RAND AMERICAN SCHOOL DISTRICT PANEL CRPE REINVENTING PUBLIC EDUCATION

Research Report

HEATHER L. SCHWARTZ, MELISSA KAY DILIBERTI

Encouraging Deeper Learning in Middle and High School

Selected Findings from American School District Panel Surveys

Teaching deeper learning involves cultivating the critical thinking, problem-solving, and collaboration skills that students need to be successful in their college, career, and civic life. It also involves encouraging students to be active participants in their learning (Alliance for Excellent Education, 2011; Vander Ark and Schneider, 2014).

K–12 public schools across the United States routinely help students develop these skills. For example, teaching such building blocks of critical thinking as the ability to reason and identify claims and evidence is commonplace in states' educational standards in the United States (Common Core State Standards Initiative, undated; Next Generation Science Standards, undated). And many schools offer *project-based learning*—an inquiry-based form of instruction in which students investigate a real-world problem over an extended period—a form of instruction that research has shown is well suited to cultivating these skills (Abrami et al., 2015; Lucas Education Research, undated; Zhang and Ma, 2023).

KEY FINDINGS

- District leaders' examples of successful teaching of critical thinking skills—a key element of deeper learning—fell into four main categories: teachers posing high-level questions, project-based learning, real-world problem-solving activities, and activities that students chose rather than were assigned.
- These examples align with research on effective methods for teaching critical thinking.
- According to reports from district leaders, districts engaged in a wide variety of project-based learning, most commonly in the form of science, technology, engineering, math, and career and technical education classes. However, some districts reported embedding project-based learning in every grade and every subject.
- Seven of ten school district leaders reported formally collecting students' input about teaching and learning, which is another element of deeper learning. The changes that these districts reported making based on student input often related to making instruction more hands-on and engaging.

In this report, we focus on several elements of students' deeper learning. That is, we present how district leaders believe middle and high schoolers' critical thinking skills are best developed in their schools, whether students' input about teaching and learning is collected in these schools, and examples of their schools' most effective forms of project-based learning. We then take a step back and summarize districts' theories of action for teaching and learning at large to see how they do or do not align with elements of deeper learning.

We use results from surveys administered to members of the American School District Panel (ASDP). The ASDP is a research partnership between RAND and the Center on Reinventing Public Education. The panel also collaborates with several other education organizations, including the Council of the Great City Schools and MGT. The full set of ASDP survey results can be viewed and user-friendly charts can be created in Bento, a free data visualization tool.[1]

Over the past four years, we have randomly selected 4,200 K–12 public school districts to invite to join the ASDP. As of spring 2024, the ASDP had a 31.2 percent recruitment rate. We invite all ASDP members to participate in our semiannual surveys, which touch on a variety of timely topics in K–12 education; only some topics are included in this report. Accordingly, we design ASDP surveys to allow multiple different respondents (e.g., superintendent, director of academics) from the same district central office to complete portions of the survey. We recommended that leaders who oversee or direct academic instruction complete the survey items we analyze in this report, although we do not know which person(s) in each district completed the surveys on behalf of their district.

The survey items we analyze in this report are ones we fielded on the fall 2023 ASDP survey or the spring 2024 ASDP survey. We posed questions about critical thinking, student input, and districts' theories of learning over two survey administrations to minimize burden on the respondents. We administered the fall 2023 survey between October 12, 2023, and December 14, 2023. Of the 1,167 public school districts that were members of the ASDP as of fall 2023, 231 districts completed surveys (a 19.8 percent survey completion rate). We administered the spring 2024 survey between March 6, 2024, and May 3, 2024. Of the 1,318 public school districts that were members of the ASDP as of spring 2024, 190 districts completed our survey (a 14.4 percent completion rate). A single school district might have responded to one or both surveys. This means that the survey responses we use in this report are from two partially overlapping sets of districts. Importantly, the districts represented in this report comprise a very small share of the roughly 13,000 school districts across the United States.

We present the results from one closed-ended and five open-ended survey questions in this report. For the one closed-ended survey item (about districts' formal mechanisms to collect student input about learning and teaching), we applied survey weights to make our sample of districts representative of the national population of public school districts. For more information about the sampling and weighting procedures for the fall 2023 and spring 2024 ASDP surveys, see Grant et al., 2024a, and Grant et al., 2024b, respectively. We did not weight the responses we received for the five survey items that asked respondents to write in a response to a prompt. We list the wording of each survey item below.

To analyze district leaders' open-ended responses, a single researcher created codes for each theme mentioned in three or more answers (e.g., a "project-based learning" code for the question about how to best develop middle and high schoolers' critical thinking skills). We then tagged each response that mentioned that theme. Throughout this report, we use such terms as *deeper learning*, *critical thinking*, and *project-based learning*, which align with the survey items we administered. However, we did not define these terms on the survey. We caution readers that respondents might have interpreted these terms differently, and the respondents' differing interpretations might be reflected in their survey responses.

We hope the results presented in this report will provide concrete examples and provoke new ideas for directors of academics in school districts and to philanthropies and state and federal department of education officials promoting deeper learning for students. However, we caution readers about several limitations of this analysis. First, the reader

should not infer that the proportion of school district leaders who reported different types of deeper learning activities equates to the proportion of schools or classrooms nationally that are actually carrying out these activities. Second, although we cannot be certain, we suspect that the leaders who answered our questions on behalf of their district are those who have devoted more-explicit thought, if not resources, to the learning activities we asked about. Third, we caution readers that because district leaders are so far removed from day-to-day instruction in classrooms, district-level staff might have less knowledge about specific activities to promote students' critical thinking skills than other school-level staff, especially teachers. Leaders in some district positions (e.g., director of academics, curriculum specialist) might have more accurate or complete information about their districts' promotion of students' critical thinking skills than others. With these limitations in mind, our objective is to describe which activities that a diverse and relatively large group of districts actively engaged in deeper learning believe are most effective.

Promoting Critical Thinking

Students' Active Participation in Their Learning Was the Underlying Theme in Many District Leaders' Answers About Cultivating Critical Thinking Skills

In fall 2023, we asked district leaders the question, "What do you think is your district's most effective teaching and/or learning activity to cultivate your middle or high schoolers' critical thinking skills?" We received 157 relevant answers, coded the frequency of themes and examples in those answers, and identified the three most common themes—rigorous academic instruction, experiential learning, and giving students choices—and then we identified numerous examples within each of those most common themes. Most respondents listed just one example—such as project-based learning or deeper questioning techniques—but many listed several, and we coded and tabulated as many examples and themes as respondents mentioned.[2]

For this report, we adopt the following common definition of *critical thinking*: "purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanations of the considerations on which that judgment is based" (Abrami et al., 2015, p. 275).

Although the examples and themes in district leaders' answers varied, most responses related to students being at least an active participant in, if not the designer of, their learning. District leaders frequently mentioned different forms of students' active participation in academic learning as promoting critical thinking. We labeled this theme *rigorous academic instruction* and coded 69 different responses as providing examples that belonged to this theme. The four most common examples of rigorous academic instruction, arranged from most to fewest mentions, were as follows:

- students answering high-level questions from teachers (e.g., teachers posing open-ended questions; asking students to explain their learning, process, or thinking; answering questions with questions, such as through Socratic seminars; posing higher-level depth-of-knowledge questions; and using document-based questions)
- students engaging in inquiry-based learning
- students performing close readings and analysis of text
- students producing writing (especially writing that explains their thinking).[3]

The second most common set of answers (62 responses) reported by district leaders, which overlaps with the first set about rigor, pertained to real-world, applied, authentic, or hands-on learning. We labeled this theme *experiential learning*. The most common example within this theme was project-based learning (30 of 62 responses). One urban leader wrote that their most effective teaching activity was "[p]roject-based learning approaches linked to mastery-based learning. Teachers who facilitate this type of real-world learning tend to cast a wider net for student investment in the inquiry and analysis process, which leads them to deeper levels of critical thinking." For some districts, these projects were capstone, end of course, or senior projects.

Respondents in other districts reported that every subject in every grade includes project-based learning. Given the frequency of mentions of project-based learning, we followed up in spring 2024 with another question to learn more specifics, which we turn to in the next section.

After project-based learning, district leaders' next most frequently reported examples of experiential learning were science, technology, engineering, and math (STEM) courses (in 13 of 62 responses) and career and technical education (CTE) courses (in 9 of 62 responses). Here, examples included robotics, fabrication labs, science projects, agricultural courses, courses in construction trades, and computer coding.

Although leaders did not explicitly state why real-world applications necessarily promote critical thinking, a few answers offer some clues. One leader said that solving real-world problems encourages students to "think in a non-linear fashion." Another wrote that real-world issues offer up good ways to engage students in problem-solving, which necessarily involves critical thinking. A third leader elaborated that real-world applications are more interesting for students and that sustaining student engagement is needed to "cultivat[e] curiosity, develop intellectual resilience, and [provide] consistent opportunities to problem solve." In sum, the answers we obtained implied two things about the importance of real-world applications: By first drawing in and then—equally critically—*sustaining* student interest in an activity, students can (1) develop proficiency in the given subject matter and (2) learn how to solve problems.

Finally, the third theme we identified based on district leaders' reports on their most effective teaching or learning activity to develop students' critical thinking skills was *giving students choices* (7 responses). The idea, as some district leaders described, is to develop students' agency and allow them to follow and develop their passion in the projects or classes they choose. District leaders wrote about the choices they offer during an exploratory class period, including creating individual plans of study, dual-enrollment courses, and CTE options. As one district leader wrote, "It is critical to develop a system where you can gather student perspective on their interest and develop both the instructional resources and learning experiences to further develop their pursuits of passion. This is how we have developed the infrastructure for rigorous high school courses and pathways." We turn to the topic of giving students more say in their instruction later in this report.

As a follow-up question, we asked district leaders in fall 2023, "What do other districts need to know so they can use this teaching and/or learning activity? (Please describe intended frequency, who needs to do what, or other factors districts need to know to do this well.)" Here, we received 130 relevant responses. District leaders' reports were highly overlapping and typically mentioned one or more of the following four building blocks for good implementation:

- elements of good planning, such as allotting time for staff to collaborate in order to set clear goals and—working backward from these goals—to set clear expectations and hash out logistics
- high-quality teacher training that includes modeling and coaching
- progress monitoring, replete with measuring student outcomes and professional collaboration time for teachers to examine student work and lesson design
- for experiential learning like internships, taking the time to coordinate between the school and community members to create high-quality experiences that align to student interests.

Project-Based Learning

Because many district leaders on the fall 2023 survey mentioned project-based learning as the most effective learning activity to foster critical thinking skills, we then asked district leaders in our spring 2024 survey, "Can you provide an example from your district of project-based learning for middle or high schoolers that you deem particularly effective at fostering critical thinking? In what subject(s), grades, or for which student populations is your district having success?" We offered a "not applicable" answer for districts not offering project-based learning and for

those who did not feel their project-based learning was successful.

We received 79 relevant answers about project-based learning in middle or high school grades (and 47 responses of "not applicable").[4] Respondents again most typically listed one example, but many listed several; we included all of the responses in our tabulations. As the following examples illustrate, the project topics reported by district leaders varied substantially. Projects most often involved real-world applications to explore jobs, science, engineering, or finance. The three most common kinds of projects were as follows:

- **CTE courses in high school** (in 22 of 79 responses). For example, one district leader wrote, "We have a number of courses offered through our career and technical programs that involve hands-on projects such as creating mobile apps, designing CAD [computer-aided design] projects, building robots, and building a small aircraft." Another leader said, "We have seen success in our [agricultural] business courses. These are currently taught to students in 9–12th grade."
- **STEM courses or activities in middle school** (in 20 of 79 responses). For example, one district leader said, "6th grade science at our middle school. Students work on hands-on STEM labs to develop solutions to a scientific problem utilizing the next generation science standards and the engineering design process."
- **STEM courses or activities in high school** (in 13 of 79 responses). For example, one district leader said, "Our STEAM [science, technology, engineering, art, and math] classrooms make active use of robotics. Students explore coding and programming and can integrate that learning to align with their own creative interests."

Although these three categories were the most common, the variety of contexts in which project-based learning reportedly occurred was large. For example, districts listed Project Lead the Way; students creating and running businesses (e.g., a food truck project); students building a small house; students designing a sample city; science fairs; personal finance projects; schools' civics requirements, for which students pick and propose how to solve a problem (e.g., what time of day school should start); marine robotics; music; dance; art; mock trial; and stock market clubs.

Furthermore, ten district leaders indicated that project-based learning was embedded in all middle grade subjects for all students, and 11 said the same about high school subjects. As one district leader wrote:

> We utilize more of a Problem Based Learning [PBL] style, as we found "project" tends to confuse teachers with "simple project" [and] not always deeper thinking and application. We use PBL in K–12, all grades, with all student populations because PBL leads students through an authentic, relevant learning experience that requires higher level thinking opportunities. In addition [to covering] the state standards, PBL allows us to integrate instructional strategies (summarize, compare/contrast, infer, etc.) and 21st Century life/career skills (communication, critical thinking, social awareness, etc.) into learning.

Six district leaders described financial literacy or business entrepreneurship projects. As an example, one district hosts Reality University, in which students need to "envision [what] their life look[s] like when they are 26. Will they have kids, will they have gone to college, what kind of house will they live in, what kind of car will they drive." Students complete a lifestyle survey, and then,

> using divorce rates from our area, students are randomly married, divorced or single [based] on the results of their survey. The project culminates with a real world experience where they have a month's salary based on their survey, their GPA, [and] divorce rates[,] and they have to survive life, purchasing a home, a car, insurance, preparing for the unexpected, [and] paying for a cell phone bill, child care, groceries. Community support and volunteers help bring this activity together for all 8th and 10th graders in our district. The project is then tied back to individual plans of study and coursework planning.

Seeking Students' Input About Teaching and Learning

A throughline in district leaders' reports about their districts' promotion of students' critical thinking was the centrality of engaging students in activities in which they were active designers or participants in learning rather than passive consumers of information. Our survey asked district leaders how they collected student input about teaching or learning and what sorts of changes they made, if any, based on this input.

This was an admittedly imperfect way to gauge how, exactly, schools actively engage students in their learning. But we chose to ask district leaders whether their schools had formal mechanisms to elicit student input on instructional matters because district leaders could reliably report on those mechanisms. In other words, although a superintendent would not necessarily know the percentage of schools offering their students a choice about which, say, project topic to investigate in a specific class or grade level, they *would* be able to say whether their school district surveys students annually about their preferences of course offerings in electives.

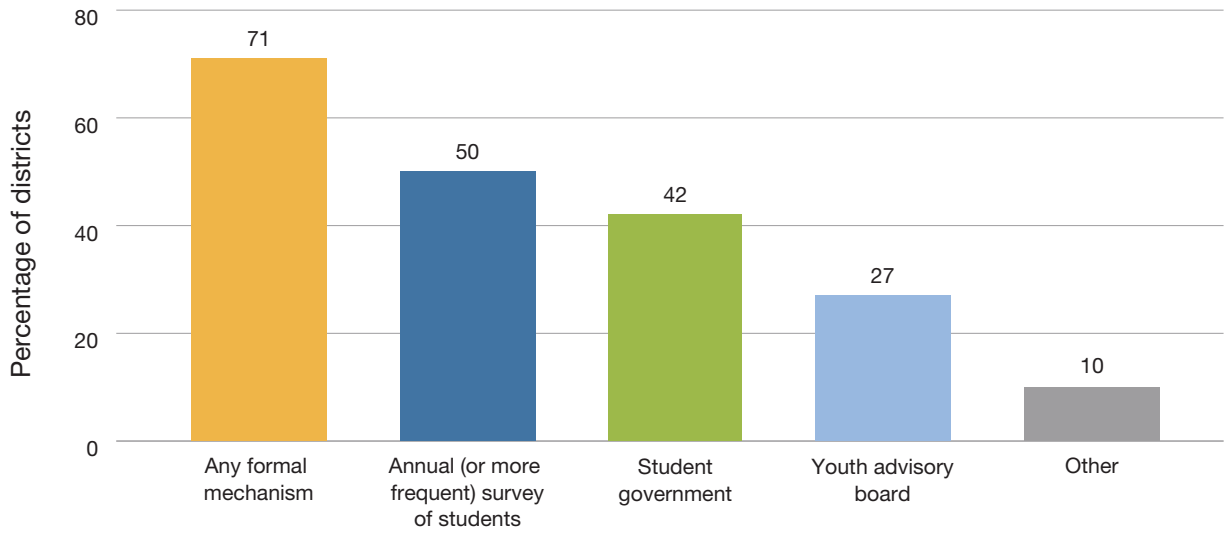
Seven of Ten Districts Reported Having One or More Mechanisms to Collect Student Input About Teaching or Learning

In fall 2023, we asked district leaders whether any of their schools formally collected or encouraged student input about teaching or learning in the 2023–2024 school year. The results are shown in Figure 1. We listed three specific options (i.e., "Annual [or more frequent] survey of students," "Student government," "Youth advisory board") plus an "other" option. We also listed the option "N/A; our district does not offer formal mechanisms to collect student input about teaching or learning," which is not shown in the figure.

As shown in the leftmost bar in Figure 1, 71 percent of districts reported having one or more activities to collect student input. The most common activity, which 50 percent of districts selected, was "Annual (or more frequent) surveys of students." The "other" mechanisms that respondents wrote in were variations of youth advisory boards (such as to the school board or to the superintendent), "shadow a student" day, nonvoting youth membership in the

FIGURE 1

Formal Mechanisms to Collect or Encourage Student Input



NOTE: This figure depicts response data from the following survey question in fall 2023: "Do any of your schools or your district offer formal mechanisms to collect or encourage student input about teaching or learning in the 2023–2024 school year?" (n = 208). Respondents were asked to select all that apply.

school board, and student focus groups with six-week improvement cycles.

District Leaders' Examples of Responses to Student Input Were Often Related to Making Instruction More Hands-On and Engaging

Of those district leaders who indicated in fall 2023 that their district had at least one formal mechanism to collect student input about teaching or learning, we then asked, "Can you provide an example of a change to teaching and learning that one or more of your schools enacted in response to student input?" We received 116 relevant responses,[5] which we thematically coded to tabulate the frequency of mentions. Although our question did not specify older grade levels, the large majority of examples pertained to the middle or high school level.

The most common theme, which 25 district leaders touched on with varied examples, was students choosing or shaping courses. For example, one district leader wrote, "Students requested the addition of business courses/business program. Students requested flex time be worked into their day if they are a student carrying a high load of AP [Advanced Placement]/dual enrollment courses." Another wrote, "Students advocated for student internships, an additional guidance counselor, and more dual enrollment opportunities, all of which were implemented." A third district wrote, "We de-tracked our 9th and 10th grade classes," and a fourth offered: "Students have provided input about course offerings at the high school level. We have changed our offerings. We have increased opportunities at our CTE program for grades 9 and 10. We have added business partnerships based on student feedback as well."

The second most common theme reported by district leaders (in 16 of 116 responses) related to the school schedule—the start or end time of the school day, the length of the school year, or the duration of classes. One district switched to block scheduling at the high school because of student input. Another district leader said, "All levels have been using feedback from students to change how they use their instructional minutes. . . . This is an ongoing iterative process at elementary [school] translating into more electives, middle school translating into new electives, and high school block scheduling and a focus on pathways." A third district changed its school start time and added brain breaks and wellness breaks.

The third most common theme reported by district leaders (in 15 of 116 responses) related to the relationships between students and staff. Here, most district leaders alluded to changes they made in response to students' feedback about the climate at school. For example, as one district leader wrote, "The feedback on student belonging showed that we were strongest in elementary [school], a little less so in middle school, and our most challenging area was high school. We have built targeted events and school climate and culture into our school site improvement plans across the district." Other districts added more time for students to collaborate and interact with each other. Another started an inclusion club and an e-sports club. And several districts wrote more generically that they worked on building relationships between teachers and students.

Adding more project-based instruction was the fourth most common theme reported by district leaders (in 14 of 116 responses). In one district, "[b]ased on student input, [middle school] instruction methodology changed from traditional teaching to project-based learning and team teaching." In a second, "[w]hile designing our Learner Profile, we solicited feedback from students as well as other stakeholders. They indicated they wanted more hands-on type activities." Additional districts added "workplace learning," service-based learning, more speakers with "real-world experiences," more STEAM experiences, and more hands-on learning.

Finally, the only other theme with more than ten examples reported by district leaders was shaping curriculum (in 11 of 116 responses). In one district, students are on the curriculum review and selection committee. In another, "[s]tudents expressed a desire for more constructivist, engaging lessons at the high school level. The site is now focused on professional development and collaboration among teachers to implement this." A third district included a student in a group creating performance tasks under the supervision of curriculum specialists. The need for new performance tasks was triggered by student feed-

back requesting more-engaging learning experiences. Finally, students reportedly had a far-reaching impact on the curriculum in a fourth district:

> Student voice/activism at one of our schools triggered an overhaul of our curricula resources. Students mandated that our curricula become increasingly more culturally and linguistically responsive in the board-adopted resolution, Know Justice, Know Peace. The impact of the resolution included an audit of all curricula resources for cultural responsiveness, feedback loops to support curriculum revisions, and professional learning to ensure teachers are capable of delivering lessons that focus on Black, Indigenous, and Latino communities' trauma with sensitivity, and [of] craft[ing] lessons to celebrate Black, Indigenous, and Latino communities' narratives that transcend beyond traumatic events.

All other examples reported by district leaders received fewer than ten mentions. These examples included adding or retaining technology, increasing focus on social and emotional competencies, changing homework assignments, adding books to the library, or adding tutoring.

Districts' Theories of Action for Learning

We conclude with districts' theories of action about learning. Theories of action for learning are the rationale for what good instruction looks like, and our intent in asking district leaders about their theories was to determine whether they included elements of deeper learning. Among the districts that reported having a theory of action for learning, we did not find elements of deeper learning commonly showcased in districts' rationale for good instruction.

We asked district leaders in fall 2023, "Has your school district formulated a theory of action for teaching and learning (e.g., 'If our district does X, we will create Y')? If yes, can you please write out the theory of action here?" In addition to an open text field, we listed an "N/A—Our district does not have a theory of action" response.

According to reports from district leaders, more districts did not have a theory of action than did: 136 district leaders selected "N/A—Our district does not have a theory of action" or wrote in "no" to our question, eight said that they were developing one, 24 skipped the question, and 47 provided some type of theory of action. Excluding the 24 districts that skipped the question, about one-quarter of surveyed leaders indicated that their district has a theory of action for teaching and learning.

Districts' Theories of Action Are Primarily Focused on Instructional Quality

Districts' theories of action had surprisingly varied focus. The most common focus in the examples provided by district leaders (in 19 of 47 responses) was offering high-quality instruction. The second most common type of answer was not exactly a theory of action but rather a description of the main framework or plan that the district adheres to (in 7 of 47 responses). Third most common was building good relationships with students (in 6 of 47 responses). There were fewer than five examples of all other areas of focus we identified in the theories of action. Those were the cultural responsiveness of instruction, project-based learning, offering students choice, treating students with respect, educator wellness, and promoting equity.

Examples of theories of action about high-quality instruction included the following:

- "If the [district name] Public Schools engage in a strategic, systemic alignment of curriculum, assessment, instruction, professional development, and resources around complex thinking, then classroom instructional practice will demonstrate a clear focus on complex thinking, and student work will demonstrate complex reasoning, inquiry, problem solving skills, and the exploration of ideas."
- "If we subscribe to a common vision of excellent instruction and provide high-quality curriculum and instructional materials and provide guidance, professional learning, and coaching to enhance the capacity of school

staff in these areas and support implementation and progress monitoring of high-quality instruction within cycles of continuous improvement then all students will experience high-quality teaching and learning which will increase academic achievement and accelerate growth."
- "If students are actively engaged in rigorous, inclusive, meaningful and engaging (RIME) lessons by highly effective teachers and are supported to take on the cognitive demand of each lesson students will meet grade level expectations through performance tasks aligned to standards."
- "If we implement our Ambitious Instruction initiative that includes explicit instruction, formative practice and engagement strategies, then students will have high-quality instruction that will lead to increased student outcomes."

Examples of answers about frameworks or plans that districts use as their guide for learning included the following:

- "If our district fully implements our strategic plan, we will create a stronger system of support for all students and staff members and increase overall performance across the system."
- "We are currently working on several theories of action (ToA); first a ToA aligned to our new strategic plan and secondly a ToA [aligned] to how the Office of Teaching Learning and Leadership supports schools which includes a teaching and learning approach."
- "We are using Marzano's [High Reliability Schools] framework as the center of our work."
- "Yes—we have an Instructional Compass, and a Portrait of a Graduate. The compass includes pedagogical approaches and the portrait represents the expected outcomes."

Examples of theories of action about relationships with students included the following:

- "If our staff builds strong relationships with students, our students will be successful academically, socially and emotionally."
- "If students have unconditional belonging, are engaged and connected then students will thrive as learners that will lead to success beyond high school."
- "When we learn from our community and bring the lived experiences of our students and families into our planning [to] support our teachers, leaders, and staff to deliver academically challenging, data-informed, and equity-driven education[,] proactively collect, analyze, and share information that clearly defines where our students stand in terms of academics and social-emotional wellness, and align our actions and resources at every level of the organization to drive improvement in teaching and learning, [t]hen, all students will graduate READY FOR THE WORLD to thrive in college, career, and life."
- "Building relationships [will] lead to better core instruction, while ability grouping our disrupting behavior students [will allow] our progress monitoring scores to increase exponentially."

Examples of theories of action statements about other, infrequently mentioned topics included the following:

- "If our district engages students in [project-based learning], we will likely create students who are intellectually engaged, develop their soft skills (e.g., collaboration) and [grow] critical thinking skills & dispositions."
- "If we meet students where they are, they will be successful."
- "If all students in grades 3–8 develop a vision for themselves tied to personal interests and skills with a connection to college/career in the context of project-based learning, student attendance will increase as well as performance on standard core measures and success in credit attainment among freshman in the following years."
- "If the district creates welcoming classroom environments & enforces a clearly communicated and strict attendance policy then we will improve students' attendance & lessen the number of failed courses."

Implications

Similar answers emerged from the questions we posed to school district leaders in fall 2023 and spring 2024 about their most effective teaching activity to promote critical thinking and actions that districts have taken in response to their students' input. These are two core elements of deeper learning for students. In responses to both questions, districts emphasized a shift to hands-on, often project-based instruction designed to engage students actively in their own learning. Of course, we have no way of knowing whether the many activities that districts mentioned were implemented as described or whether the activities, if implemented, improved students' learning.

However, district leaders' reports suggest that the activation of students in their learning seems to be a key factor in district leaders' mental models of critical thinking, which makes sense because the skill is sometimes dubbed "thinking about thinking." Leaders' primary examples of successful teaching of critical thinking skills involve (1) teachers posing high-level questions to students and (2) students learning problem-solving skills through real-world project-based learning. Rigorous academic classroom discussion and career-based, inquiry-based, and STEM mentions abound in district leaders' examples of successful teaching about critical thinking. And, interestingly, applied forms of learning are ones that district leaders also indicated that students requested.

Research about teaching students critical thinking skills aligns with district leaders' responses. Two studies that synthesize evidence from across many quantitative studies find that teacher questions, applied problem-solving, and collaboration on problem-solving do, in fact, promote critical thinking (Abrami et al., 2015; Xu, Wang, and Wang, 2023). The former meta-analysis concludes that class discussion and applied learning (such as project-based learning) are "effective in combination, particularly when [one-on-one] mentorship is added to the mix" (Abrami et al., 2015, p. 302).

Many district leaders' go-to examples of applied learning were CTE courses and project-based learning, such as design labs where students make things like robots, businesses, and blueprints. And many leaders' answers indicated that these activities were isolated to specific grade levels, such as an 8th grade science class or a senior project. However, other districts described embedding project-based learning in every subject and every grade. This latter group suggests that districts have the ability to embed applied, problem-solving tasks into not only the go-to "real-life" classes, such as business, finance, technical training courses, or science, but also other core academic courses, such as history, English language arts, social studies, and math. This could be a promising direction to increase student engagement, collaboration, and critical thinking skills.

Interestingly, the elements that district leaders frequently highlighted as their most effective at promoting critical thinking—such elements as applied tasks, problem-solving, or giving students choice—did not often appear in the approximately 40 examples we obtained of districts' theories of action for teaching and learning. Although theories of action appear to be a relatively rare practice for districts, the responses we received tended to focus on the fidelity of teachers' instruction with the elements of a high-quality system that has aligned standards, curriculum, assessment, and professional development. Certainly, high-quality instructional systems can and do include the kind of rigorous teaching questions and classroom dialogue, student choice, and even applied learning tasks that researchers and district leaders endorsed. Nevertheless, the centrality of applied problem-solving and higher-level teacher questioning to critical thinking implies that they should perhaps be elevated within districts' theories moving forward.

Notes

[1] To learn more about Bento, go to www.getbento.info/about or email bento@kitamba.com.

[2] Instead of listing generic examples, such as teachers posing high-level questions, some districts listed specific products, approaches, or programs . We categorized the type of activity that these programs or approaches focus on and include our categorization in our counts of examples and themes. The specific approaches, programs, or products that districts listed included Advancement Via Individual Determination, Socratic seminars, depth of knowledge, International Baccalaureate, Advanced Placement, visible learning, Cambridge Assessment International Education, the Modern Teacher network, cooperative learning, Building Thinking Classrooms, Project Lead the Way, New Pedagogies for Deep Learning, the books *Falling in Love with Close Reading* (Lehman and Roberts, 2013) and *Teach Like a Champion 3.0* (Lemov, 2021), Kagan Cooperative Learning Structures, and the Next Generation Science Exemplar program.

[3] Although not about students' active participation per se, district leaders also mentioned teachers' faithful use of curriculum as their districts' most effective activity to cultivate students' critical thinking skills. Several districts also mentioned differentiating instruction to engage students at different learning levels.

[4] In addition to the 79 responses about project-based learning in middle or high school grades, there were fewer than five additional answers about elementary grades that we excluded. We excluded another small number of responses (fewer than ten) that were not examples of project-based learning. There were also 39 nonresponses in which the survey respondent left the question blank.

[5] In addition to the 116 relevant responses, we received 18 responses that indicated some form of "no" or "not applicable."

References

Abrami, Philip C., Robert M. Bernard, Eugene Borokhovski, David I. Waddington, C. Anne Wade, and Tonje Persson, "Strategies for Teaching Students to Think Critically: A Meta-Analysis," *Review of Educational Research*, Vol. 85, No. 2, 2015.

Alliance for Excellent Education, "A Time for Deeper Learning: Preparing Students for a Changing World," May 2011.

Common Core State Standards Initiative, "Preparing America's Students for Success," webpage, undated. As of July 15, 2024: https://www.thecorestandards.org/

Grant, David, Claude Messan Setodji, Gerald P. Hunter, Melissa Kay Diliberti, and Heather L. Schwartz, *Technical Documentation for the Eighth American School District Panel Survey*, RAND, RR-A956-20, 2024a. As of June 18, 2024: https://www.rand.org/pubs/research_reports/RRA956-20.html

Grant, David, Claude Messan Setodji, Gerald P. Hunter, Melissa Kay Diliberti, and Heather L. Schwartz, *Technical Documentation for the Ninth American School District Panel Survey*, RAND, RR-A956-24, 2024b. As of August 8, 2024: https://www.rand.org/pubs/research_reports/RRA956-24.html

Lehman, Christopher, and Kate Roberts, *Falling in Love with Close Reading: Lessons for Analyzing Texts—and Life*, Heinemann, 2013.

Lemov, Doug, *Teach Like a Champion 3.0: 63 Techniques that Put Students on the Path to College,* 3rd ed., Jossey-Bass, 2021.

Lucas Education Research, "The Evidence Is Clear: Rigorous Project-Based Learning Is an Effective Lever for Student Success," undated.

Next Generation Science Standards, homepage, undated. As of July 15, 2024: https://www.nextgenscience.org/

Vander Ark, Tom, and Carri Schneider, *Deeper Learning for Every Student Every Day*, William and Flora Hewlett Foundation, 2014.

Xu, Enwei, Wei Wang, and Qingxia Wang, "The Effectiveness of Collaborative Problem Solving in Promoting Students' Critical Thinking: A Meta-Analysis Based on Empirical Literature," *Humanities and Social Sciences Communications,* Vol. 10, January 2023.

Zhang, Lu, and Yan Ma, "A Study of the Impact of Project-Based Learning on Student Learning Effects: A Meta-Analysis Study," *Frontiers in Psychology*, Vol. 14, July 2023.

Acknowledgments

We are extremely grateful to the educators who have agreed to participate in the panels. Their time and willingness to share their experiences are invaluable for this effort and for helping us understand how to better support their hard work in schools. We thank Daniel Ibarrola for serving as the survey manager; Gerald Hunter for serving as the data manager for this survey; and Tim Colvin, Roberto Guevara, and Julie Newell for programming the survey. Thanks to Claude Messan Setodji for producing the sampling and weighting for these analyses. We greatly appreciate the administrative support provided by Tina Petrossian and American Educator Panels management provided by David Grant. We also thank Umut Ozek, Sy Doan, and Laura Hamilton for helpful feedback that greatly improved this report. We thank Chris Anthony for her editorial expertise and Monette Velasco for overseeing the publication process for this report.

About This Report

In fall 2023 and spring 2024, we surveyed American School District Panel (ASDP) member districts about their successful teaching of critical thinking skills, their project-based learning, changes they made based on collecting student input, and their theories of action for teaching and learning. This series is intended to provide brief analyses of educator survey results of immediate interest to policymakers, practitioners, and researchers. If you would like to know more about the dataset, see *Technical Documentation for the Eighth American School District Panel Survey* (Grant et al., 2024a) and *Technical Documentation for the Ninth American School District Panel Survey* (Grant et al., 2024b) for more information on survey recruitment, administration, and sample weighting.

The American Educator Panels (AEP) are nationally representative samples of teachers, school leaders, and district leaders across the country. The panels are a proud member of the American Association for Public Opinion Research's Transparency Initiative. If you are interested in using AEP data for your own surveys or analysis or in reading other publications related to the AEP, please email aep@rand.org or visit www.rand.org/aep. Through the AEP Data Portal available from that site, researchers can download survey data files to perform their own analyses.

The ASDP is a research partnership between RAND and the Center on Reinventing Public Education. The panel also collaborates with several other education organizations—including the Council of the Great City Schools and MGT—to help ensure we produce actionable results. For more information, visit the ASDP website at www.americanschooldistrictpanel.org.

RAND Education and Labor

This study was undertaken by RAND Education and Labor, a division of RAND that conducts research on early childhood through postsecondary education programs, workforce development, and programs and policies affecting workers, entrepreneurship, and financial literacy and decisionmaking. This report is based on research funded by William and Flora Hewlett Foundation. The findings and conclusions presented are those of the authors and do not necessarily reflect positions or policies of the foundations that supported this research.

More information about RAND can be found at www.rand.org. Questions about this report should be directed to hschwartz@rand.org, and questions about RAND Education and Labor should be directed to educationandlabor@rand.org.

www.rand.org