The Future of Learning and the Future of Assessment

Richard F. Elmore
Harvard University

Abstract

**Purpose:** The aim of this article is to point out that assessment should serve as useful information about the development of learners’ capabilities, but not define, measure, evaluate, and confer “merit.”

**Design/Approach/Methods:** By arguing the current assessments are institutionalized which have deeply embedded social, cultural, and political purposes and ignoring learning at the individual or collective level, this article redefines learning, schooling, and assessment. Learning should be embodied, highly individualized, highly contextual, and lifelong, so schooling and assessment should support such learning form rather than perform attainment, custody, and control. Neurological basis of learning in human beings supports the new definition.

**Findings:** Assessment should provide valuable information to guide, give feedback, and support the dynamic feature of learning. Future assessment is a tool to reflect how learners judge their learning, how they develop as a learning organism, and how they have the ability to develop agency and control over learning.

**Originality/Value:** This article gives learning, schooling, and assessment new definitions combining the current situation and neurological evidence. It would be a thorough and novel guideline for the designing of future assessment.

**Corresponding author:**
Richard F. Elmore, Graduate School of Education, Harvard University, Cambridge, MA, USA.
Email: richard_elmore@gse.harvard.edu
Assessment as an artifact of institutional interests

Educational assessment is a product of the culture and structure of educational institutions and the societies that surround them. Assessments define attributes that are assumed to have value for society at large—the ability to remember things that one has (presumably) been taught, procedural and logical fluency, academic literacy, cultural references, and the ability to perform structured tasks under time constraints. When these assessments are institutionalized—that is, when they become part of the way society organizes itself for purposes of social control—they become something more than “objective” measures of socially valued competencies. They become instruments for making authoritative judgments for the allocation of privilege and status in society; they become accepted definitions of “merit.” Institutionalized assessments have deeply embedded social, cultural, and political purposes. They carry society’s formal definition, literally, of “what counts” and consequently “who counts.” Over time, these definitions congeal into accepted social judgments—“good schools,” “bad schools,” “smart students,” “dull students,” “gifted students,” “needy students,” and ultimately to distinguish those who “deserve” to succeed, from those who don’t, the working definition of “merit.” To perform this function, assessments have to be congruent with and useful to the complex institutional structures that compose the education sector—the administrative and governance structures that oversee education, the processes by which these organizations determine who gets access to various levels and types of education, and ultimately who deserves the formal credentials that these organizations confer. Let’s call this the attainment function—the authoritative allocation of status and privilege through the institutions of schooling.

Educational institutions have other functions besides managing attainment. Among these basic functions are custody and control. To understand the centrality of these functions to the social role of educational institutions, one has only to run a thought experiment in which schools suddenly disappear from society and then to imagine what society would do with children. In preindustrial society, the answer to this question was straightforward: Children were put to work as soon as possible to provide for the basic survival of families and communities. In industrial society, children gradually became less a source of labor and increasingly dependent on adults for their welfare and subsistence. Limiting access to the labor force by putting children in the custody of schools became a primary factor in increasing the price of adult labor, and ultimately in the development of the middle class. But the massive exit of children from the labor force created a massive problem of how and where to house them and how to control their behavior once they were
housed. Schools became the major solution to this problem. In postindustrial society, we have come to think of children alternatively as relatively helpless dependents, needing more or less constant supervision and control, and as the primary source of social capital for the future economic welfare of society. How these two ideas fit together is unresolved. But one thing is relatively clear: Schools have become the primary custodians of children outside their families and the primary agents of social control over children when they are not with their families. “Good students” are students who understand this social contract and who subscribe to the basic expectations embedded in the attainment structure: A good student is a compliant student and one who values advancement according to the expectations of the institution. The economic rewards of compliance in developed economies are substantial; educational attainment is a primary marker of social class and economic well-being, individually and collectively.

It should come as no surprise, then, that a major part of the educational assessment industry should be organized around the primary functions of schooling: attainment, custody, and control. Assessments are routinely used to make judgments about the appropriate placement of students within educational systems. Assessments are the primary mechanisms by which we judge and allocate social definitions of merit and distribute attainment. Assessments are designed to signal alert consumers of education which organizations are most likely to serve their interests. Assessments are used to allocate resources to various organizations within the education sector. And assessments are used to make normative comparisons, among demographic groups, among political jurisdictions, and among educational systems internationally. Assessments, and the underlying assumptions about social order that they represent, are assumed to be part of the “natural order” of how education should be organized and administered.

People who live inside the institutional structure of schooling, not surprisingly, have a more benign interpretation of how the sector works. While educators are generally aware of the impact of assessments on their work, they are generally passive toward the institutional forces that create those impacts. The idea of merit, and the responsibility of educators as custodians of the allocation of merit, is an important source of positional authority and status for educators in the broader society. Likewise, the virtual monopoly of schools in the maintenance of custody and control of young people is central to the legitimacy of the entire institutional structure of education. Without custody and control, schools, and the people who govern and run them, it would be just another set of organizations among many with an interest in children. In the world of schools, the language of custody and control is transformed into the language of care, of nurture, of diligent guidance, and the communication of academic expectations appropriate to the age and grade structures of the institution. In the language of institutions, custody and control becomes “duty of care”—a responsibility conferred by society to a select set of individuals and organizations.
Seen from the outside, however, education is a set of institutions, not unique among other social institutions, with its own unique interests, granted a privileged position to manage a large portion of the lives of children. A central interest of privileged institutions is self-preservation. The main mechanisms of self-preservation in the education sector are its control of mechanisms’ social control and the determination of merit. The authority of the institution depends on society’s willingness to believe that without them we would be unable to make rational decisions about who deserves to succeed and who doesn’t, among other things. Assessment, as an industry and as an institutionalized set of practices, is central to this belief system.

Notice, in this analysis, I have written at length about the education sector without once using the term “learning.” I have done this to make a point: It is possible to make a more or less complete description of the education sector, in its current state of development, without any reference whatever to how humans learn. This situation is a consequence of what I (apologetically) call the “hyper-institutionalization” of the public sector in late-industrial society. Public institutions grow in power and influence by claiming more space in public discourse and in the daily lives of individuals. They do this by creating and capturing “needs” and “problems” that are expressed through the political process and turning them into “solutions” that only they can address. Measurement and assessment are central to this process of creating and claiming problems and turning them into solutions. The limits on institutional growth in late-industrial society are relatively weak, since institutions are able to claim authority over both the definition of social problems and their proposed solutions. Hence, the “solution” to failures of the education systems in advanced economies is more public policy about education, expansion of the growth and reach of educational institutions into the lives of parents and children, more control and regulation over relations between institutions and individuals, more measurement and testing to demonstrate the importance of institutions, and, finally, more education, as defined by the institutions themselves. More measurement, more assessment, coupled to more oversight and more control are natural accompaniments to this process. Hence, the predictable process institutionalizing social problems becomes self-reinforcing. The failures of institutions require, predictably, more institutional solutions, the reach and influence of institutions in the lives of individuals’ increases. In education, the solution to educational problems is, predictably, more education, for more people, reaching into more parts of their lives.

These processes have little to do with learning at the individual or collective level in the broader society. They have more to do with the imperatives of institutional self-interest. Definitions of learning in hyper-institutionalized environments have to conform to the requirements of custody, control, and attainment, just as conceptions of how we measure and assess learning have to conform to the same requirements. Learning in hyper-institutionalized systems is defined instrumentally in terms that are compatible with the interests of those institutions.
Learning redefined, assessment redefined

In its simplest form, institutionalized learning takes place when officially sanctioned information or content passes through a person, called a teacher, to a student, who is expected to assimilate and remember that content and later to demonstrate that the content has been “learned” by submitting to some kind of assessment. This process typically occurs in a physical structure—a classroom in a school—with other students typically grouped by similar ages. Judgments about what constitutes appropriate content are organized by content areas and age. Assessments of whether students have “learned” the content are similarly organized.

In this environment, assessments perform a number of functions. They provide information to teachers and school administrators about whether and to what extent what has been taught has been learned by students. They provide information that can be used to evaluate students for a variety of purposes—whether they are succeeding or failing by age-grade standards, whether they merit advancement or special treatment, and, ultimately in many systems, whether they are allowed access to privileged attainment—secondary schools, universities, selective credentials, and so on. These assessments are typically cross-sectional: They provide a measure of a student’s performance and status at a particular moment in time. And they are intended for a specific use: judgment of ability, advancement, placement, and so on. In this sense, they are said to carry “stakes” or consequences for students, and these stakes are part of an institutionalized theory of motivation that holds that students are more likely to engage in “learning,” as institutionally defined, if they are motivated by external rewards and penalties. These assessments also provide an opportunity for educators to exert influence and control over individuals through attainment pressure, “your success on this examination will influence your well-being and status for the rest of your life.”

Now let’s suppose we were to change our conception of learning and explore its implications for how, when, and where learning occurs, and then explore the consequences of this new view for how we would assess whether someone has “learned” something. Let’s begin with the long view, derived from evolutionary biology. One major insight comes from taking this view: Human beings have evolved largely by becoming increasingly sophisticated learning organisms (Sznajder, Sabelis, & Egas, 2012). That is, the story of human evolution is, in large part, a story about how the human brain has evolved and how this evolution has affected the relationship between mind and body in the process of learning. What distinguishes human beings from other living beings—and these are as much matters of degree as of kind—is the extraordinary capability of humans to manage complex tasks involving the orchestration of sensory perception, pattern recognition, emotional responses, behavioral regulation, memory and motor control, all in an instant, and translate these complex processes into human behaviors and interactions that embody recognition, empathy, and action. These fundamental processes occur hundreds, sometimes thousands, of times
a day, from birth to old age, over a developmental course that is increasingly complex and open to human understanding and reflection. This process of development is largely self-organizing and self-optimizing. It occurs as a result of routine interactions of human beings with their environments. It is a natural process of interaction with the physical and human environment in everyday life. This process is called “learning.”

Human beings are, in large part, a product of these interactions. Who we are, what we do, how we behave, what we believe, and what we make of all these things are consequences of these interactions. As we grow in our sophistication and mastery of the environments in which we live, we become increasingly sophisticated not only in understanding how we are shaped by our interactions, but also how we deliberately shape these interactions to our individual needs and purposes. Individuals develop in different ways in large part as a function of how they manage their interactions with their human and material environment. From this perspective, “learning” could be defined as the ability to consciously modify understandings, beliefs, and actions in response to evidence, experience, and reflection. In this formulation, the term “consciously modify” means that learning is fundamentally an action requiring the development of human agency and control. The individual “makes sense” of her environment by acting on it; the ability to act on it deliberately and consciously is a measure of how, how well, and what she learns.

Here, then, are two quite different conceptions of learning, schooling, and assessment:

Learning 1:

Learning is the ability to recall and deploy information and algorithms accurately and appropriately.

Schooling is the mechanism by which we organize social and status consistent with this definition of learning.

Assessment is the means by which we define, measure, evaluate, and confer “merit” consistent with this definition of learning.

Learning 2:

Learning is the ability to consciously modify understandings, beliefs, and actions in response to evidence, experience, and reflection.

Schooling is one of many environments in which humans develop the capability to exercise judgment and control over what they learn, how they learn, what they intend to do with what they have learned.

Assessment is the means by which individuals receive useful information about the development of their capabilities as learners over time.
Learning 1 is a deliberate construction designed to represent a particular constellation of institutional interests: determining what it is “appropriate” for individuals to learn at particular ages, providing a socially and politically authoritative solution to the problem of custody for children over a particular age span, providing an authoritative solution to discipline and control consistent with the requirement of custody, and providing a solution to the problem of how to authoritatively allocate status and merit consistent with the requirements for the survival of the institution. For the most part, when we speak of “education,” Learning 1 is what we are talking about: education = schooling.

Learning 2 starts from the premise that learning is a human activity, determined by biology and evolution, which occurs in a variety of forms over an entire life course in many different natural, social, and institutional environments (see, e.g., Lave & Wenger, 1991). The determinants of learning are, in part, located in the biological and neurological makeup of human beings and, in part, in the environments that humans inhabit and shape. In this view, the vast majority of learning over a lifetime occurs outside formal educational institutions and requires the exercise of deliberate human agency and judgment over what to learn, how to learn it, with what effect, and with what consequences individually and socially. Assessment is a function of how humans themselves make judgments about their learning, how their capabilities as learners develop over time, and how individuals, in concert with others, develop agency and control over learning. Learning 2 is a fundamentally individual, developmental, and highly individualistic activity, organized in a variety of forms of social interaction.

Learning 1 collapses the variety of forms of learning into a single institutional model in which everything that is “worth” learning is channeled through a specific organizational structure in which all knowledge is passed from authoritative sources through specific actors called teachers where it registers, largely through memory and recall, on individuals called students. Learning 2 assumes that individuals are designed to learn and what and how they learn is a function of the range of experiences and environments in which they operate and how their social interactions develop their capabilities in those arenas. In Learning 1, assessment serves the fundamental institutional function of helping to allocate status according to institutionally defined measures of merit. In Learning 2, assessment is relevant only to the degree that it supports and enhances the individual’s capabilities in exercising agency and control in making use of the many possible environments in which learning occurs.

In Learning 1, what we learn and how we learn it is a matter of prescription; our worth is measured by how well we assimilate, remember, and repeat what is institutionally prescribed. In Learning 2, what we learn and how we learn it is a matter of physical, biological, and evolutionary function; put simply, our success as humans depends on our development as learners.
This distinction between Learning 1 and Learning 2, and its consequences for how we understand and assess learning, is the terrain on which we will decide, in advanced societies, how learning will be organized in the future. The massive institutional structure that surrounds and supports Learning 1 will not disappear; the economic and political stakes for those who depend on this structure for their identity and livelihood are too great for the structures to simply melt away. On the other hand, the massive growth in the opportunities, modalities, and forms of learning that are the consequence of social and economic change in postindustrial society virtually guarantee that most learning will, over time, migrate out of highly institutionalized settings into more flexible, opportunistic, and adaptable organizational forms. Put simply, learning, in society at large, will look less and less like traditional 19th- and 20th-century hierarchical structures, and increasingly like complex networked forms of organization that are increasingly common in the rest of society. The question of how we understand and assess learning will require different answers in the future than in the past.

**Human beings are learning organisms**

While politicians and educators have been struggling with how to “reform” the highly institutionalized forms of learning and assessment in the education sector, science has been involved in a massive parallel project of trying to understand the biological, evolutionary, and neurological basis of learning in human beings. These two fields of play have been largely disconnected from each other. One could argue that the growth of knowledge in the neuroscience of learning has benefited considerably from operating outside the institutional constraints of the education system. There will, however, have to be a reckoning at some point between society’s interest, on the one hand, in incorporating fundamental knowledge about learning into new forms of organization, and on the other hand, recognizing the constraints on learning imposed by institutionalized learning.

Emerging neuroscience of learning is organizing itself around a limited number of broad themes that will have significant consequences for how we think about the organization and assessment of learning in the future. Following are a few of the main themes:

**Learning is embodied**

As the science of learning has developed, it has focused less on trying to understand the constituent elements of learning—specific locations of various functions in the brain, specific interventions design to elicit specific responses, and specific measures associated with those responses—and has shifted toward a more integrated, functional view of how the human organism works as it learns. One way to describe this shift is a movement toward “embodied” cognition. Learning is increasingly seen as a complex interaction connection between the limbic system—or the instinctive fight or flight response system—and the so-called higher order systems of memory, cognitive
processing, and executive function. Learning is also seen as involving not just a function of the brain but also as a function of how the body and the brain operate in tandem to form pathways that reinforce or inhibit such fundamental capabilities as willingness to engage the unfamiliar, social engagement, and the relationship between physical movement and patterns of cognition (Claxton, 2015; Jensen, 2005).

**Learning is highly individualized**

Neuroscience had its origins in the study of human emotional and physical pathology—emotional disorders, cognitive disabilities, brain trauma; in other words, the study of human difference. As it has developed into a much broader discipline, it has maintained this disposition to describe and attempt to understand important sources of variability among humans in addition to common patterns. One concrete results of this disposition has been a deeper understanding of how the physical development of the brain and its integration with the body develop in very different ways for different individuals depending on a combination of individual dispositions, competencies, experiences, and environments. While there may be broad developmental patterns across ages and stages of development, the science of development focuses on differences in patterns of development and their consequences for individuals. The most consequential implication of this is that neuroscience is much less likely to treat individual differences in learning patterns as deviations from the norm and much more likely to treat them as a natural consequence of human development (McFarland, 2018).

**Learning is highly contextual**

Since learning involves highly individualized physical, emotional, and cognitive responses to social interactions and physical environments, no two individuals are likely to respond to the same stimulus in exactly the same way at the same time. Hence, learning occurs in very specific social, physical, and emotional contexts for different individuals. Again, neuroscience tends to view these differences as opportunities to understand and appreciate different developmental patterns, rather than as normative patterns or pathologies (Maren, Phan, & Liberzon, 2016).

**Learning is lifelong**

To say that learning is individual and contextual is also to say that humans, as learners, develop and adapt over time, depending on their predisposition to exercise agency and control over their learning in response to changes in their environment. The scientific term for this phenomenon is **neuroplasticity**. The brain develops in different ways at different life stages: In youth and adolescence, it develops through a process of organizing, pruning, and consolidating into more efficient neural networks; in early adulthood, it develops through specialized adaptations focused
on individual predispositions, practices, and occupations; and in later life, it continues to develop through increased complexity in highly specialized functions as a result of experience in practice. To the extent that people believe that they don’t develop over their life span, they are likely not to develop. To the extent that they become proficient and highly efficient learners through practice at various life stages, they will continue to develop throughout their lives, although in different ways at different stages (Vos, Thomas, Cisneros-Franco, & Villers-Sidani, 2017).

Learning, like most worthwhile things in life, requires practice, self-awareness, intentionality, and self-control. These habits of mind and body are deeply programmed in the human species, available for use if they are cultivated, and if they occur in rich and complex environments. The future of learning lies in understanding that the work of learning is learning how to learn.

**Assessing for development**

The future of assessment lies in two domains: (1) limiting the damage to human development created by institutionalized assessment and (2) building assessments that mirror the process by which individuals develop their capabilities as learners and that can be used to provide formative feedback to learners to support their development.

**Damage limitation**

Education is typically one of the most, if not the most, highly institutionalized sectors in advanced societies. Highly institutionalized sectors are notoriously resistant to change, and predictably resilient in their ability to envelop and disable attempts to fundamentally change them. It would be difficult to design an institutional structure that is any more inconsistent with emerging knowledge about human learning than the education sector. In the short and medium term, it is highly unlikely that the institutional structure of the education sector will adapt in any profound way to emerging knowledge about human learning. The imperatives of custody, control, and guardianship of attainment are much too strong and too deeply embedded in the social structure of developed societies to be changed by mere enlightenment and science. Over the longer term, the prognosis for the education sector is not good: In order for societies to develop and adapt to the challenges they face they will, over time, have to move the learning function, by degrees, out of the education sector and into the broader society. This process will be neither pretty nor easy, but it will be inevitable. The process has already begun, with the geometric growth of digital access to knowledge, but it is mostly invisible to those who populate the education sector.

In the short term, there is one major task that will have to be faced. Existing assessments, which are largely based on the use of measurement to reinforce the attainment function, occur during critical developmental periods in childhood and adolescence. Evaluating schools based on assessments of student learning has a pervasive influence on curriculum, pedagogy, and mechanisms of
control in schools. Making summary judgments of children based on cross-sectional performance measures is largely meaningless in terms of any defensible developmental theory of learning. Basing decisions about which type of school students should be allowed to attend on cross-sectional assessments in the early grades and in early adolescence is equally indefensible. These uses of assessment make sense only in the context of the institutional interests of the education sector, emphatically not in the interests of developing competent and capable learners for the broader society. Essentially, the role of assessment in the existing institutional structure of education is to deliver a summary verdict on how competent students are, a verdict they will carry through their subsequent development as learners. This verdict is reinforced and legitimated by a merit-based attainment structure designed to ration and allocate social status, rather than to develop competency in learning.

These assessments occur during a period of childhood and adolescent development when massive physical, neurological, and emotional changes are occurring in young people—changes that will shape the future competency and self-image of individuals as learners. The early stages of cognitive development involve highly complex processes, not only of learning how to orchestrate the relationship between emotions and cognition but also the absolutely critical task of developing a differentiated identity as a person and a learner (called theory of mind in neuroscience). Physically, preadolescents have roughly twice as many neurons as they will have when they eventually mature into late-adolescence and early adulthood. What is happening during the period of dramatic change is a critical process of consolidation, pruning, and organization of neural networks that will heavily influence the learning capabilities of individuals in their adulthood and later life. One helpful way of characterizing these processes is to say that the period from birth to early adulthood is a process of developing the individual’s autobiography as a learner. This is the period when people form ideas about which domains they are likely to excel in, how malleable their initial assessments of their own competencies might be, how resilient they can be in the face of difficult learning challenges, and how to differentiate between what they care about and what society tells them they should care about, what society tells them they are competent to do and what they would choose to do if they could focus their energies on what they care most about. Giving young people summary judgments of their competence as learners while this process is unfolding is, at best, highly suspect. It serves the institution’s interests and reinforces its authority; it does not speak to the development of learners (Blakemore, 2018; Gopnik, 2016).

Addressing this mismatch between assessment and the development of competent learners will necessarily be disruptive and messy. The basic design principle for this work would be to moderate the draconian impacts of existing assessments by developing increasingly complex batteries of alternative measures that lead to alternative routes through the attainment structure: exceptions to existing standards and cutoff scores for young people who have demonstrated unusual talents, breaking lockstep examination and testing schedules to accommodate students learning at different
rates, providing opportunities for students to demonstrate knowledge and competency through exhibitions, building individual agency and executive function by providing opportunities for young people to choose depth of exploration over breadth of coverage, and the like. There will be an inevitable institutional backlash to these kinds of measures on the grounds that they violate principles of “fairness” and “merit” embedded in the attainment structure. Developing individual agency and control over learning is, by definition, a subversive activity in a system that judges merit by single system of control. Nonetheless, it is important to begin the process of softening up the institutional structures that are most orthogonal to a developmental view of learning. The objective is not to transform the institution but rather to limit its collateral damage to the healthy development of young people as learners.

**Developmental assessments**

The larger, more important project lies in the creation of developmental measures of learning that do not serve the institutional interests of the attainment structure, but that rather focus on guidance, feedback, support, and the creation of agency toward learning. A significant cadre of assessment experts have been eager to build and use developmental measures for decades, but these alternatives have been consistently undermined and disabled by policies and institutional interests. The battle over whether to use “criterion-referenced” rather than norm-referenced or standards-based assessment for school accountability systems raised this issue in the U.S., although it was quickly squashed by established testing companies. The current interest in competency-based models of schooling is a small movement in this direction. But thus far there has been no concerted effort to begin the process of building assessments that are based on defensible developmental theories of learning and that treat the learner as the client, rather than the institution.

Such a developmental effort would have to return to the core ideas of “Child Study” models of research and development from the previous century. The idea of being deeply curious about how human beings approach and solve learning problems at various stages of development, of observing and asking questions rather than assessing and delivering verdicts, in the spirit of Maria Montessori, Erick Erickson, and Jean Piaget, should inform the process. The difference from earlier traditions would be that the knowledge base would now include detailed attention to the accumulating knowledge base in neuroscience—actual direct study of how the human brain and body work when they are learning, couple with attention to the diverse environments in which learning actually occurs. The work would also expand the range of human competencies included in definitions of learning. Rather than accepting institutional definitions of what is “worth” learning, research and development would take its orientation from what highly competent learners actually do when they are at large in the world, when they are actually creating and producing value for society. The focus would be on the practices and dispositions that distinguish highly
competent learners over a life span, at different phases of development, rather than on what individuals can demonstrate they know at any particular point in their development.

The main constraints on the creation and use of developmental assessments of learning are not intellectual, theoretical, or technical; they are institutional. The disciplines of neuroscience, developmental psychology, and design—to name a few—are well-situated to take on this task. What’s lacking is the entrepreneurial space and the opportunity to create alternative learning environments that allow for the exploration and systematic study of divergent approaches to learning. Given the stability and resilience of the existing institutional structure, these settings will, in the short run, have to be occasions for “parallel play.” That is, they will have to operate outside of, and in parallel with, existing institutions, serving the same populations but at different times and in more flexible ways. One example of this phenomenon is the growth of organizations that remove young people from their traditional schooling environments for a period of time, or that work with them during periods when school is not in session, that are deliberately designed around divergent theories of learning. One such organization that I have studied is NuVu, a design studio for adolescents that provides a flexible environment for students and parents to explore and familiarize themselves with highly divergent models of learning.

Building divergent theories of learning, and the assessment tools that enable the study of learning as a developmental project, requires organizational settings that are deliberately designed to represent those theories and assessments. Divergent theories require divergent designs. People will believe and subscribe to divergent theories, and the organizational designs that go with them, when they can see them in action and when they are presented with evidence that persuades them that they are healthy developmental environments for children and adolescents. As learning, in its multiple forms, migrates out into society, and as society becomes increasingly dependent on the capabilities of learners for its survival, settings that demonstrate the full range of human capabilities of learners will become increasingly important (Elmore, 2019).

The future of assessment cannot be disconnected from the future of learning. In the present, assessment technologies are primarily artifacts of the institutional structures of the educational sector and the imperatives of that sector for custody, control, and maintenance of the attainment structure for the broader society. In the future, assessments will increasingly be formed around the radical idea that inquiry, measurement, and analysis should serve the interests of the individual learner, rather than the institutions that claim authority over the learner (National Research Council, 2011).

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Notes

1. The analysis in this section is based on George, Chattopadhyay, Sitkin, and Barden (2006), Powell and Colyvas (2007), and Powell and DiMaggio (1991).
2. For a discussion of alternative definitions of learning, see National Research Council (2000) and Holland (2018).

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