WORKS OF ART ARE GOOD THINGS TO THINK ABOUT

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Introduction

Works of art are good things to think about. This simple premise underlies *Artful Thinking*, a program that helps teachers regularly use works of art in their curriculum in ways that strengthen student thinking and learning. Developed between 2004-2006 by Harvard Project Zero[1] in collaboration with the Traverse City Area Public schools, the program is being used by K-12 classroom teachers as well as art specialists in several schools in the Unites States and Europe. It focuses on looking at and interpreting art, rather than making art, and its goals are twofold: To help teachers create rich connections between works of art and topics they are teaching; and to use the power of art as a force for developing students' thinking dispositions.

This article provides highlights from the findings of two research studies conducted during the development of the Artful Thinking program[2] . The first is a study of the effect of the program on students' and teachers' ideas about art. The second is a study of the effects of the program on students' ideas about thinking and learning in general. The investigations were framed as *design research* (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003). This means that the procedures developed to explore program participants' concepts of art and concepts of thinking were designed to be learning-centered practices, integral to the spirit and goals of the program, rather than "add-on" evaluations.

The Program's Roots and Practices

The best way to get a feel for how these studies relate to the impact of the program is to consider them in the context of two foundational components of the Artful thinking program – *thinking dispositions*, and *thinking routines*. Both of these components relate directly to the program's goal of teaching thinking

Thinking dispositions. Traditionally, efforts to teach thinking have been ability-centric: They foreground the teaching of thinking skills – reasoning skills, creativity skills and the like – with the assumption that developing the requisite skills is all that's needed to insure the desired behavior. Alternatively, Artful Thinking takes a dispositional approach to teaching thinking. Thinking skills are certainly important. But if we want students to use their skills frequently, if we want them to transfer their skills to a variety of contexts, if we want them to feel committed to certain patterns of intellectual behavior (for example, committed to exploring works of art from multiple perspectives, or committed to thinking deeply about works of art), then simply

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[1] Project Zero (http://www.pz.harvard.edu) is an educational research group at the Graduate School of Education at Harvard University. Artful Thinking is one of several school-based initiatives at Project Zero that are loosely linked by the theme of visible thinking (http://www.pz.harvard.edu/vt).

[2] For a full report of the research, see the Artful Thinking website: http://www.pz.harvard.edu/at

teaching thinking skills may not be enough. In order to teach students to be good thinkers on their own and of their own volition, instead of on demand and only in specific situations, a dispositional approach to teaching thinking may serve better – an approach that emphasizes thinking-centered values, commitments, sensitivities and belief systems, in addition to thinking skills.

We often speak of people as more or less open-minded, reasonable, thoughtful, skeptical, curious, , and so on. These terms describe more than cognitive skill, they describe dispositional tendencies. And this is the general idea of dispositions – that people behave in a more or less informed and appropriate way guided not only by knowledge and skills but also by predilections or tendencies. Several psychologists and educational theorists have argued for the importance of recognizing the dispositional dimension of thinking (Baron, 1985; Langer, 1989; Perkins, 1995; Stanovich, 1994), and for a dispositional approach to the teaching of thinking (Costa, 2002; Ritchhart, 2002; Tishman, 2001) Arts educators and art education programs have also recently embraced the notion of dispositions. For example, Studio Habits of Mind (Hetland, L., Winner, E., Veenema, S., & Sheridan, K., in press) takes a dispositional approach to the analysis and design of studio arts instruction. Art Works for School takes a dispositional approach to teaching thinking in and through visual art and theater (Grotzer, Howick, Tishman and Wise, 2002). Lambert (2006) argues for the importance of thinking dispositions as an outcome of arts education.

What does it mean to "have" a thinking disposition? One answer to this question is that dispositions are comprised of two parts: Part one is ability—such as the ability to recognize multiple points of view or make careful observations – and part two is the motivation or inclination to use one's ability regularly when appropriate. Ability and inclination are certainly important. But there is more to the story. Elsewhere, we and our colleagues have put forth a triadic theory of dispositions that argues that there are three logically distinct and separable elements of dispositonal behavior: *sensitivity, inclination,* and *ability* (Perkins & Tishman, 2001) Sensitivity concerns alertness to opportunities, inclination concerns tendency to engage the opportunities once detected, and ability concerns capability to follow through appropriately. While most work on dispositions collapses sensitivity and inclination, we have offered evidence that, in the area of thinking, sensitivity is an empirically distinct and influential component of dispositional behavior, and that the challenge of developing effective thinking dispositions often lies in sensitivity more than inclination—people simply fail to notice opportunities to think deeply about things, rather than being disinclined to engage with these opportunities. (Perkins, Tishman, Ritchhart, Donis, & Andrade, 2000). So, when looking for evidence of dispositional

development, one might look for change in any or all of the three dispositional elements – sensitivity, inclination, and ability. We return to the triadic theory of dispositions – and especially to the element of sensitivity – towards the end of this article when we discuss the findings from the Artful Thinkng studies.
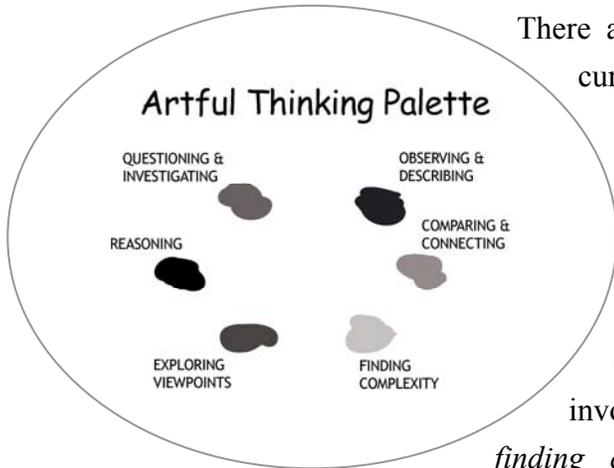
There are many thinking dispositions worth cultivating – curiosity, open-mindedness, reasonableness, to name just a few. Artful Thinking focuses on a set of six dispositions that have special power for exploring works of art and other complex topics in the curriculum. They are: *reasoning,* which involves constructing arguments and seeking evidence; *exploring viewpoints*, which involves looking at things from different points of view; *finding complexity,* which involves uncovering multiple dimensions and layers; *comparing & connecting*, which involves exploring juxtapositions and seeking connections; *questioning & investigating*, which involves posing questions and finding avenues of inquiry; and *observing and describing*, which involves close looking and re-presenting. These dispositions have been chosen for two reasons. First, they are all patterns of intellectual behavior that are powerful in terms of exploring and appreciating works of art. Second, they are equally powerful in terms of building understanding in other disciplines. As a set, the six dispositions are synergistic. For example, observing naturally leads to reasoning, which connects to questioning, which in turn links to connection-making, and so on. The Artful Thinking program uses the image of an artist's palette to express this synergy.

Developing thinking dispositions through thinking routines. Dispositions, like habits, are formed when people routinely engage in specific patterns of behavior. Accordingly, Artful Thinking develops thinking dispositions through the use of *thinking routines* – short, easy-to-learn procedures that help students routinely enact thinking-dispositional behavior in and across the six areas of the palette. The program invites students to use thinking routines first and frequently with works of art, and also with a wide range of topics and subjects in the curriculum, As just one example, an oft-used thinking routine is called *See-Think-Wonder*. It consists of three discussion questions – *What do you see? What do you think about that? What does it make you wonder?* The routine connects to two dispositions on the palette – observing & describing, and questioning & investigating – and it can be used at all grade levels to guide students' thinking about works of art, and about topic in other subjects, from mathematics to history to health. (For more thinking routines see http://www.pz.harvard.edu/at). A key feature of thinking routines,

whatever topic they are used with and whatever disposition they help learners enact, is that they are designed to deepen students' thinking about the topic at hand, whether it is a painting, an historical event, or a scientific procedure.

The foregoing discussion of these two foundational concepts in the Artful Thinking program -- thinking routines and thinking dispositions -- make it clear that the program has quite an explicit emphasis on thinking. So a natural place to look for evidence of program impact is in the way the program affects the way participants *think*, especially how they think about the program's two foci: art, and thinking.

CONCEPTS OF ART: I USED TO THINK, NOW I THINK

A qualitative examination of students' and teachers' changing perceptions of art.

Overview. Artful Thinking was originally developed in Traverse City, Michigan, between 2003-2006. During the first year of development, we began to notice what seemed to be an interesting shift in teachers' ideas about art. As teachers increasingly used thinking routines in their classrooms to guide discussions about works of art, they seemed to be growing less concerned about choosing "good" art to use in the classroom and more interested in the quality of student discussion. Along with this, teachers seemed to be growing increasingly comfortable using a variety of types of art images in their classroom – classical, contemporary, mixed and unusual media, art with provocative content—whereas in the early days of the program teachers seemed most interested in using art that was well-known and relatively traditional.

These apparent changes were intriguing and we decided to investigate them more closely. As program developers working within a design research paradigm, our goals were twofold. From a research perspective, we wanted to document teachers' and students' conceptual development in the areas of art and thinking.. From a learning perspective, we wanted to provide teachers and students with an opportunity to reflect on, and make visible to themselves, their own evolving ideas.

Instrument and Procedure. To accomplish the foregoing goals, we used a thinking routine called *Used to think, now I think* to collect perceptions from both students and teachers. The routine can be

used with virtually any topic around which sustained thought has occurred, and it works exactly as its label suggests: It asks people to reflect on what they *used* to think about a topic, and what they *now* thinks. Several, but not all, of the teachers and students had used this routine once before. The routine requires no prior training.

We used the routine with two topics as follows, with slightly different wording for teachers and students.

Teacher task:
I used to think…now I think about art (topic 1)
I used to think…now I think about connecting art and the curriculum (topic 2)

Student task:
I used to think…now I think about art (topic 1)
I used to think…now I think about how art connects to things we study in school (topic 2)

The routine was used with 26 teachers, 18 5th graders, 42 6th graders, and 25 9th graders. The length of time teachers and students had been involved in the program ranged from 2 years to 6 months. Teachers used the routine in a workshop setting, and were given about 15 minutes to write down their ideas. The following week, teachers administered the routine in a classroom setting, giving students about 15 minutes to write down their ideas. In the classroom, several teachers conducted class discussions following the routine so that students could share their ideas aloud. Those discussions are not captured in the following analysis.

A word about the structure of the task. It is important to note that the *Used to think…now I think* task was designed as a thinking routine. Like all thinking routines, it does more than simply uncover users' prior ideas about a topic, it also encourages people to construct ideas in the moment. The particular purpose of this routine is to promote reflection and discernment by setting up a dichotomy around which people can organize their ideas. The "I *used* to think; *now* I think" dichotomy encourages people to identify change where they might not have identified it before, usually encouraging people to identify change in the direction of positive growth, since the routine is typically used in a learning setting. Consequently, the routine isn't suitable as an objective measure for counting the number of people who have experienced conceptual change, since its structure virtually insures that people will report the occurrence of change. Rather, the routine is a powerful tool for documenting how people construct and characterize their own perceived sense of conceptual

change. It is the qualities of this perceived change that we aim to capture in our analysis of the data. First we report the results for students, then the results for teachers.

STUDENT RESULTS: Used to think…Now I think

Interestingly, although students followed the task structure and wrote ideas in the two areas designated by the two topics of the task – art, and connecting art to school subjects –their ideas did not divide neatly into these two categories. Students mainly seemed interested in talking about their thoughts about art in general, which they did across both tasks, and we coded their ideas wherever we found them. When students did say something specifically about the connection between art and school subjects, they seemed to take the connection as a given, reporting their ideas in more or less a yes/no fashion: For example, now they "look at pictures in math class" but they didn't used to. Since our purpose in using the routine was not to simply record *that* participants' ideas had changed, but rather to characterize the particular qualities of change, we only coded students' ideas related to topic one – art in general.

Students' ideas fell into six broad categories: three categories for their "used to think" ideas, and three categories for their "now I think" ideas. Each idea was coded, and because students' responses often contained more than one idea, the total number of ideas exceeds the total number of students. The categories are:

> **USED TO THINK**
> **1. Art is not engaging** (i.e., not an object of inquiry or sustained thought)
> **2. Art is just one thing** ("just" painting, "just" pictorial, "just" one meaning)
> **3. Art is remote, not accessible.**
>
> **NOW I THINK**
> **4. Art invites inquiry** (because it has complexity, narrative, depth).
> **5. Art is in many places and times and has many forms**
> **6. Art is beautiful, fun.**

Although the 6 categories apply to all three grades – 5th, 6th and 9th – the story unfolds somewhat differently across the grades. In what follows, we report the results category by category, comparing the grades as we go along.

Category 1: Art is not engaging (Art has no special or deep meaning, art is not worth thinking about).

- *I thought when you looked at a painting or a sculpture what you saw was the whole picture and nothing was the center of interest or thought provoking (5th grade)*
- *I used to think there wasn't a lot to say about art. (5th grade)*
- *I used to think that art had no point or meaning. (6th grade)*
- *I used to think art wasn't exciting and I didn't think that it stood out to people's eyes. (6th grade)*
- *They were just pictures, had no hidden meaning, no hidden secrets, nothing more than paint. (9th grade)*
- *Music and pictures, I never looked deeper into it, to see the message (9th grade)*
- *I used to not pay attention to detail and the mood of the artwork or music. I would look at the artwork superficially, only paying attention to what was right in front of my face such as the color. I never delved deeper into what the artist was trying to get across. (9th grade)*

As the foregoing quotes suggest, many students report that they simply didn't perceive art as something that invited deep or sustained thought. Art simply didn't seem to be on their radar screens as a worthy object of inquiry. 50 % of the 5th graders and 45% of the 6th graders report ideas in this category. Interestingly, this number increases strikingly in 9th grade, where 72% of the students report that they used to find art uninteresting or unengaging.

Category 2: Art is "just one thing" – just one medium (usually painting), just one meaning or interpretation, just realistic, just illustrative.

- *I used to think art was just drawing pictures and coloring them in. (5th grade)*
- *I used to think art is only supposed to make one message (5th grade)*
- *I thought art was pictures of people and animals and things. (6th grade)*
- *I used to think it was just like a photo, but someone painted it with more detail. (6th grade)*
- *I used to think that pictures were just to show what things looked like (9th grade)*
- *I used to just look at a picture and look at it as a picture. (9th grade)*

The thought expressed most often by 5th graders (83%) is that art is monolithic in nature: They report having perceived it as just one kind of thing, such as "just" painting, or "just a picture," or as having just one meaning. This number decreases dramatically in 6th grade to 38%, and decreases slightly again in 9th grade to 24%.

Category 3: Art is remote, not accessible, art is only for experts or people who are good at it.

- *I used to think that art was just for people who were good at it. (5th grade)*
- *Art was only from a long time ago (5th grade)*
- *The artists had to be the best of the best (6th grade)*

A relatively small percentage of students report seeing art as inaccessible, remote, or for experts only. Perhaps in keeping with their relatively sparse conception of art, 5th graders' responses fall into this category most often (33%), while the number is quite low in 6th grade (12%) and lower still in 9th grade (8%).

It is worth noting that, despite the structure of the *used to think…now I think* task, which scaffolds a negative-to-positive response, a small number of students (find percentage) – but only in 9th grade – report having positive views of art in the "used to think" portion of the task. For example, …quote here… We did not code these responses and report them as percentages because the task structure renders them artificial. It is quite possible that many students had positive feelings about art (if they were aware of having any feelings about art at all) but the structure of the task tends to suppress expression of this view. Still, it is worth noting that, despite the task structure, by 9th grade the power of art has a strong enough positive influence on a small number of students to make a mark in their initial responses.

How do students' ideas about art change? Again, we report students' ideas in each category, noting how the pattern changes across grades.

Category 4: Art is engaging: It has meaning, narrative, complexity

- *[Now I think] Art can have many questions in it (5th grade)*
- *[Now I think] Art can tell a story, or set a mood, or even let you figure out what it's telling you! (5th grade)*
- *[Now I think] Art is very complex and there are a lot of observations you can make and there are a lot of view points in art (5th grade)*
- *Now I try to look at small details and things that don't and do stand out (6th grade)*
- *Now I think art has lots of meanings (6th grade)*
- *Now in class when we look at art …we think more specifically and really discover what this artwork makes us feel and want to know and learn. (9th grade)*

- *[Now I think] that every picture or song has a message, a hidden meaning, that exists within the pictures. You just have to take the time to find it....It's not just a picture it's a symbol for something more. (9th grade)*

Across the grades, the most frequent thought expressed by students in the *...now I think* part of the task is that art *is* engaging and has deep meaning. They now perceive art as provoking questions, telling stories, having hidden messages and layers of details. Though this reported conceptual shift is robust at each grade level, students' perception that art is engaging and meaningful seems to increase over the years: 61% of the 5th graders express this thought; 79% of the 6th graders, and 84% of the 9th graders.

Category 5: Art can occur many forms, places and times

- *Art is old and new. (5th grade)*
- *Art is more than painting. It could be cooking. (5th grade)*
- *Art can be from any time, even the future. (5th grade)*
- *You can use more than just paint to do art. (5th grade)*
- *Now I know there is more than one artist (6th grade)*

The foregoing quotes are drawn mainly from 5th graders, 61% of whom expressed that they now think art is more than "just" painting and that it can take many forms, be done by many different people, be found in many different places and be made at different times. The percentage of 6th graders who express this idea drops considerably, to 14%, and only one 9th grader makes a comment in this area. This pattern recalls the earlier pattern in the *used to think* category of "art is just one thing," in which 83% of the 5th graders expressed the idea that they used to think art was "just" paintings, whereas only 38% of the 6th graders did, and only 24% of the 9th graders.

Category 6: Art is beautiful / Art is fun

- *Art paintings are pretty (5th grade)*
- *Art is a really fun thing to do and learn about. (5th grade)*
- *It just has to be fun to you (6th grade)*
- *Now I love art, music, videos, everything. It is important, it gives us information but it can also really be fun. (9th grade)*

The ideas in this category come mainly from 5th graders, 28% of whom expressed the idea that art was pleasurable in some way. Just 10% of 6th graders explicitly voiced this thought, and almost no 9th graders.

Discussion: Looking across the grades, an interesting story seems to unfold. When students report what they "used to think" about art, the youngest children seem to report having the most limited view, with 83% thinking that art was "just one thing." Less than half of the 5th graders felt this way (38%), and only about a quarter (24%) of the 9th graders felt this way. When students reported what they *now* think, it is only the 5th graders who seem to have a strong sense of a shift in this area, with 61% of them reporting a perceived change, while the number of 6th and 9th students who report shifts in this area is negligible. It seems that one of the strong effects of the Artful Thinking program on 6th graders is that it crystallizes their perceptions of art as a distinct and nuanced realm of human activity. Art, to 5th graders, used to be "just one thing." This "one thing" has now taken on dimensionality: *now they think* art can have multiple forms, be made at many times and in many places by many different kinds of people, and that works of art can have many interpretations.

Another sizable shift for 5th graders occurs around their sense of art as engaging and worth thinking deeply about. Half the 5th graders report that they used to think art wasn't engaging, and 61% report that now they do find art engaging. This shift is robust for all the grades, but interestingly, it is by far the most salient shift for 6th and 9th graders, while its saliency for 6th graders is similar to the saliency of their shift toward seeing art as having dimensionality.

For 6th and 9th graders, the program has the strongest effect on their sense of whether art is engaging. 79% of 6th graders and 84% of 9th graders report a shift in this perception, commenting that now they see art as having "deep meaning", "hidden messages", "lots of details", "stories to tell" and "lots of thought behind it". While more than half the students in all grades report this shift, the shift for 9th graders is most dramatic, with 72% reporting that they used to think art wasn't engaging and 82% reporting that now they do. As one 9th graders puts it: *Now we think more specifically and really discover what this piece of artwork makes us feel an want to know and learn.*

To summarize the student results of the *used to think…now I think* findings for students, students in all three grades – 5th, 6th, and 9th – report salient shifts in their perceptions about art. For 5th graders, two perceived shifts stand out similarly strongly: One is a shift towards a sense of as a distinct and nuanced realm of human activity, and another is a shift toward a sense of artworks as objects worthy of prolonged inquiry. For 6th and 9th graders, the shift toward perceiving art as a worthy object of

inquiry is the shift stands out more strongly than any other, and its saliency seems to increase with grade level: The shift toward seeing art as something worth thinking deeply about seems to be noticeably stronger in 6th grade than in 5th, and stronger again in 9th grade.

TEACHER DATA: I used to think…now I think

We turn now to the teacher side of the story and look at the conceptual shifts the teachers report experiencing Recall that the shifts in students' thinking occurred mainly around topic 1 -- art in general. This was not the case with teachers.   Teachers' ideas clearly fell into the two areas parsed by the task: ideas about art in general (topic 1), and ideas about art in connection to the curriculum (topic 2). In fact, teachers expressed more ideas about topic 2 than they did about topic 1. This may be because one of the explicit goals of the program was to help teachers connect art to the curriculum and many teacher-workshop hours were devoted to this goal. Whatever the reason, it is clearly the topic most on teachers' minds, so we report the results in the corresponding order: first we report teachers ideas related to art and the curriculum; then we report their ideas about art in general. Unlike the student data, there is not a cross-grade story to tell within each category, so rather than report the results category by category as we did in the forgoing section, we report the results of all categories together, for each of the two tasks. As with students, teachers' responses often contained more than one idea, so the total number of ideas exceeds the total number of teachers.

TEACHER RESULTS: Used to think…now I think about art and the curriculum

In this area, teachers reported ideas in the following 5 categories:

USED TO THINK about art and the curriculum
1. **Art is unconnected to the curriculum**
2. **Art is just for art class**
3. **Art is motivational or instrumental**

NOW I THINK about art and the curriculum
4. **Art connects meaningfully to the curriculum**
5. **Art helps students think and learn**

Many teachers seemed to begin the program with the perception that art was an "add-on," – something separate from or relatively unconnected to the curriculum. In their own words:

- *I used to think art didn't connect to the curriculum – only in the art arenas such as "art history/art appreciation."*
- *I used to think art was for the art class.*
- *I used to think pictures and visual aids were a fun addition to a lesson or unit. Too much time could be wasted discussing a work of art.*

Several teachers (37%) stated explicitly that they thought art had no or little direct connection to their curriculum. Several more (27%) stated explicitly that art was something that happened just in the art class – *"a class kids took once a week."* About a quarter of the teachers (24%) reported that they used to view art in the classroom mainly as a motivational activity to get students interested in a topic, or as something "just for fun."

How do teachers' views shift? Again, teachers' own words:

- *Now I think there is so much more if you take the time to study the details…using various routines. All learners become more engaged and connected, making the artwork much more meaningful.*
- *Now I think connecting art to the curriculum has so much depth and value for students in their way of thinking, not only in schools, but also for use in the "real world." The kids take more of an active role in class and they enjoy it.*
- *Now I think that the arts provide many opportunities for students to think and can really connect**

The largest shift for teachers seems to occur in the area of curricular connections. Almost two thirds of the teachers (62%) explicitly mention that they now think art *does* connect meaningfully and centrally to the curriculum. Many teachers (56%) also explicitly report that they now believe that exploring works of art with students helps students learn to think and deepens their understanding of subjects in the curriculum. Several teachers (18%) also explicitly mention that art fosters student engagement, and that students find art interesting.

TEACHER RESULTS: Used to think…now I think about art in general

As we mentioned earlier, teachers reported more ideas related to the connection between art and the curriculum than about art in general. Nonetheless, there are some distinct ideas and shifts in this are as well. Teachers' ideas fall into the following 5 categories:

USED TO THINK about art in general
1. **Art has just one meaning**
2. **Art is for experts**
3. **Art is recreational, contemplative**

NOW I THINK about art in general
4. **Art has more than one interpretation or meaning**
6. **Art teaches us about ourselves.**

In teachers' own words:

- *I used to think art had one specific meaning.*
- *I used to think art was meant to have the same meaning the artist wants others to know.*
- *I used to think art was for recreation, or contemplation/ meditation, trying to figure out what the artist was trying to say with his/her work.*
- *I used to think that interpretation was already known by "experts."*
- *I used to think that art was not meaningful time—that I could not make sense of it.*

About a quarter (24%) of the teachers reported thinking that works of art had just one meaning or interpretation, often the one intended by the artist.. Several teachers seemed to feel that some sort of expertise was needed to appreciate or interpret art (16%), and several explicitly mentioned feeling that art was inaccessible or uninteresting to them (16%). A few teachers talked about art as recreational or contemplative (8%)

Teachers' participation in the program seems to provoke a shift in some of these ideas. They report:

- *Now I think about how complex meaning can be drawn in many ways from a piece.*
- *Now I think that art can…give all students [of] all abilities the power/voice of interpretation.*
- *Now I think art can teach us more about ourselves.*

About a quarter of teachers (24%) report a shift from thinking that works of art only had a single "right" interpretation to thinking that works of art can have many different interpretations, generated by many different people, including students. A modest number of teachers (18%) explicitly report that they have come to feel that art is personally meaningful to their own lives.

Discussion: Regarding teachers' ideas about art and the curriculum, the biggest conceptual shift is away from the idea that art is unconnected to the central goals of the curriculum and towards a view that art can provide powerful opportunities for learning. As a consequence of their involvement in the AT program, teachers seem less inclined to think of art as a frill, or a motivational activity and more inclined to view it as an important classroom activity in its own right. Regarding teachers' ideas about art in general, the largest shift seems to be away from a view that works of art have only one interpretation—typically represented as the artist's intention or the view of an expert--and towards a view of art as affording multiple valid interpretations from multiple perspectives, including interpretations constructed by teachers themselves and their students. It is interesting to consider this shift alongside the similar shift in students' thinking, in which students moved from perceiving art as monolithic in nature – just painting, just "one message" – to perceiving art as involving many forms and having many meanings. In their shared recognition of the multiple possible meanings of works of art, teachers and students seem to be traveling on a path together.

STUDENT CONCEPT MAPS

Overview. The foregoing study, "Used to think…Now I think," explores students' and teachers' changing perceptions of art. In keeping with our interest in exploring conceptual change, we also decided to look closely at the ideas students hold about the nature of good thinking in general. Our goals were threefold: (1) to explore the general characteristics of students' concepts of good thinking, (2) to explore whether, and how, students concepts of thinking change as a result of the AT program, and (3) to create an experience for students that allowed them to reflect on, and make visible to themselves, their own ideas about thinking. To achieve these goals, we developed a concept map instrument (sometimes called a mind map) to capture students' ideas about good thinking. (see figure xx).

We stress that the Concept Map instrument was not created to measure the overall effects of the AT program. Its purpose was to provide a window into the kinds of ideas students hold about thinking, and how these ideas might change as a result of exposure to the AT program. What the instrument

does not measure is the ways in which the ideas students hold about thinking affect their intellectual behavior. For example, suppose a student holds the belief that good thinking involves looking at things from different points of view (a belief that might be reported in his or her concept map). Knowing that the student holds this belief suggests that the student is aware of this type of thinking and seems to value it. One might even go so far as to surmise that the student has the conceptual apparatus to recognize and engage in this type of thinking. What we can't know, based on what the student has told us, is whether the student has the *ability* to engage in this type of thinking. To know that, we'd need to ask the student to demonstrate the taking of different points of view in relation to a particular problem or topic (such as the revised CAAP assessment is designed to do), for instance by presenting a situation and asking the student to write about it from several points of view.

So why look at students' concepts of thinking, if they don't tell us anything about students' ability? Two reasons. First of all, research suggests that there is good reason to believe that students' concepts about intelligence and thinking *do* affect their intellectual performance. For example, the earlier section on thinking dispositions mentions research by Dweck and others that shows that the different beliefs students hold about the nature of thinking and learning are correlated with different outcomes on measures of thinking (Dweck, 2000; Cacioppo, Petty, Feinstein and Jarvis,, 1996). So having a better understanding of the ideas students associate with good thinking can give us a better idea of the kinds of thinking strategies they may have in their repertoire. Having the idea of something in repertoire doesn't guarantee that it will be used, of course. But it is a *prerequisite* for use – a necessary but not sufficient condition.

The second reason to examine students' concepts of thinking is the connection to the idea of thinking dispositions, on which the Artful Thinking program is based. Recall that idea of thinking dispositions identifies three components that need to be in place in order to successfully teach good thinking: ability, inclination, and sensitivity (see the foregoing section on thinking dispositions.) We have argued elsewhere that teaching ability alone is not sufficient to insure good thinking, since all it does is help students engage in "performance on demand" (Perkins, et al., 2000). The concept map data may not tell us about students' thinking abilities, but they do give us information about students' *sensitivities* regarding thinking. This is because the concept maps straightforwardly ask students to write about the intellectual behaviors they believe are called for, in situations that ask them to think. What a student notices as "being called for" is a self-report of an intellectual sensitivity, because the student is effectively saying, "I look for [i.e. I am sensitive to] these kinds of thinking occasions."

As with the "ability" component of the dispositional triad, having a sensitivity doesn't guarantee that one will enact it. For example, one might be generally sensitive to the importance of looking at

things from multiple points of view, but, in a particular situation, possess neither the inclination nor the ability to do so. Like ability, sensitivity is a necessary but not sufficient condition for good thinking. But unlike ability, the presence of sensitivity is rarely measured. This is the value of the concept map tool – to provide a window on the sensitivities students hold about thinking in general, and whether these sensitivities change as a result of the intervention.

Procedure. The concept map was administered to three grades – 4th, 5th, and 6[th-]—at three different times: at the beginning of the Artful Thinking program, near the end of the first year, and at the beginning of the second year. It was not possible to track the 6th grade students when they left elementary school and went to middle school for 7th grade. Therefore, only two of the groups completed the activity 3 times. The youngest group is Group 1: grade 4,4,5. This group did the first concept map in September of their 4th grade year, the second concept map in May of their 4th grade year, and the third concept map in March of their 5th grade year. Group 2, grade 5,5,6, followed the same pattern – they did the concept map activity in the beginning and end of 5th grade and the beginning of 6th. The third group is Group 3: grade 6,6. This group did the activity twice: once at the beginning of 6th grade and again at the end. As we mentioned, these students were not tracked once they entered middle school and therefore there is no t3 data for this group. Following the same procedure, the concept map was administered to a control group of students at a commensurate nearby elementary school who did not receive the intervention. There were 359 students in both groups combined.

Figure1. Example of student concept map

Coding. The coding process was lengthy and involved several iterations of coding categories. Students' responses can seem ambiguous, and we wanted to be sure not to wrongly interpret their

words. At least two independent raters both coded a third of the data to insure reliability. For the results that follow, inter-rater reliability was 83%.

Results

The data were coded into 9 categories. The first 8 categories are descriptive of both groups of students' concepts of thinking – control and experimental. They do not capture changes in students' thinking as a result of the program. Rather, they describe broad categories of thinking into which students' ideas cluster. Category 9 *does* capture some important changes in students' thinking, and we discuss these findings in detail, devoting an entire section to them. But first we present the findings in categories 1-8, urging that they not be dismissed as unimportant. They are important because they tell us something about the "building blocks" of students' concepts of thinking – the chunks, or categories, out of which their specific ideas are comprised. As we report results for each category, we construct an evolving artificial concept map as we go along, to illustrate what the data actually looked like and to give a sense – albeit artificial – of a representative concept map.

Category 1: Objects of thought. The concept map activity asks student for their ideas about thinking. Not surprisingly, many of students' ideas have to do with *what* they think about. Many ideas fall into this category. E.g., "*I think about what I am going to do when I get home." "I think about my dreams." " I like animals" "shopping" "movies" "books".* Not unexpectedly, this is the highest-scoring category, capturing roughly a third of students' responses. Though it is of interest to consider the kinds of topics students have in mind when they think about thinking, an analysis of these data isn't directly relevant to the main purpose of this study, which is to characterize to the kinds of ideas students have about the process of thinking. So we don't report the results here.
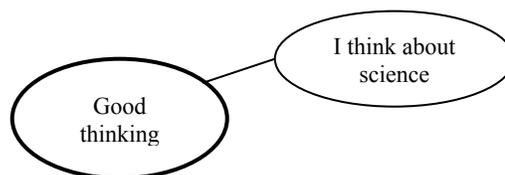
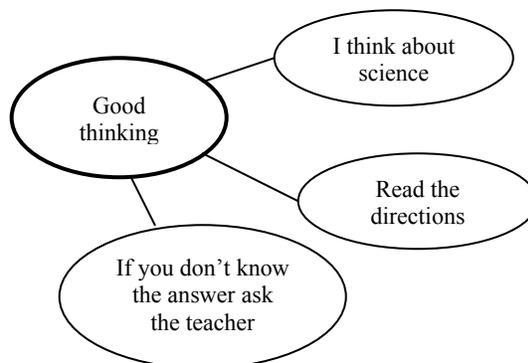Concept map with 1 node – an object of thought.

Categories 2-9: Kinds of thinking. Beyond having ideas about objects of thought, students have plenty of ideas about kinds of thinking that are important. In what follows, we describe each coding category, giving examples of students' ideas as we go along.

Category 2: Basic strategies. Most students had at least one idea in this category. Basic strategies are procedural ideas about thinking that don't touch on the areas of the Artful Thinking palette, and that typically don't demonstrate high-level or critical thinking. They have to do with basic comprehension or basic, subject-specific procedures. Student ideas in this area include: *"read the directions." "add the numbers together.," ""read it over," "read it slowly," "guess the answer."*
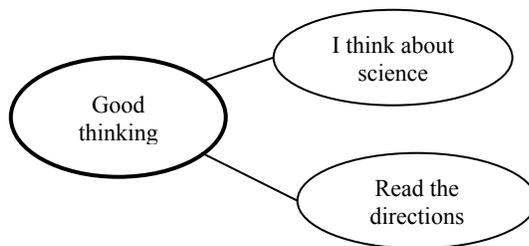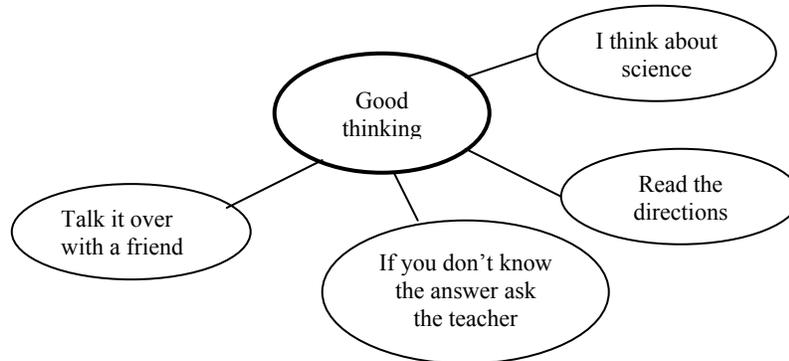

Concept map with Object of Thought and Basic Strategies.

Category 3: Authority seeking. Several students had ideas that related to asking an authority for information . For example, example, students said things like: "*See a teacher." "get help" "Ask the teacher for help" "listen to what the teacher says."*
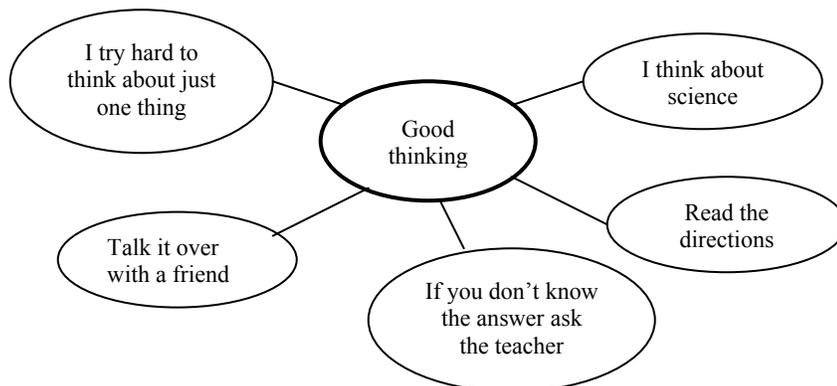
Concept map with Object of Thought, Basic Strategies and Authority seeking.

<u>Category 4: Social co-thinking</u>. In addition to looking for authority for assistance, students have some ideas about seeking assistance from their peers. For example, students said things like: "*Working in a group" "I work with a partner." "Ask someone else other than a teacher." "Ask a friend to help you."*
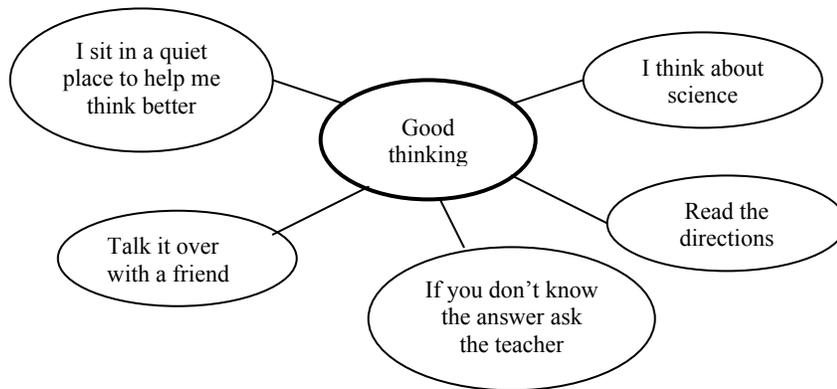

Concept map with Object of Thought, Basic Strategies, Authority seeking and Social co-thinking.

<u>Category 5: Self management-attitude</u>. Many students have ideas about how to manage their attitude or effort in thinking situations. This category captures ideas that explicitly indicate managing one's focus or effort, or intentionally making an effort to do one's best. Ideas in this category include: *I think to myself I can do it. I try to think hard on the subject. Concentrate on just <u>one</u> thing. Focus on the question.*
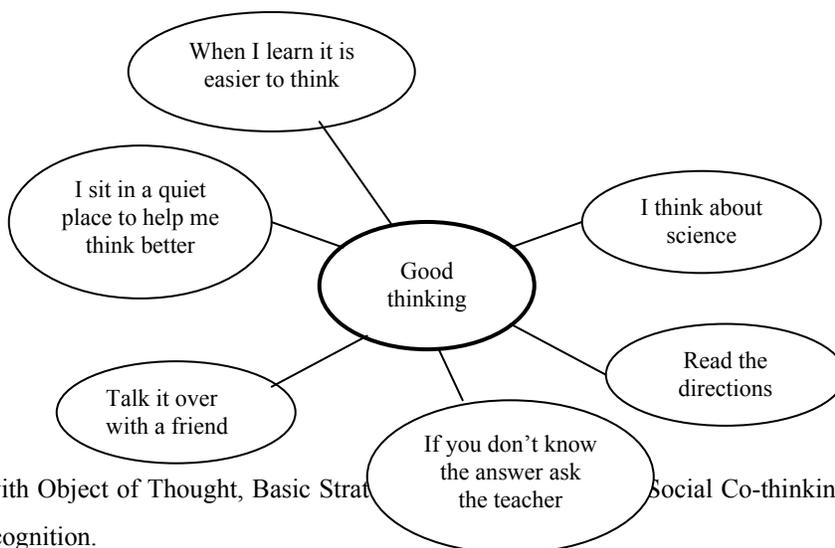
Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking and Self-management

Category 6: self-management – body. Students also have some ideas about how to manage their bodies and their environment in order to do good thinking. They mention ideas like: *Go to a quiet room to think better. Chew gum. Eat a good snack. Relax. Stay calm.*
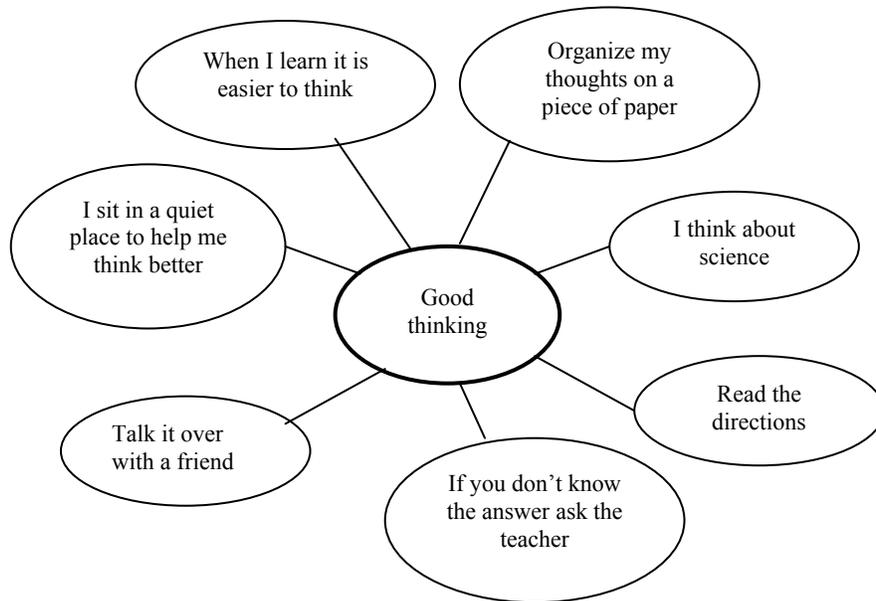

Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking and Self-management – body.

Category 7: Metacognition. In addition to managing their effort and their physical context, students sometimes respond to the task with comments that show that they have explicit thoughts about the nature of thinking itself. For example, they say things like: *I can do different kinds of thinking in different subjects. Thinking is hard and sometimes it is easy. Thinking makes you learn.*

Concept map with Object of Thought, Basic Strategies, Social Co-thinking, Self-management – body and Metacognition.

Category 8: Distributed cognition. Students frequently mentioned ideas that had to do with writing things down or otherwise "distributing" the effort of thinking onto paper. Their ideas include things like: *Jot things down. Sometimes I write it on paper. Write what's on your mind. Make a list. Make a web.*

Concept map with Object of Thought, Basic Strategies, Authority seeking, Social Co-thinking, Self-management – body, Metacognition and Distributed cognition.

## Category 9: Total palette

The total palette category captures and combines all the ideas students have about thinking that seem conceptually connected to the thinking dispositions on the Artful Thinking palette. It is the one coding category in which we see significant differences between the control and experimental group. We had hoped to be able to look at each palette area separately, to see whether there was more growth in some areas more than others (for example, do students mention more ideas in the area of questioning and investigating than in the area of observing & describing?), and whether there were correlations between areas of change (for example, do students' ideas about reasoning increase at the same rate as their ideas about finding complexity). Unfortunately, the numbers of student responses

within each palette area are so small that statistical tests are uninformative about changes at this level.

In what follows, we start by providing some examples of students' responses in the "total palette" category. Although the numbers in the total palette category combine students' ideas across the palette, we give examples in each palette area, in order to communicate the flavor of students' ideas overall. Then, we discuss two research questions addressed by the findings in this category and describe the findings relative to each question.

Student responses. The ideas that comprise this category are drawn for students ideas in each palette area, plus ideas that we have labeled "multi-palette." A multi-palette response is an idea that seems to touch on more than one palette area.

- Observing & describing: *Make observations; use words to describe.*

- Reasoning: *I see if my answer is reasonable; see if I can find a way to prove it*

- Questioning & investigating: *Ask questions; [ask] what you wonder.*

- Comparing & Connecting: *Think of something similar; compare something; think about past experiences.*

- Exploring viewpoints: *I look at it in different ways; Always think of a different way of putting it. I think how it felt then.*

- Exploring complexity: *Break the sentence down; break into sections; Take little ideas and make it into a bigger one*

- Multi-palette: *Explain your thinking, try different ways to figure out the question, Think about brainstorming to explore different answers*
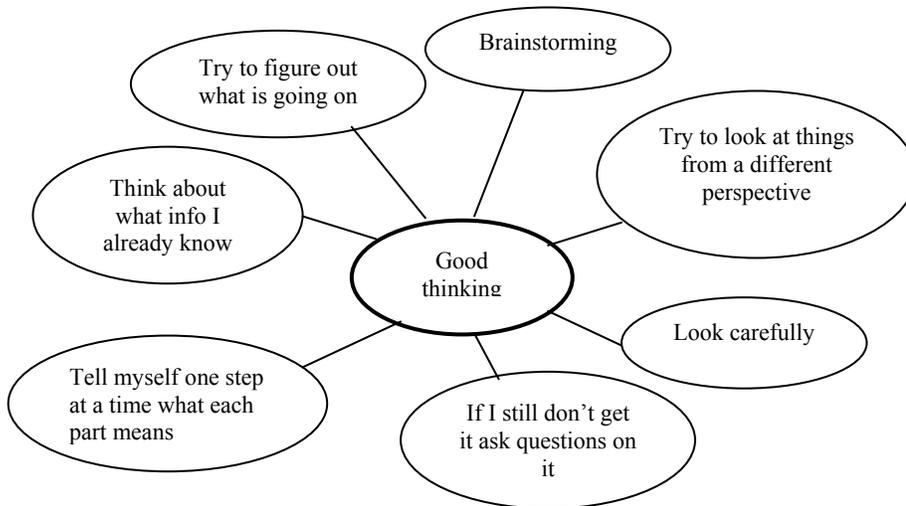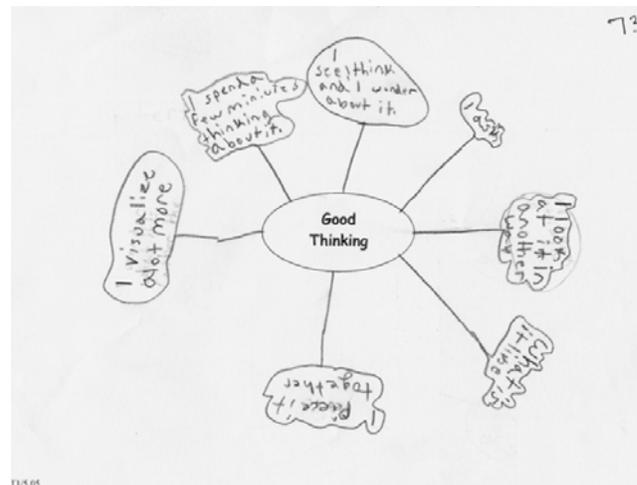
concept map with representation of all palette areas.

5th grade student map from intervention school

6th grade student map from intervention school

Two research questions about the Student Concept Map Data

There are two key questions the findings in the total palette area address. The first question has to do with whether children's ideas about thinking connect to the Artful Thinking palette, independent of the intervention. The second question has to do with whether the intervention has had any effect on students' ideas about thinking related to the palette. We discuss the findings in the order of the questions.

Question #1: How do children's ideas about thinking connect to the Artful Thinking palette, independent of the intervention?

A basic tenet of the Artful Thinking program is that the 6 thinking dispositions on the palette reflect ideas that are already present, albeit tacitly, in students' existing concepts of thinking. This constitutes one of the perceived strengths of the Artful Thinking program -- that it builds on, and expands, some of the everyday ideas about thinking that students already possess. The same principle underlies the thinking routines. The basic idea of thinking routines is that they are accessible to children because they connect to ideas about thinking that children already have. So one question to ask of the findings in the total palette area is whether they provide any evidence in support of this basic premise of accessibility.

How should one look for this evidence? If the basic premise of the program is accurate – if students *do* hold ideas about thinking that connect to the dispositions on the palette, regardless of whether they have received the intervention – then we should expect to see evidence of these ideas *in the control group's concept maps at t1, t2, and t3*. Further, because the control group was tracked over time (4th through 6th), we should also be able to see whether there are natural developmental patterns in their palette-related ideas as they get older.

In relation to the foregoing research question, the finding of note is that the control group does have ideas in the total palette category at every grade level, although the number of ideas that fourth graders have is quite small (see figure 2). This tells us that the thinking dispositions on the palette have a small but distinct presence in students' naturalistic ideas about thinking. Further, there seems to be a natural trajectory of growth in these ideas. We know this because, although the control group did not receive the intervention, their ideas in the "total palette" area increase significantly over time (p<.05).
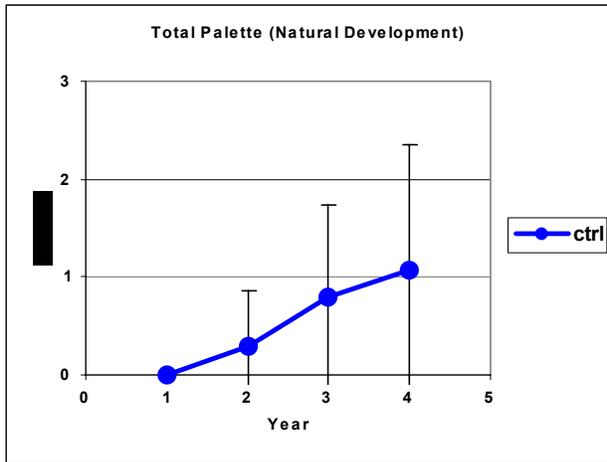
Figure 2: Developmental trajectory based on Control group data

To make sense of the chart, recall that 4th, 5th and 6th graders did the concept maps activity at the beginning and end of the school year. There is no significant difference between the scores at the end of one grade and the beginning of the subsequent grade (e.g. the end-of-year 4th graders score about the same as the beginning-of-the-year 5th graders). This gives us 4 data points across which to chart a natural trajectory of growth:

point 1 = beginning of 4th grade;
point 2 = end of 4th/beginning of 5th
point 3 = end of 5th/beginning of 6
point 4 = the end of 6th grade.

What the chart tells us is that students seem to naturally acquire more palette-related ideas about thinking as they get older. 5th graders have significantly more ideas than 4th graders, and the number of ideas rises again in 6th grade, although the difference between 5th grade and 6th grade (points 3 and 4) is not statistically significant. (p <.05) (Recall that we don't have t3 data for 6th grade, so we can't know whether this gradual rise continues.)

Question #2: has the intervention had any effect on students' ideas about thinking related to the palette?

We now turn to the effects of the intervention itself: How does the intervention affect the number of ideas students' have in the total palette area? The finding of note here is that the intervention seems to cause students to have considerably more ideas in this area than the control group does, with the sharpest rise in the number of their ideas between t1 and t2. Below are three charts, corresponding to the three experimental groups, Group 1: grade 4,4,5; Group 2: grade 5,5,6; and Group 3: grade 6,6. The charts mark the rate of increase in each group's ideas. They are overlaid onto the chart of the control group's development (figure 2 above) to illustrate how the rate of development of the experimental group compares to the natural trajectory of development of the control group.
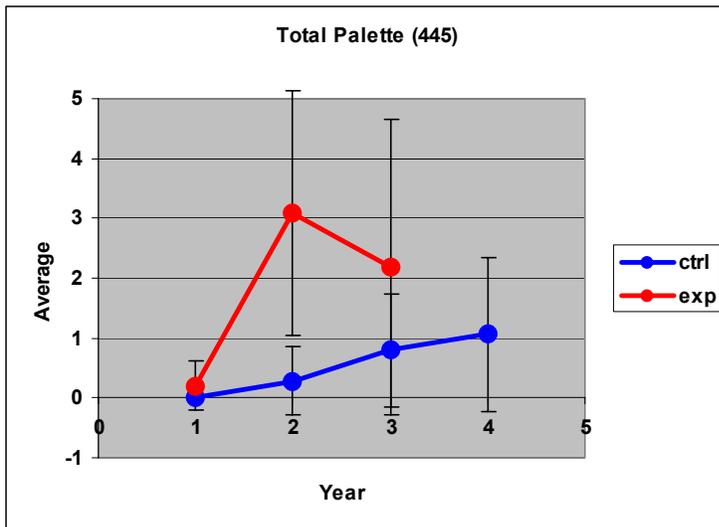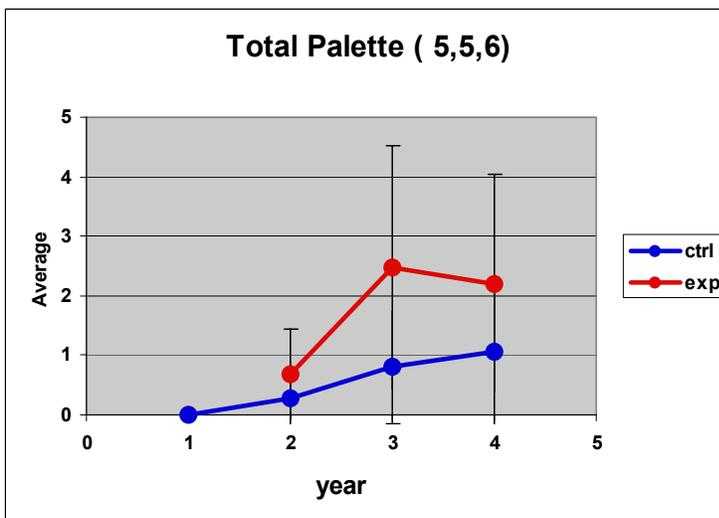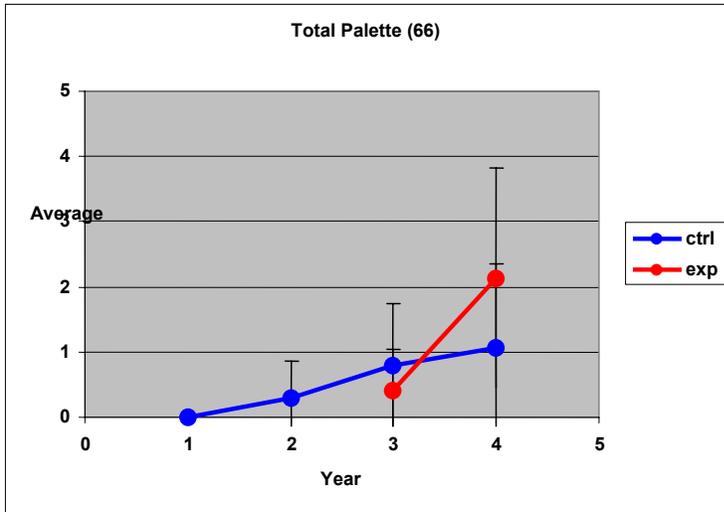

figure 3

figure 4

figure 5

The charts (figure 3,4,5) tell us three things. First of all, we see that at t1, all grades in the intervention group score similarly to their counterparts in the control group. There are no statistically significant differences in the t1 scores of the control and experimental groups at each grade. So it is reasonable to assume that the intervention group would have followed the same course of natural development taken by the control group if they had not received the intervention.

Secondly, the charts show that across all the grades, the largest effect of the intervention on students' palette–related ideas seems to occur in the first year. Across all grades in the experimental group, there is a statistically significant increase, at each grade level, from their t1 scores to their t2 scores. After year one, the increase levels off, and may even decrease slightly, although none of the decreases across the grades from t2 to t3 are statistically significant.

Thirdly, the charts show us that the experimental group's initial increase is to a level that is considerably higher than that reached naturally by sixth graders in the control group, and that this increase is sustained, even taking into consideration the slight decrease from t2 to t3. In other words, the program seems to cause an early and sharp acceleration in students' rate of conceptual development in the total palette area, relative to the natural trajectory of growth in this area for students without the intervention. Notably, the growth is most dramatic for 4th graders, the youngest students in the study.

Summary and Discussion

The categories into which students' ideas about thinking cluster provide an interesting picture of their

concepts of thinking. Regardless of whether they received the intervention, students most often report their *objects of thought* – the things the think it is important think about. But they also report being sensitive to occasions in which several different *kinds* of thinking are called for. For example, students report that they notice occasions when it is important to think in ways that focus on basic comprehension and simple procedures, mentioning occasions when it is important to "read the directions," "read slowly," and "add the numbers." Students also are sensitive to the need to seek assistance when they are trying to think well, for instance by asking authority figures such as teachers for help, as well as asking their peers. Students are by no means entirely reliant on the guidance of outsiders, however, and they have several ideas about how to manage their own thinking. These ideas are of two kinds – ideas about how to manage their own attitudes, mainly by telling themselves to focus or concentrate, and ideas about how to manage their bodies and physical environments, for example by using the right pencil, finding a quiet spot, eating a good breakfast. Students also understand the value of "downloading" some of the effort of thinking onto paper, by "jotting things down," taking notes, and "making a web."

The foregoing kinds of ideas appear with about the same frequency on the concept maps of both the control and experimental groups, suggesting that the AT program doesn't seem to have any significant effects on students' ideas in these areas and the program fits comfortably with students' existing ideas about thinking overall.

The story changes somewhat when we look at the ideas students have about thinking that relate to the Artful Thinking palette specifically. The first thing to note is that both groups have some ideas in this area. For example, both groups mention the importance of asking questions (questioning & investigating dispositions), making careful observations (observing & describing disposition), breaking things into parts to make a bigger whole (finding complexity disposition), and so on. But while students in both groups hold ideas in these areas, we see the number of ideas the experimental group hold increase quite dramatically in the early stages of the program. Recall that the experimental group has been using thinking routines in the classroom – routines that were designed to embody the thinking dispositions on the palette. So a straightforward explanation of the experimental group's increased rate of palette-related ideas is that students are internalizing palette-related ideas and strategies through their use of thinking routines and incorporating them into their concepts of thinking at a faster rate than their control group counterparts. In other words, when AT students talk about what good thinking is, they are more likely to mention things that have to do with the 6 palette areas – reasoning, observing & describing, questioning & investigating, exploring viewpoints, comparing & connecting and exploring complexity. Moreover, this marked increase in their sensitivity to these areas occurs early on in the program, when it spikes up to a level above that

of 6th graders who haven't been involved in the program, and maintains that level over time. The spike is most precipitous for 4th graders, though it is significant at all grades. This suggests that there may be a developmental window of opportunity around 4th grade, when students are especially susceptible to changing the way they think about thinking.

A question that naturally arises is whether these patterns of findings are different for different subgroups of students. We mention this because during the course of the two-year program, many teachers reported that academically challenged and special needs students seemed to derive an particularly strong benefit from the program. These anecdotal reports bring to mind an earlier related study we conducted (Tishman, MacGillivray, & Palmer, 1999). The study focused on the Visual Thinking Curriculum, which foregrounds the use of a reasoning thinking routine (the "what makes you say that" routine) to talk about art. In that study, we found that low-achieving students experienced greater gains in their reasoning abilities than high achieving students, although students of all ability-levels experienced significant gains. Given this backdrop – TCAPS teachers' anecdotal reports and the MoMA study – it makes sense to look at the concept map findings for special needs students in particular, to see whether there are any distinct patterns. To do this, we need to be able to look at a sufficient number of maps from a group of students at each data point (t1,t2, t3) or a sufficient number of matched sets of the special needs subgroup (a matched set is comprised of a set of concept maps at t1, t2, and t3 from the same student). Unfortunately, because the class make-up varies as students change grades, we did not have a large enough sample of maps from specials needs students overall, and there are only two fully matched sets of data for individual special needs students, making it impossible for us discern any particular trends.

In summary, to understand the pattern of findings around the concept maps, it is important to remember that the concept maps do not measure students' thinking abilities directly. Rather, they give us information about the kinds of ideas that populate students' *concepts* of thinking and how these ideas change as a result of the intervention. Why do students' concept os thinking matter? Because they relate to ability in two ways: First of all, as we mentioned earlier, research suggests that students' concepts of thinking – especially their ideas about what counts as good thinking -- are often causally related to their intellectual performances (Dweck 2000, Stanovich and West, 1997, Langer, 1989). While TCAPS students in both the experimental and control groups have ideas related to the palette, the experimental group's ideas are far more populous. This may indicate that students in the experimental group are more likely to engage in these forms of thinking.

The second way that the findings reported here relate to students' overall thinking ability is in the "sensitivity" dimension of thinking dispositions. Project Zero researchers and others have argued that

good thinking is dispositional in nature, pointing out that it is not enough simply to have the requisite thinking skills, one also needs more – for instance, the inclination to engage in good thinking and the sensitivity to occasions to do so (Perkins, Jay, & Tishman, 1993). The concept map data relate to the sensitivity dimension of dispositional development because they tell us about the kinds of thinking occasions students report being sensitive to. For example, most students—control and experimental – report being sensitive to situations that invite basic comprehension, to situations that invite the input of an expert, to situations that invite some form of self-management, and so on. What is distinctive about the concept maps of the experimental group is that they indicate increased sensitivity to occasions of palette-related thinking. In other words, students who have been involved in the Artful Thinking program "see" their thinking landscape as having more invitations to think along the lines of the Artful Thinking palette than do their counterparts in the control group – they see more invitations to make careful observations, more invitations to explore points of view, more invitations to explore complexity, more invitations to reason carefully. If one of the goals of the Artful Thinking program is to cultivate students' sensitivity to occasions to think, then this is a very good sign.

Concluding Thoughts

There is an ongoing debate among educators about the proper purposes and goals of arts education, and one corner of the debate is often framed as a tension between "instrumental v. intrinsic goals" (Winner & Hetland, 2000; McCarthy, Ondaatje, Zakaras, & Brooks, 2005). Should the arts be taught because they are instrumental in achieving other academic benefits, such as numeracy or literacy? Or should they be taught because they are good in themselves, for their own sake, independent of their effects on other areas of intellectual performance? A positive consequence of this debate is that it warns us about the dangers of trying to secure a place for art education in the curriculum by linking it to achievement outcomes in other disciplines. But a negative consequence of the debate is that it runs the risk of artificially narrowing the natural scope of the arts by suggesting that they are a realm unto themselves. As the *"Used to think… Now I think"* findings make clear, teachers and students find it quite natural to make all kinds of disciplinary and personal connections when thinking deeply about works of art. Some of these connections may be intrinsic to the intentions of the artist or context; some may be unique to the viewer and the moment. Perhaps more than any other discipline, the arts are *not* a realm unto themselves. Works of art are wildly and gloriously far-ranging in what they are about and in how they stimulate the mind, making it natural for those who contemplate art to make connections to an enormously wide range of human experiences.

In conclusion, we return to the topic of the conference for which this article was originally written: What should we look for when evaluating the impact of arts education? One thing we might look for is evidence that students' ideas about the purpose and scope of art have expanded, thus allowing art to do more of its natural "work" in opening students up to big ideas. The *Used to think...Now I think…* study reported here is one way to do that, because it shows how learners themselves perceive the deepening and expansion of their ideas about art. This seems to straightforwardly be an intrinsic outcome of art education. But what about the goal of using art to help develop students' thinking dispositions more generally? This is where the polarization of instrumental and intrinsic goals gets tricky. One deep connection between looking at art and learning to think is this: By both design and default, art naturally invites deep and extended thought. Works of art naturally encourage us to think – about the works themselves and about ideas beyond them. To the extent that we embrace this, then another thing to look for when evaluating the impact of arts education is evidence that students *are* seeing more occasions to think deeply about things – in works of art and beyond. This is what the *Student Concept Map* study shows us – that students' tendency to notice occasions to engage in the forms of thinking represented on the Artful Thinking palette increase as a result of the intervention – forms of thinking such as exploring point of view, making comparisons, forming reasoned interpretations, and so on. Students readily engage in these forms of thinking when thinking about art, and it changes they way they conceptualize art, as the *Used to think...Now I think…* study shows. But they are also alert to the usefulness of these forms of thinking in other things they study, as the concept map study shows. We may worry about disciplinary boundaries, but students seem to find it quite natural to make a connection between thinking deeply about works of art and thinking deeply about other things. To ask whether this is an instrumental or intrinsic end of art education seems to miss the point of art in the broadest sense.

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