

Exploring the Impact of Color on Classrooms

Prepared for: PPG

Conducted and prepared by:
c a m p o s

EXECUTIVE
SUMMARY
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Introduction

Student engagement is a prominent topic in education research, theory, and practice. While the definition is fairly broad, engagement is typically interpreted to mean a student's curiosity, interest in, and passion for learning. Studies have linked engagement repeatedly to a variety of desirable academic outcomes, such as regular attendance, GPA, and credit accumulation.¹ However, according to one 2017 survey, only about 49% of public-school students in the U.S. felt engaged.² Educators are therefore likely to be eager for interventions that can boost student engagement.

One promising avenue for enhancing engagement is by improving classroom environments. As a leading color authority and active community partner, PPG understands the positive impact that color can have on a space and the people who occupy it. This ability for color to transform and brighten lives is the inspiration for the company's COLORFUL COMMUNITIES® program, which deploys employee volunteers into the community to apply fresh coats of PPG paint products to spaces in need of a refresh, like schools, hospitals, parks, and social service organizations. PPG develops and delivers the paints, coatings, and specialty materials that customers have trusted for more than 135 years.

THE INITIAL STUDY (2017-2018)

Intrigued by the potential for the *Colorful Communities* program to catalyze student engagement, in 2017-18 PPG provided funding to Campos, a customer experience and brand strategy firm, to explore the role of color and classroom design in K-12 schools. This study included a review of the literature, interviews with educators who were beneficiaries of the program and experts in school design, and surveys of nearly 900 teachers, parents, and school administrators from across the U.S.

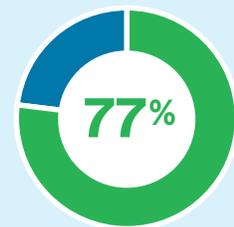
Our 2017-18 research found a consensus among educators and scholars that classroom design and color can contribute to improved student engagement and can thereby have a positive impact on student outcomes:

- **77%** of the educators we surveyed believed classroom design was important for student engagement, and **63%** believed certain colors can improve engagement.
- Moreover, the educators and experts we interviewed highlighted the important role of student engagement in helping students to learn effectively.

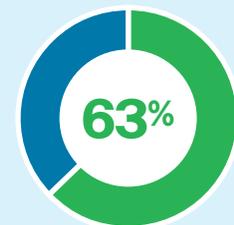
“**The environment actually will trump any other factors that you're dealing with when it comes to educating a student.**

If that environment is not on point, and it's not somewhere where the student wants to be, to participate, and to be an active learner, it's not going to work.

– Pennsylvania Teacher



77% of educators surveyed believe classroom design was important



63% of educators surveyed believe certain colors improve engagement

1 Jodene Dunleavy, Penny Milton, and Cailey Crawford, "The Search for Competence in the 21st Century," *Quest Journal* 2010 (2010); Leah Taylor and Jim Parsons, "Improving Student Engagement," *Current Issues in Education* 14, no. 1 (2011).

2 Valerie J. Calderon and Daniela Yu, "Student Enthusiasm Falls as High School Graduation Nears," *Gallup*, June 1, 2017, <http://news.gallup.com/opinion/gallup/211631/student-enthusiasm-falls-high-school-graduation-nears.aspx>.

Introduction, cont.

- Some academic research has found that classroom design, including color among other factors, could explain up to 16% of the variation in students' academic progress in a given year.³

Teachers can also benefit from improved classroom design. The educators and experts we interviewed in 2017-18 believed that classroom design features can have an impact on teachers' morale and engagement. Interviewees reported that classrooms with old, dull-colored coats of paint dampened educators' energy, pride, and sense of ownership in their school. Some studies have found evidence that teacher' engagement can have a positive effect on student academic outcome. For instance, a study conducted in a large metropolitan school district in Georgia found a correlation between teachers' job satisfaction and students' achievement.⁴ Another study of students across all OECD (Organization for Economic Co-operation and Development) countries found that students' performance in a tested subject area was associated with teacher morale, even after accounting for the socio-economic status of students and schools.⁵

EXPANDED RESEARCH (2019-2020)

PPG provided additional funding to Campos to conduct a study, building on the 2017-18 work, that would explore the effects of a freshly painted classroom on students and teachers. In 2019, Campos designed and executed a descriptive, multistate study to measure students' and teachers' attitudes and engagement before and after classrooms were painted. Campos also engaged education researchers at RAND Corporation to review the study design and methodology and to provide a review of this report. RAND is a nonprofit, nonpartisan institution that helps improve public policy and decision-making through research and analysis.⁶

We hope this study will contribute to the understanding of how classroom beautification can affect students' and teachers' attitudes and experiences in the classroom, and may help school and district leaders and classroom educators create an environment that can support student engagement and learning.

The findings from this study provide new evidence that **painting classrooms with colors specifically intended to enhance learning can improve both students' and teachers' experiences in the classroom and increase their feelings of engagement in learning.**

³ For example: Peter Barrett, Yufan Zhang, Joanne Moffat, and Khairy Kobbacy, "A holistic, multi-level analysis identifying the impact of classroom design on pupils' learning," *Building and Environment* 59 (January 2013): 678-689.

⁴ "Quality Feedback, Teacher Engagement, and Student Achievement," *Hanover Research* (February 2015), <http://www.gssaweb.org/wp-content/uploads/2015/04/Quality-Feedback-Teacher-Engagement-and-Student-Achievement-1.pdf>.

⁵ OECD, *Low-Performing Students: Why They Fall Behind and How to Help Them Succeed*, PISA, OECD Publishing, Paris (2016), <http://dx.doi.org/10.1787/9789264250246-en>.

⁶ More information can be found at RAND's website: www.rand.org

Methodology

Our proof-of-concept study took place in December 2019 in 3rd, 4th, and 5th grade classrooms in four elementary schools located in three U.S. states: Ohio, Pennsylvania, and Alabama. We selected the schools based on interest in, and district approval for, participating in the study, as well as the condition of the schools – most classrooms had not been painted in nearly a decade. The four elementary schools were located in rural, urban, and suburban areas and ranged in enrollment between 300 and 600 students.

We divided the classrooms in the participating grades within each school randomly into test and control groups. Teachers and students in 43 classrooms across the four schools participated in the study. Sixteen classrooms, or 37 percent, were test classrooms, which were painted for the study. Twenty-seven classrooms, or 63 percent, were control classrooms, which were not painted.

Students and teachers in both test and control classrooms took a short survey before and after the test classrooms were painted. The survey asked teachers and students to report on the conditions of their classroom and to respond to questions about their attitudes toward learning (for students) and attitudes towards their jobs (for teachers). Prior to the first survey, teachers were aware of the planned painting. Teachers were asked not to tell their students prior to taking the first survey that the test classrooms were going to be painted.

SURVEY PARTICIPATION

Across the 43 classrooms participating in the study, 39 teachers [16 treatment and 23 control] completed the pre-painting survey and 42 teachers [16 treatment and 26 control] completed the post-painting survey. All the teachers in the treatment group completed both surveys. The four control teachers who did not complete the pre-painting survey were excluded from the analysis.

Students in 41 classrooms completed the pre-painting survey and students in 42 classrooms completed the post-painting survey. Students in one classroom did not complete the post-painting survey; these students' responses on the pre-painting survey were included in the analysis. We are not able to provide response rates for students because the survey was anonymous. Students were not identified at the individual student level to remain compliant with district policies for surveying students. All students who responded to the surveys were included in the analysis.

PAINT COLOR SELECTION AND PLACEMENT

A PPG color and design expert assisted teachers in selecting the paint colors and color placement for their classrooms. The guidelines for color selection and placement were based on the design expert's 30+ years of experience using color and design to enhance human behavior and promote positive outcomes. Drawing on evidence-based principles derived from environmental design and scientific research in neuro-architecture, as well as principles of set design, fine art, and Feng Shui, the design expert helped teachers plan and select a classroom color scheme and layout to remove visual noise, enhance engagement, and support the teachers' desired outcomes for their students and themselves.

Key Findings

The findings from this study provide new evidence that painting classrooms with colors specifically intended to enhance learning can **improve both students' and teachers' experiences in the classroom and can increase their feelings of engagement in learning.**

Increased Student Happiness and Engagement

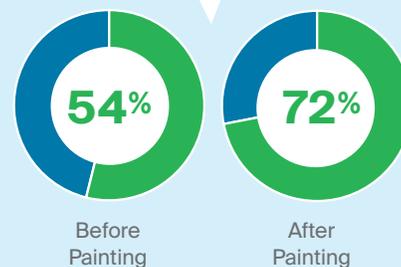
Students felt the new paint in their classrooms made them happier—and teachers also saw a change in their students' mood and general engagement.

- In newly painted classrooms, the proportion of students who reported⁷ that “the paint color in this classroom makes me feel happy” rose from **54% to 72%** pre- to post-painting.
 - > In comparison, among students in classrooms that were not newly painted, the proportion of students who reported that the paint color in the classroom made them feel happy remained similar (51% pre-painting; 48% post-painting).
- **100%** of teachers in the repainted classrooms agreed that “the paint color(s) in my classroom make the students feel happy,” compared to **44%** before painting.
- Teachers in the freshly painted classrooms also observed that the new paint color made their students happier and more engaged.
 - > *“The paint colors have made a huge difference in the level of engagement and general mood in the classroom. Students from previous classes have stopped by to say how nice the classroom looks.”*
– Pennsylvania Teacher
 - > *“Freshly painted in shades of aqua, students have commented how they like the look of the classroom and how it looks happier now.”*
– Ohio Teacher

⁷ In the analysis, we grouped survey responses on each question into two categories. One category included the “positive” responses to the question, and one category included the “negative” responses. For instance, if the question used a four-point scale of agreement, the “positive” category included responses of “Agree” and “Strongly agree.” The percentages reported in the Key Findings section of this report represent responses in the “positive” category. Three different rating scales were used in the student and teacher surveys: A four-point scale of agreement, a four-point scale of truth, and a seven-point scale of frequency. For each scale, the top two responses were categorized as “positive” and the bottom two as “negative.” For additional details about the survey questions, please email colorfulcommunities@ppg.com with your request.

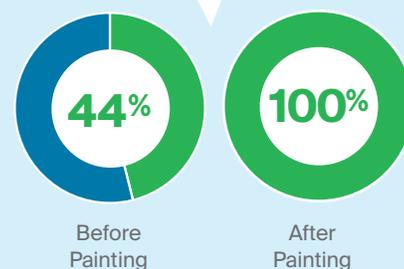
“The paint color in this classroom makes me feel happy.”

Students in newly painted classrooms
n = 303



“The paint color(s) in my classroom makes my students feel happy.”

Teachers in newly painted classrooms
n = 16



Key Findings, cont.

Students felt the new paint colors **helped them to learn**, and teachers in the newly painted classrooms also noticed an **improvement in students' attentiveness**.

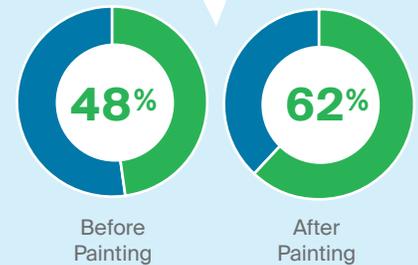
Improved Perceptions of Attention and Learning

- In newly painted classrooms, the proportion of students who reported that “the paint color in this classroom helps me learn” rose from **48% to 62%** pre- to post-painting.
 - > In comparison, there was essentially no change among students in classrooms that were not newly painted (44% pre-painting; 42% post-painting).
- The proportion of teachers in the freshly painted classrooms who reported that students “pay attention in class” rose from **63% to 94%** pre- to post-painting.
 - > In comparison, there was not a significant change in this item among teachers in classrooms that were not newly painted (65% pre-painting; 74% post-painting).
- Teachers in repainted classrooms also felt that the paint colors “helped students to learn effectively.” Before painting, **50%** felt this was the case, which doubled after the painting to **100%**.
- Teachers shared that the new paint seemed to be helping the students to learn and improving their attentiveness.
 - > *“I think the colors of my classroom make it more inviting. I feel as if the students are more ‘alive’ and work better independently. Overall, I think my students have a hard time focusing in general. This class is very chatty and [they] move about a lot. I think the paint colors are helping them calm down and relax some.”*
– Ohio Teacher
 - > *“Students feel that our new wall colors are beautiful and make them feel happy. I believe that the wall colors help with calming students and keeping them more focused.”*
– Ohio Teacher

“The paint color in this classroom helps me learn.”

Students in newly painted classrooms

n = 303



“The paint color(s) in my classroom help students to learn effectively.”

Teachers in newly painted classrooms

n = 16



Key Findings, cont.

Teachers in newly painted classrooms reported **increased satisfaction** with and **positive reactions** toward their classrooms.

Increased Teacher Satisfaction

- In the newly painted classrooms, there were large increases (often more than double) from pre- to post-painting when teachers were asked about their feelings about classroom conditions, classroom conditions enhancing teaching, attractiveness of classroom, and classroom conditions being inviting.
- > In comparison, among teachers whose classrooms were not repainted, no increase was seen from pre- to post-painting for any of these statements about their classrooms.

TEACHERS ATTITUDES ABOUT THEIR NEWLY PAINTED CLASSROOMS

“I am satisfied with the condition of my classroom.”

n = 16



Before Painting

After Painting

“My classroom is attractive.”

n = 16

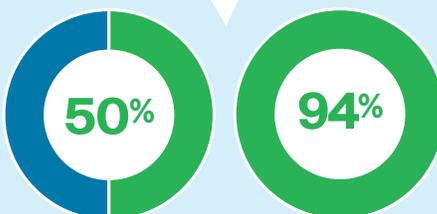


Before Painting

After Painting

“The condition of my classroom enhances my teaching.”

n = 16



Before Painting

After Painting

“The condition of my classroom is inviting.”

n = 16



Before Painting

After Painting

Key Findings, cont.

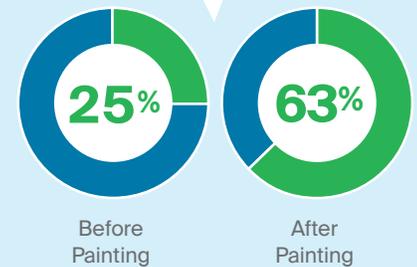
Teachers in the newly painted classrooms felt more **energetic** and more **empowered**.

Enhanced Teacher Empowerment

- The proportion of teachers in freshly painted classrooms who reported that they very often or always “feel strong and vigorous” at their job rose from **25% to 63%**.
 - > In comparison, there was no change among teachers whose classrooms were not repainted (35% pre-painting; 35% post-painting).
- Similarly, the proportion of teachers in repainted classrooms who reported that they very often or always “feel bursting with energy” nearly doubled, rising from **31% to 56%** pre- to post-painting.
 - > In comparison, the change among teachers whose classrooms were not newly painted was small (26% pre-painting; 35% post-painting).
- In the classrooms that were newly painted, the proportion of teachers who agreed that “the condition of my classroom makes me want to come to work every morning” doubled from **50% to 100%**, pre- to post-painting.
 - > In comparison, there was little change among teachers whose classrooms were not repainted (48% pre-painting; 43% post painting).

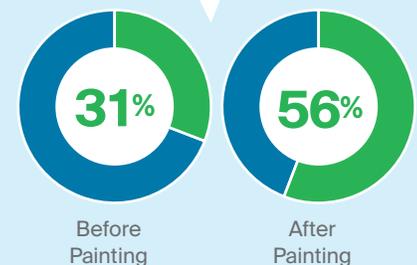
Teachers who
“Feel Strong and
Vigorous”
at their Job

n = 16



Teachers who
“Feel Bursting with
Energy”
at their Job

n = 16



Conclusion

The results of this study suggest that classroom beautification through the use of paint colors selected by a color expert may increase students' feelings of engagement and improve the experience of both students and teachers in the classroom.

Prior research has shown that high levels of student engagement are linked to stronger academic performance. This study provides suggestive evidence that freshly painted classrooms can help improve students' and teachers' feelings of engagement. Students in the freshly painted classrooms believed the new paint colors made them happier and helped them to learn. Teachers, too, noticed that their students seemed calmer, more focused, and more engaged after their classrooms had been painted. Thus, it is possible that freshly painted classrooms, by improving students' feelings of engagement, could contribute to improvements in student academic outcomes.

In addition, this study shows that freshly painted classrooms can be a source of empowerment for teachers. In the newly painted classrooms, nearly every measure of teachers' perceptions of their classroom conditions improved substantially, and teachers reported increased feelings of vigor and strength at their jobs. Other research has found that teacher engagement and morale are linked to improved student outcomes.

We hope that this report provides educators, administrators, and other readers with greater insight into the ways that paint color and classroom aesthetics can create the conditions that enhance student learning.



The *Colorful Communities* program is PPG's signature initiative for supporting communities that aims to protect and beautify the neighborhoods where PPG operates around the world. For more information, please visit communities.ppg.com. The *PPG logo* and *Colorful Communities* are registered trademarks of PPG Industries Ohio, Inc. *Colorful Communities Logo* is © PPG Industries, Inc. © 2020 PPG Industries, Inc. All Rights Reserved.