Sciences of learning and development: Some thoughts from the learning sciences

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ABSTRACT
This commentary extends and amplifies aspects of the Cantor, Osher, Berg, Steyer and Rose (2018) discussion about what we know about the nature of learning and its implications for how we educate students across the span from early childhood through advanced levels of formal education. The paper’s overall goal is to offer some guidance and clarification about how aspects of the Cantor et al. (2018) powerful vision of optimal and equitable development might be attained based on a view of what we mean by learning, the types of learning that matter, and ways to design environments for learning and development that allow all children to realize their potential. Three major topics are covered. The first concerns evolution of theories of learning as they relate to theories of development and the connection between the two. Emphasis is given to the power that comes from adopting a sociocultural perspective on the nature of learning and development. The second topic is a consideration of current targets of learning and development, including so-called 21st century competencies and deep disciplinary learning. Emphasis is given to the cognitive, intrapersonal and interpersonal competency domains that integrate cognitive, affective, social and emotional processes. The third topic focuses on a set of research-based principles that can be used to design and implement powerful and equitable learning environments that align with sociocultural theories and learning and development while integrating the three major domains of competency.

The combined articles by Cantor, Osher, Berg, Steyer and Rose (2018) and Osher, Cantor, Berg, Steyer and Rose (2018) represent an extraordinary synthesis of research and theory from multiple disciplines concerned with understanding and promoting human development and learning. As such, they constitute an important compilation of key ideas from the sciences of learning and development along with implications for understanding and promoting the healthy development of all individuals, especially those most at risk, and achieving equity. As stated in Cantor et al. (2018), “This scientific understanding of development opens pathways for new, creative approaches that have the potential to solve seemingly intractable learning and social problems.” I am in complete concurrence with this proposition given their exposition of what we now know and understand regarding the complexity and integrated nature of human development.

One of the key ideas that runs throughout this synthesis is an epigenetic view of development “as an ongoing, constructive enterprise between the individual and multiple biological, psychological, and sociocultural systems and agents over time.” (Cantor et al., 2018) Situating the understanding of development within a developmental systems theory framework allows us to consider various aspects of development, at multiple levels, and their interaction and integration. The Cantor et al. (2018) synthesis plays out this theme across multiple topic areas, one of which is labeled The Science of Learning. As a learning scientist, it is here that I want to focus my remarks, hopefully adding to the important points highlighted by Cantor et al. (2018) in that major section of their article. My goal is to extend and amplify aspects of their discussion regarding what we know about the nature of learning and its many implications for how we educate students across the span from early childhood through advanced levels of formal education.

One of the most important “contexts” for development, where complex interactions between individuals unfold on timescales that range from minutes to days to months to years, is the process of formal education and the societal creation we call school. Much of what can be both a positive and negative driver of development occurs in this context where individuals interact...
with multiple reference groups including peers, older and younger youth, and adults fulfilling various roles. In the brief sections that follow my goal is to consider some of what we know about learning and instruction. There are three topics of discussion, the first of which focuses on the evolution of theories of learning as they relate to theories of development and the connection between the two. The second topic is a consideration of current targets of learning and development, including so-called twenty-first century competencies and deep disciplinary learning. The third topic is concerned with principles for the design of powerful and equitable environments for learning and development.

**Evolution of theories of learning**

Cantor et al. (2018) discuss the evolution of theories of development and it should come as no surprise that coincident to the evolution of developmental theory there has been a corresponding evolution of theory and research on the nature of learning. This includes general theories regarding the nature of human learning and development as well as particularized, discipline-specific models of learning in practice (see, e.g., Bransford, Brown, Cocking, Donovan & Pellegrino, 2000; Pellegrino, Chudowsky, & Glaser, 2001). Various reference sources have identified “grand theories” that include the behaviorist, cognitive, and sociocultural framing of learning. Each of these grand theories makes quite different assumptions about the nature of knowledge, about the means for coming to know, and about the nature and role of interest, engagement, and motivation in learning. As a consequence, these theories also offer quite different conceptualizations of curriculum, effective instructional practices, and related forms of assessment, as well as how these are coordinated in the design of powerful and equitable learning environments.

The behaviorist perspective holds that learning occurs through the accumulation of stimulus-response associations, which can be reinforced by the administration of external rewards and punishments. Much has been written about the influence of behaviorism on the history of curriculum, instruction and assessment, the main concerns being its tendency to decontextualize and decompose content learning into tiny bits, its reliance on extrinsic motivation, and its inattention to thinking and reasoning processes. Cognitive theories, in fact, provided an answer to behaviorism by focusing on learning as a process of sense-making, that is, how individuals develop knowledge structures, construct mental representations, and in turn access these resources to answer questions, solve problems and develop new understandings. A limitation of cognitive theories is that they focus only on what goes on inside the head of the individual learner. Like behaviorist theories, cognitive theories treat social interactions as contexts for learning, and not as helping to constitute what individuals are able to know, do, and become. They also ignore the wider historical and cultural contexts in which these interactions take place and that shape what kinds of knowledge are judged worthy of knowing or assessing.

The sociocultural perspective emerged in response to the perception that research and theory within the cognitive perspective was too narrowly focused on individual thinking and learning. In the sociocultural perspective, learning takes place as individuals participate in the practices of a community, using the tools, language and other cultural artefacts of the community. From this perspective, learning is “situated” within, and emerges from, the practices in different settings and communities. A community may be large or small and may be located inside or outside of a traditional school context. It might range, for example, from colleagues in a company’s Information Technology department to a single elementary school classroom or a global society of plant biologists.

It has been argued that sociocultural theories are the more compelling general theories needed to understand and design coherent curriculum, instruction, assessment, and teacher professional development. This is not to say that all aspects of prior theories are to be discarded. Reinforcement theory from behaviorism, for example, still works for some behavioral change efforts, and the concept of cognitive structures can still be used to think about how individuals make sense of new information. However, these theories are insufficient by themselves to explain how human beings become more adept at thinking and doing. For this reason, more up-to-date and authoritative summaries of research in the learning sciences recognize the extent to which cultural practices and intrapersonal and interpersonal dimensions of learning are completely entwined with cognitive development (see, e.g., Pellegrino & Hilton, 2012). Thus, social models of learning are to be preferred because they provide a more complete account of how meanings, purpose, values, and motivation are jointly developed as part of deeper learning.

**Sociocultural learning theory: Significance of participation and identity**

All learning is fundamentally social, involving the individual’s use of shared language, tools, norms and practices in interaction with his or her social context. It is not that behaviorism does not work by rewarding
or “incentivizing” desired behaviors, but stimulus-response associations have not been found to lead to deeper understandings, complex reasoning, or knowledge beyond initial training contexts. The sense-making focus of cognitive models is still a valued aspect of contemporary learning theory; but cognitive theory is limited to the extent that it considers only what goes on in the mind of individuals and requires separate theories of motivation to explain effort and investment in learning. Cognitivists have previously recognized social influences on learning, but sociocultural theory goes further in acknowledging how it is that one’s cognitive development and social identity are jointly constituted through participation in multiple social worlds of family, community, and school.

Following many other contemporary interpreters of Vygotsky’s work (1978), we have come to view learning as the transformation of participation in valued sociocultural activities that are themselves changing (Holland & Lave, 2009; Lave, 1993b; Lave & Wenger, 1991; Rogoff, Baker-Sennett, Lumaca, & Goldsmith, 1995; Rogoff et al., 2007; Rogoff, Paradise, Arauz, Correa-Chavez, & Angelillo, 2003). Participation in sociocultural activity necessarily involves more than simply acquiring knowledge; it involves processes of identification that, in turn, present opportunities for participants to become certain kinds of people in activity (Lave, 1993a; Lave & Wenger, 1991). This more encompassing view of learning became possible when anthropologists and sociologists joined cognitivists and developmental psychologists and importantly began to study learning in contexts outside of school. In real world settings, so-called cognitive learning and identity development are inextricably connected. Street vendors (Saxe, 1988) and basketball players (Nasir, 2000), for example, develop repertoires of practice and a sense of who they are as members of their community that are inextricably tied up with their knowledge of mathematics called upon in each setting. In this way, engaging in purposeful activity leads to one’s increasingly proficient contributions to a community of practice without having to be separately or artificially induced.

Sociocultural theory offers a powerful, integrative account of how motivational aspects of learning—such as self-regulation, self-efficacy, sense of belonging, and identity—are completely entwined with cognitive development. Unlike the social psychological and developmental psychology literatures, where each of these variables and related interventions have been studied separately, sociocultural theory helps us see how knowledge and self-beliefs are jointly developed in communities of practice, and correspondingly how sense of self and meaningful participation may be harmed in unsupportive learning environments where children may be positioned as unable or deficient learners.

Sociocultural approaches make it possible to design for equity in educational settings by attending both to who learners are when they join a community and who they might become. That is, they consider what is at stake for learners when they invest in developing new knowledge or skill in practice in a particular context. Countless studies have documented the lack of learning that occurs when students are treated as deficient or when members of non-dominant communities by race, language, or gender identity are asked to park their identities at the door to join the mainstream school or college culture. In contrast, sociocultural approaches such as funds of knowledge (Moll, Amanti, Neff, & Gonzalez, 1992) and cultural modeling (Lee, 1995) pay attention to students’ everyday practices and find ways to connect “varied repertoires of practice” with academic disciplinary practices (Nasir, Rosebery, Warren, & Lee, 2014).

Going forward, providing young people with the broad access to valued sociocultural activities is a key condition for new learning. A major challenge, however, is that Western societies purposefully segregate children from the mature activities of their communities by placing them in schools during work hours (Cole, 2010; Rogoff, 2003). School learning, as a consequence, becomes “encapsulated” or separated from other meaningful activities and subservient to larger societal goals of certifying the accomplishment of some (but not all) learners (Engeström, 1991). Rendering school learning meaningful and engaging for students requires strategies for breaking down the barriers between school activities and mature sociocultural activities, for making visible, accessible, and personally relevant the knowledge, skills, and practices of those mature activities. It makes the learning that can go on in school more meaningful and purposeful.

Such a perspective has important implications for how academic disciplines are taught in school. From the sociocultural perspective, the disciplines are distinct communities that engage in shared practices of ongoing knowledge creation, understanding and revision. It is now widely recognised that science is both a body of established knowledge and a social process through which individual scientists and communities of scientists continually create, revise, and elaborate scientific theories and ideas (National Research Council, 2007, 2012).

The idea that each discipline is a community with its own culture, language, tools, and modes of discourse, has influenced teaching and learning. For example, Moje (2008) has called for re-
conceptualising high school literacy instruction to develop disciplinary literacy programmes, based on research into what it means to write and read in mathematics, history and science and what constitutes knowledge in these subjects. Moje (2008) argues that students’ understanding of how knowledge is produced in the subject areas is more important than the knowledge itself. These ideas have been extended and amplified in more recent work by Goldman et al. (2016) with respect to the nature and development of disciplinary literacies, including features of the learning environment that promote and sustain deep disciplinary learning.

It is also important to recognize that sociocultural perspectives are reflected in recent disciplinary frameworks and standards for primary and secondary education. These conceptions go well beyond the framing of disciplinary learning and instruction found in the writings of the National Math Panel or the National Reading Panel discussed as content examples in Cantor et al. (2018). For example, the NRC Framework for primary and secondary Science Education (NRC, 2012) calls for integrated development of science practices, crosscutting concepts and core ideas. The Common Core State Standards in English language arts (Common Core State Standards Initiative, 2010a) reflect an integrated view of reading, writing, speaking/listening, and language and also respond to call from Moje’s (2008) and Goldman et al. (2016) for disciplinary literacy by providing separate English language arts standards for areas such a literature, history and science. Based on the view of each discipline as a community engaged in ongoing discourse and knowledge creation, the science framework and the standards in mathematics and English language arts include expectations for learning and development of interpersonal and intrapersonal knowledge and skills along with cognitive knowledge and skills.

It should be apparent that current theory and research on the nature of learning view it as a deeply sociocultural activity that has considerable overlap with the conceptions of development discussed in Cantor et al. (2018) and the multiple factors impacting development and learning. As stated in Cantor et al. (2018), “The web metaphor supports thinking about skill construction as an active process between multiple agents, with the results skills and behaviour ultimately joint products of the child and the resources and relationships that comprise his or her context.” In the next section we briefly consider some of the contemporary discussion of the nature of the knowledge and skills that are the targeted “end products” of the process of formal schooling.

The targets of learning and development: Multiple domains of competency

Many countries have long recognised that investments in public education can contribute to the common good (namely by enhancing national prosperity and supporting stable families, neighbourhoods and communities). Likewise, current economic, environmental and social challenges illustrate that education is even more critical today than it has been in the past. Today’s children can only meet future challenges if they have opportunities to prepare for their future roles as citizens, employees, managers, parents, volunteers and entrepreneurs. Business leaders, educational organisations and researchers have begun to call for new education policies that target the development of broad, transferable skills and knowledge, often referred to as “deeper learning” and/or “21st century skills” (e.g., see Bellanca, 2014).

As a way to conceptualise and organise the various terms related to deeper learning and 21st century skills and provide a starting point for considering empirical evidence as to their meaning and value, the NRC Report Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century (Pellegrino & Hilton, 2012) identified three broad domains of competence: Cognitive, Intrapersonal and Interpersonal. Recognising areas of overlap between and among the skills and skill clusters within each domain, the report developed the following initial classification scheme (see Chapter 2 of Pellegrino & Hilton, 2012 for additional details of the elements within each cluster):

- The Cognitive Domain includes three clusters of competencies: cognitive processes and strategies; knowledge; and creativity. These clusters include skills such as critical thinking, reasoning and argumentation, and innovation.
- The Intrapersonal Domain includes three clusters of competencies: intellectual openness; work ethic and conscientiousness; and self-regulation. These clusters include skills such as flexibility, initiative, appreciation for diversity and metacognition.
- The Interpersonal Domain includes two clusters of competencies: teamwork and collaboration; and leadership. These clusters include skills such as cooperation and communication, conflict resolution and negotiation.

These three domains represent distinct facets of human learning and development and build on previous efforts to identify and organise dimensions of human behaviour. For example, Bloom’s (1956) taxonomy of learning objectives included three broad domains: cognitive, affective and psychomotor. Following Bloom, the cognitive domain is viewed as involving thinking
and related abilities, such as reasoning, problem solving and memory. The intrapersonal domain, like Bloom’s affective domain, involves emotions and feelings and includes self-regulation—the ability to manage one’s emotions and set and achieve one’s goals (Hoyle & Davison, 2011). The interpersonal domain, however, is not included in Bloom’s taxonomy. Distinctions among the three domains are also reflected in how they are delineated, studied, and measured. In the cognitive domain, knowledge and skills are typically measured with tests of general cognitive ability or with more specific tests focusing on school subjects or work-related content. Research on interpersonal and intrapersonal competencies often uses measures of broad personality traits or of child temperament. Psychiatrists and clinical psychologists studying mental disorders use various measures to understand the negative dimensions of the interpersonal and intrapersonal domains (Almlund, Duckworth, Heckman, & Kautz, 2011).

Although the three domains are differentiated for the purpose of understanding and organizing twenty-first century skills, it is recognized that they are intertwined in human development and learning. Research on teaching and learning has begun to illuminate how interpersonal and intrapersonal skills support learning of academic content (e.g., Pellegrino & Hilton, 2012) and how to develop these valuable supporting skills (e.g., Yeager & Walton, 2011). For example, we now know that learning is enhanced by the intrapersonal skills used to reflect on one’s learning and adjust learning strategies accordingly—the process called “metacognition” (Hoyle & Davison, 2011; Pellegrino et al., 2001) and discussed in Cantor et al. (2018). At the same time, research has shown that development of cognitive skills, such as the ability to stop and think objectively regarding a disagreement with another person, can increase positive interpersonal skills and reduce anti-social behavior (Durlak, Dymnicki, Taylor, Weissberg, & Schellinger, 2011). The interpersonal skill of effective communication is supported by the cognitive skills used to process and interpret complex verbal and nonverbal messages and formulate and express appropriate responses (Bedwell, Salas, & Fiore, 2011).

In many respects, the foregoing use of “competencies” reflects terminology used in an international project to identify key competencies required for life and work in the current era where a competency is defined as:

more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on and mobilising psychosocial resources (including skills and attitudes) in a particular context. For example, the ability to communicate effectively is a competency that may draw on an individual’s knowledge of language, practical IT skills, and attitudes towards those with whom he or she is communicating (OECD, 2005, p. 4).

Although research on how these twenty-first century competencies are related to desired outcomes in education, work, and other areas of life has been limited, there are some promising findings. Cognitive competencies, which have been the most extensively studied, show consistent, positive correlations of modest size with students’ achieving higher levels of education, higher earnings and better health. Among intrapersonal competencies, conscientiousness, which includes such characteristics as being organized, responsible, and hard-working, shows the strongest relationship with the same desirable outcomes. Conversely, antisocial behavior, which reflects deficits in both intrapersonal skills (such as self-regulation) and interpersonal skills (such as communication) is related to poorer outcomes. More research is needed to increase our understanding of relationships between particular twenty-first century competencies and desired adult outcomes and, especially, to look at whether the competencies are causing the desired outcomes rather than simply correlated with them.

Three important themes can be seen in the recent attempts to specify a more broad-based conception of the targets for learning and development and their relationship to education and the design of learning environments that support development of such competencies. First, as discussed in Cantor et al. (2018), we have moved toward a more integrated conception of healthy and productive human development that integrates affective, cognitive, social, and emotional processes and competencies. This is also consistent with a sociocultural view of learning and development as discussed in the prior section. Second, rather than thinking about the goals of education as strictly fostering development of cognitive competencies, including deep disciplinary learning and knowledge, we are coming to understand that the productive development of such competencies is intertwined with and supported by the development of competencies in the intrapersonal and interpersonal domains. Third, we are now recognizing the need to consciously and deliberately design learning environments that foster the co-development of all three domains of competency. Some of the research-based principles for doing so are briefly highlighted in the next section.

**Design of powerful and equitable learning environments: Teaching for transfer**

The broad call for deeper learning and twenty-first century skills reflects a long-standing issue in education
and training: the difficult task of equipping individuals with transferable knowledge and skills. The link between deeper learning and twenty-first century competencies lies in the classic concept of transfer, that is, the ability to use prior learning to support new learning or problem solving in culturally relevant contexts. We can define deeper learning not as a product, but rather as the process through which transferable knowledge (i.e., twenty-first century competencies) develops (Pellegrino & Hilton, 2012). Through deeper learning, individuals not only develop expertise in a particular discipline, they also understand when, how and why to apply what they know. They recognize when new problems or situations are related to what they have previously learned, and they can apply their knowledge and skills to solve them.

Along with this comes the challenge of creating learning environments that support deeper learning and development of the cognitive, interpersonal and intrapersonal competencies that enable learners to transfer what they have learned to new situations and new problems. How can teachers aid students’ deeper learning of subject matter and promote transfer? Addressing this seemingly simple question has been a central task of researchers for more than a century, and in the past several decades they have made progress toward evidence-based answers. Applying the instructional principles below will aid students’ deeper learning of subject-matter content in any discipline. Because deeper learning takes time and repeated practice, instruction aligned with these principles should begin in preschool and continue across all levels of learning, from kindergarten through college and beyond. Teaching in these ways will make it more likely that students will come to understand the general principles underlying the specific content they are learning and be able to transfer their knowledge to solve new problems in the same subject area. These principles and practices are based largely on research in the cognitive domain but evidence suggests that they are applicable with respect to the interpersonal and interpersonal competency domains and their integration. Several of the principles discussed in the following sections align with the discussion of instruction in Cantor et al. (2018).

**Use multiple and varied representations of concepts and tasks**

Doing so helps students understand how different representations of the same concept are mapped or related to one another. Research has shown that adding diagrams to a text or adding animation to a narration that describes how a mechanical or biological system works can increase students’ performance on a subsequent problem-solving transfer test. In addition, allowing students to use concrete objects to represent arithmetic procedures has been shown to increase their performance on transfer tests.

**Encourage elaboration, questioning, and self-explanation**

The techniques of elaboration, questioning, and self-explanation require students to actively engage with the material, which is going beyond memorizing to processing the content in their own words. Some specific techniques that have been shown to aid deeper learning include:

- prompting students who are reading a text to explain the material to themselves aloud, in their own words, as they read;
- asking students certain questions about material they have just read or been taught, such as why, how, what if, what if not, and so what;
- using teaching practices that establish classroom norms of students’ questioning each other and justifying their answers;
- asking learners to summarize what they have learned in writing; and
- having students test themselves without external feedback, for example, by asking themselves questions about material they have just read.

**Engage learners in challenging tasks, with supportive guidance and feedback**

Over 40 years of research has shown that asking students to solve challenging problems in science and other disciplines without appropriate guidance and support is ineffective at promoting deeper learning. In contrast, asking students to solve challenging problems while providing specific cognitive guidance along the way does promote deeper learning. For example, there is no compelling evidence that beginners deeply learn science concepts or processes simply by freely exploring a science simulation or game, but if they receive guidance in the form of advice, feedback, and prompts—for example, completing part of the task for the learner—they are more likely to learn the content deeply.

**Teach with examples and cases**

Using examples and cases can help students see how a general principle or method is relevant to a variety of situations and problems. One approach is a worked-out example, in which a teacher models how to carry out a
procedure—for example, solving probability problems—while explaining it step by step. Offering worked-out examples to students as they begin to learn a new procedural skill can help them develop deeper understanding of the skill. In particular, deeper learning is facilitated when the problem is broken down into conceptually meaningful steps that are clearly explained; the explanations are gradually taken away with increasing practice.

**Prime student motivation**

Another way to promote deeper learning is to prime students’ motivation so that they are willing to exert the effort to learn. Research shows that students learn more deeply when they:
- attribute their performance to effort rather than to ability;
- have the goal of mastering the material rather than the goal of performing well or not performing poorly;
- expect to succeed on a learning task and value the learning task;
- believe they are capable of achieving the task at hand;
- believe that intelligence is changeable rather than fixed; and
- are interested in the task.

There is promising evidence that these kinds of motivational approaches can be fostered in learners through such techniques as peer modeling. For example, elementary school students showed increased self-confidence (and intrapersonal competency) for solving subtraction problems and increased test performance after watching a peer demonstrate how to solve subtraction problems while exhibiting high self-efficacy (such as saying “I can do that one” or “I like doing these”).

**Use formative assessment**

Formative assessment is a process that is used throughout learning to monitor students’ progress and adjust instruction when needed, in order to continually improve student learning. It is different from traditional “summative” assessment, which focuses on measuring what a student has learned at the end of a set period of time. Deeper learning is enhanced when formative assessment is used to:
- make learning goals clear to students;
- continuously monitor, provide feedback, and respond to students’ learning progress; and
- involve students in peer- and self-assessment.

These uses of formative assessment are grounded in the research demonstrating that practice is essential for deeper learning and skill development, while practice without feedback yields little learning. Formative assessment involves a change in instructional practice: It is not a regular part of most teachers’ practice, and teachers’ pedagogical content knowledge may be an impediment to its realization (Heritage, Kim, Vendlinski, & Herman, 2009; Herman, Osmundson, & Silver, 2010).

The principles and practices described in the previous section can be used to design and implement powerful learning environments that are aligned with sociocultural theories and learning and development. The difficult part of doing so is a careful and thoughtful integration of activities that take into account development of all three of the broad domains of competency, cognitive, intrapersonal, and interpersonal, is serious about disciplinary knowledge and the trajectories of learning, and attends to the diverse needs of individual learners. While we are a ways away from designing and enacting such learning environments in typical schools and classrooms, we are not without good examples in multiple disciplinary domains from which we can learn (see Pellegrino & Hilton, 2012).

**Concluding comments**

In concluding their article, Cantor et al. (2018) state the following when considering the implications of a systems approach to development and their synthesis of key findings relative to the context of schooling.

Specifically, in schools, when consideration is given to the key drivers of positive developmental and learning outcomes — including attuned relational supports, buffering of stress; intentional sequenced development of integrated habits, skills, and mindsets; rigorous, mastery-oriented pedagogy; and culturally responsive instructional and curricular design—the developmental range, performance, success, and ultimately potential of all children can be optimized.

This is a truly aspirational view of what can come about through application of principles derived from theory and research from the sciences of learning and development. Hopefully, the present discussion offers some guidance and clarification about how certain aspects of that vision might be attained based on a view from the learning sciences of what we mean by learning, the types of learning that matter, and ways to design environments for learning and development that allow all children to realize their potential. It is worth reminding ourselves that more coherent systems of curriculum, instruction, and assessment, guided by contemporary theory and research on learning and development, could potentially reduce disparities in educational
opportunity and attainment. Doing so would allow a broader swathe of young people to enjoy the fruits of workplace success, improved health, and greater civic participation.

References


