Defined

Evidence-Based Strategies to Boost Student Engagement and Success

The American Rescue Plan Act of 2021 provides more than $122 billion in funding to help K-12 schools offset learning loss and otherwise respond to the COVID-19 pandemic. This additional relief aid supplements the $68 billion in federal assistance that came before.

To take advantage of this Elementary and Secondary School Emergency Relief (ESSER) funding, however, schools must use evidence-based practices as they aim to close achievement gaps and meet the needs of students who were most affected by the pandemic.

Understanding by Design and Project-Based Learning are two evidence-based learning strategies that have proven to be successful. K-12 leaders should consider these strategies as they look for evidence-based practices to help combat learning loss among their students. This white paper takes a closer look at these two strategies by examining how they work, why they're effective, and how they can engage and motivate students while improving academic achievement.

Understanding by Design® (UbD®)

Developed by Jay McTighe and Grant Wiggins, UbD is a curriculum, assessment, and instructional planning framework that aims to support deeper learning.

The big ideas of UbD are contained in its title. The first of those is understanding. "We believe that a modern education should focus on students' capacity to transfer their learning by applying it to new situations," McTighe says.

Transference requires more than rote learning. "Rote learning only allows you to repeat back what you've been told," McTighe explains. "To transfer knowledge, you have to have a deeper understanding of both concepts and processes—and you need to be able to see when and where those apply."

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UbD's focus on cultivating a deeper understanding of concepts isn't intended to replace the development of basic skills or foundational content knowledge. "Clearly, there is foundational knowledge is every discipline, and basic skills are essential—you can't do anything without these," McTighe says. "But I like to propose that the basic skills should be thought of as the floor, not the ceiling, of a modern education."

The second aspect of UbD is designing curriculum to allow for this deeper learning to occur. UbD proposes a three-stage backwards design process that begins with the end goals in mind.

In the first stage, educators identify the specific content knowledge and skills they want students to learn, as well as the larger ideas they want students to understand. Then, they form essential questions designed to stimulate students' thinking and help them achieve this understanding.

The second stage involves determining the assessment evidence to show that (1) students have acquired the target knowledge and skills, and (2) students understand and can apply their learning. The final stage involves planning lessons and activities that are connected to the goals from stage one and that prepare students for the assessments in stage two.

Just as foundational knowledge and basic skills are still important, traditional tests and quizzes still have a place in assessment. However, UbD places a premium on having students show that they understand and can apply their learning through more authentic performance tasks and projects.

"These aren't just something a teacher would do at the end of a lesson or unit to give students a grade or measure," McTighe says. "They serve a more important function than simply assessment. Authentic tasks and projects should actually be thought of as the goals of learning. We're teaching

skills and content knowledge so that students can apply their learning to actual challenges and situations. Assuming they're worthwhile activities that are aligned with content standards, think of performance tasks or projects as learning goals through which we can also assess what students know and can do."

Why UbD is highly engaging

From a motivational standpoint, students are more likely to put forth effort to learn something if they see purpose and relevance in the task. A key characteristic of high-quality performance tasks is that they're set in authentic contexts and present real-life challenges that have relevance to students' lives.

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One analogy that McTighe likes to use compares authentic performance tasks to athletics or other extracurricular activities. "We often see students who put forth mediocre effort in academics give supreme effort and focus when they're on a sports team, rehearsing for a play, or practicing for a concert," he observes. "Those extracurriculars are authentic performances." UbD aims to make academic learning more like participation in these extracurricular activities, where there is an authentic performance driving the learning.

Evidence of success

According to McTighe and educational consultant Elliott Seif, the UbD framework is guided by cognitive psychology research, including studies on how people learn. The two published a summary of the research basis underlying UbD[1], and some of the key principles that support the UbD framework include:

- Knowledge learned at the level of rote memory rarely transfers; transfer most likely occurs when the learner knows and understands underlying concepts that can be applied to problems in new contexts. Learning with understanding is more likely to promote transfer than simply memorizing information.

- Experts first seek to develop an understanding of problems, and this often involves thinking in terms of core concepts or big ideas. Novices' knowledge is much less likely to be organized around big ideas; instead, novices are more likely to approach problems by searching for formulas and pat answers that fit their intuition.

- Many assessments measure only factual knowledge and never ask whether students know when, where, and why to use that information. To achieve deeper learning, assessments must focus on understanding and not simply facts or procedures.

McTighe and Seif also describe how research supports the use of authentic approaches to learning. For instance, Newmann et al. (1996) conducted a study of 24 elementary, middle, and high schools that had restructured their curriculum to implement authentic pedagogy and assessments in math and social studies. They compared the performance of these students with similar students in classrooms with low levels of authentic learning, and the results were striking: Students with high levels of authentic pedagogy and performance were helped substantially whether they were high- or low-achieving students.

"The study provides strong evidence that authentic pedagogy and assessments pay off in improved academic achievement for all students, but especially for low-performing students," they write.

Project-Based Learning (PBL)

PBL is an instructional strategy in which students learn by actively engaging in projects that are personally meaningful to them and have real-world relevance.

In PBL, "students work on a project over an extended period of time—from a week up to a semester—that engages them in solving a real-world problem or answering a complex question," says PBLWorks (formerly the Buck Institute for Education), which aims to build the capacity of teachers to implement PBL in their classrooms. "They demonstrate their knowledge and skills by creating a public product or presentation for a real audience. As a result, students develop deep content knowledge as well as critical thinking, collaboration, creativity, and communication skills."

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PBL and UbD share some common DNA. Both rely on the use of authentic performance tasks to guide and assess student learning. However, the projects in PBL tend to be larger in scope, longer in duration, multidisciplinary in nature, and more student-directed.

Research confirms that PBL can be a highly motivating and effective learning strategy when done well. To encourage high-quality implementation, PBLWorks has created a PBL model called the Gold Standard, which includes seven essential project design elements:

- **A challenging problem or question.** The project is framed by a meaningful problem to be solved or a question to answer, at the appropriate level of challenge.

- **Sustained inquiry.** Students engage in a rigorous, extended process of posing questions, finding resources, and applying information.

- **Authenticity.** The project involves real-world context, tasks and tools, quality standards, or impact, or it speaks to personal concerns, interests, and issues in the students' lives.

- **Student voice and choice.** Students make some decisions about the project, including how they work and what they create, and express their own ideas in their own voice.

- **Reflection.** Students and teachers reflect on the learning, the effectiveness of their inquiry and project activities, the quality of student work, and obstacles that arise and strategies for overcoming them.

- **Critique and revision.** Students give, receive, and apply feedback to improve their process and products.

- **A public product.** Students make their project work public by sharing it with and explaining or presenting it to people beyond the classroom.

"PBL can mean many things to many different people," says John Larmer, an educational consultant who was with the Buck Institute for 20 years. "But there's a difference between Gold Standard PBL and a teacher just saying to students, 'Go build a model of a pyramid.' Much of what we see from PBL in schools is loosey-goosey, rather than rigorous implementation. To have a real impact, PBL should be intentionally designed and focused around clear content standards."

Why PBL is highly engaging

As with UbD, PBL is highly engaging and motivating because it is built around real-life challenges that are connected to students' lives. This helps students see the relevance of what they're learning.

Giving students a voice and choice in their learning is also very empowering; as best-selling author Dan Pink notes in his book *Drive*, autonomy and purpose are two of the three main drivers of human motivation (the third being mastery). In addition, completing projects for an authentic, public audience rather than just their teacher further motivates students to do their best work.

"You can have incredible, engaging instruction happen in a traditional environment. However, I believe that closing the achievement gap can be accelerated when you create an environment in which students have clarity around the 'why' behind what they're learning, they get to drive the learning, they get to ask the questions, and they can identify the best way to demonstrate their learning," says Tabitha Branum, deputy superintendent of schools for the Richardson Independent School District in Texas. "That's what happens in PBL, and I don't know if you can replicate that in any other way."

She adds: "To hear kids talk about their learning differently (is really powerful). It was no longer, 'Well, I have to learn about the quadratic equation for this test.' Instead, they were able to articulate how to use this skill in order to design a solution to an authentic problem. That's what we want for kids, and that's what PBL does."

Evidence of success

In *Setting the Standard for Project-Based Learning*, which Larmer co-authored along with John R. Mergendoller and Suzie Boss, there is a chapter summarizing 25 years of research on PBL's effectiveness.[2]

"Multiple K-12 research studies document that students engaged in PBL score higher on both traditional and performance-based assessments compared to similar students learning the same material using traditional instructional methods," they write. The research also reveals higher levels of student engagement and motivation.

For instance, Geier et al. (2008) conducted a two-year study in 18 public middle schools in Detroit. About 5,000 students—most of whom were receiving free or reduced-price lunches—and 37 teachers participated. Students in PBL classrooms worked on projects targeting physical, biological, and earth science, answering questions such as: Why do I need to wear a helmet when I ride my bike? What is the water like in my river? What is the quality of air in my community?

Norwalk schools use UbD and PBL to prepare students for success

Norwalk Public Schools in Connecticut has adopted a student-centered approach to learning that uses evidence-based practices to boost achievement. Teachers report that students are thinking more deeply about classroom topics, and they're more engaged in the learning process.

Norwalk's curriculum framework is modeled on UbD. "A unit of study begins with the end in mind, where teachers come up with essential questions that will drive the learning and they describe the culminating task right at the beginning," says Tina Henckel, director of STEM education. "This provides context and purpose for the students as they enter a given unit."

In addition to traditional methods, teachers use projects and performance tasks as instructional strategies. However, after brainstorming with instructional teams, "it was clear to me that we needed more structure around the design of projects," Henckel says. To provide this additional structure, the district has partnered with Defined Learning.

"Teachers use the Defined Learning platform and project templates as a launching pad for delivering rich PBL experiences for our students," she observes.

One eighth-grade unit was built around the essential question: "What is a legacy?" The culminating task asked students to design a unique space for student and staff use that could be utilized long after the eighth graders graduated from the school. "Students used various technology tools such as WeVideo and Google Sketchup to deliver their final products to a team of district design experts, including an architectural firm," Henckel recalls.

Norwalk's approach is helping students learn fundamental skills that are critical for success. "According to the World Economic Forum, analytical thinking and innovation are the top skills that employers will require in 2025, followed by active learning and complex problem-solving," Henckel notes. "Cultivating a learning environment where students are practicing these skills in the classroom will better prepare them for their future."

Students, too, prefer this new way of learning. When district officials asked students about their experience with PBL, they heard statements such as, "It is our voice. It isn't teachers telling us what to do—it's what we want to do" and "I like collaborating and working together with my friends on something we think is cool."

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At the end of the year, all students took the Michigan Assessment of Educational Progress (MEAP) administered by the state. Over the course of the study, students in the project-based classes scored significantly higher than students who had covered the same material using traditional methods.

In 2013-14, the American Institutes for Research (AIR) studied a group of "Deeper Learning" schools known for their schoolwide attention to PBL. Students at these schools had higher standardized test scores, on average, than similar students in comparison schools not committed to PBL and deeper learning, AIR found. Students at the Deeper Learning schools also reported higher levels of academic engagement, motivation to learn, and self-efficacy; were more likely to graduate; and were more likely to enroll at a four-year college or university.

"Project-based learning brings together a number of factors that have been shown to encourage motivation," the authors conclude. "First, PBL involves a collaborative group effort, and working with other students is usually motivating (Blumenfeld et al., 1991). Second, PBL allows students to have voice and choice, and such opportunities for self-expression and decision making are considered very powerful motivators among both students and adults (Brophy, 2013).

Third, PBL emphasizes authenticity in the tasks that are completed and the public product that emerges from the project, and such authenticity encourages student engagement (Brophy, 2013; Seidel, 2011). Finally, PBL generally involves novelty in the nature of the questions addressed, the academic tasks completed, and the contexts in which the project unfolds. PBL is not school as usual, and this is a strong catalyst of student motivation and engagement (Blumenfeld et al., 1991; Thomas, 2000)."

A unique opportunity

The nearly $200 billion in ESSER funding represents a unique opportunity for K-12 leaders to make significant investments in improving instruction and closing achievement gaps among students.

Leaders should think carefully about how to invest this money, choosing evidence-based strategies that can make a big impact on student learning and motivation if they're implemented wisely. UbD and PBL are two such strategies, and they have proven to be effective across numerous scenarios.

To learn how Defined Learning's curriculum can help schools implement authentic learning tasks and projects that can close achievement gaps and lead to deeper learning, **visit www.definedlearning.com**.

About Defined Learning

Defined Learning is an online Project-Based Learning solution that provides K-12 teachers with the tools they need to engage students in Gold Standard PBL. Each project includes an authentic performance task that follows the Understanding by Design® framework and provides students with the opportunity to apply their knowledge and skills. Defined Learning empowers students to build the critical skills they need to succeed in college, careers, and life. **To learn more, visit www.definedlearning.com**.

[1] McTighe, J., and Seif, E. (2005). "A Summary of Underlying Theory and Research Base for Understanding by Design." Alexandria, VA: ASCD.
https://www.jaymctighe.com/wp-content/uploads/2011/04/UbD-Research-Base.pdf

[2] Larmer, J., Mergendoller, J., and Boss, S. (2015). *Setting the Standard for Project Based Learning : A Proven Approach to Rigorous Classroom Instruction*. Alexandria, VA: ASCD.   http://www.ascd.org/Publications/Books/Overview/Setting-the-Standard-for-Project-Based-Learning.aspx