Enhancing Self-Regulatory Behaviors in the Classroom
Through Arts-Infused Curriculum
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When we watch a group of students engaged in an active arts experience we can observe a number of effective behaviors they use to learn, remember and demonstrate new skills and information. Some of these behaviors are intuitive, some are learned, but most can be developed through practice to enhance students' abilities to apply themselves to solve complex physical and cognitive tasks. Increasing students' repertoire and awareness of their own effective learning behaviors and strategies can be one of the most powerful benefits of study of the arts (Oreck, Baum & McCartney 2000). Applying or transferring such behaviors to other academic subject areas and learning environments has become a major goal for arts education in this time of intense focus on academic improvement and testing (Arts Education Partnership, 2004; Winner & Hetland, 2000).

A three-year study in Cleveland and Hamilton, Ohio, conducted through a United States Department of Education Jacob Javits Gifted and Talented Grant, looked at evidence of self-regulatory behavior in the academic classroom among students who had been identified as potentially talented in the arts and were involved in an advanced instructional program in dance, music, theater, or visual arts. Through Project Start ID (Statewide Arts Talent Identification and Development) (Ohio Department of Education, 2001) artists worked with classroom teachers to develop arts-infused curriculum that would allow students to use their artistic strengths and skills to learn and express their knowledge in the classroom. These arts-infused lessons were paired with other non arts-infused lessons in the same subject area to allow researchers to compare learning behaviors and content comprehension under two conditions. The results demonstrate the potential of arts-infused curriculum to aid in classroom learning and performance. Through on-

going professional and curriculum development, teachers were able to adapt their curriculum to employ artistic processes and teaching techniques. These techniques were shown to be effective in reaching students who normally struggle in the classroom or who display behavior and/or attendance problems that put them at-risk for school failure. By identifying and nurturing the strengths of highly energetic, creative and expressive students, classroom teachers, along with arts teachers, were able to help them develop and use their effective learning behaviors in the academic classroom.

Background

What is self-regulated learning? Self-regulated learning occurs to the degree that a student can use personal (i.e., self-) processes to strategically regulate behavior and the immediate learning environment. Self-regulation encompasses a range of behaviors from basic self-control to the strategic employment of learning strategies. In social cognitive theory such behaviors are seen as fundamental to generalizing learning strategies to other areas and new situations (Bandura,1986; Zimmerman, 1986). For students to become self-regulated, they need to monitor what they are doing, compare their progress to some sort of standard, self-criticize or self-praise, and have confidence and high expectations in their ability to learn (Zimmerman & Schunk, 1989).

The process of self-regulation. Self-regulated learning is best conceived of as a process – an interaction between the learner and the learning environment. A students' ability to demonstrate self-regulation is highly dependent on motivation and self-efficacy to learn, as well as on the pedagogy and the symbol system of instruction and assessment. For students to demonstrate self-regulatory behaviors, they must be motivated toward a goal and have opportunities to apply their personal strategies. Many smart, creative, artistically talented students suffer from low self-efficacy and low teacher expectations; the classroom may offer few

opportunities for them to apply their skills or most effective learning strategies (ArtsConnection, 1997; Baum, Owen & Oreck, 1997). The lack of self-regulated learning observed in these situations results, in large part, from the lack of opportunity to do so, or to self-regulate only in primarily passive ways, such as listening and following directions. More complex and active learning strategies, especially those that involve artistic expression, are neither developed nor supported in such classrooms.

Most studies of self-regulation concern the acquisition and application of specific learning strategies in tasks that involve easily represented information, such as learning mathematical operations (Zimmerman & Schunk, 1989). Learning in the arts tends to be more complex. The arts are represented in multiple ways and many of the learning strategies are collaborative, dependent on a range of social and cognitive skills. These factors complicate the observation and measurement of self-regulated learning in the arts classroom and its application to other settings.

Self-regulation in the arts. In their study on the use of self-regulatory behaviors in the classroom Baum, Owen, and Oreck (1997) observed potentially talented New York City elementary school students engaged in advanced arts classes in dance, music, and theater. Many of the students (>65%) scored below grade level on reading tests and more than 25% were considered highly at-risk for school failure (ArtsConnection, 1993;1997). In the arts classes, however, differences between high and low academically achieving students were not apparent. Both high and low scorers demonstrated high levels of self-regulation and engagement. The researchers developed a list of ten categories of observable behaviors that appeared to contribute to the students' success in the arts classroom. These behaviors were defined as: (1) paying attention, (2) persevering, (3) problem-solving, (4) self-initiating, (5) asking questions, (6) taking risks, (7) cooperating, (8) setting goals, (9) using feedback, (10) being prepared. The behavioral

descriptors for each category are included in Appendix A.

While any learning process can be used as a model to teach self-regulation, art-making provides especially rich opportunities to enhance these behaviors. The kind of excitement, satisfaction, and public validation received by students who excel in the arts builds self-efficacy through experiences that model success through directed effort. The focus on skill development, more than content-based learning, makes the process itself more transparent for the learner . Immediate performance feedback helps students gauge the effectiveness of their learning strategies and judge their progress toward explicit, real-world goals that they care about and have had a part in setting. Good arts instruction encourages students to explore and identify multiple solutions to a problem and specific strategies for success. By collaborating, students witness other people's learning strategies and gain understanding of different approaches to a task or problem. And because language is not the only modality of instruction and response, students who lack confidence in their language abilities can learn and express themselves through other symbol systems and demonstrate strengths and intelligences beyond the verbal realm.

Instruction for self-regulation. Instruction in the arts, as in all other subjects, can promote self-regulation in different ways and to greater or lesser degrees. Different art forms, styles and techniques follow different pedagogical models and require different learning strategies and behaviors. Despite these differences, instructors in any art form can help students become aware of their own learning strategies and of the process of mastering the physical/cognitive challenges. There are many parallels in the artistic process to Zimmerman's three phase self-regulation cycle (1986) of forethought, performance control, and self-reflection. Arts instruction that occurs over time, that involves skill development and challenging goals, and that provides opportunities for student response and self-reflection can enhance metacognition, self-efficacy, and self-regulation, regardless of the nature of the technique. The nurturing of student self-

regulation is not technique specific. It can be a feature of any artistic learning environment.

Artistic disciplines, such as traditional dance forms and classical music, that rely heavily on observation and repetition require a particular kind of attention, self-control, and capacity for practice. Modern dance or improvisational jazz, on the other hand, may involve different kinds of self-regulation such as working independently on a creative exploration, collaborating with a group, taking risks in offering ideas. Similarly, learning and performing a play from a script requires certain kinds of self-regulation, while improvising demands others. Within each of these art forms and instructional approaches, self-regulatory behaviors can be explicitly nurtured and supported. Teachers can help students become more aware of their own learning behaviors and strategies, further developing these behaviors by reflecting on the learning process and sharing responsibility with students for setting goals, self-evaluation, and problem solving (Zimmerman, Bonner & Kovach, 1996).

Teaching for self-regulation. Research shows that explicit teaching and reinforcement of self-regulatory behaviors and strategy use can be effective in enhancing students' abilities to self-regulate (Zimmerman and Shunk, 1998). Self-regulation can develop, however, even in the absence of such explicit instruction. In the arts, as in sports, there are students who thrive on the discipline and structure of a strong, demanding teacher. The powerful motivating effect of performance goals and participation in a group that shares those goals can promote a high level of self-regulation even in situations that offer limited opportunities for explicit choice-making and self-reflection. The self-discipline, practice habits, and self-efficacy developed through a successful performance or exhibit can become a model of self-regulation, giving students direct experiences in the value of hard work and sacrifice toward a distant goal. The student also perceives the external feedback from such experiences as deserved and genuine, which is much more effective than praise and positive comments from adults and peers that are not earned

(Zimmerman, 1986).

Mastery in the arts: external and internal speech. Non-verbal aspects of arts learning can make self-regulation and the use of learning strategies difficult to directly observe. In Vygotsky's (1978) view, mastery involves a progression from external to internal speech at which point self-regulation becomes automatic. In the arts, external speech itself may hinder performance, even in the early stages of learning. An instructor may initially verbalize a sequence of movements, for example, "right, left, right, left, turn, jump," but she may immediately tell the students, "don't think about it, just do it." We expect that someone who has mastered a task will have dropped the external language. In the arts, as opposed to other, more verbally-based subject areas, the learning process itself may eschew verbal language and all of the stages of internalization can be on a non-verbal level. Guidance in the students' zone of proximal development (Vygotsky, 1971) may thus include a large amount of non-verbal modeling, independent practice, and self-evaluation based on specific performance goals. The arts instructor, seeing a student struggle with a new skill may help most by refraining from instruction. "Do you want a suggestion, or do you just want to try it again?" is a common question in the arts classroom.

Many learning strategies in the arts are based on a perceptual, intuitive and emotional response, what Vygotsky describes as putting "feelings into objects by using sight rather than recognition" (1971, p. 57). Artistic learning strategies based on trusting the body to hear, see, and feel, to perceive complex relationships, and respond spontaneously and fully, are highly useful and applicable to other areas of life, but are often ignored in classroom instruction and are poorly measured on school tests.

Transfer of self-regulatory behaviors and learning strategies from the arts to the academic classroom. In order to study the potential of learning strategies developed in the arts to

be used in classroom settings it is necessary to identify those strategies and the conditions in which they can be employed. Before applying strategies in new situations students must first have opportunities to develop and successfully use those strategies and then must be able to identify appropriate other settings in which to employ them. In a study of elementary through high school students who had participated in dance or music classes over a period of one to five years, Oreck, Baum and McCartney (2000) reported many specific strategies and general habits developed in the arts that students applied in classroom learning situations. As noted previously, many of these strategies are non-verbal and students may use them intuitively. For example, one music student expressed her experience in a music ensemble as "mind over movement." She explained, "You have to really listen to the song and while you're playing you still have to listen to make sure you're in the right key. So you use your mind to tell you the part of the song and you use movement to keep playing it and doing what you're doing. The mind over movement has helped me listen and take notes at the same time" (p. 59).

Another student discussed the way she has internalized a sequential learning strategy from music to help her memory. "I learned that you need to make sure you understand the first thing before you have to do the second. Let's say (the music teacher) is teaching you a part. If you don't understand how to play it, you can't go on and learn the full part. In school, especially in my accelerated course, Earth Science, the teacher gives you notes every day. So every night I go home and I study them. I memorize what I study and then I go to school the next day and take more notes. I go home and study notes from both days" (p.59)

Lacking self-efficacy to learn, students who struggle in the classroom are unlikely to be able to actively identify and utilize effective learning strategies. Involvement in the arts, with it's emphasis on immediate ongoing performance feedback and public, real-world, long-term goals supports increased self-efficacy. As one dance student put it,

When someone pushes you and you find that you improve you learn to practice. Because you know if you practice it, you get it. So they gave us that start-off push. You didn't want to. You were tired. And then the next class, you didn't need the push anymore. Then you know that "if I can do this with my body, then I must be able to do this with my mind. I may not be perfect, but I am getting better" (p 54).

Support for transfer of self-regulatory behaviors. Some students who struggle in school need more than a supportive classroom environment and pedagogy, however, to effectively transfer their success in the arts to other academic areas. Low performing students need to build self-confidence and self-efficacy in their learning abilities and develop a level of metacognitive knowledge to recognize their strengths and preferred learning styles. They then need to find practical ways to apply those strengths to solve academic tasks. Students may also need individual or small group assistance in order to recognize opportunities to use their arts learning strategies in other situations. For example, a student who solves math problems best by drawing a picture may be hampered in a testing situation that does not provide space to draw. Similarly a student who learns best by moving or acting out a scene in a story may be stymied when forced to sit still and just listen. These students need both explicit strategies to imagine the task in visual and kinesthetic modes, to ask for opportunities to draw or move, and to use their strengths to help them practice and remember information.

Who may be helped by a focus on self-regulation in the arts? The powerful external motivation of public performances and exhibits can be seen in any group but registers most clearly in students who have an interest or talent and experience success in the arts. For students who are shy or those who are already able to self-regulate in the classroom, the effect of the arts will likely be less pronounced (Baum, Owen & Oreck, 1997). Research on the transfer of self-regulatory behavior in the arts to other academic settings must account for differences in student

abilities and learning styles and measurement must not be limited to standardized test scores and other strictly verbal measures.

Methodology

The purpose of the Project Start ID study was twofold: to study, 1) students' abilities to use self-regulatory behaviors in the regular classroom setting, and 2) teachers' abilities to develop and facilitate arts-infused lessons which allow students to apply self-regulation. The first part of the study was designed to observe identified students in various learning situations and to compare the effect of different instructional strategies on student learning behaviors. The second part looked at the effects of the professional development program on teachers. In addition, other measures, including standardized test scores and teachers' comments were collected to look at overall changes in student performance over time.

Sample

Students were chosen for the classroom observation study based on the following criteria: a) identified as potentially talented in dance, music, theater, or visual arts; b) participating in the talent development program in their particular art form at the time of the study; and c) in classrooms with teachers who were involved in the professional development program provided by Project Start ID.

Seven classrooms participated in the research. 52 boys and 47 girls ($n = 99$) were observed Approximately 80% of the students were observed during a math ($n=41$) or a reading lesson ($n =44$). The remaining 14 students were observed during a social studies class. Two teachers used dance as the art form ($n=13$), one teacher used music ($n=28$), two teachers used visual art ($n=31$) and two teachers used theater ($n=27$). Students were observed in grade 3 ($n=13$), grade 4 ($n=26$), grade 5 ($n=30$) and grade 6 ($n=30$). About half of the students were low scoring ($n=48$), based on previous reading test scores and teacher reports. 9 students were

identified as average in test score achievement and 42 were high scoring.

Only the Hamilton school implemented the full research design. The Cleveland teachers who developed lessons were unable to conduct the research due to the transfer of administrative control to the Cleveland Municipal School District Chief Executive Officer based on the school's low 2001-02 test scores. Teachers were not permitted the meeting and planning time to complete their lessons and felt extreme pressure to concentrate on test preparation for 2002-03. Most of the Cleveland teachers eventually implemented the arts-infused lesson alone and were observed by curriculum facilitators but self-regulatory behavior data were not collected for students.

Intervention

Students. All identified students participated in dance, music, theater, or visual arts classes over a period of twenty weeks for one to two years. The arts classes, taught by visiting professional teaching artists, were held once during and once after school each week for a maximum of 135 minutes. Students with severe academic problems (e.g. NCE <40th ile in reading or math scores, severe problems in one or more subject areas, behavior or attendance problems), as identified by their teachers, participated in one 60-90 minute session per week of small group (7 students or fewer) academic assistance. These classes, called MAGIC (Merging Artistic Gifts Into the Classroom) were directed by specially trained teachers within the school and were designed to build on the students' specific artistic strengths to solve academic tasks.

Teachers. Classroom teachers were involved in a range of professional development activities. All classroom teachers in the target grades (3-6) participated in one introductory arts workshop per year. All second through fourth grade teachers ($n = 20$) participated in the talent assessment process and acted as raters in four-session talent assessment processes in dance, music and theater (DTAP, MTAP, TTAP) (Oreck, Owen & Baum, 2003). Visual arts was

assessed by art teachers and outside teaching artists. In addition, some teachers voluntarily attended four weekend workshops and two week-long summer institutes for which they were paid a small stipend.

Three levels of professional development for teachers were offered: 1) talent identification training, 2) curriculum adaptation and arts integration, and 3) collaboration and mentorship with teaching artists and faculty colleagues. The lessons used for the research were developed during the second week-long summer institute. Teachers worked with a teaching artist in the arts discipline of their choice and a facilitator who was a curriculum expert with experience in the arts and as an academic teacher[1].

The facilitator role was essential to the success of the curriculum development process. Facilitators kept the process on track, helped to document and edit the plans, and acted as translators, clarifiers, and coaches for the teacher/artist teams. The curriculum development process continued into the school year with ongoing preparatory meetings, co-teaching opportunities with artists, observations of teachers by teaching artists and facilitators and debriefing meetings. Before leading the actual lesson to be used as part of the research, teachers had 2-3 practice lessons to try out some of the activities with the help and feedback of the artists. A follow-up meeting was held for each classroom activity.

Research Questions

Two primary questions guided the research.

1.   Does an arts-infused curricular approach help artistically talented children apply self-regulation skills to regular classroom settings as compared with an approach that does not include an artistic process?

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[1] – the facilitators were Lucie Collier and Carolyn Wheeler in Hamilton, and Carole Feddersen and Cathy Jaffe in Cleveland.

2.   What is the relationship between observed self-regulatory behaviors and learning of

academic content as measured by written content tests?

Data Sources and Analysis

Research Question 1. An observational study was used to collect evidence of self-regulatory behaviors during the arts and non-arts infused lessons. A trained observer documented evidence of student self-regulation under the two conditions. The traditional academic lesson featured no specific arts activity. This lesson was designed by the teacher using an approach that typified her or his teaching style. The other lesson, implemented within 3 days of the non-arts lesson, in the same subject area and unit, used an artistic process or activity as an instructional strategy. A written test was administered following each lesson. The order of the two classes was determined by the sequence of the academic content. A summary of the research lessons are included in Appendix B.

The term "arts-infused" is used here to describe a range of possible activities and processes that, in some cases, fell short of what might be called "arts integration." Arts integration suggests a balanced intermingling of instructional objectives in the arts and academic subject area. These lessons lasted a single class period (± 45 minutes) and focused primarily on the academic content. The artistic experiences were designed to actively engage students, allow them to express themselves artistically, and provide opportunities to demonstrate self-regulatory behaviors. In the single arts-infused research lesson researchers were rarely able to observe the completion of or reflection on the artistic process, so it was not possible to ascertain the level of true integration of the arts into the curriculum. Many of the teachers involved in the study continued to use the arts on a regular basis and ultimately expanded the research lessons into units that more fully integrated the arts into classroom instruction (Ohio Alliance for Arts Education, 2004; Oreck, 2002).

Researchers watched an average of six students per classroom using an observation form on which they noted any of 10 self-regulatory behaviors observed (Appendix A). In addition, the researchers briefly described the nature of each activity, as well as instructional cues and feedback given by the teacher. At the end of the class period the observations were summarized and transferred onto an individual sheet for each student using a 5-point Likert-scale (1 'not demonstrated'; 2 'rarely'; 3 'average'; 4 'frequently'; 5 'consistently'). The reliability of the scale was high (Cronbachs alpha = .980 for the overall scale) which supported combining the 10 items into a single self-regulation factor for use in the multiple regression analysis.

The research observers participated in a day-long training program and a pilot study. In the pilot study interrater reliability estimates for the observers averaged .84 which was adequate for the observational study. The results for the two lessons were analyzed using repeated measure ANOVA and multiple linear regression analysis to control for gender, grade and academic levels among the sample.

Research Question 2. Immediately after the end of each arts and non-arts-infused lesson, students completed a written test developed by the classroom teacher and curriculum facilitator to examine the effect of the instructional approach on content comprehension. These tests were scored by both the teacher and the curriculum experts. Test results from the two lessons were compared using repeated measures ANOVA. The relationship of the test results to self-regulatory behavior scores and to other factors such as gender, grade, and reading test scores, were analyzed with multiple regression analysis.

Results [2]

Research Question 1

Students' self-regulatory behaviors were observed in an arts-infused and a non arts-infused lesson. The ratings consistently favored the arts-infused approach. Repeated measures ANOVA showed a significant difference (F=291.351) between the self-regulatory behaviors scores for the non-arts-lesson (mean=2.063, SD=.064, *n*=81) and the scores for the arts-lesson (mean=3.146, SD=.078, *n*=81). Controlling for test score achievement level (dummy-coded – high scoring student as reference group) all groups – low, average and high-scoring – showed roughly equal improvement.

The individual self-regulatory behavior items that showed the greatest increases between the arts (A) and non-arts (NA) infused lessons were persevering (means NA= 1.8, A=3.8, F = 176.52, p < .001), self initiating (NA = 2.0, A=3.8, F = 122.44, p < .001) and using feedback (NA = 1.0, A= 3.0, F = 125.22, p < .001). Paying attention had the highest arts and non-art scores while setting goals was not observable in most cases in either lesson.

In the multiple linear-regression analysis (tables 1 & 2) for the arts-infused lesson, grade level had a significant relationship with self-regulatory behavior frequency. No such relationship was observed for the non-arts-infused lesson. Students from higher grades (5 and 6) demonstrated higher self-regulatory behavior scores in both arts and non arts-infused lessons than students from lower grades. As expected, self-regulation scores from the two lessons were highly correlated.

[2] Statistical and analytic assistance by Marie Louise-Damon, program intern, 2002-2003

Table 1: Multiple linear regression analysis for self-regulatory behaviors in arts-infused lesson (n =179)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.707(a)	.500	.489	.59052

a Predictors: (Constant), high achieving*, grade*, arts-based*, female*
dependent variable: overall self-regulatory behavior score

Variable	Standardized coefficients (beta)	t-value
Grade	.507	5.9
high scoring * (=1)	.105	1.2 (ns)
selfreg-behavior non-arts-lesson	.343	3.8

dependent variable: self-regulatory behaviors arts-infused lesson (n=80)
ns = not significant
* = dummy coded

Table 2: Multiple linear regression analysis for self-regulatory behaviors in non-arts-infused lesson

Variable	Standardized coefficients (beta)	t-value
Grade	-.184	-1.5 (ns)
high scoring* (=1)	.190	1.8 (ns)
selfreg-behavior score arts-lesson	.470	3.8
Adj. R2	21%	

dependent variable: self-regulatory behaviors non-arts-infused lesson (N=80)

When controlled for gender (n.s.), achievement test score level (n.s.), and grade (beta=.251, t-value=4.7), the regression analysis (table 4) continued to show a significant effect of the arts-infused lesson on the overall self-regulatory behavior scale (beta=.625, t-value=11.7) for the two lessons combined. No significant differences were seen in self-regulatory behaviors between boys and girls or between high scoring students and others. The order of lessons was also non-significant.

Table 3. Multiple linear regression analysis for self-regulatory behaviors in both arts-infused and non-arts-infused lessons

Variable	Standardized coefficients (beta)	t-value
Arts-infused *(=1)	.625	11.7
Female * (=1)	.054	1.0 (ns)
Grade *(1-4)	.251	4.7
high achieving *(=1)	.155	2.8 (ns)
Adj. R2	49%	

dependent variable: overall self-regulatory behavior score (N=179)

Results for individual teachers and classrooms varied greatly. Teachers 1 and 7 had much higher scores on the self-regulatory behavior scale for both arts and non-arts-infused lessons, suggesting that their normal style of teaching fosters and/or allows more self-regulation. Teacher 3, who was new to the school in the last year of the project and had less professional development than any of the other teachers in the study, had significantly lower scores for both lesson pairs. Dummy-variables were created with Teacher 5 as the comparison variable.

Table 4. Regression analysis model summary (*n* =179)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.840(a)	.706	.692	.45815

dependent variable = self-regulatory behavior score

a Predictors: (Constant), teacher#1, "arts-infused", high achieving, teacher#3, teacher#2, teacher#6, teacher#7, teacher#5

Table 5. Summary of regression analysis by teacher (*n*=179)

Variable	Standardized coefficients (beta)	t-value
Arts-infused (=1)	.654	15.7
high scoring (=1)	.081	1.8 (ns)
Teacher #1	.344	6.3
Teacher #2	.031	.6 (ns)
Teacher #3	-.243	-4.7
Teacher #5	.103	1.8 (ns)
Teacher #6	.141	2.6
Teacher #7	.340	6.1

The changes in frequency of self-regulatory behaviors broken down by classroom shows significant improvement in the arts-infused lesson in three of the six classrooms (compared with teacher #4). Again, there was no significant difference in self-regulatory change between high and low scoring students.

Research Question 2

Written tests to measure student learning of academic content, developed along with the lessons by the teacher/artist/curriculum team, were administered after each lesson and scored by the teachers. The tests concerned only the academic content. Repeated measures ANOVA revealed no significant differences in student performance on content-tests after the arts-infused and non-arts-infused lessons (F=.238, *n*=71).

Multiple regression analysis was used to look at the relationship of self-regulatory behavior scores to content test results in the arts- and non-arts-infused lessons. These results show a significant correlation between increases in self-regulatory behaviors in the arts-infused lesson with content test scores, regardless of reading and grade level. No such relationship was found for the non-arts-infused test, however. In other words, students with high scores on the arts-infused-self-regulatory behavior scale performed better on the arts-infused content test

(compared to students with low scores on the scale). No significant relationship was seen between performance on the non arts-infused content test and self-regulatory behavior scores in either arts or non arts-infused lesson. Tables 6 and 7 present the content test results.

Table 6: Multiple regression analysis for content test results for arts-infused lesson

Variable	Standardized coefficients (beta)	t-value
Grade	.147	1.5 (ns)
high achieving (=1)	.191	2.2 (ns)
selfreg-behavior non-arts-lesson	-.432	-4.9
selfreg-behavior arts-lesson	.624	5.7
Adj. R2	61%	

dependent variable: content-test score for arts-infused lesson (*n*=62)

Table 7: Multiple regression analysis for content test results for non-arts-infused lesson

Variable	Standardized coefficients (beta)	t-value
Grade	.167	1.2 (ns)
high achieving (=1)	.305	2.4 (ns)
selfreg-behavior non-arts-lesson	.170	1.1 (ns)
selfreg-behavior arts-lesson	-.070	-.5 (ns)
Adj. R2	16%	

dependent variable: z-score content-test non-arts-infused lesson (N=63)

Discussion

While it was not unexpected that artistically talented students would display self-regulatory behaviors more frequently and consistently in a lesson that includes an arts activity, this study provides empirical evidence of engagement, self-initiative, and self-monitoring in many students who do not frequently display these qualities in traditional classroom activities. These results provide evidence of teachers' abilities to positively engage students and allow more self-regulated learning to occur as well as students' abilities to apply effective learning behaviors when given opportunities to do so in the classroom.

Teachers strongly endorsed these behavioral descriptors as relevant and essential for learning (Jaffe, 2003; Oreck, 2002; 2004). They expressed satisfaction and in many cases,

surprise, at the active participation, initiative, and leadership roles taken on by their students in the arts-infused lesson. Their post-class comments reflected the opinion that, in most cases, the arts-infused approach helped behavior and understanding on the part of both the research group and the class as a whole (Ohio Department of Education, 2004).

The outcomes cannot be ascribed to any particular aspect of the lessons – structure, content, or pedagogy. The arts-infused approach provided teachers with an active, cooperative learning model that, in many cases, differed significantly from their normal teaching practices. The arts lessons offered students more opportunities to take initiative, identify and pursue problems, cooperate, persevere, and apply feedback from the teacher and other students. Smaller differences were observed in more basic self-regulatory behaviors such as paying attention and asking questions between the arts and non-arts infused conditions. Goal-setting was difficult to directly observe in the short time frame of these lessons and was rarely noted by the observers in either lesson. This was a significant limitation given the importance of short and long-term goal-setting to self-regulated learning.

The higher level of self-regulatory behavior seen in the older grades supports the developmental theories of self-regulation, suggesting that older students become more metacognitive and able to apply personal learning strategies. No firm conclusions can be reached from these data, however as the older grade teachers (fifth and sixth grades) happened to also be the most effective in facilitating arts processes.

Investigating the link between self-regulatory behavior and content comprehension was an important aspect of the study. Transfer of effective learning behaviors to the classroom is, in itself, a worthy goal, but without evidence that the arts approach also results in greater comprehension or other specific learning outcomes, the evidence is unlikely to promote change in instructional strategies. Only the arts-infused lesson showed a significant relationship between

increased self-regulation and performance on the content test. Overall, however, students did not significantly improve their performance on the content test after the arts-infused lesson. The fact that students with high self-regulatory behavior scores in the non-arts-infused lesson appeared to do worse on the content tests after the arts-infused lesson is intriguing but difficult to explain. It could suggest that students who do better with a more traditional approach may not, in fact, be aided by the infusion of an arts process. There are too few students and lessons to make broad conclusions on this point. The differential effects of arts-based to teaching on students with different learning styles and academic abilities is an important issue for study when comparing the arts to other pedagogical and curricular approaches.

Improved academic test scores was not a stated goal of Project START ID; the length and intensity of the intervention was inadequate to predict immediate changes in standardized test-score performance. However, given the interest in test scores, two years of reading and math scores were collected and analyzed. No improvement was seen either in the identified group of students, as compared to their similarly achieving classmates, or among the sub-group of low-scoring or MAGIC students. Both schools declined overall in reading scores over the course of the project and identified students generally reflected this trend. The nature of proficiency tests and the "scaled" scores of different tests provided by the testing companies (proficiency in grades 4 and 6, off-year proficiency in grades 3 and 5) make any comparisons unreliable and yearly comparisons dubious. A case study approach was taken to further investigate participating students whose scores and/or grades showed marked improvement during the course of the project (Ohio Alliance for Arts Education, 2004).

Limitations of the study and suggestions for further research

Statistically significant differences were found in these analyses, but the numbers of participants (*n* = 99) and classes (7 teachers and lesson-pairs) in the quantitative portion of the study were too small to draw substantial generalizations. The original research design involving 20 classrooms (n = ± 150) with each teacher conducting two lesson pairs would have equalized some of the differences between teachers and provided a far better measure of student performance. Teacher turnover and the curtailment of the study in Cleveland severely limited the scope of the research. For teachers to develop new skills, adapt and create new arts-infused lessons, and implement those lessons for the purposes of research, a three-year time frame (two and half years of actual programming in schools) proved inadequate. A larger sample of classrooms, in a research design conducted over a longer period of time, will be needed to validate and extend these preliminary results. In a five year plan, this phase of the study could have been piloted, with successful lessons repeated each year and new lessons created based on what was learned.

There are a number of potentially confounding issues involved in using written forms to measure arts learning. Little direct assistance was given to students to help them make the transition from the arts activity to the content test. MAGIC tutoring focused on developing general strategies rather than on specific test-taking skills. In a more extensive study, more time and attention should be taken in the creation and pilot testing of content tests, including the addition of performance-based assessments, particularly in the interest of those who struggle on written tests. In addition, the transition from the arts activity to the content test should be more carefully planned.

The research was designed to look primarily at artistically talented, low-scoring students on the assumption that they would be most receptive to intervention and have the most room for

improvement. Interestingly, the results showed equal improvement in self-regulation among high scoring students; anecdotal evidence from teachers and observers, in fact, suggested increased engagement and self-regulation among the entire class. Further research is needed to compare the behaviors of artistically talented students to non-identified students in the same classrooms. A mix of identified and non-identified students would also mitigate a potential source of observer bias in the study.

Rather than study a single lesson, an arts-infused unit would allow for more student learning and a wider range of self-regulatory behaviors to be observed, including goal setting and self-evaluation. Most important, teachers need more time to create, practice, and revise their lessons, gaining experience and confidence before conducting them in front of researchers. A new approach cannot be adequately compared to a familiar one without significant practice time. In addition, more attention should be paid to the development of the comparison or non-arts infused lesson (or unit) so that the differential effects of specific artistic processes and teaching strategies on various students are compared with other effective teaching methods.

Many additional questions are suggested that can only be answered with a larger sample of students and classrooms. In order to find evidence of transfer from the arts to other academic areas we will need to study the arts as well as the academic classroom. Can various arts teaching strategies increase the potential for transfer? To what extent can an explicit focus on developing self-regulatory behaviors and metacognition in the arts class increase the level of student self-regulation in the regular classroom? What effect does professional development have on teachers' practices outside of the arts-infused lesson?

Conclusion

The issues involved in promoting and studying transfer from the arts to other aspects of school performance are highly complex and pose challenges both to professional developers and

researchers. What transfers? What conditions make transfer possible? Which students are most likely to be affected by an arts-based curricular or pedagogical approach? How can teachers learn to better support self-regulated learning? This study offers an approach and methodology to answer these questions and provides some intriguing (if preliminary) results.

The process of self-regulated learning involves learner and teacher equally. In this research the relationship is especially complex, involving two or more arts and academic teachers and very different classroom settings. The evidence of positive change in students and teachers must be viewed in the context of the entire Project START ID, a comprehensive, two and a half year, whole school, arts program. In addition to curriculum development, teachers collaborated with artists to assess students' artistic and creative abilities. This made them more sensitive and aware of the strengths of their students and motivated them to apply new arts-based teaching methods (Oreck, 2004). Students had opportunities to develop their skills and effective learning behaviors in high quality arts classes. Students experiencing particular academic difficulties had the support of trained tutors who appreciated their abilities in the arts. A common vocabulary aided both teachers and students in a focus on positive learning behaviors and cooperative learning through arts processes.

In order for schools to expand the role of the arts, both as part of the core curriculum and as a pedagogy and methodology used in regular classrooms, they must have evidence of its value – at least for some students who are not thriving through other methods. Professional development programs in the arts may have many effects on teachers' knowledge and attitudes, but we need evidence that teachers can make changes in their practices and that those changes can have a positive effect on student performance. By identifying and developing learning behaviors that can be applied and observed in new situations we have an opportunity to measure – through means other than standardized test scores – the effectiveness of new approaches to teaching and learning, both in the arts and the regular classroom.

Appendices

Appendix A
Self-Regulatory Behaviors

1. **Paying Attention**
   avoids distractions
   comes back to task after interruptions
   shows good concentration
   listens carefully
   follows directions
   makes appropriate contributions and comments

2. **Using Feedback**
   uses criticism to improve work
   maintains corrections
   is open to other points of view
   evaluates own work

3. **Problem Solving (Curricular)**
   is able to identify the problem
   comes up with unique approaches to challenges
   doesn't stop with one answer
   thinks for self -- is not swayed by the opinions
     of others
   is able to identify missing information
   relates other information and experiences to the
     problem

4. **Self-Initiating**
   takes responsibility for learning
   moves self to a productive place to learn
   works on task without explicit instructions from
     the teacher
   uses own strategies to become a more effective
     learner
   starts on own

5. **Asking Questions**
   asks good questions
   is not afraid to ask when instructions or
     information is unclear
   will pursue an area of curiosity
   is motivated to find solutions for unanswered
     questions

6. **Taking Risks**
   offers opinions, even if they are unpopular
   volunteers readily
   will do or show something rather than just
     talking about it
   is ready to try new things
   is willing to explore difficult or vague
     concepts

7. **Cooperating**
   works well in group activities
   follows instructions
   listens to, observes, and learns while
     interacting with peers and teachers
   negotiates and compromises with others to
     achieve a goal

8. **Persevering**
   doesn't stop when it gets hard
   continues when the teacher is not looking
   exerts effort throughout the activity
   enjoys challenges
   follows task through to completion
   isn't stopped by criticism

9. **Being Prepared**
   does homework
   is ready to begin the exercise or task
   has supplies
   remembers information and instructions
   is organized

10 **Setting Goals**
   sets up specific interim goals to solve a
     problem
   is motivated towards the goal
   recognizes the sequence of tasks needed

Appendix B. Summary of arts-infused lessons

School/ Grade	Lesson Title	Subject Area/ Art Form	Instructional Objectives
HAM/3	Graphing	Math/Visual Art block printing	Students will be able to make and interpret information in a pictograph.
HAM - 3	Acting Out Word Problems	Math/ Theatre	Students will be able to determine which operation to use to solve word problems and create and present dramatic situations demonstrating the problem.
HAM - 3	The Earth's Movements	Science/ Dance	Students will be able to describe and show the movements of the earth, the concepts of revolution and rotation on an axis using choreographed and improvised movement.
HAM - 4	Story Retelling through Music	Reading- Language Arts/Music	Students will be able to retell a story through music including main characters, setting, important details in chronological order and conclusion.
HAM - 5	Reflective Movements	Math/ Dance	Students will demonstrate geometric transformation (reflection) using movement and dance.
HAM - 6	Egyptian Sarcophagus	Reading/ Visual Art	Students will be able to make inferences in reading. Students will be able to give an opinion and support it with details from a story. Students will be able to write a summary of a story. Students will be able to identify vocabulary in context.
HAM - 6	Who Wants A Piece of Peace?	Social Studies/ Theatre	Students will be able to identify and show the main points of Golda Meir's life through the creation and presentation of dramatic scenes emphasizing cause and effect
HAM - 4*	Tesselations	Math-Geometry Visual art	Students will apply knowledge of tessellating and create patterns with no gaps to create works of art.
HAM - 6*	Area Sculptures	Math/ Visual Art	Students will be able to create and find the surface area of irregular shapes.

* not implemented for research

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