

Artist/Teacher Partnerships: Exploring Pathways to Arts Integration in STEM Curriculum

By

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## **Dedication**

To my husband and children, whom I'll never be able to thank enough for the sacrifices they made for me to be able to do this work.

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## **Abstract**

Given that arts integration and engaging in arts processes is a productive pathway to helping learners make deeper connections to content and making sense of their world, the work to be done is supporting a shift in teaching practices. This dissertation examines artist/teacher partnerships across periods of planning, teaching and reflection to show how the partners engage in distributed integration through various models of arts integration partnerships.

This study aims to theorize the practice of being a teaching artist, bringing arts integration into the formal classroom, as a partner to a classroom teacher. I build on work in arts integration as well as our understanding of what a teaching artist is, and how they position their work in the classroom, including what it means for teachers and artists to work collaboratively. I do this using a conceptual framework to ground my analysis, based on distributed cognition theory and sociocultural learning theory.

Specifically, this dissertation examines partnerships between three teaching artists and seven classroom teachers as they work together to integrate arts into STEM (science, technology, engineering and math) curriculum in elementary school classrooms through a STEAM residency program administered through a local youth arts organization. Through observations of planning meetings as well as in-class teaching time, I analyze the teaching artist/teacher co-teaching partnership, including how the two negotiate how arts should be integrated into the curriculum, how teachers support teaching artists during instructional time, and the impact this partnership has on both the artists' and teachers' professional development as educators.

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## Chapter 1: Introduction

Integrated curriculum, where the learning in one subject area can further and support learning in another subject area, has gained momentum as an approach to teaching and learning. Integrating curriculum across disciplines not only makes the subjects more meaningful to students, but can promote democratic schooling by providing learners with choice and active inquiry (Parsons, 2004). Integration across subjects also provides numerous opportunities for the arts in education, particularly in the area referred to as STEAM (Wolff, 2019). These opportunities are reinforced by the Every Child Succeeds Act (ESSA) of 2015, which places an emphasis on the importance of a “well-rounded education.” While the law does not dictate what constitutes a well-rounded education, it indicates that it can include “the arts” and “music” along with other subject areas, and provides funding opportunities for arts programming and arts integration (Wan et al., 2018; Ludwig et al., 2017).

Arts integration, at a high level, is instruction that blends content and skills from an arts discipline with another academic subject. Arts integration practices are aligned with constructivist learning theories, where knowledge is constructed by the learner as they engage in arts making processes. Engaging in these processes allows learners to actively build and demonstrate their understanding of both an art form and other disciplinary content. Further, research shows that arts integration can have a profound effect on student engagement in the classroom, and can support student success across the curriculum (Wolff, 2019; Scripp & Paradis, 2014; Henrikson, 2014). Arts integration also has the ability to energize teacher’s practices (The Kennedy Center,



2018). In elementary schools in particular, when treated with integrity, the arts can be used as a way to promote dynamic pathways of interdisciplinary teaching and learning, and give students and teachers new ways to make meaning in their worlds (LaJevic, 2013).

The work of arts integration typically relies on the classroom teacher often working with a teaching artist or arts specialist (Dwyer, 2011). Leveraging teaching artists in schools can aid in the expansion of arts integration. Under President Obama, The President's Committee on Arts and the Humanities (PCAH), made five recommendations for advancing arts education including these three focused on arts integration and the work of teaching artists (Dwyer, 2011, p. viii):

- Build collaborations among different approaches: Leaders of professional associations should work with federal and state agencies to build and demonstrate connections among different educators in the arts. These include art specialists working on standards-based approaches, classroom teachers trained in arts integration and project-based teaching artists;
- Develop the field of arts integration: Through regional and state arts and education agencies as well as private funders, action should be taken to strengthen teacher preparation and professional development, target available arts funding, and set up mechanisms for sharing ideas about arts integration through communities of practice;
- Expand in-school opportunities for teaching artists: Use working artists as partners with arts specialists and classroom teachers, through sustained

engagements in schools, including professional development in curriculum and pedagogy.

Teaching artists, by which I mean an artist who brings their work into educational spaces to teach their craft, have expertise in a variety of disciplines including visual arts, music, dance, drama/theater, literary, and media domains. For the artist, this work in a learning environment provides not only another way to practice their art, but brings a new creative experience to students. This may be through non-integration models such as guest instructors, or artists-in-residence, or performances, but when used towards arts integration they are often “familiar partners in regular education classrooms where they plan with classroom teachers to integrate at least one art form and one non-arts content area” (Burnaford et al., 2007, p. 2). This partnership can allow for the artist to refine their work with students and teachers, and can allow formal classroom teachers to explore how the arts can play a role in their classroom, leveraging discussion, planning, and co-teaching with artists (Burnaford et al., 2007).

While teaching artists have held an important role in arts education, they are an under-developed resource for education reform, and have historically been limited by lack of resources to work long-term, a lack of structure in the role of the teaching artist as a profession, and inconsistent training and certification (Dwyer, 2011). While policy documents such as the one written by the PCAH have done teaching artists a service by pointing out their value to arts education, they do not capture the motivations or opinions of the teaching artists (Reeder, 2015). There is much more to understand about how bringing arts integration into classrooms impacts the teaching practices and

professional development of both the teaching artist and the classroom teacher, and how partnerships can be formed to allow this work to happen collaboratively. There is also more research needed about how a teaching artist's practices shift when moving into the classroom, where integration means not only sharing arts practices, but exploring those practices through a discipline-specific lens, requiring teaching and understanding of that discipline as the arts are taught. And, because every school has differing access to resources - including access to artists working in and outside of the school - and because every school will have its own culture and ways to value the arts, there is no one way that teaching artists are used for arts integration.

### **Dissertation Overview and Research Questions**

This study aims to theorize the practice of being a teaching artist, bringing arts integration into the formal classroom, as a partner to a classroom teacher. I build on work in arts integration as well as our understanding of what a teaching artist is, and how they position their work in the classroom, including what it means for teachers and artists to work collaboratively. I do this using a conceptual framework to ground my analysis, based on distributed cognition theory and sociocultural learning theory.

Specifically, this dissertation examines partnerships between three teaching artists (including myself) and seven classroom teachers as they work together to integrate arts into STEM (science, technology, engineering and math) curriculum in elementary school classrooms through a STEAM residency program administered through a local youth arts organization. Through observations of planning meetings as well as in-class teaching time, I analyze the teaching artist/teacher co-teaching

partnership, including how the two negotiate how arts should be integrated into the curriculum, how teachers support teaching artists during instructional time, and the impact this partnership has on both the artists' and teachers' professional development as educators.

### **Research Questions**

In particular, this dissertation study examines the teaching artist/classroom teacher partnership as the two navigate merging expertise while designing curriculum to include both STEM standards and an arts component. This study aims to develop a Jeffersonian understanding of the role of the teaching artist in formal education, document models of arts integration, and document models of artist/teacher partnerships. Through this work, I aim to answer these research questions:

1. How do teachers and teaching artists negotiate arts integration into STEM curriculum?
2. How do teachers collaborate with artists during instructional time?
3. What are the outcomes of these partnerships?

I use each of these questions to frame the analysis chapters of this dissertation. In Chapter 4, I examine the various interactions that occur during collaborative planning and designing of the workshops. In Chapter 5, I look at the workshop time to describe the ways that teachers support artists during instructional time. In Chapter 6, I use exit interviews and partner reflections to examine the perceived outcomes of the program and impact the program had on the partners.

While I am interested in studying the partnership between the teaching artist and teacher, and while this residency is meant to serve as a professional development opportunity for both the teacher and teaching artist, I am not attempting to position this work against other professional development that artists or teachers participate in, nor am I attempting to create one framework for arts integration in elementary school STEM curriculum. What I aim to do is theorize the practice of teaching artists in the elementary school setting as they partner with classroom teachers to integrate the arts into STEM curriculum. Through this work, the goal is to develop a Jeffersonian understanding of the role, and practices, of the teaching artist in these contexts. I expect that this research will spotlight ways in which artists share their craft and integrate their practices with various instructional situations, primarily the formal classroom setting. This work fills a gap in existing research literature on how arts can integrate into the public school classroom taking into account issues of structure, process, and classroom content (Gadsden, 2008). Furthermore, this work has the possibility to highlight the potential contributions of the arts to and in education by examining models of arts integration in the formal classroom.

## **Chapter 2: Literature Review and Theoretical Framing**

To look at the work of the teaching artist, and how teachers and artists negotiate arts integration, I reviewed two bodies of literature. The first explores what a teaching artist is, what arts integration is, and how arts integration impacts pedagogy. The second explores the situative and sociocultural paradigms that the teaching artist and teacher are operating within, and how arts integration work impacts how the teaching artist and teacher collaborate and learn from one another, and what the relationship between teacher and teaching artist means in regards to integration and teaching. Together, this literature represents what we know about the considerations for classroom teachers and teaching artists to collaborate and merge their pedagogical content knowledge to integrate the arts in STEM curriculum in formal elementary classrooms.

### **The Current State of Teaching and Learning In and Through the Arts**

#### *What is a Teaching Artist?*

There is no singular definition of what a teaching artist is, but typically they are an artist who brings their work into an educational space to teach their craft. Teaching artists are typically not certified teachers, but practice an art form as a profession, and have chosen to develop educational skills as a part of their connected careers (Booth, 2010). Booth offers this working definition: “A teaching artist is a practicing professional artist with the complementary skills, curiosities and sensibilities of an educator, who can effectively engage a wide range of people in learning experiences in, through, and about the arts” (2010, p. 2). Teaching artists are critical to the success of some models

of arts integration (Burnaford et al., 2007), but using teaching artists in the classroom can induce fears from teachers that teaching artists are a cheap way to replace in-school arts programs and teacher, or that a teaching artist will drop in with programming that is not supportive of other work happening in the school and then disappear (Booth, 2010). However, teaching artists are often not interested in taking the place of certified arts instructors in schools, and rather have an interest in amplifying the value of the arts and the work of arts instructors (Reeder, 2015).

While teaching artists often work in a variety of ways with schools, from whole-school presentations, to classroom workshops, to artist-in-residence, for the purpose of this work I am concerned with the role of a teaching artist as a partner in arts integration. With this view in mind, the teaching artist is not only an artist with educational sensibilities, but a collaborator with the classroom teacher. Arts integration is often defined as a process of collaboration, and when working with an artist this collaboration can recognize the artist for their contributions of content as well as the community they represent (Burnaford, et al. 2007). When structured properly, this collaborative work lends time and space to co-plan and implement an arts integrated curriculum, presenting a whole curriculum, where the arts are not pushed to the side. As the arts are typically taught as discrete subjects (and typically focus on visual arts and music), in many schools art teachers and classroom teachers are not provided the time and space to do this work. Students therefore view this work as separate and isolated domains, missing the opportunity to infuse the arts into the learning process (Davis, 1999). Because the teaching artist is an independent resource outside of the formal

school system and schedule, she/he likely has more flexibility in scheduling planning time and workshop time, and therefore the time and space to work can be given.

Teaching artists then must remain flexible in adapting their teaching practices for multiple settings. Teaching artists working in the classroom have to adjust their practices from how they may teach in informal arts settings where there is more time to explore production practices, and where there can be a “pedagogy of collegiality,” where exploration and accountability occurs for both youth and adults (Chávez & Soep, 2005; Halverson et al., 2015). Informal arts settings lend themselves to participation in an apprenticeship model, where “teaching becomes a distributed act, determined by what the community is trying to accomplish, rather than an a priori set of goals that frame the teacher as always expert and the learners as always novices” (Halverson et al., 2015, p. 376). These freedoms do not always exist in the formal classroom, and require adaptation to work within classroom constraints.

Teaching artists who are tasked with arts integration also must adapt to the content they are integrating with, the classroom teacher they are partnering with, and the shared goals of instruction by both the teaching artist and classroom teacher. To foster successful collaboration for arts integration between a teaching artist and classroom teacher, Brown (2007) offers this set of questions to consider: “What is the content? What is appropriate instruction? Who provides the instruction? What strategies are implemented? How will assessment occur?” (p. 172). These are some of the questions that not only help the teacher and artist develop the curriculum, but these



questions also shape the role of the artist in the classroom, and how the arts are positioned with the other disciplinary content.

### *What is Arts Integration?*

Despite a movement towards cross-curricular connections in disciplines such as science, mathematics and language arts, there is not clarity around the role of arts integration in curriculum (Russell & Zembylas, 2007). There is not a singular definition of what arts integration is, or how educators should approach arts integration, but it is generally instruction that blends content and skills from an arts discipline with another academic subject. The work of arts integration, an evolving term, may be called interdisciplinary, or may be referenced by terms such as arts-infused curriculum, learning in and through the arts, learning with the arts, and arts as a vehicle for learning (for a brief overview, see Burnaford et al., 2007). Some define arts integration as building relationships between an art form and another subject area, and meeting objectives in both (Deasey, 2003; Silverstein & Layne, 2010). Others see arts integration as a movement towards a whole curriculum, rather than divided into distinct disciplines or areas (such as engineering and art), where arts integration is “a dynamic process of merging art with (an)other discipline(s) in an attempt to open up a space of inclusiveness in teaching, learning, and experiencing” (LaJevic, 2013, p. 2). Arts integration can not only be leveraged as an approach to integrating disciplinary content, it can be used as a tool to engage in new forms of communication and visual arts (Parsons, 2004). Despite the lack of a singular definition, what arts integration is *not* is

simple activities used as time fillers that trivialize the importance of the process of art making (Gullatt, 2008, p. 16).

Learning through arts production processes are inherently deep and robust constructivist learning experiences (Halverson, 2011), providing students with opportunities to construct meaning of content through the arts (whether visual, dramatic or musical) while simultaneously gaining exposure to skills gained through the instruction of these art forms (Gullatt, 2008, p. 24). Arts integration is “multi-layered and symbiotic with other learning” (Russell & Zembylas, 2007, p. 288) and can serve as a system for mapping knowledge, where paths of inquiry come together, aiding a learners’ need to find connections and relationships between ideas and concepts (Burnaford et al., 2007). As arts integration is generally a constructivist learning experience, through engagement in arts processes the student is actively constructing meaning of what is learned, and relating what is learned with what is already known as an “active meaning-maker,” responsible for integrating what is learned into their own understanding (Parsons, 2004, p. 782). In contrast to the study of a subject, arts integration engages learners in experiential learning, allowing them to make meaning from the learning experience (LaJevic, 2013). In short, the *process* matters, and arts integration provides opportunities for learners to connect with content, through a process that allows the learner to construct meaning of the content matter.

### *STEAM - ARTS Integration Into STEM - Challenges and Considerations*

Among the challenges of achieving integration are that standard school curriculum are fragmented and do not fit well together, which can create problems in

maintaining the integrity of the discipline (Eisner, 2000). Integration requires teachers to have the content knowledge across disciplines to recognize potential points of integration, as well as pedagogical content knowledge, or subject matter knowledge for teaching (Nathan et al., 2013; Shulman, 1986). Teaching, regardless of discipline, requires teachers to have a deep understanding of the subject matter and its structure, as well as an equally thorough understanding of the kinds of teaching activities that help students understand the subject matter (Bransford et al., 2000).

Designing an effective learning environment requires interactions between disciplinary knowledge and pedagogical knowledge. Using a teaching artist to integrate the arts with STEM brings together pedagogical and epistemological considerations. Kirschner (2009) makes this distinction between epistemology and pedagogy: “Epistemology refers to how knowledge is acquired and the accepted validation procedures of that knowledge; pedagogy refers to how something is taught,” (p. 151). Epistemology should not be mapped onto a pedagogy, but teachers should find a pedagogical approach to help the learner acquire the epistemology (Kirschner, 2009).

When using a teaching artist to integrate art and science curriculum, decisions around who teaches what, and how the content is taught are added into the mix of epistemological and pedagogical considerations. Additionally, while teaching artists have their own disciplinary knowledge and understanding of how to bring their practice to learners, they may lack experience with navigating the formal classroom, including pre-established cultures, norms, and behavior expectations established by the classroom teacher. All of these considerations impact the interactions the teaching artist

is managing when integrating arts into another discipline. When co-teaching, and creating an interdisciplinary curriculum, both the classroom teacher and the teaching artist bring their own expertise in discipline knowledge, epistemologies, and pedagogy to the discussion.

The classroom teacher of course brings their own set of interactions, including their subject matter knowledge, views of teaching that subject matter, and views of how integrating new ways of teaching that subject matter could benefit learners. In science education for example, the teacher comes with an idea for how they want their students to understand science. If their plan uses arts integration to help teach the science content, the learner is given a new way to engage with content to construct their understanding of the world. Russ (2014) suggests a view of science learning that shifts towards learners as adopting epistemologies *for* science, versus thinking of learners adopting epistemologies *of* science. In other words, shifting to “a model in which the motivation for and value of particular learner epistemologies is the productivity of those epistemologies for constructing knowledge of the natural world” (p. 4) versus a model based on learners of science practicing science as professional scientists do. This shift requires changes to science learning research, including looking to new places to identify possible productive epistemologies for learning science, and researching epistemologies use in a range of contexts, even if those are not found in professional science (Russ, 2014). The arts can be viewed as a system for mapping knowledge, not simply as an outlet for personal expression, but as a reflection of the world as it is understood by the learner (Burnaford et al., 2007). Inquiry is consistent with arts

integration as it encourages students to question concepts across the disciplines (Amdur, as cited by Burnaford et al., 2007). Arts integration into STEM curriculum can be leveraged as a tool for educators to provide learners with new ways to think about what science is, and construct knowledge about the world around them.

In addition to managing curriculum and content decisions, and navigating the classroom environment, when a teaching artist is working with a classroom teacher to integrate the arts, they must form a sort of collaborative partnership and agreement around shared goals. Collaborative discussions between teachers are most valuable when both are jointly engaged in sense-making and understanding of “the phenomena of learning” (Bransford et al., 2000, p. 198). It also requires a shared understanding of what constitutes as evidence of the learners understanding (Bransford et al., 2000). In some cases, this partnership may also require the teacher and teaching artist to gain confidence in discussing materials outside of the primary domain, such as the teacher using artist talk, and the teaching artist using science talk.

Another challenge of integration is helping the learner connect ideas across disciplines. One way for educators to help students build those connections is through the use of representations. Nathan et al. (2013) propose a framework for “cohesion production,” identifying ways teachers’ pedagogical actions help students to perceive links between disciplines through use of representations, or “symbolic and visual forms that are intended to stand for ideas, objects, and relations.” They argue that cohesion serves an “integrative role” that can foster greater understanding (Nathan et al., 2013, p. 100).

While Nathan et al.'s framework does not account specifically for arts integration into STEM, it does rely on the use of representations. Representations serve as tools to help highlight and communicate ideas and understanding to others, and have long been a fundamentally important part of science and math understanding and instruction (diSessa, 2004). Enyedy (2005) described representations as “sketches, diagrams, symbols, and so on, are a durable trace of our activity and thought that allow us to abstract, highlight, and coordinate salient aspects of the world around us” (p. 427). Nathan et al. (2013) define representations in their study of engineering curriculum as an all-inclusive term for the various notational systems, objects, tools, spaces and even social configurations that engineering students encounter. Artistic production is “primarily concerned with creating representations,” and there are strong parallels found in the construction of representations for science and art (Halverson, 2013, p. 127). When teacher's actions support cohesion production, they help learners connect ideas to representations; engaging students in the creation of those representations lends itself to arts integration into STEM content.

### **Theoretical Framing and Considerations for Partner Teaching and Learning**

To understand what happens in these partnerships, I developed a theoretical framework constructed from theory in sociocultural perspectives of learning, distributed cognition, and understanding complex learning environments. These theories guided my research and interpretations, and are used because they have been productive in understanding how humans learn. Furthermore these theories lend support to the

conceptual framework that I will later introduce which guides each analysis chapter of this dissertation.

### *Teacher Learning and the Sociocultural Impact of Arts Integration*

Helping educators learn to adapt their teaching practice to include arts integration may mean having to unlearn old ways of teaching to adopt a new approach, requiring the teacher to become comfortable with being the learner, which involves taking risks, and making oneself vulnerable (Bransford et al., 2000; Oreck, 2004). Teachers learn from a variety of sources and interactions, including their own practice, interactions with other teachers, and professional development programs (Bransford et al., 2000). Russ et al. (2016) discuss in detail the entities and processes inside the broader learning system that impact how teachers learn. A situative or sociocultural perspective views the teacher (or teaching artist) as a “thinking agent” in a larger context, where teaching is fundamentally interactional, and requires looking at how the educators interact with students, their school, their district, tools and artifacts, and other teachers in teacher communities (Russ et al., 2016). Within the teacher community, one type of entity that changes as learning occurs are *rules*, *norms* and *participation*, affected by change processes of *negotiation* and *individual attunement*. Negotiation can be understood as shared understanding in the group, where individual attunement focuses on the changing participation of the individual (Russ et al., 2016). These types of potential changes reflect the bi-directional nature of learning, and affect participation in the community that may then affect their role in another community. In other words, as a classroom teacher learns new ways of teaching through arts integration via

collaboration with a teaching artist, their previous idea of rules, norms and participation are impacted by the negotiation of the co-teaching partnership. The changes to the teacher's understanding of the material may then be carried over into other communities, such as with other teachers, or other classroom settings.

### *Distributed Cognition*

Changes that occur as a result of teaching partnerships also reflect a distribution of cognition around a shared activity, resulting in a reciprocal interaction around the act of integration. As teachers and artists work together to integrate the arts, their individual skills enter into a distributed, collaborative situation, that also affords the opportunity for the practice of skills. According to Salomon's (1993) view of the relationship between the individual and distributed cognitions, these components interact with one another in a:

spiral-like fashion whereby individuals' inputs, through their collaborative activities, affect the nature of the joint, distributed system, which in turn affects their cognitions such that their subsequent participation is altered, resulting in subsequent altered joint performances (p. 122).

Together, the partners engage in "qualitative scaffolding" where one partner provides meaning to the other, possibly changing the cognitive activity of the other, thereby qualitatively changing the teaching activity (Salomon, 1993, p. 133). This change in activity can then become generalized and part of the regular practices for both the teacher and artist.



### *Designing Complex Learning Environments*

While administrators and teachers can look to arts integration as a way to make discipline knowledge more engaging, or as a way to add “21st Century Skills” to the classroom, bringing a teaching artist into the school for arts integration work expands the sociocultural setting of the formal classroom. Integrating the arts into other disciplines gives space for the classroom teacher to develop a constructivist classroom, at least for the moments where the arts integration work is happening. When developing a constructivist classroom, two factors are in play: the degree to which the social is acknowledged as integral to the individual learning process, and the particular subject matter (Richardson, 2005). By bringing outside artists in - those who are experts in an outside domain and represent different roles in the community - the school learning environment is opened up to new cultural tools and discourse, expanding the activities that constitute classroom life. These additional interactions further complexify the learning environment, which should be looked at as complex composites - an interdependent system of variables (Salomon, 2006). The variables that comprise the learning environment “affect each other reciprocally and give meaning to each other” (Salomon, 2006, p. 257).

### *Teacher Learning and Collaboration*

This sociocultural view of learning - that knowledge is co-constructed and relies on the interdependence of interactions in a social context, generated between the individual and their own processes and understanding, the activities one engages in to generate new ideas and meaning, and the community where ideas are communicated

and exchanged - pertains to student learning, but also to the teacher when working collaboratively with a teaching artist. The work of teaching and teacher learning is social and collaborative (Russ et al., 2016). Moreover, in the work of collaboration between a teaching artist and classroom teacher, with an aim of professional development and learning for both, consideration has to be paid to the changes occurring in the interactions in the learning community, across different entities the teacher and teaching artist participate in (Russ et al., 2016). Teachers are not always prepared for these forms of collaboration with teaching artists and the resulting changes in interactions, and researchers have called for additional evaluation and research in the area of teacher development with respect to arts integration (Burnaford et al., 2007). While this section is primarily focused on understanding how teachers learn, many of these ideas can be carried over to how teaching artists learn as well. There is little research dedicated to the study of how teaching artists/informal educators learn to teach and is an area that deserves more attention.

This theoretical framing will be embedded throughout this study in support of how I view this work, my research questions, and the analytic frameworks I developed to examine my questions. In particular, I will use these ideas to support and develop an understanding around the interactions at play in the learning environment, and how they impact teacher and artist, collaboration, instruction and change, both for the individual and as a distributed act.

## Chapter 3: Research Design and Methods

This study aims to understand the role of teaching artists in arts integration into STEM curriculum. Building from what we know about the work of teaching artists, what arts integration is, and considerations and challenges for integrating disciplinary content in a co-teaching partnership, this study looks at how teachers and teaching artists collaborate and adapt their practices and pedagogy to achieve arts integration in a complex social situation.

### Methods Rationale

In order to answer my research questions, I collected multiple forms of data from three different sites. These sites are elementary schools in the Greater Kansas City area. Each site had a different artist paired with it for the duration of a STEAM residency program, where the artist co-planned and co-taught with the classroom teacher. Each artist had their own arrangement at the school; one worked with two 2nd grade classes, the second worked with a Kindergarten, 2nd grade, and 4th grade class at the same school, and I worked with a 2nd grade class of 50 students co-taught by two teachers. From my observations of each of the teacher/artist partnerships, I developed a *collective case study* (Stake, 1995, 2000). Using the common theme of teacher/artist partnership, these various cases allowed me to conduct analysis across the planning, teaching and final interviews to study different forms of partnerships and outcomes. For review, the research questions I aim to answer are:

1. How do teachers and teaching artists negotiate arts integration into STEM curriculum?

2. How do teachers collaborate with artists during instructional time?
3. What are the outcomes of these partnerships?

Collective case study, or instrumental study extended to several cases, was chosen “because it is believed that understanding them will lead to Jeffersoner understanding, perhaps Jeffersoner theorizing, about a still larger collection of cases” (Stake, 2000, p. 437). Case studies “enable researchers to contextualize the experiences of subjects and access the ways participants make sense of those experiences” (Compton-Lilly, 2007, p. 80). It is appropriate for this dissertation because I aim to understand from these residencies what it means to partner an artist with a formal classroom teacher for the purpose of arts integration, specifically what this type of collaboration looks like, and what is gained from this form of partnership.

## **Site Descriptions and Participant Recruitment**

### *Program Overview*

The teachers I worked with for this study were each awardees of a grant from a STEAM residency program made possible through a partnership between Kansas City Young Audiences and KC STEM Alliance. Kansas City Young Audiences (KCYA) is an affiliate of the national Young Audiences Arts for Learning network, and serves approximately 100,000 students in the greater Kansas City area annually through a variety of programming both in and out of schools. Aside from the STEAM residency program, Kansas City Young Audiences offers regular programming to schools and community partners, placing teaching artists in schools, libraries, and community centers for classroom workshops, artist residencies and school performance

assemblies. They work with over 150 artists and present 165 programs in creative writing, dance, drama, music, and the visual arts, made up of performances, workshops, and professional development seminars for teachers. KC STEM Alliance is a collaborative network of educators, business partners and organizations organized around increasing interest in STEM. They support STEM education in a variety of ways, but through this grant encourage adoption of Project Lead the Way Launch curriculum, a project-based curriculum that many of the schools involved in the STEAM residency have adopted.

In addition to recruiting schools for the program, KCYA recruits artists to pair with the schools. Many of these artists have worked with KCYA in other capacities, including their in-school programming where schools bring artists in for performances, residencies, workshops, and after-school programs across a variety of arts disciplines. After being selected for the program and an initial professional development workshop, teachers and artists were paired. 2017-2018 was the second year for the program and included 17 artists, across 27 classrooms in 18 different participating schools. I came to learn about this work through invitation to work as one of KCYA's new teaching artists, and participated in the program as an artist March-May, 2018.

The majority of schools participating in the program are using Project Lead the Way Launch curriculum. According to the Project Lead the Way website:

The program empowers students to adopt a design-thinking mindset through compelling activities, projects, and problems that build upon each other and relate to the world around them. And as students engage in hands-on activities in

computer science, engineering, and biomedical science, they become creative, collaborative problem solvers ready to take on any challenge (Project Lead the Way, 2018).

Not all teachers in the program adopted the curriculum. Of the teachers participating in my study, two 2nd grade teachers from a charter school did not use the Project Lead the Way Launch curriculum and instead wrote their own, four teachers referred to the curriculum but did not follow it, and only one followed the curriculum closely.

The residency program consists of the following:

- Professional Development Session: A hands-on session where the program's classroom teachers and teaching artists work side by side, and together explore and practice different ways to use the arts to teach STEM lessons. This 3-hour session also included presentations from previous teacher/artist pairs who have participated in previous STEAM residency projects.
- 4 Hours of Planning Time with the Teaching Artist and Team: Each teacher in the program has planning time with their partner teaching artist. KCYA or a KC STEM staff member help facilitate the first planning session to help with setting dates for the future planning meetings and workshops, as well as helping to plan use of particular Project Lead the Way Launch curriculum modules. In some cases one planning session may be used as a classroom visit instead.

- 7 Classroom Visits by the Teaching Artist: The teaching artist comes to the classroom for seven workshops to teach or co-teach depending on how the pair has organized in their planning of arts integration and the STEM curriculum.
- 1 Exit Interview with Project Evaluator: Each teacher and teaching artist has one final meeting with the KCYA and KC STEM Alliance staff to reflect on the project.

The opportunity to research this STEAM residency program came to fruition through my own involvement in the program as a teaching artist. In addition to studying the partnerships of three artists partnered with six teachers across three different elementary schools, I also documented my own residency experience.

### *Site Rationale*

In addition to placing me in a school as a teaching artist, KCYA helped in matching me with three other schools (with five participating teachers) and two artists. The decisions were based on teachers who were comfortable having research done in their classroom, artists who had participated in the prior year of the program and are considered expert teaching artists. Every teacher and artist then gave consent to participate in the research. This consent assured names would not be used; for that reason, pseudonyms are used throughout.

### *Site and Participant Descriptions*

#### Site Overviews

The teachers I observed were in three schools in the Greater Kansas City Area.

- A charter school that served K-2nd grades during the 2017-2018 school year. The school serves a racially, culturally, and socioeconomically diverse student population. I observed two 2nd grade classrooms at this school.
- A public elementary school southwest of Kansas City. The school serves a predominately white student population. I observed one Kindergarten, one 2nd grade, and one 4th grade classroom at this school.
- A public school northeast of Kansas City. This school is a lottery school that admits a limited number of students per year, with even distribution from the school sites in the district. This school uses project-based learning, and also highly values arts integration at the school and district level, regularly bringing the visual arts and music teachers into classroom projects, as well as additional support as desired through the district's fine arts department.

Additionally, consent forms were sent home to students for permission to photograph student work (not the individual student) that was created during the STEAM workshops.

<b>School</b>	<b>Artist and Discipline</b>	<b>Teacher, Grade and Curriculum Focus</b>
School A	Mr. Barkley - choreography and dance	Ms. Alan, 4th grade, Energy Conversion
School A	Mr. Barkley - choreography and dance	Ms. MacIntosh, 2nd grade, States of Matter and Maps
School A	Mr. Barkley - choreography and dance	Ms. Hooper, Kindergarten, Animals and Algorithms (pre-coding)



School B	Mr. Johnson - mime	Ms. Jefferson, 2nd grade, Force & Motion, Simple Machines and Inventions
School B	Mr. Johnson - mime	Ms. Luis, 2nd grade, Force & Motion, Simple Machines and Inventions
School C	Ms. Jordan-Douglass - digital media production	Mr. Gordon & Ms. Robinson (co-teach) 2nd grade, The Changing Earth (weathering and erosion)

Table 1: The mapping of school, artist and teacher for each residency.

### Teaching Artist Overviews

Each school has one teaching artist assigned to it:

- A dancer and choreographer with over 30 years of teaching experience. This artist worked with School A in Kindergarten, 2nd grade and 4th grade to integrate dance and movement into three different curricular units.
- A mime, juggling and magic performer, with nearly four decades of performance experience. This artist worked with School B to teach mime and general performance practices.
- I worked with School C to teach about digital media production, the production process, and puppet building and performance. I was paired with 2 teachers who co-teach 2nd grade.

### Descriptions of Residencies

Each artist worked with multiple teachers at three different schools. The dance and movement artist conducted three different residencies across three grade levels. The mime teaching artist conducted two residencies, but used the same content back to back with two 2nd grade classes. I worked with two teachers who co-taught 50 2nd graders.

*School A - Mr. Barkley - Dance and Movement*

Mr. Barkley has over 30 years of experience as a teaching artist. He formerly held executive positions at several area arts organizations, and is on the Kennedy Center's National touring roster for the Partners in Education program and Changing Education through the Arts. He works regularly in schools as a teaching artist, and in leading professional development workshops for teachers and teaching artists around arts integration. Mr. Barkley worked with three teachers at one school, Ms. Hooper (Kindergarten), Ms. MacIntosh (2nd grade), and Ms. Alan (4th grade). All planning sessions were done at the same time across all three classes.

Kindergarten:

Ms. Hooper had participated in a KCYA STEAM residency with Mr. Barkley the prior year, and the two have a long-time working relationship. They had decided to repeat the same lesson they had done previously, which built on a Project Lead the Way unit called Animals and Algorithms. They adapted the unit to incorporate dance and movement to "code" sequences on the classroom floor, which corresponded to animal actions, developing the student's understanding of the relationship between choreography and coding, and that each uses a set of specific steps.

Mr. Barkley began the residency by introducing the students to a core set of ideas that he then built on throughout the residency: space bubbles (creating space between students as they move around the room); creating shapes with your body and at different levels (high, medium and low); stop and go dance (move until the music stops, then freeze), and mirroring. The next week he revisited these concepts, but

added on hand sculptures, which later became whole body sculptures. Each week, these concepts were built upon, until they were using movement and music in conjunction with performing different animals.

In the fourth workshop, connections between coding and choreography were introduced, where they used colored paper to represent an animal. The student then performed that animal's actions for each piece of corresponding colored paper (for example, if red paper represented frog, and 3 sheets were laid down in one direction, the student hopped like a frog three times in one direction). Once that was understood, the colored papers were mixed up so that the student had to change up animal actions, and the papers were placed in different directions. The workshops continued to build up the complexity of the sequences and actions, while continuing to practice the foundational exercises such as stop and go dance, shapes and levels, and making sculptures with their bodies. For the final performance, they performed their animal coding sequences and living sculptures for the 4th graders who were also participating in the residency.

Ms. Hooper was an active participant throughout the residency, helping make connections to the workshops and other material they were learning, and acting as a learner alongside the children. These two partners continued to work together after the residency, and have presented their workshop at conferences and have hopes of taking it to other schools.



Figure 1: Kindergartners perform a series of animal-related movements tied to sequences of colors papers.

### Second Grade:

Ms. MacIntosh was new to the residency program and to arts integration, but was a seasoned teacher. She presented Mr. Barkley with a number of open standards she still needed to address with her students, and their residency attempted to integrate several different concepts, including form and function, properties of matter, and mapmaking; due to the variance of topics, some workshops were more successful than others. Mr. Barkley brought ideas in for what to do with each workshop, and Ms. MacIntosh filled in teaching more on the concepts between his visits. They borrowed topics from the Project Lead the Way curriculum but did not use it as a guide. While Ms. MacIntosh did a lot between the workshops to pre-teach concepts or continue the ideas, they weren't always aligned, which made for some disconnects. Additionally, each of these topic areas became layered; for example, mapmaking led to the creation of dance maps, but an attempt was made to demonstrate the water cycle and the rock cycle using the same maps, and those connections were difficult for the students.

Like he did with the kindergarten class, Mr. Barkley began the workshops with some foundational exercises to introduce shared vocabulary and concepts about dance and choreography. He introduced the same ideas of space bubbles, stop and go dance, shapes and levels, mirroring, and hand sculptures but adapted it for the age group by moving onto new ideas a little more quickly, or giving slightly more complex configurations. He spent the first two workshops on these ideas before moving into a very brief discussion on form and function, and then a lesson on properties of matter, with a focus on using their bodies to move like gas, liquid or solid (spread out and moving quickly as gas, closer and less quickly as liquid, and close together as a solid). He then challenged small groups to flow between the states connecting ideas of levels and shapes with properties of matter. In the fourth workshop, they set form and function and properties of matter concepts aside and switch to a focus on creating dance maps. For this work, they leveraged ideas they had been working on with Ms. MacIntosh around cardinal directions and legends, then added on using different locomotor movements and drawings of those movements to create a map for another person to follow. At his next workshop, Mr. Barkley tried to combine ideas of dance maps with properties of matter and cycles, which worked when they were using their bodies to move, but the students struggled when trying to translate it to paper as a map. In week six, they revisited some of the earlier dance concepts as well as form and function to create sculptures with their bodies. Then Mr. Barkley gave a lesson on figure drawing; while the kids seemed to like learning about it, it didn't have a direct and clear tie to the other concepts they had been exploring. This led to the final performance, where they

shared with other 2nd graders the dance maps they had made, as well as their body sculptures.

Ms. MacIntosh played a strong supporting role to Mr. Barkley, not only in the work she did between workshops to teach new material, but also to reinforce what Mr. Barkley had taught. She also engaged during his visits to support the students by redirecting or helping the kids, writing helpful words on the board, and interjecting with connections to other things they were learning about. They were successful in creating a clear activity in the dance maps, but realized that they had layered too many concepts and that weeks 6 and 7 with the extra cycles and figure drawing exercise were less accessible and connected than the other activities.

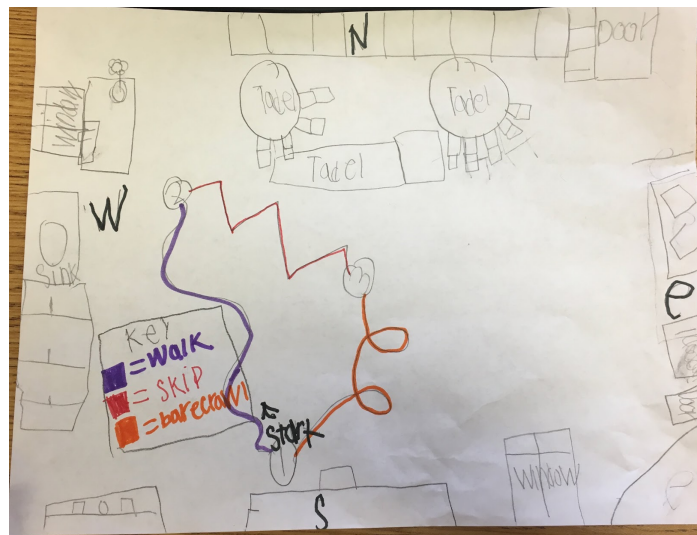


Figure 2: A 2nd grade dance map.

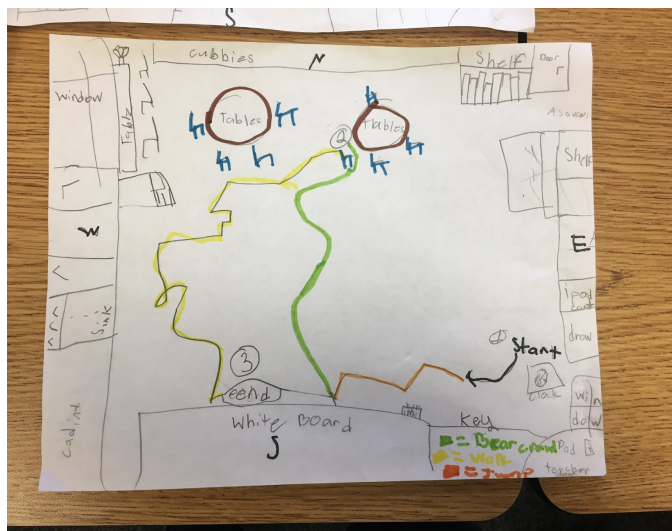


Figure 3: A 2nd grade dance map.

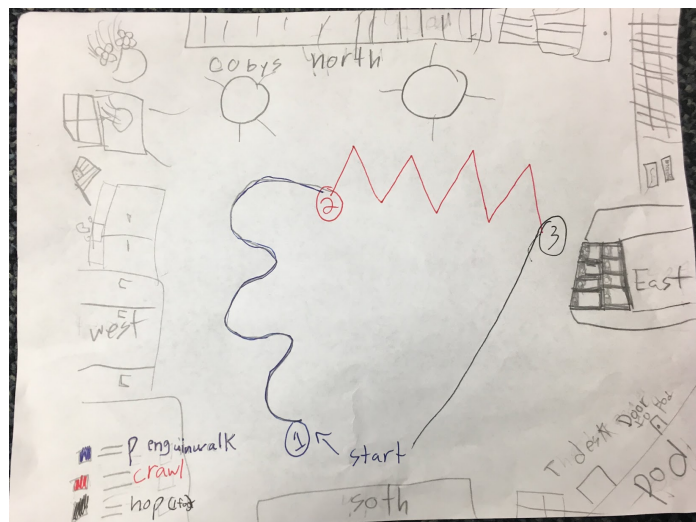


Figure 4: A 2nd grade dance map.

#### Fourth Grade:

Ms. Alan is a young teacher, and was also new to the residency program and arts integration. She chose energy conversion as the STEM area of focused based on Project Lead the Way modules she had access to, but did not use the Project Lead the Way curriculum at all. Based on the topic, Mr. Barkley came with an idea of teaching energy conversion through the digital diagram on the Toyota Prius dashboard. The

students learned the same foundational dance concepts and language as the Kindergarten and 2nd graders, but as they progressed through the workshops, their body movements aligned to different forms of energy, leading to a choreographed piece that demonstrated what happens in the Prius.

In the second workshop, Mr. Barkley introduced form and function. In addition to the dance and movement exercises, which he again had adapted for the older kids (more complex movements and moving from one activity to the next more quickly). In the third workshop he spent time introducing simple machines (which is a topic covered in 2nd grade standards), and then had them act them out to his drum beat, building this activity up from individuals, to pairs, to groups of four. In the fourth workshop, Mr. Barkley introduced the Prius diagram, and three areas of focus: battery, gas motor, and electric motor. For each of these, they discussed its function, and explored ways to demonstrate it: a battery storing energy looked like a shaking body with minimal movements; the gas motor looked like explosive hand movements to indicate spark plugs; the electric motor looked like pulsing hands to show electric energy. The following workshop, they practice moving the energy from one area to the next, choreographing the transition between one another. They used the sixth workshop to prepare for the final performance, which included showing their use of their body to demonstrate simple machines in pairs, and then their enactment of the Prius engine as a quarter.

Ms. Alan supported Mr. Barkley throughout by tending to student needs and managing the classroom, but mostly turned the room over to him. There were few



explicit ties for alignment between the workshops and what she was working on in between, making this residency feel more like guest instructor visits than a teaching partnership.



Figure 5: 4th graders use their body to demonstrate energy conversion in the Toyota Prius.

### *School B - Mr. Johnson - Mime and Toy Design*

Mr. Johnson has been working as a teaching artist for nearly four decades. He works individually in residencies such as this one, but also performs regularly at schools alongside his wife, using mime, juggling and magic. Mr. Johnson had performed at this school before, and was familiar to the students from that visit.

Classroom teachers Ms. Jefferson and Ms. Luis were new to the residency program with KCYA, and to arts integration overall. The charter school they work in was only in its 2nd year of operation during this program. While each teacher had their own classes and approach to teaching, the two planned together and created curriculum together. They did not use the Project Lead the Way curriculum, and designed a custom

unit with Mr. Johnson. It was the teachers' decision to focus on force and motion and simple machines as the STEM content area. They already had the idea of approaching this unit as a toy fair, so used that as a starting point with Mr. Johnson. Mr. Johnson built on this idea by leveraging his own toy collection, but then layered on mime as another performance aspect. With that shared agenda, the three worked on laying out a residency that wove together simple machines, force and motion, toy design and presentations, and performing with mime.

As was the case with many residencies in the program, Mr. Johnson shifted some scheduled planning time to workshop time; because he was doing two residencies (accounting for two sets of allocated planning hours) these shifts allowed him to have 8 workshop visits plus a final performance with each class. Across the visits, Mr. Johnson aimed to teach kids games and expose them to toys that leveraged and taught force and motion as well as simple machines. He taught them games such as the magic shelf, where the kids performed in mime by taking an imaginary object from a shelf, then demonstrating it so the class could guess the object. As they got comfortable using mime, they then worked together to mime different machines such as a washing machine or lawnmower, using their bodies to represent different components and moving parts. Each week they would build on these ideas and get more focused, using their bodies to represent simple machines, such as using their bodies to "wedge" between two people. In later weeks he brought in toys, such as stomp boards (lever) and spinning plates (wheel and axle) to show kids playful examples of simple machines.

Every workshop, Ms. Jefferson and Ms. Luis complemented Mr. Johnson's focus with additional lessons and activities. In some cases they started the workshop time with a lesson on a simple machine in advance of Mr. Johnson's games and examples. In others they followed up on Mr. Johnson's activities with additional hands on activities; for example, Ms. Jefferson had the kids use Legos to build the simple machines they had just practiced with their bodies, and during this time Mr. Johnson moved around the room to work with the students. Between Mr. Johnson's visits, the teachers built on these concepts to have kids design a toy that used a simple machine and demonstrated force and motion (to be shared at the final production).

Each week the classes were working towards a final production that was part toy fair, part simple machine mime demonstration, and part mime story. In week three, to tee up the mime story performance, Mr. Johnson had the kids brainstorm actions that kids might be doing in a park. The following week he started staging a story with these actions, assigning roles to kids (basketball, baseball, catch, picnic, etc.). This final piece of the planned performance was a nod to force and motion (centered around a game of tug of war) but was primarily used to demonstrate the students mime and performance abilities. For the final performance, Mr. Johnson acted as the emcee, where he guided the students through a brief presentation on their toy design, and had each small group demonstrate a simple machine mime, followed by the tug of war mime story.



Figure 6: 2nd graders' toy designs featuring simple machines.

*School C - Ms. Jordan-Douglass - Digital Media Production & Puppetry*

My partner teachers were experienced teachers, both with prior exposure to arts integration. They also co-taught their class, so were adept at collaborative teaching. When establishing what we wanted to teach together, they shared remaining standards they needed to meet for the year, and based on this and other plans they had for teaching other areas, they decided weathering and erosion was the best fit. While there is a Project Lead the Way module (The Changing Earth) that maps to these standards, we did not ever refer to the curriculum as a guide. When it came to the arts piece, I have a background in digital media production, and worked for years at a company well-known for creating puppeted characters. While I'm a generalist across disciplines, it happened that the class of 2nd graders I was working with were really into puppets, so it was a great fit to use part of the residency to explore the art of puppet making and performance. I also wanted to use the puppets as a mechanism for researching and explaining weathering and erosion, and because of my production background, creating a mini documentary with puppet hosts became the final product. We worked

collaboratively to devise production roles for the students and put them in crews of six students made up of two partners to each role: puppet designer, set/prop designer, and writer. These were structured to be interdependent roles to support their collaboration. Each student also had to conduct research to contribute to the project. After the pre-production work was done, we shifted roles to have puppeteers, directors, and camera operators. Then we shifted roles again for editing and assembling the final videos.

We started the residency with a brief introduction to the work I do, an overview of what weathering and erosion are, and an “erosion walk” where we walked the school campus documenting evidence of erosion. This became foundational material we carried throughout the writing and creation pieces week to week, supplemented with additional research, reading, and writing between my visits. The second week we explored the kinds of work I do more deeply as context for the work we were going to be doing together, including a puppet demonstration. From there we started planning and pre-production work. We reviewed examples of mini documentaries and discussed approaches to how to use characters, how to use the set and props, and how to use additional resources such as pictures from the erosion walk. As the students began writing there was a balance to negotiate between creative writing and factual reporting of their understanding of weathering and erosion. Our fourth workshop was designated as a hands-on writing and designing day, and the teachers leveraged a wealth of resources (high school theater teacher, librarian, a parent, and the art and music teachers) so that each group had an adult guide. This was where the students really started to see the interdependence of the roles (for example, the writers needed to be

on the same page as the puppet designers to write the character properly), and the adult guides played a big role in facilitating that collaboration and keeping the groups aligned.

Each week we kept progressing the production work, moving from planning to making. The teachers managed a lot of necessary prep work between my visits, especially in regards to getting the scripts in place. By workshop seven, we were recording video. We shot everything on green screen, and in the 8th workshop started editing, including adding assets and effects to the videos. Due to time, I wasn't there for final assembly of all the videos, but the kids were able to finish them, and then I came back for a later visit to have a showing party where parents were invited.



Figure 7: 2nd graders' puppets.

## Data Collection

I observed two artists, documenting their work across five classrooms with five different teachers. Additionally, I documented my own residency experience. Each classroom and teacher/artist relationship is unique, as is the curricular content and

approaches to teaching it for each classroom. I began data collection in February 2018, and finished in May, 2018. Data was collected in four ways:

1. Observations: Ethnographic field notes and photos were collected during observations of planning sessions and classroom workshop sessions, as well as auto-ethnographic accounts as a participating teaching artist. Photos focused on the teacher and artist and were also be taken of student work (but not specifically of individual students).
2. Audio recordings and video recordings: Audio and video of the classroom sessions were recorded to help capture talk happening in the classroom, and during planning meetings. These recordings were also used to aid in collecting observations of how teachers and artists negotiate classroom instructional time. Videos focused on the teacher and artist and not on individual students.
3. Semi-structured interviews: To conclude the residency program, every teacher/artist partnership participated in an exit interview, conducted by an evaluator for Kansas City Young Audiences. When time allowed, I also asked a few follow-up questions at the end of their interview. Data was collected from notes taken during the interviews and audio recordings.
4. Artifacts: Collection and analysis of materials developed during co-planning and co-teaching time (such as Google docs, drawings on the board, presentation materials), as well as student creations made during the STEAM workshops.

This data is particularly useful to the collective case study approach, as looking at these partnerships across the planning, teaching and final interviews can help

facilitate our understanding of the teacher/artist partnership. This is practical given that through this intrinsic study, I am bound by the constraints of the program, but I am interested in what is produced in the partnership between teacher and artist; the case itself plays a supportive role to the collaborative and distributed activities occurring during the residency.

### **Data Analysis**

Because I am looking at the partnership between teacher and teaching artist in a particular context, and what each learns through their work together, I analyzed my data through a conceptual framework developed from two bodies of work from Gabriel Salomon. The first involves the study of complex learning environments. The second explains how individual and distributed cognitions interact. I use these together to create a framework to structure my analysis of the three parts of the residency: the planning, the teaching, and the exit interview/reflection.

Salomon (2006) describes three attributes of learning environments. First, they are comprised of many components, including teacher characteristics, student characteristics, learning activities, learning materials, and rules and norms. Second is that these components interact with each other “affecting each other and giving meaning to each other” (p. 256). Third, these interactions are always changing and evolving. When examining how educators work together in designing and teaching collaboratively in learning environments, we can relate these attributes to Salomon’s (1993) reciprocal learning spiral showing the relations between individuals’ cognitions and distributed cognitions. I view Salomon’s reciprocal learning spiral as having three



components: 1) individuals' inputs, through their collaborative activities, affect the nature of the joint, distributed system; 2) which in turn affects their cognitions such that their subsequent participation is altered; 3) resulting in subsequent altered joint performances and products (p. 122). I blend these together to form the conceptual framework of my analysis of each of my three research questions, as this study looks at the partnership between two individuals and how their shared understandings impact a learning environment:

<b>Research Question</b>	<b>Data Analyzed</b>	<b>Conceptual Framing for Analysis</b>	<b>Code Categories</b>
How do teachers and teaching artists negotiate arts integration into STEM curriculum?	Audio recordings from scheduled planning meetings	<p><i>Attributes of Learning Environments:</i> Learning environments are comprised of many components including teacher interactions</p> <p><i>Relationship Between Individual and Distributed Cognitions:</i> Individuals' inputs, through their collaborative activities, affect the nature of the joint, distributed system</p>	<p>Activity Formation</p> <p>Logistics</p> <p>Backgrounding</p> <p>Future Looking</p> <p>Show of Respect or Deference</p>
How do teachers collaborate with artists during instructional time?	Field notes, audio and video recordings of workshop time	<p><i>Attributes of Learning Environments:</i> Components in a learning environment interact with each other affecting each other and giving meaning to each other</p> <p><i>Relationship Between Individual and Distributed Cognitions:</i> The joint, distributed system</p>	<p>Participating Learner</p> <p>Support</p> <p>Check in/Alignment</p> <p>Classroom Management</p> <p>Student Helper</p>

		in turn affects individual cognitions and participation	or Advocate Documenter Logistic Communication Co-teach
What are the outcomes of these partnerships?	Field notes, audio recordings of exit interviews	<p><i>Attributes of Learning Environments:</i> In a learning environment, interactions and their consequences are always in flux</p> <p><i>Relationship Between Individual and Distributed Cognitions:</i> Changes in individual cognitions from participation in a system impacts future performance and products</p>	<p>Views on Integration</p> <p>Views on Partnership</p> <p>Reflection on Teaching Practices</p> <p>Impact on Future Practices</p> <p>New Teaching Tools</p> <p>Impact on Learners</p> <p>Areas of Improvement</p>

Table 2: Conceptual framework, developed from the work of Salomon on distributed cognitions and the attributes of learning environments (1993, 2006).

To study the interrelations among variables of complex learning environments requires a study of the “differences of patterns” or looking at the way the variables are organized (Salomon, 2006, p. 259). This differs from looking at patterns of difference, or how learning environments differ in terms of the strength of particular variables. To examine the differences of patterns requires a “systemic approach” analysis strategy.

Assumptions tied to a systemic approach strategy, vs analytic approach strategy, are captured by Salomon (2006) in Table 3 below:

<b>The Analytic Paradigm</b>	<b>The Systemic Paradigm</b>
You can break down complex situations and processes into their constituent components	Situations and processes are viable entities and cannot be reduced to their components
Single variables have meaning in and of themselves, independent of each other	Variables come as “clouds of interrelated events” affecting and giving meanings to each other
Hypothesis pertain to single variables	Hypothesis pertain to whole Gestalts
Behavior and learning are a function of what you can manipulate	Behavior and learning are part of reciprocal interactions
Manipulation of a variable leaves all others unchanged	Changing one important variable is changing the whole configuration

Table 3: Contrasting assumptions of the analytic and systemic approaches (Salomon, 2006, p. 261)

This table illustrates the interconnectedness of variables, and justifies the emphasis on a systemic approach to the analysis of this data. To form my approach to analysis, I created a coding system for each chapter to develop themes (Creswell, 1992), which maps to my three research questions, and also maps to the three areas of the residency I observed - the planning, the teaching, and the reflection. More on the analysis approach for each question is found in the following chapters.

## Chapter 4: Planning Arts Integration into STEM Curriculum

### Introduction

When a teacher and artist come together to design integrated STEAM units, there are many elements in play beyond the science curriculum and art form that will be taught. The artist needs an understanding of the classroom's existing practices and management procedures. Teachers may want to share an understanding of specific student needs and goals for their students as a result of the project. They might want to exchange prior experiences, or discuss additional resources that can be used to enhance the experience. Providing planning time for these matters to be discussed, in addition to the planning of instruction to reach shared goals, is critical to the success of the teaching of the content, as well as the partnership between the teacher and the artist.

With this understanding, and using evidence from audio recordings of planning meetings, in this chapter I address the following research question: **How do teachers and teaching artists negotiate arts integration into STEM curriculum?** In order to answer that question, I studied the planning interactions that teachers and teaching artists had and looked at how these interactions impacted their resultant collaborations. Specifically, I examined how these interconnected variables affect and give meaning to each other throughout the process of negotiating integration and collaboratively designing activities.

## Methods

To answer this question, I attended planning meetings between the teachers and artists, which occurred throughout the residency. Each residency structure was set up to provide up to four hours of planning time. Planning meetings were usually 30 to 60 minutes long. While each partnership chose their own approach to planning meetings, they generally mapped to the same goals and outcomes.

The first meeting included KCYA staff to facilitate, as it was focused on first introductions, scheduling the workshop and future planning dates of the residency, as well as establishing clear expectations of the overall goals of the residency. There was also some discussion around the Project Lead the Way Launch curriculum modules or standards that the classroom teacher planned to use or address. Because this meeting typically did not begin to build out the activity ideas, and because I was unable to attend the first meeting for the other two artists as my study had not commenced, I did not include this meeting in my analysis. However, this meeting was fundamental to the planning process as it provided time for an initial meeting, establishing shared understanding of the program, and scheduling of future meetings and workshops, and getting that work out of the way in this planning meeting allowed for future planning meetings to stay focused on discussions more closely related to the activity design.

The second meeting was where the teachers and artist started to make a real plan to structure their collaboration, and made decisions that shaped the entire residency. During these discussions there was more granularity and insight into the

specific curricular goals and standards to be addressed during the residency, and inspiration for the artistic activities the teaching artist would bring to the workshops.

The third planning meeting served as a check in and time to make any necessary adjustments to plans for the upcoming workshops. While a fourth planning session was available, all of the residencies used the fourth planning time as an additional instructional workshop.

In addition to the planned meeting time, sometimes the partners used shared planning documents, email, phone calls, and quick meetings after workshops to further their communication and alignment. Those additional encounters are not part of this analysis as I did not have access to them. Of the planning sessions I attended, it was never a singular classroom teacher and the artist meeting; in all three residencies, the artist was working with multiple teachers in one school, and planning sessions included all the teachers and plans were made simultaneously across classes.

### **Data Collection**

My primary source of data is transcribed audio recordings of the planning meetings. Due to some planning meetings occurring before my study began, I was not able to attend every planning meeting for every partnership. For this set of data, the meetings observed were as follows:

<b>Artist</b>	<b>Teachers</b>	<b>Planning Meetings</b>
Mr. Barkley - Dance and Movement	Ms. Hooper, Ms. MacIntosh, Ms. Alan (School A)	2 and 3
Mr. Johnson - mime	Ms. Luis and Ms. Jefferson (School B)	3

Ms. Jordan-Douglass - Digital Media Production	Ms. Gordon and Ms. Robinson, Innovation Coach (School C)	2 and 3
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Table 4: Attendees of each planning meeting observed.

## Analysis

My coding scheme is rooted in the conceptual framework I used to structure each chapter (see Table 2 for the complete conceptual framework). My codes were developed by identifying the common themes from planning sessions that I viewed as important interactions to the design of the residency, and factors that influence the teacher/artist collaboration. From these 16 codes, I created five higher level code categories: Activity Formation, Logistics, Backgrounding, Future Looking, and Show of Respect or Deference. I used these categories to help connect the codes and give meaning to them.

Research Question	Data Analyzed	Conceptual Framing for Analysis	Code Categories
How do teachers and teaching artists negotiate arts integration into STEM curriculum?	Audio recordings from scheduled planning meetings	<p><i>Attributes of Learning Environments:</i> Learning environments are comprised of many components including teacher interactions</p> <p><i>Relationship Between Individual and Distributed Cognitions:</i> Individuals' inputs, through their collaborative activities, affect the nature of the joint, distributed system</p>	<p>Activity Formation</p> <p>Logistics</p> <p>Backgrounding</p> <p>Future Looking</p> <p>Show of Respect or Deference</p>

Table 5: Mapping of code categories to the conceptual framework.

Definitions of each code, and the category it belongs to, follow.

<b>Code</b>	<b>Category</b>	<b>Definition</b>
Points to STEM curriculum or standards alignment	Activity Formation	Primarily focused on learning goals related to the STEM curriculum or specific standards. This can be talk from either the artist or the teacher.
Points to art form	Activity Formation	Primarily focused on learning goals related to the art form. This can be talk from either the artist or the teacher.
Activity inspiration	Activity Formation	An idea that lends itself to the activity. Can be either STEM or arts focused.
Activity validation	Activity Formation	The teacher or artist validating the other's idea for the activity.
Reference to prior experience	Activity Formation	Sharing previous related experiences with either the STEM curriculum and related activities, or arts experiences.
Reference to additional resources	Activity Formation	References to additional tools (digital like apps, or physical like cameras), books, people resources (parents, other teachers), or funds (grants or activity budgets)
References to co-teaching or division of duties	Logistics	Reference to how planning or teaching work might be shared.
Performance planning	Logistics	Discussion regarding the final performance or end project.
Classroom management	Logistics	References to expectations and management of behavior, participation, best approaches for structuring groups and time management.
Student awareness	Logistics	Mention of specific student needs or mention of class skill level/ability
References to classroom practices	Backgrounding	References to academic, behavior or cultural practices that are established in the classroom.
Reference to	Backgrounding	Mention of terms that indicate the teacher or



teaching or learning philosophies		artists' understanding of how to teach or how students learn.
Reference to long-term value of this work	Future Looking	Mentions of longer term goals for either the teachers or the students, beyond the impact of the specific workshop activity.
Expresses vulnerability	Show of Respect or Deference	Reference to feelings of meeting the partner's expectations or honoring the partner's expertise.
Open call for feedback on idea	Show of Respect or Deference	Mention of openness to change or feedback of idea.
Growth opportunities for students	Show of Respect or Deference	Reference to goals the classroom teachers have for their students.

Table 6: Codes, corresponding categories, and definitions used for data analysis.

## Findings

The five code categories -- Activity Formation, Logistics, Backgrounding, Future Looking, Show of Respect or Deference -- represent the major areas commonly discussed across the planning meetings I observed, and lay a foundation for the interconnectedness of variables at play in the design of these complex learning environments. These categories are made up of groupings of codes, which I created to help describe the interconnectedness of the variables. Because these variables are interconnected, no category or code is mutually exclusive of another - often multiple interactions are occurring simultaneously. Below I describe these categories and the codes that make them up, using specific data to explicate each code.

While much of these planning discussions are centered around brainstorming and collaboration to create the workshop series and meet both the STEM curricular

goals and create a hands-on arts experience, the teachers and artists must also be on the same page about details as wide-ranging as ensuring the kids will have name tags on in advance, or what supplies are available on hand, or what to know about certain kids to be set up for success. They also tend to align on the broader, long-term goals of the work they are embarking on, reflect on what worked or didn't about previous experiences, and get comfortable with one another through anecdotes and expressions of vulnerability.

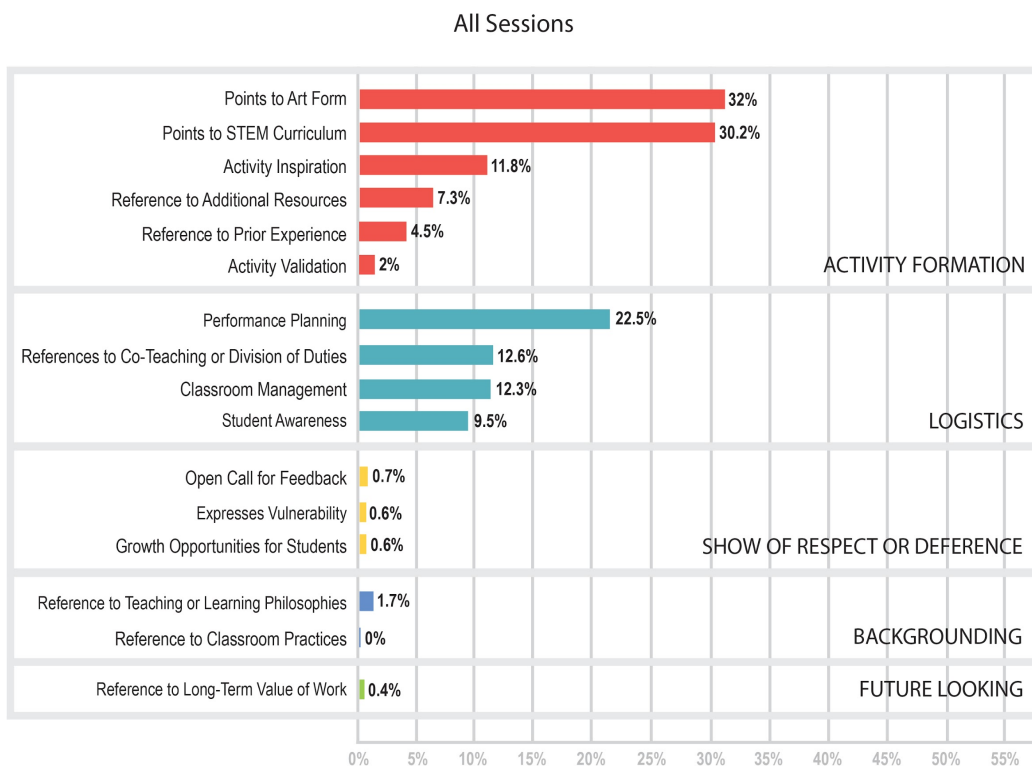


Figure 8: Code breakdown across all planning sessions observed.

Artist 1

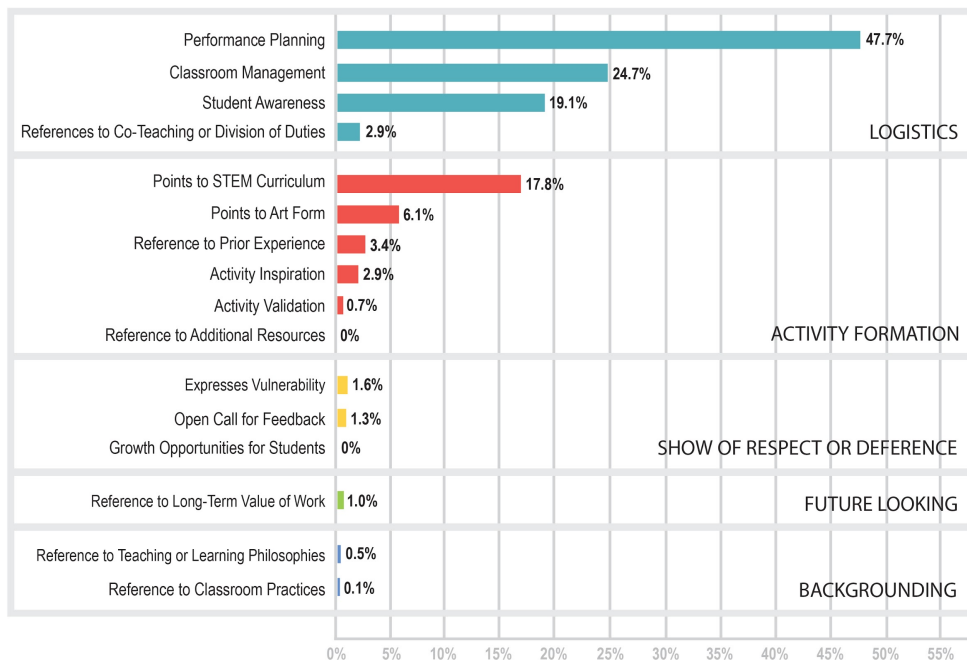


Figure 9: Code breakdown across all planning sessions observed for Artist 1.

Artist 2

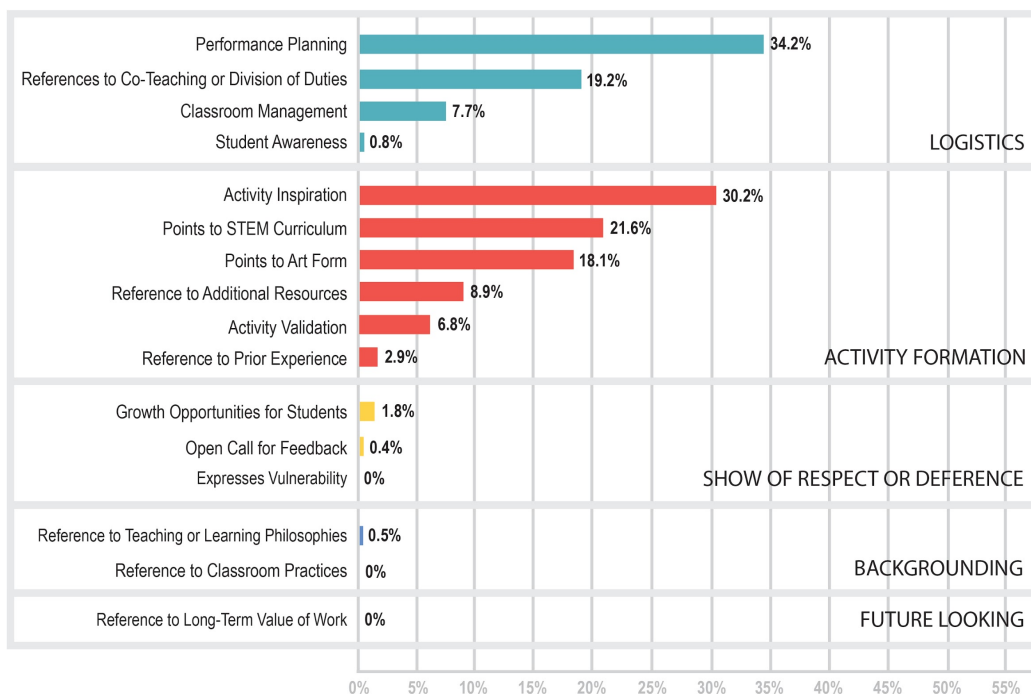


Figure 10: Code breakdown across all planning sessions observed for Artist 2.

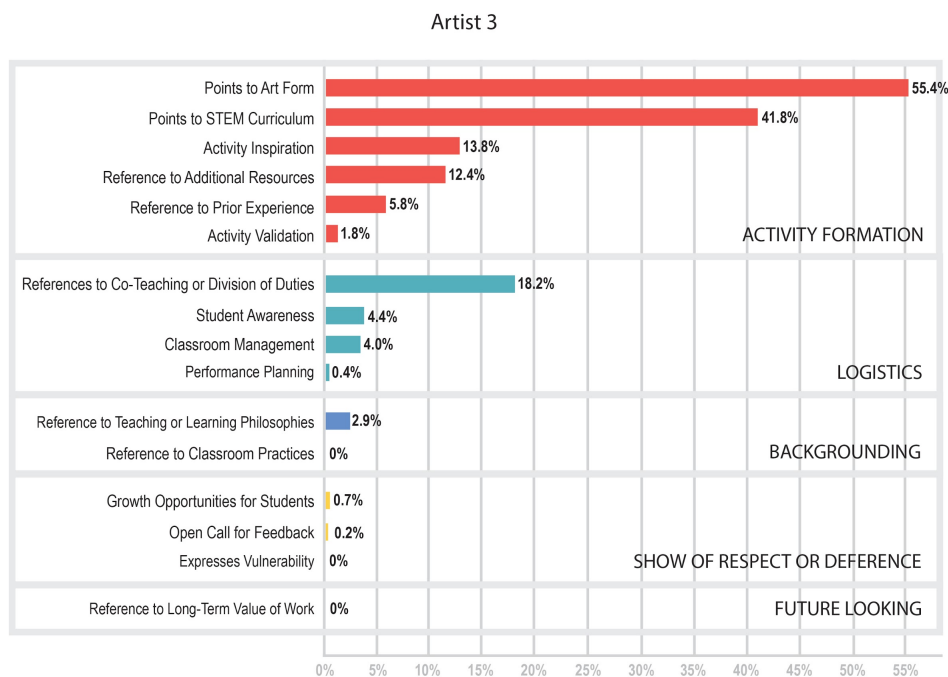


Figure 11: Code breakdown across all planning sessions observed for Artist 3.

### Activity Formation

To be able to concretely plan what the residency might look like, an exchange of information was necessary around the goals for standards alignment and arts opportunities. For each artist residency, the classroom teacher took the lead on determining the STEM standards they wanted to meet. The artist comes to the planning meeting armed with their own experience teaching their art form, and perhaps some background info on the STEM topic if it had been previously decided upon. Each artist had to first understand any considerations for how the teacher wanted to approach the unit, and how they could then support the teacher's work during the artist's workshops.

<b>Artist</b>	<b>Teachers</b>	<b>STEM Curriculum</b>
Mr. Barkley - Dance and Movement	Ms. Hooper - Kindergarten	Animals & Algorithms (tied to PLTW Launch module)
Mr. Barkley - Dance and Movement	Ms. MacIntosh - 2nd Grade	Properties of Matter Mapmaking
Mr. Barkley - Dance and Movement	Ms. Alan - 4th Grade	Energy Conversion
Mr. Johnson - Mime	Ms. Luis - 2nd Grade	Simple Machines & Force and Motion
Mr. Johnson - Mime	Ms. Jefferson - 2nd Grade	Simple Machines & Force and Motion
Ms. Jordan-Douglass - Digital Media Production	Ms. Gordon and Ms. Robinson - 2nd Grade	Erosion and Weathering

Table 7: Teacher/Artist partners and the STEM curriculum focus.

#### *Points to STEM Curriculum or Standards Alignment*

Collaboration on the content of the artist's workshop time was the bulk of the discussion in these planning meetings, across the STEM and arts content. By percentage of coded talk, these two segments (points to STEM curriculum and points to arts) made up 62% of the coded segments across all planning meetings of all partnerships. It made up the bulk of the discussion in my residency (compared to performance planning as the highest percentage of talk for the other two artists). In that collaborative talk, much of the discussion between teacher and artist was bringing forward an understanding of the STEM-related learning goals, and how the arts could be leveraged to deepen the connection to the STEM content. This included sharing insight for how the teacher is introducing the content to the students and how concepts might build:

After he does the review of the simple machines that's where we can pull how would you put it into a complex machine or how could some of these work together, because we want to relate that to the complex machine part because a lot of our toys may be complex machines. So that would be a good intro to go into the toy is ... having them make it with their bodies (Ms. Luis, planning session 3, 02/08/2018).

While the teacher(s) determined the STEM curriculum and standards to be met during the residency, I saw examples of the artist leading the interpretation of the science content in new ways that aligned with an art form:

I have an exercise called moving wall that the kids absolutely love which is where I create the fourth wall in a room and I slowly start walking toward the other wall. And so what happens is they've already got used to moving through the space right. And now they start to get more and more closer together. And then we relate and say well that's like the solid right and you were all bunched up because the molecules are all close together now as I move back away. Now you're more fluid with your space now I want to see the water with liquid. Now I'm going to move further away. Now I want to see the gas. The gas has more energy more using up and down right. So there's more energy in a gas (Mr. Barkley, planning session 2, 01/30/2018).

We can come up with like three things we really want them to pay attention to and notice and be looking for to take pictures of. So obviously there will be places we stop and have a moment to be like 'we want you to take a picture or film this' but then also maybe there's things that we ... I mean even I think noticing the size of ... a pile of rocks stopping soil you've got big chunky rocks and fine soil, noticing those kinds of properties (Ms. Jordan-Douglass, planning session 2, 03/14/2018).

Across the residencies, the collaboration assumed a shared understanding of the STEM standards and vocabulary. While in some cases the teachers offered anecdotes around prior experience with the topic or spoke to specific goals they had for the students over the entirety of the unit, there wasn't discussion dedicated to specific terms or ideas that mapped to learning goals for each individual workshop. There was not a lot of time spent going over the STEM curriculum in detail but rather broad strokes to

ensure alignment. This may have been because the artist's understanding of the topic was assumed, or because the artist conveyed their understanding by offering up science talk that made their understanding of the topic evident, such as:

Then I've got the properties of matter which work really well with space because we could talk about the different qualities of gas versus water versus solid ... We can also relate that to the space. So when you are compact you are denser so you're solid. We can talk about the qualities of solidness like there's not necessarily as much energy in a solid right it's stiller. They can be stronger. Water is fluid than gas is right. We can show like the gas uses lots of space (Mr. Barkley, planning session 2, 01/30/2018).

While these examples highlight an emphasis on the science content, these moments were often fluidly discussed in conjunction with the art form and how the activity might be shaped to reach integration. Interestingly, in these planning meetings there was no evidence of the teachers challenging the artists' science talk or understanding of the science content.

### *Points to Art Form*

Just as the teacher took the lead on determining the STEM standards and curriculum, the artist took the lead in determining the best way to integrate an art form into the residency by steering the direction of the activities tied to the domain they are expert in. An example of this leading is:

“Well I had been thinking it would be really fun to do a puppet documentary. And so we could imagine that it is partly constructed pieces that they're making to demonstrate some of these things, and part photography or video they've taken maybe and even part interviews with experts if they come in or whatever ... Let's go out and take some pictures and see what we notice and come back and talk about what's the purpose of that of that netting or those rocks or whatever and even use those as prompts to think of it. I mean it's really funny to me to think about building puppet hosts for a documentary ... then the end product is a video that kind of captures a lot of examples and hopefully it's a funny take on it too” (Ms. Jordan-Douglass, planning session 2, 03/14/2018).

Though the artists typically initiated ideas to begin the discussion and for the teachers to provide feedback on, there were also instances of teachers offering ideas for the art form. These suggestions often offered ways to weave ideas together, such as “I would like to have a review of all the simple machines and I would love if we could do that in mime” (Ms. Jefferson, planning session 3, 02/08/2018). These suggestions also helped redirect the artist to map to classroom goals Jeffersoner. In my residency, the school instructional coach who attended our third planning meeting, and who also helped in handling production logistics, offered:

So the one shift is that they all need to do the research because of their standards. So we discussed possibly instead of doing researchers could we have directors that would run behind the camera (planning session 3, 04/05/2018).

This redirection was pivotal to shaping how we formed production groups for the project and in assuring that all students were reaching required standards.

As with the STEM content, arts-focused moments were often fluidly discussed in conjunction with the STEM content to reach integration. There were not moments in these cases of artists challenging or correcting teacher’s art talk. Rather, there was evidence of teachers incorporating language the artist used into shaping the activity. For example, Mr. Barkley introduced that he would like to make dance maps as part of his work with Ms. MacIntosh’s class. Exploring this later, she expanded on the idea with: “One of the things I’d like to do with map making is once they create their dance maps, then I’d like to give the dance map to somebody else and see if they can interpret it” (planning session 2, 01/30/2018). This example shows Ms. MacIntosh’s ability to



understand Mr. Barkley's vision for how mapmaking could tie to movement and dance, and then layer onto it, which Mr. Barkley saw the immediate benefit of.

### *Activity Inspiration and Validation*

Inspiration for activities were openly shared from both artists and teachers across the partnerships, and across the STEM and arts content. These moments of sharing leant ideas to the residency and the direction of the workshops, but also were an opportunity to share creative ideas that resonated as interesting or engaging to the individual. By offering an activity suggestion, the teacher or artist was not only contributing to the collaborative discussion, but was often presenting something they had a personal connection to. This could be a connection from a previous engagement that was successful, or a connection to an idea that seemed novel. These moments were an important catalyst in merging the individual inputs from the teacher and artist; presenting an activity idea is a concrete validation of understanding of how the science and art can come together. These might be adding on to ideas being discussed, or offered to get a discussion started.

So you know my Prius has this little diagram of the different energy sources... So my thought was that they would diagram that and they would recreate that as a structured improvisation. So there would be a battery motif, there would be a combustion engine motif. Then we could actually do the real thing to do the more structured one when they're recreating this [for the performance] but they can also do it is an improvisation (Mr. Barkley, planning session 2, 01/30/2018).

It's perfect for the concept of conversion (response of validation by Ms. Alan, planning session 2, 01/30/2018).

Activity validation is coupled with activity inspiration, as the moments when one of the partners affirms the suggestion for the activity proposed by the other.

### *Reference to Prior Experience*

References to prior experiences are woven throughout the formation of the activity. These references both provide anecdotal evidence of things that worked well or didn't from prior teaching of either the STEM curriculum or the art form. A typical mention included:

And when I did it before, that was kind of a fun thing too. After [we used] some signs ... identifying what the simple machines were and then seeing if they could identify from how the group was acting out which simple machine it was. It was third graders doing it for second graders but they picked it up (Mr. Johnson, planning session 3, 02/08/2018).

### *Reference to Additional Resources*

During activity formation, both teachers and artists commonly made suggestions for resources that could be used. These resources spanned additional people resources, digital tools, funds for supplies, and books. School C made the most reference to a wide variety of resources they could lean on for our activity. These included ideas to bring in civil engineers from a local firm, librarians and theater teachers from the high school, high school student helpers, classroom parents, books as story prompts, apps to use for documentation, grant money, and ideas for leveraging their own school's art, music and technology teachers. Their suggestions and ability to bring additional support into my residency with them allowed us to consider a more ambitious project. It also deepened our creative discussion as we were less constrained, given the additional support. Where some teachers may hesitate to bring in outside experts (for reasons such as extra planning work, limited connections, unsure how to leverage a guest, etc.) these two build it into the design of their projects:

If we map it out though enough then maybe Burns and Mac (local engineering firm) could come in on the piece where they're designing. If we could get people from the community to come on certain days (Ms. Robinson, planning session 2, 03/14/2018).

### Logistics

Logistics, including fidelity in scheduling, discussion of classroom behaviors and norms, and planning a final performance are all practical and necessary components of the planning meetings. These considerations impact the overall goals of the residency, as well as each individual workshop, and include everything from how to access projectors, to how desks can be moved to open up space or allow for group work, to what behavior procedures exist.

### *Classroom Management*

Classroom management was a critical component of a good residency experience. A point of collaboration for the residency is understanding in advance what practices will be followed during the artists' visits. Mr. Barkley's second planning meeting (01/30/2018) with his three teaching partners codified their expectations:

Mr. Barkley: So the basic creative class just gets them used to moving around the space, gets them familiar with the terminology that I'm going to use because I use a fair amount of dance vocabulary for them to work with.

Ms. Alan: And also just used to expectations.

Mr. Barkley: And also expectations, right. So what I usually do and I don't usually have too much trouble with this. But I tell everybody I'm going to give them a warning if I need to, and then I do the timeout. But I put kids back in.

Ms. Alan: I was gonna say, how hands on do you want the teachers to be versus, you know I mean if I notice something do you want you to take it or...

Mr. Barkley: I think if you notice something and you can help that's always good.

Ms. Alan: OK I just wanted to know do you want to be more in charge or do you want us to be more of a team.

Mr. Barkley: I think it's more of a team.

Ms. Alan: That's right.

Mr. Barkley: You know your kids a lot Jeffersoner than that. Right. You know what to expect of so and so versus so and so.

Ms. Alan: Ok, so we'll work together on it.

Ms. Hooper: Have you used that language of the observation deck?

At the end of this exchange, Ms. Hooper's reference of "the observation deck" introduces a classroom management program called "Acting Right: Drama as a Classroom Management Strategy" taught by Sean Layne at an arts integration conference that she attended the previous summer. The program is described as:

While active, social, cooperative learning is a desired approach to teaching, it can be challenging for teachers to create a calm, focused, and balanced classroom community where these types of learning thrive.

Actor and educator Sean Layne has taken the foundational elements of acting such as concentration, cooperation, and collaboration and created a structured process, which can become the basis for effective classroom management every day. This engaging, step-by-step approach empowers students to take ownership of and be responsible for their own behavior while building the skills necessary to establish a sense of self-control, accountability, and team building in the classroom. Students also learn how to have curriculum-centered conversations and create physical models of their thinking. (Acting Right: Drama as a Classroom Strategy, n.d.)

The "observation deck" is like a time out from the activity, but with the expectation that the student is actively watching from the sidelines and able to rejoin the larger group when ready. As the planning progressed, the idea of using the observation deck as a management strategy during Mr. Barkley's visits stuck. While the approach

was new to all, it became a common reference point between the artist and teachers.

Specific examples were given in reference to using it, such as mention of one child who would possibly struggle with the group activity, but “she will learn from the observation deck.”

Other examples of classroom management from the planning sessions analyzed from the other residencies were more focused on group sizes, how long students could be expected to sit still, and how to manage time for groups who could use supplemental activities in the event of working ahead of others.

#### *Division of Duties and Co-Teaching*

Each partnership needed to come to an agreement on how the workshop time was used, and who was teaching what. Because the artists’ visits were spread out, and each unit required a lot of science understanding, most partnerships planned out a system of the teacher introducing the science concepts before the artist arrived. As Mr. Barkley planned with three teachers at once, he was negotiating this across three grade levels and aligning expectations simultaneously (from planning session 2, 01/30/2018):

Ms. Hooper: Well I have a preliminary question too. I think this is on your minds too. How much of Project Lead the Way is it going to be necessary for them to have taught before your first visit to go ahead with your first visit?

Ms. Alan: I was going to ask you just what I understand that the concept you're teaching them is related to my Project Lead the Way module. Does that mean I need to be doing the module at other times.

Mr. Barkley: No, I don't think so.

Ms. Alan: And what you do doesn't necessarily align with, like, the concepts align with the module but the activities are not the same.

Mr. Barkley: That's exactly right.

Ms. Alan: So I technically don't even have to do the activities if I didn't get to them. Right? I mean not that I won't.

Ms. Barkley: Right. So if you can introduce the concepts to them or at least give them a little bit of primer if you will, or introduction to the concepts that will help a lot because then they will have seen it again and it won't be brand new.

Ms. Hooper: Because I'm giving an introductory lesson tomorrow and then you're coming on Friday right?

Mr. Barkley: Are you doing the Three Little Pigs thing?

Ms. Hooper: If we get to it because it's actually, like that's not the first tomorrow and then tomorrow is Wednesday right. Wednesday, Thursday and then you're coming Friday. So I'm not deep in and when you get here ask me if I got that far because it might just be this preliminary animals algorithm things that is talking about oh why does a camel have a hump and why do birds have different beaks and.

Mr. Barkley: Right.

Ms. Hooper: So I'm not sure I'm going to be there for Friday. True confession.

Mr. Barkley: Yeah. That should be fine. It should enhance what you are doing.

Ms. Hooper: By the next time.

Mr. Barkley: And it will be I think it's just another way for the kids to experience the same curriculum.

Ms. Alan: Yes.

Mr. Barkley: But it's a way that for some kids will be more accessible than for others. Because they are more kinesthetic in the way that they learn.

Ms. Alan: Yeah right.

Ms. MacIntosh: It will reinforce for everybody. But it will be key for some kids. So like the map do you want us to have gone over the legend are you going to get to that on Friday?

In this exchange with one artist working across three teachers, there is evidence of identifying structure and order of instruction, to ensure that the students are prepared for Mr. Barkley's visits. Beyond that, Mr. Barkley's responses, such as "Right. So if you can introduce the concepts to them or at least give them a little bit of primer if you will, or introduction to the concepts that will help a lot because then they will have seen it again and it won't be brand new" show a coordinated hand-off of instruction between teacher and artist. He is setting expectations that he expects to carry some of the science teaching, but prefers to play a reinforcing role, adding on with the arts teaching, than be the one exposing the science content for the first time. Establishing this division and overlap of teaching expectations creates a more fluid, distributed act of instruction, where concepts can be built and exemplified further during the workshops. Furthermore, this exchange indicates the additional value the teachers expect the arts instruction to bring. Where Mr. Barkley is the one to offer that his work should "enhance what you are doing" and a way to make the content "more accessible than for others," Ms. MacIntosh affirms this with: "It will reinforce for everybody. But it will be key for some kids," a validation of both the value of the arts integration, and Mr. Barkley as a teaching partner.

*Student Awareness*

Student awareness were mentions of specific students' needs or things to know about certain students. These were also mentions of considerations for the whole class, such as interests or abilities. Together, these were all moments where the partners specifically pointed to student considerations, and sometimes overlap with other logistical conversations. These include things such as awareness of how groups are formed for successful collaborations. These conversations also included mention of how much direction the students might need to be successful in performing. Or, in the case of my residency, we discussed how to frame each production role so all students would perceive all roles as important and interesting. These conversations also included mentions of specific students as needed, who may have required additional support, or where more background information on a student would be helpful to understand how best to interact with them. For example a second grade teacher offered:

“You will run into the kids that still have a hard time with...this is always my right hand. But it doesn't always face north. You know what I mean they have a hard time with ok left and right it's related to their body and north and south and the directions are not. So that's something that some of them, the less mature ones will have a hard time” (Ms. MacIntosh, planning session 2, 01/30/2018).

### *Performance Planning*

Each residency partnership determined their own end goal, but for many, the end product was some form of a production. Given this end product, it's understandable that this generated the highest percentage of talk for Mr. Barkley and Mr. Johnson's partnerships. In these cases, a final performance where the learners could show what they had learned with their bodies was determined to be the best display of what was gained from the workshops.



“So we would have a little rehearsal before where we were showing to get everyone remembering what they were working on and I can structure the rehearsal tomorrow based on what we think we'd like to see and do. So my thought was to think about what you thought was more successful or what you would just like to simply see them do, and also who would you invite to watch” (Mr. Barkley, planning session 3, 03/01/2018).

These were performed for other students in the school and provided an opportunity for the artist to present the work of the workshop through the student performance. Figuring out the logistics of the performance - what, when, for whom - was a recurring question in planning, as each workshop practiced an element building to that performance. Therefore understanding things like how the room would be set up were useful to know for any practice times during the workshops. My residency concluded with a viewing party of our documentaries, which did not require us to plan in the same way; the actual viewing occurred after my residency concluded.

For Ms. Hooper, Ms. MacIntosh and Ms. Alan, there was a lot of consideration for how it would be best to share their performances, and if it would be most ideal to share with the other classes in their grade level, or with each other's classes. These discussions also addressed rehearsals and how that would be worked into the workshop time.

#### Show of Respect or Deference

Sprinkled throughout the partner's discussions were small comments that indicated a respect for the partner's expertise. Also included were mentions of growth opportunities for students, which I viewed as moments of showing respect for the student's needs. These snippets revealed vulnerabilities and were a way for either the teacher or artist to express an understanding of personal boundaries to their own

expertise. For example, Ms. Hooper had an exchange with Mr. Barkley where she admits that despite working with him on previous workshops, she does not feel like she can represent his work, to which Mr. Barkley responds with his own vulnerabilities (from planning session 2, 01/30/2018):

Ms. Hooper: I know! I just meant it would make me feel like I would be self-conscious and I'm not very often self-conscious especially when it comes to teaching but I would bow down to you and say I'm not Mr. Barkley!

Mr. Barkley: So I'm self-conscious too coming in front of a classroom of kids that I've never met before. Knowing that there are these high expectations about how it's going to go!

Ms. Hooper and Mr. Barkley both have around three decades of teaching experience. They had worked in various capacities together prior to this residency, and openly admire the work of the other. This sharing of vulnerabilities allowed both to express their admiration for the other, as well as an openness to not being the expert. This was also reflected in moments of open calls for feedback from Mr. Barkley. As mentioned earlier, he came with a plan to present to the teachers, but also made sure they understood that he was open to collaboratively changing things at the teacher's request, using language such as "let's think about it," or "if we want to do some re-thinking..."

These mentions of respect or deference also included moments where the artist asked about the teacher's goals for her students. These moments gave space for the teacher to consider her class and what they might gain from the residency, with the understanding that only she can name that - it's her expertise. Ms. Jefferson requested an opportunity for her students to include an oral presentation as part of their final

performance, and offered “Our kids don't have good enough experience presenting to a group beyond their class ... And if you have ideas for helping kids gain confidence” (Ms. Jefferson, planning session 3, 02/08/2018).

Another area is openness to new ideas and learning. Mr. Barkley offered:

“Now if we want to do some re-thinking or if something pops up ... one of the things I really love about teaching is that sometimes you spontaneously think of something right that you never thought of before you're like ‘oh let's try this’ or ‘do you think there's something’ and all the sudden then you're like ‘oh you know’ I'm totally open to changing my lesson plan to say OK let's see what that looks like because I'm learning as well from this” (Mr. Barkley, planning session 2, 01/30/2018).

Despite his decades of experience, Mr. Barkley openly wears the role of learner. Being vulnerable in this way allows him to grow in his teaching practices, and also makes him a good partner and leader; he models risk-taking, collaboration and maintaining flexibility in a complex learning environment.

Each of these examples revealed a small opportunity to grow the collaboration on a more emotional level, separate from the logistics and curriculum discussions. They allowed for moments of discussion that signal the deeper value of a strong teaching partnership with an expert from another domain, and its worth for continued growth in practice as a teacher and learner.

### Backgrounding

Backgrounding includes additional information shared by either the artist or teacher that provides context. These include examples of existing practices established in the classroom such as, “we call that peer review” (Ms. MacIntosh, planning session 2, 01/30/2018), as well as mention of teaching and learning philosophies the artist or

teacher made. These are important because they insert a nod of expertise to the group. In these cases, these came across as fairly subtle references, but still signal a level of knowledge about teaching and learning. These moments often overlap with others such as classroom management and student awareness, as this example does:

“So one thought is to use that idea of zone of proximal development, and if there are pairings that we might want look at that might help that's another way to think about it too. If there's one kid who's struggling with that maybe you think let's pair him with so and so” (Mr. Barkley, planning session 2, 01/30/2018).

Mr. Barkley possesses degrees in dance and in educational research and psychology; mentions of educational psychology concepts such as Zone of Proximal Development, or Gardner’s Multiple Intelligences and kinesthetic learning exemplify his background in education and perhaps serve as additional validation for the careful crafting of his workshops.

### Future Looking

Some moments of discussion led to the long-term expectations or value of the work of the residency. These included asking what teachers wanted their students to gain from this work, but also what teachers themselves might gain in terms of professional development. Mr. Barkley teaches through the Kennedy Center’s *Partners in Education* program, which provides professional learning in the arts for teachers. He is used to leading professional development for teachers and saw the residency as a professional development opportunity for his partner teachers (as is the intent). To strengthen the professional development, he offered that the teachers might want to demo teach and have him observe, as a way to hand off the arts work with his help.

“One thing you could do is you could do a demo teach and I could come in and observe and you would lead the class and then I could then I could help, if I could say to you here's an idea I'm thinking about maybe this way or that...” (Mr. Barkley, planning session 2, 01/30/2018).

This idea caused the above mentioned exchange of vulnerability with Ms. Hooper, but later, Ms. MacIntosh reflected “Because that is Mr. Barkley’s goal, is for us to be independent.” While professional development was infused as a goal of the residency program, it was easy to get caught up in the immediate planning, and lose the focus on how teachers might incorporate these ideas longer-term. These moments show that a thread was maintained in some of the early planning.

## **Discussion**

From this data looking at the interactions that impact how teachers and teaching artists collaborate on project design, it is evident that many variables are at play as individuals work collaboratively and negotiate the design of a learning environment. As the teacher and artist discuss and plan, they bring together their individual ideas to collaborate on a new idea -- one that reflects their joint expertise, creative ideas, and goals. We see at play in these discussions the many components that are working in concert in any learning environment, not only in moments of teaching, but in planning. Beyond the learning activity planning, we see reflected in these discussions what materials might be used, rules and norms of the classroom, teacher characteristics, student characteristics, and school characteristics. The negotiation of the arts into the STEM curriculum is of course one core consideration. While the activities evolved out of the joint collaboration of the teacher and the artist, each offering support and ideas for the STEM and arts content, there are clearly additional considerations to be accounted

for. All of these variables are at play before the teaching unit begins, and a shared understanding between the teacher and artist is at the base of the relationship.

### *Shared Understanding of the Value of Arts Integration*

The artists and teachers participating in this residency did so by choice. Therefore, to some degree, they collectively had buy-in on the idea that arts integration matters, and could make an impact on helping learners connect to STEM concepts. This created a common ground to start from, where one did not have to convince the other that some form of experimentation or risk-taking should occur; by participating everyone was in theory already expecting such. This shared value of the work allowed for the planning of integrated lessons where the paths of science and art inquiry come together, which aids a learner understanding of the connections between ideas (Burnaford et al., 2007). Once on board with the shared goals for the students and understanding of what each offers to the project, the teacher and artist can have collaborative discussions where both are jointly engaged in sense-making and understanding of “the phenomena of learning” (Bransford et al., 2000, p. 198). For example, in my residency, engaging in data collection around local examples of erosion and using that data to shape a creative telling of what erosion is through puppets, allowed the students to explore the science content through modes that were personally interesting and further allowed them to create an artifact that demonstrated their understanding of the material. Beyond the science, making and digital media production, this project challenged their writing skills, integrated real world connections,

and introduced them to new roles in a collaborative group that fostered sharing of ideas, negotiation, and communication.

### *Relationships Matter - Valuing Different Forms of Expertise*

These partnerships were intentionally designed by KCYA, a mutually trusted partner. Had that not been the case, there may have been more need for justification of how or why an idea might work. With KCYA serving as a trusted mediator, there was a shared understanding of the expertise each partner was bringing into the residency. For these partnerships to form, beyond buy-in that arts integration matters, the teacher has to value the expertise of the artist, both in their art form, and in their teaching ability. The artist has to value the teacher as expert of how to best teach their students and run their classroom. This mutual understanding and respect of another's expertise is the foundation which the rest of the collaboration rests on. Where we see a show of deference between Ms. Hooper and Mr. Barkley in their exchange around their own feelings of vulnerability when stepping into the expert role of the other, this exchange also indicates how they value the work of the other, even as they both work to grow their practices in learning from one another.

### *Openness to New Ideas and Practices*

This residency program was intended to offer a professional development opportunity to both the artists and teachers. Development suggests growth and change in the individual. As the teacher and artist share ideas with each other, and come to agreement on the goals and breakdown of the residency, they are learning from one another and expanding their views on how to approach teaching. This negotiation of

ideas leads to attunement of the individual's perspective, and is where personal development, or change, occurs (Russ et al., 2016). When this change leads to a broader worldview of available resources, it opens up new ways to seek out new resources (such as curriculum, experts, tools) and leverage them in practice. By having time and space to discuss, explore and practice arts integration with a teaching artist, teachers can broaden their perspectives on how to teach through “qualitative scaffolding” (Salomon, 1993, p. 133).

With new perspectives, both individually and as a partnership, the teacher and artist can then apply their work to the classroom. This space, where the individuals impact one another's thinking and converge on a new activity leveraging both's expertise, has broader implications beyond the two of them; they now can “affect the nature of the joint, distributed system” (Salomon, 1993, p. 122). Their new shared ideas and openness to new approaches has some form of impact on the learning environment.

### *Limitations*

This analysis examines the types of interactions that occurred during planning sessions, which impacted the arc of the residency program, and therefore teacher/artist collaboration. While these interactions accounted for the talk occurring during the meetings, it does not account for all of the relationship building occurring in these partnerships, and additional factors that should be considered when looking at these forms of collaboration.

### **Conclusion**



The variables explored in this chapter come together as “clouds of interrelated events” affecting and giving meaning to each other (Salomon, 2006, p. 256). Each variable or component discussed above works in concert with other variables. As an example, activity ideation and validation is dependant on an understanding of the STEM and arts curriculum, and activity formation is dependent on working out the logistics. While each of these variables is important in the planning, the interpretation and shape of the discussion is dependent on the unique partnership and the individual inputs from the teacher and artist. These are additionally impacted by the broader sociocultural setting, for example the resources readily available to the classroom teacher.

## Chapter 5: Teacher/Artist Collaboration In STEAM Instruction

### Introduction

Arts integration is “a process of collaboration” (Burnaford, et al., 2007, p. 14). For an artist and teacher to work collaboratively to integrate the arts into other curriculum, the two must work in partnership together, with the artist understanding the teacher’s goals and approach to teaching, while bringing forward their arts expertise. The teacher and artist must have a plan in place for how this work will be executed (see previous chapter), and then come together, aligned, in the learning environment to teach. This teaching may happen collaboratively during workshop time where the partners are co-presenting ideas and guiding students, or it may be approached as a hand off, where the teacher works with the students on the STEM curriculum between the artists’ visits, and the artist then uses the workshops to add on, supplement, or provide another view to the teacher’s work.

In co-created learning environments, many components are impacting the environment; beyond the teacher and artist, the students, place and time constraints, and classroom norms are among the factors that affect and give meaning to each other (Salomon, 2006). Furthermore, collaboration is affected by the curricular threads both educators are stretching across the STEM and arts learning. The components are not only affecting one another and giving meaning to one another while instruction is happening; the teacher and artist are each adding their own individual attributes and affecting one another throughout the residency, resulting in distributed cognition, distributed instruction, and ultimately distributed integration.

The Kansas City Young Audiences STEAM residencies were structured to promote collaboration and professional development for teachers and artists as the two work together to plan and teach a STEM unit with arts integration. Over the course of the residency, partnerships evolve; what was established during planning meetings comes to fruition, and as workshops progress, so does the relationship and ways the teacher and artist support one another and collaborate in instruction. In this chapter I will use evidence from video and audio recordings of artist's workshops to answer the question: **How do teachers collaborate with artists during instructional time?**

### **Methods**

To answer this question, I observed the residencies of two artists across five classrooms, and documented my own residency. The two artists I observed worked in partnership with an individual classroom teacher. In my residency, I worked with two 2nd grade teachers who co-teach 50 students together. Artist workshops were typically 45 minutes to one hour long. The frequency was established between the artist and teacher based on their schedules, and were typically one to two times per week (school closings due to weather, or spring break, sometimes created a longer gap between workshops).

### **Data Collection**

For each partnership, I attended and collected data from as many of the artists' workshops as was possible, which was 6-8 workshops for each residency, and over 30 hours of video and audio data (see Tables 11 and 12 for time breakdown). All but one

workshop was recorded by audio, and the majority were recorded with video as well.

Observational field notes were also collected, as well as photos.

<b>School</b>	<b>Artist and Discipline</b>	<b>Teacher, Grade and Curriculum Focus</b>	<b>Number of Workshops Attended</b>
School A	Mr. Barkley - choreography and dance	Ms. Alan, 4th grade, energy conversion	7
School A	Mr. Barkley - choreography and dance	Ms. MacIntosh, 2nd grade, states of matter and maps	7
School A	Mr. Barkley - choreography and dance	Ms. Hooper, Kindergarten, animals and algorithms (pre-coding)	7
School B	Mr. Johnson - mime	Ms. Jefferson, 2nd grade, simple machines and inventions	8
School B	Mr. Johnson - mime	Ms. Luis, 2nd grade, simple machines and inventions	6
School C	Ms. Jordan-Douglass - digital media production	Ms. Gordon & Ms. Robinson (co-teach) 2nd grade, weathering and erosion	6

Table 8: Overview of workshops by school and partner teacher.

## **Analysis**

My coding scheme is rooted in the conceptual framework I used to structure each chapter (see Table 2 for the complete conceptual framework). My codes were developed by identifying the moments where teachers interacted in the environment in some way during the artist's workshop time. These interactions fell into eight types, which became my codes. I looked at these moments of interactions as they impacted the distributed, collaborative activities of the teacher and artist working together. These

interactions are also among the components of the learning environment that should be accounted for, as they contribute to shaping the overall outcomes of the workshop.

<b>Research Question</b>	<b>Data Analyzed</b>	<b>Conceptual Framing for Analysis</b>
How do teachers collaborate with artists during instructional time?	Field notes, audio and video recordings of workshop time	<p><i>Attributes of Learning Environments:</i> Components in a learning environment interact with each other affecting each other and giving meaning to each other</p> <p><i>Relationship Between Individual and Distributed Cognitions:</i> In partner-like situations, the collaborative activities affect the nature of the joint, distributed system, which in turn affects individual cognitions and participation</p>

Table 9: Section of the conceptual framework used for this chapter (see Table 2 for the complete framework).

Every workshop for every artist has its own goals, rhythms, and approaches (see Chapter 3 for an overview of the workshops). In some workshops the artist lead a presentation or demonstration; in some they had the students participate in a hands-on activity. The role the teacher played varies in conjunction; in moments of hands-on activity, the teachers were there alongside the artist floating between groups to give support as the students engaged in their project. In times when an artist was demonstrating an art form or presenting information, the teachers tended to stand on the side, interacting as needed in a support role, to redirect students or field student needs. And between those moments are times when the artist and teacher flow in and out of instruction together, presenting the STEM and Art instruction woven together.

My coding of these workshops accounts for those moments, and captures interactions of co-teaching, supporting students, managing behavior, documenting the

work, and participating as a learner. I also accounted for moments of logistical communication between artist and teacher (such as time checks and room setup) as well as moments where the teacher and artist aside to check in with one another.

<b>Code</b>	<b>Definition</b>
Participating Learner	Teacher is participating on their own in arts instruction as a learner (e.g. dancing).
Support	Teacher provides support to artist and students in a variety of ways to help artist stay focused on teaching. These might include language, gesture or body movements to help guide students (including those who need additional language or developmental support); may also include support in things like running presentations.
Check in/Alignment	Teacher and artist aside to touch base either on how it's going, what they perceive is being learned, or what they need to revisit.
Classroom Management	Teacher monitors student behavior or helps directs students behavior to meet expectations; occurs on a whole class or individual level.
Student Helper or Advocate	Tends to student needs such as health/sickness; the one the students go to with needs during workshop; or also teacher pointing out a student who is doing something interesting or well.
Documenter	Capturing photos of the workshops.
Logistic Communication	Moments of teacher artist communication around logistics/materials/timing.
Co-teach	Teacher takes over instruction; Tying together STEM content with arts content, drawing connections and supporting one another. This includes when artist and classroom teachers break students out into small groups and work together to support and manage hands-on project time.

Table 10: The codes and definitions used for data analysis.

The final workshop for every artist was a performance. I did not include this workshop in my analysis as that workshop is not instructional, but used to show other classrooms or parents what had been learned over the course of the residency.

After coding video recordings (or audio recordings if video was not available) of every workshop I attended, I analyzed the overall codes to explicate two primary models of collaboration during these residencies: Co-Teaching and Support. While every teacher represented activities across the coded moments, each resulted in a dominant model where one type of activity far exceeded the others.

These models remained dominant for each teacher when looking both at percentage of total coded instances (see Table 11), and at total time which accounted for time when no interactions were coded (see Table 12). Examining the total time reveals the amount of time the teacher was present and actively watching, but not interacting; in these moments teachers were primarily observing, or in rare cases working on other things while the artist taught. If the teacher was not actively interacting

Code System	Szczucinski	Bett	Epic	Henley	Ratliffe	Gaughan	TOTAL
<input type="checkbox"/> Check in/Alignment	6%	9%	4%	13%	6%	6%	6%
<input type="checkbox"/> Participating Learner	13%	20%		0%	17%	2%	9%
<input type="checkbox"/> Support	5%	8%	4%	56%	26%	65%	14%
<input type="checkbox"/> Student Helper	0%	11%	0%	0%	3%	9%	4%
<input type="checkbox"/> Logistical Communication	1%	1%	1%	5%	11%	15%	3%
<input type="checkbox"/> Co-teaching	59%	60%	87%	21%	63%	2%	68%
<input type="checkbox"/> Classroom Management	17%	6%	4%	6%	8%	8%	7%
<input type="checkbox"/> Documenter	1%	1%	1%		1%	1%	1%
NOT CODED	3:39:58.4	3:41:11.8	2:55:30.2	3:02:48.7	3:09:25.5	3:29:45.8	19:58:40.7
CODED	100% (1:02:44.4)	100% (2:27:00.5)	100% (4:23:37.0)	100% (0:28:37.0)	100% (1:33:01.9)	100% (0:29:30.0)	100% (10:24:31.0)
TOTAL LENGTH	4:42:42.9	6:08:12.3	7:19:07.2	3:31:25.8	4:42:27.4	3:59:15.8	30:23:11.7

with students or the artist, their actions were not analyzed.

Table 11: Percentages of codes, time of coded segments.

Code System	Szczucinksi	Bett	Epic	Henley	Ratliffe	Gaughan	TOTAL
☐ Check in/Alignment	1%	4%	2%	2%	2%	1%	2%
☐ Participating Learner	3%	8%		0%	6%	0%	3%
☐ Support	1%	3%	3%	8%	8%	8%	5%
☐ Student Helper	0%	4%	0%	0%	1%	1%	1%
☐ Logistical Communication	0%	0%	1%	1%	4%	2%	1%
☐ Co-teaching	13%	24%	52%	3%	21%	0%	23%
☐ Classroom Management	4%	2%	3%	1%	3%	1%	2%
☐ Documenter	0%	0%	0%		0%	0%	0%
NOT CODED	78%	60%	40%	86%	67%	88%	66%
CODED	22%	40%	60%	14%	33%	12%	34%
TOTAL LENGTH	100% (4:42:42.9)	100% (6:08:12.3)	100% (7:19:07.2)	100% (3:31:25.8)	100% (4:42:27.4)	100% (3:59:15.8)	100% (30:23:11.7)

Table 12: Percentages of codes of all data (coded and uncoded).

## Findings

During artist workshop time, there were a myriad of ways that teachers were interacting in the classrooms. These actions were often performed simultaneously - maintaining class behavior while tending to a child who didn't feel well or needed a shoe tied, to documenting the experience - all while supporting the artist's instruction.

However, each had one interaction type that was much more dominant than others.

Partnership	Collaboration Type
Ms. Alan & Mr. Barkley	Support
Ms. MacIntosh & Mr. Barkley	Support
Ms. Hooper & Mr. Barkley	Co-Teaching
Ms. Jefferson & Mr. Johnson	Co-Teaching
Ms. Luis & Mr. Johnson	Co-Teaching
Ms. Gordon, Ms. Robinson & Ms. Jordan-Douglass	Co-Teaching

Table 13: The primary model of collaboration for each partnership.

### Support Model

Two teachers, Ms. Alan and Ms. MacIntosh, fell into a Support model of



collaboration. Both worked with teaching artist Mr. Barkley, who integrated dance and movement into STEM topics. These teachers handed over teaching time to the artist and primarily helped to make sure students were meeting expectations and monitoring behavior. They were attuned to those students who they knew might need extra attention and were especially hands-on in supporting those students. As an example, both of these teachers had English Language Learners who occasionally needed additional language support to follow along. While active in helping in these ways, they had very few instances of taking over instruction or making content ties to supplement Mr. Barkley's lessons. They were very much still a part of the classroom space but as a helper.

Looking at total time coded reveals that these two teachers in the Support model also resulted the fewest amount of coded interactions. Ms. Alan's interactions accounted for 12% of total time, and Ms. MacIntosh's interactions accounted for 14% of total time. What this looked like in practice was Mr. Barkley leading all of the instruction across the workshops, with these teachers on the sidelines - still actively observing and supporting, but in service of Mr. Barkley, not as a teaching partner. For both teachers, the STEM content explored during these times was less connected to an explicit set of standards or curriculum than with every other teacher/artist partnership. Neither Ms. Alan nor Ms. MacIntosh closely mapped their STEM teaching during the residency to PLTW. For example, Ms. Alan used PLTW Launch to determine the curricular area of energy conversion for Mr. Barkley to focus on, but she did not teach the PLTW unit outside of Mr. Barkley's visits. Ms. MacIntosh did not follow the PLTW Launch

curriculum but pulled standards from several areas that she needed to address with her students, and worked with Mr. Barkley to figure out how to incorporate. This resulted in a variety of topics being covered (form and function, properties of matter and mapmaking), linked together by Mr. Barkley's instruction in dance and movement. Because neither had a specific curriculum mapped out ahead of the planning periods or workshop time, Mr. Barkley took the instructional lead and determined how to present his dance and movement curriculum as well as the STEM curriculum.

There are additional considerations at play. For both Ms. MacIntosh and Ms. Alan, their residencies were their first exposure to arts integration; neither had participated in the STEAM residency prior, nor had attended summer arts integration professional development workshops. As became evident throughout planning sessions and the final exit interview, both teachers were very open to learning and adopting new methods, but the artist's instructional moments were their first exposure to this kind of work; for Ms. MacIntosh her exposure "changed [her] way of thinking" (field notes, 04/12/2018). Another consideration was time. Mr. Barkley always visited Ms. Alan, then Ms. Hooper, then Ms. MacIntosh in the same morning, back to back. Overall, Ms. MacIntosh's sessions were typically cut short, both because the Mr. Barkley's work with the other classrooms ran long, and because there was no flexibility in Ms. MacIntosh's schedule to allow for Mr. Barkley to run over due to a very tight school lunch schedule. Therefore, practically, Ms. MacIntosh also had less time to co-teach, and she deferred instruction to Mr. Barkley during his visits to maximize use of his time. Despite this particular consideration, the lower percentage of interactions indicate that the teachers

primarily viewed the artist as a guest teacher there to teach special content versus a collaborator. Ms. MacIntosh in particular expressed an awareness of this and an eagerness to move towards a more collaborative partnership, noting a desire to have more connectedness between her teaching and Mr. Barkley's between and during workshops (for more on this see the next chapter).

*Ms. Alan*

Mr. Barkley worked with Ms. Alan's class to integrate dance and movement into a unit that covered complex machines and energy conversion. While Ms. Alan (4th Grade) had the least amount of interaction by time - 12% of approximately 4 hours of data - her support of her students during Mr. Barkley's visits was evident. In place of instruction, Ms. Alan always actively watched, meaning she attentively sat on the side, engaged, but as an observer more than an participant. Through smiles, eyebrow raises, nods of approval or gestures, she was always in her student's view and quietly supporting their engagement. She kept Mr. Barkley's goals at the forefront, not only in making sure that students were on task and participating, but doing small check-ins, such as asking if it was ok for the students to produce sound as they move.

While she generally observed from the side, she supported Mr. Barkley in ways such as addressing her students verbally using his vocabulary and language, for example: "You've got to hold it. You're a shape you've got to hold it. Space... watch out for each other" (workshop 2, 02/09/2018). Or she would even use Mr. Barkley's exact phrasing from a previous workshop: "Remember you're talking with your bodies not with your mouth" (workshop 2, 02/09/2018; workshop 3, 02/16/2018) to remind her students

of expectations, but also nodding to her desire to align with his goals. When students were up and practicing dance and movement, she would often reposition herself in the room to be helpful, especially to one student who needed additional support due to developmental delays; throughout the workshops and into the final performance she put herself right in this student's line of sight and made sure to make eye contact to guide her. Overall her constant attention was a signal of her support and ability to lend a quick helping hand.

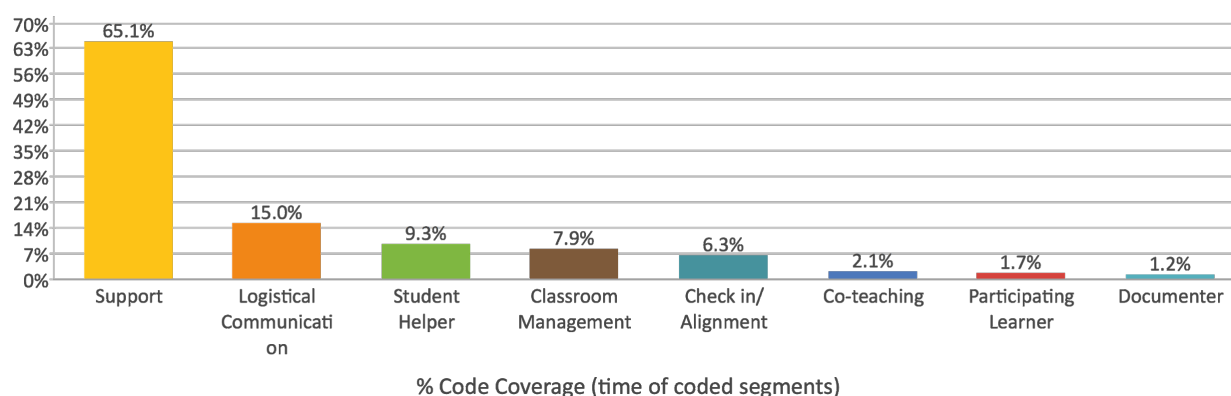


Figure 11: Ms. Alan's primary interactions.

### *Ms. MacIntosh*

Mr. Barkley worked with Ms. MacIntosh's class to integrate dance and movement into a unit that covered form and function, properties of matter and mapmaking. Ms. MacIntosh is a seasoned 2nd Grade teacher who did not have prior experience with arts integration but was open to learning about and adopting new instructional approaches and strategies (see next chapter for more on this). While her dominant interactions were in support of Mr. Barkley's instruction, she did participate in co-teaching interactions as well. Rather than taking over blocks of instruction, for Ms. MacIntosh co-teaching looked

like interjections with connections to other content they were working on, such as showing Mr. Barkley a related mapping exercise they had worked on using grids and cardinal directions (workshop 3, 02/16/2018). At the top of Mr. Barkley's workshops, Ms. MacIntosh often gave a quick recap of what they had been working on to carry out his work between his visits; for example in the second workshop, she started by spending time as a class sharing the principles from the first workshop that they had practiced throughout the week.

In her primary role of Supporter, Ms. MacIntosh was always actively present and watching. Though she primarily observed from the side, she was quick to aid students who needed extra guidance, or capture vocabulary on the board (such as choreographer, composer, author) from Mr. Barkley's instruction as a second mode of presentation. Throughout, she demonstrated comfort in learning from Mr. Barkley, and carrying his work through between his visits, in ways such as starting workshops by revisiting ways they had practiced the gift of space throughout the week, or continuing the work of the dance maps that they weren't able to complete during workshop time. As noted above, Ms. MacIntosh's workshops suffered from lack of time - her average workshop length was closer to 37 minutes than 45-60 minutes that other teachers had for their workshops.

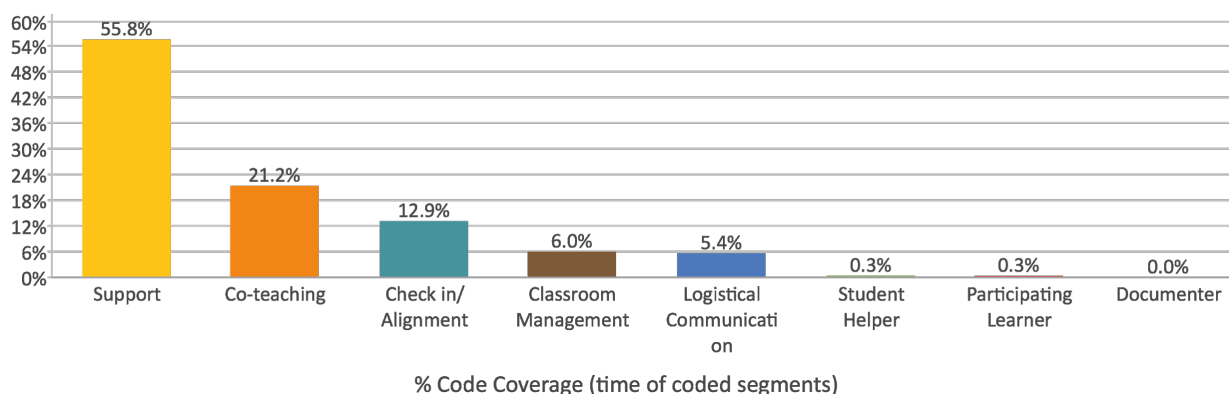


Figure 12: Ms. MacIntosh's primary interactions.

### Co-Teaching Model

The dominant model across this set of residencies was Co-Teaching. In the Co-Teaching model, the classroom teacher actively participates during the artist's workshop visits in a variety of ways - interjecting to make content ties, taking over instruction through a coordinated hand off, engaging in hands-on involvement during arts activities, or presenting ideas together with the artist. These teachers show more comfort and ease of use of the artist's language. In these cases, the teachers and artist had a tight (but flexible) plan created together, that included space for teachers to dedicate to STEM curriculum, and leveraged the teacher for hands-on activity times. As a point of contrast in percent of time where interactions were coded (12%-14% in the Support model), my residency resulted in the highest percentage of teacher interaction time, 60%, a result of hands-on workshop time where we were all supporting student work together, and intentional co-teaching instructional time dedicated to the STEM content. In addition to more explicit mapping and planning around STEM curriculum, other factors support a co-teaching model:

*Prior experience with arts integration*

The 2017-18 school year was the third year of the residency program. Ms. Hooper had participated in the program the previous year, on the same unit with Mr. Barkley. The two have a long history together. As both a trained artist and teacher, Ms. Hooper has for decades maintained both roles and looked for ways to intertwine them. Mr. Barkley was formerly the Executive Director of Kansas City Young Audiences (KCYA), and in 2003, Ms. Hooper was hired by Mr. Barkley to work as a teaching artist in dramatic storytelling. As a pair they had demonstrated their 2016-2017 work for the broader cohort of artists and teachers, and were clearly comfortable with the content and with teaching together. Ms. Hooper initiated the growth of the STEAM residency program in her school for the two other teachers from her school, Ms. Alan and Ms. MacIntosh, and has long-term aims of seeing arts integration work available in every classroom in her school. She had also previously attended the summer arts integration workshops twice.

Ms. Gordon and Ms. Robinson also had prior arts integration experience. While their work during the workshops was accounted for together (therefore referenced by the school name, School C, in my analysis), they each brought prior exposure to the residency. Ms. Robinson has participated in the STEAM residency program in the prior year at a different school. She had also attended a summer arts integration workshop, as well as other professional development courses throughout the school year. Ms. Gordon had not previously participated in the residency program, but had attended two summer arts integration workshops. Additionally, their school, and the district as a

whole, strongly support arts integration. Their school leverages their visual arts and music teachers regularly for integrated project work. Their school motto is Every Person Inspired to Create. The district's Director of Fine Arts came to visit our workshops and attended our third planning meeting. This school and these teachers also wholly adopt technology, and are an Apple Distinguished School. Given that our project was centered around puppet-making and performance but also digital media production, their student's comfort with technology, and Ms. Gordon and Ms. Robinson ease of incorporating technology made our ambitious project feasible.

*Prior experience co-teaching or collaboratively planning*

Another factor that may contribute to more Co-Teaching interactions is how the teacher typically works with other teachers. Ms. Jefferson and Ms. Luis, the only 2nd grade teachers in their school, do not co-teach, but co-plan together. They write their own curriculum for their classes (and did not use the PLTW Launch curriculum for their unit), and while they seemingly take their own direction when deciding which materials to use to present topics (for example, Ms. Jefferson used videos to introduce simple machines, and Ms. Luis used worksheets) they align on the topics. In their planning sessions with Mr. Johnson they co-developed the overarching plan for each week of the residency, using Google Docs to collaborate. They indicated this kind of planning and alignment was their norm. Ms. Luis had also taught Kindergarten the prior year in a co-teaching relationship, so had comfort with and enjoyed having a partner to teach together with.



Ms. Gordon and Ms. Robinson co-teach their 50 students together daily. They make all classroom plans together, and have an ease of continual hand-off between each other. In their school, each classroom is a 'studio' with a focus on project-based learning. As a teaching pair, they demonstrated alignment on everything from project goals, which standards needed to be emphasized, and classroom management, and also demonstrate a great deal of respect for one another. Coming in as a third element in that partnership was easy as they were naturally collaborative, supportive, and ambitious.

*Ms. Hooper*

Mr. Barkley worked with Ms. Hooper's class to integrate dance and movement into a unit that covered animals and algorithms as an introduction to coding. Ms. Hooper has nearly three decades of teaching experience. Of all the partnerships, hers and Mr. Barkley's was the only one that was recurring. They had worked together the prior year on the same unit, tying together coding and choreography for Kindergartners. Their experience working together was evident in their ease of alignment and candor with one another. Ms. Hooper also displayed an ease of integrating the STEM content into Mr. Barkley's lessons, while also easily using his dance and choreography language. For example, when connecting choreography with coding, she shared: "When coding you are giving a set of instructions to the computer to tell it what to do. Movements that dancers use and that you are using as a set of directions for your movements is a big word called choreography. Choreography, a set of directions and movements, is a lot like coding, which is a set of directions to tell the computer what you want it to do"

(workshop 4, 02/23/2018). Here, Ms. Hooper is the one to introduce this new dance vocabulary, and connect it to the work they had done in the Scratch, Jr. coding app. This exchange also exemplifies the a back and forth in instruction that was markedly different from Mr. Barkley's work with Ms. Alan and Ms. MacIntosh. After this introduction to the connection to choreography and coding, she took the class directly into an activity that they built on for the remainder of the residency, using different colors of papers to indicate how to move their bodies through a sequence as different animals. While the first three workshops were primarily lead by Mr. Barkley, by the fourth workshop Ms. Hooper was not only taking over large parts of instruction, but lead the students into an end of workshop relaxation ritual that Mr. Barkley ends all of his visits with - a swap from their typical roles and evidence of their fluid partnership and alignment. This residency also had a lot of hands-on activity time, like the others with majority Co-teaching interactions, requiring Ms. Hooper to work in concert with Mr. Barkley with small groups of students.

While the majority of her interactions were co-teaching, followed by support of Mr. Barkley, 17% of her interactions were as a participating learner. She appeared delighted to participate in dance and movement exercises alongside her students, not only modeling engagement in the art form, but seemingly as a way to continue sharpening her own practices.

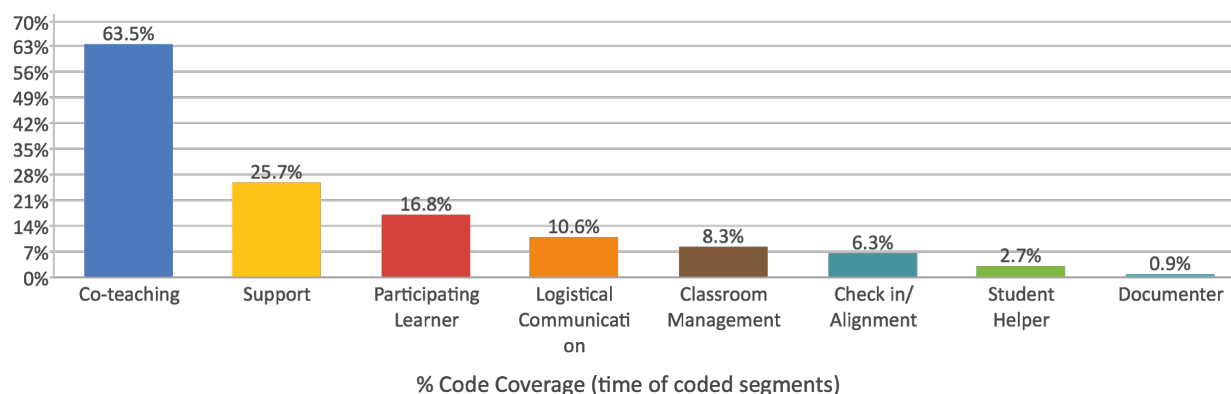


Figure 13: Ms. Hooper's primary interactions.

### *Ms. Gordon & Ms. Robinson - School C*

I worked with Ms. Gordon and Ms. Robinson to integrate puppet making and performance and digital media production into an erosion unit. They are a co-teaching team, in a school and district that strongly support arts integration. This was their first year teaching together. Ms. Robinson has been teaching for 12 years, and Ms. Gordon has been teaching for 28 years. Compared to other schools I observed, they have a wealth of resources - primarily people - to help make ambitious projects feasible. The blended learning coach helped manage things like video cameras, computers and moving files around. Parent volunteers, the school paraprofessional, the music and visual arts teachers, as well as the high school theater teacher also attended hands-on workshop time, so that we could have one adult with each student working group. This collaborative effort was all handled by Ms. Gordon and Ms. Robinson and with no hesitation or worry that we wouldn't have help - leveraging resources is core to the way the school operates. Due to the scope of our project, the teachers also had to carry on with some of the arts work between my visits. This included continuing puppet or set

builds, or continuing filming. This was coordinated, and worked extremely well given time constraints.

Our partnership was structured to be very collaborative in the instructional time, and to also allow for a lot of hands-on workshop time for kids to create, during which we all worked with small groups or floated between small groups giving more targeted instruction relevant to their projects. This work was all accounted for as co-teaching time. This class also operates under a social contract, a ritual they participate in together to prepare for focus, communication and collaboration. In the first workshop, we all engaged in this ritual together, which also counted as co-teaching time, where the classroom teachers are bringing me, the artist, into their classroom norms and practices, which are founded in in the arts.

Almost all of Ms. Gordon and Ms. Robinson interactions were co-teaching. In part, this is due to the structure of the workshops - I would often lead a lesson, and then we would as a class engage in exploring that idea. Our alignment on content and goals allowed this to happen fluidly, but the number of students (50) required everyone to actively support the small groups. The amount of hands-on time, which I view as co-teaching time, also leaves less time to be spent on a support role because the level of direct involvement is higher - the teachers had to be comfortable working on both the puppet and set builds, and the digital media production. During these hands-on activity times, we were all working around the room with students. While this time was accounted for as co-teaching time, it's very likely that there were many interactions from

the other categories (such as moments of documentation, or student help) that my recordings did not capture.

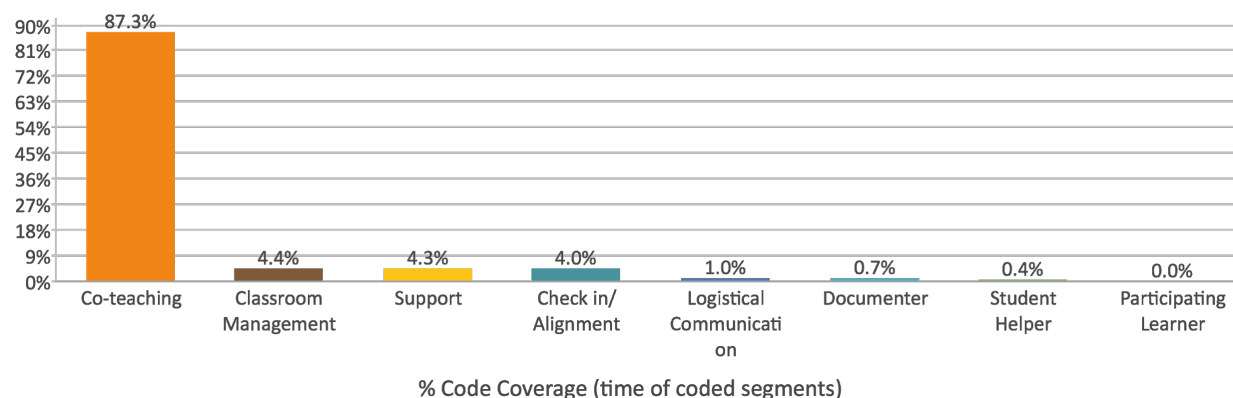


Figure 14: Ms. Gordon and Ms. Robinson's primary interactions.

### *Ms. Jefferson*

Ms. Jefferson worked with artist Mr. Johnson, who introduced mime into a simple machines unit, which built over the residency to both a mime performance and presentation of toys using simple machines. Ms. Jefferson and Mr. Johnson split instruction during the workshop time, particularly in the second and third workshops. In those workshops, Mr. Johnson supported Ms. Jefferson as she lead instruction on introducing simple machines, and then lead kids into a hands-on activity using LEGOS to build simple machines. In those workshops, Mr. Johnson had brought along toys such as a stomp board to further the connection to simple machines and toys, and provide some additional observation and discussion opportunities. During the LEGO time, he circulated the small groups to support them alongside Ms. Jefferson. In later workshops, they started working on their mime performance, and Ms. Jefferson actively

engaged, interjecting with support such as aiding students when it was their time to enter the act, or actively participating as a learner alongside her students.

Like every teacher I observed, Ms. Jefferson was consistently managing a variety of tasks and needs simultaneously. In addition to her own students, a Kindergartner with behavior issues was often sent to her room for support. Because this was a regular occurrence in her classroom, there were established expectations around activities he would engage in off to the side, or on occasion he would sit with Ms. Jefferson as part of the whole group. Generally this did not disrupt Ms. Jefferson's flow with the rest of the class, but on a few occasions it was definitely disruptive, where she had to turn her attention solely to him to keep him from running around or hiding under desks, and on a separate occasion she had to leave the room for approximately 15 minutes to take him to another room to calm down. While she was away her absence was definitely felt, as she was not there to manage classroom behavior and keep students focused on Mr. Johnson. Given that this was the 6th workshop and they were preparing for their performance, this resulted in a moment of frustration all around. However, this candid look into Ms. Jefferson's everyday classroom experience was an exception; overall she was always engaged and always actively supported Mr. Johnson, through co-teaching, supporting him, helping students and participating as a learner.

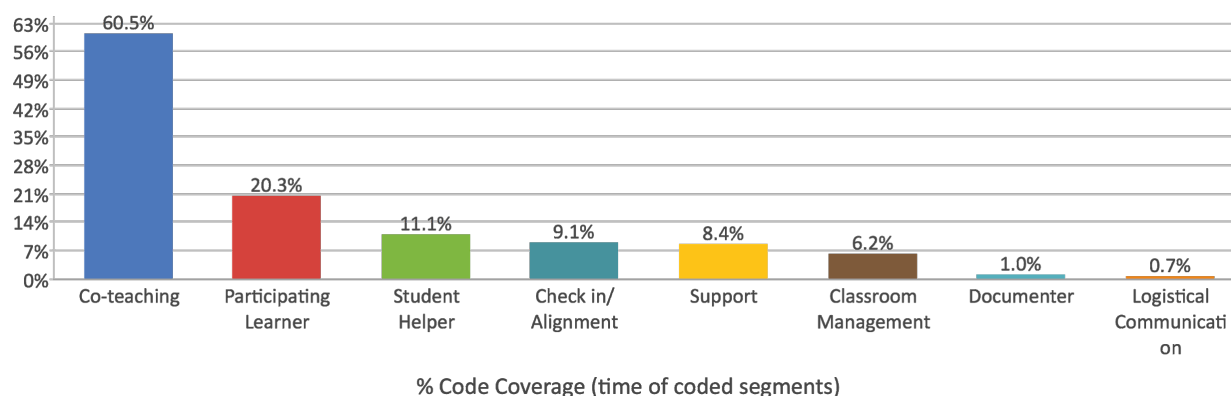


Figure 15: Ms. Jefferson's primary interactions.

### *Ms. Luis*

Ms. Luis also worked with artist Mr. Johnson, on the same content, introducing mime into a simple machines unit, which built over the residency to both a mime performance and presentation of toys using simple machines. I was not able to attend Workshop 3 or 7. While Ms. Jefferson and Ms. Luis co-plan and generally align on standards and curricular goals, they took different directions in the STEM instruction. Overall Ms. Luis was actively engaged during workshops, and like Ms. Jefferson, split instruction time in some workshops to introduce the simple machine content. Like with Ms. Jefferson, in his 2nd workshop, Mr. Johnson brought a stomp board to demonstrate levers. Ms. Luis used that demonstration to add on a class discussion. This discussion not only primed the students before they tried the stomp board, but signaled classroom practices to Mr. Johnson, with the language “What do you notice about these stomp boards? What do you wonder? ... We do a lot of notice and wonders in here... so when you try the stomp board, think about those notices and wonders, and if it answers any of your questions” (workshop 2, 02/01/2018). These prompts helped the students name

observations, and gave them a focus before trying the toy, while showing Mr. Johnson a practice Ms. Luis values in her instruction.

Like Ms. Jefferson, this co-teaching and division of instruction primarily happened before workshop 5, where the focus shifted more to applying what they learned about simple machines to preparing a mime performance. Ms. Jefferson's second highest number of interactions were around classroom management. Where other teachers seemed to have one or two methods for quieting a class or redirect a student, Ms. Luis had several approaches, which appeared to vary depending on how she was involved in the session. During times that she was on the side she said "shhhh" or rang a bell. Other times she would use a call and response. Or she would call individuals to her for one on one discussion. Those interactions left an impact on me, and before completing my analysis had assumed a much higher percentage of her interactions would map to classroom management; my impression had been that her class needed a lot of behavior support generally. Indeed, based on percentage of interactions alone, hers are much higher in this category, but also shows the layering of interactions required for classroom teachers to keep a class on task.

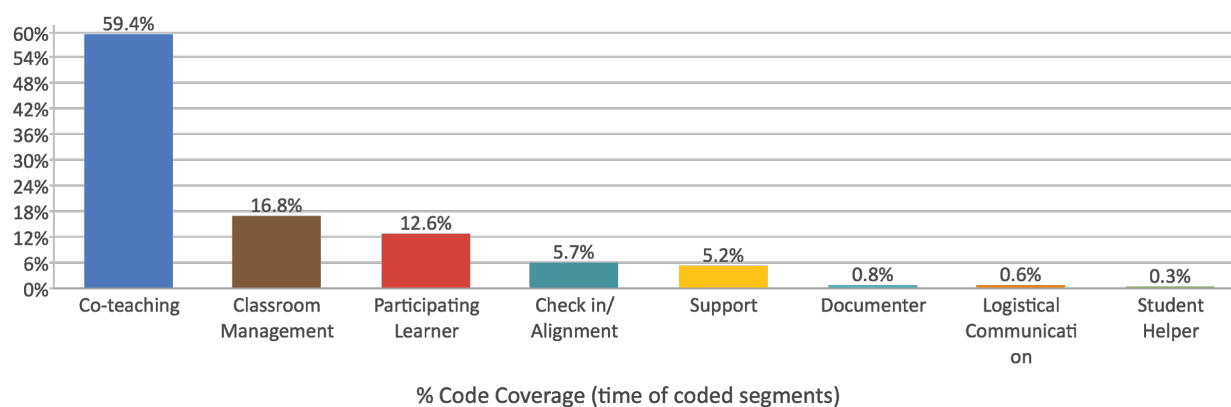


Figure 16: Ms. Luis' primary interactions.



## Discussion

Moments of collaboration ebb and flow. One model is not persistent from start to end of the artists' teaching time. These models are also not mutually exclusive; in one session a teacher may move from co-teaching to participating as a learner, to popping in to keep a student on task. And, over time across sessions teachers also show different interactions as some workshops may lend themselves more to teachers instruction, or require more teacher support than others.

What these models reveal is the different ways teachers support artists during these workshops. On a higher level, they also reveal the onboarding of a teacher into arts integration, and demonstration of doing arts integration work. When engaging with the artist as a co-teacher, the classroom teacher is practicing the integration more than a teacher who is working in a supportive way to the artist. Moreover, this participation demonstrates the interconnectedness of the inquiry to the learner, where they can see two experts working jointly in their teaching.

### *Other Impacts on the Model*

By coding for moments of interaction, the amount of teacher involvement is captured. The type of activity may impact the type of interaction and involvement. For example, as Ms. Alan's students worked in small groups on dance and movement, the time devoted to group work was shorter, and required less collaboration and communication. While Ms. Alan was available to support students in those moments, she was not directly working with students in those moments. In contrast, in hands-on projects such as puppet building, toy making or creating coding sequences, the

teachers and artists together had to support students more directly, make sure the creation aligned with goals, and generally help as needed.

This distinction around activity helps make sense of how one artist can fit into two models. Mr. Barkley worked with three teachers, two of which fell into a support model. This is due to a variety of factors, but that his work with Ms. Hooper to choreograph coding sequences required working with small groups of kindergartners to develop the sequences. Directly related to this is the age/grade level of the learners; Kindergartners need more support than 4th graders. So when Mr. Barkley explored dance and movement with Ms. Alan's class, the project didn't directly lend itself to hands on work, but also the students were more capable of doing the work without as much additional adult support.

### *Limitations*

This data and analysis has several limitations. Not accounted for in this data is the amount of effort a teacher makes between artist's visits to give their students additional background knowledge to be ready for the artist's workshops, or arts-related work that happens between visits to keep the overall project on track. Additionally, this data does not represent two of Mr. Johnson's visits to Ms. Luis's class. Not accounted for here is how grade level might impact the type of interactions a teacher participates in.

### **Conclusion**

This data examines the interactions of a teacher in their classroom when an artist is visiting, as the two work collaboratively to integrate art into STEM units. Going back to

my conceptual framework, the interactions chosen represent the middle of Salomon's distributed cognition "spiral"; in the relationship between individual and distributed cognitions, partners engaged in collaborative activities affect the nature of the joint, distributed system, which in turn affects individual cognitions and participation. That's to say, that as the teachers and artists teach together in a learning environment, their work together, and the ebb and flow of instruction, sharing of classroom norms, or participating as a learner in the arts instruction, all affect both the teacher and artist, and their understanding of their own work and practices. As will become more evident in the next chapter, this work teaching alongside one another gives new ideas, new tools, and new concepts to explore.

Moreover, these interactions capture one component of the learning environment. While it is only one component (the teacher's interactions) it is the primary component impacting how the artist approaches their work in the classroom. These interactions change the artist's real-time responses, ability to teach without tending to classroom management, and impact the scope of project. Together they engage in "qualitative scaffolding" where one partner provides meaning to the the other, possibly changing the cognitive activity of the other, thereby qualitatively changing the teaching activity (Salomon, 1993, p. 133). The impact on teaching activity imparts change on the individual as well as the learning environment.

## **Chapter 6: Perceived Impact of Teacher/Artist Collaboration**

### **Introduction**

In this chapter I analyze the exit interview data to capture reflections from the artist and teacher on their partnership and the residency program. Through these reflections, the teacher and artist discuss and analyze many of the interactions discussed in the previous chapters and their consequences. These interviews also allow for reflection on what went well, areas of improvement, and personal growth. Finally they capture ways that this work may impact teaching practices or adds new tools to the teacher and artist's repertoire. I will use this data to answer the question: **What are the outcomes of these partnerships?**

### **Methods**

To conclude the residency program, every teacher/artist partnership participated in one exit interview, conducted by an evaluator for Kansas City Young Audiences. When time allowed, I also asked a few follow-up questions at the end of their interview. Data was collected from notes taken during the interviews and audio recordings. Exit interviews were 30-60 minutes long. When an artist worked with multiple teachers and all were interviewed together, there was an attempt to discuss each partnership separately. Questions asked by the evaluator, posed to both the teacher and artist for a response, included: How consistently did the art form help students reach STEM content? How was the balance of learning art and learning science? What were the best moments for learners in this collaboration? Where is there room for improvement? We both then pursued follow up or clarifying questions as needed, and my additional

questions generally focused on asking the teachers if they had a Jeffersoner understanding of and comfort with arts integration after the residency, and asking artists if they have gained Jeffersoner understanding of working in the classroom. Additionally I inquired about the partners' views on collaboration and new ideas for teaching.

<b>Artist</b>	<b>Teachers</b>	<b>Interviewers</b>
Mr. Barkley - Dance and Movement	Ms. Hooper, Ms. Alan (School A)	KCYA Evaluator and Ms. Jordan-Douglass
Mr. Barkley - Dance and Movement	Ms. MacIntosh (School A)	KCYA Evaluator and Ms. Jordan-Douglass
Mr. Johnson - Mime	Ms. Luis and Ms. Jefferson (School B)	KCYA Evaluator and Ms. Jordan-Douglass
Ms. Jordan-Douglass - Digital Media Production	Ms. Gordon and Ms. Robinson, Innovation Coach (School C)	KCYA Evaluator

Table 14: Exit interview attendees.

## **Analysis**

As is the case in the previous chapters, I coded the transcripts of the audio recordings and field notes using codes rooted in the conceptual framework I used to structure each chapter (see Table 2 for the complete conceptual framework). These codes were developed by identifying moments of reflection spanning views on the partnership, views on integration, new teaching tools or impacts on teaching practices, and areas for improvement. I looked for these moments because they were indicators of the consequences or outcomes of interactions that occurred throughout the residency, as well as indicators in the individual cognition changes and impacts on teaching practices and future performance.

Research Question	Data Analyzed	Conceptual Framing for Analysis	Codes
What are the outcomes of these partnerships?	Field notes and audio recordings of exit interviews	<p><i>Attributes of Learning Environments:</i> In a learning environment, interactions and their consequences are always in flux</p> <p><i>Relationship Between Individual and Distributed Cognitions:</i> Changes in individual cognitions from participation in a system impacts future performance and products</p>	<p>Views on Integration</p> <p>Views on Partnership</p> <p>Reflection on Teaching Practices</p> <p>Impact on Future Practices</p> <p>New Teaching Tools</p> <p>Impact on Learners</p> <p>Areas of Improvement</p>

Table 15: Section of the conceptual framework used for this chapter (see Table 2 for the complete framework).

## Findings

Of the partnerships I observed, the exit interviews revealed a positive experience for both teacher and artist. Despite noted room for improvement in some areas, across the board the residency was highly valued for professional development for both the teacher and artist, and for the impact the teachers could see on their students.

### Views on Integration

The residencies provided a time and place for arts integration into STEM to be demonstrated and practiced. For teachers without prior arts integration experience, that experience goes a long way for showing the how and why of arts integration. And for those who had practiced arts integration before, it helped show other pathways and/or examples. Ms. Jefferson who did not have prior arts integration experience shared:

So often as teachers we neglect kinesthetic learners being in a small space, bodies that aren't quite sure how to control themselves. Mr. Johnson provided them with a lot of scaffolded practice to learn how to control their bodies in group settings and then gave them practice to create simple machines with force and motion concepts we were learning about and made it really concrete for them. And then they were able to take what they had done with their body and recreate it first in my class through LEGOs and then through their toy invention (exit interview, 04/04/2018).

Additionally, this work gave insight into new creative ways to teach content. Ms. Jefferson and Ms. Luis both shared that Mr. Johnson's prior experience with teaching simple machines gave them new ideas for how to approach the content, and deepen the connection with the arts, for them and for their students. "This is my seventh year teaching second grade so I've taught simple machines and force and motion six other times to second graders. And this is the first time that I got to be a part of this [residency] and they learned way more" (Ms. Luis, exit interview, 04/04/2018).

In my residency partnership, the school is centered around project based learning (PBL). My work with them was treated as a PBL project, and as such they used different pockets of instructional time to support the documentary project. However, they noted that this time the integration was deeper. They used their reading, writing, and science times to learn about weathering and erosion. This led to more quality work, as Ms. Robinson commented that "the writing that came out of this project was phenomenal." Regarding deeper connections to the content, she reflected that:

The information piece was huge. It was the arts just went in with the science and our science experiment that went to the documentary. It wasn't separate ... Our collaboration piece too, I mean it wasn't just the art piece it was bringing them all together (exit interview, 05/22/2018).

In our residency, we felt the integration was seamless and really allowed the students to highlight the weathering and erosion concepts through puppets and documentary production. Ms. Gordon commented: "I don't think I'm as amazed as other people are. And they're like 'I cannot believe a second grader did this.' Like they cannot get over it and that's what's so cool" (exit interview, 05/22/2018).

Ms. MacIntosh also appreciated how concepts from the workshops had connections to other content areas. For her, she often found things in their readings that related to Mr. Barkley's visits, "and that was probably my favorite part about this, the connections." She witnessed her students take the ideas Mr. Barkley shared, and take off with them after he left. In addition she used ideas Mr. Barkley had taught around giving the gift of space, which gave them a concept to apply around the school, such as moving through the hallways and their classrooms. Ms. MacIntosh and Mr. Barkley also shared that their work on creating dance maps, which tied together dance with reading and writing map features, as their favorite part of the residency. In part this was because it worked well as a hands-on project, but also Ms. MacIntosh shared that "it showed that they got it – it was kind of the assessment." Mr. Barkley added on, "and taking something abstract and make it concrete is a critical skill. Watching them



translate each other's maps – to me that is the crux of it. Can you take someone else's work and do something with it?" (field notes, 04/12/2018).

### Views on Partnership

While understanding the how and why of the arts integration work is a critical component to the residency, working with a partner towards that integration work is the way to put it into practice and evolve teaching approaches.

#### *Positive experiences*

Partnerships that resulted in a co-teaching relationship and approach to the workshops were reflected on as the most beneficial experiences of the residency. Mr. Johnson (artist) typically performs as part of a duet with his wife, but in this teaching artist role he was solo. For him, being partnered with teachers that folded him into their classroom and jumped in to teach alongside him was really enjoyable, both as an opportunity to build on content, and for him to pick up new teaching ideas. Reflecting on the residency overall, he said:

In part it was because I enjoyed the co-teaching style that we have and when it worked best was when we would just sort of trade off. I would be teaching something and then one of them would jump in and say 'ah, that ties in with what we're doing' and I thought, oh ok. And kind of to build on that ... One of the things that you use that I'm going to continue to use is after something was presented to the kids....what you notice, what do you wonder. I like that. You know I picked up tools, that's one of the things I like about these residencies (from exit interview, 04/04/18).

Mr. Johnson's partner teachers also reflected on the enjoyment of having a partner to co-teach with. Ms. Jefferson shared that she felt the co-teaching relationship felt seamless.

It felt like we've known each other for a while and worked together for a while - it wasn't awkward. It didn't feel awkward to me. It felt really natural. And Mr. Johnson worked really hard to kind of adapt to our classroom culture. And it didn't seem like a lot of effort on his part (from exit interview, 04/04/2018).

Ms. Luis added that she appreciated having someone to expand on ideas with in front of the class, as well as to help demonstrate and play with ideas.

The idea of having a partner to engage in a back-and-forth with was also valued in Ms. Hooper and Mr. Barkley's partnership. They too remarked on their co-teaching relationship and the value of having someone to improv or try things out with. Mr. Barkley commented "if Ms. Hooper's got an idea I am happy to step back and say 'ok what do you want to do' and that goes back and forth" (from exit interview, 04/12/2018).

In the exit interview for my residency, a major focus on our partnership was my recognizing the amount of effort the teachers managed between my workshop visits. In line with this was recognizing the supplemental resources they brought in to achieve an ambitious project. That support allowed my workshop visits to focus on pushing the production process forward and introducing next steps. I specifically commented that "they took a lot of the workload between between the visits. A lot of time writing and refining." They additionally noted that the purpose and passion I brought to the

classroom added to the success of the project, something that each teacher appreciated in all of the artists across the residencies I observed.

*Reflections on improvement in the partnerships*

Reflections on ways to improve the partnership also surfaced in these interviews. For Ms. MacIntosh and Mr. Barkley they together agreed that if they were to do another residency together, they would approach it differently. Namely, as is discussed in the previous chapter, time was an issue for this partnership, both because workshops sometimes were cut short on time, and also because planning sessions were done with three teachers at once. Ms. MacIntosh felt like communication between sessions could have been improved but “also I could have done Jeffersoner of keeping him up to speed; planning with three teachers was difficult” (field notes, 04/12/2018). Because of these challenges, they had more of a divide and conquer approach, where Mr. Barkley primarily focused on the dance component and Ms. MacIntosh, to the best of her ability, carried that into her curriculum between Mr. Barkley’s visits. Despite this not being what they saw as the ideal arrangement, Ms. MacIntosh remarked “we were divided but that worked really well” (field notes, 04/12/2018). She did recognize that the preference would be moving towards co-teaching, in this exchange:

Ms. MacIntosh: Doing it again I would take a different approach but I would also know more about you wanting to be involved.

Mr. Barkley: Versus me coming in and doing my thing and leaving.

Ms. MacIntosh: And that is due to lack of time and ability to communicate.

## Reflection on Teaching Practices

The teachers and artists revealed different ways that the residency program engaged them in new teaching practices, both in ways they explored during the residency, and things they intend to take with them for future teaching.

### *Implementation Approaches*

Across the interviews, teachers remarked that the residency program helped reach learners through a variety of learning styles. Mr. Johnson, Ms. Jefferson, and Ms. Luis each reflected on the role of kinesthetic, body-based activities to help the kids learn ideas. They also commented on the ability to supplement evidence of learning with mime and gesture for students who are more challenged in writing. In my residency, part of our practice was intentionally scaffolding collaborative roles, and taking a lot of care to establish student roles that were engaging but also dependent on one another, which provided a new model of student collaboration to work with in the future.

### *Co-teaching*

Ms. Jefferson, Ms. Luis, and Mr. Johnson, who all were in the Co-teaching model explored in the previous chapter, appreciated having an opportunity to demonstrate sharing of ideas for their students, as a way to add examples, challenge assumptions, or use other's expertise. The appreciation for co-teaching as a practice also was affirmed by Mr. Johnson, as an area to place more emphasis:

And I think if there had been even more chances when we were doing more back and forth co-teaching because than there were other things that would come up. Discipline issues or other things that you needed to do. And that was fine. I was

always prepared to be leading class but even more jamming back and forth (exit interview, 04/04/2018).

Additionally, as part of the co-teaching partnership, Mr. Johnson appreciated having an opportunity within the workshops to observe the students working on hands-on projects and having time to visit with them and discuss their work.

But this [residency] there was often more time at the end where I was mostly done, but I was interacting with the kids and observing what they were doing. That was important to me too, that I wouldn't have known as much where they were and where they were going if I'd done my part and left. And so just to be another bee buzzing around to say 'OK, I see wheels do you have an axle somewhere?' So yeah that kind of thing (exit interview, 04/04/2018).

### *Risk Taking*

These residencies provided a time and place for trying new ideas, both in new projects for the students, and in stretching the teachers' and artists' teaching practices. Everyone involved had to be comfortable with risks such as taking on new language/vocabulary, roles, and even using their bodies in new ways. Artist Mr. Barkley views risk taking in front of the students, especially in dance and movement, as critical to engagement: "If I'm willing to take the same risk I'm asking you to take, which I had done in earlier classes when I would demonstrate, that's part of that process of getting them to buy in" (exit interview, 04/12/2018).

Additionally, Mr. Barkley took risks with trying new materials, and leaving himself open and vulnerable to feedback from the students on it:

You know there were a couple of times too I was thinking that I had said to them when I started the lesson you know I really don't know what's going to happen. We're going to try this out so maybe you can help me do that. Are you willing to do that? (exit interview, 04/12/2018).

Ms. Jefferson saw the residency as practice in opening up her classroom to more partnerships:

It was just really outside the box and even outside of what we usually think of as art integrated into our classrooms but it was just so seamless. I guess what it taught me is that I need to be more brave to take risks in my teaching practices. Again (I like) structure and control and I'm not always confident that other people can like jive with what I have going on here as well as we already do it, and Mr. Johnson just fit in so well. And it was just such an easy experience" (exit interview, 04/04/2018).

### Impact on Future Teaching Practices

As has been noted, professional development for the teachers and artists was a major goal of the overall program. For the teachers who didn't have experience with arts integration previously, the residency program raised awareness to new approaches and the power of the arts. For the artists, observing teachers and being able to teach along with them was powerful and provided each artist with new insights. For me, I was extremely impressed with my partner teacher's awareness of and thoughtfulness to leveraging a multitude of resources (primarily people support), as well as their classroom management of 50 students. Mr. Johnson was inspired by the co-teaching

relationship he was able to explore with his teachers. And Mr. Barkley learned new considerations for planning and adapting content for three different grade levels/teachers.

For the teachers, having a chance to observe an artist introducing concepts and be able to learn alongside their students gives new tools and ability to use them. Ms. MacIntosh said that incorporating the processes Mr. Barkley taught has “changed my way of thinking – it’s more deliberate now and that self-reflection about why and how – it’s not just a gut feeling” (field notes, 04/12/2018). Ms. Luis expects to use mime to encourage more of her students showing than telling about their understanding of ideas. Ms. Jefferson also expressed new confidence to explore mime concepts further: “I’ve always tried to do things with their hands but I feel more comfortable letting them use their bodies especially because they already had a structured scaffolded practice before” (exit interview, 04/04/2018).

### New Teaching Tools

On a more granular level, some references were made to new teaching tools that the artists and teachers picked up as useful for specific cases. As noted above, Mr. Johnson liked Ms. Luis’s use of discussion prompts of “what did you notice? what did you wonder?” and intends to use those questions as future teaching tools. Ms. Luis also picked up tools from Mr. Johnson, in how mime can be used in different applications, both to use your body to show such ideas such as math understanding, and more: “it gave me another tool that I can see what they’re creating and what they’re capable of. And it also provides a little bit of classroom management oddly enough that I really like

that aspect of it” (exit interview, 04/04/2018). As noted above, she is now empowered to explore having her students turn off their voices and use their bodies to demonstrate their thinking. Ms. Jefferson also indicated that she would use mime in new ways to connect concepts: “Now I’m teaching our math unit about geometry and angles so we’ve been acting out a lot of shapes and different types of angles of their body and different types of lines and so it’s been a really fun way for them to continue what they did with Mr. Johnson” (exit interview, 04/04/2018).

### Impact on Learners

In addition to professional development in the teachers and artists, there was noted positive impact on the students from their engagement in the arts integrated units. This impact was apparent both in how the students connected with the content, and how they connected with the teaching artist.

### *Relationship with students*

The students developed their own relationships with the teaching artists throughout the residencies. While these may not have provided space to develop individual relationships with each child, the teachers noted various ways that the residencies were powerful for their students. Ms. Jefferson summed up her view of Mr. Johnson’s relationship with her students as a standout quality of the residency:

Something that stands out to me is the relationship that Mr. Johnson built with the kids... how highly engaged they were in all the activities we were doing and how much they enjoyed him ... I also loved his conversations with the kids as they were building simple machines out of LEGOs. He provided them with a lot of



great questions that challenged their thinking and made them more competent to defend their ideas but also made them think about things from a different perspective... So it's a gentle relationship...And it was such a safe and caring environment that they were able to develop Jeffersoner skills because of the relationship they had with him (exit interview, 04/04/2018).

The artist/student relationship was also recognized as powerful for guidance and feedback to the students. Ms. Alan shared:

I just think when they got to experiment and then they were validated in what they were doing and just making that connection of 'wow I just made this' and now you know [Mr. Barkley's] making that connection with them and saying 'yeah that was great.' You know I feel like I saw them get so excited about that... And the fact that they were able to create something that was not only correct but their own (exit interview, 04/12/2018).

### *Carrying the concepts to other areas*

Several interviews revealed ways students were carrying the STEAM concepts beyond the workshop times, in play and at home. Ms. Gordon shared that she saw a student take photos of erosion on her vacation, adding "I think [the documentary project] started the passion and went beyond the classroom which I think is very powerful" (exit interview, 05/22/2018). Two teachers saw evidence of their students playing with the idea at recess. Ms. Luis shared that she witnessed her students playing with the mime activities at both indoor and outdoor recess and "they do a lot of imaginative play and creating those movements with their body where they have to guess (referring to mime

game play)” (exit interview, 04/04/2018). Ms. MacIntosh noted that the dance maps they had made were a big deal; she saw them using them to have dance-offs at recess. Part of the work in creating the dance maps was making them readable by a partner. She noted that they had to make new seating charts and a student commented “I guess we’d Jeffersoner make this so someone else can read it” (field notes, 04/12/2018).

### *Engagement*

Overall, student engagement in every residency was high. In some cases, such as my residency, the way the project was structured required every student to participate, and the teachers saw increased engagement where collaboration was high, and where everyone had a role but also had to rely heavily on each other. Other cases challenged expectations of how engaged the learners might be. Ms. Alan, a 4th grade teacher, initially thought her students might not be as in to the dance and movement workshops as younger grades would.

A lot of kids that just stepped up to the plate who were either more engaged then I had anticipated...because they're more worried about what their peers think you know that kind of stuff, and so going into it I was surprised at how my class really just took hold of it and they all wanted to be participatory and engaged because I was worried about that” (exit interview, 04/12/2018).

Additionally, she was impressed with seeing new strengths in individual students that she may not have seen without this kind of program. She also saw new pathways for engagement for two particular students who often struggle in their day-to-day class work. One, who was a new student learning English, is often held back by vocabulary

and language, but could use her body and movement to communicate in a new way. A second student was academically at a lower grade level and while she struggled some, it was less than Ms. Alan had anticipated. Both cases revealed insights to her about this kind of work: “Those two really stood out to me just because they have such high needs in different areas and so to see them shine in that way was really cool” (exit interview, 04/12/2018).

#### Area for Improvement in Residency Program

A focus of the exit interviews was to provide a time to reflect on areas of improvement for the program. Of the residencies I observed, overall the experiences were very positive, but two areas surfaced as places to improve: time and revisiting professional development opportunities.

##### *Time*

Across the exit interviews, the one thing everyone would have appreciated more of, was more time. There was a desire to either have longer sessions (they were generally 45-60 minutes in length) or more of them, to allow for even deeper diving into the content on both the arts and STEM curriculum. Additionally, Ms. MacIntosh noted she would have liked more time or more opportunity to pre-teach more to Jeffersoner connect to Mr. Barkley’s lessons, as well as building in more time for reflection, both week to week and afterwards.

##### *Professional Development*

One area of opportunity to improve professional development are more options for reflection during the residency. Every workshop session, the teachers were given a survey to fill out about the artist, but there was no mechanism in place for the artist to

receive the feedback, and no explicit ask for the artist to do the same about the teacher's role, or to capture their own experience. Some form of journaling to capture barriers, and things that worked well in the moment, might prove useful for Jeffersoner program and professional development.

Mr. Barkley supported the idea that more feedback to the teaching artist would be very valuable: "It would be more instructive as a teaching artist to know how what I'm doing will be used." (exit interview, 04/12/2018). Moreover, he suggested an opportunity for more group sharing of best practices, and how teachers could share those practices with other teachers.

Professional development is a primary goal of the overall program. The residency starts with a half day workshop training to provide an overview of the program and give some hands on time practicing arts integration. Mr. Barkley happened to lead those workshops, and every participant had gone through training with him on one of his dance and movement workshops. Ms. Alan, who worked with Mr. Barkley during the residency, reflected:

So I thought that the day that we went to the training was super beneficial for us because we had [Mr. Barkley] so I had been pre-taught almost what he was going to come teach my kids. But if I had not had [Mr. Barkley] as a teaching artist I don't know that that would have been super beneficial for me - the whole day at least. Just because like it was your art form and your art form is so different from some of the others and so you know going through yours... But you know I mean I feel like it's more specific to what we're going to be teaching

our students and would be more beneficial [to show different art forms for that day].

## **Discussion**

The reflections examined in this chapter reveal the perceived impact of the partners' work during this residency program. These reflections and perceptions range from specific insights into teaching tools and practices, to an understanding of the how and why of arts integration, to ways the whole program could be improved. In these exit interviews, the teachers and artists offered thoughtful reflections on the work and their own practices.

### *Impact of the Program*

For both Ms. MacIntosh and Ms. Alan, who fell into the Support model, their exit interviews revealed an understanding of the how and why of arts integration work. While Ms. Alan didn't indicate how it might inform her future teaching practices, she saw the impact the work had on her learners, noting that she felt her students ideas seemed "validated" when they "were able to create something that was not only correct but their own." These indications of a connection to why arts integration matter and a shift in views of teaching to account for arts integration show a change in the teachers. If that work continued, that may create a shift from these teachers working as supporters of the teaching artist, to co-teachers. That shift may then deepen the connection to the arts work and the power of leveraging and artist partner's expertise, furthering teacher knowledge and inquiry in true arts integration (Gadsden, 2008). Overall the partnerships

in the Co-teaching model were viewed as stronger, with more anecdotes around the power of the joint, shared work between partners.

### *Change in Views and Practices*

Of the teachers I observed, despite noted areas of improvement for the partnership, Ms. MacIntosh's exit interview revealed the greatest shifts in thinking. She noted she had an "a-ha stage" early in the residency where she saw her students take Mr. Barkley's work and run with it after he left, and that moment stood out to her as a favorite, demonstrating her understanding of the value of the work, and her desire to further develop her practices. Her feedback in these interviews also revealed her noticing of threads and connections to other areas (both content and spaces outside of their classroom), her desire to work in deeper partnership, and explore more co-teaching opportunities. As a first time participant in the residency program and in exploring arts integration, she was open to the work, but didn't fully understand the how and why until participating. Despite issues of being short on time and covering too many various concepts during the workshops, her attitudes towards the arts integration work were strengthened. This evolution of thinking about arts integration is promising for the future of this work and for showing evidence of the meaningful connections that help establish the value of arts integration.

This data also reveals ways that these partnerships invigorated the teachers from a content and practices perspective. The teachers saw new ways to work with standards and content matter. They were able to practice new ways of partnering and leveraging others' expertise. The teachers I worked with in my residency are especially

skilled at leveraging a wide network to bring in real-world experts to supplement what the students are exploring. In contrast, teachers like Ms. Jefferson who like more control of the classroom and lessons can use residencies like this to practice leveraging partnerships to add on to the learning environment.

Finally, this work required a level of risk-taking from both the artist and teacher in effort to learn new strategies and be open to shifts in attitudes towards teaching and learning (Andrews, 2008). This means remaining open minded and vulnerable to allowing those shifts to occur. Further, it's being able to openly discuss and reflect upon those shifts that might indicate growth, as well as being open to areas of improvement.

### *Limitations*

This analysis looked at the reflections and perceived impact of the partnership. While the teacher and artist were both encouraged to be open and honest with their feedback, and while conducting these as a group allowed for a richer discussion between partners, the perceptions may have shifted if these interviews had been conducted individually.

### **Conclusion**

This work encourages teachers and artists to further explore their practices and deepen their understanding of arts integration as an approach to create new learning opportunities for their students. Because these interviews took place within a few weeks of the workshops ending, it's difficult to determine if these findings will lead to long-term change in teaching practices for both the teachers and artists. Expressing a greater awareness and understanding of the hows and why of arts integration and arts

partnerships is a necessary first step, but fundamentally changing practices - especially asking the teacher to adopt arts integration without a teaching artist partner - is another.



## Chapter 7: Discussion and Conclusion

Given that arts integration and engaging in arts processes is a productive pathway to helping learners make deeper connections to content and making sense of their world, the work to be done is supporting that shift in teaching practices. Integration is hard work. Aligning standards in multiple areas to create units that teach required content while showing connections across disciplines - while also making the work personally relevant to the learners - takes creativity, resources, and freedom to try new things. These are not trivial hurdles. The reality is that many teachers face a dilemma: they teach because they want to have an impact on youth, to aid in their development as capable critical thinkers who understand and participate in their community. They hope to help them be kind, empathetic, and caring. They hope to help them be problem solvers who think creatively about possible solutions to issues in society. Often, these goals are at odds with the reality of test scores, and the constant drive to improve scores and teaching to the test to do so.

Moreover, shifting practices to make room for new ways of teaching and exploring approaches to content is complicated. This residency program provided key elements to support this work: a structure to follow, allowing for a sense of constraints to shape the scope of the work; time allocated to planning and reflection around the instructional time; the effort of matchmaking artist to teacher; and professional development support to provide an initial shared foundation and some best practices. While these supports made these partnerships possible, the learning comes from the time spent planning and teaching together. It happens intentionally, in moments when

there is an expectation of teaching a new thing. And it happens unintentionally; as one absorbs new ideas and understandings from another and makes slight shifts, such as moving their body in new ways as they practice being a learner, or trying out new language, or even subbing gesture for words.

Through the phases of planning, instruction, and reflection, the teacher and artist are engaged in a collaborative relationship that changes their understanding; they have, through their collaborative activities, created something that changes not only their individual perspectives on teaching, but the system that they work within, as this shift in thinking will be carried forward and impact future work. This impact may be fruitful and lead to more attempts at integration, or may be ignored and set aside; either way, the teacher is changed by the experience. This change, the result of the relationship between individual and distributed cognitions, feeds into the attributes of the learning environment, where the teacher/artist are simultaneously creators, conductors, and deflectors of interactions. Their actions and reactions are dependent on the relationship of their self and their view of the interactions.

Additionally, at each level of activity (planning, teaching, reflecting) I have written about central tensions that play a role in affecting the partnership. In the planning phase, the central tension is the negotiation of ideas; the core of this is collaborating and what the central STEAM activity should be and how to achieve it, while balancing all of the other variables the learning environment demands. In the teaching phase, the central tension is around supporting one another's teaching, and modeling practices, while learning from one another. In the reflecting phase, the tension lies in assessing

what happened during the program, and how the impact it had on teaching practices and understanding of the value of arts integration.

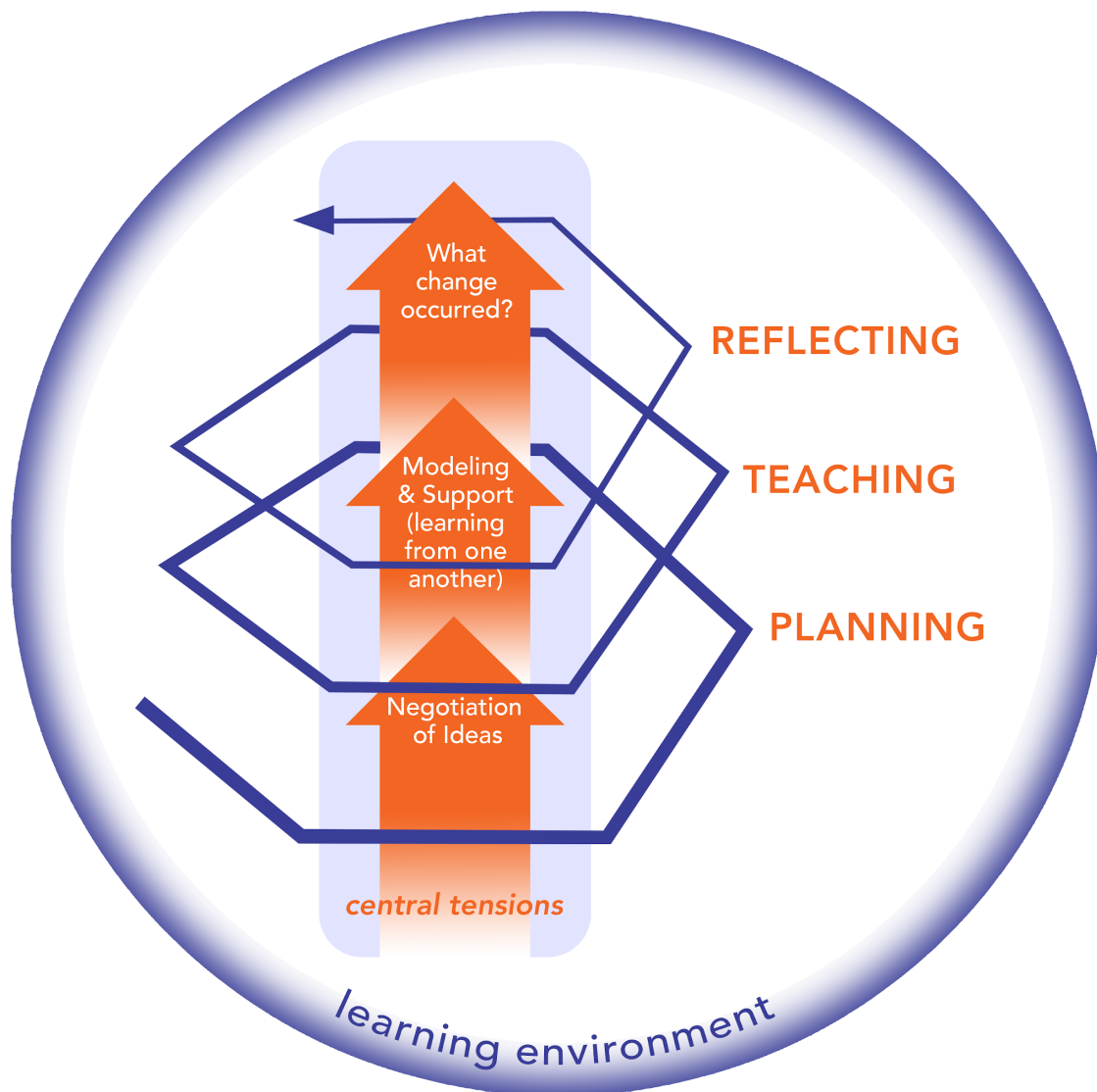


Figure 17: The reciprocal relations between individuals' cognitions and distributed cognitions as they move through the activities of planning, teaching, and reflecting.

Allowing these changes and interactions to play out over time is important. In this study, I look at the before, during, and after, through the planning, instruction, and reflection times of the residency. While I have deconstructed Salomon's work to create

a conceptual framework to map to these events, they depend on one another to make a whole, full view of the systems and relationships, and must be woven back together as one.

### *Attributes of Learning Environments*

The learning environment is more than a classroom, lab or studio - it is an ever-changing space, with layers of meaning, understanding, and relationships. The space itself is impacted by the interactions of these layers, with additional, perhaps hidden factors including administrative, societal and community influences. In teaching, educators step into this space with some amount of knowledge, a plan, and some expectations, created in advance of instructional time. The work done in this planning time impacts the learning environment; the plan and preconceptions impact the interactions the teacher or artist brings to teaching. Then, in instructional time, the lesson, how it's received, the work created, the questions raised, are all additional interactions that influence and give meaning to one another. These interactions are unpredictable, always changing, and always dependent on other interactions. And, reflection on the interactions, and what they mean for the educator, the learner, and approaches to teaching, must be considered. Taken as a whole, it's a look not only at what happens within the learning environment during instructional time, but the design wrapper around the learning environment as well, which impacts and informs the instruction.

The learning environment and partnership then operate together to create the whole. Considering both the wrapper, and the package inside, is the only way that an

attempt at shifting practices to integration can occur. This package is not predictable or stagnant; the interactions that occur in the environment impact the cycle and how the partners react and flow in response to interactions. All together these elements combine to create a microcosm; when successful, educators will have designed a place where learners are inspired by new approaches to learning, are exploring creative approaches to showing their understanding of content, and are open to trying new things and taking risks.

What I see as required to have a productive, arts-integrated learning environment are:

- Educators who are skilled at interdisciplinary teaching (whether solo or alongside a partner).
- Educators who value arts processes as inquiry practices.
- Educators who can plan activities that reach learning goals and standards across the arts and disciplinary content, while remaining flexible and able to respond to shifts in planning as needed.
- Educators who can model risk-taking, particularly in trying out new arts practices (such as dance and body movement).
- Educators who are looking to grow their teaching practices, are open to being learners, and expect to change.
- Educators who can make creative connections between class work, real-world problems, and student interest.
- Spaces that allow for collaboration, communication, presentation, mess-making, and movement.
- Time for learning, planning, doing, and reflecting.
- Administrators who value arts integration, and provide resources to help educators shift practices.

When learning environments can support arts integration and interdisciplinary learning in these ways, and educators are empowered to learn from outside experts and

shift their practices, distributed integration can occur. And in this model, partners work collaboratively to demonstrate and teach content that weaves together the arts with other disciplines.

### *Distributed Integration*

As the teacher and artist develop their partnership, they come together to plan and develop alignment. As they share ideas, they learn from one another. This learning comes from exposure to new teaching practices, views on subject matter, and views on students. With new knowledge, the two can find common ground, around a shared activity that they both believe meets their goals. As they move into teaching together, the partnership moves into another new area, where the ideas are put into practice, and the two can leverage one another, model for one another, and support one another. The shared agreement from the planning plays out in real time, and each individual performs their teaching acts under the influence of their own expertise plus their partner's. This dance of collaboration, influence and learning from one another results in a "distributed" model of integration. As this approach to teaching and learning gains traction, and access to resources increases (such as leveraging teaching artists in the classroom, and arts integration conferences for teachers) this model will gain support.

If administrators support interdisciplinary approaches to learning and teaching, they can further support a model of distributed integration on the school level, using school resources. By finding ways to bring the school's visual arts, theater and music teachers into classroom projects, and foster curriculum ties between standards across disciplines, they are promoting distributed integration, where both the classroom

teachers and arts teachers are collaborating to create interdisciplinary ties. If done across the school, it truly becomes an approach to learning, where the student takes this understanding from class to class, and grade level to grade level.

This model can extend to the community as well. While this dissertation has explored leveraging outside arts experts as partners, through creative approaches educators can leverage the same model and thinking to engage with other types of experts. If we broaden the definition of “arts” and “artists,” this model can leverage community resources such as writers, graphic designers, toy and game designers, media producers, architects, fashion designers, animators, and other creative jobs, to show how the design process, creativity, and collaboration are critical components of these kinds of work. These processes and job roles can be modeled in the classroom in project work. Where bringing experts into the classroom in these areas may not be feasible for some teachers or schools due to lack of connections, or the time it takes to find the connections, technology and media resources can help teachers create these connections (such as videos, creative production tools, live chats, interactive media and games, podcasts, etc.)

But how and why should we do this? And, how can teaching practices shift while giving teachers support to reach all of their goals, aspirational and practical? And why is arts integration one critical pathway towards reaching these goals? Leveraging partnerships to learn these approaches is a practical way to get hands-on practice in doing this kind of work, while opening up new and creative approaches.

## **Why Partnerships Matter**

In the case of these residencies, successful collaboration (meaning one where both teacher and artist had a positive experience in creating a new arts integration project) required a partnership that valued the process, valued arts integration, and valued the expertise that both the artist and teacher brought to the partnership. When structured well, partnerships like these can have a number of positive impacts.

### *Invigorating teacher practices*

Partnerships provide educators with new tools and new ideas for exploring content. They help to foster meaningful, real-world connections for learners by leveraging a community partner to bring additional expertise into the classroom. When structured well, these partnerships can be developed in a way that makes them additive to a teacher's efforts, rather than taxing them. Creating new models for these kinds of partnerships is something that should continue to be explored.

### *Expanding Worldviews and Professional Development*

As a professional development opportunity, this residency structured an opportunity for a classroom teacher to leverage an outside expert as partner. This work lends new ideas for how to teach certain subjects, and opens up possibilities for connecting content and engaging learners in new activities. Moreover, the teachers and artists who participate in this residency program are part of a larger community brought together by Kansas City Young Audiences. As the program develops and re-occurs, the same faces appear year to year, and a community of educators is born. This opportunity for teachers and artists to continue growing together, and provide a space where ideas



can be demonstrated, new ideas can be developed, and best practices can be shared, furthers the professional development opportunity on a deeper level, with professionals outside of the building. However, while this is perhaps a meaningful way to engage in professional development and expand teaching practices, it does become self-selecting; those teachers who desire to evolve and grow as a teacher seek out these kinds of opportunities.

### *Additional Resources*

Leveraging an outside expert for new ideas can invigorate a teacher's approach to content. Together, "what ifs" become practical. A strong network of resources beyond the classroom brings connections - both to specific content but also the wider world - to the learners. One thing I found profoundly interesting in the observations of this residency was the difference between my partner teachers and others in regards to leveraging resources. The teachers I partnered with had a seemingly endless list of resources to layer into not only our unit, but other units referenced. These resources were sometimes books, apps, or videos. Sometimes it was other teachers in the school or district. Sometimes it was parents or high school students. And sometimes it was community experts. In some cases they would refer to their own network for community expert suggestions, but as became obvious to me over subsequent work with these teachers, they are fearless about thinking broadly beyond their own network to find the right expert to help make a real world connection for their students. This to me is indication of a broader worldview on teaching and learning and making connections. It

means more work, and it means thinking bigger than the standards, but the result can be more creativity in lesson planning, and more impactful connections for learners.

### *Taking Risks*

Learning to use new, creative approaches to teaching requires a willingness to take risks (Oreck, 2004). Risk taking can be scary, but when it is approached with a partner, it can be exciting. Whether it's moving your body in front of your students, adopting new vocabulary, or trying a new approach to project based learning, taking risks alongside a partner who is also willing to engage and support can offload the fear of trying new things.

### *Helps Shift Teaching and Learning Through the Lens of Inquiry*

Arts integration can foster learner connections between ideas and concepts across disciplines, and has the potential to “create transformative zones, thereby encouraging open-endedness, spaces for exploration, connection, discovery, and collaboration by bringing together various areas of knowledge, experiences, and beliefs” (Russell and Zembylas, 2007, p. 298). Moreover, arts integration engages students in experiential learning, where they can make meaning from the process and learning experience (LaJevic, 2013). This is consistent with inquiry practices as it encourages students to question concepts across the disciplines, and therefore arts integration into STEM curriculum can be used as a teaching tool to help learners construct knowledge about the world around them.

### *Teaching Artists Need Teachers*

Working in a classroom gives an artist an opportunity to explore new approaches to their teaching at different developmental levels. This not only helps make their practice more relevant to different audiences, but likely reveals insights into their own process and ways they connect with their art form. And, just as the teachers are learning new ways to integrate art into other disciplinary content, the teaching artists are too; being put into a position for shifting arts practices to reach standards alignment within the constraints of a classroom creates new project ideas and ways to approach arts learning.

Related, working in partnership with a classroom teacher can bring more relevancy to the arts for some students due to a disciplinary connection (as may be the case in STEAM), thereby making the connections to the arts stronger. This may be especially true when the partnership is approached as co-teaching, where students see the teacher and artist together weaving ideas, making the arts processes and connections more relevant to the content they are studying. This helps to not separate the arts as a side, special content area, but as a process to engage in for inquiry.

### **Practical Implications of Teaching Partnerships**

For these partnerships to work, there are practical considerations that play a role in the success of collaboration and integration.

#### *Near and Far Planning*

To lay out this kind of project, planning times must look at the immediate needs, the product (end goal), and the long-term impact, and both partners must be aligned.

These include asking questions such as “What is the content? What is appropriate instruction? Who provides the instruction? What strategies are implemented? How will assessment occur?” to not only design the curriculum, but position it, and keep the immediate and longer term goals in mind (Harlin & Brown, 2007, p. 172). Additionally, more opportunities for reflection on the long-term goals of the work could further grow the collaboration and validation of the work.

### *Ability to Teach Interdisciplinarily*

Interdisciplinarity, creativity, authentic or real-world learning, and project-centered thinking are central to STEAM (Henrikson, 2017). To do this kind of teaching requires an ability to think creatively across disciplines, and requires domain knowledge across disciplines as well. In the case of these residencies, artists were regularly using science talk, and teachers were using artist talk. While this talk was often picked up from one another, it wasn't always, and it's not clear what the bounds might be for an artist taking on science talk, or a teacher taking on art talk. While teaching interdisciplinarily is the goal on both sides in the case of these residencies, and both should be encouraged to teach across the disciplines, an area of improvement would be greater alignment and focus on the specific vocabulary and standards to ensure that the same language is being used and reinforced. This could further strengthen instruction moments.

### *Resources*

As mentioned above, teaching artists can serve as a resource to classroom teachers. But when the support is greater than the partnership, and buy-in occurs at various levels across school administrators, district administrators, and parents, the

access to resources is greater, and makes arts integration more feasible. Using my residency site as example again, the school has arts integration support from the school administration and regularly pursues interdisciplinary projects involving their visual arts and music teachers. This support also exists at the district level, where the district's Director of Fine Arts works to create arts integration opportunities for all K-12 students. He not only facilitates partnerships such as the STEAM residency program, but is a key facilitator in arts integration conferences and workshops that offer professional development opportunities to teachers and artists. This support from the district level down to the classroom impacts the rules, norms and participation of the school and classroom community, creating change in the teacher's practices. Ms. Gordon and Ms. Robinson ability to reference so many additional resources at their disposal is evidence of this, as their teaching practice reveals the expertise of the outside community, and creates real-world connections for their students. Where some teachers may hesitate to bring in outside experts (for reasons such as extra planning work, limited connections, unsure how to leverage a guest, etc.) these two build it into the design of their projects, through examples such as:

If we map it out though enough then maybe [local engineering firm] Burns and Mac could come in on the piece where they're designing. If we could get people from the community to come on certain days (Ms. Robinson, planning session 2, 03/14/2018).

Throughout this dissertation I have alluded to a summer arts integration professional development opportunity. This regional conference brings Kennedy Center-trained teaching artists to host 2.5 days of workshops for teachers and teaching artists to get more hands on exposure to arts integration techniques, and ideas for shifting and

evolving teaching practices to include the arts. Several members of the residency program attended this conference. Resources like this give time and space outside of the regular school rhythm to think about new approaches to teaching. They also further build a community of professionals to grow with.

### *Doing the Work Without a Partner*

Through this work, the teacher and artist gain understanding and new skills. As they practice and gain confidence in new approaches to teaching, they may opt to take on the work by themselves without a partner. In fact, that is a hope and goal so that this work can be taken up more broadly. But what are the implications of not using a partner for this work? How does it change the scope of potential projects, or ability to leverage extra expertise and hands to help make projects manageable? When a teacher incorporates the arts across lessons, do students value the arts experience in the same way as if a teaching artist represents the work? When an artist teaches STEAM content, especially in informal settings, what assurances are in place that the STEM content is being taught accurately? These are all practical questions to consider when the work shifts from partnership to individual educator.

### **Conclusion & Future Research**

This study examined some of the factors at play when a teaching artist is brought into the classroom to partner with a teacher on arts integration into STEM curriculum. These factors include how time is used, and the interactions that occur, during planning, instructional, and reflection times. They also include prior experience of both the teacher

and artist, understanding of arts integration, willingness to collaborate, and openness to vulnerability and risk-taking.

This work also explores the factors that contribute to a teaching partnership as they design a learning environment together. This exploration includes what arts integration looks like through different art forms, how different partnerships approach the work, and why this work matters to these teachers.

There is still much more to understand and explore around how to best approach interdisciplinary teaching, teaching partnerships, and arts integration. Specifically, future research should include: looking at how informal educators learn to teach; looking at the long-term impact of the residency and how teaching practices are changed; and looking at how resources such as arts integration professional development conferences impacts different communities differently.

## References

- Acting Right: Drama as a Classroom Strategy, n.d., Retrieved from:  
<http://www.artsintegrationconsulting.com/professional-development/foundation-workshops/acting-right-drama-as-a.html>
- Andrews, B. W. (2008). The odyssey project: Fostering teacher learning in the arts. *International Journal of Education & the Arts*, 9(11).
- Booth, E. (2010). *The history of teaching artistry: Where we come from, are, and are heading*. Unpublished manuscript.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind experience, and school*. Washington, DC: National Academies Press
- Harlin, R., & Brown, S. (2007). Issues in Education: An Arts-Integrated Approach for Elementary Level Students. *Childhood Education*, 83(3), 172-174.
- Burnaford, G., Brown, S., Doherty, J., & McLaughlin, H. J. (2007). *Arts Integration Frameworks, Research Practice*. Washington, DC: Arts Education Partnership.
- Chávez, V., & Soep, E. (2005). Youth radio and the pedagogy of collegiality. *Harvard Educational Review*, 75(4), 409-434.
- Compton-Lilly, C. (2007). The complexities of reading capital in two Puerto Rican families. *Reading Research Quarterly*, 42(1), 72-98.
- Creswell, J. (1992). Data analysis and representation. *Qualitative inquiry and research design. Choosing among five traditions*, 139-218.
- Daugherty, M. K. (2013). The Prospect of an "A" in STEM Education. *Journal of STEM Education: Innovations and Research*, 14(2), 10.
- Davis, M. (1999). Design's inherent interdisciplinarity: The arts in integrated curricula. *Arts Education Policy Review*, 101(1), 8-13.
- Deasy, R. J. (2003). *Creating quality integrated and interdisciplinary arts programs: A report of the arts education national forum*. Washington, DC: Arts Education Partnership.



- Dwyer, M. C. (2011). *Reinvesting in Arts Education: Winning America's Future through Creative Schools*. President's Committee on the Arts and the Humanities.
- diSessa, A. A. (2004). Metarepresentation: Native competence and targets for instruction. *Cognition and instruction*, 22(3), 293-331.
- Enyedy, N. (2005). Inventing mapping: Creating cultural forms to solve collective problems. *Cognition and Instruction*, 23(4), 427-466.
- Gadsden, V. L. (2008). The arts and education: Knowledge generation, pedagogy, and the discourse of learning. *Review of research in education*, 32(1), 29-61.
- Gee, J. P. (2004). *An introduction to discourse analysis: Theory and method*. Routledge.
- Gullatt, D. E. (2008). Enhancing student learning through arts integration: Implications for the profession. *The High School Journal*, 91(4), 12-25.
- Greeno, J. G., & Engeström, Y. (2014). Learning in activity. In *The cambridge handbook of the learning sciences* (pp. 128-150).
- Halverson, E. R. (2013). Digital art making as a representational process. *Journal of the Learning Sciences*, 22(1), 121-162.
- Halverson, E. R., Lowenhaupt, R., & Kalaitzidis, T. J. (2015). Towards a theory of distributed instruction in creative arts education. *Journal of Technology and Teacher Education*, 23(3), 357-385.
- Henriksen, D. (2014). Full STEAM ahead: Creativity in excellent STEM teaching practices. *The STEAM journal*, 1(2), 15.
- Henriksen, D. (2017). Creating STEAM with design thinking: Beyond STEM and arts integration. *The STEAM Journal*, 3(1). Retrieved from <http://scholarship.claremont.edu/steam/vol3/iss1/11>
- Kirschner, P. A. (2009). *Epistemology or pedagogy, that is the question*. Routledge.

- LaJevic, L. (2013). Arts Integration: What Is Really Happening in the Elementary Classroom?. *Journal for Learning through the Arts*, 9(1), n1.
- Ludwig, M. J., Boyle, A., & Lindsay, J. (2017). Review of Evidence: Arts Integration Research Through the Lens of the Every Student Succeeds Act.
- Nathan, M. J., Srisurichan, R., Walkington, C., Wolfgram, M., Williams, C., & Alibali, M. W. (2013). Building cohesion across representations: A mechanism for STEM integration. *Journal of Engineering Education*, 102(1), 77-116.
- Oreck, B. (2004). The artistic and professional development of teachers: A study of teachers' attitudes toward and use of the arts in teaching. *Journal of Teacher education*, 55(1), 55-69.
- Parsons, M. (2004). Art and integrated curriculum. *Handbook of research and policy in art education*, 775-794.
- Project Lead the Way (2018, February). *PLTW Launch (K-5)*. Retrieved from <https://www.pltw.org/our-programs/pltw-launch>
- Reeder, L. K. (2015). Teaching Artistry as a Critical Community of Practice: An arts-based ethnography (Doctoral dissertation, Syracuse University).
- Richardson, V. (2005). Constructivist teaching and teacher education: Theory and practice. In *Constructivist teacher education* (pp. 13-24). Routledge.
- Russ, R. S., Sherin, B. L., & Sherin, M. G. (2016). What constitutes teacher learning. *Handbook of research on teaching*, 391-438.
- Russell, J., & Zembylas, M. (2007). Arts integration in the curriculum: A review of research and implications for teaching and learning. In *International handbook of research in arts education* (pp. 287-312). Springer Netherlands.
- Salomon, G. (1993). No distribution without individuals' cognition: A dynamic interactional view. *Distributed cognitions: Psychological and educational considerations*, 111-138.
- Salomon, G. (2006). The systemic vs. analytic study of complex learning environments. *Handling complexity in learning environments: Theory and research*, 255-265.

- Scripp, L., & Paradis, L. (2014). Embracing the Burden of Proof: New Strategies for Determining Predictive Links between Arts Integration Teacher Professional Development, Student Arts Learning, and Student Academic Achievement Outcomes. *Journal for Learning through the Arts*, 10(1), n1.
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational researcher*, 15(2), 4-14.
- Silverstein, L. B., & Layne, S. (2010). What is arts integration. *Washington, DC: The Kennedy Center for the Performing Arts*.
- Stake, R. E. (1995). *The art of case study research*. Sage.
- Stake, R. (2000). Case Studies. In Denzin, N.K. & Lincoln, Y. S. (Eds.) *Handbook of qualitative research, 2nd edition* (pp. 436-554). Thousand Oaks, CA: Sage Publications.
- The Chicago Guide for Teaching and Learning in the Arts (2018, March). Retrieved from <http://chicagoguide.cpsarts.org/introduction>
- The Kennedy Center (2018, April). Retrieved from <http://artsedge.kennedy-center.org/educators/how-to/arts-integration/why-arts-integration/why-two-big-reasons>
- Thomas, M. K. (2011). The utility and efficacy of qualitative research software in grounded theory research. *Grounded theory: The philosophy, method and work of Barney Glaser*, 117-132.
- Vygotsky, L. (1978). *Interaction between learning and development*. Cambridge, MA: Harvard University Press.
- Wan, Y., Ludwig, M. J., & Boyle, A. (2018). *Review of Evidence: Arts Education Through the Lens of ESSA*.
- Wolff, K. (2019). ESSA: Mapping Opportunities for the Arts. Retrieved from <https://www.ecs.org/wp-content/uploads/ESSA-Mapping-Opportunities-for-the-Arts.pdf>

Yamagata-Lynch, L. C. (2010). *Activity systems analysis methods: Understanding complex learning environments*. Springer Science & Business Media.