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Arts Integration And 21st Century Skills: A Study of Learners and Teachers

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Abstract

Arts integration and 21st century skills are increasingly relevant to addressing complex student needs in contemporary education. *The Creative Classroom Collaboratives: Creativity, Confidence, & Competence* (C3²) study found that comprehensive arts integration approaches and peer-to-peer professional collaborations between teachers, teaching artists, and cultural partners such as museums, theaters, and arts councils had a positive relationship to students' achievement and 21st century skill development. By reinforcing criteria that make up the core 21st century skills of creativity, critical thinking, collaboration, and communication, arts integration methods were associated with increases in student learning in a cluster randomized control trial of a study of fourth- and fifth-grade students in two school districts with low socioeconomic status on Long Island, New York. This study includes implications for arts integration in schools, peer professional development and teaching practices, and dynamic partnerships with arts and cultural partners.

Introduction

The *Creative Classroom Collaboratives: Creativity, Confidence, and Competence* (C3²) study examined the potential that arts integration may provide in the development of students' 21st century skills. Education systems currently place importance on the development of skills that students may need in order to be successful in the 21st century, also known as "21st century skills" (Kereluik, Mishra, Fahnoe, & Terry, 2013; Partnership for 21st Century Skills, 2006). A range of competencies or skills for 21st century life have been proposed and integrated into educational practices for over two decades, yet four core competencies concerning learning and thinking across frameworks and disciplines persist and have been characterized by education, social, and business advocates (Workman, 2017) as creativity, critical thinking, collaboration, and communication (Dede, 2010; Jacobs, 2015; Partnership for 21st Century Skills, 2006). This study focused on student development of 21st century skills through arts integration by developing teachers' competence to model them for students through arts integration curriculum design and implementation.

Arts Integration and 21st Century Skills

Arts integration is defined in this study as a strategy for connecting development of skills and concepts in the arts with skills and concepts from other areas of learning through multiple modes of engagement in classrooms (Ludwig, Boyle, & Lindsay, 2017). As new technologies have emerged since the 20th century, capacities for success in civic, college, and career settings have changed and there is increased emphasis in schools on 21st century skills. For example, tasks that were historically completed by people are often conducted by computers,

necessitating more advanced computer and analytical skills for those preparing for the workforce today. Moreover, work and research that was previously conducted independently is now more frequently completed in knowledge-sharing teams, requiring today's students to hone more attuned collaborative skills (Ingalls Vanada, 2016). Overall, in contrast to the separation of knowledge from practical skills characteristic of 20th century learning, 21st century skills are meant to be intertwined, resulting in sophisticated skill sets that can be applied readily to solving a multitude of complex problems (Ingalls Vanada, 2016; Kereluik, et al., 2013). The workforce of the 21st century is trained to support a culture of continuous improvement, using creative techniques like design thinking to challenge the norms and rapidly iterate, review, and adjust to new processes (Ingalls Vanada, 2016). While we are almost two decades into the 21st century, it is important to note that rapid changes in global society have also unified educational leaders around the world to call for increased emphasis on 21st century skills as part of social equity and sustainability efforts (UNESCO, 2017). A 2018 Brookings Institution report on United Nations sustainability research stated:

From these global and regional studies, there is strong evidence of a widespread shift in national education aspirations toward explicit recognition of the value of 21CS [21st century skills]. Although some global and national communities might still argue which 21CS are more valued than others, and how they might be classified or categorized, there is no question that governments have taken up the challenge to ensure that future students will be better equipped to cope effectively and constructively with the demands of our world (Care, Kim, Vista, & Anderson, 2018, p. 12).

Increased understanding of shared artistic and human experiences also requires education systems to develop new curriculum, pedagogy, and assessment approaches that can be valued among cultures as proposed by the arts education research meta-analysis of Winner, Goldstein, and Vincent-Lancrin (2013). Dance, drama, music, literary, media, and visual arts disciplines may provide pathways to development of 21st century skills, but as stated by Winner, Goldstein, and Lancrin in their overview to the Organization for Economic and Cooperative Development (OECD), “[F]or all children, the arts allow a different way of understanding than the sciences and other academic subjects. Because they are an arena without right and wrong answers, they free students to explore and experiment. They are also a place to introspect and find personal meaning” (2013, p. 19).

In light of the evolution of skills deemed necessary in the current era, schools are challenged to implement dynamic curricula in order to foster 21st century skills with their students. Arts education may be uniquely positioned to help students develop these skills. While traditional academic subjects are often learned through didactic instruction and passive or rote exercises, such as memorization, arts education invites and encourages students to be active learners

(Gullatt, 2007). The arts are also effective in supporting learning for students of varying abilities and linguistic and cultural backgrounds, providing students with new avenues for success and opportunities to bond with their peers in a meaningful way (Rooney, 2004). Our increasingly globalized civic societies benefit from people who can translate ideas across different contexts.

Arts integration as a curriculum and pedagogical endeavor was prioritized in this study along with an understanding that the intervention might also encourage teachers and their cultural partners to make more effective use of the arts as part of school culture (Charland, 2011). The arts offer ways for educators to support diverse learning needs by exploring individual concepts through multifaceted experiences. The C3² study modeled arts integration as described by Maxine Greene (2017) when she wrote:

If we are going to affirm, extend, and expand the role of the arts in education, we must give up the kind of standardization that wipes clean the diversity, richness, and humanness that infuses the arts as well as human beings' individual—and sometimes collective—responses to the arts. Further, we must learn more about how to attend. We must be able to demonstrate to our students how the arts enable our full engagement in and of the world, allowing us to attend or be open to others and their possibilities. (p. 252)

While arts education has been shown to improve discrete aspects of students' 21st century skills in various disciplines (Wan, Ludwig, & Boyle, 2018), arts integration—whereby arts and core academic concepts are applied to big ideas and learner-centered instruction—can also expand opportunities for applying 21st century skills across contexts (Ingalls Vanada, 2016; Workman, 2017) and bolster teacher competence at demonstrating richer engagement with ideas.

Creativity

As systems and technologies are constantly changing, creativity encourages societies to keep up with fast-paced workforce adjustments across all sectors (Shaheen, 2010). On a global level, fostering creativity in students can ensure competitive social and economic progress in the future, as creativity can lead to powerful innovations over time. Though core academic subjects often focus on increasing students' knowledge, knowledge alone is no longer sufficient for future success; students need creativity in order to apply that knowledge to solving a wide range of complex issues. As young students are in the midst of a developmentally critical age, primary education offers a crucial opportunity to inspire innovation. Perhaps unsurprisingly, arts integration has been linked to the development of creativity in students. For example, a study of The Creative Advantage initiative for equal

access to the arts in Seattle Public Schools found that, when students were offered opportunities to exhibit creativity in their traditional academic subjects, they demonstrated higher levels of creativity over the course of one year (Baker, Mehlberg, & Hickey, 2018). Koutsoupidou and Hargreaves (2009) found that musical improvisation with 6-year-old students showed changes in extensiveness, flexibility, originality, and syntax as identified in Webster's measures of Creative Thinking in Music.

Critical Thinking and Problem Solving

Engagement in the arts has been linked to students' higher order thinking and problem solving skills (Gullatt, 2007). One study measured the effects of the Visual Thinking Strategies (VTS) program, which integrates visual art analysis into curricula with the goal of improving students' critical thinking and communication skills. Results showed that 8th grade VTS participants demonstrated a substantial increase in their critical thinking skills after just one school year, while comparison students showed no improvement (Grohe & Egan, 2016). Treatment students maintained these improvements, demonstrating greater critical thinking skills four years later as compared to their peers, and some treatment students even credited the program for their gains in these skills. Similarly, the evaluation of The Creative Advantage found that students in one Seattle school demonstrated marked improvement in their critical thinking skills after just one year of arts integration across disciplines (Baker et al., 2018).

Communication

By creating art together, students learn to listen to each other both verbally and non-verbally (Brouillette, 2010). The study of The Creative Advantage initiative showed that, at one school, students demonstrated strongest improvements in their communication skills after one year of arts integration (Baker et al., 2018). Music instruction has been found to develop the neural pathways responsible for language, and this is especially vital for young children (Hallam, 2010). Moreover, arts integration may be particularly beneficial for developing the communication skills of English language learners; for example, a study of K-2 students found that while non-native English speakers were frustrated by their limited language skills in other academic subjects, these students were able to more effectively express themselves when art was integrated in the curricula (Brouillette, 2010).

Collaboration

Arts education and arts integration offer additional opportunities for students to learn to work together that are not characteristic of traditional academic subjects. Indeed, one study found that students who attended schools where arts were integrated into other academic subjects showed increased collaboration skills after just one year (Baker, et al., 2018). When students work together to create art, they learn to understand varying perspectives, make compromises

to accommodate a range of interests, and respect differing opinions (Bertling, 2015). Various arts activities teach students to share, take turns, take initiative, and put the needs of the group above their own desires (Brouillette, 2010). Moreover, students who struggle to fit in with their peers sometimes find common ground through the arts, helping them to make friends with whom they identify. Working together in groups, such as coming together to play a song, helps students build trust and respect for each other, as well as a sense of commitment toward achieving group goals (Hallam, 2010).

Creative Classroom Collaboratives

Despite evidence of the power of arts education to affect students' 21st century skills, many schools across the country still reduce or eliminate their arts education faculty and instruction in the face of critical budget decisions (Dwyer, 2011). High-poverty urban and rural schools also persist in having fewer arts learning opportunities for their students than do suburban schools (NAEP, 2016). Acknowledging the need for students to receive more comprehensive approaches to arts education starting at the elementary level, the *Creative Classroom Collaboratives* (C3) project was designed in 2012 to assist high-poverty schools in integrating the arts into 2nd, 3rd, and 4th grade classroom instruction. Through a federal Arts in Education Model Development and Dissemination (AEMDD) grant, the Eastern Suffolk Board of Cooperative Educational Services (ESBOCES¹) partnered with local arts and cultural organizations and high-poverty schools in the William Floyd (WFSD) and Riverhead Central (RCSD) School Districts on Long Island, New York, to partner teaching artists (TAs) with school-based classroom teachers and specialists (such as music teachers, art teachers, librarians, and physical education teachers) in developing arts integration curricula.

The C3 study utilized a quasi-experimental design in which WFSD and RCSD schools that met eligibility criteria were selected to participate in the three-year project as treatment or comparison schools. Prior to the start of project implementation in 2011-12, four of the seven eligible schools, three from WFSD and one from RCSD, were selected to be treatment schools (i.e., to receive the project activities and participate in the study) and the remaining three schools, two from WFSD and one from RCSD, were selected to serve as comparison schools (i.e., to not receive the project activities, but to participate in the study to provide data for comparative purposes). During the 2012-13, 2013-14, and 2014-15 school years, treatment teachers and specialists collaborated with TAs to design curriculum and implement instruction in various modalities, such as visual arts, dance, theater, and music. Treatment students participated in arts-integrated instruction in combinations of these modalities for five-week

¹ Eastern Suffolk BOCES is an educational cooperative providing regional leadership and advocacy, direct instruction, management, and support through instructional programs, and shared services to school districts on Long Island.

periods and were then engaged in another modality, ensuring that they experienced a variety of artistic disciplines and content area combinations over time. C3 utilized an arts-integration model in which instruction was centered on a work of art, such as a performance or exhibit. Students engaged with aspects of the work of art throughout the residency and in the form of a culminating performance or gallery visit. Results of the C3 evaluation (Metis Associates, 2015) showed that, during each of the three implementation years, treatment students demonstrated significantly greater gains in 21st century skills as compared to their peers who did not participate in the program. Additionally, a majority of treatment teachers and teaching artists reported increased confidence and competence in interdisciplinary, arts integrated collaborations in curriculum, lesson planning, and instructional strategies to meet student needs.

Upon successful completion of that AEMDD project, further research on arts integration for older students, for teachers, and with a wider range of cultural partners was warranted. ESBOCES secured a second AEMDD grant in 2015, providing funding for the continuation of C3, referred to as (C3)². Following one planning year, C3² was implemented in fourth and fifth grades in a new set of schools in the South Huntington and Patchogue-Medford Union Free School Districts of Long Island, New York, during the 2015-16, 2016-17, and 2017-18 school years.

The C3² model aimed to improve students' 21st century skills through improved instructional practices for teachers. To that end, certain aspects of C3 instruction were continued in the implementation of C3², such as reinforcing curricular concepts across academic content areas and artistic disciplines; facilitating collaboration between classroom teachers, specialists, and TAs for meaningful use of cultural resources; and analyzing formative and summative learning to account for high-risk student needs. To ensure effectiveness of the model in benefiting students, C3² expanded support for training teachers to model confidence and competence in their own creative capacities for students; to engage with greater agency in peer-to-peer curricular planning with TAs; to further assess progress through documentation and presentation of learning in photo, video, and student work samples via the Pecha Kucha presentations;² and to align student experiences with arts and cultural examples.

In order to measure the effectiveness of C3 and C3², Metis Associates, an independent research and evaluation consulting firm, was contracted to develop the evaluation for the AEMDD grant proposals and implement the studies. As methodologically rigorous studies of

² Pecha Kucha is a visual presentation method developed by the design industry to shift from showing and telling knowledge to engaging audiences as participants in understanding ideas by using a presentation style that uses 20 slides with compelling images and minimal text in 20 minutes.

an arts integration program, the evaluations of C3 and C3² adhered to quality standards³ in evaluation practice.

Confidence and Competence in Creativity

The C3² study was developed based on findings from the C3 study that proposed students were more capable of developing 21st century skills through integrating the arts into their instruction when they and their teachers had greater confidence and competence in their own creativity (Metis Associates, 2015). Research from the American Institutes for Research (Wan, Ludwig, & Boyle, 2018) suggests that “arts education interventions may focus on intermediary outcomes, such as teacher capacity, that may affect student outcomes” (p. 6). The C3 study provided a foundation for the C3² design with four essential structures: a rubric for identifying 21st century skills in teaching and learning, a practice of peer-to-peer (P2P) collaborations, an understanding that quality assessment of learning emerged from critical engagement among peers, and acknowledgement that partnerships with artists and personnel from cultural organizations were necessary to reinforce relevant and real-world concepts across content and discipline area learning.

21st Century Skills Rubric

C3² used criteria from a carefully designed rubric as a structure for participants to identify qualities of 21st century skills in their own educational expertise and share them with artistic and cultural partners, such as teaching artists and staff from cultural organizations. Thus, a rubric with criteria that could be understood by students, teachers, and cultural partners alike was warranted. The 21st century skills rubric used in this study was designed to assess creativity and innovation, critical thinking and problem solving, communication, and collaboration in students over time. The rubric was developed by Metis evaluators, in collaboration with program personnel, based on several published and locally developed instruments, including: the Elementary Teamwork Rubric (Franker, 2010); the Holistic Critical Thinking Scoring Rubric (Facione & Facione, 1994); the P21 Framework Definitions (Partnership for 21st Century Skills, 2009), and a locally developed writing rubric used with another AEMDD project. The rubric provided a common text that was translated into an array of assessment tools for use by students in both English and Spanish.

Though the importance of developing students’ 21st century skills is clear, current methods of assessing student learning, such as essay writing, do not capture the degree to which students

³ Metis’s research and evaluation activities are conducted in compliance with all applicable state and federal laws and within the guidelines of the American Evaluation Association, the American Psychological Association, and the *Program Evaluation Standards* issued by the Joint Committee on Standards for Educational Evaluation (2010), and in accord with generally accepted standards for ethical conduct in research with human subjects.

are able to effectively source solutions to problems; thus, Dede (2010) calls for valid and reliable tools to measure the development of 21st century skills. The student 21st century skills rubric consists of 25 items, with each item being rated by teachers on a scale of 1 (not at all) to 4 (very much) (see Appendix A for a full copy of the 21st century skills student rubric). By using a common language of the rubric criteria while engaging teachers as peer collaborators with artists and cultural partners to plan, implement, and assess their arts integration efforts, a critical community of practice (Reeder, 2014) expanded among adults and children alike.

Peer-to-Peer (P2P) Collaboration

P2P planning sessions allowed teachers to form meaningful inquiry and artistic investigation around a relevant theme with their arts and cultural partners. The core understanding of P2P activities in this study was that each adult and student participant alike brings valuable expertise in creativity, collaboration, critical thinking, and communication to learning, along with diverse perspectives for confident and competent understanding of outcomes (Wan, et al., 2018). Arts, academic, and 21st century competencies were identified in curriculum and instruction using an arts integration unit planning tool. P2P practices were incorporated into C3 and C3² by program developers who used similar methods in the Empire State Partnerships initiative (Baker et al, 2004). Creating a culture of collaboration “that transforms the school environment” (Duma & Silverstein, 2014, p. 57) is both a 21st century skill as well as an enduring quality of arts integration.

Assessment as Critical Engagement

Assessment of effective practices in C3² was incorporated into aspects of the project using the Latin origin of assessment as *assidēre* meaning “to sit beside.” Participating teachers, teaching artists, cultural partners, and students used reflective strategies to “sit beside” each other and their students to analyze changes in 21st century skills, as well as achievement of academic and artistic goals. With creativity as a learning goal, and collaboration as a professional practice, 21st century skill criteria for critical thinking and communication were reflected more specifically in the assessment methods. For example, each P2P meeting involved teams creating Pecha Kucha and video presentations of planning, implementation, and outcomes from arts integration units as a way to review student learning data more dimensionally and to model their instructional practices for peers. Critical thinking criteria from the rubric included interpreting and analyzing information to justify and explain assumptions. Communication criteria from the rubric included conveying information as well as ensuring that information was understood by presenters and audience as well. Adopting an approach from the design field, such as Pecha Kucha, allowed presentations as assessment to become engaging and liberated from rote reporting habits that could exclude audiences from understanding educational data (Klein & Dytham, 2003). The practice of Pecha Kucha presentations ultimately reinforced confidence in all participants’ abilities to integrate, refine, and share ideas.

Arts & Cultural Partnerships

C3² was designed to surround students and their teachers with a comprehensive arts integration ecosystem that included attending performances, exhibits, and study trips outside of the classroom. The study further reinforced 21st century confidence and competence in teachers by expanding professional development to include community cultural partners as allies in arts integration (Charland, 2011). By adhering to consistent use of the four core 21st century skills, it was possible to enlist galleries, museums, performing arts organizations, and individual TAs in developing more relevant works and programs for schools. For example, a P2P session was held in the galleries of the Heckscher Museum of Art. By working with gallery curators and education staff to analyze ways that students might respond to aspects of the art as it related to their curriculum, teachers and TAs helped the museum to better understand the impact that the exhibits and materials might have on 21st century skill development.

Paying attention to the confidence and competence of teachers and learners throughout both studies provided a flexible theme for aligning one study to the other. Eastern Suffolk BOCES continues to introduce tools such as the 21st century skills rubric, the unit planning worksheet, and a partnership criteria tool from C3 and C3² to schools and community cultural partners through their outreach and engagement in the field to strengthen expectations for 21st century skill development in students and in the adults who care for them.

Methods

Design

This text describes the methods and findings from the evaluation of C3² specifically. The study of C3² used a cluster randomized control trial (RCT) design, which included the random assignment of eight elementary schools in the Patchogue-Medford and South Huntington Districts on Long Island, New York, to treatment or control conditions. Students and their teachers in the treatment schools received all aspects of the program, while students and their teachers in the control schools participated only in culminating performances.

The study of C3² was conducted over three implementation years and included an evaluation that utilized a range of data collection instruments designed to assess and inform both project implementation and impact. While the overarching hypothesis was that the program would positively impact students' and educators' skills, as well as support school-wide integration of arts education strategies, the main theory centered on the effectiveness of the program in improving students' 21st century skills specifically.

Data Collection

The aforementioned student 21st century skills rubric was completed by teachers for their

students and took approximately two to three hours for them to complete at both pre- (fall) and post-administration (spring) each year. Teachers completed the rubrics in paper format.

In addition to the student rubric, data were collected through teacher and specialist focus groups and student unit reflections.

- Focus groups were designed to gather feedback from teachers and specialists about their perceptions of the effects of the program on collaborative instructional practices, their use of arts-integration strategies, and their own 21st Century skills. Data were also gathered regarding program implementation, including strengths and areas for program improvement. A semi-structured protocol was utilized for the focus groups, which were conducted at the end of each implementation year, with each focus group lasting approximately 45 minutes.
- Student unit reflections enabled them to engage in a “sit beside” assessment of their own learning by writing unit reflections on their participation in arts-integrated units of study. Reflections were administered in paper format by teachers to students in treatment classrooms during each implementation year. Students completed the unit reflections midpoint in the school year (approximately January) and again at the end of the school year. The student unit reflection asked students about a recent program-related performance they had seen, the program-related projects they worked on, and their use of 21st century skills.

All instruments were submitted to the Metis Associates Institutional Review Board⁴ for review and were subsequently approved. All rubric data were collected from treatment and control groups, while unit reflections and focus groups were implemented only in treatment schools. Lead teachers at treatment and control schools disseminated program instruments to the appropriate staff and subsequently collected and sent the data to the program evaluator for analysis.

Procedure & Participants

Student Rubrics

In C3², the 21st century skills student rubric was completed by teachers in both the treatment and control schools for each of their students in the fall (pre) and spring (post) of each

⁴ The Metis Associates Institutional Review Board (IRB) served as the IRB of record, as the school districts did not have their own IRBs. Metis has a duly-constituted Institutional Review Board (IRB) that is registered with the U.S. Department of Health and Human Services (IRB #00003465) and ensures compliance with Federal Worldwide Assurance (FWA) requirements for the Protection of Human Subjects (#FWA00004755).

implementation year. Individual students' 21st century skills rubric scores were matched from pre to post administrations for each implementation year. The number of pre, post, and matched student rubrics by year, treatment status, and grade level are presented in Table 1 below.

Table 1*Student Rubrics Completed Each Implementation Year*

	2015-16			2016-17			2017-18		
	Pre	Post	Matched	Pre	Post	Matched	Pre	Post	Matched
Treatment	892	823	780	1155	884	648	460	280	229
4th Grade	461	436	396	614	437	342	223	115	96
5th Grade	431	387	384	516	447	306	237	165	133
Control	762	731	731	937	853	623	639	392	313
4th Grade	352	335	335	388	390	283	292	208	177
5th Grade	379	365	365	496	463	331	331	179	131

Student Unit Reflections

The student unit reflections were administered by the classroom teachers in paper format. They took approximately 15 minutes in January and another 15 minutes at the end of the school year for students to complete, for a total of 30 minutes per student. In spring 2016, 668 students (a response rate of 55%) completed a unit reflection; in 2016-2017, 621 students completed a unit reflection in the fall (response rate of 65%) and 782 completed one in the spring (response rate of 82%); and in 2017-2018, 518 students completed a unit reflection in the fall (response rate of 54%) and 508 completed one in the spring (response rate of 53%).

Teacher and Specialist Focus Groups

As part of the evaluation, focus group interviews with participating teachers and specialists were conducted by Metis evaluators during the P2P sessions at the Patchogue Theater for Performing Arts in Patchogue, NY. Over the course of two days in spring 2018, three focus groups were conducted with the following groups: one group of fourth-grade teachers (N=6); one group of fourth-grade teachers (N=4) and specialists (N=2); and one set of fifth-grade teachers only (N=7). All participating teachers (N=31) and specialists (N=2) who attended the P2P session were invited, and these individuals voluntarily agreed to participate.

Analyses

Linear regression analyses were conducted in SPSS with data from the full sample of 4th- and

5th-grade students across all three years of the evaluation.⁵ Some 4th-grade students participated in the program again in 5th grade; thus, those students may have two years of data included in the analyses. Additional analyses were conducted based on implementation year and are included in Appendix B. For both the full sample across all three implementation years and the subsamples by implementation year, multiple regression techniques in SPSS were used to examine whether treatment status (i.e., participation in the treatment or control group) was a significant predictor of students' post-rubric scores on each 21st century skill, while controlling for the corresponding pre-intervention rubric scores.⁶ Essentially, this technique was used to examine the extent to which the C3² curriculum affected students' skills above and beyond their initial skill level. In addition to assessing intended program outcomes based on statistical significance level, effect size indices (i.e., Hedges' g ⁷) were generated to measure the practical importance of every finding.

Additionally, student unit reflections were content analyzed to examine themes with regard to student perceptions of the program and its impact on their 21st Century skills. Likewise, teacher and specialist focus group data were content analyzed to identify themes related to impact on their instructional practices.

Results

Multiple regression analyses of student data showed that treatment status predicted post scores in each of the 21st century skill areas, while controlling for pre scores (see Table 2). Specifically, multiple regression analyses indicated the following:

- While controlling for pre *Creativity* scores, the treatment group significantly outperformed the control group on post *Creativity* scores by 12.40% [$F(2, 3244) = 1017.04, p < .001$, Hedge's $g = .43$].
- While controlling for pre *Critical Thinking* scores, the treatment group significantly outperformed the control group on post *Critical Thinking* scores by 12.59% [$F(2, 3261) = 945.97, p < .001$, Hedge's $g = .44$].
- While controlling for pre Communication scores, the treatment group significantly

⁵ Note that multi-level modeling was not employed for these outcome analyses as statistical power would be substantially restricted by the small number of schools in this study. Rather, regular linear regressions were conducted for exploratory purposes.

⁶ Due to lack of student demographic data, only the corresponding pre-intervention outcome measure was included in the linear regression models as the predictor, in addition to the treatment dummy indicator.

⁷ Hedges' g measures the standardized group mean difference (the difference between the mean outcome for the treatment group and the control group, divided by the pooled within-group SD of the outcome measure), and is the most commonly used effect size index and the default measure by the What Works Clearinghouse (WWC) for continuous outcomes.

outperformed the control group on post Communication scores by 11.67% [$F(2, 3252) = 929.32, p < .001$, Hedge's $g = .43$].

- While controlling for pre Collaboration scores, the treatment group significantly outperformed the control group on post Collaboration scores by 11.80% [$F(2, 3270) = 742.73, p < .001$, Hedge's $g = .41$].

Table 2

C3² Results of 21st Century Skills Multiple Regression Analyses: Predicting Post Scores Controlling for Pre Scores

	B	SE B	β	t	p
Creativity	0.34	0.02	0.21	15.47	.000
Critical Thinking	0.35	0.02	0.21	15.04	.000
Communication	0.33	0.02	0.20	14.49	.000
Collaboration	0.34	0.02	0.22	14.94	.000

These findings lend support for the positive effect of $C3^2$ interventions on students' 21st century skills (see Table B1 in the Appendix for results displayed by implementation year). The student unit reflections added key context about their awareness of their gains in 21st century skills. While these findings could not be compared to a control group,⁸ they add important context for understanding the quantitative findings. From the student unit reflections, we learned that:

- students could easily develop and identify their own criteria for creativity, critical thinking, communication, and collaboration;
- learning was most enduring or memorable when it related directly to student life experiences;
- family life, politics, identity, peer opinions, and other important social issues connected student interest to schoolwork;
- students are savvy about difficult world issues that surround them and they seek relationships that include safety and compassion in school.

Data from the unit reflections also demonstrated that students perceived that they had made gains in their 21st Century skills. For example, large majorities of students indicated that:

- they came up with their own ideas in the project (creativity), agreement ranged from

⁸ Unit Reflections were collected only from treatment schools, as control schools did not receive the units.

- 77% to 87% across administrations;
- organized their projects to make them more understandable (communication), with agreement ranging from 72% to 86% across administrations;
 - felt happy to be on a team (collaboration), with agreement ranging from 83% to 91% across administrations; and
 - problem-solved to complete the project (creative thinking), with agreement ranging from 67% to 81% across administrations.

Student voices in the data were of great interest to teachers and administrators. Many of the students in this study were dealing with issues of immigration, English as a second language, learning disabilities, and social inequities. The student ideas and perspectives provided direction for adjusting curricula and instruction in practice.

Data from the focus groups with teachers and specialists added further important context to understanding the findings. These groups, which were conducted only with the treatment teachers revealed that the teachers themselves felt that they personally benefited from the C3² interventions with regard to their instructional practices.

Some teachers indicated that they previously felt stuck focusing on preparing students to pass Common Core assessments, but that, through the C3² intervention, they were more confident about incorporating the arts into their instruction. The units served as reminders to them that learning can be pleasurable. For example, one teacher said, *“It reminded me of why I came into teaching and how ... we have to bring in the joy.”* Another teacher reported incorporating more hands-on projects in her own lesson plans as a result of the program. In addition to strengthening their own creativity, teachers indicated enhancing their skills in promoting students’ creativity and new perspectives on non-traditional teaching methods. Several teachers expressed that, as a result of the program, they learned to be more flexible. One teacher explained, *“It was a cool reminder too that you can invite people into your classroom. If I’m not so great at something, you can find outside resources.”*

Moreover, teachers and specialists generally agreed that the P2P meetings were essential for planning units and discussing what might work best for each classroom. One teacher explained that, *“...it’s definitely helpful because you get to meet with your teaching artist and kind of decide, like what part of the curriculum you want to enhance, and then you decide through the curriculum how they’re going to help, and I feel like without doing that, you wouldn’t really know where you’re headed as far as the whole semester goes.”* Two teachers agreed that it was easiest to incorporate teaching artists into social studies curricula, so their collaborations included topics such as Black History Month and the Revolutionary War. Teachers appreciated having time specifically carved out to plan and gain background knowledge about the unit prior to implementation, and teaching artists expressed the

importance of teacher involvement in both planning and implementation.

Discussion

Overall, findings showed that participation in the C3² curriculum was significantly associated with higher post-intervention 21st century skills of students, and this effect seemed to be strongest on students' critical thinking skills. Unit reflection responses further support this finding, demonstrating students' perceptions of the way in which the units were impactful, specifically when they connected to issues in their lives. Moreover, results of teacher focus groups indicate the positive effects of the program on teachers' ability to integrate the arts into their curricula, thus impacting their own instructional practices and their students' creativity. While the current study was not intended to examine or claim the causal relationship between the intervention and the target student outcomes,⁹ the exploratory results of this study provided reasonable support for the potential positive effects of an arts-integration program on students' 21st century skills, and findings offer important applications for educators seeking to bolster these skills. The criteria measured by the 21st century skills rubric may be translated into a range of planning and assessment tools. Collaboration with peer researchers, as proposed by Diaz and McKenna (2017) in their call to action, "As we build a stronger, more vibrant community of practice, we engage in the work of making the arts a part of education at all levels in the United States" (p. 13), may facilitate refining similar tools measuring impacts of the arts and 21st century skills in learning. Further, training and assessment modalities that were successful in C3² can be adapted to other contexts to assist schools and teachers in integrating the arts across curricula. Strategies for creating partnerships with cultural arts organizations and individual partners can also be expanded from these results.

Limitations

While the results of this study demonstrated strong relationships between an arts integration program and all four 21st century skill areas in student program participants, the study also had some limitations. First, it was noted that some students likely participated in the program during both 4th and 5th grade, which may have affected the results of this study. Unfortunately, it was not possible to track students across multiple years due to inconsistencies in identification numbers both across years and across schools.

The study also relied on student rubrics that were completed by treatment and control teachers. Treatment teachers were likely more invested in the program and its success, and

⁹ The information about the joiners in the study was not available to assess the rigor of the cluster RCT. In addition, given the small number of study schools, multi-level regressions were not carried out to appropriately adjust for the clustering effects (i.e., students were nested within schools).

may thus have been more likely to perceive growth in their students' and their own 21st century skills. Thus, the results may have been biased by the nature of the data collection. Student unit reflections were also completed only by treatment students, and focus groups were conducted only with treatment teachers and specialists; thus, the experiences and perceptions of control students and teachers are not as well-understood.

Sample sizes also decreased markedly by the third and final implementation year. It is possible that the most invested teachers completed student rubrics at this point in the study, which may have biased the results.

Notwithstanding these limitations, the C3² study shows promise for the potential of arts integration to help students improve their 21st century skills.

Conclusions

Arts integration and 21st century skills have been promoted steadily and in tandem with education system reform over the past two decades (Workman, 2017). Proposing variations on these approaches can reinforce and grow more inclusive and effective education for all learners. Education systems are still seeking ways to overcome rote, overwhelmed, and inequitable practices. Teachers are still seeking ways to revive their own excitement about learning with students. Communities are still seeking ways to support meaningful arts and cultural resources. As former American Education Research Association (AERA) president and arts education advocate, Maxine Greene (1995) once wrote:

At the very least, participatory involvement with the many forms of art can enable us to see more in our experience, to hear more on normally unheard frequencies, to become conscious of what daily routines have obscured, what habit and convention have suppressed (p. 132).

Findings and reflections from the C3² study offer opportunities for education, arts, cultural, and social development to be more dynamically integrated in diverse instructional settings. Education advocates, researchers, and practitioners may find that the tools from this study are useful in documenting and analyzing more explicit outcomes for arts integration and 21st century skill development across content areas. *Educational Leadership* published an issue on “The Arts & Creativity in Schools” (ASCD, 2019) encouraging greater use of the arts in schools for the future. Arts and cultural professionals may find value in methods for partnering with schools and for aligning their programs with 21st century criteria. By empowering both students and teachers to critically reflect on their own growth and strengths, they may be able to adjust cultural systems to meet a more equitable range of human needs. Whole educational and arts communities may find that P2P approaches to reflecting on learning and professional practices can improve confidence and competence across

differences to support student learning in the 21st century and beyond.

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Appendix A.

Creative Classroom Collaboratives: Creativity, Competence and Confidence (C3)² **21st Century Skills Rubric for Students**

In completing the rubric below, think about the general behaviors of the student named above when they completed classroom assignments over the past 30 days. For each item, rate the student on a scale of 1 (not at all) to 4 (very much).

Creativity and Innovation	Not at All	Sometimes	Often	Very Much
	1	2	3	4
<u>Fluent Thinker:</u> Student usually had several ideas about something rather than only one				
<u>Flexible:</u> Student could shift thinking and take another point of view or consider situations from different perspectives				
<u>Original:</u> Student enjoyed new ideas and could easily create, make-up, and construct ideas				
<u>Elaborate:</u> Student went beyond assigned tasks and expanded ideas by adding details				
<u>Curious:</u> Student continually explored books, games, maps, pictures, etc.				
<u>Imaginative:</u> Student could invent and design, was perceptive and saw relationships between things				
<u>Complex:</u> Student could move from concrete to abstract thinking and from general to specific concepts				
<u>Risk-taker:</u> Student was not concerned about disapproval of others and would challenge, criticize, judge, question, and dispute others				

In completing the rubric below, think about the student's behaviors when working with other students during class time over the past 30 days. For each item, rate the student on a scale of 1 (not at all) to 4 (very much).

Collaboration	Not at All	Sometimes	Often	Very Much
	1	2	3	4
Student worked to complete all group goals				
Student had a positive attitude about the task(s) and the work of others				
Student helped to ensure all team members contributed equally to the finished project				
Student performed duties beyond those of their assigned team role and contributed knowledge, opinions, and skills to share with the team				

In completing the rubric below, think about the student's general behaviors when completing classroom assignments over the past 30 days. For each item, rate the student on a scale of 1 (not at all) to 4 (very much).

Critical Thinking & Problem Solving	Not at All	Sometimes	Often	Very Much
	1	2	3	4
Student interpreted evidence, statements, graphics, questions, etc. accurately				
Student identified the most important arguments (reasons and claims) pro and con				
Student thoughtfully analyzed and evaluated major alternative points of view				
Student drew warranted, judicious, and non-fallacious conclusions.				
Student justified key results and procedures and explained assumptions and reasons				
Student fair-mindedly followed where evidence and reasons led				
Student interpreted evidence, statements, graphics, questions, etc. accurately				

In completing the rubric below, think about the student's writing on classroom assignments over the past 30 days. For each item, rate the student on a scale of 1(not at all) to 4 (very much).

Communication	Not at All	Sometimes	Often	Very Much
	1	2	3	4
Student's writing excelled in conveying the intended information				
Student's writing enabled a shared understanding of the intended information				
Student's writing was characterized by a unique point of view				
Student's verbal communication excelled in conveying the intended information				
Student's verbal communication enabled a shared understanding of the intended information				
Student's verbal communication enabled listeners to understand his or her thoughts and ideas				

Appendix B.

21st Century Skills Multiple Regression Analyses: Predicting Post Scores Controlling for Pre Scores

	B	SE B	β	t	p
2015-2016					
Creativity	0.34	0.04	0.20	9.71	.000
Critical Thinking	0.30	0.04	0.17	8.17	.000
Communication	0.30	0.04	0.18	8.49	.000
Collaboration	0.34	0.04	0.21	9.51	.000
2016-2017					
Creativity	0.29	0.04	0.18	8.37	.000
Critical Thinking	0.62	0.02	0.61	8.85	.000
Communication	0.29	0.04	0.18	8.08	.000
Collaboration	0.29	0.04	0.19	8.30	.000
2017-2018					
Creativity	0.52	0.05	0.36	11.03	.000
Critical Thinking	0.61	0.05	0.40	12.27	.000
Communication	0.59	0.05	0.36	11.24	.000
Collaboration	0.48	0.05	0.32	9.06	.000

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