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Creative Learning Initiative

Impact of Creative Teaching on Academic Growth

STAAR Reading and Math Growth From 2016–2017 to 2017–2018

Introduction

The Creative Learning Initiative (CLI) is a community-wide effort to bring creative learning and the arts to every student in Austin. Lead by MINDPOP, the City of Austin, and the Austin Independent School District (AISD), CLI supports systemic and sustainable programs that integrate: creativity, the arts, use of Creative Teaching strategies in the classroom, campus programming, and campus improvement. Since 2012, CLI has provided 56 campuses with ongoing support to design and implement comprehensive campus plans to become more arts rich. At the campus level, the three pillars of the program are to (a) increase students' access to sequential fine arts instruction, (b) foster classroom learning with Creative Teaching across the curriculum, and (c) increase community arts programming during and out of the school day.

Creative instruction across the curriculum is a critical pillar of CLI. As a signature pedagogy of the district, teachers use these highly flexible and easy-to-use Creative Teaching strategies to teach any content, across all of their curricula and instructional day. Creative Teaching strategies are a bank of research-based strategies used to enhance learning, engaging students, drive inquiry, promote rigor, and create personal connections.

Creative Teaching strategies are designed and curated by MINDPOP as an instructional methodology that draws on techniques from drama, visual arts, music, movement, and digital media arts. These strategies provide opportunities for the generation of ideas, creative choice making, analysis, synthesis, mental and physical modeling, point-of-view taking, translation of ideas, the transfer of learning to different contexts, and cooperative learning constructions.

These essential elements of Creative Teaching are natural and logical extensions of many powerful instructional theories, most of which are aligned with brain-based pedagogy, socio-constructivist learning theory, multiple intelligence theory, project-based learning, total physical response, and schema development and are also designed to foster social-emotional learning and cultural proficiency.

The CLI initiative supports a professional development model that empowers teachers to use a specific set of research-based strategies, collectively called "*Creative Teaching*", to enhance student learning. The CLI goal for arts rich schools is that 75% to 100% of the teachers are competent in using Creative Teaching strategies and use them throughout their curricula, at least once per week.

Creative Teaching Analysis Method

In the interest of analytic rigor, this analysis of Creative Teaching was restricted to the most valid data, and was designed to look for both overall relationships, and moderating effects for student subgroups. For the teacher cohort, we limited our analysis to teachers of 4th– to 5th-grade students; those who received coaching; and those for whom we have data on both their competency of use, based on a professional observation, and their self-reported frequency of use (n = 2,896). With this information we created a Creative Teaching Factor for each teacher, which was the product of each teacher's competency in Creative Teaching and his or her frequency of use in the classroom. For the student cohort, we limited our analysis to students who received instruction from those teachers, attended one school for 85% of the year or more, and had State od Texas Assessment of Academic Readiness (STAAR) scores in both 2016–2017 and 2017–2018 (math n = 276; reading n = 576). The student's exposure to Creative Teaching was weighted based on the percentage of time spent with each teacher within each subject. The totality of these restrictions improved the quality of the data used in the analysis but restricted the students to those in 4th and 5th grade in the 2017–2018 school year (math 4th grade n = 6, 5th grade n = 261; reading 4th grade n = 2; 5th grade n = 574).

To ensure that we were not confounding overall teaching quality with good Creative Teaching skills, we controlled for overall teaching proficiency, using Spring 2018 scores from the instructional practice observation of the district's teacher appraisal system. The instructional practice observation rubric is content neutral and measures pedagogical skills related to student engagement, assessment and feedback, differentiation, problem solving and critical thinking, classroom expectations, routines and procedures, and classroom climate. Teachers' instructional practice scores were significantly correlated with the Creative Teaching factor for both math and reading (math r = 0.13, p < 0.0001; reading r = 0.43, p < 0.0001). By controlling for those relationships, our analyses were able to estimate the unique influence of Creative Teaching on student outcomes, above and beyond the influence of overall teaching proficiency.

The previous study indicated strong correlations between socioeconomic status (SES) and academic achievement (Andrews, Christian, Williams, & Zhao, 2019), supported by historic data regarding AISD students. However, for these analyses, the change in standardized STAAR scores from 2016–2017 to 2017–2018 was the outcome of interest, and the relationship between SES and this academic outcome was substantially weaker than in previous studies (math and SES r = 0.17, p = 0.004; reading and SES r = -0.02, p = 0.69). The influence of SES on STAAR math, although significant, was much weaker than what was found in previous research; therefore, it was included in our multilinear regression analysis but removed if it was not significant.

To calculate growth from 2016–2017 to 2017–2018 on STAAR math and reading, both years' scaled scores were transformed into z scores. Transforming scaled scores into z scores is a way of standardizing scores form one year to the next, using one scale so they can be compared over time. Z scores range from −3 to +3, where 0 indicates the mean score. When we subtract one year's z score from the other, negative values indicate the amount of change below the mean, and positive values indicate the amount of change above the mean.

To determine whether certain subgroups of students related to Creative Teaching in different ways, we ran each analysis looking for significant interaction effects based on those subgroups. If a significant interaction was detected for a subgroup, the regression model was run comparing those in the group with those not in the group.

Previous research has shown a positive relationship between Creative Teaching and several student outcomes, such as elementary engagement, school attendance, and performance on STAAR 3rd– through 5th-grade math and reading tests (Andrews et al., 2019). The purpose of the current report is to examine the impact of Creative Teaching on elementary students' academic achievement growth from 2016–2017 to 2017–2018. There were two main research questions:

1. Did teachers' Creative Teaching quality and frequency of use have an impact on students' academic achievement growth for STAAR math or reading?
2. Did any student characteristics moderate the relationship between students' STAAR outcomes and teachers' Creative Teaching quality and use?

To answer these questions, we employed methods similar to those used by Andrews et al. (2019).

Creative Teaching and Student Academic Growth

To answer the research questions regarding the impact of Creative Teaching on the change in STAAR math and reading scores from 2016–2017 to 2017–2018, we used a multiple regression model, incorporating both how well teachers implemented the method and how often they used it with their students. We examined correlations between student variables and the change in STAAR to determine which student variables should be included in the multiple regression equations. These variables included gender, race/ethnicity (Black, White, Hispanic, and two or more races), special education participation, limited English proficiency status, and economic disadvantaged status. Hispanic, special education status, limited English proficiency, and economic disadvantaged status were found to be significantly correlated with the change in STAAR math, whereas only gender and Hispanic status were significantly correlated with the change in STAAR reading. All regression models included teachers' instructional practice observations under the Professional Pathways for Teachers (PPfT) Program as a control for general teaching quality.

Finding 1: Creative Teaching had a significant impact on the change in STAAR reading scores from 2016–2017 to 2017–2018 for students who had teachers using Creative Teaching at least 1.5 times per week, with moderate competency.

Creative Teaching was found to be a significant positive predictor in the change in STAAR reading scores for students who had teachers rated in the top quartile of the Creative Teaching factor (i.e., moderate competency and high frequency). These teachers' average competency rating was 1.89 (on a scale of 1 to 2) and they reported using Creative Teaching strategies at least once per week with their students. For more information about the Creative Teaching factor categorization, see the side bar. For students who had teachers in the moderate competency and high frequency group, the largest impact in terms of STAAR reading score change was 0.25 of a standard deviation better than the average student change. Creative Teaching done with less competency or less

Creative Teaching Factor

The Creative Teaching factor was categorized into four groups, based on competency and frequency of use in the classroom. Competency was measured by instructional coaches, based on classroom observations. The competency rating was on a 4-point scale: 0 = *not using*, 1 = *beginning*, 2 = *developing*, 3 = *applying*, and 4 = *adapting and innovating*. Teachers rated with a 3 or 4 were determined to be competent in implementing Creative Teaching strategies. Teachers self-reported frequency of use in the classroom during the previous 7 days.

Based on the analysis of the Creative Teaching factor, four categories emerged:

Low competency, low frequency **included teachers who had an average competency of 0.69, corresponding to between *not using* and *beginning*, and had an average frequency of use of 0.46 per week.**

Moderate competency, low frequency **included teachers who had an average competency of 2.22, corresponding to between developing and applying, and had an average frequency of use of 0.51 per week.**

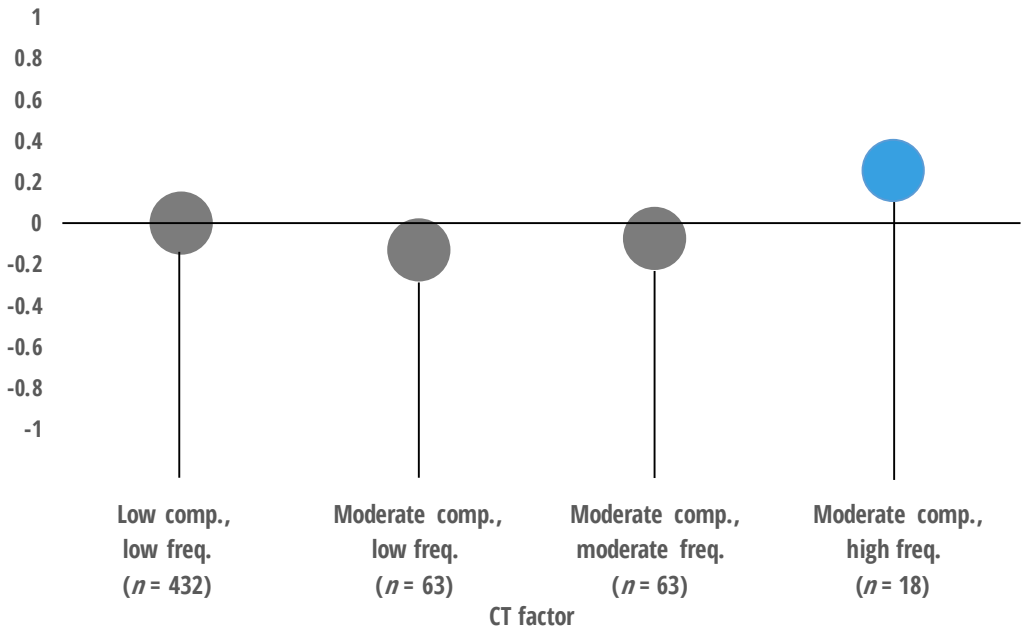
Moderate competency, moderate frequency **included teachers who had an average competency of 1.95, essentially a rating of developing, and used Creative Teaching strategies 1.32 per week, on average.**

Moderate competency, high frequency **included teachers who had an average competency of 2.0, equivalent to a competency rating of developing, and used Creative Teaching strategies 1.5 times per week, on average.**

frequency was not found to be a significant predictor of change in STAAR reading scores from 2016–2017 to 2017–2018. Additionally, general teaching quality, as measured by PPfT instructional practice observation scores, was not found to be a significant predictor in the change in STAAR reading scores. Figure 1 displays the average change in STAAR reading scores from 2016–2017 to 2017–2018 for each of the teachers' Creative Teaching factor categories.

Figure 1.

Students who had teachers with moderate competency and high frequency of Creative Teaching strategy use had significant growth in STAAR reading scores above the average yearly change.



Source. STAAR 2016–2017 and 2017–2018 records, AISD student and teacher records
Note. Statistically significant differences between groups ($n = 576$, $F = 4.73$, $p = 0.003$). Pairwise comparisons revealed all groups were significantly different from the moderate competency, high frequency group at alpha of 0.05.

Teachers in the moderate competency, high frequency group had an average competency of 2.0 and an average frequency of use of 1.5 times per week. Teachers in the moderate competency, low frequency group and moderate competency, moderate frequency group had similar competency ratings but used the method less frequently than did teachers in the moderate competency, high frequency group, resulting in no impact on change in STAAR reading scores. This indicates that Creative Teaching can have a positive impact on STAAR reading scores if it is implemented moderately well and often. Although this impact was relatively small, this could be due to issues related to measurement. The frequency of use was based on a self-reported measure and may include a large amount of measurement error. The competency measure was based on a rubric completed by an instructional coach. Not all teachers' competency was measured during 2017–2018 and it is unknown if the teachers who were measured were a representative sample of teachers using Creative Teaching in the district.

Finding 2: Creative Teaching did not have a significant impact on the change in STAAR math scores from 2016–2017 to 2017–2018.

Although several student demographic variables and general teaching quality were positively related to the change in STAAR math scores, the impact of Creative Teaching above and beyond these variables was not a significant predictor. Additionally, even when only looking at the teachers in the top quartile on the Creative Teaching factor, Creative Teaching was not a significant predictor for change in STAAR math scores.

Finding 3: The influence of Creative Teaching techniques were not moderated by demographic sub-groups (i.e., Creative Teaching techniques were not more or less likely to be effective when teaching certain demographic sub-groups).

Although several student demographic variables were correlated with the outcome (i.e., change in STAAR math and reading scores), none was a significant moderator of the relationship between Creative Teaching and the change in STAAR math or reading. The previous study (Andrews et al., 2019) found moderating effects on some single-year achievement rates. The lack of significant moderating effects in this study is likely due to the relationship between the predictor variables and the growth and measurement issues. The growth (i.e., the change in STAAR scores from one year to the next) controled for demographic differences, thus resulting in nonsignificant moderating effects.

Conclusions

This study indicates that Creative Teaching, if implemented moderately well and often, can have a significant positive impact on students' academic growth in reading achievement. Creative Teaching was only found to be a significant predictor of change in STAAR reading for students whose teachers were rated in the top quartile on the Creative Teaching factor, which accounts for both competency in using Creative Teaching strategies and frequency of use. Teachers who had moderate competency and used Creative Teaching strategies with high frequency their students, on average, had significantly more growth in STAAR reading than the average growth seen in students included in the sample. However, Creative Teaching was not a significant predictor of the change in STAAR math scores. Furthermore, no significant moderating effects were found for the change in STAAR math or reading scores.

References

Andrews, M., Christian, C., Williams, H., & Zhao, H. (2019). *2017–2018 Creative Learning Initiative: Creative Teaching implementation and outcomes*. Austin, TX: Austin Independent School District.

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