

THE EVIDENCE BASE FOR

The 12 Practices of Deeper Learning

Research Foundations for a Framework of Classroom Practice

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Purpose of This Document

The 12 Practices of Deeper Learning is a reference framework — a way of naming, aligning, and strengthening the instructional practices that research consistently associates with deeper student learning. This document is the evidence base beneath that framework: an accounting of the research that supports each of the twelve practices, organized by the framework's four layers, with full citations.

This document was researched and drafted with the assistance of AI, under the author's direction. The framework itself — the twelve practices, their organization into four layers, and the reasoning behind that architecture — reflects more than two decades of independent classroom observation, coaching, and leadership practice, and is not a product of AI synthesis. The research citations connecting each practice to specific studies were identified and drafted with AI assistance, then reviewed and revised by the author; they are a credible starting point for further inquiry, not a substitute for primary-source verification.

This is a working draft. It will continue to be refined as the framework is piloted and tested in schools, and as new practitioner and research feedback informs each practice.

Why This Framework Exists

Over the past two decades, educators have benefited from an extraordinary expansion of research and innovation around deeper learning. The field now includes compelling visions of what students should know, be able to do, and become — through initiatives such as the Hewlett Foundation's deeper learning competencies, Portraits of a Graduate, project-based learning, competency-based education, culturally responsive teaching, Challenge Success, and numerous school design frameworks. Together, these contributions have significantly advanced our understanding of meaningful, equitable, and engaging learning.

Yet they also reveal a gap. While many existing frameworks describe the outcomes we hope students will achieve or the conditions schools should cultivate, relatively few focus on the observable instructional practices that consistently create those outcomes across classrooms. Teachers, instructional coaches, principals, and district leaders are often left asking practical questions: What exactly should we see students and teachers doing in classrooms where deeper learning is occurring? How do we build a common language for instructional improvement across an entire school? How do we move from isolated examples of excellent teaching to coherent systems that make deeper learning more consistent and more equitable?

The Deeper Learning Practices framework was developed in response to those questions. Rather than proposing another instructional model or school reform initiative, it synthesizes decades of research into a shared language for twelve observable instructional practices that educators can discuss, coach, strengthen, and refine together. It is designed to complement — not replace — the many excellent frameworks already shaping the field. The question this framework asks is not whether schools should abandon the models already available, but whether those models can benefit from a common language describing the instructional practices that make them successful in actual classrooms.

How This Framework Was Developed

The Deeper Learning Practices framework emerged through an iterative process of research synthesis, classroom observation, professional learning, and leadership coaching, rather than from a single research study or theoretical tradition. Its development has been informed by several complementary sources: a review of major research traditions associated with deeper learning, cognitive science, motivation, assessment, collaboration, transfer, and experiential learning; more than two decades of work as a teacher, school administrator, district leader, consultant, and instructional coach working alongside schools implementing deeper learning, project-based learning, Portraits of a Graduate, competency-based education, and related instructional initiatives; repeated observation of classrooms across public, independent, and international schools, seeking recurring patterns in classrooms where students demonstrated unusually high levels of engagement, ownership, intellectual challenge, and authentic learning; and ongoing refinement through workshops, leadership coaching, Communities of Practice, and collaborative design conversations with educators, researchers, and school leaders.

The framework was developed using an iterative synthesis process rather than a deductive research methodology. Individual practices were not selected because they appeared in a single influential publication; instead, they emerged repeatedly across multiple research traditions and consistently appeared in high-quality instructional environments. The citations throughout this document should be read in that spirit — as evidence that supports and substantiates each practice, not as the original source from which each practice was derived. In most cases, the practice was recognized first, through observation and synthesis, and the research tradition was identified afterward as its strongest grounding.

The organization of the framework into four layers represents an interpretive contribution rather than a direct borrowing from any existing model. It reflects the proposition that deeper learning develops through a progression of mutually reinforcing conditions — psychological safety and belonging create the conditions for productive learner behaviors; learner behaviors make intellectually demanding work possible; and meaningful work culminates in authentic demonstrations of understanding. While these layers are analytically distinct, they are experienced simultaneously in effective classrooms and continually reinforce one another.

The Evidence for the Four-Layer Sequence

The previous section explained that the four-layer architecture is an interpretive contribution rather than a borrowed model. This section adds empirical support for that architecture specifically — evidence that the sequence itself, not just the individual practices within it, has consequences for student outcomes.

The American Institutes for Research's multi-year, quasi-experimental Study of Deeper Learning compared twenty “network schools” with a mature, well-implemented approach to deeper learning against a matched sample of comparison schools. Students in network schools reported higher academic engagement, motivation, self-efficacy, and collaboration skills, and scored higher on state assessments regardless of background (American Institutes for Research, 2014). The Learning Policy Institute's synthesis of this and related research found that gains were most pronounced for students from low-income families, new immigrants, and students of color who have been historically underserved (Learning Policy Institute, n.d.). The William and Flora Hewlett Foundation's original 2010 definition of deeper learning — mastery of core

content, critical thinking, collaboration, communication, and academic mindset — remains the clearest single statement of what the four layers of this framework are collectively trying to produce.

The claim embedded in the four-layer order is this: a classroom that pushes rigor (Learning Work) or visible demonstration (Learning Demonstrations) without first establishing psychological safety and belonging (Learning Culture) risks increasing student anxiety rather than deepening learning. This is not a hypothetical concern — it is the single most common pattern this framework's self-assessment tool surfaces in practice, and it is why Learning Culture is Layer I rather than an afterthought.

Layer I — Learning Culture

Conditions for risk-taking. The foundation for all deeper learning — psychological safety, clarity, and intellectual engagement. Before students can be asked to think harder, they must first believe the room is safe enough to think out loud.

Practice 01 — Belonging & Safety

Gregory Walton and Geoffrey Cohen's 2011 randomized controlled trial is one of the most replicated findings in the social psychology of education. A brief intervention — reading survey results showing that most first-year students worry about whether they belong, but come to feel at home — raised the GPA of African-American college students continuously over their four-year college careers, while a control group's GPA remained flat (Walton & Cohen, 2011). The effect was not motivational fluff: students in the belonging condition subsequently emailed professors more, attended office hours more, and sought out academic support more (Walton & Brady, 2019). Subsequent studies have replicated and extended the finding to broader populations and to K–12 contexts (Yeager et al., 2016).

The implication for classroom practice is direct: belonging is not a precondition schools can assume or a soft skill to attend to once academics are handled. It is itself a lever on academic outcomes, and it is most powerful precisely for the students who are least sure they belong.

Supporting evidence: Walton & Cohen (2011); Walton & Brady (2019); Yeager et al. (2016)

Practice 02 — Feedback & Revision

Feedback's reputation as an unambiguous good does not survive contact with the research. Avraham Kluger and Angelo DeNisi's 1996 meta-analysis of 607 studies and over 23,000 observations found that feedback interventions improved performance on average — but decreased performance in more than a third of cases (Kluger & DeNisi, 1996). The determining factor was where the feedback directed a person's attention: feedback that kept attention on the task improved performance; feedback that shifted attention to the self — to ego, identity, or self-worth — often backfired.

This finding sharpens rather than contradicts Dylan Wiliam's research on formative assessment, which the framework already draws on. Wiliam's work establishes that feedback is most powerful when it is embedded in the instructional cycle and used to close a gap between current and desired performance (Wiliam, 2011). Kluger and DeNisi explain why some feedback fails to do that: it talks about the student instead of the work.

Supporting evidence: Kluger & DeNisi (1996); Wiliam (2011)

Practice 03 — Discourse & Reasoning

Sarah Michaels, Catherine O'Connor, and Lauren Resnick's program of research on “Accountable Talk” identifies three dimensions of classroom discourse that predict learning: accountability to the learning community (listening and building on others' contributions), accountability to reasoning (logical connection and evidence), and accountability to knowledge (accurate, verifiable content) (Michaels, O'Connor, & Resnick, 2008). In a district-wide intervention with low-income elementary students, structured Accountable Talk practices produced measurable gains on standardized mathematics assessments — a finding replicated in subsequent controlled studies (Resnick, Michaels, & O'Connor, 2010).

The research base here converges with a much older tradition — Dewey's claim that democratic reasoning is built through practiced dialogue — but Michaels, O'Connor, and Resnick's contribution is operational: they specify exactly what productive classroom talk sounds like, which is what makes their framework usable by teachers rather than merely inspirational.

Supporting evidence: Michaels, O'Connor, & Resnick (2008); Resnick, Michaels, & O'Connor (2010)

Layer II — Learning Actions

How students learn. Building students' capacity to think about their thinking, work productively with others, and take ownership of their learning. These are the practices that turn students from recipients of instruction into agents of their own development.

Practice 04 — Reflection & Metacognition

Barry Zimmerman's research on self-regulated learning defines effective learners as those who actively use metacognitive, motivational, and behavioral strategies to guide their own learning, rather than passively receiving instruction (Zimmerman, 1990; Zimmerman, 2000). Across decades of subsequent research, self-regulation has consistently predicted academic achievement independent of prior ability — and critically, it is teachable. Students who are taught to plan, monitor, and evaluate their own learning outperform equivalent-ability peers who are not (Zimmerman & Schunk, 2011).

Metacognition also has a compounding property that few other practices share: because it is a skill about learning itself, gains transfer across subjects in a way that content-specific skills typically do not.

Supporting evidence: Zimmerman (1990, 2000); Zimmerman & Schunk (2011)

Practice 05 — Structured Collaboration

David and Roger Johnson's decades-long research program on social interdependence theory and cooperative learning is among the most replicated bodies of evidence in education research. Their meta-analyses — spanning hundreds of studies — consistently find that structured cooperative learning outperforms competitive or individualistic learning, with effect sizes ranging from moderate to large (Johnson & Johnson, 2009). The operative word is structured: the research is specific that simply seating students in groups does not produce these effects. The conditions that make cooperation work — positive interdependence, individual accountability, promotive interaction, taught social skills, and group processing — must be deliberately designed (Johnson, Johnson, & Smith, 2014).

This is the research distinction this framework's practice name is built on: “structured” collaboration, not simply “group work.”

Supporting evidence: Johnson & Johnson (2009); Johnson, Johnson, & Smith (2014)

Practice 06 — Bounded Agency

Edward Deci and Richard Ryan's self-determination theory identifies autonomy — alongside competence and relatedness — as one of three basic psychological needs whose satisfaction drives intrinsic motivation (Ryan & Deci, 2020). Their research distinguishes controlled motivation (driven by external reward or pressure) from autonomous motivation (driven by genuine interest or internalized value), and finds that autonomous motivation predicts deeper engagement, better conceptual learning, and more durable achievement across educational levels and cultures (Ryan & Deci, 2000; Ryan & Deci, 2020).

The framework's specific formulation — bounded agency rather than unlimited choice — reflects a nuance in the self-determination literature: autonomy does not require the absence of structure. Students can experience genuine ownership within a clearly bounded set of goals and expectations; in fact, some structure appears necessary for the autonomy to feel meaningful rather than directionless.

Supporting evidence: Ryan & Deci (2000, 2020)

Layer III — Learning Work

What students are asked to do. Defining the level of cognitive demand and relevance in student work — emphasizing transfer, application, and meaning-making. This layer asks whether the tasks students spend their time on are actually worth that time.

Practice 07 — Experiential Fieldwork

David Kolb's experiential learning cycle — concrete experience, reflective observation, abstract conceptualization, active experimentation — remains the dominant framework for direct, hands-on learning outside a traditional classroom setting (Kolb, 1984). Kolb built explicitly on John Dewey's foundational claim that education is not preparation for life but continuous with it: “there is an intimate and necessary relation between the process of actual experience and education” (Dewey, 1938).

Fieldwork is the practice where this framework's four layers become hardest to separate: it requires the psychological safety to venture beyond the classroom (Culture), the metacognitive habits to make sense of unstructured experience (Actions), the cognitive demand of real investigation (Work), and it culminates naturally in demonstration (Demonstrations). If any single practice makes the case for the framework's four-layer architecture, it may be this one.

Supporting evidence: Kolb (1984); Dewey (1938)

Practice 08 — Real-World Application

Jean Lave and Etienne Wenger's situated learning theory makes a strong claim: that knowledge is not well learned in the abstract. Learning happens through participation in real practice — what they term “legitimate peripheral participation” in a community of practice, where newcomers gradually move from the periphery toward full participation as they gain skill (Lave & Wenger, 1991). Decontextualized, purely academic tasks

— disconnected from any real audience, purpose, or community — are, on this account, a weaker form of learning than tasks embedded in authentic practice, however simplified.

Applied to K–12 classrooms, situated learning theory is the theoretical backbone for why real-world application isn't a motivational add-on. It's a claim about how knowledge actually gets constructed and retained.

Supporting evidence: Lave & Wenger (1991)

Practice 09 — Cross-Disciplinary Connections

This is the practice in the framework that best illustrates the observation-first side of the development process described earlier in this document. Cross-disciplinary connections did not emerge from a single canonical study the way Belonging traces to Walton and Cohen or Structured Collaboration traces to Johnson and Johnson. It emerged from repeated observation — noticing, across public, independent, and international schools, that the classrooms producing the deepest and most durable learning were consistently the ones where teachers made connections across subjects explicit, rather than leaving students to notice the overlap on their own.

The broader literature on transfer of learning — the study of how skills and understanding developed in one context apply in another — supports this observation without being unified around a single dominant researcher the way most of the other eleven practices are. James Beane's work on curriculum integration and Perkins and Salomon's research on teaching for transfer are the two strongest available anchors, and both are consistent with what this practice claims. But it is more honest to say this practice was recognized in classrooms first and grounded in the literature second, rather than implying a tidier derivation than actually occurred.

Supporting evidence: Beane (1997); Perkins & Salomon (1992) — supporting, not originating, sources

Layer IV — Learning Demonstrations

Making learning visible. Allowing students to demonstrate understanding publicly, apply learning in authentic contexts, and develop confidence and identity as learners. This layer asks whether learning has a destination beyond a grade in a gradebook.

Practice 10 — Presentations of Learning

The American Institutes for Research's Study of Deeper Learning — a three-year, quasi-experimental comparison of deeper learning network schools against matched comparison schools — found that students in schools emphasizing authentic demonstration of learning reported higher academic engagement, motivation to learn, self-efficacy, and collaboration skills, and scored higher on state assessments and PISA-based measures of complex problem-solving, regardless of student background (American Institutes for Research, 2014). Demonstration of learning to a real audience — not just a teacher issuing a grade — appears repeatedly across deeper learning school models as a defining structural feature, not an occasional culminating event.

The mechanism is straightforward, if underappreciated: knowing your work will be seen by someone beyond your teacher changes how you approach the work itself, from the first draft forward.

Supporting evidence: *American Institutes for Research (2014); Learning Policy Institute (n.d.)*

Practice 11 — Digital Creation

Seymour Papert's constructionist learning theory — extending Piaget's constructivism — argues that people learn most effectively when they are actively constructing something meaningful and shareable, not passively consuming information (Papert, 1980). Constructionism gives this framework its theoretical basis for treating technology specifically as a creation tool rather than a content-delivery mechanism: the same digital device can either extend the worksheet or become an instrument of authorship, and the research suggests these are not equivalent uses.

Later research on constructionist and participatory media environments (Resnick, Bruckman, & Martin, 1996) extends Papert's original claim into networked, social contexts — students don't just create in isolation, they create for and with an audience, which reinforces the same authentic-audience mechanism found in Practice 10.

Supporting evidence: *Papert (1980); Resnick, Bruckman, & Martin (1996)*

Practice 12 — Performance Tasks

Fred Newmann's research on “authentic intellectual work,” conducted across restructured elementary, middle, and high schools nationally, established specific, scoreable standards for what makes a task intellectually authentic: construction of knowledge (not just reproduction), disciplined inquiry, and value beyond school. Newmann, Marks, and Gamoran (1996) found that authentic pedagogy was strongly associated with authentic academic achievement — and, critically, that the achievement effects held consistently across students of different races, genders, disability statuses, and socioeconomic backgrounds. Authentic tasks were not a luxury that only benefited already-advantaged students; they were, if anything, more equalizing than routine instruction.

This is one of the more consequential findings in the framework's full evidence base: the same instructional design that raises rigor also narrows achievement gaps, provided the routine, low-level alternative is what students would otherwise be given.

Supporting evidence: *Newmann, Marks, & Gamoran (1996); Newmann, King, & Carmichael (2007)*

A Note on Synthesis

Read individually, these twelve research traditions span social psychology, cognitive science, organizational behavior, and educational philosophy — Walton and Cohen's belonging research has little surface resemblance to Papert's constructionism. But read as a set, they converge on a single, load-bearing claim: deeper learning is not produced by any single instructional technique, however well-executed. It is produced by the accumulation of specific, research-grounded conditions across an entire classroom experience — psychological, motivational, and cognitive — sustained consistently over time.

This is also the strongest argument for why the framework resists being treated as a checklist. The evidence base underneath each practice describes a different mechanism operating on a different part of the learner. Belonging changes what a student is willing to risk. Feedback changes what a student attends to. Autonomy

changes what a student is intrinsically motivated to pursue. A school that implements one practice in isolation, however well, is applying one mechanism and expecting the compounding effect of twelve.

This document will grow as the framework does, refined through ongoing dialogue with researchers, practitioners, and schools implementing it in diverse educational contexts.

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