

# What Works in Juvenile Justice Outcome Measurement— A Comparison of Predicted Success to Observed Performance

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**IN THE CURRENT** environment of increased demands for accountability and outcome measurement, it is essential to develop sound empirical models for evaluating the effectiveness of juvenile justice programs. Since Martinson's (1974) indictment of rehabilitation, many researchers have revisited the question of "what works" in the juvenile justice system (Steele, Austin and Krisberg, 1989; Rivers and Trotti, 1989; Andrews, Zinger, Hoge, Bonta, Gendreau and Cullen, 1990; Gottfredson and Baron, 1992; Wilson and Howell, 1993; Greenwood and Turner, 1993). Most studies, however, have employed simplistic methods of comparing programs on the basis of aggregate recidivism outcomes, with no consideration of the types of offenders served by the program or the cost to operate the program. This study presents an innovative program evaluation methodology that accounts for programmatic differences in the underlying risk factors of the population of youths served relative to program cost-effectiveness. The authors were part of a team of researchers who developed what is now referred to as the Program Accountability Measures (PAM) analysis.<sup>1</sup> This outcome-based model has been used to evaluate juvenile day treatment and commitment programs in Florida. We discuss here the development of

this methodology and present outcome findings by program model, gender composition of program, and program security level.

## Model Development

The PAM methodology was begun in the early 1980s and initially consisted of a comparison of non-residential and residential juvenile commitment programs in terms of rates of recommitments and successful program completion. Later a measure of program cost was incorporated into the model and an overall cost-effectiveness summary score was calculated for each program. These preliminary versions of the model were in themselves rather innovative in light of the fact that 47 percent of states surveyed in a recent study do not track even basic recidivism outcomes for the programs serving juvenile offenders in the state (Florida Department of Juvenile Justice (FDJJ), 1999). Part of the difficulty encountered in conducting statewide accountability studies of juvenile justice programs is the fact that many states do not operate centralized juvenile justice systems. As such, uniform program data are not available and the comparison of program indicators obtained from decentralized information systems is often plagued by validity and reliability problems. Findings from a recent national survey of juvenile justice specialists indicate that difficulties with evaluation of juvenile justice programs are widespread (Justice Research and Statistics Association, 1999). In this survey of evaluation practices, only 5 percent of state juvenile justice specialists responded that they are satisfied with their state's evaluation methods. Among the top reasons respondents cited for dissatisfaction were

difficulties comparing across programs without common performance measures, and the fact that the large diversity of programs makes it difficult to develop standard evaluation outcome measures. The most common approach to evaluation reported in the survey responses was program monitoring.

We sought to develop a model based upon common performance and outcome measures to evaluate Florida's day treatment and residential program effectiveness. Florida has one of the largest juvenile justice systems in the nation, with a current roster of nearly 300 residential programs and over 6,200 beds. A wide variety of program models are utilized, including family-style group homes, wilderness camps, halfway houses, boot camps, specialized mental health programs, specialized sex offender programs, and maximum security "juvenile prisons." Juvenile programs in Florida include both non-residential, day-treatment programs and residential commitment facilities. Residential programs are currently classified into four security levels: low-risk, moderate-risk, high-risk, and maximum-risk programs. Approximately 80 percent of Florida's programs are contracted, with the majority contracted to non-profit providers.

Despite the challenge inherent in comparing outcomes within and between a large field of widely varying programs, growing legislative pressure for accountability and efficient use of resources requires the development of a technique to equitably evaluate and compare outcomes for the state's many juvenile justice programs. Florida's program models and security levels make side-by-side recidivism rate comparisons impractical and inequ-

<sup>1</sup> The primary team of researchers consisted of individuals who were at that time employees of the Florida Department of Juvenile Justice, Bureau of Data and Research. The following individuals contributed over the years to the development of the current PAM model: Ted Tollett, Julia Blankenship, Kristin Winokur, Elizabeth Cass, Steven Chapman, Amie Schuck, LucyAnn Walker Fraser, Greg Hand, Sherry Jackson, and Karla Blaginin.

uitable. Not surprisingly, tremendous variation exists in the characteristics and backgrounds of the youth committed to the various programs. If programs were ranked strictly on recidivism, low-risk wilderness camps serving minor offenders, for instance, would *always* fare better than high-risk programs serving youth with serious offending histories. In fact, even among facilities with similar treatment models, the youths served have divergent socio-demographic backgrounds and relative risks for recidivism.

Working from previous versions of the model that compared programs using a summation of basic youth offense factors and cost measures, we refined the methodology by using statistical analyses to standardize across all programs and control for the individual characteristics of youths served in the program. Seeking an accountability model that would allow for the comparison of programs both within and between security levels and program models, we developed a measure that would estimate the difference between a program's expected success rate, given the clientele served, and the program's actual performance, or observed success rate. More specifically, the PAM model calculates how well a program is *expected* to do based on the program youths' risk of reoffending (expected success) and compares this to how well the program youths actually performed (observed success). This ensures that programs serving more difficult youth are not held to inequitable standards due to the higher re-offense risk of the youth they serve, and provides a realistic measure of program effectiveness for those programs serving less challenging youth. While this standardized measure evaluates overall program effectiveness in terms of recidivism outcomes, it does not account for program differences in *cost-effectiveness*. Of equal importance to legislative decisions about juvenile justice budget allocations are cost/benefit comparisons of programs. Therefore, we also incorporated into the model a mean cost differential factor that compares the program's average cost per successful completion to the statewide average cost.

## Data Sources

The PAM analyses presented here include effectiveness comparisons for all day treatment and residential programs serving youths in Florida during the two-year period between July 1, 1998 and June 30, 2000. Seeking to improve validity and reliability through in-

creased sample sizes, we chose to examine a two-year period rather than one-year snapshot. Using the JJIS database, we determined that a total of 17,762 youths were released from 186 programs during this time.<sup>2</sup> Demographic, offense history, and subsequent juvenile court recidivism data were obtained from JJIS. Recidivism was defined as any juvenile adjudication, adjudication withheld, or adult conviction for an offense that occurred within one year of a youth's release from a program to the community or a conditional release program. For those youths who reached 18 years of age during the follow-up period or had a case handled in adult court, recidivism data were obtained from FCIC and DOC.

## Calculating the PAM Score

A PAM score is calculated for each program to provide a program rank based on its effectiveness and cost relative to other programs. The score is derived from a formula based on: 1) program youths' reoffending, and 2) average cost per youth completing the program. Program effectiveness is defined as the difference between a program's predicted success and its actual success. To determine predicted success, we initially used logistic regression analyses to predict the likelihood of reoffending based on youths' risk factors. Four factors were identified as statistically significant predictors of reoffending for the youths served in Florida's programs. These factors include: age at release from program, age at first offense, number of prior adjudications and gender. Males were much more likely than females to receive a subsequent adjudication, adjudication withheld or adult conviction following program release. Younger offenders were more likely to reoffend than older youths, and the more prior adjudications a youth had, the greater the odds the youth would reoffend upon release. Having identified the four significant predictors of recidivism at the individual level, we used Hierarchical Linear Modeling (HLM) to calculate the probability of success (no subsequent adjudications or convictions), plus or minus a margin of error (i.e., the 99 percent confidence interval), for the 186 programs that released 15 or more youths between fiscal years 1998–99 and 1999–2000. Expected success is then compared to how well program

youths actually performed, or the *observed success rate*. The difference between a program's expected success rate and its actual success rate provides a measure of the crime reduction effect the program achieved.

Cost-effectiveness is measured by comparing the program's mean cost per completion to the statewide average. Cost figures are limited to FDJJ expenditures for the program and do not include other sources of funding, either governmental or private. A program's total expenditures for the two-year period of the analyses are summed and divided by the number of youths completing the program during this time. This figure is then compared to the average cost per completion statewide, which was \$23,555.

The PAM score is calculated as the sum of the program effectiveness measure weighted by a factor of two-thirds and the program cost-effectiveness measure weighted by a factor of one-third.<sup>3</sup> Program and cost-effectiveness categories were created to facilitate the comparison of programs across security levels and program models. The categories are defined as:

### Program Effectiveness Categories

- *Effective Programs*: These programs are defined as having an observed success rate above the expected success range.
- *Average Programs*: These programs are defined as having an observed success rate within the expected success range.
- *Below-Average Programs*: These programs are defined as having an observed success rate below the expected success range.

### Cost-Effectiveness Categories

- *Low-Cost Programs*: One-third of the programs were grouped into this category on the basis of having a cost per completion below \$15,690.
- *Moderate-Cost Programs*: One-third of the programs were grouped into this category on the basis of having a cost per completion between \$15,690 and \$26,999.
- *High-Cost Programs*: One-third of the programs were grouped into this category on the basis of having a cost per completion above \$26,999.

<sup>2</sup> Due to small sample sizes, programs serving fewer than 15 youths during the two-year period and programs that closed during 1998–99 were not included in the analyses.

<sup>3</sup> The weighting factors were agreed upon collectively by statewide juvenile justice stakeholders including those from the FDJJ, Florida Legislature, Office of Economic and Demographic Research, and the Florida Governor's Office.

## Findings

We present findings from the analysis of all 186 programs according to program model, gender composition, and security level. This presentation is intended to serve as a demonstration of the type of analysis permitted by the PAM model. However, it is important to note that we use the PAM model in Florida not as a mechanism for comparing program models but rather to evaluate the performance of *individual* commitment programs by comparing expected outcomes to observed performance within each program. The PAM analysis also permits the ranking of individual facilities relative to all other commitment programs in the state.

Mirroring the population breakdown of security levels among Florida's juvenile commitment programs, most of the 186 programs evaluated in the analyses presented here are moderate-risk facilities (46 percent). The sample consists of equal proportions (20 percent) of minimum-risk day treatment programs and high-risk residential programs. The low-risk security level represents 12 percent of the sample, while maximum-risk juvenile prisons comprise the smallest percentage (3 percent) of the sample and population of commitment programs in Florida. Most juvenile correctional facilities in Florida serve male offenders (66 percent). Notably, however, the minimum-risk day treatment facilities are typically co-ed programs.

There are a number of program models or treatment approaches used within Florida's juvenile justice system. We compare the most common models used in terms of program and cost-effectiveness (as such, due to omission of least common models, sample size may be somewhat reduced). The following is a general overview of each program model presented:

- *Day Treatment Programs:* These facilities represent the least restrictive portion of the juvenile commitment continuum. They are day schools that provide education and rehabilitative programming to committed youth who continue to live at home. The most common day treatment program in Florida is based on an experiential learning model developed by the private provider Associated Marine Institutes. These programs provide instruction and hands-on training in marine-based activities.
- *Group Treatment Homes:* Group treatment homes are generally small programs located in a neighborhood setting. The fa-

cility typically consists of a house with enough bedrooms to accommodate up to twelve youth. The treatment focus is on social skill acquisition and education to assist in the youth's re-entry into the home community. Although some homes provide on-site education, the majority of facilities allow youth to attend local public schools. Rehabilitation focuses on family involvement and community-oriented experiences.

- *Wilderness Camps:* These are adventure-based programs in rustic settings. Wilderness camps emphasize self-sufficiency through experiential learning and include private providers such as Outward Bound. Activities include shelter construction, community service projects, ropes courses, canoe trips, challenge courses, and counseling. These camps typically serve between 18 to 40 youths at one time.
- *Sex Offender Programs:* This model specifically targets only youths adjudicated of sexual offenses. These programs provide a range of care, counseling and treatment based on standards established by the Association for the Treatment of Sexual Abusers or the National Adolescent Perpetrator Network.
- *Halfway Houses:* Halfway house programs typically serve 15–30 youths in a moderate-risk security setting. These programs provide 24-hour awake staff supervision and many are hardware-secure, as well. Education is provided on-site. Some halfway house programs permit limited community access, though generally youth confined in halfway houses do not leave the facility grounds. Programming includes substance abuse counseling, individual and family counseling, and sexual development services.
- *Boot Camps:* The military-based boot camp programs utilize a highly structured, impact incarceration approach delivered by trained drill instructors. An initial verbal confrontation period is used to break down resistance to authority and treatment, and to firmly establish the boot camp expectations for the youth or "recruit." The programs emphasize "changing criminal thought processes," education, work, physical training, and counseling in a regimented environment.
- *Youth Academies/Youth Development Centers:* These program models are designed

to provide between six and twelve months of secure residential treatment to serious offenders. Services include diagnostic evaluations, substance abuse intervention, mental health services, sexual dysfunction interventions, gang-related behavior interventions, vocational services, self-sufficiency planning, and behavior modification aimed at curbing misconduct.

- *Juvenile Prisons:* Commitment facilities classified under this program model are physically secure residential programs with a designated length of stay ranging from 18 to 36 months. The prisons are maximum-custody hardware-secure with perimeter security fencing and locking doors. The facilities are required to provide single-cell occupancy, except that youth may be housed together during prerelease transition. Placement in a program at this level is prompted by a demonstrated need to protect the public. Youth remain in these programs during their entire stay except in emergency situations and are provided all services on-site. They are not allowed home visits or involvement in the community.

Among the programs evaluated here, the greatest percentage (39 percent) fall into the halfway house model. Day treatment programs (22 percent), wilderness camps (11 percent), and youth academies/centers (10 percent) were the next most common treatment approaches employed by the programs included in the study.

As outlined earlier, program effectiveness scores are grouped into three categories. Overall, the results indicate that the majority (61 percent) of commitment programs in Florida are performing as would be expected given the youth served. That is, most programs are average in program effectiveness. Only 16 percent of the programs evaluated perform better than expected, while nearly one-quarter of the facilities actually perform below average in terms of recidivism outcomes.

The results indicate that minimum security day treatment programs appear have the largest number of programs performing better than expected, after controlling for the individual risk factors of the youths served (see Table 1). The program effectiveness of day treatment programs is nearly double that of programs in the next most effective security level, high-risk residential programs. In fact, only 5 percent of all day treatment programs fall into the below average effectiveness category, while among resi-

**TABLE 1**  
*Program Effectiveness and Cost by Security Level (in percent)*

	Minimum Risk Day Treatment	Low Risk Residential	Moderate Risk Residential	High Risk Residential	Maximum Risk Residential
Program Effectiveness					
Above Average Effectiveness	32.4	9.1	9.3	18.4	0.0
Average Effectiveness	62.2	59.1	61.6	55.3	100.0
Below Average Effectiveness	5.4	31.8	29.1	26.3	0.0
Program Cost					
Low Cost	75.7	40.9	27.9	2.6	0.0
Moderate Cost	18.9	45.5	43.0	21.1	0.0
High Cost	5.4	13.6	29.1	76.3	100.0
N =	37	22	86	38	3

dential programs, between 26 percent and 32 percent of all programs are ranked below average in effectiveness.

In addition to recidivism outcomes, day treatment programs are, on average, less costly than residential programs. More than three-quarters of day treatment programs are ranked as low-cost facilities, compared to between 0 percent and 41 percent for residential programs. Fewer than 10 percent of the minimum-security programs are high-cost facilities, while 100 percent of the juvenile prisons are grouped into this cost category. Not surprisingly, as security level increases, average facility costs also generally increase. The findings reveal that on average, programs that perform better than expected in terms of recidivism, also tend to cost more to operate (see Table 2). Nearly 80 percent of the programs performing below average are moderate- to low-cost facilities. It is interesting to note that of the programs performing above average and doing so with relatively low operating costs, all are classified within the day treatment program model. This suggests that the community-based approach offers not only the greatest effectiveness when controlling for youths' individual risk factors, but also does it at minimal cost.

A breakdown of program effectiveness in terms of varying program models or treatment approaches reveals once again that most programs are performing within the average effectiveness range (see Table 3). However, there are some notable differences among program models and the above/below average effectiveness classifications. Sex offender programs, day treatment programs, and boot

**TABLE 2**  
*Program Cost by Program Effectiveness (in percent)*

	Above Average Effectiveness	Average Effectiveness	Below Average Effectiveness
Program Cost			
Low Cost	27.6	33.6	36.4
Moderate Cost	20.7	32.7	43.2
High Cost	51.7	33.6	20.5
N =	29	113	44

camp have the greatest percentage of facilities categorized as above average effectiveness, after controlling for youths' likelihood to recidivate given individual risk factors. The program models most likely to demonstrate average or below average performance are also those programs that are among the most numerous: halfway houses, wilderness camps, group treatment homes, and high-risk youth academies. Together, these four program models comprise 65 percent of Florida's juvenile commitment programs.

Our final analyses examine program effectiveness in terms of treatment models and the gender composition of youth served (see Table 4). The effectiveness of program models varies by gender. Group treatment homes appear to be a more effective model for female offenders than males. In fact, the majority of male group treatment homes perform worse than expected, while none of the female group treatment homes are below average in effectiveness. This finding suggests

that delinquent girls may respond better to the less secure, community-oriented treatment approach offered within this program model. Similarly, despite the existence of a very large number of halfway houses serving males, not a single male halfway house performed better than predicted and nearly half are classified as below average. Among halfway houses serving females, on the other hand, one-third are in the above average category and none are in the below average category, suggesting that the halfway house treatment model, as it is implemented in Florida, may be more effective with female youth. Because the majority of day treatment programs are co-ed, too small a number of exclusively male or exclusively female programs exist to draw meaningful conclusions. Similarly, the small number of female boot camps and female wilderness programs prevents meaningful comparisons with the male versions of these programs. A female juvenile prison was recently opened in Florida, and is

**TABLE 3**  
*Program Effectiveness by Program Model (in percent)*

Program Effectiveness	Group							
	Day Treatment	Treatment Home	Wilderness Camp	Sex Offender	Halfway House	Boot Camp	Youth Academy	Juvenile Prison
Above Average Effectiveness	28.9	14.3	15.8	100.0	9.1	22.2	0.0	0.0
Average Effectiveness	63.2	50.0	47.4	0.0	59.1	55.6	82.4	100.0
Below Average Effectiveness	7.9	35.7	36.8	0.0	31.8	22.2	7.6	0.0
N =	38	14	19	4	66	9	17	3

**TABLE 4**  
*Program Effectiveness by Program Model and Gender (in percent)*

Program Effectiveness	Group							High Risk
	Day Treatment	Treatment Home	Wilderness Camp	Sex Offender	Halfway House	Boot Camp	Youth Academy	Juvenile Prison
<i>Males</i>								
Program Effectiveness								
Above Average Effectiveness	0.0	0.0	11.1	100.0	0.0	12.5	0.0	0.0
Average Effectiveness	66.7	37.5	50.0	0.0	56.3	62.5	82.4	100.0
Below Average Effectiveness	33.3	62.5	38.9	0.0	43.8	25.0	17.6	0.0
N =	3	8	18	4	48	8	17	3
<i>Females</i>								
Program Effectiveness								
Above Average Effectiveness	100.0	33.3	100.0	0.0	33.30	100.0	0.0	0.0
Average Effectiveness	0.0	66.7	0.0	0.0	66.7	0.0	0.0	0.0
Below Average Effectiveness	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N =	1	6	1	0	18	1	0	0

one of the only facilities of its type in the nation. However, this program has yet to be evaluated using the PAM model, because insufficient time has elapsed since the program opened to allow for the required one-year recidivism follow-up.

As displayed in Table 4, programs serving females, in general, perform better with regard to expected recidivism than programs serving males, even after controlling for the influence of gender on youths' individual likelihood to reoffend. The factors underlying the generally strong performance of female juvenile commitment programs are not clear. However, the Florida Department of Juvenile Justice has made enhancement of gender-specific programming a priority for a number of years, an effort spearheaded by a very active "Girls Initiative" statewide workgroup. In

addition, the Department obtained Challenge Grant funding to conduct an extensive four-year empirical investigation into the characteristics, needs, and backgrounds of girls incarcerated in the "deep end" of the juvenile justice system. The findings of the study have been widely disseminated among juvenile justice professionals at all levels throughout the state. It is possible that this emphasis and prioritization of girls programming has had a significant impact on the effectiveness of facilities serving female juvenile offenders.

### Summary and Discussion

The primary intent and greatest value of the Program Accountability Measures model is its cost/benefit approach to comparing individual juvenile commitment facilities. Programs are

held accountable to the level of performance anticipated for the youth they serve, rather than to a static statewide recidivism target. The PAM approach solves a major problem faced by evaluators of juvenile justice programs, namely, the difficulty of comparing across program models, security levels, and other factors that may impact the relative likelihood of reoffending of the youth served by individual facilities. The PAM analysis allows evaluators to take an important step beyond simple recidivism measures and program monitoring. It is indeed possible for a program with a high number of recidivists to be ranked as more effective than other programs with fewer recidivists. Once the underlying risk factors of the youth served are held constant, however, it becomes clear to what extent the program performed better than predicted.

Program monitoring, the most common method of program evaluation, can yield valuable information about facility safety and contract compliance; however, it cannot predict—and is not intended to predict—program outcomes. In fact, a recent comparison between program monitoring performance and PAM-based program effectiveness in Florida revealed that monitoring outcomes are unrelated to effectiveness. While this may seem counter-intuitive, many possible explanations exist. Most important, perhaps, is that the factors that contribute to successful juvenile rehabilitation are still not fully understood, and therefore cannot be written into even the most carefully crafted contract or thoughtfully written operational policies. Additionally, ensuring the delivery of services such as counseling and education does not necessarily ensure the quality of those services. The effectiveness of interventions within program models may actually be highly related to factors too intangible to be measured by even careful contract monitoring. Quality of management and its impact upon the culture within a program, the nature of staff-to-client interactions, staff turnover, and the level of dedication of key staff members may be more predictive of treatment success than objective measures such as program model, monitoring outcomes, and funding levels.

The statistical approach of the PAM model offers evaluators, policymakers, and funding sources an important new option to measure and reward the intangible factors that contribute to successful outcomes. Currently in Florida, private providers' past PAM performance is one measure used to score propos-

als to operate new juvenile justice programs. Poor past performance decreases the likelihood that a provider will be awarded new contracts. PAM scores have also been used to identify programs that warrant in-depth study. For example, a particularly high-performing boot camp was targeted for intensive study in the hopes that other boot camp operators could benefit from qualitative information regarding the facility's operations. More recently, a high-risk program for younger juvenile offenders was selected for in-depth analysis using the Correctional Program Assessment Inventory (CPAI), given the program's consistently poor performance compared to the expected recidivism of the youth served.

The Program Accountability Measures approach represents a major step forward in juvenile justice program evaluation. Increased demands for accountability in human services demand advanced outcome measurement and cost-effectiveness. While program monitoring continues to be a necessary and useful evaluation technique, the statistically-controlled recidivism measures employed here offer a roadmap to comprehensive, accurate evaluation of whether juvenile commitment programs accomplish their primary mission: reduction of re-offending among the youth they serve.

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## Appendix

### Calculating the Program Accountability Measures (PAM) Score

1. **Calculate the program effect on recidivism.** For each program, calculate the difference between the program's success rate and the upper limit of its expected success range (if observed success is higher than expected) or the lower limit of its expected success range (if observed success is lower than expected). If the observed success rate is within the confidence interval, the difference is not statistically significant and is counted as 0. This value is referred to as the percent difference.

Program: Alachua Halfway House  
 Success Rate: 76%  
 Expected success range: 71%–74%  
 Percent Difference: 76%–74% = 2%

2. **Calculate the program cost per successful completion** by dividing total DJJ expenditures by the total number of successful completions during the period being tracked.

Cost Per Successful Completion:  $\$1,879,625 \div 63 = \$29,835$

3. **Standardize.** To standardize the program percent differences, calculate the average percent difference for all the programs. Then, for each program, subtract this average percent difference from the program's percent difference, and divide by the standard deviation of the percent difference.

$Z_{\text{success}} = (2\% - 0.075\%) \div 2.96 = 0.65$       Mean: 0.075%  
 Standard deviation: 2.96

Note: The top-scoring program had a program effect that was more than three standard deviations above the mean and was given a maximum z-score of 3.

To calculate the cost difference for each program, subtract the program's cost per successful completion (in this example, \$29,835) from the mean program cost per successful completion (in this example, \$23,555).

Cost Difference =  $\$23,555 - \$29,835 = -\$6,280$

Standardize this difference by subtracting the mean cost difference for all programs from the program's cost difference, and divide by the standard deviation.

$Z_{\text{cost}} = (-\$6,280 - (-\$2,580)) \div \$21,369 = -0.17$       Mean:  $-\$2,580$   
 Standard deviation: \$21,369

Note: Any program having a cost per successful completion that was 3 standard deviations or more above/below the mean cost per youth was given a standardized cost score of  $+/-3$ .

4. **Add the z-scores together** with a factor of 2/3 for the recidivism component and 1/3 for the cost.

PAM Index =  $2/3 \times Z_{\text{success}} + 1/3 \times (Z_{\text{cost}}) = .43 + (-0.06) = 0.38$

5. **Standardize sum of component z-scores.** For standardization, subtract the mean PAM Index value from the program PAM Index value, and divide by the standard deviation.

$Z = (0.38 - 0.03) \div 0.65 = 0.54$       PAM Index average: 0.03  
 PAM Index standard deviation: 0.65

6. **Translate** into a distribution with an average of 70 and a standard deviation of 10, modeled after A-F report card grades.

PAM Score =  $(0.54 \times 10) + 70 = 75$       PAM Score average: 75  
 PAM Score standard deviation: 10