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Abstract:
The arts have long been valued for their aesthetic contributions to education, and studies have been conducted to demonstrate their contribution to academic performance in an attempt to justify their inclusion in the curriculum. Art integration involves learning core content subjects (math, reading, language, science, social studies) through the arts (drama, dance, music, visual arts). The focus of this qualitative pilot study was to examine and describe how the arts are integrated

with curriculum concepts to promote cognitive development. The theororetical framework was based on standard theory of intelligence and cognitive development. Curriculum concepts were taught through experiential methods and hands-on projects integrated with state Standard Course of Study. Data collection consisted of field ethnographic description and passive observation to identify behavioral correlates of cognitive and intellectual functioning as well as to capture how state standards are integrated within arts-based instruction. Field notes were analyzed to look for patterns, themes, and defining categories for data analysis. The focus of domain analysis was guided by semantic, means-end relationships related to instruction, learning, and types of processing information, as well as products of that learning. Taxonomic analyses were created of thematic units and how the different arts were used breaking thematic units into arts used, instructional vehicles/ learning activities, and types of cognition being used. A guiding principle was, how does this relate to cognitive/intellectual development? Cognitive correlates were listed as a type of domain yielding examples of different types of cognitive and intellectual processing. Systematic field study was noteworthy for thematic instruction through which curriculum concepts were taught. Thematic-driven and project-based learning often additionally required students to use planning, researching, imagination related to an overall instructional objective. Analysis revealed multi-layered and complex domains within instructional delivery. Context and culture were running themes across observations. Thematic units provided vehicles for cognitive development that promoted vocabulary development, reasoning, comparing/ contrasting, abstraction, integration of concepts, and conceptual development. This information informs instructional delivery and the use of arts-based instruction to promote greater understanding of underlying development of cognitive and intellectual abilities in the classroom.

Supporting material:

Art Integration and Cognitive Development

Art Integration and Cognitive Development

Dawn Baker, University of South Carolina-Columbia

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Purpose and Significance

The arts contribute to, and enrich, our lives in ways that go beyond the three “R’s” of education. However, it has often been questioned whether they contribute in any substantive way to education beyond enrichment. Whether the arts contribute to the curriculum based on standard courses of study, as well as state standards, comes up particularly when budgets are tight. In terms of connecting the arts and learning, Unsworth (1999) rightly states that, “Art is not demeaned by connecting it with math, science, social studies” but that, “The connection gives substance to the artwork and shape to the subject content.” The fragmentation of learning into subject headings gives students the notion that there aren’t connections among math, science, language arts, etc. Thus, it is important to promote interdisciplinary thinking in students (Unsworth, 1999). Additionally, there has been a fair amount of focus on student achievement with respect to the arts, but there has been limited research of the arts as contributors to cognitive development.

This research is designed to meet several objectives:

1. To examine and describe how the arts are integrated with curriculum subject matter essential to cognitive development in a school devoted to arts integration,

2. To identify behavioral correlates of cognitive/intellectual factors related to cognitive functioning and how these processes contribute to the cognitive development of children,

3. To contribute to the literature on the importance of including arts in the curriculum learning and support of children's development, as well as inform instructional practice.

This pilot study lays the foundation for further quantitative assessment of performance on cognitive functioning of children exposed to arts on a daily basis during a period of childhood when cognitive development is most influenced and rapid. This study will not focus on the aesthetic value of the arts, as this is a well documented area. Also, issues of self-esteem related to the arts and learning are easily found in the literature. Given the current atmosphere of budget cuts, it seems most prudent to limit the focus of the study to how the arts make unique contributions to cognitive and intellectual growth in children.

Conceptual framework

The arts in education

The literature on the importance of the arts to student growth and achievement is somewhat mixed. In *The Brain and Learning* (2008), Eisner states that the arts provide children with experience, meaning, and development of thought. In particular, they create meaningful links with concepts being taught through active learning activities. They also develop critical and complex forms of thinking, in part due to multiple brain areas being involved. He further states that there are eight competencies the arts provide in developing cognitive growth, including the perception of relationships and that problems and questions can have multiple possibilities.

The arts are not only expressive, but also cognitive. Vaughn and Winner (2000) reported that students who took more art classes performed higher on math, verbal, and composite SAT scores than students who did not take art classes. While this does not imply a causal relationship, it does suggest a positive correlation (Vaughn, & Winner, 2000). In contrast, Winner and Cooper (2000) conducted a meta-analysis of studies to examine whether studying the arts led to improved academic outcomes. While correlation studies demonstrate that an association exists, their conclusions were that researchers found little evidence that learning through music, dance, drama and visual art contribute to reading and math achievement, as it is typically measured.

There have been a number of programs and educational initiatives that examined inclusion of the arts with curriculum. The North Carolina A + School Program was a four year project from 1995-1999 sponsored by the Kenan Institute for the Arts (North Carolina A+ Schools, 2001). This initiative originally included 25 schools throughout North Carolina that participated in a pilot project geared towards integrating the arts into the curriculum in a comprehensive manner. It was designed as comprehensive school reform that viewed the arts as fundamental to how teachers teach and how students learn in reading, math, language, science, and social studies. Underlying this foundation was a premise that students needed to be given diverse learning opportunities, based upon Howard Gardner's theory of multiple intelligences--a philosophy of learning with emphasis on hands-on instruction. While this theory has expanded, the eight intelligences that were a part of the theory at that time included bodily kinesthetic, visual-spatial, mathematical-logic, verbal linguistic, musical, interpersonal, intrapersonal, and naturalist. However, Gardner's theory has been met with great criticism, as the different intelligences do not have a common theoretical structure, nor are they measured in any standardized manner. The instructional components of the A+ program were: 1) increasing art instruction not only by having more art specialists on staff but integrating art instruction into the regular classroom; 2) fostering two-way arts integration; 3) designing curriculum to tap into the multiple intelligences of students; 4) emphasizing an integrated, thematic approach in implementing the curriculum; and 5) emphasizing hands-on learning experiences. The program also

focused on increased teacher collaboration, as well as enhanced partnerships with parents and the community to bring the arts into the school setting. Instructional strategies included increasing and integrating the arts into the curriculum, providing students with more hands-on learning projects that allow for multiple learning opportunities, and presenting curriculum and instruction through thematic units. The research of the project consisted of fieldwork, interviews, surveys, and examination of student achievement patterns. The findings in that four year pilot period were that A+ schools achieved growth on North Carolina's accountability tests comparable to that of other schools statewide (North Carolina A+ Schools, 2001).

SPECTRA+ is an arts infusion program that came out of a Cultural Action Plan in 1990 (Luftig, 2000). It developed into a school-wide, multi-disciplinary, integrated arts-in-education program in Ohio that focused on creative thinking, academic achievement, self-esteem, locus of control, and appreciation for the arts of school children. Locus of control was defined by a child either construing outcomes as attributable to his/her actions (internal control) or to fate, chance, and/or the actions of other people (external control). It too was an approach geared towards educational reform to help schools incorporate the arts as a basic subject in the daily curriculum. Components included arts instruction, arts integration, artists-in-residence, professional development, and evaluation/advocacy. The study included 600 children from four schools in two school districts that were divided into three groups: arts infusion, modified control, or full control for one year. Design included pretest and post-test measures. Academic achievement was mixed with SPECTRA+. boys scoring higher in math than all other groups, but SPECTRA+ girls scoring lowest in math. In one of the school districts, SPECTRA+ students achieved higher scores in reading than the control group. However, in another school district, large differences were seen in SPECTRA+ students in all grades in total reading, reading comprehension, and reading vocabulary (Luftig, 2000).

Lastly, the Arts in the Basic Curriculum project (ABC) was an initiative that began in 1987 in South Carolina. The program included art specialists in residence and the development of state arts standards. Interviews of principals, arts and classroom teachers, and students were conducted to describe various aspects of the program. Standardized test scores were then collected to compare changes in scores in ABC schools vs. matched schools that did not participate in the program. Seaman (as cited in Deasy, 2002) evaluated the standardized test scores and found that the ABC program neither enhanced nor lowered standardized test scores, suggesting that additional time spent with the arts did not cause children's performance in other school subjects to decline. In contrast, this same publication also summarizes and discusses 62 other research studies that examined the effects of each of the art forms on students' social and academic skills adding to their importance to education (http://www.aep-arts.org/files/research/CriticalLinks.pdf).

Transfer of learning through the arts to determine if cognitive skills such as higher order thinking are developed through the arts has also been studied. Burton, Horowitz, and Abeles (2000) examined a wide variety of programs and practices across twelve different types of schools involving over 2000 children in grades four, five, seven, and eight. Both quantitative and qualitative methods were employed that initially included field study, interviews, observations, examination of children's artwork, performance, and writing, with the quantitative methods including the Torrance Test of Creative Thinking (TTCT). The study was conducted in four phases, beginning in New York City, Connecticut, South Carolina, and Chicago in 1997. In the initial field study, 12 schools were included for quantitative data collection. Cognitive factors examined included expression of ideas, layered relationships, imagining new possibilities, and considering multiple vantage points. High-arts groups and low-arts groups were assigned for comparison. Criteria for defining these groups were based on

the number of years students spent in school arts and art lessons. High-arts was composed of the top quartile and low-arts the bottom quartile. Results suggested the high-arts groups performed higher on the TTCT than the low-arts groups. Qualitative analysis included systematizing across school sites and development of a codebook of specific characteristics that included the cognitive factors noted previously, as well as socio-cultural and personal learning outcomes. Results indicated that expression of ideas and feelings and making connections were the most cited codes in the cognitive indicator category. Schools with the strongest inclusion of arts revealed evidence of expression of ideas and feelings, layered relationships, multiple vantage points, construction and organization of meaning, and focused perception. Regression models based on quantitative analysis were developed to examine the influence of arts learning on personal dimensions of learning. Statistical significance was found with amount of instruction plus integration of art providers in the school environment as a predictor of Elaboration scores on the TTCT.

Burton, Horowitz, and Abeles' also noted in their review (2000) types of cognitive capacities that have been implicated in music to critical thinking. Rauscher (as cited in Burton, Horowitz, and Abeles, 2000) conducted a series of experiments measuring the effects of Mozart on spatial-temporal reasoning and found significant improvements in this area, although this study also had some inherent flaws in methodology. Other studies have shown a relationship between creating music and enhancement of spatial temporal reasoning. Ho, Yim-Chi, Cheung, Mei-Chun, and Chan (2003) tested how musical training improves children's verbal memory compared to children without any musical training and found that musical training significantly increased children's verbal memory. Further, they found this effect was not temporary. Movement has also been purported to improve academic functioning, particularly as research has demonstrated the importance of the cerebellum to learning beyond movement. Bower and Parsons (2003) discuss its importance in attention, memory, spatial perception, and impulse control.

Cognitive development and intelligence

There have been various views regarding the nature of cognitive development and intelligence. Theorists such as Piaget and Vygotsky have contributed to global conceptions of cognitive growth. Domain specific views of cognitive development have focused on specific aspects such as language development (Peterson, 2005). Across the 1990's the influence of cognitive neuroscience has attempted to bridge processes. Joint efforts among neuroscience, cognitive psychology, and education have focused on how people acquire and use knowledge. These efforts have helped to fund additional studies to support research in cognitive development.

Traditionally, intelligence is generally considered to be a global entity comprised of a number of factors, which may be measured in different ways and contexts (Sattler, 2001). Contemporary views of intelligence emphasize biological or genetic, as well as developmental and environmental, influences. All ability tests measure what an individual has learned. Wilson (1978b) also notes that the course of mental development is influenced by a combination of genetic programming, maturational status, and environmental issues. Plomin and DeFries (1980) also stated that the best estimate of genetic variation appears to account for at least 50% of the individual differences in intelligence scores with the remainder attributed to environment and non-genetic influences. As such, environmental factors contribute to fluctuations in intelligence as well as emotional well-being and illness. However, an individual's intelligent quotient becomes more stable as a child ages, particularly after age five, although individual fluctuations may be great. Subsequently, while the structure of intelligence remains stable across development, the content changes and expands with increased amounts of knowledge (Sattler, 2001).

Prominent theories of cognitive development would further suggest that thinking is greatly influenced by instruction. Vygotsky noted that instruction leads development (Gredler & Shields, 2008). Both Luria and Vygotsky emphasized the importance of language and cultural experience on concept development. Early experiments established the influence of education in the development of higher order thinking abilities (Luria, 1976). Development of thinking is fundamental to and dependent on experiences and instruction. Gagne has also noted that thinking skills do not generalize beyond the context in which they are taught unless transfer for learning is directly built in (Gredler, 2005).

Instruction plays a key and essential role to the mental development of children (Gredler & Shields, 2009). Vygotsky‘s theories regarding the development of higher psychological functions is dependent, in part, on a child’s ability to think in concepts or concept development. This is primarily influenced through teacher instruction and the teaching of academic concepts specifically. The importance of academic concepts to the development of higher order thinking is that it contributes to forming relationships between concepts and ultimately to a hierarchy of concept development (Gredler & Shields, 2009). This systematic development leads to new and higher stages of development. Thus, the elementary school years are critical to childrens’ cognitive development.

According to Vygotsky’s theory of cognitive development, a child between the ages of seven and twelve is in the process of developing inner operational speech, which, in part, contributes to the process of developing conceptual thought (Gredler and Shields, 2008). Vygotsky identified intellectual thought through the use of a culture’s “signs” and “symbols”. These become psychological “tools” used in intellectual “operations.” Examples such as the signs and symbols of language, math, science, the arts, and music amongst others are used in intellectual operations. These thought processes develop with rapid growth in the elementary school-age child. The curriculum of the elementary school-age child is geared towards using a culture’s signs and symbols. As mastery of these is attained, a child develops more complex thinking. The specific teaching of academic concepts during these years thus becomes essential towards promoting hierarchical and complex thinking. Instruction becomes the vehicle for turning sign/symbol development into concepts to be used as tools in intellectual development. This semantic understanding evolves into the development of a hierarchical system that eventually results in the ability to abstract and generalize (Luria, 1976).

Development aside, research studies in the arts have often focused on qualitative elements and/or quantitative comparisons to academic achievement to justify their inclusion in education. However, it can be difficult for educational researchers to recognize cognitive development as it occurs with students and in the classroom. Peterson (2005) developed a list of Elements of Behavior associated with cognitive development based upon her review of mind-brain sciences. She describes two case studies that explored the use of elements of behavior as a research tool, although she also recognized that additional validation was needed regarding these elements. Elements include behaviors such *as making comparisons, viewing things from different perspectives, looking for ways to remember information,* and *recalling information that considers essential components*. While there were a total of 16 noted “elements” of behavior associated with cognitive development, the aforementioned elements are the ones most often associated with assessment of cognitive functioning found on standardized intelligence tests. Peterson’s research suggests that teachers are able to influence students’ world views through these elements (Peterson, 2005).

In addition to quantification beyond academic achievement, there has been little, if any, connection made between specific factors of intelligence that is correlated with intellectual functioning as is it typically measured beyond Peterson’s list and associations with single cognitive

functions. Most conventional instruments of cognitive and intellectual functioning have elements of reasoning, conceptual and abstract thinking, patterns and relationships, quantitative elements, vocabulary, retrieval, and/or visual-spatial recognition, although these are each measured in different ways and different contexts. This pilot field study was conducted to discover and examine behavioral-cognitive elements in an arts-integrated curriculum to shed light on the cognitive connections between instruction and learning. It is important to capture cognitive development as it is happening and to the extent that these elements are more specifically elaborated on in instruction, they can further inform instructional practice to promote intellectual and cognitive growth.

Given that this study focuses on examining specific instances of cognitive development, a theoretical framework for assessment and data collection is offered by Baxter and Glaser (as cited in the National Research Council's How People Learn, 2000). This framework describes performance in terms of process and content demands being observed. It also seeks to describe the cognitive activity likely being observed. This content process approach provides a framework for examining performance that purports to measure reasoning, understanding, and problem solving. Furthermore, focusing attention on cognitive activities and student performance provides information with regards to task demands, which may be helpful in designing instruction aimed at directly influencing cognitive and intellectual development.

Research Design and Method

Setting--Art Space Charter School is a publically funded charter school committed to the integration of the arts with curriculum. Curriculum is based on the North Carolina Standard Course of Study. It is a school that serves children kindergarten through eighth grades. This school was granted a 10 year renewal of its charter and one of the first to receive a renewal of that length. It is one of the very few state-recognized charter schools with a 10-year charter from the state of North Carolina. Emphasis is on the visual and performing arts utilizing an experiential approach. There is also an emphasis on parent/family involvement, as well as outreach to build relationships with arts in the community (http://www.artspacecharter.org). The number of children currently enrolled at this school is 371. Most of the population is Euro-American. Minorities include ten American Indian, seven Asian, eight African American, and one Hawaiian/Pacific Islander, although students may check more than one category. Fifteen students identified themselves as such, which also included Hispanic.

This field study builds on previous knowledge from the literature, but focuses more closely on cognitive elements. In an environment where quantitative measurement results drive educational decisions, there is a need to provide greater specificity regarding the arts as important contributors to children's cognitive and intellectual development. Previous qualitative research studies have focused on academic aspects such as reading, math, and language. Also, some quantitative research studies have focused on specific processes like classical music in developing spatial processing (Rauscher, Shaw, Levine, Wright, Dennis, & Newcomb, 1997) and Rauscher, Shaw, & Ky, 1993). However, what is needed is a comprehensive study that systematically brings to light the cognitive processes involved when the arts are integrated with academic concepts. Such a study allows for rich descriptions and analysis during the process of learning.

Two meetings were conducted prior to data collection with the director of the school to discuss the preliminary intentions of this research. Suggestions were also made for classrooms that would be good representations of arts integrated into the curriculum. Permission was also obtained from teachers prior to observing in their classrooms. Research integrity also included consultation

with teachers to ensure accuracy of observations and clarity of what the students were studying during the observations for validation purposes. The focus of this pilot study was limited to third through sixth grades. Third grade students had previously been cognitively evaluated in third grade with CogAT (http://www.riversidepublishing.com/), a group-administered intelligence test, and would be re-evaluated in sixth grade. Art integration is accomplished through instruction that is project-based upon thematic units. Focus was limited to these grade levels due to the necessity of covering basic academic skills in the early grades and preparation for high school in the upper grades. In addition to instructional time, all children also go to an art, drama, music, and dance class each week. Thematic units being studied in the classroom are supported through these various media as well as the children receiving direct instruction in each particular form of the aforementioned arts. In addition, AIT (Art Integration Team) meetings are held once a month for classroom and art teachers to come together to plan how the arts can support the classroom instructional unit.

Data collection--Primary data collection consisted of ethnographic field work and observation in classrooms to capture a rich description of how the arts are integrated with cognitive concepts within the curriculum. The focus was on classroom study to capture unobtrusively the process of learning and particularly behaviors reflective of cognitive functioning with the understanding that cognitive development is a process that unfolds over time. Art, drama, dance, and music classes were also observed, as these arts providers reinforce classroom thematic units through art-specific activities. Structured field notes provided the observational record to address the research questions. Method of observation was O' Hearn- Curran (as cited in Marshall, 2006) with description in the left column and researcher's comments in the right column. These adjunct comments guided the analytic process and focused data collection and subsequent inquiry for additional observations. Field notes from observations of the learning environment were used to identify behavioral correlates of cognition and meaningful links with concepts being taught through active learning activities. In addition, a log of research activities was kept for organizational purposes (Marshall & Rossman, 2006).

Data collection consisted of observations from September through November 2009 focusing on instructional discourse between teacher and student to target behavioral correlates of intellectual development cultivated through the arts. Instructional discourse was chosen as the primary initial method to help uncover complex interactions of instruction and learning. Passive observation was chosen to make the researcher's presence in the classroom minimal and not interfere with ongoing instruction or with children's engagement with concepts during the learning process. It was important to focus on teacher instruction and interaction between teacher and student, as well as student engagement with art elements and curriculum materials used in learning. According to Vygotsky (1978), dialogue between student and teacher provides a powerful vehicle for learning and development. He further asserts that individuals learn and develop from the outside in, or in other words, development moves from the interpersonal to the intrapersonal. Thus, it was important to focus on arts-based products of this instruction as outcomes of interactions. This meant including descriptions of the setting, use of materials, teaching methods, and student work created in reference to specific cognitive/academic concepts being taught in the classroom. Products of children's learning evidenced in their artwork, music, and drama, as well as mini-tours of bulletin boards and other displays were analyzed as well. This second source of data gathering and description of artifacts reflected the product of instruction, as well as evidence of understanding regarding concepts being taught. It also provided a description of the learning environment. This data collection allowed for objective content analysis of the integration of the arts with academic materials in the learning situation.

Analysis-- Generating categories to assist with data collection was developed based upon the theoretical framework guiding the study as well as coding that revealed other correlates of cognitive/intellectual development. Cognitive variables of interest included vocabulary development, relational concepts, verbal and nonverbal reasoning, quantitative-spatial concepts, nonverbal/figural relationships, retrieval, and concept development based on standardized cognitive/intellectual frameworks, although other variables were included as analysis revealed these. Some of these included problem solving, knowledge construction, and creativity. From the initial field work, notes were expanded and then printed to include as many specific details as possible, keeping in mind principles set forth by Spradley--language, verbatim, and concrete word description (Spradley, 1980).

The preliminary mode of analysis consisted of coding field notes. Field notes were read and re-read to look for patterns, themes, and defining categories for data analysis. Coding was developed to further organize and quantify data from the field. As field notes were coded, thematic content and concepts began to emerge. Domain analysis was guided by Spradley (1980) whose method of devising a domain analysis focuses on semantic relationships characteristic of school learning environments: instruction; the nature of and ways art is included in instruction; types of learning and processing information; and products of learning. Theoretical understanding of cognitive and intellectual development guided domain analysis. Means-ends types of relationships appeared to be the most important type of relationship to focus on, given the focus was on learning and development.

Analysis of cultural domains and semantic relationships provided an inventory of the learning culture. Coffey and Atkinson (1996) was also used to guide analysis, as it was important to use both deductive and inductive methods in pattern and thematic analysis. While deductive analysis came from the conceptual and theoretical framework guiding the study, it was also important to allow an inductive process where the art of creative analysis was driven by the data itself. Secondary analysis consisted of developing checklists to focus more closely and expand on the investigation of cognitive factors. Standardized frameworks of cognitive development and cognitive functioning provided greater objectivity and a structural framework for the study.

To ensure trustworthiness and credibility, information from observations was shared with the teachers to gain additional perspective and assist with any misperceptions. Data collection also consisted of observing AIT (Art Integration Team) meetings where classroom teachers, as well as drama, art, and music teachers, came together to discuss how the arts could be instructionally integrated with curriculum content. This helped with understanding how topics and thematic units are discussed to move concepts from a top down approach to instructional activities based upon instructional goals. It also informed feedback and accuracy for the examiner as well as allowed for an openness regarding research intentions. While an intensive year-long study would have been most advantageous, as well as videotaping, time limitations and the necessity of not disrupting the learning process in a field pilot study seemed paramount. The hope is that this study can inform teachers about processes important in learning with detailed information about how the arts help to develop cognitive processes, inform instructional processes and impact instructional strategies. Further, it is hoped this information can be used by other teachers who wish to understand how the arts can be combined with academic concepts being taught in the classroom.

Findings

Cultural themes-- Domains were created by reading and re-reading field notes to make note of what might be a cultural domain. Analysis of cultural domains revealed categories that also revealed

smaller cultural domains. For example, the category, "Ways children show what they have learned," was identified as a *kind of learning.* Within this category, an example was writing a monologue, an activity used in the fifth grade as part of studying European progression to the New World and how they and Native Americans felt with the coming of the Europeans to America. This one category produced additional smaller categories and attributes, such as doing research on the character and the time period; creating a character within the context; constructing and writing a monologue; learning the elements of presenting a monologue and public speaking generally; sharing monologues, and giving feedback. Fifth grade students were later observed delivering these monologues to the school. In groups of four to five students, each student delivered his/her monologue. Students, with made-up names for their character, were dressed in costume based upon their own research, and presented individual scenarios of how they were affected by the progression of Europeans to America. The project involved writing, acting, and public speaking, in addition to creating, imagining, researching, and memorizing.

A second example of a domain that contained smaller, multiple domains was the Superhero unit in third grade used for character development. All of the arts were used to help students develop their own personal superhero. The Superhero character was based on students having taken a Multiple Intelligence Test developed by Howard Gardner that allowed them to identify their strengths and weaknesses. After students' responses were scored, students graphed the results of each of the eight areas in the inventory: verbal linguistic, math-logic, visual-spatial, bodily-kinesthetic, musical, interpersonal, naturalist, and intrapersonal. Just in this one event, students were exposed to a variety of concepts related to an overarching theme of character development as well as thematic content objectives. Each student's creation of a superhero was based upon taking their weakest "intelligence" and developing a superhero that made that area stronger. Aspects of the project included developing a name for the character, a symbol for the superhero that would then go on a costume they designed, a lair, sidekick, nemesis, acquisition of power, weakness, motivation, and alter ego. The dance teacher helped students develop a pose for their superhero; the drama teacher helped them develop their character's slogan; and the music teacher helped students develop a theme song they would later record. In art, they also developed a comic strip based upon their character. The culminating project was a musical that incorporated the various elements of their superheroes. A mini tour of the comic strips created by the students reflected elements of pop art and comic strip instruction to which the students were exposed as well as story development. In all the comic strips, a dilemma presented itself; the student transformed into a superhero from the development of a weakness into a strength; the students used their powers to save someone and right a wrong.

These are but a couple of examples where several layers of thematic structures were present within the educational/instructional framework that would be developed all year long. Overall themes and the use of thematic units were the driving elements through which instruction was delivered. Project and thematic-based learning was used requiring students to use planning, researching, imagination, and creating individual assignments related to an overall theme. Projects also stressed the teaching of different art media and vocabulary related to each medium as applied to the project. Individuality and creativity were stressed. Integrated into instruction were elements of class culture and development of character with respect for self and others.

Instruction, curriculum, and arts were integrated in several examples. One example is the year-long study of Native Americans for fourth graders. The second quarter utilized the theme of *Choices* to show how the *choices* we make affect ourselves and others. Instruction about Native Americans and the pioneers of the time looked at cultural aspects such as ways of life, music,

communication, spirituality, and response to Euro-Americans taking over their land. Activities included role play, character development including costume, crafts, dances, etc. Story illustrations and poetry were other activities to transfer learning while influencing personal development. Musicals, plays, and multimedia productions were often used to combine various elements of a thematic unit into an integrated whole. A second example is the same grade's unit on Adaptation. The first part of the year unit utilized a theme of investigation and research for knowledge. The fourth grade unit on adaptation and NC geographical regions combined research and the arts into different plays from two classrooms. Each focused on plants, geographical displacement, adaptation to the environment, and the need to find their way back home. The sixth grade also used a play to integrate their research on Greek culture.

Cognitive frameworks-- Spradley (1980) notes that ethnographic analysis is a search for the parts of a culture, the relationships among the parts, and their relationships to the whole. The goal is to discover the cultural patterns people are using to organize their behavior, to make and use objects, to arrange space, and to make sense out of their experience. This philosophy guided the thematic analysis as well as elements of grounded theory, particularly Glaser's notion (Gribich, 2007) that the construction of self is through social interaction with the world, a notion also held by Vygotsky. "Meaning" is constructed through the use of symbols, signs and language, and our ability to take the position of others and interpret our own actions from that position. Change is important, as well as action and interaction in social settings and the construction of meaning within these settings through reflections. Instructional discourse and children's learning processes provided the substance for this analysis. Additionally, grounded theory uses an inductive approach, which relies on observations to develop processes and understanding that can then form theory. While intellectual theories were reviewed for this study, Glaser's approach of constant comparison of incident to incident to emerging concept was also implemented to enhance evidence of additional intellectual manifestations. Such analysis guides the search for underlying pattern evolvement among the different perspectives in teaching and children's response to learning.

Related to the conceptual framework, cognitive/intellectual correlates were listed as a type of domain- verbal reasoning, nonverbal reasoning, concept formation, abstraction, quantitative elements, vocabulary development, spatial reasoning, and memory/retrieval. The context of behavioral and cognitive correlates identified from intelligence literature review as well as a review of standard measures of intellectual functioning were used as types of cognitive and intelligence elements. These constructs assisted with categorizing identified behavioral correlates as examples of these constructs such as looking for *forms of reasoning*, *types of spatial understanding*, etc. Other cognitive categories included *ways vocabulary is developed, ways memory is developed, ways of forming concepts and relationships, ways to develop spatial understanding*, *ways to abstract/generalize, types of reasoning*, and *types of quantitative reasoning*.

Within the framework of cognitive/intellectual development, smaller categories or domains were also developed. For example, types of reasoning could be further divided into types of *verbal reasoning* and types of *nonverbal reasoning*. Making a list of identifiable domains helped to gain an overview of the instructional learning culture and use of the arts. This list was limited to elements associated with instruction, as well as the focus on arts integration. Even within this one domain, four different art forms emerged, and within these categories or domains, how various arts are used in specific ways, such as creating masks, monologues, dance, and lyrics. This kept the focus on the arts within instruction. Additionally, these domains allowed for additional cultural domains to emerge, for example the ways children process information and demonstrate cognition and learning, learning

products, types of context, and ways of instructing. The following table presents an example of componential analysis of the ways children demonstrate learning. Componential analysis is a systematic search for attributes that serve as components of meaning as part of domain analysis. They are attributes associated with a cultural category that represent contrasts of those attributes or components of meaning (Spradley, 1980). Table 1 is an example using the domain of *Ways children demonstrate learning.*

Table 1

Dimensions of contrast

Cultural domain	Visual arts	Drama	Music	Dance
Ways children demonstrate learning	story illustration comic strips masks costumes projects	plays monologues commercials slogans skits	writing lyrics recording singing musicals pattern recognition	poses creating dances movement rhythm pattern recognition

The above analysis provides only a partial example of the many ways children provided evidence of learning through the various art forms. Overall, contrast examples demonstrated cognition and learning in different ways and different art forms, such as costumes, writing lyrics in certain linguistic forms, and monologues of character development. Instructional discourse and student response during instruction assisted with generating connections and ideas, which allowed them to be explained theoretically (Gribich, 2007).

Additional levels of analysis-- Field notes were re-read for a secondary level of analysis, which provided terms and examples for specific semantic relationships. For example, types of nonverbal reasoning and vocabulary development included demonstrating or acting out vocabulary words associated with the sixth grade unit on the Greek culture and creating commercials to act out based upon research of Greek culture. Creating urns were expressions of symbol and characteristic of a culture and also an example of abstraction. Examples of ways verbal reasoning and vocabulary skills were developed included discussing poetry, writing monologues, lyrics, and skits, using specific vocabulary from various arts, pointing out new vocabulary words across subjects, and developing scenarios. The fourth grade unit on adaptation included development of academic concepts through visual art projects through discussion of different concepts related to cultures and the arts; conversations about plant adaptation through scientific experiments and data collection of observations with plants and adaptation to the environment within the context of North Carolina regions; discussion of concepts related to different art media in paintings and pictures; and discussion of concepts in the context of poetry and lyric development.

Another example of a semantic relationship was *Ways to abstract*. This included examples such as creating symbols to represent a concept being learned, i.e., masks, slogans, lyrics, comic strips, and generalizing concepts by getting children to think beyond their immediate circumstances through both imagination and research. Generally, vocabulary development was interwoven with academic concepts, context, and culture. Examples of spatial and quantitative understanding and perspective-taking were stressed in visual art instruction. Elements were uncovered that represented examples of cognitive and intellectual growth, e.g., development of vocabulary, concepts figural and abstract relationships, quantitative elements, and memory.

Integration of arts into the classroom was also seen in one teacher's discussion and teaching of the musical terms of pitch, rhythm, and volume to promote not only vocabulary development but also music instruction within the classroom. These were both verbally and nonverbally demonstrated and then repeated by students. This teacher also had students act out vocabulary words associated with their Greek unit. In another example, a teacher used lyric writing to teach about form and rhythm combining a number of writing concepts. Terms and concepts related to various art forms were also discussed in the classroom. Not only was discussion and inquiry of art concepts such as anthropomorphism, medium, and form encouraged, but using comparing and contrasting, reasoning, which provided an opportunity for students to see and hear multiple perspectives.

Taxonomic analysis (Spradley, 1980) provided another form of analysis. According to Spradley, a taxonomy is a set of categories organized on the basis of a single semantic relationship. It brings to light the relationship among elements inside a particular cultural domain. These relationships additionally reveal the subsets and the way they are related to the whole domain. In the current study, taxonomic analyses were created from thematic units and the way the different arts were used, specific content/ art elements, and cognitive variables. This was one way to use task analysis and break thematic units into arts, instructional vehicles/ learning activities, and types of cognition used. A guiding principle was, *How does this relate to cognitive/intellectual development*? The third grade superhero unit depicted in Table 2 provides an example of taxonomic analysis for how character development was woven into instruction while also providing multiple pathways through which the arts could be integrated with academic concepts and building cognitive and conceptual development.

Table 2

Taxonomic Analysis of Superhero thematic unit on Character Development

Art Elements			
Visual Art	music	drama	dance
drawing constructing	writing lyrics singing playing instruments	writing skits/plays public speaking	acting dance movement
Activities			
comic strips caricatures learning about pop art	theme song musical recording	slogan catch phrases	pose musical
Cognitive factors			
planning visual-spatial verbal reasoning vocabulary nonverbal reasoning quantitative	planning patterns/relationships memory reasoning quantitative	vocabulary verbal reasoning nonverbal reasoning memory/retrieval	figural relations patterns/ relationships nonverbal visual-spatial relationships

While not complete, all of the above examples also involved hierarchical understanding, which promotes conceptual development, as well as creating, and imagining- variables also important in intelligence. Similar taxonomic analysis was also possible with the fourth and sixth grade thematic units. In the fourth grade, the theme of *adaptation* included investigation and research for knowledge incorporating learning about science and how plants adapt to different regions, formulation of problems, hypothesis testing, conducting experiments, data gathering and recording observations. This culminated in a musical that used singing, dancing, and drama incorporating these elements into learning vehicles. Language and writing were also infused with science. These objectives folded in music, dance, drama, and the visual arts to deliver and expand content objectives. The sixth grade Greek culture unit used music drama and visual art elements incorporated with learning about the culture, language, and history. The drama element was a play, with commercials, to present information learned from student research on the Athenians and Spartans, including their mythology. Demonstration and instruction promoted vocabulary and concept development as well as integration of thought. Brainstorming was also often used to develop seeing multiple possibilities. All of these examples used context and culture, which provided vehicles for cognitive development that promoted vocabulary growth, reasoning, comparing/contrasting, integration of thought, seeing patterns and relationships, memory/retrieval, and concept development. Thematic units, which were school wide and ongoing throughout the school year also included character development, such as development of honesty, making, choices, developing strengths, etc.

Conclusions

The first objective for this study was to examine and describe how the arts are integrated with curriculum subject matter essential to cognitive development in a school devoted to arts integration. The second objective was to identify behavioral correlates of cognitive factors related to cognitive and intellectual functioning and determine how these processes contribute to the cognitive development of children. This pilot study lays the foundation for further quantitative assessment of cognitive functioning of children who are exposed to learning curriculums that are arts-based during the period of childhood when cognitive growth is most influenced. A review of the literature provided a conceptual framework to reduce bias in what cognitive elements were selected, although analysis was also led by the data itself. Observations and questions regarding instruction were shared with the staff to confirm their credibility and accuracy.

Findings from domain analysis were significant for multi-layered and rich cognitive domains within instructional delivery, as well as evidence of student learning provided through the artifacts of the learning environment. Hierarchical structure was used to inter-relate concepts being learned. Layers of hierarchical domains were evidenced school wide in terms of character development within grade levels in the form of thematic, instructional units and project based initiatives, as well as through academic concepts within individual tasks. Context and culture were running themes across observations and yielded information from both the point of view of instruction and learning.

What is evident and what can be learned from this research is how instruction, even instruction based on a standard course of study, can be guided by thematic objectives interwoven with the arts to yield rich and complex forms of learning for children that promote conceptual and

intellectual development through their inter-relatedness to overall instructional concepts and objectives. Through arts integration, hierarchical implementation of instructional objectives including use of context and culture can be incorporated across instructional units to promote cognitive variables related to intellectual development. Further quantitative research is needed, however, to assess to what extent cognitive development promotes intellectual growth and intelligence. Certainly, findings from this study inform instructional practice and the use of arts-based instruction to promote greater understanding of underlying development of cognitive and intellectual abilities adding to the literature on how the arts contribute to cognitive development

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