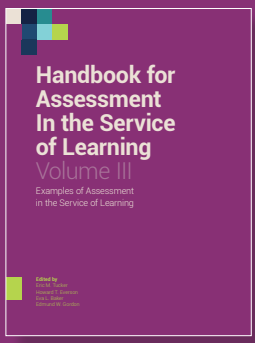
Assessment as a Catalyst for Identity Development, Skill Cultivation, and Social Impact

Saskia Op den Bosch, Jennifer Charlot, Clarissa Deverel-Rico, and Susan Lyons

UMassAmherst
University Libraries



Series Editors:
Edmund W. Gordon, Stephen G. Sireci, Eleanor Armour-Thomas, Eva L. Baker, Howard T. Everson, & Eric M. Tucker

ISBN: 978-1-945764-33-2

Suggested Citation:
Op den Bosch, S., Charlot, J., Deverel-Rico, C., & Lyons, S. (2025). Assessment as a catalyst for identity development, skill cultivation, and social impact. In E. M. Tucker, E. L. Baker, H. T. Everson, & E. W. Gordon (Eds.), *Handbook for assessment in the service of learning, Volume III: Examples of assessment in the service of learning.* University of Massachusetts Amherst Libraries.

Assessment as a Catalyst for Identity Development, Skill Cultivation, and Social Impact

Saskia Op den Bosch, Jennifer Charlot, Clarissa Deverel-Rico, and Susan Lyons

Abstract

This chapter explores how RevX's assessment system extends beyond content mastery to nurture identity development, skill-building, and real-world impact. Through the lens of a fourth-grade student, Lana, we illustrate how a structured cycle of action, reflection, and feedback supports learners in developing resilience, critical thinking, and a sense of agency. RevX's DEEDS framework—Discover, Examine, Engineer, Do, Share—guides students through real-world problem-solving, positioning assessment as a tool for growth rather than a static measure of performance.

Rooted in sociocultural learning theories and critical pedagogy, RevX integrates formative and summative assessments to shape responsive instruction, ensuring students see themselves as capable change-makers. By embedding identity-affirming assessments into project-based learning, students not only acquire disciplinary knowledge but also develop the confidence to navigate challenges and contribute meaningfully to their communities. This chapter details how the RevX assessment model—grounded in intellectual prowess, strong sense of self and community, and the ability to create impact—redefines traditional metrics of success. Looking ahead, we discuss ongoing efforts to validate and scale this model, demonstrating how assessment, when intentionally designed, can empower learners to see their own potential and step into their roles as leaders and problem-solvers in an evolving world.

Introduction

A fourth-grade student, Lana, set out to create floor tiles that could harness energy from footsteps, aiming to reduce power consumption for a commonly used school item, like a smartboard or computer. Each week, she tackled the principles of energy flow, circuits, and wiring, demonstrating her understanding through standards-based quizzes called Checks for Understanding. However, as she moved from theory to practice—soldering wires, troubleshooting connections—she faced repeated setbacks, often leaving her frustrated, questioning her abilities, and in tears. At times, she withdrew from her team, needing space to process the challenge independently.

RevX's pedagogical model is predicated on addressing a relevant community challenge. Our approach to *Assessment in the Service of Learning* goes beyond content knowledge, supporting skill-building and identity development by encouraging students to explore who they are and what they're capable of as they engage in real-world challenges. This approach is grounded in three key pillars:

1. Action—the hands-on learning experience itself, which pushed Lana to solve complex, real-world problems;

2. Reflection—weekly academic assessments to confirm understanding combined with personal reflections (through journaling, vlogging, or other forms) on her growth, teamwork, and what additional support from her facilitator (teacher) could help her move forward; and

3. Feedback—from her own data reports, her team, and her facilitator, who provided constructive feedback on technical skills and personal development.

Through this structured cycle of action, reflection, and feedback, Lana was able to confront challenges, build resilience, and develop a clearer sense of her capabilities, not just in terms of knowledge but as a growing individual and teammate.

As the project grew tougher, so did Lana's determination. She began coming to school early and staying late, dedicating extra hours to refining her work and double-checking her thinking. Her presentation, which she had to prepare for the Department of Sustainability in New York City, became a focal point for feedback from her teacher, filled with comments that encouraged her to push through

doubts, deepen her technical knowledge, and reflect on how her reactions to challenges affected her team dynamic.

When the Department of Sustainability and graduate engineering students visited, Lana demonstrated an astonishing grasp of the content—not because she had simply studied it, but because she had learned through failure, course corrections, and real-world application. More importantly, the growth and confidence she displayed left a teacher whom she had the year before remarking, "*I almost didn't recognize her.*"

This process was new for Lana; she wasn't just learning circuits, she was also building confidence in herself as a learner and collaborator, which were becoming essential pieces of her identity. In her weekly reflections, she considered not only her academic progress but also her personal growth. The feedback loop became a mirror, helping her see herself more clearly: her strengths, her areas for growth, and her impact on others. She began to identify as someone who doesn't back down from challenges, recalibrates her timeline for meeting her expectations, and sees setbacks as essential steps in her journey. With each reflection, she focused on two goals: maintaining her confidence and learning requisite technical skills, each effort reinforcing her belief in her own capabilities.

Through this experience, Lana's journey illustrated how *Assessment in the Service of Learning* can support the three critical RevX outcomes: Intellectual Prowess, Strong Sense of Self and Community, and Creates Impact. Although her device ultimately only generated enough energy to power a phone—falling short of her original goal—her learning experience was remarkable. By engaging in a cycle of action, reflection, and feedback, Lana discovered that learning isn't just about achieving perfect results; it's about the process of understanding who she is becoming, building resilience, and finding confidence in her abilities, even when success is partial.

In this chapter, we will explore how RevX's assessment system is embedded within an instructional framework that creates meaningful learning experiences and gathers multiple sources of data to inform educator practice. We will revisit Lana's story throughout the chapter to illustrate each component in action.

RevX Origin Story

RevX, a play on Revolutionary Experiences, was born from urgency and built for transformation. Each of our founders came to see how the education system had conditioned us to doubt ourselves—to shrink in the face of power rather than claim it. We were taught to comply, to play small, and as educators, we found ourselves unintentionally passing those same limitations to the young people in our care.

Then, in 2020, young people started asking, "*What can we do about injustice*? *Will my father die because he is Black*?" They felt powerless. We felt powerless. And we knew we couldn't wait for someone else to solve the problem. We knew education had to be a place where students reclaimed their agency, tested their resilience, and built the skills to shape the world on their terms.

That's why we created DEEDS (Discover, Examine, Engineer, Do, Share)—a framework that makes learning active, relevant, and transformative. When students apply real-world skills to solve pressing challenges, they do not just learn—they develop confidence, critical thinking, and a strong sense of self.

Lana's journey mirrors the very reason RevX exists. Her story is the embodiment of what our founders, Jenn, Alexa, Saskia, realized about education. Traditional learning often teaches Black and Brown students to fear failure, to doubt themselves, to wait for permission instead of claiming their power.

- Jenn was told to leave parts of her identity behind to succeed. She later led national school transformation efforts, built alternative schools for disconnected youth, and designed career-connected learning models that empowered students to bridge academic success with real-world application.
- Alexa was once labeled a "delinquent" for missing school. She now leads New York City's top-performing elementary and middle school, proving that rigorous academics can coexist with student empowerment.
- Saskia was conditioned to believe she "wasn't good at math" after failing a test. She now leads national efforts to redesign assessment systems, ensuring students see learning as a tool for growth, not just measurement.

Like Lana, they faced moments where the system told them they weren't enough. Like Lana, they pushed beyond those limitations. And like Lana, they chose to redefine what success looks like.

Through DEEDS, real-world problem-solving, and a reimagined approach to assessment, RevX is shifting education from compliance to confidence, from passive learning to active change-making. The impact isn't just in the skills students build—it's in the identities they claim, the communities they transform, and the power they recognize within themselves. Because when students like Lana step into their full potential, they do not just succeed—they lead.

Overview of the RevX Learning Model

Today's world faces challenges that demand new ways of thinking, creative problem-solving, and a willingness to act with purpose. At RevX, we believe in preparing young people to tackle these challenges by helping them connect their learning to real-world issues, fostering both academic growth and personal identity development. RevX's approach to learning is deeply rooted in sociocultural theories, emphasizing that knowledge is co-constructed through learners' lived experiences and participation in meaningful, real-world activities (Rogoff, 2003; Vygotsky, 1978). We also draw on critical pedagogy literature to support students' social consciousness and action (e.g., Freire, 2020). Our model is designed to position students as active participants in their learning, fostering skill acquisition, identity development, and social engagement.

RevX Outcomes: Developing Key Competencies

The RevX model prioritizes three key competencies that together cultivate well-rounded learners who are capable of meaningful social impact. The first competency, "Intellectual Prowess," fosters critical thinking, problem-solving, and collaboration. Students demonstrating intellectual prowess ask thoughtful questions that deepen understanding and synthesize diverse sources of information to solve complex problems. This competency aligns with the sociocultural perspective that learning is socially situated. Lave and Wenger (1991) argue that knowledge is constructed through active participation in meaningful social contexts. Similarly, Brown, Collins, and Duguid (1989) emphasize that cognitive apprenticeship, where learners engage in authentic problem-solving activities with peers and facilitators, enhances comprehension and skills development. Through the RevX model, students engage in projects that require them to integrate multiple perspectives and navigate complex challenges.

The second competency, "A Strong Sense of Self and Community," supports students in developing self-awareness, resilience, and empathy. Indicators of this competency include students' ability to recognize their strengths and challenges, as well as their capacity to respect and incorporate diverse perspectives in collaborative tasks. This aligns with research on identity formation in learning. Holland et al. (1998) explain that identity is socially constructed, evolving through interactions with peers, mentors, and communities. Nasir and Hand (2008) further highlight that identity is not static but shaped through engagement in learning environments that require students to take on meaningful roles. RevX intentionally embeds learning within authentic social contexts and collaborative work, ensuring that students not only acquire knowledge but also develop a deeper understanding of themselves and their role within their broader communities.

The third competency, "Creating Impact," prepares students to apply their learning in meaningful ways, positioning them as critical agents of social action and justice. This competency is demonstrated when students work in teams, communicate effectively, gather feedback to improve their work, and develop strategies to solve complex social justice challenges. Freire (2020) argues that education should be a tool for liberation, empowering learners to critically engage with the world and take action against systemic injustices. Similarly, Gutstein (2012) emphasizes the role of critical pedagogy in fostering students' ability to analyze and challenge inequitable structures through their learning experiences. By engaging in collaborative, problem-based learning experiences that center on social impact, students are developing disciplinary expertise alongside their abilities to effect meaningful change in the world.

The Instructional Framework: DEEDS

RevX's DEEDS framework serves as the structural foundation of RevX's instructional model, guiding students through five interconnected phases of learning. The Discover phase emphasizes the identification and exploration of pressing societal challenges within relevant cultural and social contexts. This stage aligns with Vygotsky's (1978) theory that learning is mediated through cultural tools and social interactions, with students constructing understanding through guided exploration.

During the Examine phase, students engage in structured inquiry and collaborative research to analyze root causes and potential solutions. Brown, Collins, and Duguid (1989) advocate for an apprenticeship model in which learners gain expertise

through sustained engagement with mentors and peers. This phase ensures that students critically engage with content rather than passively absorb information.

The Engineer phase involves the design and development of actionable solutions, a process through which students transition from novice to expert roles. This form of participation fosters deep learning as students refine their skills through direct application and iteration (Lave & Wenger, 1991).

In the Do phase, students implement their solutions in real-world contexts. This stage reinforces the notion that learning is an active, situated process, allowing students to engage with authentic audiences and refine their work based on feedback and experience.

Finally, the Share phase prioritizes structured reflection, where students assess their growth and articulate their evolving identities as learners and contributors. Gutiérrez and Rogoff (2003) argue that learning is a culturally mediated process in which individuals construct meaning through dialogue, reflection, and interaction with social tools. Within RevX, this reflective practice enables students to recognize and articulate their own development trajectories.

The RevX Learning Model offers a robust framework for fostering socially situated, identity-driven learning experiences. RevX centers the importance of processes of becoming in addition to its emphasis on knowledge acquisition. Through structured engagement, real-world problem-solving, and reflective assessment, RevX cultivates an educational environment in which students are empowered to shape their own trajectories and contribute meaningfully to their communities. This model thus serves as an exemplar of how sociocultural learning theories can be operationalized to create transformative educational experiences.

The DEEDS framework comes to life through six-to-eight-week instructional modules like Power Up, where students engage in a hands-on, real-world challenge that directly impacts their community. Instead of simply studying energy systems in theory, students step into the role of engineers and problem-solvers, applying their knowledge to design sustainable solutions that address real energy challenges in NYC schools. For Lana, a fourth-grade student in the Power Up module, learning was no longer about memorizing facts—it was about solving a problem that mattered. Like many schools in New York City, hers relied heavily on fossil fuels, consuming large amounts of energy daily. Partnering with the NYC Department of

Education Office of Sustainability and Columbia University School of Engineering, Lana and her classmates were tasked with designing and pitching renewable energy solutions that could reduce energy consumption in their school.

Through Power Up, students moved through the DEEDS framework in a structured, purpose-driven way:

- In Discover, they explored energy transformation and conservation, examining how their own school's energy use contributed to environmental challenges.
- In Examine, they researched renewable energy solutions, analyzed real-world examples, and evaluated how sustainable technologies could be applied in school settings.
- In Engineer, they designed and refined prototypes, such as kinetic tiles that generate electricity from footsteps or bike-powered classroom tools, pushing them to think critically and creatively.
- In Do, they presented their solutions to engineers and sustainability experts, applying their learning in an authentic setting and receiving actionable feedback.
- In Share, they reflected on their experiences, considering both their academic growth and their role in shaping a more sustainable future for their community.

The impact of Power Up extended beyond academic learning—it reinforced the core outcomes of the RevX model. As students engaged in problem-solving and real-world application, they strengthened their Intellectual Prowess, building scientific understanding and technical skills. They developed a Strong Sense of Self and Community, recognizing their ability to contribute meaningfully to their communities. And most importantly, they Created Impact, as their ideas and solutions drove tangible change, making sustainability a priority within their school.

The story of Power Up demonstrates how RevX's DEEDS framework transforms learning into a process of discovery, agency, and action. Through structured engagement, students like Lana do not just learn about the world—they learn to shape it. Scan the following QR code to view this module in action.

RevX Assessment System: A Responsive Design

In viewing assessment as part of a coherent system that includes curriculum and instruction (Black et al., 2011; NRC, 2001; Wilson, 2018)—a system that is grounded in shared, sociocultural views of learning and developmentally appropriate models of disciplinary learning—the RevX approach to assessment has been designed to support the DEEDS framework for curriculum and instruction. The multifaceted RevX assessment system supports the idea that young people learn best when their growth is ongoing, rooted in purpose, and responsive to who they are becoming. In line with contemporary calls for classroom assessments that support more than just academic outcomes (NASEM, 2025), RevX assessments encourage learners to engage deeply, see their progress, and understand themselves. Research supports this approach: formative, real-time assessment improves learning and builds self-confidence (Black & Wiliam, 1998).

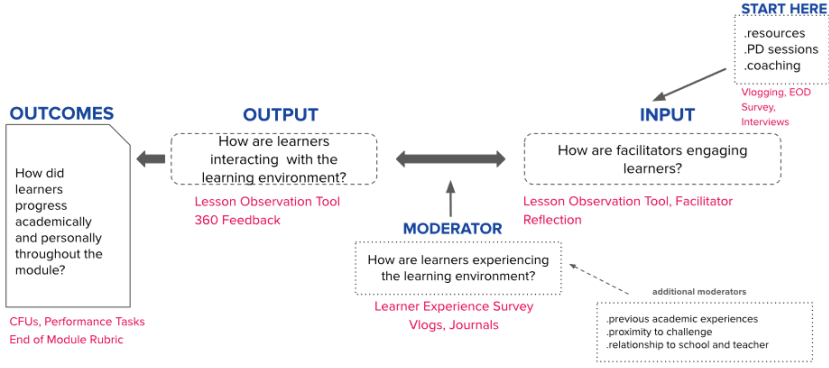
The RevX assessment system seeks to understand and improve each of these focal points individually and the relationship among them:

- Teacher practice: The assessment system aims to ensure that teaching practices build inclusive, engaging, and identity-affirming learning spaces where students feel motivated to learn, valued, and appropriately challenged and engaged (Gay, 2002).
- Learning experience: The assessment system aims to ensure that learning experiences are relevant, challenging, and foster agency, problem-solving, and critical thinking (Bandura, 1986), and to ensure that learners' voices are amplified so that their academic and social-emotional needs are met.
- Learner outcomes: The assessment system aims to ensure that young people are building the foundational knowledge, 21st-century skills and mindsets to step into their roles as community builders.

The RevX Assessment System is built on a theory of action that if facilitators regularly implement quality instruction that is rigorous, relevant, and identity-affirming, and young people engage as intended, then overtime, we will observe academic and personal growth that is increasingly consistent and skilled, across contexts (Figure 1). A facilitator's ability to implement quality instruction will be influenced by the quality of resources, professional development, and coaching provided.

We also hypothesize that the power of facilitator and learner dynamics leading to strong outcomes is effectively moderated by learners' internal states and interpretations of their experiences within the learning environment, which are influenced by their previous academic experiences, their own identity, and proximity to the content, and their relationships to the school, their peers, and their educators.

Figure 1.
RevX Assessment Theory of Action



Integrating Tools for Learning and Growth

At RevX, assessment is not an isolated event but an ongoing process that actively shapes learning, identity development, and real-world skill-building. Rather than treating assessment as a static measure of performance, RevX integrates multiple tools to create a holistic and dynamic feedback system. Tools, like material artifacts and recurring processes, scaffold learning for students and educators (Wertsch, 1988; Stroupe et al., 2019). These tools allow facilitators to monitor student engagement, conceptual understanding, and skill application, ensuring that learning remains responsive and personalized.

As shown in *Figure 1, RevX Assessment Theory of Action*, we hypothesize that when Teacher Practice (e.g., facilitators using high-quality, identity-affirming instructional methods) effectively meets student needs, the Learning Experience becomes more engaging, rigorous, and supportive. In turn, this drives positive Learner Outcomes, such as mastery of disciplinary skills, development of a strong sense of identity,

and the ability to create real-world impact. Conversely, each learner brings prior experiences, motivations, and identities into the classroom, moderating how well the teaching practices land and shaping the learning experience. By gathering feedback on these dynamics, we can continuously refine teaching strategies and support stronger outcomes for every student.

To make this process concrete, RevX uses multiple assessment tools that inform each focal point of the assessment system:

1. ***Learner Experience Surveys*** - Gauge how students feel about their belonging, motivation, and support each day or week. These surveys give facilitators real-time insights into the Learning Experience, revealing how effectively current teaching practices are fostering a supportive environment.
2. ***Checks for Understanding (CFUs)*** - Provide frequent formative snapshots of students' conceptual knowledge and skills. CFUs primarily help teachers fine-tune Teacher Practice by highlighting gaps in understanding. In turn, they also inform Learner Outcomes as teachers adapt lessons to improve mastery and confidence.
3. ***Facilitator Observations*** - Qualitative, real-time notes on classroom interactions, including student collaboration, engagement patterns, and points of confusion. Observational data bridges all three focal points—showing the immediate impact of Teacher Practice on the Learning Experience, and how students' emerging behaviors signal changes in Learner Outcomes or potential areas for intervention.
4. ***Performance Tasks*** - Assess students' ability to apply knowledge and skills in authentic, real-world contexts. These tasks serve as a key indicator of Learner Outcomes, demonstrating students' intellectual prowess and potential for real-world impact. They also feed back into Teacher Practice, helping facilitators refine future instruction.
5. ***Self-Reflections and 360° Feedback*** - Encourage students and peers to articulate growth, challenges, and teamwork dynamics. By capturing student perspectives, reflections and peer feedback illuminate how the Learning Experience is shaping identity development and collaboration. This information loops back to support more responsive teaching and deeper Learner Outcomes.

Processing and Using Data: The Assessment-to-Action Cycle

Each tool corresponds to, and continuously informs, one or more of the focal points in our assessment system: Teacher Practice, Learning Experience, and Learner Outcomes. When used in tandem:

- Teacher Practice can adapt in real time, guided by CFU scores, observational data, and feedback loops.
- Learning Experience improves as facilitators act on data from learner surveys, reflections, and performance tasks, personalizing support for individuals and groups.
- Learner Outcomes become more robust when students receive timely feedback, see relevance in their work, and feel supported in their personal growth and community impact.

This system is built on the belief that learning is iterative. Students must have multiple opportunities to engage with disciplinary content, reflect on their understanding, and receive targeted support. Our facilitators use data reflection protocols and dashboards to analyze patterns, identify student needs, and adjust instruction accordingly. The process begins with key questions: *Are students deeply engaged*? *Are instructional practices supporting identity formation and skill-building*? *Where do students need targeted interventions*?

By systematically applying these assessment tools and analyzing the resulting data, RevX triangulates multiple perspectives—from the learner, the facilitator, and the performance evidence—to paint a comprehensive picture of growth. Rather than viewing assessment as a static, isolated event, we see it as a dynamic, continuous process that both reflects and guides the evolving relationships depicted in Figure 2.

Lana's story illustrates how this approach plays out in practice. Her assessment data revealed early struggles, allowing facilitators to target support interventions that ultimately contributed to her growth.

Lana's Growth: A Story of Progress and Persistence

At the start of the module, Lana's data showed two challenges: Her Check for Understanding (CFU) assessment data revealed she was only scoring 21% on the scientific practice of fair testing (3-5-ETS1-3; NGSS Lead States, 2013) and she

evidenced low engagement, reporting frustration in her Learner Experience Survey. Based on these early CFU scores and classroom observation notes, her facilitator introduced structured experimentation templates and small-group coaching—practical steps to scaffold Lana's troubleshooting process. By pairing her with a peer who excelled at iterative design, her RevX facilitator aimed to increase her exposure to effective problem-solving and build her confidence in a supportive partnership.

Within two weeks, new CFU data (Week 2) indicated Lana still had difficulty connecting *speed to energy transfer,* scoring 25% on 4-PS3-1 (NGSS Lead States, 2013). Recognizing this gap, the RevX facilitator shifted instruction to hands-on ramp-and-ball demonstrations to illustrate how speed affects energy. Brief CFUs with sentence starters prompted Lana to verbalize her thinking, while think-aloud sessions encouraged her to process misconceptions with peers. These focused interventions not only clarified the science concepts but they also seemed to help Lana feel more comfortable voicing questions—a turning point reflected in her Learner Experience Surveys, where she began to report feeling "part of the group."

By Week 3, Lana's ability to generate and compare multiple solutions (3-5-ETS1-2; NGSS Lead States, 2013) improved from 25% at baseline to 50% in that week's CFU, showing she was more open to generating and comparing multiple solutions, though she still struggled to pivot on her designs. Building on that data, the facilitator implemented structured brainstorming sessions with explicit prompts, inviting Lana to explore alternative designs on chart paper. These sessions doubled as a check on her mindset—she could articulate challenges and propose next steps, which in turn gave the facilitator targeted insights on how to guide her.

As summarized in Week 5 data shown in Table 1, Lana's resilience and collaboration were noticeably stronger as observed during a Performance Task, affirmed by peer feedback highlighting her initiative in troubleshooting. Encouraged by these shifts—evidenced by more positive Learner Experience responses—the facilitator provided ongoing one-on-one check-ins and emphasized "small wins" to sustain momentum. Each time Lana demonstrated new problem-solving or collaborative behaviors, the teacher spotlighted them, using immediate feedback to reinforce her growing confidence.

Table 1

Lana's Data Journey Over Time

Time Point	CFU Performance Data	Observation Notes	Learner Experience Data	Data-Driven Instructional Action
Week 1	3-5-ETS1-3 = 21% (Fair Testing & Iteration)	Lana struggled with troubleshooting her prototype; she often withdrew from group discussions after test failures.	Fluctuating sense of belonging; reported frustration with frequent setbacks.	Introduced structured experimentation templates. Paired her with a peer who excelled at iterative design. Held small-group coaching.
Week 2	4-PS3-1 = 25% (Speed & Energy Relationship)	Lana had difficulty connecting the speed of an object to its energy in a preliminary mini-presentation, showing uncertainty about how energy transfers at higher speeds.	Still uncertain about her skills and place on the team; moderate motivation.	Led hands-on "ramp-and-ball" demonstrations to show speed-energy relationships. Used brief CFUs with sentence starters. Encouraged think-alouds.
Week 3	3-5-ETS1-2 = 50% (Generating & Comparing Ideas)	Lana began exploring multiple solutions—though this might reflect greater comfort with brainstorming than with deeper scientific concepts. She still hesitated to pivot her design.	Sense of belonging improved; reported feeling more supported and "part of the group."	Implemented structured brainstorming sessions with explicit prompts. Added reflection journals for analyzing and adjusting her ideas.

Table 1. (continued)

Week 5	Prototype Iterations (Performance Task checks)	Showed stronger resilience and collaboration. Peer and teacher feedback noted she was taking initiative to troubleshoot issues rather than withdrawing.	Reported higher confidence, citing a feeling that "I can figure things out even if it's hard."	Continued 1:1 check-ins and peer feedback loops. Used success milestones (small "wins") to sustain motivation.
Week 7 (final)	Final Pitch & Prototype (Performance Task)	Although Lana's final pitch was overall strong—she demonstrated her working prototype and explained key energy-flow concepts—she still struggled with minor gaps, e.g., detailing how speed affects voltage output.	Reported feeling "very motivated and proud," rating her sense of belonging as consistently high.	Addressed minor clarity issues through last-minute coaching on speed-voltage relationships. Reinforced her progress with positive peer affirmations.

Note. CFU = Checks for Understanding. The final presentation showed that Lana's understanding of energy transfer had improved substantially from Week 1, though she occasionally missed specific cause-and-effect details about speed. Overall, her clarity, confidence, and collaboration were significant leaps from the early stages of the module.

By the final assessment in Week 7, Lana's Performance Task scores indicated she could consistently apply the Science practice of fair testing and explain energy flow (4-PS3-4; NGSS Lead States, 2013). While she still had minor gaps around how speed affects voltage output, targeted last-minute coaching helped refine her final pitch. The NYC Department of Sustainability praised her thoroughness, reflecting both her deeper conceptual mastery and her stronger sense of self. Her Learner Experience data also showed the highest levels of motivation and belonging yet—she reported feeling "very motivated and proud," a testament to how instructional changes, informed by data, had accelerated both her academic and personal growth.

Lana's Growth Was Evident Across All Three RevX Outcomes

- Intellectual Prowess: By Week 7 of the module, Lana had improved her average score on standards-based assessments to around 70%, demonstrating a significant leap in both conceptual understanding and practical application. She progressed from early struggles (Week 1's 21% on fair testing and iteration) to confidently explaining her prototype's energy flow by the final pitch.
- Creates Impact: Although her energy tile prototype did not fully achieve its initial goal—only powering a smartphone rather than a larger device—Lana recognized the value of her learning process. The Department of Sustainability still favored her idea, and engineering students praised the clarity of her explanation about how energy transfer worked through her tile's circuitry.
- Strong Sense of Self and Us: Lana's confidence grew steadily across each week, as reflected in her Learner Experience Survey responses, which indicated rising motivation and sense of belonging. She spoke openly about how her setbacks deepened her self-awareness and collaboration skills. By the time she presented her final work, her self-assuredness was as notable as her improved science comprehension.

By embedding assessment within the learning process, RevX ensures that students like Lana strengthen scientific and engineering concepts and develop the resilience and self-efficacy to thrive in real-world problem-solving. "*The transformation in her self-assuredness was just as remarkable as her improved science understanding,*" her facilitator noted, tying back to the core philosophy underlying RevX's Assessment System design: by using assessment data to shape timely, relevant instructional interventions, educators can help students like Lana reach new heights of competence and confidence—well beyond what simple scores alone would predict.

Educator Training and Supports

Key to the assessment theory of action, RevX ensures that facilitators are equipped with the training, guidance, and resources needed to effectively implement the DEEDS framework and support both academic growth and identity development. Through professional learning workshops, real-time coaching, and data-driven instructional tools, educators learn to interpret assessment data, create identity-affirming spaces, and scaffold student agency.

Facilitators receive structured training on using formative assessments, learner experience surveys, and reflection tools to adapt instruction in real-time. They also engage in ongoing coaching to refine their practice, ensuring every student experiences rigorous, relevant, and empowering learning. By preparing educators to integrate data with student identity development, RevX builds a model that is impactful across diverse learning environments.

RevX recognizes that effective implementation requires more than just training—facilitators need intuitive tools that streamline instruction, assessment, and student support. To enhance consistency and impact, RevX is developing a digital platform that integrates preprogrammed prompts, assessment tools, and module design capabilities, while also capturing and analyzing student data in real-time. This platform will empower educators to implement DEEDS more effectively, ensuring every learner receives high-quality, data-informed, and identity-affirming instruction. Providing digitized on-demand support will also help address sustainability and scalability challenges—discussed in further detail under *Challenges and Strategies for Scaling*.

Connections to the Principles for Assessment in the Service of Learning

RevX's approach aligns closely with the *Principles for Assessment in the Service of Learning*, ensuring that assessments not only measure progress but also support learning, motivation, identity development, and support for individual differences. By integrating formative and summative assessments throughout the learning experience, the RevX assessment system embodies assessment precisely for learning, rather than assessment of learning (e.g., Taylor, 2022; Wiliam, 2011), and provides a structure that nurtures each student's journey of growth, self-awareness, and agency.

Principle 2: Assessment Focus is Explicit and Includes Purposes, Outcomes, Progress Indicators, and Processes that can be Transferred to Other Settings, Situations, and Conditions

RevX assessments are designed not just to measure content knowledge, but to capture progress, competencies, and processes that extend beyond the classroom. The focus on transfer ensures that learning applies to new settings, situations, and real-world challenges.

For example, in the Power Up module, students use scientific inquiry, engineering design, and systems thinking to develop renewable energy solutions for their schools. They analyze energy consumption, prototype alternative power sources, and present their findings to the NYC Department of Education Office of Sustainability and Columbia University engineers.

This aligns with research emphasizing that effective assessments must move beyond isolated academic tasks and engage learners in applying knowledge to authentic, complex contexts. John Dewey (1938) argued that learning should be experiential, connecting knowledge to real-world applications. The ability to analyze, reflect, and act in new situations is a hallmark of deep learning and assessment for transfer.

Through Power Up, students do not just demonstrate an understanding of energy—they develop the confidence and skills to apply their knowledge in different contexts, whether designing sustainable solutions in their communities or advocating for environmental change in the future.

Principle 3: Assessment Design Supports the Learner's Processes, such as Motivation, Attention, Engagement, Effort, and Metacognition

RevX's DEEDS framework ensures that assessments support, rather than hinder, motivation and metacognition. Assessment design must enhance learner engagement, effort, and self-regulation rather than simply measure performance. At RevX, assessments are embedded within learning experiences, allowing students to receive feedback, iterate on their work, and understand their growth trajectory. This aligns with Zimmerman's (2002) research on self-regulated learning, demonstrating that when students can track their progress and set goals, they develop a greater sense of agency and persistence.

Principle 5: Feedback, Adaptation, and Other Relevant Instruction should be Linked to Assessment Experiences

Black and Wiliam's (1998) seminal research on formative assessment highlights the power of continuous feedback in improving learning outcomes, a principle that underpins the RevX approach. The RevX assessment system is designed to provide clear, actionable feedback that informs both students and facilitators of the next steps. Feedback is not just about evaluating past performance—it serves as a catalyst for future learning and decision-making. An integrated dashboard can bring together multiple assessment sources—learner self-reflection, performance tasks, formative assessments, and environmental feedback surveys—to create a holistic picture of student progress. Facilitators use this data to adapt instruction, scaffold learning, and ensure that every student receives personalized support.

RevX's alignment with the *Principles for Assessment in the Service of Learning* demonstrates a commitment to transfer, equity, motivation, and meaningful feedback. Instead of treating assessments as static measures of ability, RevX uses assessments as tools for learning, self-discovery, and social impact. By ensuring that assessments empower rather than restrict learners, RevX is building a model that prepares students not just to succeed academically but to become agents of change in their communities.

Principle 6: Assessment Equity Requires Fairness in Design of Tasks and their Adaptation to Permit their Use with Respondents of Different Backgrounds, Knowledge, and Experiences.

Equity is fundamental to ensuring that assessments fairly measure students' competencies without reinforcing systemic barriers. Assessment equity requires that tasks be culturally relevant, adapted to different backgrounds and experiences, and free from bias. RevX ensures that assessments connect to students' lived experiences and provide multiple ways to demonstrate learning, fostering an inclusive and affirming environment.

- Equity demands differential treatment according to need. RevX achieves this by:
- Designing culturally relevant tasks that resonate with students' diverse experiences,
- Using multiple forms of expression and representation to allow students to demonstrate their knowledge in ways that align with their strengths, and

- Ensuring that assessments are capable of capturing the processes by which abilities are developing.

This commitment to fairness ensures that all learners can meaningfully engage with assessments and that results contribute to better educational opportunities and practices.

Forecasting Future Work for RevX

Ongoing Validation of the Learning and Assessment Model

RevX's next steps focus on validating and refining the DEEDS framework to ensure its effectiveness, adaptability, and scalability across diverse educational settings. Central to this effort is the development of a robust evidence base that is grounded in disciplinary models of learning (Shepard et al., 2018) and a platform that connects student outcomes, instructional protocols, and embedded teacher moves, providing a comprehensive understanding of how the DEEDS framework functions in varied learning environments.

Centering this work in disciplinary models of learning and working from shared definitions of learner experience outcomes supports the ability to establish construct validity. For example, having a deep and detailed understanding of how students might progress within and across grade bands on the performance expectations represented in the Next Generation Science Standards will inform the curriculum and assessment design, along with teacher learning for supporting students in progressing along disciplinary concepts and practices. Similarly, designing assessment and learning experiences that support learner experience will also attend to construct validity if grounded in clear definitions of such outcomes. Gathering evidence—for example—for how the different components of an instructional module attend to and draw on these research-centered definitions would bolster claims for construct validity.

A critical component of this validation is the RevX digital platform—the crux for organizing assessment data and connecting responsive teaching practices—which allows us to easily display data, monitor implementation fidelity, track student progress, and refine instructional approaches in real-time. Investigating how practitioners make sense of and act on these multiple sources of assessment data will provide evidence for validity-in-use or validity related to the consequences of using assessment (Messick, 1998; Shepard, 1997). By capturing and organizing

key learning data, the platform will help educators visualize student growth, engagement, and areas for further development, making assessment a tool for action rather than a static measure of performance. The platform will ensure that the assessment system provides a holistic picture of student learning, triangulating data from multiple sources to offer both a broad and nuanced understanding of progress. By synthesizing performance tasks, formative assessments, learner self-reflections, environmental surveys, and facilitator observations, the system enables educators to see not just what students know, but how they are applying their knowledge, how they experience the learning environment, and how their identity as learners is developing over time. This process ensures that assessment is not fragmented, but instead woven into the fabric of instruction, supporting timely, responsive teaching.

Validation also requires testing the adaptability of the model across different educational contexts. By working with schools in urban, rural, and alternative settings, RevX will study how the DEEDS framework operates in diverse conditions, allowing for refinements that make the model more accessible and scalable—supporting the ability to gather evidence for cultural validity (Solano Flores & Nelson-Barber, 2001). Partnering with educators in these environments will provide valuable insight into how facilitators interpret and implement DEEDS, ensuring that the framework remains flexible enough to meet the needs of varied student and school populations while maintaining fidelity to its core principles.

Another key aspect of validation is the ability to track both immediate and long-term student outcomes. Through future longitudinal studies, RevX will examine how participation in DEEDS-based learning experiences influences not only academic achievement but also identity development, skill transfer, and real-world application. This approach allows for a deeper understanding of how students carry their learning beyond the classroom, reinforcing the idea that education is not just about knowledge acquisition but about shaping capable, confident, and engaged problem-solvers.

Ultimately, this validation process is about more than proving the effectiveness of DEEDS; it is about ensuring that assessment is integrated seamlessly into instruction, making learning more meaningful, identity-affirming, and responsive to student needs. By refining how data is collected, displayed, and used, RevX is working to create an ecosystem where assessment is not just a measure of

past performance but a tool that actively shapes the learning journey, equipping students and educators alike to grow, adapt, and thrive.

Challenges and Strategies for Scaling

As RevX expands, we recognize key barriers to implementation, including resource constraints, varying school contexts, and the need for educator capacity-building. To address these challenges, we are:

- Equipping educators with structured training and coaching to help them integrate DEEDS seamlessly, by providing opportunities to build shared understanding of the theoretical foundations undergirding the RevX approach (perspectives on learning, models of disciplinary learning, definitions of learner experience outcomes), opportunities to make sense of assessment data, opportunities to reflect on appropriate interventions or responsive approaches in light of their students' contexts and needs, even in schools with limited experience in project-based learning;
- Developing an AI-powered digital platform to provide preprogrammed instructional tools, real-time assessment analytics, and adaptive learning supports, reducing the planning burden on teachers and ensuring quality and consistency in implementation; and
- Offering flexible adoption models, allowing schools and organizations to adapt DEEDS in whole and in part to fit their specific needs—whether with just a few strategies or assessment tools, as a standalone program after school, embedded as part of the instructional day, or through a community-based learning initiative.

By proactively addressing these scalability challenges, RevX ensures that its model remains accessible, adaptable, and impactful, creating a clear pathway for schools and communities to implement authentic, student-driven learning experiences at scale.

Long-Term Impact Goals

As RevX grows, we remain committed to empowering young people to actively engage with the world around them and building the capacity of educators, mentors, families, and school leaders to co-design and facilitate these experiences.

By leveraging real-time assessment data, we will support continuous learning, ensuring that both students and educators evolve alongside one another.

Through a sustained focus on student-centered, real-world learning, RevX will continue to refine its model, setting a new standard for education systems that prioritize purpose-driven lives, community engagement, and lifelong growth. Additionally, our research and data collection will contribute to the broader field of education and assessment, offering a replicable model for embedding identity development and real-world learning into assessment practices.

Takeaways for the Field: Assessment as a Catalyst for Identity and Growth

RevX redefines the role of assessment, demonstrating that it can be more than a measure of academic achievement—it can be a catalyst for personal growth, skill development, and social impact. Through the DEEDS framework and its embedded research and development system, RevX integrates assessment into the learning process, making reflection, feedback, and action central to every student's journey. Rather than treating assessment as separate from learning, RevX positions it as a tool to help students recognize their strengths, expand their thinking, and see the impact they can have on the world. This approach has the potential to not only improve academic outcomes but also build agency, confidence, and a deep sense of purpose, proving that assessment—when designed with intention—can be a force for transformation.

References

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education*, 5(1), 7–74.

Black, P., Wilson, M., & Yao, S.-Y. (2011). Road maps for learning: A guide to the navigation of learning progressions. *Measurement: Interdisciplinary Research and Perspective*, *9*(2–3), 71–123.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32–42.

Dewey, J. (1938). *Experience and education*. Macmillan.

Freire, P. (2020). Pedagogy of the oppressed. In *Toward a sociology of education* (pp. 374–386). Routledge.

Gay, G. (2002). Preparing for culturally responsive teaching. *Journal of Teacher Education, 53*(2), 106–116.

Gutiérrez, K. D., & Rogoff, B. (2003). Cultural ways of learning: Individual traits or repertoires of practice. *Educational Researcher, 32*(5), 19–25.

Gutstein, E. (2012). *Reading and writing the world with mathematics: Toward a pedagogy for social justice*. Routledge.

Holland, D., Lachicotte, W., Skinner, D., & Cain, C. (1998). *Identity and agency in cultural worlds*. Harvard University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Messick, S. (1998). Test validity: A matter of consequence. *Social Indicators Research, 45,* 35–44.

Nasir, N. I. S., & Hand, V. (2008). From the court to the classroom: Opportunities for engagement, learning, and identity in basketball and classroom mathematics. *The Journal of the Learning Sciences*, *17*(2), 143–179.

National Academies of Sciences, Engineering, and Medicine. (2025). *Equity in K–12 STEM education: Framing decisions for the future*. National Academies Press. https://doi.org/10.17226/26859

National Research Council. (2001). *Knowing what students know: The science and design of educational assessment*. National Academies Press.

National Research Council. (2013). *Next generation science standards: For states, by states*. The National Academies Press.

NGSS Lead States. (2013). *Next generation science standards: For states, by states*. The National Academies Press. https://doi.org/10.17226/18290

Rogoff, B. (2003). *The cultural nature of human development*. Oxford University Press.

Shepard, L. A. (1997). The centrality of test use and consequences for test validity. *Educational Measurement: Issues and Practice, 16*(2), 5–24.

Shepard, L. A., Penuel, W. R., & Pellegrino, J. W. (2018). Using learning and motivation theories to coherently link formative assessment, grading practices, and large-scale assessment. *Educational Measurement: Issues and Practice*, *37*(1), 21–34.

Solano-Flores, G., & Nelson-Barber, S. (2001). On the cultural validity of science assessments. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, 38(5), 553–573.

Stroupe, D., Moon, J., & Michaels, S. (2019). Introduction to special issue: Epistemic tools in science education. *Science Education*, 103(4), 948–951.

Taylor, C. S. (2022). *Culturally and socially responsible assessment: Theory, research, and practice*. Teachers College Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard University Press.

Wertsch, J. V. (1988). *The social formation of mind*. Cambridge University Press.

Wiliam, D. (2011). What is assessment for learning? *Studies in Educational Evaluation, 37*(1), 3–14.

Wilson, M. (2018). Making measurement important for education: The crucial role of classroom assessment. *Educational Measurement: Issues and Practice*, 37(1), 5–20.

Zimmerman, B. J. (2002). Becoming a self-regulated learner. *Theory Into Practice*, *41*(2), 64–70.