An Introduction to Scientifically Based Research

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Commissioned by the National Assembly of State Arts Agencies through a cooperative agreement with the National Endowment for the Arts

Foreword

The intent of this monograph is to familiarize the state arts agency (SAA) field, and especially arts education managers, with an understanding of scientific research as a tool for making informed recommendations. State arts agencies are uniquely positioned to play an important role in arts education policy making at the state level; influencing broader education infrastructure in their states; and delivering arts education programs. These agencies have systems in place to respond to constituent needs by identifying trends, forming partnerships, and establishing programs and initiatives. Central to the effectiveness of this system is informed decision making. The Arts Education Advisory Group of the National Assembly of State Arts Agencies recognizes that arts education managers not only administer programs, but also are often called upon to make informed recommendations as a part of this decision-making process.

As part of a larger professional development initiative for arts education managers, the concepts and ideas set forth in this monograph are also intended to prompt reflection, spark discussions and spur further investigation. The members of the committee are grateful to Debra Ingram and Michael Sikes for their sensitive and formative approach to the development of this monograph. The staff of NASAA, particularly Carmen Boston and Johanna Misey Boyer, provided critical and diligent support. This monograph would not have been possible without the support of the National Endowment for the Arts. The NEA's long-term partnership with SAA arts education managers has been essential to our continued professional growth and development, allowing us to produce this monograph and share it with the field.

Marty Skomal, on behalf of the Arts Education Advisory Group
National Assembly of State Arts Agencies

March 2005

Research is a vital tool that arts agencies and organizations can use for building their knowledge about effective practices and for improving their programs. At the same time, due to changes in federal education policy, arts education (AE) managers and others in arts education are now often asked by government policy makers to base program and policy decisions on scientifically based evidence. The intent of this monograph is to help AE managers navigate this shift in the education landscape by addressing the following questions:

What makes research scientific?
How is research in arts education scientific?
How can research improve arts education programs and practices?
How can research provide information to policy makers?

What Makes Research Scientific?

Scientific research methods are based on philosophical theories of how we know what we know and how scientific knowledge accumulates over time. The research designs and data collection methods used in education research are diverse because they are influenced by methodology from a variety of fields such as psychology, anthropology and economics. As a result of this diversity, researchers have different views of what scientifically based research looks like in education.

To address this lack of consensus the National Research Council (2003) commissioned a study to "examine and clarify the nature of scientific inquiry in education" (p. 1). The study identified the following principles for high quality in scientific research:

1. Pose significant questions that can be investigated empirically.
2. Link research to relevant theory.
3. Use methods that permit direct investigation of the question.
4. Provide a coherent and explicit chain of reasoning.
5. Replicate and generalize across studies.
6. Disclose research to encourage professional scrutiny and critique.

These principles provide a guide for assessing the quality of a study whatever its purpose, design or methodology, although studies will vary in the extent to which they address each principle.

One useful way to explore the principles is to take a look at how the type of research question compels the choice of design and methods. The National Research Council (NRC) identified three interrelated types of research questions common to education:

- Cause – Is there a systematic effect?
- Description – What is happening?
- Process or mechanism – Why or how is it happening?

We highlight the critical relationships between research question, design and methods for each type of question in the sections that follow.

Questions about Systematic Effects

Experimental or quasi-experimental research designs are needed when the purpose of the research is to study the effects, for example, of arts instruction on students and to determine with the highest degree of probability whether the instruction was the factor causing the effects.

The U.S. Department of Education (USED) has indicated a preference for research that uses experimental design when questions of causality are involved. And in a recent request for proposals under the Arts Education Model Development and Dissemination program, the department awarded extra points to proposals that include designs that are experimental or quasi-experimental. Arts education managers may also encounter this preference at the local level when educators or policy makers ask for scientific research on the impact of a proposed arts education program.

It's a safe assumption that when the USED and other funding agencies ask for research designs that are experimental, they are asking for research that includes a control group. In an experimental design the subjects of the study—teachers, students, artists or even schools—are randomly assigned to one of two groups: an experimental group or a control group. The experimental group will participate in the program and the control group will not participate in the program. Random assignment means that subjects have an equal chance of being in either the experimental group or the control group, and specific procedures exist to conduct the random assignment process properly. The value of this arrangement, many researchers believe, is that randomization creates equivalent groups at the start of the study. Therefore, any observed differences in the outcomes can be attributed to the program being studied—a specific arts experience or instruction, for example—and not to preexisting differences between subjects in the two groups, since care has been taken to make sure the groups have a similar makeup.

Quasi-experimental research is designed to create a *comparison* group instead of the control group used in experimental design. In a quasi-experimental design the subjects participating in the program must be matched to a group of subjects not participating in the program. The subjects should be matched on characteristics known or suspected to affect program outcomes. The aim is to create two groups that are as similar as possible before one group begins the program so any observed differences in outcomes can be attributed to the program rather than to any systematic differences in the subject groups.

The USED specifies that under certain conditions, an experimental study is not feasible and so a quasi-experiment is an acceptable substitute. Generally, these conditions prevail when random assignment, which is a necessary component of experimental studies, is not possible because program participants have already self-selected. The USED stipulates, however, that grant applicants for some programs must demonstrate why random assignment is not possible.

In addition, there may be conditions under which it is unethical to randomly assign students to either a treatment or control group. These determinations must be made by project personnel on a case-by-case basis.

Questions about What Is Happening

Not all research studies, however, need to be experimental or quasi-experimental to be scientific. Despite the preference on the part of the USED and other policy makers, researchers continue to debate the kinds of studies most appropriate for determining program effectiveness. Many important questions in education and arts education require descriptions of conditions or activities. For example, sometimes the purpose of a study is to describe the state of arts education in U.S. elementary and secondary schools; or document how many teachers in a region have implemented new arts learning standards; or describe the personnel, spaces and resources available for arts programs in a school. In these cases, a descriptive design is appropriate because the purpose is to gather detailed information about the current state of something. Such studies can fulfill the criteria for scientific research established by the NRC.

Questions about Why or How Something Happens

Another example of using scientific research for a purpose other than demonstrating a causal connection is research designed to generate an explanatory theory. This is often the purpose of research on programs or policies that may be too new to have developed a clear underlying theory that could be tested by research studies using experimental designs. When the program itself is not well defined, the most important step may be to use research to understand the processes taking place within the program, processes that may explain how or why the program is working. Many of the studies of arts education partnership programs fall into this area. For example, a study might examine the processes in a residency program and generate an explanatory theory for how the program might affect students' social development.

Misconceptions about Scientifically Based Research

There are several misconceptions about what makes research scientific:

- Studies that involve numeric, or quantitative, data—such as test scores or percentages—are always scientific.
- Studies that include a pre-test and a post-test are always scientific.
- Studies that include statistics are always scientific.
- Studies based on qualitative data—data in the form of words rather than numbers —can never be scientific.

None of these characteristics alone is sufficient for judging the scientific quality of a study. As defined by the NRC, scientific research is characterized by a set of principles

rather than strict adherence to a particular type of design, a type of data, or even the purpose of the study.

Another common misconception is that a program evaluation study can never be scientific. However, just as program evaluation studies and research studies draw from a common set of data collection methods (such as interviews or mailed questionnaires) and study designs (such as a case study design or a quasi-experimental design), both evaluation studies and research studies can be scientific. What matters is how well an individual study adheres to the NRC principles, not whether the study's intent is to build or clarify theory—as is often the case in research studies—or to compare a program's actual results to its intended results—as is often the case in evaluation studies.

A closely related misconception is that certain designs (such as experimental, quasi-experimental and naturalistic) are intrinsically qualitative or quantitative, and therefore more or less scientific. Rather, a given study can and should use multiple methods of data collection and analysis. Moreover, an effective study can include, but need not be limited to, an experimental component.

How Is Research in Arts Education Scientific?

Although arts education has characteristics in common with other areas of education and with the social sciences in general, there are characteristics, and challenges, particular to arts education that influence how the NRC's principles for scientific inquiry play out in the arts education field.

One major characteristic of art education, and challenge for AE managers, is its complexity and diversity:

> Research about learning in and with the arts must be especially conscious of affective, ineffable, or intangible elements of the arts that do not fit easily into a physical or direct transfer model of learning. Consideration of cognition involving the arts must include all the characteristics of artistic work including imagination and creativity. At the same time, these elements must be considered in a richly direct and physical context of hues, textures, pitches, shapes, costumes, rhythms, social relationships, and historical influences. (Baker, 2003, p. 11)

Put simply, the development of skills and understanding in the arts is less tangible, less quantifiable, and not as easily researched as it is in, say, mathematics.

While this diversity and complexity is integral to arts education, it does make it more difficult for educators to establish consensus around arts education goals, and thus more difficult for researchers to pursue corresponding lines of inquiry that could lead to an accumulation of knowledge. For example, in contrast to disciplines such as mathematics or science education, national standards for student learning in the arts are relatively new and many researchers and practitioners continue to debate the value of standardizing any aspect of arts education. When goals around student learning in the arts differ widely

among states, districts and even classrooms in the same school it is difficult to design research studies that are connected in any meaningful manner to previous studies.

Another challenge affecting the availability of scientific research in arts education is the lack of funding for research. Much of the existing arts education research has been done by arts educators and researchers with little or no funding. This lack of funding severely limits the scope and duration of a study as well as the capacity of the researcher to develop assessments and measurement tools that meet the needs of arts education. As a result, the research and theory base in arts education—that is, the body of accumulated knowledge—is small relative to other disciplines, such as mathematics or reading, that contain an in-depth base of theory and research from which to pursue new studies.

While the challenges of complexity, underfunding and a diverse and scattered research base all do exist in the field of arts education, they do not preclude the application of principles of scientific inquiry; they do, however, shape what is possible.

There are many examples in arts education of scientifically based research. The three studies profiled below illustrate the importance of matching the method to the type of question being asked and to the level of existing theory and scientific knowledge in that particular area. All three studies are similar in how they address the following NRC principles:

- Pose significant questions that can be investigated empirically.
- Provide a coherent and explicit chain of reasoning.
- Replicate and generalize across studies.

The studies differ, however, in the type of question being asked, the methods used, and the extent of relevant theory that is linked to the study.

Research To Describe What Is Happening

The first example is a study conducted by USED to describe the current status of arts education in the nation's schools (National Center for Education Statistics, 2002). The study design and data collection methods—a questionnaire sent to a sample of elementary and secondary principals—is appropriate for investigating the type of question being asked. In this case, the department was asking a question that required a descriptive answer. The purpose of the study was not to investigate why arts education was this way or identify systematic relationships between variables, such as school size and teacher qualifications, but simply to uncover what is happening in arts education in the nation's schools.

The quality of the study is also indicated by the manner in which the data was collected, analyzed and reported. Because it wasn't feasible to visit every school in the nation or ask each school to complete a survey, the researchers sent a questionnaire to a sample of elementary and secondary principals that asked them to describe various facets of the arts education provided at their school. To conduct the study, the researchers focused on two

goals: selecting an accurate sample of respondents that would reflect schools across the country, and getting a high enough response rate to provide acceptable accuracy in the responses. In this case, the aim was to be able to generalize from the principals who completed the survey to all principals in the country. The researchers used established procedures for developing the sample, such as stratified random sampling, and in their analysis they report on margin of error, or fuzziness, for each questionnaire item. These procedures involve sophisticated use of statistical tools that are not normally available to laypersons.

Research on Why or How Something Happens

A second study of arts learning in nonschool hours (Heath & Roach, 2001) illustrates what scientifically based research looks like when the purpose of the study is to describe a phenomenon about which little is known and to begin to explore some possible mechanisms underlying the phenomenon. In this case, the researchers wanted to examine what happens in nonschool learning environments and how these environments might encourage young people's sustained participation and learning.

The study focused on 124 youth-based organizations that the researchers identified as exemplary based on the fact that young people chose to participate in the organization's activities. In a decade-long ethnographic study, Heath and her colleagues (including youth trained as anthropologists)

> fanned out to record the everyday life of these organizations, collecting data through observing and noting events from the beginning of planning for a season through its final cycle of evaluations. In addition, these researchers made audio recordings of adults and young members as they went through practice, critique sessions, and celebrations. (p. 21)

From this data they identified patterns in how youth-based organizations work with youth and patterns in the skills developed by youth as they pursue the arts. For example, they found that these organizations offer youth significant learning and practice opportunities with adult professionals and older youth who work in the capacity of teachers and role models. They also noted that these organizations developed strong pro-civic and pro-social values in youth.

In another component of their study the researchers used a written survey to explore the potential relationship between student involvement in leisure-time activities and their perception of self. They collected survey data from a sample of youth arts organization members and then compared these results to a national database of high school students who had taken a similar survey. The information that resulted from this comparative study provided evidence of a correlation between participation in youth arts organizations and positive use of leisure time and self-perception. A correlation means there is statistical evidence that these variables are related. It does not indicate that there is a cause and effect relationship among the variables because this is something that can be established only through an experimental or quasi-experimental design.

However, an experimental or quasi-experimental design would not have been appropriate or possible in this situation. Based on the limited theory and knowledge in this area, the researchers developed a study that would provide in-depth information about young people's experiences in nonschool learning environments and generate data that could be used to further develop the theory and practice in this area. This study illustrates the importance of matching the research design and data collection methods to the question at hand and the state of knowledge in the area, not blindly applying one particular study design or data collection method.

Research on Systematic Effects

The final example illustrates the use of a quasi-experimental design in an area of arts education that has a relatively rich body of theory and previous research—the development of aesthetic understanding. The purpose of the study was to test five hypotheses about the relationship between use of the Visual Thinking Strategies (VTS) curriculum and aesthetic understanding and transfer (Housen, 2001-2002). Because the researcher wanted to determine how likely it was that the curriculum, rather than other systemic or random factors, caused the observed changes in students' learning, a quasi-experimental design was required. The study compared the levels of aesthetic judgment and transfer over time between a group of students who received instruction in the curriculum and a similar group of students who did not receive the curriculum.

The findings showed a statistically significant difference between the two groups of students on each measure. Students who received instruction in the VTS curriculum had an increased rate of aesthetic development, transfer of learning across social context, and transfer of learning across content. Because the research design reduces the possibility that the differences observed between the two groups of students might be caused by other factors such as differences in socioeconomic status or prior achievement, the study results provide strong evidence that the curriculum led to the growth in student learning.

One benefit to conducting sustained research on a particular topic is that over time the theory, measurement tools and study methods are often refined through experience. In this case, the researcher was able to use measures that had been developed and tested in earlier studies, which strengthens the evidence by increasing the reliability and validity of the tools used to measure students' aesthetic growth or critical thinking. Often in arts education both practitioners and researchers are forced to develop new measurement tools to capture the nuances of the context they are studying rather than being able to draw on the development work conducted by themselves or others at an earlier point.

How Can Research Improve Arts Education Programs and Practices?

With the new emphasis in education on scientifically based research, it might seem that AE managers should base every decision about programs and practices on a body of scientific research. The reality is that yes, arts education programs and practices probably could benefit from an increased use of research. Even the most hard-nosed positivists, however, would probably agree that most, if not all, decisions about practice are based on a combination of experience, intuition, contextual factors such as agency planning or the broader environment of authorizers, and research. The NRC Committee on Scientific Principles for Education Research reflected the realities of practitioners' work well in this statement:

> Ultimately, policy makers and practicing educators will have to formulate specific policies and practices on the basis of values and practical wisdom as well as education research. Science-based education research will affect, but typically not solely determine, these policies and practices. (p. 17)

One reason policy makers and practitioners often must rely on a combination of information sources to guide their decisions is the limited scope of the current body of scientific research in education, particularly in arts education. Another factor is the resource-intensive nature of applying research to practice. Identifying studies relevant to a particular program or practice, translating the study findings into a specific context, and then actually changing behavior based on the research requires a commitment of funding, time and human resources that many organizations find daunting.

Given these realities, AE managers need to prioritize their research needs. There will not be sufficient resources to fund research for every decision that arises. Instead, managers and program staff must prioritize the areas where research is most needed and focus on where there will be the most return for the investment of time, energy and money. Some aspects to consider in establishing priorities are:

- The degree of uncertainty.
- The cost of being wrong—financially, and to the well-being of your clients and your staff, as well as the reputation of your agency.
- The degree to which the question can be answered empirically. Not all questions can be answered by conducting a study.

It might be useful, and ultimately save resources, to develop a formal research agenda. This is typically a multistage process that includes a preliminary search to identify existing research (which could be conducted by a graduate student or intern) and some discussions with experts in your own region to establish needs. The research agenda for your organization should reflect your mission, clientele and local needs. (For example, research on arts and students who are learning English as a second language might be more relevant to a populous urban state than to a rural state with mostly farmland.)

Identifying Existing Research That Could Be Used to Improve Programs and Practices

Once priorities have been determined, there are two approaches to obtaining research that can help strengthen arts education programs and practices. The first is to rely on research conducted by others and the second is to conduct or commission a new study. This section addresses the first option, and suggests a two-step process: first, identification of resources, followed by evaluating the quality of the research you have found.

The initial step is to identify and obtain copies of research reports from studies of programs and practices similar to those your agency seeks to improve. There are a wide variety of sources to consult to help identify existing research. Some suggested strategies are as follows:

1. Search the Education Resource Information Center (ERIC) database sponsored by the U.S. Department of Education at http://eric.ed.gov.

2. Search the online catalog of books and journals at a local college or university library. Major research journals in arts education include:
    a. The *Journal of Dance Education*
    b. The *Journal of Research in Music Education*
    c. *Studies in Art Education*

3. Visit the Web site of well-regarded national and local arts education organizations such as:
    a. NASAA resources for AE managers at http://www.nasaa-arts.org/nasaanews/index_anl.htm.
    b. The Arts Education Partnership's Web site and related links provided at http://www.aep-arts.org.
    c. The research section of the National Endowment for the Arts Web site at http://www.nea.gov/pub/ResearchNotes_chrono.html.
    d. Harvard Project Zero at http://www.pz.harvard.edu/index.htm.

4. Contact people operating programs in your area of interest, such as juvenile delinquency and community-based arts education or collaborations between schools and arts organizations, and inquire about research they may have available. Often the small studies conducted on specific, localized programs remain unpublished and can easily be overlooked unless you contact the program directly.

5. Place a query on arts education related listservs.

6. Use a Web search engine such as Google.

Once you have identified copies of relevant research, the next step is judging the quality of the research. In some cases there will be "surface" indicators that suggest the research is of good quality. For example:

- Publication in a peer-reviewed journal, which means that the editor submits papers to a peer review process before accepting them for publication. This increases the quality because it means someone (often more than one person) other than the researcher who conducted the study, has scrutinized the methods and claims.

- The reputation of the author or researcher. What else has he or she published? How does this body of work compare with that of other researchers?

- The frequency with which the research is cited in the literature. Also, is the researcher frequently quoted?

In addition to the above surface indicators, you, or one or more people who are familiar with the question being researched, will need to review the report to make a determination of the quality. Here are some areas to consider:

√ How well does the method/design match the type of question?

√ Can you follow their chain of reasoning or is the paper missing detail on how they collected and analyzed data? If they don't mention source(s) of data, it might be an opinion piece in which case it's often more difficult to trace the chain of reasoning.

√ Do the measures seem a good match with what they're trying to measure (instead of asking adults about what students learned, the measures collect data from students directly)?

√ Are there multiple sources of information? This is called triangulation.

√ Do they discuss the limits of the study; other possible explanations for the results?

√ Are the reported claims relatively modest and reasonable based on the data?

√ Is this a stand-alone study or are there multiple studies in this area, indicating that there is beginning to be some consensus about what works?

The goal is not to find the perfect study. Rather, it is to separate out the opinion pieces and advocacy papers from reports of actual research studies, and, then, to be aware of the strengths and limitations of each study when applying them to practice.

In some cases you may discover that someone else has already identified, reviewed and compiled the existing research in an area you've identified as a priority. For example,

these publications from the Arts Education Partnership (http://aep-arts.org/Research.htm) review existing literature in areas of concern to many AE managers:

> *Critical Links: Learning in the Arts and Student Academic and Social Development* summarizes and discusses 62 research studies that examine the effects of arts learning on students' social and academic skills.
>
> *The Arts and Education: New Opportunities for Research* surveys existing research in arts and education and contains suggestions for new studies in four areas: cognition and expression; personal and social development; community, democracy and civil society; and teaching and learning environments.

Along with articles on the results of individual studies, most research journals also publish reviews of existing research in targeted areas that could be useful to AE managers. For example, a special issue of *The Journal of Aesthetic Education* contains articles summarizing meta-analyses of existing research in areas such as music and mathematics, verbal skills and classroom drama, and teaching cognitive skills through dance. Meta-analysis is a statistical technique used to synthesize the results of existing research in a particular area. The technique can only be used with studies that contain quantitative data.

Translating Research to Practice

An accumulation of research on changing individual and organizational behavior indicates that neither is likely to change as a result of simply locating and reading a relevant research study or collection of studies. To assist practitioners in arts and education in translating research to practice, the Arts Education Partnership commissioned the Perpich Center for Arts Education to develop a Web-based guide for a study process. The guide is available at http://www.criticallinks.org.

The Pipeline of Knowledge

At Delphi, in ancient Greece, the Oracle would speak directly to anyone who would approach her temple, ask a question (usually with offers of gold), and listen for the answer. Alas, educational research does not reveal its wisdom so directly to us. Instead, before we as consumers can use them, the findings of research must move along a pipeline of connected, yet discrete, sections. This pipeline begins with the research data itself, and then includes a series of publishers, disseminators and other middle people and handlers, until the information at length reaches its users. Oftentimes this process can seriously affect the usefulness and even the truthfulness of the information. Let us look at an illustration of this effect.

A team of university researchers is conducting a study of the effects of visual art on primary-grade children's reading comprehension. During the process of their research, they accumulate significant bodies of data, which constitute the first section of the pipeline. Such data may include endless pages of numbers or reams of qualitative interviews and field notes. What matters is that such data is impossibly unwieldy and beyond the understanding of most persons.

So the second section is an analysis of the data that reveals the key trends, averages (researchers refer to this as central tendency), variability, or main ideas found therein. Usually, this secondary section is still quite daunting. It may appear in the form of a 300-page report with numerous data tables and summaries. What is more, the report is also sprinkled liberally with statements like this: "Using an alpha level of .05, the researchers found that for Cohort I, the effect size was statistically significant at a 95% confidence level." (It is said that the Oracle's advice was similarly cryptic.)

Now, there is nothing wrong with this report, if the reader is a college-trained statistician or research methodologist with lots of free time. But for the vast majority of stakeholders and information consumers, including policy makers and parents, it is written in a foreign tongue for which there is no readily available pocket dictionary. An additional problem is that academic research reports such as this often don't move far beyond campus or out of the research center's walls.

This is where a third segment in the pipeline takes over. Usually it consists of a sponsoring agency or organization. Suppose that in this case the research organization is a large nonprofit research company such as the RAND Corporation. It is in the interest of such organizations to provide broad public access to their research findings, so they will use various means to disseminate the research. They may translate the reports into less encyclopedic lengths and more user-friendly language. They will often post these more user-friendly reports on their Web site in downloadable files.

The consumers who go often to the RAND Corporation's Web site to read or download research summaries will include other researchers, perhaps other organizations with an agenda, and occasionally members of the press. Usually they will not include a lot of school district leaders, teachers, parents or laypersons—even though these persons might have the most to gain from the knowledge. Thus a fourth section in the pipeline is necessary to translate the findings to those persons who don't typically surf the net looking for educational research. That link is usually the mass media.

The hard-pressed reporter, however, even if he or she understands research at a fairly deep level, is constrained by the eternal vexation of limited copy length—or, in the case of electronic media, limited air time. So the thousands of pages of data, which were previously compressed into a 300-page report and thence into a briefer, more understandable summary, are further reduced to a news story of 30 air seconds or four column inches of print.

Funnel Vision

It is important to understand that the pipeline also is a funnel. Each successive stage crunches the data into smaller spaces and less time. And with each stage of compression comes a greater loss of information and increasing degradation of meaning. This is a critical problem for research. Moreover, each link in the chain means an increased possibility that bias, preconception, misunderstanding of specialized terminology, and other threats to truth will weaken the quality of the research. This problem is especially pernicious at the last link before the ultimate consumer (usually the press). There are three reasons for this:

1. The first reason is that the compression and loss of meaning, already a significant problem in the other links, becomes critical as the entire report is reduced to a headline, a sound bite, or a few words of text crawling across the bottom of the screen.

2. The second is that a headline usually highlights the most "newsworthy" aspect of a phenomenon. *Newsworthy* often means *sensational*, and sensational wins out over nuance in any reader-excitement test. Moreover, the headline is typically not written by the person who wrote the news story, yet it may be all that the reader sees.

3. The third reason, regrettably, is that some of the news media are subject to strong biases that impel them to deliberately distort what they report. There are newspapers, radio or television stations, and even entire news networks that do this. (Bias and deliberate distortion are actually problems further back on the pipeline, much to the discredit of many policy organizations masquerading as "think tanks.")

What are the implications of this problem for those who would use research as an advocacy tool? There are at least two:

1. Your research has to filter through this funnel; thus it is invariably compressed, diluted and compromised by the time people read about it over morning coffee.

2. Your research may have to contend with other research whose implications are contradictory, at least at the news media stage.

Practical Implications

For any person or agency that truly wishes to sponsor and disseminate honest and useful research, these challenges are daunting. Clearly it is insufficient to simply hope that the research will make its way to the public unassisted. Rather, there should be a systematic strategy for ensuring that the most important information from the research finds its way relatively unscathed to those who can use it. Two principles should guide your strategy:

1. There is a practical limit on compression. A brief news story cannot truly "report" the findings of a complex research project; it can only report that such a project took place.[1]

2. Shorter summaries must reflect the overall findings of the longer reports that they summarize.

Both of the principles require a skilled control of the process by which your research makes it to users. Such a process should constitute a plan. This section helps you develop such a plan.

[1] This generally pessimistic view of the media's distillation of research is in no way meant to demean or slight the long tradition of investigative journalism, many of whose exemplars constitute quality research in their own right. Such investigative reportage and documentary work, both in print and electronic journalism, continue today.

How Can Research Provide Information to Policy Makers?

The process of getting research findings to persons who can ultimately use those findings to make policy decisions is neither smooth nor universally successful. Research usually moves along a convoluted trail from the original data to its broadband dissemination; thus "it is invariably compressed, diluted and compromised by the time people read about it over morning coffee." (See "The Pipeline of Knowledge.") To help solve this problem, this section offers a planning guide for taking research and making it more universally understandable and user friendly.

Disseminating Research: A Planning Guide

There is a logical process for planning the dissemination of research—either your own or that of others. It consists of a "backward design" approach familiar to many curriculum writers (working backwards from ultimate outcomes to intermediate activities). The process consists of three steps.

Step 1: Identify Audiences and Purposes

Who are the ultimate audiences and thus the users of your research, and to what purposes will they use it? Having this information as a first step is critically important. Examples:

- School board members, in order to vote on cutting or preserving funding for an after-school program.
- Legislators, to vote wisely on an upcoming initiative.
- Parents, in order to support allocating funds to hire arts specialist teachers.

As a first step in your plan, identify some of these users and place them into the first column of a table. Be selective. It is better to target a few types or groups of users instead of everyone.

Note that in addition to identifying the users of your research, it is important to have an idea of what uses they might have for it. This further knowledge can help you to craft the right informational tools.

Step 2: Identify The Context

Under what conditions will the audience for your research use it? How much time will they have to read it beforehand, present it, or discuss it? Will they use oral, written or audiovisual communication, or all three? Here are some examples. Note that they are very specific as to how the audiences will use the information:

- *School board meeting*. Board members will hear arguments and discussion for a half hour, then vote.

- *Meetings with legislators*. They will hear your presentation, take some of your written materials, and prepare for their work in a caucus on arts education.

- *Testimony before legislative committees.* Legislators will then vote on reauthorization of a public program.

- *Meeting with the board of a social service agency*. They will watch a 15-minute presentation that includes 10 minutes of video and 5 minutes of oral summary, and then vote on whether they should provide funding for an arts program for new immigrants.

- *Meeting with reporters*. They will use your detailed background information for a report on arts and underserved youth (notice that the press can also be an audience).

Step 3: Decide on Formats

In the last stage, you use the information from the preceding stages to design appropriate formats that might include some of the following:

- Printed research summaries
- Bulleted talking points
- PowerPoint presentations
- Video or CD-ROM presentations

Your completed worksheet might look something like this:

Users	**Conditions**	**Formats**
School board members	School board meeting: board members will hear arguments and discussion for ½ hour, then vote	Talking points, printed research summary handouts
Legislators	Meetings with legislators, one hour in length, no presentation or media allowed	Bulleted talking points
Parents	PTO meeting, parents will hear arguments and then vote	PowerPoint
State department of education policy makers	Interagency meetings, joint planning committee meeting with the aid of video conferencing	Printed research summary handouts, with full reports available as downloadable PDFs on the Web site

Finally, AE managers often find that beyond talking directly to policy makers, they also help arm other stakeholders, such as artists or parents, to approach policy makers on their own. This role could also be reflected in the table format, as follows. Note that it is important for such persons to make clear why they are interested.

Users	Conditions	Formats
Parents, artists, businesspersons, community members	PTO meetings, school board meetings, legislator/constituent meetings, correspondence (letters, emails, phone calls)	Bulleted talking points indicating why the research is important to the stakeholders

Other Strategies: Forming Roundtables

One strategy with considerable promise is to form a research interest group or roundtable. This could include policy makers such as legislators. Monthly meetings could offer an opportunity to share and discuss findings and plan for more effective policymaking.

Communication *Do*s and *Don't*s

- *Do* target messages based on interests and needs of audiences.
- *Do* condense information into useable packages.
- *Do* have copies of detailed research reports available for those who want to examine them, and have them available in both print, and electronic formats (often as a PDF downloadable from a Web site).
- *Do* identify and take advantage of appropriate opportunities and venues for communication.
- *Do* be aware of contrasting viewpoints and research, and be prepared to defend yours.
- *Don't* claim more for your research than it actually supports.
- *Don't* allow your research findings to be distorted or their integrity to be compromised in the process of communication.

Conclusion

Research is a vital tool that arts agencies and organizations can use for building their knowledge about effective practices and improving their programs. At the same time, due to changes in federal education policy, AE managers and others in arts education are now often asked by government policy makers to base program and policy decisions on scientifically based evidence. Although many people assume that a scientific study

requires an experimental design, the National Research Council has identified principles for high quality scientific research that include a range of research designs and methods. What matters more than using a single "gold standard" design is careful attention to selecting a design that matches the type of research question being studied and the level of existing theory and knowledge in the area of study.

Many of the principles outlined in this monograph, such as quality of research, project design and audience, are also pertinent and applicable to state arts agencies' program evaluations. The information gained from a program evaluation can help address more immediate SAAs' concerns around performance measurements results—data that describe the scope, efficiency and outcomes of the grant dollars that SAAs invest in artists and schools.

There are many examples of scientifically based research in arts education. This monograph describes three studies that demonstrate a range of this research. The studies pose different types of research questions and use different designs and data collection methods, but each study is an example of quality scientific research based on the NRC principles.

Arts education managers who want to use arts education research to improve their programs and practices might start by developing a formal research agenda to help prioritize their agency's research needs. The agenda can guide the search for existing studies and ultimately save resources. Research can also provide useful information for policy makers, whether it is an existing study or a study an arts agency has carried out itself. There is a logical process for planning the dissemination of research and it consists of three steps: identify audiences and purposes, identify the context, and decide on formats.

Authors' note: We gratefully acknowledge Dick Deasy's role in conceptualizing the initial plan for this monograph with Mary Campbell-Zopf and Marty Skomal, and we appreciate the valuable comments provided on earlier drafts of this monograph by Carmen Boston, Johanna Misey Boyer, Mary Campbell-Zopf, Camellia El-Antably, Marty Skomal and staff at the Ohio Arts Council.

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