply clarifying isolated skills but bridges the gap between education and workforce needs by showing connections between how distinct skillsets are acquired, developed, assessed, and applied across various settings and contexts. The framework includes three distinct skill types—technical, durable, and functional—and a fourth element, workplace readiness, to address this imprecision. While numerous skills taxonomies exist, this framework offers something fundamentally different: a practical structure that links skill development, workplace readiness, and labor-market outcomes through a shared language by which educators, employers, and learners can align expectations, investments, and outcomes in a rapidly changing economy. The goal of this framework is to enable the design of more effective policies, strategies, and interventions that provide learners with real-world scenarios and experiences embedded in STEM disciplines.

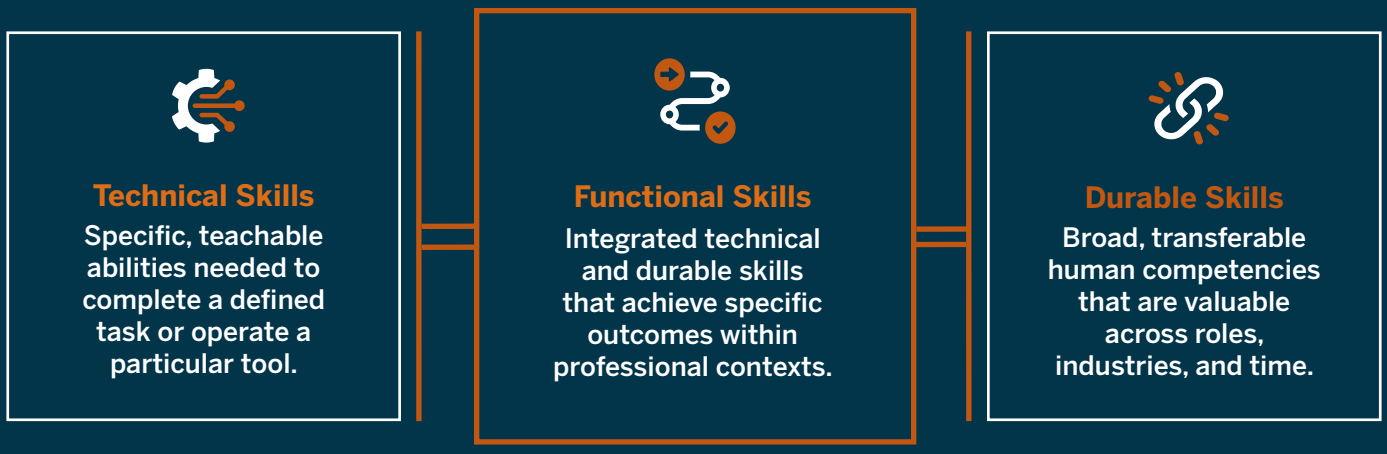
The following table distinguishes the three skill types—technical skills, durable skills, and functional skills —and the workplace readiness dimension and shows how each is defined, learned, assessed, and applied in STEM contexts.

Table 1. The Skills Framework: Three Skill Types and the Workforce Readiness Dimension

Skill Type	Definition	How to Develop	How to Identify	Key Distinction
Technical Skills	Specific, teachable abilities needed to complete a defined task or operate a particular tool.	Through structured training and repetition (e.g., workshops, certifications).	Has the worker earned a related certificate or passed a test?	Tool/method-specific; evolves with technology and requires periodic updating.
Durable Skills	Broad, transferable human competencies that are valuable across roles, industries, and time.	Through reflection and feedback from diverse experiences (e.g., coursework, group projects, internships, extracurricular activities).	Does the worker demonstrate adaptability, problem solving, and effective collaboration in varied situations?	Context independent; valuable across roles, industries, and career stages.
Functional Skills	Integrated technical and durable skills that achieve specific outcomes within professional contexts.	Through authentic work experiences requiring a synthesis of skills (e.g., internships, capstone projects, applied research).	Can the worker successfully complete role-specific tasks by combining technical proficiency with durable competencies?	Context-specific; demonstrated through purposeful integration.

Understanding the Relationship Between Skill Types

These three skill types are distinct yet interdependent. Table 2 shows real-world examples of each skill type. Each skill type requires different learning pathways, assessment approaches, and interventions:



Technical skills provide the ability to use specific tools and processes—such as Computer-Aided Design (CAD) software for engineering design, clinical data collection protocols for healthcare research, or Lean Six Sigma methodology for process improvement. **Durable skills** provide the human capacities—collaboration, critical thinking, and communication. **Functional skills**, however, represent something more than simply using both: they demonstrate how the integration of technical and durable skills in specific professional contexts creates outcomes that neither could achieve alone.

For example, an engineer applying CAD software to design an aerodynamic chassis (technical skill) in conjunction with collaborative problem solving (durable skill) does not just complete two tasks simultaneously. Instead, the collaboration enables the team to surface effective design trade-offs earlier, test solutions iteratively, and ultimately produce a more optimized chassis that meets competitive guidelines. The functional skill is not CAD plus collaboration—it is the ability to leverage collaboration to enhance the technical design process, creating better results.

Similarly, an environmental scientist applying GIS to model invasive species spread (technical skill) combined with critical thinking and strategic communication (durable skills) does not simply perform analysis and then communicate. Instead, by critically evaluating model limitations and transparently communicating uncertainty, the scientist strengthens constituent confidence in the findings, which increases urgency for conservation action. The functional skill is the integrated capacity to use critical thinking to enhance the credibility and impact of technical analysis.

Examples of Skills

Technical Skills

- Programming in Python, R, or MATLAB software
- Creating 3D models using CAD software (e.g., SolidWorks)
- Conducting spatial analysis using GIS software (e.g., ArcGIS)
- Performing lab techniques (e.g., polymerase chain reaction or PCR, titration)
- Conducting statistical analysis using specialized software
- Managing projects using digital tools (e.g., Jira)
- Taking precision measurements using varied tools
- Creating data visualizations using specialized tools (e.g., Tableau, Power BI)
- Querying and managing databases using structured query language (SQL)
- Operating spectroscopy equipment

Durable Skills

- Critical Thinking: Analyzing information and evaluating solutions
- Problem Solving: Identifying issues and developing effective solutions
- Collaboration: Working effectively with diverse teams and constituents
- Communication: Exchanging information clearly across formats and audiences
- Learning to Learn: Acquiring new knowledge and adapting skills independently
- Embracing Feedback: Receiving input constructively and applying it for improvement
- Follow-Through and Accountability: Completing commitments and taking ownership of results
- Navigating Ambiguity: Making decisions and progressing despite uncertainty
- Systems Thinking: Understanding interconnections and broader context
- Adaptability: Adjusting approaches in response to changing conditions
- Ethical Reasoning: Making principled decisions considering impact and values
- Time Management: Prioritizing tasks and meeting deadlines effectively

Functional Skills

- Analyzing clinical trial data by integrating Python programming with collaborative problem solving to identify patterns more rapidly and accelerate constituent decision making.

- Designing aerospace components by combining CAD with iterative feedback and problem solving to surface constraints earlier and optimize solutions.

Functional Skills Cont.

- Developing GIS-based conservation plans by integrating spatial analysis with systems thinking and adaptive planning to create robust strategies for changing conditions.
- Managing software development by integrating project tools with ambiguity navigation to maintain progress despite evolving requirements.
- Conducting manufacturing quality control by integrating statistical analysis with real-time problem solving to reduce defects and improve efficiency.
- Applying measurement techniques by integrating precision with clear communication to identify and address deviations quickly in quality assurance work.

Skills Framework Purpose and Application

Recognizing the distinctions between each skill type is critical, as the distinctions provide the foundation for appropriate and applicable learning experiences. Mistaking a need for functional application as a lack of technical skill or treating a durable skill deficit as a simple training issue leads to misdiagnosis and ineffective solutions in education, training, and development. By clarifying not just what skills are needed but also how they are acquired and developed, this framework enables the design of more targeted and effective education-workforce partnerships and interventions and provides learners with the experiences they need to apply skills in various real-world contexts.

For Example

When a new conservation scientist struggles to communicate GIS findings to constituents, the solution is not more GIS training (technical) or a communication workshop (durable)—it is creating opportunities to practice integrating spatial analysis with constituent engagement in authentic contexts (functional).

Workplace Readiness Dimension

While technical, durable, and functional skills form the foundation of the skills needed to prepare learners for the future, a fourth dimension—workplace readiness—plays a critical role in employee success. Workplace readiness is the ability to navigate the job market, continually demonstrate professional etiquette, and succeed and advance throughout careers. The workplace readiness dimension is evident in the professional behaviors that enable individuals to translate their skills into opportunities and influence. How a researcher communicates in a meeting with a funder, for example, can shape the credibility of their work and affect how their findings are perceived, received, and acted upon.

Source: iStock-1443303360

The elements of workplace readiness are often the hidden elements of workplace culture and include the following capabilities:

- **Professional etiquette and workplace norms**
- **Timeliness and attendance expectations**
- **Appropriate workplace communication**
- **Professional appearance standards**
- **Understanding organizational culture**

Workplace readiness capabilities are context-specific within industries, organizational cultures, and individual workplaces. While education can introduce professional norms through internships and work-based learning, the primary responsibility for developing these skills rests with employers through onboarding, mentorship, and workplace socialization.

This framework focuses on the three skill types where education-workforce collaboration is most critical and impactful and acknowledges that comprehensive workforce preparedness also attends to the hidden elements of workplace culture, referred to as workplace readiness.

Infographic 1. Integrating Technical and Durable Skills

Technical Skills

Specific, teachable abilities needed to complete a defined task or operate particular tools, such as:

- Data visualization tools
- Python/R programming
- SQL database querying
- Mathematical modeling
- Statistical data analysis

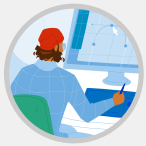
Durable Skills

Broad, transferable human competencies valuable across roles, industries, and time, such as:

- Analytical thinking
- Problem solving
- Scientific reasoning
- Collaboration
- Learning agility
- Quantitative communication
- Systems thinking
- Adaptability

Functional Skills

Integrated **technical and durable skills** that achieve specific outcomes within professional contexts, such as:



Designing an environmental monitoring system by applying data modeling and scientific reasoning to identify pollution patterns across regions.

Analyzing clinical trial data by combining biostatistical methods with collaborative interpretation to accelerate evidence-based treatment decisions.

Optimizing a manufacturing process by integrating statistical quality control with cross-functional problem solving to reduce defects.

Workplace Readiness emerges from this integration—equipping individuals to navigate job-specific environments, meet employer expectations, and grow throughout their careers.

The Technical Skills Gap: A Problem of Current Pathways, Not Potential

The technical skills gap in STEM is fundamentally a supply problem: too few individuals possess the specific technical competencies required by industries. As one semiconductor industry leader noted, "This shortage is often less a consequence of skill complexity than of systemic misalignment." He described a common disconnect in which a two-year technical degree requires calculus as a prerequisite, despite calculus having little relevance to the jobs graduates ultimately perform (Anonymous, personal communication, n.d.). Meanwhile, postsecondary institutions often devote insufficient attention to skills that employers consider essential. In this sense, the challenge is not merely producing more workers—it is producing individuals with the technical preparation that industries demand.

This is a pipeline problem, not a capacity problem. Systemic barriers—particularly misaligned prerequisites—filter out capable students before they can acquire the technical skills employers need. Research confirms that math requirements, in particular, have served as a significant gatekeeper, blocking access to technical pathways (Burdman, Hale, & BeVard, 2025). Additionally, a policy expert at a national think tank noted, "The hardest part for a student should be mastering the subject matter itself, not navigating a broken system" (Anonymous, personal communication, n.d.). Closing the technical skills gap requires reengineering the pathway from education to employment—eliminating barriers that impede opportunity, aligning educational requirements with workforce demands, and creating clear, accessible pathways through which learners can develop, demonstrate, and apply the technical capabilities employers value.

The Durable Skills Gap: A Problem of Performance, Not Just Proficiency

The most complex and conflated gap concerns durable skills: the set of transferable, "human" skills consistently cited by employers as necessary for workforce success. These are the broad competencies that appear across both educational learning outcomes and talent management frameworks in the workplace. Among these, certain skills have taken on new urgency—elevated by the pace of technological change from useful competencies into critical meta-skills. Chief among them is learning how to learn: the ability to rapidly identify knowledge gaps and fill them through research, feedback, and practice. The World Economic Forum (2025) identifies curiosity and lifelong learning as among the fastest-growing core skills through 2030, with experts across engineering, technology, and healthcare

The Durable Skills Gap Cont.

sectors ranking it among their highest workforce priorities—yet it remains among the least defined and least deliberately taught skill sets in education.

This gap is complicated by the conflation of proficiency with performance. Consider a software project manager who excels at collaboration, critical thinking, and communication—core durable skills. After two years of leading successful cross-functional teams, they take on a new role with significantly increased scope and complexity. During this transition, their performance declines: they miss deadlines, communication becomes strained, and team dynamics suffer. A manager might conclude they lack the durable skills for higher-level work. The employee possesses strong durable skills but needs support to adapt them to a new context. The solution is not remedial training—it is providing coaching, mentorship, and time to adjust to the increased demands. This pattern appears across contexts. A high school chemistry teacher experiencing burnout may perform poorly—but this is a performance issue caused by exhaustion, not a durable skills deficit. Similarly, a medical researcher working in a dysfunctional team environment may appear to lack collaboration skills, when their performance is being hindered by circumstances beyond their control.

This distinction is crucial because the solutions are entirely different. A skills deficit requires education and practice. A performance issue requires coaching, support, or an environmental change. Misdiagnosing one as the other wastes resources and fails to address the actual problem.

Addressing the true durable skills gap—the deficit, not the performance issue—requires different approaches from educators and employers. For educators, the solution is pedagogical innovation—creating learning experiences where students can practice and hone these skills. For employers, the solution is cultivating work environments where employees can authentically use their durable skills—providing safe, collaborative environments and the ongoing learning experiences needed to perform at their best.

The most critical durable skill—learning how to learn—is also the hardest to assess. It can only be observed through performance over time, which makes the proficiency and performance distinction even more important.

The Functional Skills Gap: A Problem of Application, Not Ability

Functional skills emerge from applying technical knowledge within specific, domain-rich contexts. While functional skills in STEM fields often build on technical foundations, they require more than technical proficiency alone. For instance, the ability to conduct quantitative data analysis is a technical skill, but applying it effectively in an HR information system, a biopharmaceutical lab, or an aerospace simulator requires domain-specific context and knowledge. Functional skills can also encompass non-technical competencies, such as understanding labor law compliance or clinical trial protocols.

The Functional Skills Gap Cont.

The need to distinguish functional skills is critical because a functional skills gap can easily be misdiagnosed as a technical skills gap. Here is an example: a new graduate has landed a position as an HR data analyst and is asked to create an attrition risk model for critical roles within the company. Without prior HR-related experience or context, they may struggle with historic data inconsistencies and navigating personal information sensitivities. They may hit several barriers in their early work, and a manager could perceive it as a lack of data analysis skills, when the issue may be that they do not have the functional HR skill sets needed for the role.

The barrier here is the unrealistic expectation that academia can perfectly replicate every professional context a student might encounter. As an expert from a national policy nonprofit noted, "It's unrealistic to think someone's going to just show up on the job knowing exactly what they should be doing" (Anonymous, personal communication, n.d.). Expertise is developed through "situated learning," where knowledge is applied within authentic contexts (Lave & Wenger, 1991). While postsecondary education provides foundational technical knowledge, employers must provide the on-the-job training and mentorship required to transform that knowledge into productive workplace performance. The solution requires shared responsibility: educators must expose students to authentic professional contexts, while employers must provide structured workplace learning that develops functional expertise within the specific contexts in which work is performed.

Workplace Readiness: A Problem of Mentoring, Not Generations

Workplace readiness is the ability to navigate the job market, continually demonstrate professional etiquette, and succeed and advance in careers. Many employers express frustration about employees successfully integrating into the workplace and navigating the unspoken rules that govern access to success, growth, and persistence in the workplace. This includes both the processes used to screen and hire candidates and the day-to-day expectations once a worker is on the job.

With hiring now dominated by AI-enhanced processes, jobseekers must understand how to identify job opportunities that align with their skill sets and elevate their applications among a growing flood of applicants. This goes beyond traditional resume writing workshops and requires that individuals can translate their knowledge for the specific expectations of each employer.

Many workers never make it through the screening process because they lack professional work experience, have not mastered workplace etiquette, and may perceive themselves as more competent than employers do (Gray, 2025). Others face stalled career progression because they have fewer opportunities to strengthen these often-hidden dimensions of the workplace. Educators and employers must work together to design authentic work-based learning experiences that help learners develop, practice, and navigate the professional expectations and behaviors that influence hiring, advancement, and long-term career success.

Architecting the Talent Pipeline:
The Dana Center's Strategic Position

A common critique holds that education is failing to develop workforce-ready skills. The evidence suggests a more complicated truth. Even as some employers drop degree requirements, major corporations like Walmart and Target are investing billions in partnerships that provide employees access to higher education—a market-driven endorsement that higher education develops critical workforce skills. Higher education builds strong technical foundations and cultivates essential durable skills. The issue is not all about the quality of education; rather, it is often what happens at the handoffs.

A real friction lies in the fragmented transitions between K–12, higher education, and the workforce—the seams where capable students fall through and where institutional accountability goes undefined. This is precisely where the Dana Center operates: in the connective tissue of the entire system. With a mandate spanning the full K–16 continuum and a proven track record of convening partners across institutional boundaries, the Dana Center is uniquely positioned to architect the policies and practices that ensure students enter the workforce with the skills needed to excel and adapt as work evolves. This positioning is built on three core principles:

From Math Education to Building Cognitive Capacity

The skills debate often conflates the need for technical skills (like a STEM degree) with the underlying cognitive capacities required to attain them. The Dana Center's work redesigning math pathways is a scalable method in American education for cultivating the most critical meta-skill of all: the capacity to learn, unlearn, and relearn across an entire career.

Strengthening the Foundation, Not Just the Finish Line

The workforce landscape is saturated with last-mile solutions like bootcamps and job training. These programs underperform if students arrive without the durable abilities around learning. The Dana Center addresses this gap by working across the entire educational journey, not just the final transition to work. Investment in the Dana Center is a force multiplier for the entire workforce ecosystem—strengthening the foundation that makes all other workforce interventions more effective.

Mathematics Pathways as a Skills Lab

Employers, economists, and workforce experts broadly agree: the most valuable skills for a rapidly evolving, technology-enabled economy are durable. A rigorous, well-designed mathematics pathway is the single most effective and scalable environment for building them.

By embedding technical, durable, and functional skill development with workplace readiness experiences into the pedagogical framework, rather than treating them as siloed ideas or add-ons, mathematics instruction becomes a crucible where students build the capacity to persist productively through ambiguity, apply knowledge in unfamiliar contexts, grow as learners across their entire education and career, and are optimally prepared to navigate and create the future.

From Insight to Action:
Three Commitments for Closing the Skills Gaps

This section translates the framework into action. The Dana Center presents three interconnected commitments, each targeting one of the three skill types, with workplace readiness woven throughout as the dimension through which those skills are ultimately demonstrated. Each commitment is grounded in a field-wide best practice—a broader principle that any education organization, funder, or policy body can apply. Together, they represent a coordinated strategy for building a more responsive talent pipeline from K–12 through workforce entry.

The following tables outline each Dana Center commitment in greater detail. Each table focuses on one skill type and summarizes the corresponding challenge, the Dana Center's commitment, and a best practice for the field.

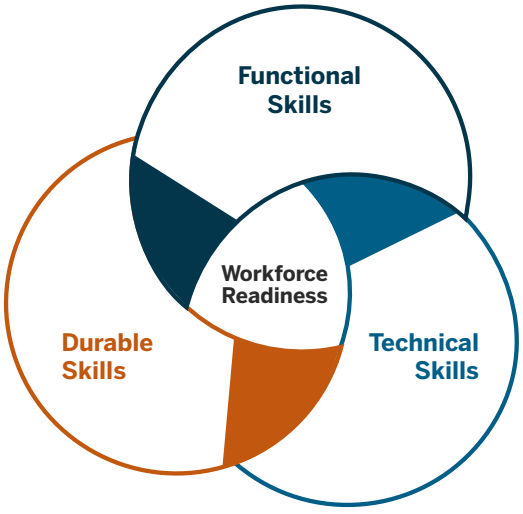
Commitment 1:	**Cross-Sector Collaboration for Technical Skills**
 **The Challenge**	The technical skills gap is a problem of supply and responsiveness. The K–16 pipeline loses capable students due to misaligned policies and curricula that focus on calculus over other quantitative disciplines. As a result, it cannot adapt quickly enough tow meet the economy's rapidly changing demand for specific, verifiable technical skills (Education Strategy Group & Charles A. Dana Center, 2025).
 **Dana Center Commitment**	The Dana Center convenes cross-sector collaborative groups that bring together educators, employers, workforce intermediaries, and policymakers. Drawing on the proven convening model of the **Launch Years Initiative**, each group's membership is tailored to specific goals: identifying high-priority sectors and regions, surfacing state and national policy change priorities, and ensuring that technical skill pathways remain aligned with evolving workforce needs.
 **Field Best Practice**	Education systems cannot keep pace with the labor market in isolation. Effective education-to-workforce alignment requires institutionalized, recurring cross-sector convenings—not one-time summits—that bring together educators, employers, HR technology firms, workforce intermediaries, and policymakers. These groups should be structured around specific skill dimensions and regional labor markets, and they should be empowered to inform pathway design, credential alignment, and policy priorities. Funders can accelerate this work by investing in the infrastructure for sustained convening—dedicated staff, data systems to track labor market shifts, and mechanisms for rapid pathway adjustment—rather than one-time program grants.

Commitment 2:	Scale Evidence-Based Pedagogy for Durable Skills and Workplace Readiness
 **The Challenge**	The durable skills gap and workplace readiness are problems of practice and pedagogy. The modern economy demands transferable, durable, and meta-skills—like navigating ambiguity and learning to learn. Students also need support to clarify their value to employers and to navigate the process of securing and advancing in a job. These skills need to be intentionally cultivated through pedagogical design, not treated as byproducts of instruction.
 **Dana Center Commitment**	The Dana Center develops curricular materials that intentionally integrate durable skill development across all grade levels. This includes providing professional development that equips educators to cultivate both technical and durable skills and helps make an explicit connection to careers—because teachers cannot teach what they have not been equipped to practice. The Dana Center's active, problem-based pedagogical model demonstrates that rigorous technical instruction, durable skills, and workplace readiness development are not competing priorities; they are mutually reinforcing.
 **Field Best Practice**	Durable skills are a core component of academic content, serving as the mechanism through which technical knowledge becomes productive over a career. Education organizations at every level should audit their instructional materials and professional development offerings to ask: Where are students getting sustained practice with ambiguity, feedback, collaboration, and self-directed learning? How will they prepare to secure a job? How will they advance their careers, moving from entry-level positions to positions of leadership? The answer cannot be "somewhere else" or "eventually." The onus is on education systems to prepare students to navigate the future. The ultimate meta-skill for the modern economy is the ability to learn rapidly—seeking feedback, conducting research, asking the right questions, engaging in repetition, and testing knowledge. This capacity must be cultivated starting in K–12 and reinforced through postsecondary. Funders and policymakers should prioritize professional development investments that help educators incorporate durable skills and workplace readiness development into technical instruction, rather than treating them as separate programs (World Economic Forum, 2023).

Commitment 3:	Industry-Informed Curriculum for Functional Skills
The Challenge	The functional skills gap is a problem of context. Graduates possess technical knowledge but lack experience applying it within specific professional domains, leading to the perception that they are not "workforce-ready."
Dana Center Commitment	The Dana Center includes industry and workforce representatives as co-authors and reviewers in curriculum development. This ensures that students are exposed to authentic professional contexts and learn not just technical knowledge but how to apply that knowledge within the diverse domains where it matters. This approach treats curriculum development as a shared responsibility between educators and employers, not a handoff from one to the other.
Field Best Practice	Curricula developed without industry input will always lag behind the workplace. Education organizations should establish formal, perpetual mechanisms—co-authorship agreements, industry review panels, and embedded project-based modules—that bring real workplace contexts into instructional materials before they reach students. Using real, anonymized data and problem scenarios from industry partners, these materials give students vital exposure to professional domains, shortening their "ramp-up" time once hired. Policymakers and funders should incentivize and require industry co-development as a standard of quality in publicly funded curricula, particularly within STEM pathways.

Investing in the Infrastructure That Makes All Other Investments Work

The central argument of this paper is that rigorous diagnosis must precede investment. The generic "skills gap" framing has persisted for four decades precisely because it is vague enough to accommodate every constituent's preferred solutions: more STEM degrees, more soft skills training, and more apprenticeships. Each of these interventions has merit, but without a shared diagnostic framework, they address symptoms rather than causes. The framework presented here—three skill types (technical, durable, and functional) and the workplace readiness dimension—offers something the field has lacked: a common language for distinguishing problems that require different actors, different timelines, and different kinds of investments.



In practice, this means recognizing three distinct skill types and the workplace readiness dimension, each requiring a targeted response. Technical skills gaps demand pipeline repair: removing misaligned prerequisites, aligning student learning outcomes at the course and credential level to actual job requirements, and building dynamic feedback loops between labor market data and pathway design. Durable skills gaps and workplace readiness call for pedagogical transformation—the intentional redesign of how and where students practice persistence, ambiguity, collaboration, professionalism, and the meta-skills capacity to keep learning throughout a career. Functional skills gaps require shared accountability between educators and employers, with industry co-designing the contexts in which technical knowledge is applied. Key constituents who can hold all four components of this framework simultaneously will make better decisions about where to direct resources, which partnerships to require, and how to evaluate whether interventions are working; these constituents include:

System Administrators

The immediate opportunity is to apply this framework as a diagnostic audit: examine your own pathways, curriculum, and professional development through the lens of these three skill types and the workplace readiness dimension and ask honestly where the gaps lie and who owns them.

Policymakers

The framework suggests new questions to ask of workforce and education programs—not just "How many people completed?" but "Which skill gap did this intervention actually address, and how do we know?"

Funders

The most leveraged investment is in the full journey, the pipeline from K–16 to workforce that determines whether students arrive at that last mile with the foundational capacity to benefit from it. The philanthropic and corporate worlds are already pouring billions into last-mile solutions that underperform precisely because the pipeline feeding them is fragmented and misaligned. Addressing that fragmentation is where the real leverage lies.

This work requires an organization that can operate across the entire system, from early mathematics through workforce transition. The Charles A. Dana Center is uniquely positioned to serve as the architect of this better-aligned pipeline. With deep expertise in mathematics pathways, a proven model for convening K–16 partners through its Launch Years Initiative, and research-grounded pedagogy that intentionally builds durable skills alongside technical content, the Dana Center brings something rare to this space: the ability to work across the full continuum, from early math instruction through postsecondary transition and into the workforce.

Partnerships with the Dana Center are investments in the coherence of the entire system, not just a single program or intervention. As the economy continues to shift faster than any single institution can track, that coherence is foundational—it is the precondition for everything else working.

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