**WHY**

Reading, writing, mathematical analysis, and scientific reasoning are all important skills for young people to practice and develop in order to form their future aspirations and improve the world they live in. However, academic skills are not enough and they do not develop in isolation. We know about others skills that serve as gatekeepers to academic success and personal growth. But what are the essential ingredients of these skills that transform the learner from vessel to innovator? How do these skills grow to make knowledge personally meaningfully and contributions personally fulfilling? Across sectors, professionals agree that skills, such as collaboration, creativity, communication, and self-direction, are essential for life-long learning, achievement, and personal and professional self-actualization.

Some may find these skills an intuitive part of learning while others may consider them to be abstract, foreign concepts. If we have identified and named these skills, why do they remain in the receded backdrop for the academic skills taking center stage? Perhaps, the mythology that these skills are innate to some and not to others has overwhelmed evidence to the contrary. Perhaps past interpretation of these skills has considered them fixed for individuals and not learnable. Perhaps, measurement and observation of these skills has always been considered untenable. Or perhaps, the field lacks a clear picture of how these skills do, in fact, grow over time, through practice and experience, and ongoing reflection and adaptation. This foundational gap could be at the heart of the why these skills remain sidelined in education.

What are the essential ingredients of these skills that transform the learner from vessel to innovator?

A review of current research and practice depicts an inconsistent, incomplete understanding. Even though most stakeholders agree that these skills are critical to learning at all levels, there is no consensus on how they develop, what this development looks like at different stages, and what practices lead to successful growth. Research conducted on existing models and theories turns up a dearth of descriptive detail of what these skills look like as they grow from early development to expertise over a long period of investment and effort. Early descriptions of skills and dispositions paved the way, raising awareness that knowledge is only as useful as students are able to draw on and apply it. Teachers, leaders, researchers, and policy makers recognize the need to build students’ skill sets and feel the urgency to do what they can, though unsure of how to make it happen.

Many current approaches attempt to engage learning environments by relying on rubrics or other assessment tools without clarifying what a specific skill entails, how it develops over time, or the types of opportunities, environments, and experiences required to practice and improve. In order to convey what lower developmental progressions of growth look like, many models rely on deficit-oriented language to describe the absence of certain behaviors that are evident at advanced levels. That approach limits how learners of all ages perceive nascent growth and undermines a mutual understanding of how to make adjustments and improve. It fails to recognize the necessity of exposure and experience that are vital for these skills to take shape; it encourages a fixed mindset for teachers and learners.

**WHAT**

In the current system of education we choose what is important for students to learn, then measure and judge how well they do. In some cases we identify what they are good at and what they are not, what they should or shouldn’t do, what they can or can’t become, directing each student to the professional or personal goals we deem him or her to be capable of meeting. Alternatively, we try to prepare students to be capable at everything with the assumption that upon graduation they are ready for anything they choose to pursue. In both cases, *we* prioritize where resources go, including the time commitments of not only educators but students as well.

With each student we have an opportunity to support his or her development for over a decade. Should we spend 12+ years directing what they do and where they gain their experience, only to send them out into a world that demands they self-direct responsibly, collaborate flexibly, and problem-solve creatively? Is that time better spent helping students develop their ability to think on their feet, know what they want and how to get it, be strategic about their time, and enjoy learning for its own sake? If students can experience how to engage the resources around them in pursuit of their unique path before they leave a system of support, they may be able to transfer these skills and strategies into their own post-secondary success.

The following pages offer a new approach to understanding these skills. They provide aerial views of complex skill development as the starting point, unpacking each skill into definitional components and illustrative markers of growth. The enclosed frameworks describe the makers, thinkers, and doers learning in our classrooms as they travel along a journey toward expertise. These theoretical *skill-progressions* bridge general insights about expertise to specific processes of individual skills. Each framework serves as an invitation. Experts across subject areas and disciplines can situate the skill within experiences and demands, specific to a specific domain. Expert educators can engage in systematic action research to construct and test the learning progressions, experiment with environmental factors, and create new approaches to assess student growth.

Each framework serves as an invitation.

To answer the clarion call for a robust foundational understanding, the development of these frameworks builds off of existing models and establishes a new pathway and approach. As the educational field begins to recognize the importance of metacognition and reflective thinking more broadly, these skills deserve the same treatment. To bind learning to the person and the person to the world around them, these skills require ongoing reflection and engagement to emerge and flourish. By venturing to define the complex dimensions of these skills in relevant and visible terms, these definitional frameworks risk over-simplification and misuse. This risk has always been present in the educational field and will remain at every level of teaching and learning. Just as the skills represented in these frameworks require reflection and negotiation, the work to understand these skills deeper and apply this understanding to practice requires risk-taking self-awareness at every step along the way.

**HOW**

The development of theses skill frameworks targeted research, theories, and models that deconstructed each skill into components and processes for different contexts, populations, and purposes. This work emphasized models that illuminated the development of these skills over time. The research analysis honed in on the component parts of each skill and outlined these components on four levels of development, from beginner to emerging expert. The research articulated reflective thinking strategies evident in all four skills that depend on awareness of strengths, interests, challenges, and engagement. These behaviors are pivotal to optimize effort and recognize insights. The following research-based principles defined the development of these frameworks:

* Some talents and abilities viewed as inherent and fixed can be cultivated as fluid, malleable skills but require a growth-oriented mindset to do so;
* Skill development is a product of strategic experience and exposure, with noticeable behaviors marking degrees of expertise;
* Performance and development in skill areas over time depend on specific contexts, disciplines, and the depth and breadth of experience and modeling. Expertise in a skill may be apparent in one context but require a beginner approach in situations with little prior exposure.
* Metacognition, or thinking about thinking, plays a crucial role in skill development and helps distinguish behaviors between the different progression levels of growth, ranging from beginner to expert.
* Demonstrations of a skill occur *intrapersonally* within the individual’s thinking, emotions, and imagination. Other demonstrations exist *interpersonally* between an individual and others in the world around them.

The components each build from a beginner level and develop towards the emerging expert level that some students may approach when they move on to college and careers or possibly even earlier. To illustrate this progression, these frameworks rely on theories generalized across skills as well as specific descriptions for each skill. To bridge these different levels of precision, the frameworks focus on each skill independently but remain general across subject area, discipline, and context. For that reason, they require further interpretation and elaboration to support the particulars of different tasks, settings, age levels, and needs.

The development of these frameworks did not rely solely on prior examples and research. The developers incorporated practitioner feedback at two key stages of development. Early discussions with an Implementation Advisory Board of state and district level education leaders informed the approach to deconstruct each skill into components. This feedback emphasized the need to highlight individual focused behaviors as well as context-driven, interpersonal actions. In addition, a Teacher Advisory Group of K-12 teachers and school leaders, representing four states examined the frameworks closely during production. They drew on their content area and pedagogical expertise as well as their intimate knowledge of different student populations to steer the development, language, and organization of the frameworks.

**NOVICE-To-EXPERT**

Nearly all people, including experts, perform at different levels across all tasks within a domain (Klein & Hoffman, 1992). Experts are defined by their use of intuition to address a wider range of tasks, while others with less experience rely on analysis or rules. This general rule applies to many disciplines and subject areas and often stimulates the innovative contributions that experts make to their field.

For the *Beginner* level of each skill to be a meaningful target, an individual needs foundational skills, exposure, mindset, and self-control. For this reason, the *Beginner* level is designed as a target for early development not the starting point for growth. For learners, at any age, who have had less experience and modeling or who naturally develop slower the *Beginner* level may seem less accessible. Still, it can serve as a target to work towards and define the experiences that will help a learner get there.

The skill progressions in these frameworks reflect markers in behavior that develop through thousands of hours learning explicit rules, discovering implicit boundaries, and discerning patterns and strategies through analysis. All of this exposure leads toward the ability to act intuitively based on accumulated experiences and knowledge in and across domains. For these reasons, the frameworks cannot and are not intended to describe growth within a single grade level. Notably, at any point in life, individuals are introduced to unfamiliar tasks in unfamiliar domains that require beginner behaviors to engage. Similarly, as students become more aware of their interests and long-term professional and life goals, their choices to specialize in a certain area will likely require prioritizing time away from other areas in order to develop expertise. The goal is not necessarily to develop all of a student’s skills to expert levels, but rather to help students understand where they are in their development and what steps they can take to keeping growing.



**CONTEXT**

Learning is a complex blend of personal, contextual, and social ingredients. Like other learning skills, collaboration, creativity, communication, and self-direction develop in specific contexts of the workplace, the classroom, and unique home and community environments. These skills build from a structure of knowledge and prior experience unique to each learner. By design every learning context either draws on and enhances these individual assets or suppresses and stifles them. Together, the learner and the environment shape the contextual factors that impact the development and application of these skills.

Early in their development, these skills may not transfer across contexts easily. For instance, a student’s collaborative skill may shine on the basketball court but struggle to surface during a group project in class. Often, this disconnect is directly related to the learner’s familiarity with a new context and their opportunity to observe, learn, and reflect on different applications of the skill. With practice, feedback, mistakes, and successes, eventually, these skills become intuitive so that a learner can effortlessly transfer from one domain to another.

To progress towards this level of familiarity and ease, learners must work hard; they must fail until they succeed. Making this investment requires durable, intrinsic motivation. A learners’ motivation to take risks, move beyond their comfort zone, and apply these skills in new ways depends largely on the encouragement they receive. The consequences for mistakes and failure present a powerful factor often dictated for learners by external, institutional forces. When these extrinsic consequences overpower intrinsic motivation, a learner misses out on the experience of positive failure—a pivotal step to learn and grow.

Common contextual factors emerge across the four skills unpacked in these frameworks. For parents, practitioners, educational leaders, and policymakers seeking to integrate these skills into teaching and learning, these factors require deliberate consideration.

* The design and implementation of ***learning tasks and assessments*** set the stage for how students approach their learning, monitor their progress, make choices, and relate their learning to past experiences and knowledge.
* The ***norms and environment*** reinforce the implicit and explicit rules and assumptions that determine acceptable behavior, govern teacher-to-learner and peer-to-peer relationships, dictate the level of learner autonomy and sources of motivation, and design the physical space to encourage certain behaviors.
* ***Teaching and learning technology*** provides the technical and instructional resources to make engaging, investigative learning experiences universally accessible for learners. This factor influences the relevance of learning, the opportunities to transfer skills across contexts, and the capacity to allow multiple means of representation.
* The factor of ***community and culture***incorporates the immediate interactions and attitudes that undergird an educational setting. This factor includes the unique community, family, social network, and cultural roots that every educator and learner brings to their teaching and learning. Contextual to the development of these skills, community and culture determines how equitably the three other factors support meaningful connections for all learners.

**How do these contextual factors relate to each of the four skills?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Learning Tasks & Assessments* | *Norms & Environment* | *Teaching & Learning Technology* | *Community & Culture*  |
| *Collaboration* | Complexity and structure of assignmentsEqual opportunity to participateEvaluation of individual contributions vs. group outcomesRequired interdependence | Interaction and behavioral expectationsDidactic instruction vs. student-centered tasksClassroom layoutRecognition and acceptance of individual differences | Equitable access to and familiarity with learning technologiesUse of technical tools to connect with other virtually and to enable transfer between domains | Acknowledgement of cultural and gender differences that govern roles and group dynamicsInclusion of input from members external to the school |
| *Creativity* | Learner choice and learner-centered tasksPreset outcomes vs. multiple optionsInquiry-oriented vs. memorization and analysis onlyNon-judgmental feedback to ideas | Tolerance for failure and diversion from rules and normsQuestioning assumptionsAuthentic problems to solve that are meaningful to students | Access to multimedia toolsAccess to stimulating examples and ideasMultiple means of representing ideas and knowledgeAccess to hands on materials  | Inclusion of multiple perspectivesDifferent cultural values and interpretationsValue placed on how ideas can impact othersCulturally-specific definitions of what is creative and new |
| *Communication* | Encouragement to convey and elaborate meaning using multiple modesSupports for how to use and interpret different communication conventions and technical terms | Code-switching between colloquial, cultural and academic vernacular Modeled effective feedback and use of body language in speaking and listeningMutual respect | Access to diverse sources of informationTechnical tools to express ideas through different modes and channelsReal-world venues to challenge learner to apply skills | Understanding of context-appropriate communication Opportunities to learn and apply non-dominant languages and cultural communication conventions |
| *Self-Direction* | Learner choice and learner-centered tasksScaffolded learning to approach complex tasksOngoing constructive feedback on learner’s progressEncouragement to pose questions | Environment that supports self-efficacy, intrinsic motivation, and learner autonomyMutual respect and trust between learners and educatorsReciprocal feedback between learners and educators | Organizing tools that support management of specific tasksMeans for goal-setting and self-monitoring Resource ease and availability that supports learner independence | Skill is modeled in real-world context by community members in different contextsFlexibility for learners to interpret the tasks to fit their interestsPerception of how skills and knowledge relate to student’s future |

**EXPLORE & REFLECT**

Upon reading, absorbing, and challenging the following frameworks, consider how the development of these skills relate to the educational policy and practice that dictates the learning experiences and growth of learners across grade levels. The following questions can serve as a compass to engage and explore these skills specific to your own environment and contextual factors.

* How does the growth progression of these skills bump up against your existing assumptions and definitions?
* What’s new and exciting that you can bring to your work immediately?
* What do you think will be most challenging?
* How can you model these skills as an educator and colleague?