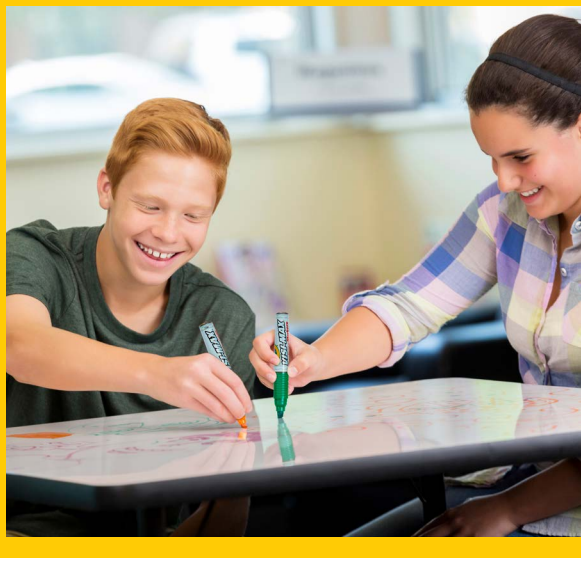
Transforming Schools by Developing Creative Leadership Built Around Art-Infused Education



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INTRODUCTION

We live in a time of unparalleled potential for education. Never before have so many resources been available to support teaching and learning. Never before have we known so much about what makes for effective instruction, and how to transform schools in positive ways.

At the same time, educators and students face substantial challenges as well. Students are expected to master both traditional knowledge and new literacies, but often find it difficult to connect with what they are learning in school—and how they are learning it. Teachers are expected to teach for deeper understanding, foster meaningful connections with students, and provide quality instruction while at the same time fulfilling institutional requirements—and maintaining their own positive attitudes and professional satisfaction. Education leaders in turn struggle with supporting both teachers and students, while at the same time dealing with institutional challenges such as retaining good teachers and improving school climate.

Educators know there is no magic wand anyone can wave that will solve all the challenges they and their students face. However, recent research suggests an approach with potential to help in a number of areas. This is the approach presented by the Crayola model for school transformation—a model of creative leadership built around art-infused education.

The Crayola Model of School Transformation

The Crayola model builds on decades of involvement with art-infused education, including a recent collaboration with President's Committee on the Arts and the Humanities (PCAH) Turnaround Art Schools, National Association of Elementary School Principals (NAESP), and the Partnership for 21st Century Learning, and draws on research on effective school change, professional development, and pedagogy. The result is an innovative approach to teaching and learning that starts with a shared vision, provides ample professional development and support to build creative leadership for educators and students, and integrates art education across the curriculum. The approach incorporates making meaning through art; multiple approaches to literacy—written, digital, mathematical, and visual; and implementing an art rich approach to STEAM, focused at grades K–8.

Research suggests that a transformative model such as this one can contribute to positive outcomes in a variety of areas. Innovative, research-supported teaching strategies can help to make learning deeper and more engaging for students, while at the same time helping to foster creativity and develop valuable social skills and habits of mind. These outcomes in turn have the potential to help improve student interest and behavior in school. Likewise, teacher experiences can be improved not only through the positive impacts on students, but also by building teachers' professional capacity while fostering teacher leadership, collaboration, and peer support.

About This Paper

The remainder of this paper consists of the following sections:

- The value of art-infused education
- Key instructional ideas, including project-based learning, making meaning through art, metacognition, student leadership development, and design thinking
- Creative leadership, where we address the school change process and professional development
- Recommendations for implementation

The first three major sections present research evidence and expert opinion and describe how the Crayola model of school transformation aligns with the research findings. The final section brings together recommendations for local educators based in research and expert opinion about how to effectively implement a program of creative leadership built around art-infused education.

The Value of Art-Infused Education

- Art infused education using art integration approaches has the potential to improve student engagement, motivation, and academic achievement.

Art education has long been a valued part of K–12 schooling in the United States. However, it has traditionally been seen as something separate from instruction in academic subjects such as reading and math. Crayola's approach encourages collaboration among all teachers, giving art and core content educators the opportunity to work synergistically and strategically to improve student outcomes. But this approach is now changing. Increasingly, there is interest in the idea that art may have benefits that extend into the subject areas, with potential for improving student engagement and motivation while at the same time deepening content area learning.

Benefits of High-Quality Art Education

According to a recent review of research findings and best practices, high quality arts education programs continually emphasize "the value of the arts in helping students to make sense of their world, make connections between disparate ideas, and make connections between the self and others." In short, arts education at its best represents, "in every discipline at every level," a way for students to make meaning (Charleroy et al., 2012, p. 8).

More specifically, in-depth analysis of art instruction by Hetland et al. (2013) identified six general "habits of mind" that are developed by art education, in addition to more specifically art-related skills and content. They describe these habits of mind as follows:

- "**Engage and Persist**: Learning to embrace problems of relevance within the art world and/or of personal importance, to develop focus and other mental states conducive to working and persevering at art tasks.
- "**Envision**: Learning to picture mentally what cannot be directly observed and imagine possible next steps in making a piece.
- "**Express**: Learning to create works that convey an idea, a feeling, or a personal meaning.
- "**Observe**: Learning to attend to visual contexts more closely than ordinary "looking" requires, and thereby to see things that otherwise might not be seen.
- "**Reflect**: **Question and Explain**: Learning to think and talk with others about an aspect of one's work or working process. **Evaluate**: Learning to judge one's own work and working process, and the work of others in relation to standards of the field.
- "**Stretch and Explore**: Learning to reach beyond one's capacities, to explore playfully without a preconceived plan, and to embrace the opportunity to learn from mistakes and accidents" (p. 6).

The authors argue that these habits of mind may transfer to other disciplines, particularly if instruction is designed to promote transfer. Additionally, they make the case that regardless of transfer, such habits of mind possess value in themselves (p. 7). They argue: "While arts teachers rightly resist making their classes like 'academic' classes, teachers of academic subjects might well benefit from making their classes more like arts classes" (p. 11, quoting Winner & Hetland, 2007).

An important study of inner city third graders in two major U.S. cities found evidence of this kind of transfer from high-quality visual arts instruction. In one city, participating classes completed two 90-minute visual arts classes a week in a local arts facility for 20 weeks, with a focus that included "self-expression through drawing, painting and sculpture...[and] teaching students to engage their senses, particularly touch and sight." In the other city, classes engaged in an in-school residency program with a professional ceramics artist for one hour a week over 30 weeks, with students creating "individually produced ceramic and ceramics-based sculptural works" (Catterall & Peppler, 2007, p. 545).

Comparison of student pretest and posttest results found that more than half of the students who had participated in the programs significantly improved their self-efficacy beliefs, compared to slightly more than one-third of the students in the comparison group—a statistically significant difference.[1] Students who participated in the programs also were significantly more likely to show improvements in the "originality" subscale of a standard creativity test (p. 554). Discussing the importance of these findings, the authors argued that

> tendencies toward original thinking spawned by artistic learning may spill over or transfer to original thinking more generally. Confidence about the ability to generate novel solutions to problems or conceiving original pathways when facing a roadblock is a workable definition of self-efficacy. (p. 559)

Art Integration Approaches

Looking more specifically at the inclusion of art as part of content-area instruction, a 2011 report by the President's Committee on the Arts and the Humanities (PCAH) describes the benefits of arts integration, which they define as "teaching 'through' and 'with' the arts, creating relationships between different arts disciplines and other classroom skills and subjects" (p. 19).

The report found research documenting "significant links between arts integration models and academic and social outcomes for students, efficacy for teachers, and school-wide improvements in culture and climate," including outcomes that were "often seen school-wide and...with the most hard-to-reach and economically disadvantaged students" (p. 19). More specifically, studies reported "better attendance and fewer discipline problems, increased graduation rates, and improved test scores; motivating students who were difficult to reach otherwise; and providing challenges to more academically successful students." In addition, "economically disadvantaged students and English learners...[experienced] reading achievement gains" (p. 19, citing Fiske, 1999; Ingram & Reidel, 2003; DeMoss & Morris, 2002).

The promise of an arts integration approach is illustrated by the recent Turnaround Arts project, in which Crayola was a partner. Eight low-performing "turnaround" schools (elementary and middle school) with high free and reduced lunch rates (88% to 100%) and high ethnic minority populations participated from around the country. Schools selected for the program had to show strong school leadership, have at least one full-time arts specialist on staff, and commit to arts education as part of the school's "turnaround strategy." Key elements or "pillars" of the program implementation included

> 1) principal leadership, 2) the strategic use of arts specialists, 3) non-arts classroom teachers integrating arts into core content, 4) the use of teaching artists and community organizations, 5) the engagement of the district, parents, and community, 6) strategic arts planning, 7) professional development, and 8) improvements to the school environment. (President's Committee on the Arts and the Humanities, 2015, p. vi).

Results included improvements both in academics and in student behavior. Out of the 8 schools, 7 improved the percentage of students meeting criteria for proficiency in reading and 6 improved the percentage meeting criteria for proficiency in math, with every school improving in at least one area. Over the three years of the program, the Turnaround Arts schools improved their percentage of math proficiency by 22.6% and their reading proficiency by 12.6%—significantly higher rates of improvement than comparable schools[2] (p. vii).

[1] The study authors described self-efficacy beliefs as "children's self-beliefs about their abilities to make things happen for themselves, their capacities to conceive and carry out actions, and their general sense of agency in life" (p. 544). Reported differences were significant at $p<.01$.

[2] I.e., other schools in their states that received federal School Improvement Grants.

With respect to student behavior, 5 out of 8 schools "demonstrated dramatic improvements in...in out-of-school suspensions, in-school suspensions, and/or overall disciplinary actions" (p. vii). Additionally, based on a 2014 survey of teachers and school leaders:

- More than 75% in every school agreed that using the arts in classroom reduced the number of disturbances within the classroom.
- More than 75% in every school agreed that using the arts reduced students being off-task.
- 70% to 100% of the educators in every school reported that "the arts had helped increase parent, student, and teacher engagement in the school and in instruction" (p. 51).

Crayola's Art-Infused Education Approach

Crayola promotes an art-infused education program focusing on integration of visual arts into the content curriculum in areas including reading, writing, science, and math. The program is designed to help students develop art-related habits of mind and apply them in the academic content areas. For example, the program is designed to:

- Foster student engagement and persistence (e.g., in designing and carrying out projects)
- Help students develop the habits of envisioning and expressing ideas, observing visually, and reflecting on their experiences
- Encourage students to stretch and explore their own capabilities.

In all these ways, Crayola helps bring the power of art into the entire spectrum of student learning experiences.

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Key Instructional Ideas

Project-Based Learning

- Well-designed project-based learning has the potential to support deep student content learning and help students develop other valuable cognitive and interpersonal skills.

Learning in the Crayola model takes place largely within the context of student projects. By utilizing a project-based learning (PBL) approach, teachers are able to promote deeper learning while at the same time helping students express their own creativity and develop key cognitive and interpersonal skills that extend beyond the subject areas.

While there are many different "flavors" of PBL, researchers identify several core elements that are central to most versions. These include a student-centered focus for instruction; some variety of real-world question or authentic challenge; and a process in which students (usually working in groups) develop and carry out a plan and create a product or presentation of findings (e.g., see Holm, 2011, p. 1).

Research Support for the Value of PBL

Research evidence suggests that compared to more traditional instructional strategies, project-based learning can result in comparable or superior content knowledge while at the same time providing other academic benefits, such as development of media literacy and critical thinking skills.

In a review of the research literature about project-based learning published by MDRC, Condliffe et al. (2016) began by citing Thomas's (2000) finding that "PBL can support student learning and may be more effective than traditional modes of instruction," then added that research published since 2000 included "numerous studies reporting positive associations between a PBL approach and students' development of knowledge and cognitive skills" (pp. 42, 46). The largest body of evidence was in science instruction, with fewer studies from math, social studies, and English language arts.

Benefits associated with PBL included not only content knowledge but also key interpersonal and intrapersonal aspects of education, including "improve[d] student attendance (a possible proxy for student engagement), self-reliance, and attitudes towards learning" (Condliffe et al., p. 52).

More broadly, Barron and Darling-Hammond (2008) found that "small group inquiry approaches" (a blanket category including project-based learning, design-based learning, and problem-based learning) "can be extremely powerful for learning" (p. 13). They argued further that in order for students to "gain vital media literacies, critical thinking skills, systems thinking, and interpersonal and self-directional skills," such skills need to be developed "in the context of complex, meaningful projects that require sustained engagement, collaboration, research, management of resources, and development of an ambitious performance or product" (pp. 11–12). Specific benefits of PBL cited by Barron and Darling-Hammond included increases in student "curiosity, creativity, independence, and positive feelings about school" (p. 15).

Along similar lines, Holm (2011) summarized comparative studies that "found project-based learning to be an effective means of teaching both content information and related skills. Students in project-based classrooms exhibited greater gains in content knowledge than their traditionally taught peers" (p. 8). The studies also found greater gains in other areas, including information literacy skills and process and group skill development (p. 8). Additionally:

In all studies where student attitude was examined, project-based learning was perceived positively by participants, and described as fostering greater engagement with the subject matter. Students reported enjoying the active, hands-on approach to content, as well as improved perceptions of the subject matter. (p. 9)

Recommendations for Implementing PBL

An important caveat is that the benefits of PBL described above are not consistently found in every school or study where PBL is implemented. Research supports the following recommendations for increasing the chances of successfully implementing PBL:

- Provide strong professional development support in order to help teachers "catch the vision." Ideally, such PD should itself feature PBL experiences (Condliffe et al., 2016, p. 42).
- Support teachers in changing both classroom practices and the pedagogical beliefs that may underlie those practices. As Condliffe et al. (2016) note, "PBL requires a major shift in teacher practice because the student-centered and constructivist orientation of a PBL approach challenges the dominant modes of interaction in a classroom" (p. 30).
- Support teachers in addressing the classroom management demands that often accompany PBL (Condliffe et al., 2016, p. 33, citing Mergendoller & Thomas, 2000). Valuable peer support can be provided through peer coaching and professional learning communities.
- Use a whole-school approach. Teachers find it easier to adopt PBL when all or most of the teachers in their school are also implementing it (Condliffe et al., 2016, pp. 40–41, 62).

Crayola's PBL Model

As noted above, project-based learning is a central feature of student learning using the Crayola model. This takes place in the context of a whole-school approach to school transformation. Key elements of the Crayola approach to PBL include the following:

- Cross-curricular content connections. Crayola projects use art as a tool to explore intersections among the subject areas.
- An inquiry process, moving from a problem, challenge, or question to a solution, creation, or response, often involving design thinking (Barron & Darling-Hammond, 2008, p. 13; Holm, 2011, p. 2). By completing this process, students in Crayola projects engage their creativity while addressing important content-related ideas.
- Collaboration. Support for collaborative learning is both one of the advantages that is frequently cited in support of PBL, and one of its most common defining characteristics (e.g., Condliffe et al., 2016, p. 14). Crayola projects combine individual and collaborative group work , providing opportunities for students to learn together and build leadership and social skills.
- Student-directed. Researchers in the field of PBL cite the importance of student choice (Holm, 2011, p. 14). In the Crayola model, students take the lead in planning and carrying out their own projects, with support from the teacher.
- Use of art processes and activities to make meaning. These include hands-on activities, visual representations and expressions, etc. (For more details, see the section on Making Meaning Through Art, below.)
- Student self-reflection. Condliffe et al. (2016) cite several researchers on the importance of having students engage in self-reflection and feedback as part of the PBL process (p. 16). In the Crayola model, students are prompted to reflect on their experiences through journaling. (For more details, see the section on Metacognition later in this paper.)

- Professional development and support, including peer coaching, are provided to help teachers implement the Crayola PBL approach. For more details, see the section on professional development later in this paper.

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Making Meaning Through Art

- Hands-on activities involving students making meaning through art can help to develop students' visualization skills, contributing to improved reading comprehension and deep learning.

A key characteristic of art-infused instruction is the use of drawing and other hands-on strategies to explore ideas and concepts across the various academic subject areas. Such activities draw on the link between hand and brain, with the potential to make learning more meaningful for students. Engaging in these kinds of activities also supports students in developing visual representations of what they know—a strategy that is supported by research as helping students both to improve their reading comprehension and to deepen their content learning.

Hands-on Learning

Neurologist Frank R. Wilson, in his groundbreaking book *The Hand: How Its Use Shapes the Brain, Language, and Human Culture*, draws on brain research, research on the evolution and current physiology of the hand, and Wilson's own investigations to explain ways that hand use contributes to cognition—a process that continues throughout the stages of life. Citing both the findings of researchers and the reflections of professionals who work extensively with their hands, he argues that "the hand speaks to the brain as surely as the brain speaks to the hand" (Wilson, 1998, p. 291 citing Davies, 1986). In light of this insight, he makes that case that "the most effective techniques for cultivating intelligence aim at uniting (not divorcing) mind and body" (p. 289).

In an article about the role of the hands in learning, Wilson explains further that "interaction of the hand with objects in the real world gives rise to...'ideas,' " taking advantage of the hand as "a sort of express lane" to the brain (1999, p. 9). This process begins in early childhood but continues in later stages of life. By the time a child becomes an adolescent, the hand "becomes a connecting link between self and community and a powerful enabler of the growing child's determination to acquire adult skills, responsibility, and recognition" (p. 12). Drawing, sculpting, and other artistic activities involving use of the hand take advantage of this connecting link in ways that can provide deep and meaningful learning experiences for students.

Visualization in Reading Comprehension

Researchers De Koning and van der Schoot (2013) define *visualization* in the context of reading comprehension as "the process of forming nonverbal representations...of objects or events that are not physically present but are described in a text." Visualization can occur "externally," for example, by making a drawing of the nonverbal representation or completely "internally" in the person's head (p. 264, citing Hibbing and Rankin-Erickson, 2003;

Sadoski and Paivio, 2001).

Theoretical support for visualization. Visualization as a reading comprehension strategy is supported by important theories of cognition. In Paivio's *dual coding* theory, "verbal and nonverbal information is processed in separate but interconnected mental subsystems in working memory." Based on this theory, visualization during reading supports comprehension "by bridging [verbal] information in the text and a reader's [non-verbal] mental representation" (De Koning & van der Schoot, pp.264– 265, citing Clark & Paivio, 1991; Sadoski and Paivio, 2004).

According to more recent theories of *embodied cognition*, higher order cognitive processes such as language are "grounded in the same neural systems [e.g., sensory and motor systems] that control direct perception and interaction "with the surrounding world." Following this theoretical perspective, helping students to visualize while reading gets them to "activate perceptual and/or motor experiences stored in long-term memory that are relevant to the events described in the text"(De Koning & van der Schoot, p. 266, citing several sources).

In either case, visualization is expected to aid comprehension by linking the text to what the reader knows from sensory and motor experience with the world.

Research on external visualization. Research suggests that having readers draw pictures while reading is effective as an external visualization strategy when they receive "supports such as drawing prompts or guiding questions" to improve the accuracy and level of detail in their drawings. Providing such supports has been shown to improve "free recall performance, drawing accuracy, and problem-solving outcomes." In contrast, having readers draw without such supports "shows no comprehension benefits" (De Koning & van der Schoot, 2013, p. 275).

Van Meter and Garner (2005) report that "comprehension gains resulting from a drawing activity are most likely to be found on tests of deeper understanding " (De Koning & van der Schoot, p. 275)

Leopold and Leutner (2012) found that when reading scientific texts, having readers construct a drawing was superior to "other reading comprehension strategies (i.e., main idea selection, summarizing)" (De Koning & van der Schoot, p. 275).

External and internal visualizations complementary. Based on their review of both external and internal visualization strategies, De Koning & van der Schoot conclude that "both strategies could fulfill complementary roles in the visualization process." They recommend that readers first be guided to "depict text content" through external visualization (e.g., by drawing), then gradually be introduced to the strategy of "visualiz[ing] the text content through mental imagery" only (p. 280).

What Works Clearinghouse confirmation of visualization efficacy. Based on its review of two experimental studies involving visualization training with second graders, the What Works Clearinghouse concluded that "visualizing is a useful component of multiple-strategy instruction" (Shanahan et al., 2010, p. 51). Commenting on this finding, the President's Committee on the Arts and the Humanities described visualization as "clearly a skill that could be supported by helping students draw or paint pictures...[of] what they imagine from a story" (2011, p. 23).

Concept Mapping

According to Hattie (2009), "Concept mapping involves the development of graphical representation of the conceptual structure of the content " students are trying to learn (p. 168).

In his synthesis of meta-analyses of student achievement, Hattie found that concept mapping "can assist in synthesizing and identifying the major ideas, themes, and interrelationships—particularly for the learners who do not have these organizing and synthesizing skills." This learning advantage was greater for lower ability than for

higher ability students (p.168–169).
The benefit of concept mapping was more pronounced when it "occurred after initial exposure to the material to be mapped" and "when the emphasis was on understanding the central...ideas of the topic being mapped" rather than on the details (pp. 168–169, citing several sources).

Concept mapping was shown to be more effective than "lectures or discussions of the topic" and similar in effectiveness to constructing an outline. However, concept mapping was more effective than simply " studying text passages, lists, or outlines." (pp. 168–169, citing Nesbit and Adesope, 2006).

The Value of Art Activities

Several sources talk specifically about the potential of student artmaking activities to deepen student knowledge through hands-on activities and visualization strategies.

According to Hetland, Winner, and Veenema (2013), among the "studio habits of mind" that art instruction helps to develop is the ability to envision, which they describe as "Learning to picture mentally what cannot be directly observed and imagine possible next steps in making a piece" (p. 6). The authors argue that it is "reasonable to suggest" that the habit of envisioning could apply to other contexts, such as science classes (p. 7),

More specifically with respect to art-infused instruction, a review of research and best practices stated that "[t]here is evidence that integrating art into other subject areas... can enhance students' abilities to learn new concepts, and pictorial representation techniques in these subjects may effectively be used to communicate their ideas more fully" (Charleroy et al., 2012, p. 50). For example, activities in which students make drawings "can contribute directly to learning, rather than being an extension activity" (p. 50, citing Edens & Potter, 2001).

Researcher and educational specialist Mary Ann Reilly described the potential of art-based activities in writing with an example in which third graders created visual collages, then used them as springboard to write stories. Teachers reported an increase in both the volume and the fluency of students' writing. Reilly explained that "creating a visual representation of the story" allowed students to "see their thinking displayed....The collage becomes a physical (re)presentation of their thoughts" (2010, p. 117).

A research-based report from the New York State Department of Education described art integration as enhancing literacy for English language learners and tied this in part to the impact of visualization. For example, teachers at a school serving a large ELL population:

> Observe[d] that drawing to represent science concepts often engages students who might otherwise be disinterested in science and can help students move beyond simple recall when they are asked to make connections and come up with a unique interpretation through an artwork or drawing. (New York State Education Department Office of Bilingual Education and Foreign Languages Studies, 2010, p. 6)

How Crayola Helps Students Make Meaning Through Art

Crayola's approach to art integration provides extensive opportunities for both teachers and students to give visual expression to their internal thinking and make meaning through hands-on art activities in cross-curricular contexts. For example:

- As part of the professional development process associated with the Crayola model, local educators explore use of the visual arts for making thinking visible in the content areas through hands-on activities.
- Projects typically involve students working together to create concept maps, "mind maps" (similar to concept maps but simpler and using words and images to represent ideas), and other hands-on visual expressions of ideas and concepts—including connections between concepts from different subject domains.

- Students engage in writing projects where artwork serves as a springboard for writing."
- Students and teachers are prompted to keep a journal in which they typically respond to reflective prompts with a combination of words and pictures —an application of external visualization strategy.
- Products in which students express their understanding at the conclusion of a project typically include elements of visual expression.

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Metacognition

- Students learn more deeply and effectively when they are guided to practice metacognition as part of their learning process, including planning and reflection activities.

According to Baker (2013), metacognition includes both "knowledge about the skills, strategies, and resources that are needed to perform a task effectively" and "the use of strategies to ensure successful task completion, such as planning, evaluation, and monitoring" (p. 419). As such, it encompasses activities such as learners reflecting on their experiences and considering what to do next in order to achieve their desired outcomes.

A sizeable body of research evidence confirms the value of metacognition as an element of student learning. For example, Hattie (2009) identified an effect size of 0.69 for metacognitive strategies, making this one of the more effective strategies reviewed (pp. 188–189). Baker (2013) confirmed both the positive impact of metacognitive strategies across core subject areas and that "these strategies can be successfully taught" (p. 421).

Metacognition is important not only for knowledge acquisition in general but more specifically for learning that will be meaningful for the student. According to Darling-Hammond (2008), "studies consistently find that that highly effective teachers support the process of meaningful learning by...[e]ncouraging *strategic and metacognitive thinking*, so that students can learn to evaluate and guide their own learning" (p. 5, emphasis in original).

Importance of Reflection as a Habit of Mind

Findings in several areas identify the metacognitive practice of reflection as an important habit of mind for students to develop. More specifically:

- Describing the habits of mind developed by studio thinking, Hetland et al. (2013) identified reflection, which they described as incorporating questioning, explaining, and evaluating (p. 6).
- As noted above, student self-reflection is an important element of successful PBL implementation (Condliffe et al., 2016, p. 16).
- Researchers recommend helping students develop an "aptitude for self-reflection" as a way to help build leadership self-identity (Avolio & Vogelgesang, pp. 195–196; Faa, 2015, pp. 13–14).

How Crayola Supports Use of Metacognition

As part of the project process, students—and educators during professional development—plan and evaluate their own learning activities, involving elements of metacognition.

More specifically, reflective journaling by both teachers and students in response to prompts stimulates metacognition in areas including planning, monitoring, and evaluation. Models from master teachers help to point individuals toward using the journals in this way.

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Student Leadership Development

- Research on leadership and leadership development and experts in the field have identified critical elements to address and ways schools can support student leadership development.

What is leadership? From the perspective of Avolio and Vogelgesang (2011), researchers of early leadership development, leadership is "a social influence process by which individuals motivate followers to move toward a particular goal or mission" (p. 187).

Based on this understanding of leadership, Avolio and Vogelgesang argue that "leaders are both born and made" (p. 182). For example, studies on identical and fraternal twins suggest that while parents and genetics play a role in leadership development, education also "contribute[s] to emergence of individuals into leadership roles much later in life" (pp. 183–184, 185, citing Arvey, Zhang, Avolio, & Krieger, 2007). Experts note the that

helping children develop their leadership potential can improve their motivation to lead as they grow older (Faa, 2015, p. 15, citing Gottfried et al., 2011; Kretman, 2009) and point to childhood as a critical time for leadership intervention (Avolio & Vogelgesang, 2011, p. 183, citing Sorcher & Brant, 2002).

Necessary Elements for Effective Leadership Development Training

Empirical research on leadership and leadership development, and Avolio and Vogelgesang's (2011) leadership emergence developmental model (p. 187), suggest important elements to address in helping children develop as leaders.

Promotional focus. Researchers recommend helping students to develop a "promotional focus" driven by aspirations and "goal-attaining desires," as opposed to a "prevention-focused strategy," seeking to maintain the safety of the status quo by not reaching for higher levels of success (Avolio & Vogelgesang, 2011, p. 188, citing Lapidot, Kark, & Shamir, 2007; Faa, 2015, p. 13, citing Wagner, 2008; Higgins & Spiegel, 2004, pp. 171–172).

Optimistic style. According to Murphy (2011), an "optimistic style" plays an important role in self-regulation and self-management among potential leaders. She observes that "those with a more optimistic style tend to take credit for their successes," but when they don't succeed, they seek explanations related to the situation during which failure occurred. Murphy notes, "This self-protective thought pattern helps people tackle challenging situations...and...plays a role in how they manage their subsequent behavior." She advises that teachers can help foster an optimistic attitude toward leadership by praising instances of successful leadership and guiding students to identify obstacles and "methods to increase their proficiency" in cases of unsuccessful leadership (2011, p. 17, citing Seligman, 1998).

Motivation to lead. "Motivation to lead" (MTR) is an internal state that positively influences "leaders' decision[s] about undertaking leadership positions and sustain[s] the drive toward attaining the desired goals." Experts recommend that educators foster MTR by providing students with early, positive leadership experience, starting with "small and less challenging leadership roles...that do not have high costs associated with them" that students will take on due to "a sense of duty" (Avolio & Vogelgesang, pp. 189–190, citing Chan & Drasgow, 2001; Lapidot, Kark, & Shamir, 2007; Murphy, 2011, p. 17).

Leader self-efficacy and personal agency. Leadership self-efficacy is people's belief in their ability to accomplish leadership tasks and succeed in a leadership role. Such belief, combined with a sense of personal "agency"—i.e., "taking ownership and responsibility for their own leadership development"—work together to shape successful emerging leaders. Researchers recommend that teachers can help students develop both leadership self-efficacy and personal agency regarding leadership (Avolio & Vogelgesang, p. 192; Faa, 2015, p. 13, citing Popper & Mayseless, 2007).

Learning goal orientation. Avolio and Vogelgesang distinguish a "learning goal orientation" from a "performance goal orientation." Individuals with a learning goal orientation "desire to increase competence incrementally." In contrast, those with a "performance goal orientation" seek to reach "a specific goal and receiv[e] a positive evaluation—a task-by-task completion focus." Research suggests that those with a learning goal orientation adopt challenging goals, are more persistent in pursuit of their goals, attain their goals more often, and seek feedback to continuously improve. Avolio and Vogelgesang recommend that educators help students develop a learning goal orientation (pp. 190–191).

More specifically with respect to leadership development, researchers argue that a learning goal orientation can contribute to leader self-efficacy: "[I]f we can develop a learning goal orientation in our emerging leaders, they may be more apt to approach leadership roles, thus strengthening their efficacy in approaching future leadership opportunities" (Avolio & Vogelgesang, p. 191, citing multiple sources; see also Murphy, 2011, p. 17).

Self-regulation. Specific aspects of self-regulation related to effective leadership include "goal setting, cognitive strategies of planning or rehearsing, and monitoring of goal attainment" (Murphy, 2011, p. 16, citing Markus & Wurf, 1987).

Additional leadership skills and attributes to develop. Researchers have identified other skills and habits of mind associated with successful leadership that can be developed through appropriate experiences and instruction:

- "People skills," including collaboration, communication, listening, conflict resolution skills, and social competence
- Higher order skills, including decision-making, critical thinking, and problem solving skills
- Habits of mind, including a sense of openness and curiosity, conscientiousness, and moral judgment (Faa, 2015, pp. 13, citing several sources; Murphy, 2011, p. 11, 18, 24)

Ways Educators Can Help Develop a Leadership Self-Identity in Students

Researchers recommend a variety of ways for educators to support students' development of a leadership self-identify, including exposing them to successful leaders; providing opportunities for students to serve in leadership positions; providing them with service learning opportunities; providing leadership coaching; and helping students develop an "aptitude for self-reflection" (Avolio & Vogelgesang, pp. 195–196; Faa, 2015, pp. 13–14, citing Greenwald, 2010; Kouzes & Posner, 2002; Murphy, 2011, p. 18)

Ways Schools Can Support Leadership Development

Based on research and expert opinion, schools can support student leadership development by doing the following:

- Work to improve school culture by developing a clear schoolwide vision and mission, encouraging the participation of students and other key stakeholders, and maintaining consistent communication about the school's vision, definition of leadership, and the leadership program (Faa, 2015, pp. p. 15–16, 23, 61–62, citing several sources).
- Plan a leadership curriculum and a formal leadership program in collaboration with students, make it available to all students, and establish this as a priority for the school (pp. 14–16, 22, 62, citing Hall, 2005; Stella, 2013; and several other sources).
- Promote 21st century learning, including creativity, innovation, problem solving and team building, and communication skills (p. 20, citing multiple sources).
- Provide staff time for collaboration on the program and time devoted to leadership programming, and develop a sense of school community (pp. 18–19, 23, 60, citing several sources).
- Assign a visible program facilitator, and organize partnership groups (pp. 59–60).

Ways Crayola Builds Student Leadership

Professional development for teacher leaders provided by Crayola includes a focus on creative leadership, during which participants consider together what it means to be a creative leader and make plans for their own local leadership activities. The Crayola program guides teacher leaders to support classroom teachers, who in turn lead students through a process of articulating a schoolwide vision and mission, integrating a focus on leadership throughout the school. Participating schools commit to dedicating time for teacher leadership development and class time to focus on leadership.

Students engage in student-led project-based learning, during which they explore how leaders make decisions related to challenges they face. Students are also prompted to consider how they make decisions in the face

of their own challenges. In the course of this and subsequent projects, students use and develop 21st century skills, including problem solving, team building, and communication skills. Many PBL activities take place in collaborative small groups, where students take on group responsibilities with leadership opportunities. The Crayola approach to PBL activities include time for prompted student self-reflection.

Throughout the school year, students' PBL experiences across the curriculum feature artistic expression (e.g., drawing, painting, sculpting). This not only promotes their creativity but also provides opportunities to develop "studio habits of mind" that relate to effective leadership, such as engagement and persistence, reflection, and stretching and exploring (Hetland et al., 2013; see The Value of Art Integration above).

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Design Thinking

- Design thinking—an integral part of the STEAM approach to integrated learning of science, technology, engineering, arts, and math—represents both a potentially effective approach to instruction and an important part of the knowledge base students are expected to develop.

Design is a key concept underlying art, engineering, and science, and every other field involving creative processes to generate products or solutions. Projects in an art-infused context provide opportunities for students to experience the design process and develop a design thinking mindset.

Evidence for Design-Based Learning as a Promising Instructional Method

Design-based learning—described as a small group inquiry approach based on "the idea that children learn deeply when they are asked to design and create an artifact that requires understanding and application of knowledge"—was identified by Barron & Darling-Hammond (2008) as one of several approaches that "can be extremely powerful for learning" (pp. 13, 45). They based this conclusion on findings across "science, technology, art, engineering, and architecture," with much of the supporting evidence coming in the domain of science (p. 48, citing multiple sources).

Mehalik et al. (2008) provides an example of the instructional power of design-based learning as a method for teaching science. Students in 26 urban eighth grade science classes "designed and built electrical alarm systems to learn electricity concepts over a four-week period using authentic engineering design methods," including having students "articulate their own needs for a particular design" (p. 71). In comparison, students from another 20 classes engaged in a "traditional scripted inquiry" approach in which they followed "step-by-step instructions for most aspects of [the] investigation" (p. 75).

Results showed that student learning was superior from the design-based learning approach:

- On a test of science content knowledge, the design group showed significantly higher gains from pretest to posttest—a mean gain of 16%, compared to a mean gain of 7% for the scripted inquiry group (p. 77).[1]
- While the design group had scored substantially lower on the pretest, posttest performance was essentially the same between the two groups (less than 1% difference).
- One possible explanation of the pretest difference between the two groups was that the difference in school socioeconomic status (SES) between the two groups. 53% of the students in the design group were low-SES schools, compared to only 32% of the students in the scripted inquiry group (p. 77).
- Improvement with the design-based learning was particularly noteworthy for African Americans, 21% of whom shifted from the "low achieving" category to higher categories—compared to the scripted inquiry group, where there was a small *increase* in the percentage of African American students who were in the low achieving group (p. 78).

Based on these findings, Mehalik and his colleagues concluded that "it was possible to achieve higher science concept learning when the scientific inquiry process was integrated into a design setting, motivated by meeting needs that students articulated themselves" (p. 81).

Venturing outside the STEAM domains, Leverenz (2014) makes the argument that design thinking represents a potentially powerful approach to writing instruction through the assignment of "wicked problems" that are "contingent and ambiguous" and therefore defy final solutions (p. 3, citing Marback, 2009). Such a writing project calls for a problem-solving process in which students have to "figure out together how to learn about their problem and design a solution" (p. 10). This alternative approach to the standard research paper assignment, according to Leverenz, would make writing tasks more authentic, increase student engagement, and encourage students to take positive risks (p. 3).

Design Thinking as a Goal of Instruction

The *Framework for K–12 Science Education* identifies design thinking as an important part of learning science and engineering. Broadly speaking, the *Framework* defines engineering as "any engagement in a systematic practice of design to achieve solutions to particular human problems" (National Research Council, 2012, p. 11). The *Framework* goes on to clarify that "engagement in the practices of engineering design is as much a part of learning science as engagement in the practices of science" (p. 12).

As described in the *Framework*, the engineering design process includes "defining and delimiting an engineering problem"; "developing possible solutions"; and "optimizing the design solution" (p. 203). Elements of this process, as elaborated in the *Framework*, parallel elements of the art design process, including the need to choose among multiple possible design solutions, the importance of communication, the role of collaboration, the value of visualization, and an iterative process based on feedback and evaluation (e.g., pp. 46–47, 52, 57, 68, 207–208).

Art education researcher James Catterall (2013) argues that it is precisely through this common focus on design that art has the potential to help educators more fully incorporate the engineering element of STEAM. He writes:

Right here, the arts could reenter the discussion and help to bind STEAM into a coherent whole. Simply put, schools could elevate design education in the curriculum...[D]esign and engineering go hand in hand, and a basic course in design is developmentally and curricularly appropriate when it comes to a comprehensive STEAM-focused education. (p. 5)

[1] $p < 0.01$

In short, design thinking provides opportunities for shared learning in art and engineering in particular, and more generally between art and any other subject where a design process takes place. Art can provide tools for initial conceptualization, visual planning (e.g., through sketches), and consideration of aesthetics and the creation of appealing end products.

How Crayola Supports Design Thinking

Students in Crayola projects work together collaboratively to design and create products that answer a challenge or express their insights, using the tools of visual art. In so doing, they naturally engage in design thinking. This has the potential not only to help students engage in meaningful learning about the specific topics they explore in their projects, but also to help them develop a deeper understanding of design as a key process in both art and engineering.

More specifically, local educators in the Crayola model are encouraged to create cross-disciplinary projects that include both an art design component and an engineering design component—integrating art and engineering in authentic STEAM contexts.

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Creative Leadership

Arguing that "[p]romoting new kinds of learning fundamentally depends on creativity," researchers Louise Stoll and Julie Temperley (2009, p. 65) argue the need for creative leadership in education, which they define as follows:

> Creative leadership is an imaginative and thought-through response to opportunities and to challenging issues that inhibit learning at all levels. It is about seeing, thinking and doing things differently in order to improve the life chances of all students. Creative leaders also provide the conditions, environment and opportunities for others to be creative. (p. 66)

This quote encapsulates the essence of creative leadership, as conceived by Crayola. Creative leadership is fundamentally about kindling the creative capabilities of students, teachers, and leaders at the district and school level to make education better for everyone. This is carried out in the Crayola model through a school change process, combined with effective professional development.

Elements of the School Change Process

- ***School improvement efforts have great potential for success if they are systemic and institution-wide, are based on a shared vision, support distributed leadership, and include strategies to build teacher professional capacity.***

Crayola's School Change Process

As part of the model for school transformation, Crayola supports local districts and schools as they complete a flexible change process that incorporates the following elements.

1. **Articulation of goals, a shared vision, and plans for meeting goals**
   Goals, shared vision, and plans for meeting agreed-upon goals are created by the district- or school-level creative leadership team, incorporating both desired outcomes and elements of an art-infused creative approach. Ideally, this team will include art instructors, content area experts (e.g., math and reading coaches), lead teachers, and formal district/school leaders. This process is guided by Crayola consultants.
2. **Professional development for local teacher leaders who will become creative leadership coaches**
   Professional development for the local teacher leaders is carried out by Crayola in a train-the-trainer model.
3. **Sharing the vision and building capacity among classroom teachers**
   Local districts and schools develop a plan for how to build capacity among classroom teachers, incorporating elements of the Crayola approach and Crayola professional development resources, and supported by the local teacher leaders.
4. **Implementation in the classroom**
   Teachers plan collaboratively in teams that also function as professional learning communities, then carry out instruction in their classrooms. As part of the project of developing art-infused projects and lessons, teachers become more creative and engaged. Teacher coaches provide support, and classroom teachers reflect on their experiences.
5. **Informed reflection and program revision**
   Individual teachers, teacher teams, and the district and/or school creative leadership team collect information on how well the program is being implemented and progress toward goals and desired outcomes. At all levels, there is ongoing reflection and collaborative discussion about needed change.

Once the process starts, it is ongoing—less a matter of distinctive phases than of processes happening continuously.

Sections below describe research findings related to elements of educational change as they relate to the Crayola model.

Systemic, Institution-Wide Change

There is general consensus among experts on school improvement that efforts at transforming schools are most effective if they are planned and implemented systemically and school-wide. According to Fullan (2015), policies and associated strategies that are systemic and coordinated are important drivers of positive change (pp. 41–42). Stoll (2009) agrees that school improvement should no longer be done piecemeal, given the complex, fast-changing nature of the educational environment:

> Different parts of the system must...be aligned to provide a coherent and consistent picture and strategy for change, and this means that people with diverse roles in the system have to connect and learn together. (Stoll, 2009, p. 469)

Holm's (2011) research suggests that changes to instructional practice can be enhanced when implemented school-wide. For example, her literature review on project-based learning found that "achievement was higher in schools where the systems and policies [more closely] aligned with project-based ideals.... The optimal application of project-based instruction requires change not only in the classroom, but at school and system levels to optimize effectiveness" (p. 10, citing multiple sources).

Based on their review of research on professional learning in schools, Darling-Hammond et al. (2009) found that collaborative professional development is an important means of promoting "school change that extends beyond individual classrooms. When all teachers in a school learn together, all students in the school benefit" (p. 5). Stoll added that in order for change to be sustainable, professional learning must be ongoing (2009, p. 469).

Crayola's Systemic, Institution-wide Approach

As noted above, Crayola's approach to school change is systemic and is designed to be planned and implemented districtwide or schoolwide.

Shared Vision

Several researchers note the need for a shared vision in order to bring about systemic school improvement.

Leithwood and Sun (2012), based on their meta-analysis of "transformational school leadership (TSL)," identified "*Develop[ing] a shared vision and building goal consensus*" as a transformational school leadership practice identified across multiple models (p. 14, citing multiple sources). Developing a shared vision and goals was found to have statistically significant effects on school conditions (aggregated), teacher commitment, and teachers' job satisfaction, and teacher positive internal states and behaviors (aggregated) (pp. 17–19).

Hallinger (2003) compared the TSL leadership model with the Instructional Leadership model and found that both included "creating a shared sense of purpose" (Leithwood & Sun, 2012, p. 23).

Focusing on the role of teacher instructional leaders, Neumerski (2013) reported that "promoting a shared vision and acceptance of group goals" is one of the ways that" teacher leaders improved student learning" (p. 332, citing Leithwood & Riehl, 2005).

However, Fullan (2005) offers a note of caution about vision:

[A] certain amount of vision is required to provide the clarity and energy for promoting specific changes, but vision by itself may get in the way if it results in impatience...[and] failure to listen...Stated in a more balanced way, promoters of change need to be committed to and skilled in the *change process* as well as in the change itself. (p. 83)

Fullan suggests a search for "*shared meaning*" as a solution, and he stresses that it is essential that the change process "engage[s] individuals and groups to develop new solutions" (pp. 8–9; italics in original). This search for shared meaning is essential if teachers are to "find the considerable energy required to transform the status quo" (p. 37).

Crayola's Approach Encourages Development of a Shared Vision

As noted above, a key element in the Crayola approach is articulation of goals and shared vision in a process that involves collaboration among district and/or school leaders, teachers, and other important stakeholders. When carried out at the local level, this becomes a vehicle for shared discovery of educational meaning and community building—not something that is imposed on educators.

Distributed Leadership

As noted above, Crayola's approach is based on a model of distributed leadership, including prominent roles for teacher leaders and collaborative decision-making among groups of classroom teachers on how to implement instruction. The research literature describes advantages and conditions for successful implementation of this kind of distributed leadership.

Effects of Distributed Leadership

Research has found positive impacts of distributed leadership on students, teachers, and school principals.

For example, Heck and Hallinger (2010) conducted a large-scale (197 primary schools) longitudinal study that used structural equation modeling (SEM) to explore "the impact of 'the changes in distributed leadership on changes in school improvement capacity and growth in student learning.' " The authors found "that distributed leadership indirectly but significantly enhanced students' mathematics and reading performance" (Tian, Risku, & Collin, 2016, pp. 23–24).

Similarly, based on their research on instructional leadership, Printy and Marks (2003) found that "shared instructional leadership between principals and teachers" resulted in student achievement gains (Neumerski, 2013, p. 326).

Effects on teachers. Besides student achievement gains, Printy and Marks's (2003) research also revealed that shared instructional leadership led to positive changes in pedagogy (Neumerski, 2013, p. 326).

Researchers in Belgium observed that in a distributed leadership model, teachers "appeared to welcome support from both formal and informal leaders." They found that "cohesion in the leadership team" can "significantly enhance teachers' organisational commitment and job satisfaction." However, their "commitment seemed to drop if multiple leaders supervised them" (Tian, Risku, & Collin, 2016, p. 24, citing Hulpia et al., 2009a, Hulpia and Devos, 2009b).

Leithwood et al. (2007) point out that the existence of distributed leadership "would not necessarily flatten the [formal] hierarchical structure." Instead, distributed leadership would allow the formal leadership hierarchy to coexist with more fluid, informal leadership structures (Tian, Risku, & Collin, 2016, p. 25).

In contrast to schools with distributed leadership, "schools with only one power centre and a steep hierarchy" tend to result in "poor performance and low morale" (Tian, Risku, & Collin, 2016, p. 19, citing Oswald and Engelbrecht, 2013; Williams, 2011).

Benefits perceived by principals. Neumerski (2013) reports on several studies of principals' perceptions about the benefits of a distributed leadership model that includes teacher leaders and coaches. Perceived benefits included:

- Building of "school capacity" (p. 325, citing Youngs & King, 2002)
- Principal's sense of satisfaction and "increased positive influence over classroom teaching" (pp. 325–326, citing Datnow & Castellano, 2001; Marks and Nance, 2007)

Importance in learning communities and learning networks. Research suggests that distributed leadership is important to the success of "professional learning communities within schools (Hargreaves & Fink, 2006b), [and] also contribute[s] to success of learning networks [that extend beyond the local school] (Hopkins, 2003; Wohlstetter, Malloy, Chau, & Polhemus, 2003)" (Stoll, 2009, p. 481). After reviewing research on learning communities and learning networks, Stoll noted, "Taking distributed leadership seriously means being committed to collective responsibility" (p. 481).

Favorable Conditions for Distributed Leadership

Research suggests that in order for distributed leadership to flourish, there needs to be support from the formal leaders (especially the principal), supportive school structures, professional development, and a climate of trust.

Formal leaders' support. In their meta-analysis of distributed leadership, Tian, Risku, and Collin (2016) found that informal leadership was "significantly shaped by formal leadership....In a distributed leadership setting, formal leaders should… be regarded as important 'gate keepers' who either encourage or discourage others from leading and participating in organisational changes" (pp. 18–19, citing multiple sources).

More specifically, Neumerski (2013) stresses the importance of the principal's role in supporting distributed leadership, pointing to research suggesting that "teacher leaders are more effective" when the principal gives his/her support, for example in the form of "acknowledg[ing] the role of the teacher leader[s] or provid[ing] time for them to work with teachers." Further research suggests that the most supportive principals have deep knowledge about teacher leadership, are directly involved in the focus of the change the school is trying to affect, and work directly with teacher leaders (p. 325, citing multiple sources).

Similarly, "Birky et al. (2006) found that principals who actively supported, encouraged and collaborated with teacher leaders promoted leadership development and helped to motivate teachers" (Poekert, 2013, p. 18).

Supportive school structures and routines. Distributed leadership depends on the development of teacher leaders. Based on his review of the research literature on professional development of teacher leaders, Poekert (2013) asserts the value of supportive "school structures" such as assigned roles for teacher leaders and established organizational conditions under which they will do their work. He also touts the benefits of routines, such as protocols for "shared decision-making and professional development" (p. 20).

Professional development in support of distributed leadership. Poekert also stresses the

> strong link between teacher leadership and professional development because professional development is both a cause and an outcome of teacher leadership. First, professional development is required to develop teachers as leaders...More than just an outcome of professional development, however, teacher leadership can also create effective professional development that is embedded within the school context. (p. 10)

Poekert further notes that there is a different skill set required for leading colleagues than for teaching students, which necessitates dedicated professional development for teacher leaders. Similarly, principals also need their own professional development tailored for their role (p. 19, citing Smylie & Mayrowetz, 2009, and other sources). This seems especially necessary for principals working in a distributed leadership environment.

(Also see the section on professional development, later in this paper.)

Climate of trust. According to Tian, Risku, and Collin (2016), research "suggest[s] the essential aspect of the climate of trust for distributed leadership" to be effective (p. 20). They observed:

> [I]n American schools, trust mostly tended to come from leadership competencies, which appeared tightly connected to a specific expertise. American teachers thus seemed to accept expertise-based distributed leadership fairly easily. (p. 20–21, citing Jing, 2010)

Similarly, Poekert considers a climate of trust to be a condition supportive of teacher leadership development. In this regard, he notes that emerging teacher leaders value a degree of autonomy in their work (Poekert, 2013, p. 17, citing York-Barr & Duke, 2004).

Crayola's Approach to Supporting Distributed Leadership

Distributed leadership in the Crayola approach is developed with full involvement and support of local leaders, especially the principal(s). This provides opportunities for local educators to develop the infrastructure to support distributed leadership. Teacher leaders enhance their leadership skills through professional development and coaching. In turn, they provide professional development and coaching to teachers in their school(s), with the goal of embedding the new art-integration instructional strategies throughout the school. Throughout the tiered approach to coaching and support, a climate of mutual respect and trust is stressed.

Teacher Leadership

Teacher leaders are teachers who are able to influence others in their schools to make changes in instruction for the betterment of students. Teachers can serve in formal or informal leadership roles.

Characteristics of effective teacher leaders. Based on his research, Poekert (2013) identifies characteristics of effective teacher leaders, including open-mindedness, respectfulness of other points of view, "optimism and enthusiasm, confidence, and decisiveness" (p. 11, citing multiple sources). Effective teacher leaders also tend to be "accomplished teachers, which demonstrates their expertise and gives them credibility" (p. 11, citing York-Barr & Duke, 2004).

Describing factors that contribute to individual success, psychologist Carol Dweck explains the importance of a "growth mindset" as opposed to a "fixed mindset." Whereas individuals with a fixed mindset focus on using their observations to judge themselves and others, those with a growth mindset instead focus on how positive and negative information can provide opportunities for change and growth (Dweck, 2010). Interpreted in the lens of research on teacher leadership in the context of school improvement, it seems evident that in order to be effective, teacher leaders need to possess a growth mindset and support that mindset in others.

Ways teacher leaders improve their schools. Research points to several ways in which teacher leaders contribute to "improved student learning." These include "promoting a shared vision and acceptance of group goals, strengthening [the school] culture, and developing [teachers] through individual support and intellectual stimulation" (Neumerski, 2013, p. 332, citing Leithwood & Riehl, 2005).

Poekert identifies action research as a potentially promising "strategy to develop and exert the influence of teacher leadership" (Poekert, 2013, p. 22, citing Smeets & Ponte, 2009). Action research would enable teacher leaders, in collaboration with the classroom teachers they support, to collect information about strategies teacher are using and which are working and not working, with an eye toward improving teacher practice.

Crayola's Approach to Supporting Teacher Leadership

As noted above, teacher leaders in the Crayola approach provide professional development and coaching on instructional strategies to and with classroom teachers. Crayola PD for teacher coaches promotes:

- Intentional listening to the goals and challenges of the teachers they support
- Creating a safe climate that encourages openness, mutual respect, and trust; celebration of teachers' strengths and successes; and acceptance of mistakes as teachers learn
- Helping teachers discover how best to apply new instructional strategies in their teaching-learning contexts, so that teachers can gain a sense of ownership of the new strategies
- A growth mindset (Dweck, 2010), stressing change and growth based on new information and experience

In the Crayola approach, teacher coaches are encourage to conduct action research in order to provide meaning information about teachers' attempts at apply new instructional strategies, successes, and failures—for the purpose of informing teacher improvement and better supporting student learning.

Active Role of the Principal

Michael Fullan (2015) points out the principal's central role in efforts to bring about positive change in schools: "All major research on innovation and school effectiveness shows that the principal strongly influences the likelihood of change." He explains, "Principals' actions serve to legitimize whether a change is taken seriously... and to support teachers both psychologically and with resources" (p. 74).

A critical part of the principal's role involves encouraging teacher leadership. Again quoting Fullan, "effective principals share—in fact, develop—leadership among teachers.... Principals are important in their own right and all the more so in terms of how they lead other potential leaders in the school" (Fullan, 2015, p. 124; see also Tian, Risku, & Collin, 2016).

Meta-analysis results confirm the value of principals establishing goals and expectations (effect size = 0.42) and leading teacher learning and development (effect size = 0.84): activities that relate to the role of the principal as an instructional leader (Fullan, 2015, p. 133, citing Robinson, 2011). More specifically, "Robinson found that the principal who makes the biggest impact on learning is the one who attends to other matters as well, but, most important, 'participates as a learner' with teachers in helping move the school forward" (Fullan, p. 133). Fullan characterizes this in terms of the principal acting as "lead learner" in the school, a role with several important implications for how principals can most effectively lead in the direction of positive change:

- The principal as lead learner not only helps to build a vision and encourages others in their efforts, but personally learns "what is specifically needed to stimulate ongoing organizational improvement" (p. 133).
- Encouraging teacher learning "require[s] the principal to be present as a learner" (p. 134).
- Instead of working individually with teachers, the principal more effectively changes culture across the school by participating as a learner within the group (p. 128).

How Crayola Supports the Role of the Principal

In the Crayola model, principals are involved as planners and learners along with teacher leaders and other members of the creative leadership team. They are not expected either to micromanage teachers or to

individually set the vision for schools, but instead are part of a collaborative process that encourages positive change by working within groups, giving support to teacher coaches as needed.

Building Teacher Capacity

Improvement of student learning hinges most critically on providing teachers with the tools to teach more effectively. This speaks in turn to the importance of building teacher capacity—both to help make teachers more effective, and to improve their professional satisfaction as educators.

Districts and schools can develop teacher capacity to improve instruction through embedded professional development (including peer coaching), support for collegiality and collaboration, encouragement of creativity in teachers and students, and addressing teachers' emotional response to change.

Embedded professional development is addressed separately in a later section of this paper. Each of the other three areas is addressed in turn below.

Collegiality and Collaboration

Fullan (2015) cites findings from international research (drawn largely from the PISA data) in support of his identification of collaborative work as one of the important positive drivers of positive change (p. 42). He writes: "If you want to reach a goal faster, you must invest in capacity building and use the group to get there....[P]urposeful group learning is more powerful than individuals learning one at a time" (p. 44, citing multiple sources).

Along similar lines, Zembylas (2009) cites research from the last two decades in which "educational reformers... [emphasize] the importance of collegial relations, collaborative networks, and trust among teachers in enriching the school organizational climate while also providing teachers powerful opportunities for self-renewal.... True collegiality...involves ongoing professional interaction and trust; in these interactions there is validation of colleagues as equals" (p. 223, citing multiple sources).

Further confirmation of the importance of collaboration is provided by Leithwood and Sun (2012), who identify "building structures to enable collaboration" as one of several common practices across several transformational school leadership models. In their meta-analysis, this was found to have a statistically significant effect on school conditions (aggregated), teacher commitment, teachers' job satisfaction, teacher internal states and behaviors (aggregated), and student achievement (pp. 17–19).

Supportive colleagues and a spirit of collegiality can help teachers sustain their commitment to teaching (Fullan, 2015, p. 106, citing Day & Gu, 2010). Similarly, research has found that the extent to which teachers change is "strongly related to the extent to which teachers *interact* with one another and to others providing technical help and peer support and pressure" (Fullan, 2015, p. 107; italics in original). Personal contact is important, as is social and emotional support for teachers who are dealing with change (Fullan, 2015, p. 108; Zembylas, 2009, p. 223). More specifically, Fullan quotes Judith Little (1981) on the important of communication and sharing of knowledge between teachers and administrators: "*Teachers and administrators teach each other* the practice of teaching" (p. 76, quoting from pp. 12–13; emphasis in original).

How Crayola supports teacher collegiality and collaboration: The Crayola model embeds collegiality and collaboration at every point in the process, from the creative leadership teams to teacher leaders as peer coaches, to collaborative planning teams that function as professional learning communities. Crayola provides coaching protocols for teacher leaders, along with specially developed resources that support effective coaching practices. Personal contact is fostered through face-to-face team meetings. More specifically, PD provided by Crayola discusses the difference between *collegial* and *congenial*, explaining the importance of cultivating a collegial school climate and culture of openness, acceptance of other viewpoints, and collaborative decision-making.

Encouragement of Creativity

A key goal for Crayola is to build teacher capacity in the area of creativity—both their own and that of students.

The value of creativity in a school change context is attested by Leithwood and Sun (2012), who identify "provid[ing] intellectual stimulation," including "stimulat[ing] and encourag[ing] [teachers'] creativity," as one of several common practices across several transformational school leadership models. In their meta-analysis, such intellectual stimulation was found to have a statistically significant effect on school conditions (aggregated), teacher commitment, teacher's job satisfaction, and teacher internal states and behaviors (aggregated) (pp. 17–18).

A study involving third and fourth grade teachers found that a program of art-infused instruction with strong professional development support, including coaching, led to "a sense of renewal or creativity in their teaching." This was associated with positive changes in their instructional practices (Saraniero et al., 2014, p. 19).

Art similarly plays an important role in creativity among students. Discussing the involvement of children and young people in educational change, Thomson (2009) notes that they "express their, ideas, experiences and opinions through artistic media and creative genre," including sculpture, painting, writing, music, and dance. Thomson notes that the arts "provide important avenues for the development of knowledge and skills as well as the means of self-expression and communication"—"the opportunity to use their 'aesthetic voice' " (pp. 813, 818, citing multiple sources).

How Crayola encourages the development of creativity: Teachers in the Crayola model are stimulated intellectually through the introduction of innovative instructional ideas and concepts. At the same time, they are encouraged to develop and express their own ideas. Use of art as a tool for communication provides opportunities for teachers and students to express themselves creatively. The Crayola approach to professional development immerses teachers in creative artistic expression to support educational purposes, mirroring the instructional strategies they will use with their students.

Addressing Teachers' Emotional Response to Change

Based on his review of research on teachers' emotional response to school change, Zembylas (2009) identifies "collegial relations, collaborative networks, and trust among teachers" as ways of providing "social and emotional support in teachers' efforts to cope with change" (p. 223, citing multiple sources).

Zembylas also notes that teachers need the time and "space" to try out new instructional approaches individually and collaboratively, then reflect on their practices in order to make the new approaches part of their teaching (pp. 224–225, 231).

Bransford et al. (2009) looked across "three different academic traditions—the learning sciences, organizational theory and design"—and concluded that people need help and support in order to adopt what they call a "learning stance when encountering and enacting new ideas and challenges" (p. 846):

> "We suggest that *what's new* is the growing realization that learning is not simply a process of pleasantly *topping off* one's current knowledge, skills and attitudes. Instead, learning often involves emotionally charged activities such as *letting go* of current ideas and ways of doing things and admitting to having been wrong or having simply fallen behind the times." (p. 846)

The authors suggest that organizations (e.g., schools) establish processes that support a learning stance. A key concept they promote is "adaptive expertise," which

acknowledges the importance of well-honed sets of skills and knowledge, but it also celebrates the ability and willingness of experts...to leave their existing comfort zones and engage in the kinds of learning that often require risk taking and conceptual and behavioral change. (pp. 846–847, citing multiple sources)

How Crayola supports a positive emotional response to change. The Crayola approach addresses and provides vehicles for teachers to express their emotions as well as their thoughts through creative expression. Reflective journaling in particular helps teachers both to record their emotions and to take a step back and look at change from a larger context. Additionally, teacher planning teams and professional learning communities represent "spaces" where teachers can experience support in the sometimes challenging aspects of dealing with change, encouraging teachers to take a learning stance while developing their adaptive expertise.

Crayola has developed coaching protocols for creating a climate of collaboration and trust, supporting a growth mindset and a learning stance, and building teacher confidence over time. Crayola professional development for teacher coaches stresses that the coaching experience should be an "oasis"—a safe space where teachers can observe their teaching from the student perspective, face their fears about new instructional strategies, and discover how best to adapt art integration to their teaching in collaboration with their coach.

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Effective Professional Development Practices

- Well-designed professional development can have a powerful impact on instructional practices, teacher satisfaction, and student learning and engagement.

"Professional learning can have a powerful effect on teacher skills and knowledge and on student learning.... When well-designed, these opportunities help teachers master content, hone teaching skills, evaluate their own and their students' performance, and address changes needed in teaching and learning in their schools." (Darling-Hammond et al., 2009, p. 7)

Elements of the Crayola Professional Development Model

Professional development and support is a central component of the Crayola model of school transformation. Elements of Crayola's PD model include the following:

- Crayola provides initial PD for the local creative leadership team and local teacher leaders who will become creative leadership coaches. This includes 2 to 3 days of initial PD per year for 3 years.
- Creative leadership coaches provide PD, coaching, and support for local classroom teachers, using materials provided by Crayola (e.g., reflective journal prompts and models from master teachers). Typically, the expectation is that the local creative leadership coaches will provide 16 hours of initial PD to classroom teachers, plus follow-up contact every one or two weeks over the course of the school year. The model is adaptable to fit the school's system for delivering PD, coaching, and support to teachers—for example, through professional learning communities.
- Local teacher leaders/creative leadership coaches are supported throughout the year by Crayola through live monthly online webinars, virtual learning via an online portal, and remote coaching.
- Classroom teachers plan collaboratively in teams (e.g., horizontal grade level teams and vertical teams that span grade levels), implement in their individual classrooms, and reflect on their experiences. Teacher teams typically function as professional learning communities (PLCs), supported by the local teacher leaders/peer coaches. These teams provide a venue for sharing results of teacher reflections so that teachers can learn together from their experiences.

Effective Professional Development

Both Darling-Hammond et al. (2009) and Desimone (2011) have reviewed the sizeable research literature on teacher professional development and summarized top-level findings about effective PD, as described below.

Sustained and Intensive

Darling-Hammond et al. (2009) cite research findings that professional development is more effective when it features 30 or more contact hours over 6–12 months (p. 9, citing Yoon et al., 2007). Similarly, Desimone (2011) recommends that professional development "should be spread over a semester and should include 20 hours or more of contact time" (p. 29).

Crayola PD. Local creative leadership coaches are encouraged to provide sustained and intensive PD contact with classroom teachers over the course of the school year. While specifics will vary depending on the local implementation, classroom teachers should typically experience at least 20–30 hours of PD over the course of the school year—between initial PD, follow-up contacts, and PD activities in teacher teams and professional learning communities.

Schoolwide and Coherent

Darling-Hammond et al. (2009) argue that "[w]hen all teachers in a school learn together, all students in the

school benefit" and claim that PD should "align with school improvement priorities and goals" (pp. 5, 10). Along similar lines, Desimone (2011) recommends that "[w]hat teachers learn in any professional development activity should be consistent with other professional development, with their knowledge and beliefs, and with school, district, and state reforms and policies" (p. 29)

Crayola PD. The Crayola approach is a schoolwide model for improvement, with PD as one element of a larger effort. Strategies teachers learn in connection with the Crayola approach can be applied to whatever curriculum goals have been set in the local district and school, in alignment with the institution's shared vision.

Connected to Practice

According to Darling-Hammond et al. (2009), PD should be "connected to practice" (pp. 5, 9).

Crayola PD. The Crayola model centers on implementation of classroom projects, lessons, and activities planned by local teachers using strategies of art-infused instruction introduced during the PD.

Involving Active Learning

Desimone (2011) identifies active learning as one of the principles of effective PD, explaining that "[t]eachers should have opportunities to get involved, such as observing and receiving feedback, analyzing student work, or making presentations, as opposed to passively sitting through lectures" (p. 29).

Crayola PD. Crayola's approach to PD is deeply active. Typically during PD sessions, teachers plan and engage as learners in the same types of activities they will be using with their students.

Focused on Teaching and Learning Specific Academic Content

Both Darling-Hammond et al. (2009) and Desimone (2011) describe effective PD as being focused on "the teaching and learning of specific academic content" (Darling-Hammond et al., p. 5).

Crayola PD. Crayola PD focuses on exploring methods for classroom instruction but does not specify the academic content that should be taught. Instead, specific content priorities are determined locally through the involvement of content experts and teachers. After the initial Crayola PD sessions, time spent with the teacher leaders/creative leadership coaches can focus on applying art-infused education principles to specific subject areas and content focuses.

Collaborative and Helps Build Educator Communities

According to Darling-Hammond et al. (2009), effective PD "builds strong working relationships among teachers": "research shows that when schools are strategic in creating time and productive working relationships within academic departments or grade levels, across them, or among teachers schoolwide, the benefits can include greater consistency in instruction, more willingness to share practices and try new ways of teaching, and more success in solving problems of practice" (pp. 5, 11).

Professional learning communities represent a logical vehicle for the kind of collaborative, community-building professional development supported by the research. For example, Desimone (2011) argues that "[g]roups of teachers from the same grade, subject, or school should participate in professional development activities together to build an interactive learning community" (p. 29; see also Darling-Hammond et al., p. 11; Stoll, 2009, pp. 469–470).

Crayola PD. Crayola's approach typically takes place in the context of learning communities through collaborative planning and discussion in teacher teams. Where learning communities don't exist, they can be formed with the support of the Crayola professional services team.

Peer Coaches

Based on the research they reviewed, Darling-Hammond et al. (2009) considered teacher coaching from well-regarded veteran educators a "promising practice," but noted that much is unknown about "the conditions under which [coaching is] most likely to be effective (pp. 11–12). They interpreted the evidence as suggesting that "coaching may need to be embedded in broader efforts to build professional knowledge if it is to be most useful." (p. 12).

Within a context of art-infused education, a study involving third and fourth grade teachers who were learning to use an art-infused instructional approach found that PD from a summer institute plus about 25 hours of ongoing coaching "had a deeper impact on teacher practice and attitudes as well as on student academic success" compared to teachers who attended the summer institute only (Saraniero et al., 2014, p. 19). The authors noted that part of the impact might have been due to the fact that coached teachers "received almost twice the professional development hours as the institute-only teachers" over an extended period of time (p. 20)—a substantial advantage of coaching implementations.

More specifically with respect to peer coaching, Neumerski (2013) cited a series of studies that found peer coaching "led teachers to practice and implement new teaching skills" (p. 322, citing several sources. Poekert (2013) specifically praised the efficiency of a train-the-trainer model using peer coaches, arguing that instead of "providing ineffective professional development to a broad number of teachers," it is better to "target...resources more narrowly to provide fewer teachers with more substantial and effective professional development that we know to be effective" (p. 26).

A recent review of the peer coaching literature found that successful peer coaching requires nonjudgmental communication, trust, and reflection (Hooker, 2013, pp. 130–131).

Peer Coaching in the Crayola Model

As described above, the Crayola model takes advantage of the train-the-trainer approach using local peer coaching embedded in broader efforts to provide professional development and support to classroom teachers. Training and coaching protocols provided to the local creative leadership coaches by Crayola stress the importance of active listening and nonjudgmental communication, helping teachers discover rather than telling, creating a safe climate of respect for diversity and trust, celebrating successes and accepting mistakes, and reflection in working with classroom teachers .

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Recommendations for Implementation

Research and expert opinion reviewed in this paper support the following recommendations for districts and schools that are interested in implementing a program of creative leadership build around art-infused instruction.

Implement teaching strategies that integrate art activities as part of subject-area instruction.

- Include instruction in the visual arts to help students develop valuable habits of mind that can transfer to other academic areas and contribute to life success.
- Integrate art activities with instruction in the content areas. Help teachers design and carry out hands-on activities that use art to help students connect meaningfully to what they are learning.
- Utilize a project-based learning approach to help students develop both deep content knowledge and valuable cognitive and interpersonal skills. Support students in planning, implementing, monitoring, and evaluating the project experience.
- Support project-based learning with a whole-school approach that provides strong professional development, help for teachers in changing classroom practices and pedagogical beliefs, and support for classroom management.
- Use external visualization activities to help students develop the capability to visualize information and ideas. This can be particularly valuable as a reading comprehension strategy.
- Introduce visual mapping techniques to enable students to graphically represent both information they are learning and their own ideas.
- Prompt students to reflect on their learning.
- Include "leadership" as a curriculum focus, and provide student leadership experiences in the context of art-infused projects.
- Promote design thinking by guiding students to use a design process in completing art-infused projects.
- Expand STEM to STEAM to promote meaningful connections among art, science, technology, engineering, and math.
- Assign cross-disciplinary projects that include both an art design component and an engineering design component in authentic STEAM contexts.

Design and carry out a change process to foster school improvement.

- Plan for systematic, schoolwide change.
- Develop a shared vision for school improvement focusing on both desired end results and processes that bring together art expertise, content area knowledge, classroom experience, and local leadership.
- Utilize a distributed leadership model that takes advantage of teacher leaders, active involvement and support from the principal and other formal leaders, supportive school structures, professional development, and a climate of trust.
- Build a schoolwide or districtwide creative leadership team that includes formal leaders, classroom teachers, content area experts, and art specialists.
- Empower teachers to act as instructional leaders.
- Recognize the key importance of the principal playing an active role as "lead learner."
- Build teacher capability through embedded professional development, collegiality and collaboration, encouragement of creativity in teachers and students, and addressing teachers' emotional response to change by providing ongoing support.

Use professional development to improve instructional practices, teacher satisfaction, and student learning and engagement.

- Design professional development that is sustained and intensive, schoolwide, and coherent with district and school policies and goals.
- Use an active learning approach to focus teacher professional development on classroom practices related to teaching and learning specific academic content in a way that brings together the knowledge of art specialists, content experts, and classroom teachers.
- Encourage a team approach to professional development that encourages collaboration and builds educator communities (e.g., professional learning communities).
- Use the power of a train the trainer model with peer coaching to support sustained involvement and collaboration.

Crayola is committed to working with districts and schools to build local programs aligning with these research-based recommendations that will help them meet their goals for student learning and school improvement.