

Toward Assessment in the Service of Learning

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Pedagogical sciences and practice have long utilized educational assessment and measurement too narrowly. While we have leveraged the capacity of these technologies and approaches to monitor progress, take stock, measure readiness, and hold accountable, we have neglected their capacity to facilitate the cultivation of ability; to transform interests and engagement into developed ability. Assessment can be used to appraise affective, behavioral, and cognitive competence. From its use in educational games and immersive experiences, we are discovering that it can be used to enhance learning. Assessment, as a pedagogical approach, can be used to take stock of or to catalyze the development of Intellectual Competence. Educational assessment as an essential component of pedagogy, in the service of learning, can inform and improve human learning and development. This Handbook, in three volumes, points us in that direction.

More than sixty years ago, I had the privilege of working alongside a remarkable educator, Else Haeussermann, whose insights into the learning potential of children with neurological impairments forever altered my understanding of educational assessment. At a time when many viewed such children as unreachable or incapable, Haeussermann insisted that their performances must be interpreted not merely to sort or classify, but to understand — and that understanding must inform instruction. Rather than measuring fixed abilities, she sought to uncover the conditions under which each child might succeed. Her lesson plans were not dictated by standardized norms, but by rich clinical observations of how learners engaged with tasks, responded to guidance, and revealed their ways of thinking. Though her methods defied the conventions of test standardization and were deemed too labor-intensive by prevailing authorities, they represented a foundational model of what I now describe as *assessment in the service of learning*; assessment not as an endpoint, but as a pedagogical transaction—designed to inform, inspire, and improve the very processes of teaching and learning it seeks to illuminate. The lesson I took from Haeussermann was simple yet profound: that assessment should be used not only to identify what is, but to imagine and cultivate what might become. In every learner's struggle, there is the seed of possibility, and our charge as educators is to create the conditions under which that possibility can take root and flourish.

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A Vision for Assessment in Education

In recent years, a profound shift has been gathering momentum in educational thought: the recognition that assessment should serve and inform teaching and learning processes—not merely measure their outcomes. Nowhere was this vision articulated more forcibly than by the Gordon Commission on the Future of Assessment in Education. Convened over a decade ago under my leadership, the Commission argued that traditional testing—focused on ranking students and certifying “what is”—must give way to new approaches that also illuminate how learning happens and how it can be improved. The Commission’s technical report, *“To Assess, To Teach, To Learn”* (2013), proposed a future in which assessment is not an isolated audit of achievement, but rather a vital, integrated component of teaching and learning processes. It envisioned assessment practices that help *cultivate* students’ developing abilities and inform educators’ pedagogical choices, thereby contributing to the very intellectual development we seek to measure. This call to re-purpose assessment—to make assessment a means for educating, not just evaluating—sets the stage for the present Handbook series. Since 2020, I have convened a group of leading scholars to advance the Commission’s central proposition with urgency and optimism: that educational assessment, in design and intent, must be reconceived “in the service of teaching and learning.”

To fulfill the promise of education, we must use assessment to cultivate intellectual competence, identity, and human flourishing.

The need for this reorientation has only grown more pressing. Conventional assessments, from high-stakes tests to admissions exams, have long been designed primarily to determine the achieved status of a learner’s knowledge and skills at a given point in time. Such assessments can tell us how much a student knows or whether they meet a benchmark,

which may be useful for the purpose of accountability and certification. Yet this traditional paradigm reveals little about how students learn, why they succeed or struggle, and what might help them grow further. As I have often observed, an assessment system geared only toward outcomes provides a point-in-time picture—a static snapshot of developed ability—but does not illuminate the dynamic processes by which learners become knowledgeable, skilled, and intellectually competent human beings. In effect, we have been evaluating the outputs of education while neglecting the processes of learning that produce those outcomes. The result is an underutilization of assessment’s potential: its potential to guide teaching, to inspire students, and to support the cultivation of intellectual competence—that is, the capacity and disposition to use knowledge and thinking skills to solve problems and adapt to new challenges. To fulfill the promise of education in a democratic society, we must reimagine assessment as a positive force within teaching-learning processes, one that supports intellectual development, identity formation, equity, and human flourishing, rather than as an external judgment passed upon learning after the fact.



From Measurement to Improvement: Re-Purposing Assessment

Moving toward assessment in the service of learning requires candid reflection on the limitations of our prevailing assessment practices. Decades of research in educational measurement have given us reliable methods to rank, sort, and certify student performance. These methods excel at answering questions like: *What has the student achieved? or How does this performance compare to a norm or standard?* Such information is not without value—it can inform policy decisions, signal where resources are needed, and hold systems accountable for outcomes. However, as we refocus on learners themselves, a different set of questions comes to the fore: How can we improve learning itself? How can assessment and instruction work together to help students learn more deeply and effectively? Traditional tests rarely speak to these questions. A test score might tell us that a learner struggled with a set of math problems, but not *why*—Was it a misunderstanding of concept, a careless error, test anxiety, or something about the context of the problems? Nor does the score tell us *what next steps* would help the learner progress. In short, status-focused assessments alone do little to guide improvement. They measure the ends of learning but not the means.

By contrast, the vision of assessment espoused by the Gordon Commission and echoed in my volume *“The Testing and Learning Revolution”* (2015) is profoundly educative in its purpose. In this view, assessment is not a mere endpoint; it is part of an ongoing process of feedback and growth. When assessment is woven into learning, it can provide timely insights to teachers and learners, diagnose misunderstandings, and suggest fruitful paths for further inquiry. It becomes a continuous conversation about learning, rather than a one-time verdict. This shift entails treating assessment, teaching, and learning as inseparable and interactive components of education—a dynamic system of influence and feedback. I describe assessment, teaching, and learning as a kind of troika or three-legged stool: each element supports and strengthens the others, and none should function independently of the whole. A test or quiz is not an isolated exercise; it is a transaction between the student, the educator, and the content, one that can spark reflection, adjustment, and new understanding. In this transactional view, the student is not a passive object of measurement but an active agent in the assessment process. How a learner interprets a question, attempts a task, uses feedback, or perseveres through difficulty—all of these are integral to the learning experience. Assessment tasks thus have a dual character: they both measure learning and simultaneously influence it.

Embracing this dual character opens up exciting possibilities for re-purposing assessment. Consider, for example, the power of a well-crafted problem-solving task. When a student grapples with a complex problem, the experience can trigger new reasoning strategies, reveal gaps in understanding, and ultimately lead to cognitive growth—if the student receives appropriate guidance and feedback. The late cognitive psychologist Reuven Feuerstein demonstrated decades ago that targeted “instrumental enrichment” tasks could significantly improve learners’ thinking abilities; importantly, these tasks functioned as assessments and interventions at once. In the same spirit, assessments can be designed as learning opportunities: rich problems, projects, or simulations that *both challenge* students to apply their knowledge *and* teach them something in the process. A challenging science investigation, for instance, might double as an assessment of inquiry skills and a chance for students to refine their experimental reasoning. When students receive scaffolded support (hints, feedback, opportunities to try again), the assessment itself contributes to their development. In this way, assessment becomes a catalyst for learning. It shifts from a static checkpoint to a dynamic, educative experience. Each assessment interaction is an occasion for growth, not just an audit of prior learning.

Re-purposing assessment also calls for expanding the evidence we consider and collect about learning. If our aim is to understand learners' thinking and guide their progress, we must look beyond right-or-wrong answers. We need to examine *process*: How did the student arrive at this answer? What misconceptions were revealed in their intermediate steps? How did they respond to hints or setbacks? Such evidence may be gleaned through clinical interviews, think-aloud protocols, interactive tasks, or educational games that log students' actions. Today's technology makes it increasingly feasible to capture these rich process data. For example, a computer-based math puzzle can record each attempt a student makes, how long they spend, which errors they make, and whether they improve after feedback—yielding a detailed picture of learning in action. An assessment truly “in the service of learning” will tap into this kind of information, using it to formulate next steps for instruction and to provide learners with nuanced feedback on their strategies and progress. In short, we must broaden our view of what counts as valuable assessment data, integrating qualitative insights with quantitative scores to understand and support each learner's journey fully.



Assessment, Teaching, and Learning as Dynamic Transactions

Central to my proposed paradigm is the understanding that assessment is fundamentally relational and contextual. Learning does not unfold in a vacuum, and neither should assessment. Every assessment occurs in a context—a classroom, a culture, a relationship—and these contexts influence how students perform and how they interpret the meaning of the assessment itself. I speak of the “dialectical” relationship among assessment, teaching, and learning. By this they mean that these processes continuously interact and shape one another like an ongoing dialogue. A teacher's instructional move can be seen as a kind of assessment (gauging student reaction), just as a student's attempt on an assessment task is an act of learning and an opportunity for teaching. When we recognize this, assessment ceases to be a one-way transmission (tester questions, student answers) and becomes a two-way exchange—a *transaction*. In this transaction, students are active participants, bringing their own thoughts, feelings, and identities into the interaction. They are not simply responding to neutral prompts; they are also interpreting *what the assessment asks of them* and *why it matters*. In essence, assessment is a conversation about learning, one that should engage students as whole persons.

This perspective urges us to design assessments that are embedded in meaningful activity and closely tied to curriculum and instruction. Instead of pulling students out of learning to test them, the assessment becomes an organic part of the learning activity. For instance, a classroom debate can serve as an assessment of argumentation skills while also providing students with cycles of preparation and feedback regarding how to formulate and defend ideas. A collaborative applied research project can function as an assessment of problem-solving and teamwork, at the same time building those very skills through practice. In such cases, assessment and instruction intermingle; feedback is immediate and natural (peers responding to an argument, a teacher coaching during the project), and students often find the experience more engaging and relevant. The transactional view also highlights the role of relationships and identity in assessment. How a learner perceives the *purpose* of an assessment and their *relationship* to the person or system administering it will affect their engagement. Do they see the test as a threat or as an opportunity? Do they trust that it is fair and meant to help them? These factors can influence performance as much as content knowledge. Therefore, assessment in the service of learning must be implemented in a supportive, trustful environment. It should feel *to the student* like an extension of teaching—another way the teacher (or system) is helping them learn—rather than a judgment from on high. This more humane and dialogic approach aligns with my lifelong emphasis on humanistic pedagogy: education that honors the whole learner, respects their background and identity, and seeks to empower rather than stigmatize.

Embracing Human Variance and Equity

A commitment to humanistic, learner-centered assessment inevitably leads us to confront the reality of human variance. Learners differ widely in their developmental pathways, cultural and linguistic backgrounds, interests, and approaches to learning. I have often described human variance not as a complication to be managed, but as a core consideration and asset in education. Traditional standardized assessments, in their quest for uniform measures, have often treated variance as “noise” to be controlled or minimized. In contrast, assessment in the service of learning treats variation as richness to be understood and leveraged. Every learner brings a unique profile of strengths and challenges; a truly educative assessment approach seeks to personalize feedback and support to those individual needs. This is not only a matter of effectiveness but of equity and justice. When assessment is used purely as a high-stakes gatekeeper, it has often exacerbated social inequalities—for example, by privileging those who are test-savvy or whose cultural background aligns with the test assumptions, while penalizing others with equal potential who happen to learn or express their knowledge in different ways. By re-purposing assessments to guide learning, we can instead strive to lift up every learner. Each student, whether gifted or struggling, whether English is their first or third language, whether learning in a suburban school or a remote village, deserves assessments that *help them grow*.

What Makes an Assessment Educative?

- Embedded in instruction
- Offers actionable feedback
- Allows retry + reflection
- Supports identity & engagement
- Challenges learners authentically
- Reveals thinking processes

To achieve this, assessments must become more adaptive and culturally sustaining. They should be able to accommodate different ways of demonstrating learning and provide entry points for learners of varying skill levels (the idea of “low-floor, high-ceiling” tasks). They should also be sensitive to the cultural contexts students bring: the languages they speak, the values and prior knowledge they hold, the identities they are forming. An assessment that allows a bilingual student to draw on both languages, for instance, may better capture—and cultivate—that student’s full communicative ability. Similarly, assessments can be designed to honor diverse knowledge systems and ways of reasoning, rather than only a narrow canon. When students see their own experiences and communities reflected in what is being assessed, they are more likely to find meaning and motivation in the task. Moreover, such inclusive assessments can play a role in identity formation: they send a message to students about what is valued in education and whether *they* belong. If assessments primarily signal to some students that they are “failures” or “deficient,” those students may internalize negative academic identities, which can undermine their confidence and engagement. But if assessments are reimagined to recognize growth, effort, and multiple and varied abilities, students can begin to see themselves as capable, evolving learners. In this way, a re-purposed assessment system supports not only cognitive development but also the formation of a positive learner identity for every student. Ultimately, embracing human variance is crucial to realizing the broader aim of human flourishing. Education is about nurturing the potential of each human being; assessment should be an instrument for that nurture, helping all learners discover and develop their capabilities to the fullest.

Toward a Pedagogical Renaissance: Analytics and Intellectual Competence

Realizing the vision of assessment in the service of learning will require innovation and a renewed research agenda—what we might call a pedagogical renaissance in assessment. One promising path I have begun to explore is the development of “pedagogical analyses” as a robust practice in education. Pedagogical analysis refers to the systematic study of how teaching, learning, and assessment interact—using all available data to understand what works for whom and why. With modern technology, we have more data than ever before about learners’ interactions (click streams, response times, error patterns, etc.), and powerful analytical tools, including machine learning, to detect patterns in this data. The goal of pedagogical analysis is not mere number-crunching for its own sake, but to generate actionable insights into the learning process. For example, an analysis might reveal that a particular sequence of hints in an online tutoring system is especially effective for learners who initially struggle, or that students with specific background knowledge benefit from a different task format. These insights allow educators and assessment designers to refine their approaches, tailoring them to a wide range of learners—in essence, personalizing assessment and instruction on a large-scale. Importantly, this data-driven approach must be guided by sound theory and a humanistic compass: we seek not to reduce learners to data points, but to augment our understanding of their intellectual competence and how it grows.

The concept of intellectual competence is central here. Intellectual competence, a term I coined, denotes the ability and disposition to use one’s knowledge, strategies, and values to solve problems and to continue learning. It is a holistic notion of what it means to be an educated, capable person—going beyond the memorization of facts or routine skills. Our assessment systems should ultimately aim to foster *and* capture these broad competencies: critical thinking, adaptability, creativity, and the capacity to learn how to learn. Doing so means designing assessments that pose authentic, complex challenges to students and then analyzing not only whether students got answers correct, but *how* they approached the challenge. Did they show ingenuity in finding a solution? Did they learn from initial failures and try alternative strategies? Such qualities are the hallmarks of intellectual growth. By gathering evidence of these behaviors, we align assessment with the real goals of education in the 21st-century. Moreover, assessing for intellectual competence has the positive side effect of encouraging teaching toward deeper learning, rather than teaching to a narrow test. When assessments value reasoning, exploration, and resilience, teachers are more likely to cultivate those capacities in their students. In this way, re-purposed assessments can help bring about a richer educational experience for learners—one that genuinely prepares them for lifelong learning and flourishing in a complex world.





Of course, moving from our current assessment paradigm to this envisioned future is a substantial endeavor. It raises important questions for policy, practice, and research. Policymakers will need to broaden accountability systems to value growth and process, not just point-in-time proficiency. Educators will need professional support to use formative assessment strategies effectively and to interpret the richer data that new assessments provide. Researchers must continue to investigate the best ways to design and implement assessments that embed learning, as well as develop valid ways to infer student understanding from interactive tasks and big data patterns. These challenges, while significant, are surmountable. Indeed, around the world we already see glimpses of the possible: innovative formative assessment programs that transform classrooms into collaborative learning labs; game-based assessments that engage children and teach new skills; participatory assessment approaches that involve students in self- and peer-evaluation, building their metacognitive awareness. Such examples are heartening “existence proofs” that assessment can be reimaged to the benefit of everyone. The task now is to build on these successes, knitting them into a coherent approach that can be implemented broadly and equitably.

The Journey Ahead—and the Contributions of this Handbook Series

This Handbook for Assessment in the Service of Learning series stands as a timely and essential contribution to this educational renaissance. Across its volumes, a breadth of perspectives is presented, all converging on the central theme of transforming assessment to better support teaching and learning. The chapters compiled here bring together renowned scholars and practitioners from a wide range of fields, including cognitive science, psychometrics, artificial intelligence, learning sciences, curriculum and learning design, educational technology, sociology of education, and more. Such range is intentional and necessary. Rethinking assessment is a complex endeavor that benefits from multiple lenses: theoretical, empirical, technological, and practical. Some contributions explore foundational theoretical frameworks, helping us reconceptualize what assessment is and *ought to be* in light of contemporary knowledge about how people learn. Others delve into the design of innovative assessments, offering design principles and prototypes for assessments that measure complex competencies or integrate seamlessly with instruction. We also encounter rich case studies and practical exemplars—from early childhood settings to digital learning environments—that demonstrate how assessment for learning can be implemented on the ground. These range from classrooms where teachers have successfully used formative assessment to empower students, to large-scale programs that blend assessment with curriculum, to cutting-edge uses of data analytics and AI solutions that personalize learning experiences. The wide-ranging nature of these examples underscores a crucial point: *assessment in the service of learning is applicable in a significant range of educational contexts*. Whether in formal preK-12 schooling, higher education, workplace training, informal learning, or through media and games, the principles remain relevant—aligning assessment with growth, understanding, and human development.

While the chapters in this series each offer unique insights, they are united by a spirit of inquiry, urgency, and hope that echoes the ethos of the Gordon Commission. There is inquiry—a deep questioning of assumptions that have long been taken for granted, such as the separation of testing from teaching, or the notion that ability is a fixed trait to be measured. There is urgency—a recognition that as we move further into the 21st century, with its rapid social and technological changes, the costs of clinging to outdated assessment regimes are too great. We risk stifling creativity, perpetuating inequity, and mis-preparing learners for a world that demands adaptability and continuous learning. But above all, there is hope—a belief that through thoughtful innovation and collaboration, we *can* redesign assessment to be a positive force in education. The work is already underway, and this Handbook is part of it. The range of perspectives in these volumes is a source of strength, encompassing critical analyses, bold experiments, and a blend of longstanding wisdom and fresh ideas, each contributing a piece to the larger puzzle of how to make assessment truly *for* learning.

In closing, let us return to the animating vision that I have championed throughout my career and which inspires this series. It is a vision of education where every learner is seen, supported, and challenged; where assessment is not a grim rite of ranking, but a continuous source of insight and improvement; where teaching, learning, and assessment form a holistic enterprise devoted to nurturing the growth of human potential. Realizing this vision will require perseverance and creativity. It will mean overcoming institutional inertia and reimagining roles—for test-makers, teachers, students, and policymakers alike. Yet the potential payoff is immense. By making assessment a partner in learning, we stand to enrich the educational experience for all students, help teachers teach more effectively, and advance the cause of equity and excellence by ensuring that every learner receives the feedback and opportunities they need to thrive. This is assessment in the service of learning: assessment that not only reflects where learners are, but actively helps them get to where they need to go next. With the insights and evidence gathered in this Handbook series, we take important steps on that journey. The message is clear and hopeful—it is time to move beyond the extant paradigm and embrace a future in which to assess is, intrinsically, to teach and to learn.

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About the Study Group

The Study Group exists to advance the best of artificial intelligence, assessment, and data practice, technology, and policy; uncover future design needs and opportunities for educational systems; and generate recommendations to better meet the needs of students, families, and educators.

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