

Translations

THE NATIONAL ART EDUCATION ASSOCIATION

WINTER 2001

Volume 10, No. 1

A Refereed
Publication

The Arts and Academic Improvement: What the Evidence Shows

Executive Summary
Harvard Project Zero
Reviewing Education and the Arts Project (REAP)

Funded by the Bauman Foundation, Ellen Winner, Principal Investigator, Boston College and Harvard Graduate School of Education
 Lois Hetland, Project Manager, Harvard Graduate School of Education

Instrumental Claims for the Arts Are Often Invoked

The arts have typically played a relatively unimportant role in American schools. Arts educators have tried to strengthen the position of the arts in our schools by arguing that the arts can be used to buttress the 3Rs. The arts, they said, could help children learn to read and write and calculate and understand scientific concepts. The reasoning was clear: perhaps schools under pressure would value the arts because the arts strengthened skills in "valued" areas. This approach became a favored strategy in the United States for keeping the arts in the schools

and for making sure that every child had access to arts education.

Instrumental Claims are a Double-Edged Sword

There is a danger in such reasoning. If the arts are given a role in our schools because people believe the arts cause academic improvement, then the arts will quickly lose their position if academic improvement does not result, or if the arts are shown to be less effective than the 3Rs in promoting literacy and numeracy. Instrumental claims for the arts are a double-edged sword. It is implausible to suppose that the arts can be as effective a means of teaching an academic subject as is direct teaching of that subject. And thus, when we justify the arts by their secondary, utilitarian value, the arts may prove to have fewer payoffs than academics. Arts educators should never allow the arts to be justified wholly or even primarily in terms of what the arts can do for mathematics or reading. The arts must be justified in terms of what the arts can teach that no other subject can teach.

What is the Evidence for Instrumental Claims?

What is the research base on which instrumental claims for arts education are made? REAP has conducted the first comprehensive and quantitative study of

what the research on academic outcomes of arts education really shows.

Comprehensive Syntheses of 188 Reports (275 Effect Sizes)

REAP conducted a comprehensive search for all studies from 1950-1999 (published and unpublished, and appearing in English) that have tested the claim that studying the arts leads to some form of academic improvement. Searches turned up 11,467 articles, books, theses, conference presentations, technical reports, unpublished papers, and unpublished data. Irrelevant reports were then weeded out, along with advocacy pieces and program descriptions lacking an empirical test. One hundred eighty-eight reports investigating the relationship between one or more arts areas to one or more academic areas were retained

A total of 275 effect sizes were then calculated. An effect size r is a number ranging from -1.0 to $+1.0$ that represents the strength of the relationship between two variables. An effect size of $+1.0$ would mean a perfect positive correlation between two variables, e.g., the more air you put in your tires, the greater the air pressure. An effect size r of $.10$ is considered small in size, comparable to the difference in height between 15 and 16 year old girls (.5 inches). An effect

Reproduced by
 Permission
 from
 Harvard Project Zero

size r of .24 is considered medium in size, comparable to the average height difference in 14 to 18 year old girls of one inch. And an effect size r of .37 is considered large in size, equivalent to the difference in IQ between typical college freshmen and those who have attained doctorates.

A set of 10 meta-analyses were conducted. A meta-analysis combines and compares effect sizes across groups of studies that address similar research questions. Statistical analyses are then used to determine whether the effect size can be generalized to new studies on the same research question. If the effect size cannot be generalized to new studies, we must conclude that the finding is not reliable and is not likely to hold up.

Three areas were found in which a substantial number of studies have demonstrated a clear causal link between education in an art form and achievement in a non-arts, academic area. The effect sizes found in these three areas ranged from small to large. Although small or medium differences may seem trivial, they may in fact turn out to be of practical importance. For instance, the relationship between taking an aspirin a day and reduction of heart attack risk is only $r = .03$! Thus when judging the value of any intervention, we must attend not only to the size of the effect but also to the importance of the outcome compared to the cost of the intervention in effort and dollars. If a small effect size is due to scores on standardized tests of mathematics increasing an average of 3 points, that seems of little consequence. However, if a small effect size is due to even a few children staying in school as opposed to dropping out, that is of great consequence.

We found three areas in which clear causal links could be demonstrated. However, in seven other areas no reliable causal link was found. The lack of findings in these seven areas is attributable to one or more of three factors: in some cases the failure to find a causal link probably reflects the fact that there is in fact no causal link; in some cases a causal link was found but it

was not strong enough to be reliably generalized to other studies; and in other cases, the lack of findings may have been due to the small number of studies carried out on a given research question.

Three Areas Where Reliable Causal Links Were Found

Listening to Music and Spatial-Temporal Reasoning: Based on 26 reports (36 effect sizes), a medium-sized causal relationship was found between listening to music and temporary improvement in spatial-temporal reasoning. However, there was wide variation in the studies, with some showing the effect clearly and many not showing the effect at all. Moreover, the existing research does not reveal conclusively why listening to music affects spatial-temporal thinking. For education, such a finding has little importance, since it is temporary and not consistently found. Scientifically, however, this finding is of interest because it suggests that music and spatial reasoning are related psychologically and perhaps neurologically as well. Further research is needed to understand the mechanism by which certain types of music influence spatial skills.

Learning to Play Music and Spatial Reasoning: Based on 19 reports (29 effect sizes), a large causal relationship was found between learning to make music and spatial-temporal reasoning. The effect was greater when standard music notation was learned as well, but even without notation the effect was large. The value for education is greater here, since the effect works equally for both general and at risk populations, costs little since it is based on standard music curricula, and influences many students (69 of every 100, 3-to-12 year old students). Of course we must still determine the value of improved spatial skills for success in school. Spatial skills might or might not be of benefit to students, depending on how subjects are taught. For example, mathematics or geography might be taught spatially, and if they are, then students with strong spatial abilities should have an advantage in these subjects. Sadly, many schools offer few chances to apply spatial abilities.

Classroom Drama and Verbal Skills: Based on 80 reports (107 effect sizes), a causal link was found between classroom drama (enacting texts) and a variety of verbal areas. Most were of medium size (oral understanding/recall of stories, reading readiness, reading achievement, oral language, writing), one was large (written understanding/recall of stories), and one was small and could not be generalized to new studies (vocabulary). In all cases, students who enacted texts were compared to students who read the same texts but did not enact them. Drama not only helped children's verbal skills with respect to the texts enacted; it also helped children's verbal skills when applied to new, non-enacted texts. Thus, drama helps to build verbal skills that transfer to new materials. Such an effect has great value for education: verbal skill is highly valued, adding such drama techniques costs little in terms of effort or expense, and a high proportion of students are influenced by such curricular changes.

Seven Areas Where No Reliable Causal Links Were Found

Arts-Rich Education and Verbal and Mathematics Scores/Grades: Based on 31 reports (66 effect sizes), a small to medium correlation was found between studying the arts and academic achievement as measured primarily by test scores. However, no evidence was found that studying the arts causes academic indicators to improve. The correlational findings can be explained by non-causal mechanisms. For example, high achieving students (no matter what their ethnic or racial group, no matter what their social class) may choose or be guided to study the arts. This would then result in the finding that students who take arts courses are also high-achieving, high test-scoring students.

Arts-Rich Education and Creative Thinking: Based on 4 reports (6 effect sizes), no relationship was found between studying arts and verbal creativity test measures. A small to medium sized relationship was found between studying arts and figural creativity tests (which themselves are visual tests) but this relationship could not be generalized to new studies.

Learning to Play Music and Mathematics: Based on 6 reports (6 effect sizes), a small causal relationship was found between music training and math. However, while 3 of these studies produced medium effects, 3 produced either very small effects or none at all. Thus, more studies are needed before any firm conclusions can be drawn.

Learning to Play Music and Reading: Based on 6 reports (6 effect sizes), a small relationship was found between music and reading but this relationship could not be generalized to new studies.

Visual Arts and Reading: Based on 5 reports in which visual arts was taught separately from reading (7 effect sizes), a very small relationship between visual arts and reading was found, but this relationship could not be generalized to new studies. This effect was entirely due to reading readiness outcomes (which are themselves visual), and did not hold up for reading achievement outcomes. Based on 4 reports in which visual arts were integrated with reading instruction (4 effect sizes), a medium sized relationship was found between integrated arts/reading instruction and reading outcomes. However, this result could not be generalized to new studies.

Dance and Reading: Based on 4 reports (4 effect sizes), a small relationship between dance and reading was found, but this relationship could not be generalized to new studies.

Dance and Nonverbal Reasoning: Based on 3 reports (4 effect sizes), a small to medium sized causal relationship was found between dance and improved visual-spatial skills. The value of this effect is unclear, since it is based on so few reports.

Policy Implications

These mixed findings should make it clear that, even in cases where arts programs add value to non-arts academic outcomes, it is dangerous to justify arts education by secondary, non-arts effects. Doing so puts the arts in a weakened and vulnerable position. Arts educators must build justifi-

cations based on what is inherently valuable about the arts themselves, even when the arts contribute secondary benefits. Just as we do not (and could not) justify the teaching of history for its power to transfer to mathematics, we must not allow policy makers to justify (or reject) the arts based on their alleged power to transfer to academic subject matters

A Better Justification for the Arts in Education

Let's stop requiring more of the arts than of other subjects. The arts are the only school subjects that have been challenged to demonstrate transfer as a justification for their usefulness. If we required physical education to demonstrate transfer to science, the results might be no better, and probably would be worse. So, it is notable that the arts can demonstrate any transfer at all. Perhaps with more attention to how the arts foster transfer, we can understand how to exploit that capacity further. But even when the relationships are understood, we still maintain that the justification for arts programs must be based on their inherent merit.

Let's stop justifying the arts instrumentally. This is a dangerous (and peculiarly American) practice. Anyone who looks closely, as we have done, will see that these claims do not hold up unequivocally. Those who live by instrumental claims risk dying by such claims.

The arts offer a way of thinking unavailable in other disciplines. The same might be said of athletics. Suppose coaches began to claim that playing baseball increased students' mathematical ability because of the complex score keeping involved. Then suppose researchers set out to test this and found that the claim did not hold up. Would school boards react by cutting the budget for baseball? Of course not. Because whatever positive academic side effects baseball might or might not have, schools believe sports are inherently good for kids. We should make the same argument for the arts: the arts are good for our children, irrespective of any non-arts benefits that the arts may in some cases have. Just as a well-rounded

education requires education of the body through physical education, a balanced education requires study of the arts.

Let's bet on history. Of course, we do not know for sure what is the best education for children to ensure that they will grow up to lead productive and happy lives. But the arts have been around longer than the sciences; cultures are judged on the basis of their arts; and most cultures and most historical eras have not doubted the importance of studying the arts. Let's assume, then, that the arts should be a part of every child's education and treat the arts as seriously as we treat mathematics or reading or history or biology. Let's remember why societies have always included the arts in every child's education. The reason is simple. The arts are a fundamentally important part of culture, and an education without them is an impoverished education leading to an impoverished society. Studying the arts should not have to be justified in terms of anything else. The arts are as important as the sciences: they are time-honored ways of learning, knowing, and expressing.

Where Should Researchers Go from Here?

Researchers should try to make sense of the claim frequently made by schools that when the arts are given a serious role in the curriculum, academic achievement improves. While we should never justify the arts on non-arts outcomes, we believe there is value to the search for such links. Researchers should continue to look for, try out, and specify whether—and if so, how—the arts can serve as vehicles for transfer. Educators could then exploit this relationship.

We recommend two kinds of studies to advance our understanding of the relationship between arts and non-arts outcomes: theory-building studies and theory-driven experiments. Both types require rigorous methods. Here is an example of each type.

A Theory-Building Study: What Happens in Schools When the Arts are Given a Prominent Role?

Our research shows that studying the arts does not, in and of itself, lead to improved test scores. Yet schools with strong arts arts often report a rise in test scores. Why?

One possibility is that the same schools that treat the arts seriously institute other kinds of innovations that are favorable to academic learning. For instance, these schools may become more inquiry-oriented, more project-based, more demanding of high standards, and more focussed on processes that lead to excellence. Educators and policy makers need to understand what comes along with the arts.

To discover this, researchers need to carry out ethnographic studies of exemplary schools that grant the arts a serious role in the curriculum. What kinds of innovations have been made in these schools to foster excellence? If certain innovations are always found in schools that grant the arts a serious role, this finding could account for why schools with serious arts programs have high academic performance.

A Theory-Driven Experiment: Are the Arts Motivational Entry Points for Non-Academic Students?

While we oppose justifying the arts based on their secondary effects, there may well be educational value in programs that integrate the arts as vehicles that foster understanding of non-arts content. Perhaps the arts do cause academic achievement, but only for a certain type of student, and only when the arts are integrated with an academic subject. In schools that make the arts important, academic subjects are often taught “through” the arts. The arts are used as entry points into academic subjects (e.g., role-playing in history courses; analysis of rhythms in a proportions unit in mathematics). Perhaps certain students—those lacking academic interests or strengths in specific subjects—benefit. If these students experience success in the art form linked to the academic subject, they may then believe they can succeed in the academic subject. Or, if they experience success in the subject when it is viewed through an artistic lens, their willingness to stay with the subject may increase. Increased confidence should lead to increased motivation and effort, which in turn should result in higher achievement.

Experimental studies thus far have not tested this hypothesis. What is needed are comparisons of academically strong vs. aca-

demically at-risk students taught the same subject matter with and without the arts as entry points. Can we identify students who first experience success in the art form, and subsequently go on to show heightened interest and effort in the academic subject matter? And do levels of interest and/or motivation predict later achievement in that subject matter?

It is also possible that all students would benefit from an arts-integrated approach, even those who are high achievers to begin with, simply because an arts-integrated approach makes any subject more interesting. This hypothesis also deserves a rigorous test.

Research in the two directions suggested here can help us to understand the puzzling finding that when the arts are granted a serious role in our schools, academic achievement often rises. It is time to look seriously at the possibility that the arts are associated with academic achievement because of other academic innovations that are made in schools that bring in the arts, and/or because the arts provide engaging and motivational entry points into academic study for the many students who do not thrive in the structures and cultures of our schools today.

Acknowledgments

We are grateful to Ralph Smith, of the University of Illinois, for his interest in this project, and for his willingness to invite us to publish this work as a special issue of *The Journal of Aesthetic Education*. We thank him for his excellent editorial guidance.

REAP Research Team

Ellen Winner, Principal Investigator; Lois Hetland, Project Manager; Ron Butzlaff, Statistics Consultant; Mia Keinanen, Dance Specialist; Ann Podlozny, Drama Specialist; Kathryn Vaughn, Music Specialist; Kristin Burger; Monica Cooper; and, Erik Moga

Research Assistants

Lisa French, Kimberlee Garris, Nandita Ghosh, Jessica Gordon, Joanna Holtzman, Jenny Martin, Elisabeth Moriarty-Ambrozaitis, Brian Moss, Melissa Mueller, Leah Okimoto, Nina Salzman, and Daniel Schneider served as research assistants during various periods of this project.

Project Advisors

Howard Gardner, John H. and Elisabeth A. Hobbs Professor of Cognition and Education, Harvard Graduate School of Education; Richard Light, Professor, Harvard Graduate School of Education and John F. Kennedy School of Government David N. Perkins, Professor, Harvard Graduate School of Education; Robert Rosenthal, Edgar Pierce Professor of Psychology, Emeritus, Harvard University, Distinguished Professor, University of California, Riverside ; Judith D. Singer, Academic Dean and Professor of Education, Harvard Graduate School of Education

Funder

The Bauman Foundation supported the research reported here. We thank John Landrum Bryant, co-director of the Bauman Foundation, for his vision and generous support

The double issue of *The Journal of Aesthetic Education*, entitled **Special Issue: The Arts and Academic Improvement: What the Evidence Shows** (Vol. 34, No. 3-4, Fall/Winter 2000) can be ordered from the University of Illinois Press.

The Journal of Aesthetic Education is item number JAE-1055. To order from the University of Illinois Press contact: Journals Division, University of Illinois Press, 1325 S. Oak St., Champaign, IL 61820 or go to the website: pzweb.harvard.edu

Translations manuscripts should survey research on a given topic related to art education clearly translating it to practical information useful for art teachers, and can conclude with a “Highlights” section that recaps the major points from research. Papers should be no longer than 2,500 words including references. See recent issues or contact the editor for more specific information. Submit three copies for blind review to:

Dr. Mary Erickson
Arizona State University
Tempe, AZ 85287-1505;
e-mail: m.erickson@asu.edu