

**A Value Model for Ballet Arts Minnesota, Spring 2003**  
**Case Study: Using Multi-Objective Decision Analysis to Help a Ballet School Set**  
**Priorities for Growth**

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**Objectives of article**

- Explain strategic planning effort undertaken at a small, non-profit, arts organization. Explain how the ballet school clarified its mission by developing a logical framework that allows the school to clearly indicate its goals and assess progress.
- Make a connection between science and art. Show how the priority setting tool Multi-objective Decision Analysis (MODA) can be applied at a small, non-profit arts organization such as a ballet school. Structured, quantitative, operations research methodologies can and do help arts organizations!
- Demonstrate that the initial phases of decision analysis – framing and developing a Value Model with objectives and scales – can provide clear, tangible benefits to an organization. These benefits are real even without extensive work on other phases (Weight Assessment, Strategy Generation and Strategy Evaluation).

**Can a Ballet School “Grow” Even as Financial Resources Shrink?**

How does any arts institution make decisions in today’s challenging political and economic environment? When a ballet school is successful, for example, but it has reached a point where a variety of external and internal circumstances require it to change, is there a reliable way to analyze and compare past and potential priorities and performance? When past strategies don’t seem adequate to the demands of the day, how can the Board, staff, and other vitally interested stakeholders of an arts institution make sound decisions about future organizational, investment and programmatic choices?

Ballet Arts Minnesota (BAM), located in Minneapolis, was established in 1989 by Bonnie Mathis and Marcia Chapman. The school reached a crossroad at the end of 2002. With State and Federal resources for the arts being cut drastically, demands on private

foundations and individual funders quickly exceeded their resources. Even in Minnesota, where support for the arts is traditionally considered quite good, small institutions like Ballet Arts soon realized that their plans for the future would have to be adjusted to meet a new reality of reduced funding. The question was “how do we do that responsibly?” Ballet Arts chose an unusual decision-making tool to accomplish this task: “Multi-Objective Decision Analysis,” or MODA, which until recently had not been recognized as an effective tool for arts organizations.

### **The Methodology**

Developed in an academic setting in the 1960’s, MODA has been applied extensively to solve business and engineering problems of such corporate entities as oil and gas companies, electric utilities, hospitals, airlines, and pharmaceutical companies, as well as government. A formal theory for making complex decisions that impact multiple objectives, it is designed to help executives and boards make strategic decisions and set priorities. The method provides a formal structure to facilitate group decisions and build consensus. It also yields a way to explain and defend choices, breaking a complex decision into smaller parts and linking priorities to long-term strategic goals.

Being clear on objectives is the first, and most important, step. One key way MODA is different from other methods is the formal process for developing and defining those objectives. A set of axioms, or rules, guides the process. If the rules are followed, a mathematical equation can be derived for evaluating alternatives based on the degree to which they achieve objectives. Being clear about objectives is important even if no quantitative analysis is conducted. Often boards agree on mission but are less clear in translating that mission into terms that help managers make program decisions. Frequently managers do not have criteria, such as measurable scales, that help them clearly demonstrate how well, or when, their programs help the organization achieve the mission.

Although multi-objective decision analysis is widely accepted as useful for applications involving more standard businesses, some might question its usefulness for aiding

decisions intended to achieve objectives such as promoting dance education and performance. This project could be viewed as a test of whether business and engineering concepts can be successfully integrated with concepts of art and dance.

### **The Issues for Ballet Arts**

Ballet Arts needed to make choices and set priorities to fit the changing needs and demands of their students and community, but they were concerned about their ability to meet the necessity of change without jeopardizing the fundamental values and programs that have made them a superior professional dance training ground for the pre-professional student as well as for those who study ballet solely for its physical and aesthetic benefits.

In the spring of 2003, Ballet Arts Minnesota was at a critical point. The Board wanted the school to grow, and they had a number of ideas, but very different opinions, about what to do. And, they had no plan for reconciling their different opinions into a consensus that could be acted upon. Many ideas fit the current mission, but there was no way to compare or weigh them for effectiveness. Board members were adamant about continuing the core mission – training youth to be professional dancers – but they also wanted to do other things, such as making dance accessible to a more diverse community of students and audiences. Typically, insufficient administrative staff and uncertain funding made implementation of new ideas risky. It was critical that the Board become clear on top priorities and understand what the organization could and could not afford.

For example, should they expand classes for high school students? Should they continue their partnership with the Minneapolis Park & Recreation Board to provide inner city children with affordable opportunities to study and perform with Ballet Arts? Should they increase tuition and ticket process? What should be the elements of a sound financial strategy to ensure the school's future and assure its funders of the long-term uniqueness and quality of the Ballet Arts program?

### **Ballet Arts Fundamentals**

*Ballet Arts Dance Education* is a comprehensive program beginning with Creative Movement for preschoolers through Fundamentals of Dance, with eight “levels” in the Professional Division which include Contemporary, Modern, and Pointe classes. About 75% of Ballet Arts Minnesota’s budget comes from earned income through tuition and performances. With the economic slowdown, they must consider the possibility that they may lose students and audiences, and therefore have less earned income. Where, then, should Ballet Arts consider cuts to offset possible losses in earned income, as well as certain reductions in government and foundation funding? How might cuts affect Ballet Arts? On the other hand, if the economy improves and Ballet Arts can secure *additional* funding, where should they place those resources? For example, what combination and level of scholarships would provide the best value toward achieving their mission of increasing access and diversity?

The *City Children’s Nutcracker* is a partnership with the Minneapolis Park & Recreation Board. Since 1991, it has been an opportunity for many inner city children to participate in high-quality dance classes beginning in a free summer park program. Along with other Ballet Arts students and professional dancers from around the world, the children perform in a professional production of the Nutcracker each year. Though successful in providing a unique and powerful experience for thousands of children, the bottom line is it loses money each year. What options should Ballet Arts consider to reduce those losses – cuts to marketing, fewer performances or fewer classes? Are there opportunities for increasing revenues to offset losses such as higher ticket prices and charging a nominal fee for the classes without jeopardizing outreach opportunities?

The *Springboard Dance* program is for advanced 14 to 16 year olds but not all students aspire to be professional dancers. Competition for teenage time is keen. Students who may be interested in the art and discipline of ballet may also be attracted and recruited by athletics or other art forms. In order to grow, Ballet Arts could offer a second, less rigorous track. A second option would be to develop partnerships with public and private secondary schools. Both options would require additional resources. And the question remains: would these programs enhance or diminish the Springboard program, and

therefore negatively impact the classical dance training program that has been at the strong heart of Ballet Arts?

### **How Multi-Objective Decision Analysis Came to Ballet Arts Minnesota**

Kathy Thurber, a Ballet Arts board member, had experience with the method when she was deputy director at the Perpich Center for Arts Education. The Perpich Center faced a major reduction in their budget. Employing this method, they were able to build a budget that sustained their mission and was 15% less than the prior year. As a result of the success of the Perpich Center project, Ms. Thurber arranged a meeting with Marcia Chapman, Executive Director for Ballet Arts, and Elsie Martin, who had been the decision analysis consultant to the Perpich Center. At a subsequent meeting, Ms. Martin reviewed the proposal with Ms. Chapman and the Board Chair, Dr. Robert Goodale. Both Ms. Chapman and Dr. Goodale were enthusiastic about applying a business methodology at Ballet Arts Minnesota. They agreed to proceed with the understanding that the project would be completed in phases, with evaluation of each step before proceeding with the next.

This paper describes the initial phase completed between April and June 2003. That work – developing a Value Model with objectives and scales – is described below. Because of summer absences, further work on the strategic plan was deferred until fall. The completion of this value framework provided clear, tangible benefits to the organization even without extensive work on the subsequent phases. The overall goal for the whole project is to create a three-year plan for Ballet Arts Minnesota. The initial phase was to create an analytical framework (logical model) that would:

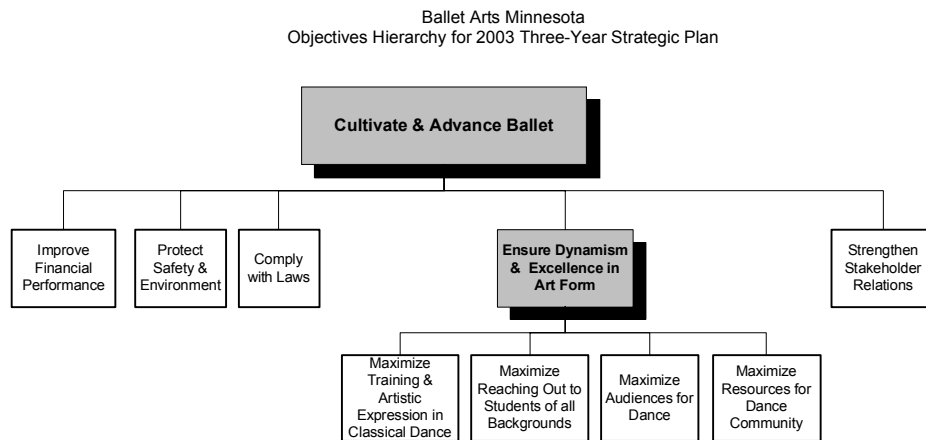
1. Specify objectives and criteria for evaluating the benefits derived from Ballet Arts Minnesota and its various programs.

This phase provides documentation that can be shared with staff and parents as well as with current and potential funding agencies.

### **Developing a Value Model**

Organizations exist because they provide value. A successful business, for example, must provide more value to its customers (in the form of services and products) than the price it charges or it will lose customers. An organization receiving public funding must likewise produce more value to the community than the funding it consumes or it risks losing public support. All organizations must understand and seek to maximize the value they produce.

As policy setters for Ballet Arts Minnesota, the Board must define how value is derived from the work of the organization. Vision and mission statements are examples of policy setting. Multi-objective decision analysis is a tool to help translate vision and mission into a Value Model with measurable criteria that can be debated, shared with stakeholders and used to track progress. In a two-hour meeting, the Board identified the basic objectives that, if achieved, create value for its various stakeholders. It was a brainstorming session to list “what we want”; the objectives were then organized into a hierarchy to show how they relate to one another (Figure 1). Subsequent meetings clarified the meaning of each box and adjusted wording.



Key Principles for Objectives Hierarchy

- Comprehensive
- Fundamental
- Relevant
- Non-redundant, no overlap
- Measurable
- Independent
- Minimal in number

As indicated, eight fundamental objectives were identified as relevant to a Three-Year Strategic Plan. The four objectives, shown under the heading “Ensure Dynamism & Excellence in Art Form,” represent the core mission of Ballet Arts. These objectives are

unique to Ballet Arts although some parts would likely apply to any organization promoting arts or dance. *Maximize Training & Artistic Expression in Classical Dance* confirms the school's desire to be an outstanding ballet conservatory. This objective is very important to Ballet Arts. The other three objectives in this category, however, demonstrate that Ballet Arts wants to be more than a dance conservatory. Dance has a much lower profile than athletics; the Board sees part of Ballet Arts' mission is to raise the profile of classical dance. *Maximize Reaching Out to Students of all Backgrounds* and *Maximize Audiences for Dance* are about teaching dance to many types of students and about developing new audiences for dance, including ballet, modern, contemporary and ethnic dances. With *Maximize Resources for Dance Community*, Ballet Arts wants to support the whole dance community – professional dancers, teachers, choreographers and dance ensembles.

The four other boxes in the objectives hierarchy are typical of many organizations. Most non-profit arts organizations, as well as for-profit businesses, want to *Improve Financial Performance* and *Strengthen Stakeholder Relations*. *Improve Financial Performance* is measured using a quantitative, for-profit business metric, net present value. *Strengthen Stakeholder Relations* addresses building advocacy and support among stakeholders as a platform for the future, an objective often seen in for-profit businesses and educational institutions. The two objectives *Protect Safety & Environment* and *Comply with Laws* are also relevant to for-profit businesses although some laws and safety issues are unique to non-profits and schools.

Several benefits came from the Board meetings to create and review this objectives hierarchy. The goal of constructing an objectives hierarchy provided structure to help organize discussions. Individuals on the Board had many opinions and ideas; some similar, some in conflict. This method helped board members gain clarity in their own ideas, listen to other opinions and reach a common understanding. The process forced them to search for the fundamental objective, rather than argue over the means to get to those fundamental objectives. The method also helped ensure that the objectives hierarchy is comprehensive, leaving nothing out. Initially the Ballet Arts Board forgot

objectives for compliance with laws and protecting safety and environment. The discussion helped confirm that the objectives are independent for assessing and comparing how important each one is. It helps Board members be precise, ensuring that their set of objectives is non-redundant with no overlap. Limiting the number of lowest-level objectives to a minimal number of eight judged to be most important helped to keep things relatively simple.

The objectives hierarchy is the first step in developing a Value Model. Building on that work is the step to make each objective measurable. Additional clarity in the value that an organization provides to its customers comes through defining metrics and constructing scales. Without metrics and scales, the process for measuring progress toward achieving objectives is subjective, often flawed and biased. Once scales are developed, Ballet Arts has a tool for assessing current performance and tracking progress. The initial framework is then complete.

Having scales also gives policy makers a tool to debate the tradeoffs of achieving different objectives. Objectives are often in conflict. How can Ballet Arts simultaneously “Improve Financial Performance” and “Maximize Reaching Out to Students of all Backgrounds?” Some objectives are more important than others. Several Board members have repeatedly said that “Maximize Training & Artistic Expression in Classical Dance” is most important. Only with measurable scales, however, can the Board have a meaningful debate about relative importance.

### **Building Influence Diagram and Scales**

Not all objectives, especially those addressing artistic goals, can be easily set to a scale and described in quantitative terms. Multi-objective decision analysis provides a defensible and mathematically sound way to build scales for quantifying the achievement of objectives – those that are quantifiable and those that do not lend themselves to engineering or financial measurements. The process starts with an influence diagram. Participants then either chose a metric or construct a scale. The constructed scale requires descriptions of Best to Worst performance.

Although the Board developed the objectives hierarchy, other stakeholders helped complete the definition of each objective – building influence diagrams, constructing scales, doing self-assessments and discussing uncertainties. These small group sessions brought many other stakeholders – including alumni, faculty and staff, parents and executives from dance companies – into the strategic planning process. These other voices added new perspectives to the discussions and added valuable ideas.

The results of the small group sessions for four objectives are shown in Figures 2 through 5. The diagrams show the factors identified as influencing the degree to which objectives are achieved. The arrows show the nature of the influences. The Board articulated their “wants” clearly and precisely in the objectives hierarchy and the small group sessions expanded those definitions to measurable scales. Care was taken to ensure the axioms of fundamental, relevancy and no overlap were satisfied.

**Objective 1: Maximize Training & Artistic Expression in Classical Dance**

This influence diagram and scale were constructed by the artistic director, several professional dancers, a faculty member and an alumna who is no longer a professional dancer. No one resisted the task nor said it could not be done. In fact, they enthusiastically participated in the session, reflecting and discussing what goes into becoming an exceptional ballet dancer.

The meeting began with the participants brainstorming a lengthy list of factors that influence the degree to which Training in Classical Dance is achieved. They added “Artistic Expression” to the definition because they believe that training includes much more than Mastery of Vocabulary and Execution of Steps. After brainstorming, the group highlighted several factors, the ovals marked with a thicker line in Figure 2. Self-esteem and lifestyle as well as syllabus in all dance levels are key influencers.

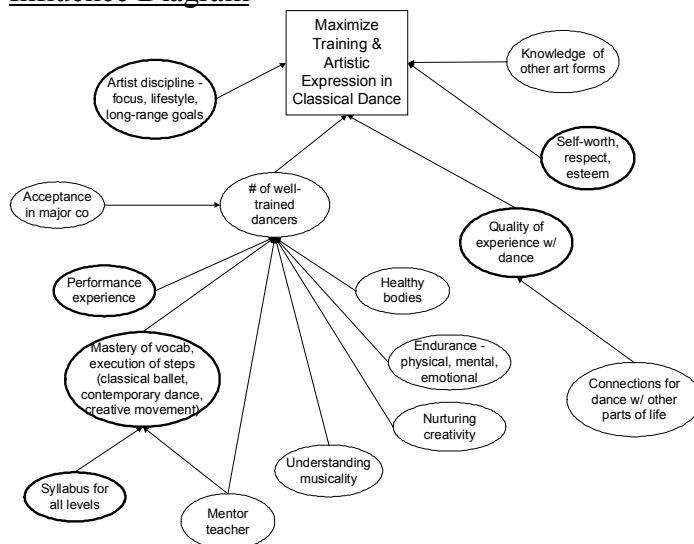
Next the group constructed a scale as there are no metrics available for this objective. A “5”, or BEST, is a description of results for a “top decile” ballet school for professional

dancers. This description forced them to think beyond where they are today. What things would they see in their students and graduates? What would graduates know and be able to do? Where would they go? How many students would graduate? Conversely, a “1”, or WORST, describes indicators of a ballet school that fails to pay attention to its mission to Train in Classical Dance.

As a check of whether the constructed scale is practical and usable, the group assessed today. They said Ballet Arts is very good – a 4 on the 5 point scale. As they talked about where they are today, however, they noted several areas where they could do better.

Now that they know “where they want to go”, where they are today, and how bad it might look, they can begin to talk about program and curriculum changes to better achieve this and other objectives. And, they have a tool to compare and rank proposed program alternatives in a consistent manner. They also have a tool to measure progress or declining performance in subsequent years. These newly defined metrics and scales give them an efficient way to assess program effectiveness.

### Influence Diagram



### Scale

5 BEST

- 20 Springboard students (including men) per year; ¼ graduate and are accepted into a dance company or dance program at a university.
- 100% of Springboard graduates have mastery of vocabulary & technique.

- Ballet Arts syllabus for Levels 1 through Springboard is a measured program of progression for classical dance based on 500-year international standards. Includes cross-training to support technique and dance history. Placement auditions are required for all levels.
- 100% of Springboard graduates have ability to grow in artistry, including understanding different dance forms. Students gain a discipline of focus that helps them pursue long-range goals in dance or other professions.
- Teacher values are healthy (physical, emotional, mental, and spiritual). Students and teachers communicate to solve problems and provide positive support through a strong sense of community. The connections that Ballet Arts makes with students are sustained.
- All youth students have a “quality experience with dance” including multiple performance opportunities.

## 1 WORST

- Little interest in Springboard program (5 or fewer students) per year.
- There is no syllabus and the audition process is inconsistent.
- Discipline slips and teachers are demeaning to students with obvious favoritism.
- Few performance opportunities

Score for TODAY (2003) is 4

- 11 Springboard students; the 2 high school graduates are going into a dance program at a university.
- 60-75% of Springboard graduates have mastery of vocabulary & technique. Students could understand more about dance history.
- Placement auditions are required for all levels.
- 100% of Springboard graduates have ability to grow in artistry with understanding of different dance forms. Discipline of focus is evident with good attendance among upper level and Springboard students.
- Springboard and the whole school have a sense of community. Teacher values are healthy.
- There are multiple performance opportunities for all levels.

Similar sessions were held for all the other objectives. At least one Board member was at each session, each member choosing those objectives that he or she felt most passionate about. Either the Executive Director or Artistic Director attended all meetings.

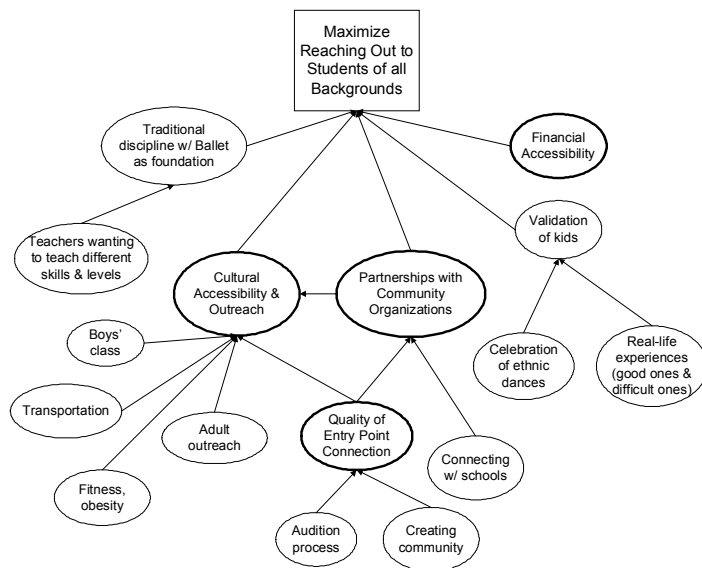
## **Objective 2: Maximize Reaching Out to Students of All Backgrounds**

Ballet Arts has a strong commitment to removing barriers for all students to attend classes and workshops. They do not want to be an elite conservatory. Participants in this session represented those Board members most committed to this objective as well as stakeholders that represent multiple backgrounds. The group included the Executive Director, several other Board members, a Minneapolis Park & Recreation Board sponsor and a teacher in the *City Children’s Nutcracker*.

This session helped clarify meaning and remove overlap with another objective, Maximize Audiences for Dance. “Maximize Reaching Out” means that Ballet Arts wants to remove barriers and open access to many types of students. The influence diagram represents the factors that are barriers as well as factors that encourage participation. The scale was constructed to reflect the degree to which barriers are present to prevent or encourage participation in Ballet Arts programs. Financial need is a large factor; other factors such as the entry point atmosphere and cultural accessibility are also very important.

This discussion confirmed the good work that Ballet Arts does today even though they assessed current achievement in the middle of the scale. This scale gives Ballet Arts a means to gauge consistently the impact of a variety of program changes (e.g., funding cuts, differing types of scholarships) on their ability to reach out to students of all backgrounds. During times of tight budgets, debates and arguments about program changes are necessary. Because they now have clear definitions with measurable criteria for this and other objectives, the Board can have a discussion that moves beyond eloquent, persuasive speaking.

Influence Diagram



Backgrounds included

1. Age (youth, adult)
2. Developmental

3. Economic
4. Ethnicity
5. Gender (boys and girls, men and women)
6. Geographic
7. Physical size
8. Religion

### Scale

#### 5 BEST

- 1000 students (230 students in school, 600 from collaborations or partnerships representing very diverse backgrounds, 100 in satellite centers and 70 adults)
- No one is turned away because of financial need.
- Ballet Arts is a warm, welcoming place to all. No one feels too fat or too old to come to class. Students know how to act and have high respect for etiquette and behavior.
- There are no transportation barriers.

#### 1 WORST

- 200 girl students in school who are capable of paying full tuition. 0 Adult students
- No scholarships.
- Elitist, exclusive, intimidating atmosphere. People believe that Ballet Arts is a school only for those aspiring to be a professional ballet dancer. Auditions are required for admission with rejection because of body type.
- Limited public transportation

Score for TODAY (2003) is 3

- 450 students (200 students in school, 100 from Parks in Nutcracker, 100 in satellite centers and 50 adults)
- 31 Scholarships (11 for Parks kids in BA classes, 10 other students, 10 work study) and 100 free classes for Parks kids in Nutcracker. 2 BA scholarships are full, most are 1/5 to 1/2.
- Atmosphere is welcoming.
- There are some transportation barriers.

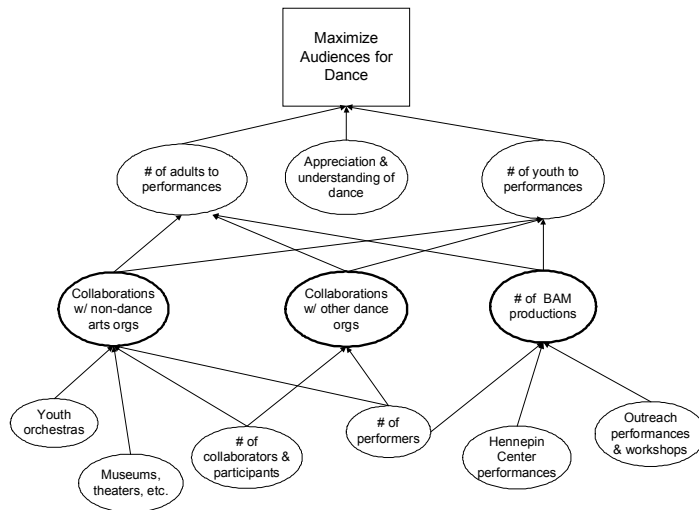
### **Objective 3: Maximize Audiences for Dance**

Part of Ballet Arts' mission is helping youth and adults throughout the Twin Cities and greater Minnesota appreciate the dance art form. This objective reflects a desire to market classical dance, not just Ballet Arts productions, to a broader audience. Board members, faculty and parents participated in the session to prepare this scale. To help avoid overlapping definitions, several of the same stakeholders attended both this session and the one for Maximize Reaching Out.

Appreciation comes through an understanding of the art form. The influence diagram shows factors that help increase understanding. For example, number of performances, number of participants in those performances and the quality of the connection at the

performance are important. More youth and parents gain experience with dance when Ballet Arts collaborates with other arts organizations and holds workshops that provide explanations of the performances. Metrics are available today that track achievement of this objective.

### Influence Diagram



### Scale

5 BEST

- 16 Ballet Arts sold out performances
- 2 or more collaborations with other organizations for performances
- 12 outreach performances with workshops (e.g., Young Audiences performances)

1 WORST

- 6 Ballet Arts performances, only parents attend
- No collaborations with other organizations for performances
- No outreach performances
- Performances are without explanation.

Score for TODAY (2003) is 3

- 15 Ballet Arts performances (4 Springboard, 4 Spring Performance, 7 Nutcracker) with good attendance
- No collaborations with other organizations for performances
- 8 outreach performances and workshops (Young Audiences)

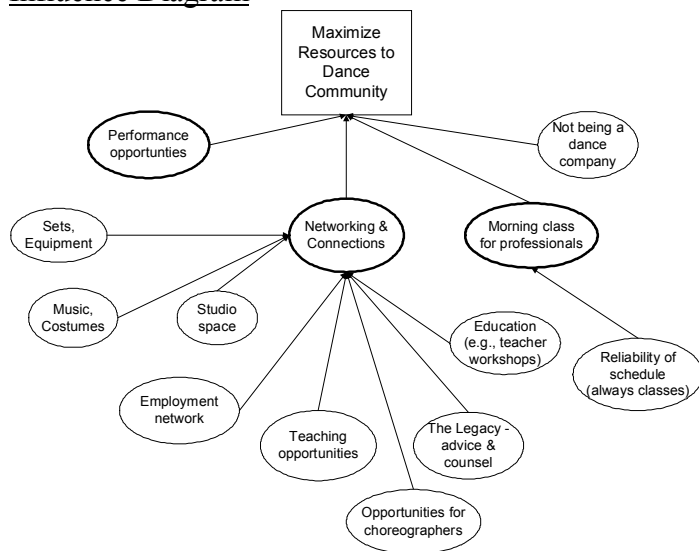
### **Objective 4: Maximize Resources for Dance Community**

Ballet Arts is unique among ballet schools because it is a resource to dancers and dance companies. This uniqueness is possible because Ballet Arts is not a dance company and supports dancers from many different ensembles through classes and networking.

Ballet Arts’ Artistic Director, local professional dancers and ensemble directors participated in this session. The Artistic Director received much positive feedback. She teaches a professional dance class that provides great value to the dance community. The quality of that class is a huge influencing factor in how Ballet Arts helps both local dancers and visiting artists.

As the influence diagram shows, other factors – opportunities for job networking, performance pay, availability of studio space, accessibility to costumes and sets, access to advice and counsel – influence the degree to which Ballet Arts supports the dance community. Through this session, these stakeholders affirmed that Ballet Arts provides many resources and they suggested new ways that Ballet Arts could support the dance community. For example, Ballet Arts’ has not clearly articulated its role in advocating for dance. Board members could now discuss an advocacy role for Ballet Arts.

Influence Diagram



Scale

5 BEST

- High caliber morning class for dance professionals 6 times a week (e.g., large studio, welcoming to all professional dancers, Bonnie Mathis as teacher, excellent accompanists, challenging dance environment)
- Multiple employment opportunities for teachers, choreographers, accompanists, performers (e.g., a resource for employment building opportunities) through school programs or participation in consortium

- Provide vehicle (e.g., Interactive website) for Networking, advocacy, trends, connections for finding costumes, substitutes, making resources known to the community
- Exchange programs for students, teachers and ensembles at both the regional and international level
- Minimize competition by not being a dance company

## 1 WORST

- Inconsistent morning class (e.g., unreliable schedule, no accompanist, small space, poor faculty, caliber of students drops)
- No paid performance opportunities and no participation in a consortium to develop performance opportunities
- No interactive way to network and no open door policy
- No exchange programs

Score for TODAY (2003) is 4

- High caliber morning ballet class 6 times a week (5)
- Many employment opportunities(e.g., Nutcracker), pay could be higher (4.5)
- Do not participate in a consortium (0). BA's role in advocating for dance is unclear in dance community.
- Just starting website; ad hoc networking (2)
- A few exchange programs both regional and international (3)

Scales for the other four objectives were developed in similar working sessions. In addition, two key uncertainties – Grant Funding and Number of Students at Beginning of Year – were defined to use for sensitivity analysis. A working session with the Executive Director fine-tuned the definitions; the Board approved the Value Model in June.

## Conclusions and Next Steps

This Value Model completes a framework for Ballet Arts Minnesota that specifies objectives and criteria for evaluating benefits derived from the various programs. It allows the school to clearly articulate its objectives and assess progress toward achieving those objectives. Even without the next steps, the Value Model is a valuable strategic tool for Ballet Arts. It gives Board members a starting point for discussions. It serves to help generate new ideas for program options. It functions as a measuring stick for evaluating those new program options. It clarifies mission for current and prospective employees, parents and students. And, it is a document that Ballet Arts can use when seeking funding from foundations, government agencies or corporations. Ballet Arts can demonstrate a mission for “Cultivating and Advancing Ballet” that includes both measurable artistic goals as well as business accountability.

Next steps planned for fall 2003 include building on the work completed for the Value Model by adding to the framework with:

- Weight Assessment,
- Strategy Generation and
- Strategy Evaluation.

In the Weight Assessment exercise, Board members will debate relative importance of each objective. In Strategy Generation, participants will build on the draft program ideas collected in a table in June. In Strategy Evaluation, participants will evaluate each strategy using the criteria developed through the Value Model and Weight Assessment steps. This evaluation will yield a ranking of strategies. The overall goal for this project is to create a three-year plan for Ballet Arts Minnesota that clarifies its direction and mission given current funding uncertainties. The plan will include what Ballet Arts is going to do, and not do, if funding is lower or higher than anticipated. It will provide documentation of mission and strategies that can be shared with internal and external stakeholders.

### **Who Can Benefit from Multi-Objective Decision Analysis?**

- Managers and Executives unfamiliar with management tools such as Multi-objective Decision Analysis
- Arts-in-education advocates, especially those supporting efforts to make connections between the arts and sciences
- Current and potential funding agencies for non-profit arts and education organizations
- Operations Research and Management Scientists interested in new applications of decision analysis

Applying sound business strategies and tools for decision making to arts organizations and schools may appear to be either a contradiction in terms or an obvious fundamental of good stewardship. Certainly, there are “artistic” temperaments in business, and “bottom-liners” in the arts. Nevertheless, the application of mathematical models for evaluating educational and artistic programs and goals is not a common practice.

Perhaps, too many artists in their youth were turned off to math and science and likewise for mathematicians and scientists. Perhaps, they have been allowed to live in a divided universe for too long. But, increasingly, it is clear that such divisions are neither real nor

healthy for people or institutions. The interplay of both sides of the brain, if you will, makes for better decisions in the long run. This conclusion may be the most attractive thing about promoting the application of multi-objective decision analysis and other quantitatively-based models to the arts.

## References

Ballet Arts Minnesota, various brochures

Keeney, Ralph L. *Smart Choices*. 1999.

Keeney, Ralph L. *Value-Focused Thinking: A Path to Creative Decisionmaking*. 1992.

Kirkwood, Craig W. *Strategic Decision Making: Multiobjective Decision Analysis with Spreadsheets*. 1997.

Martin, E and L. Merkhofer. "Lessons Learned – Resource Allocation based on Multi-objective Decision Analysis", *EPRI Power Delivery Asset Management Workshop*, New York, NY, June 3-5, 2003.

Merkhofer, L. "Tools and Approaches for Prioritizing Projects and Selecting Project Portfolios", *EPRI Power Delivery Asset Management Workshop*, New York, NY, June 3-5, 2003.

Merkhofer, M. W., "Using Influence Diagrams in Multiattribute Utility Analysis – Improving Effectiveness through Improving Communications," Chapter 13 in *Influence Diagrams, Belief Nets and Decision Analysis*, R. M. Oliver and J. Q. Smith, eds. Wiley, 1990.