

## **AC 2009-59: EVALUATING AN NSF ATE CENTER USING BALDRIGE CRITERIA**

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# Using a Baldrige/Sterling Evaluation Plan for an NSF ATE Center

## Introduction

FLATE, the Florida Advanced Technological Education Center, a NSF ATE Regional Center of Excellence has as its mission to create a manufacturing educational delivery system by offering the technical programs, curriculum development, best practice demonstrations, student involvement and outreach activities necessary to meet the workforce capacity and high performance skill needs of the manufacturing sectors within its region. To accomplish this mission FLATE initiates and participates in a variety of projects and activities. To meet the reporting needs of the National Science Foundation and align itself with business models, FLATE has developed an Evaluation Plan that uses the impact and effectiveness data required by NSF as one component of a more comprehensive organizational self evaluation plan that is based on the Malcolm Baldrige Criteria. This approach keeps the Center's projects and activities, data, and motivation aligned with its vision, mission and goals and target objectives.

## Traditional Evaluation Plans and Their Implementation

NSF funded projects and centers focused on student recruitment and outreach, curriculum development and deployment, professional development into STEM Career pathways are all required to submit evaluation plans with their project proposals and provide annual reports of their performance data to document their activities. An informal survey of several such projects reveals that they contain many similar components including a variety of formative (periodic assessments), summative (end of project), and longitudinal data elements. Because many of the projects are broad in activity scope and focused on a single technology sector, the types of activities and when and how they are conducted might be similar, but not exactly the same. This forces many similar activities to be added together as activity data (e.g. number of students attending an outreach/promotional event). Additionally, many projects and /or centers build in a "process evaluation" provides feedback on the project implementation, timeliness, etc.

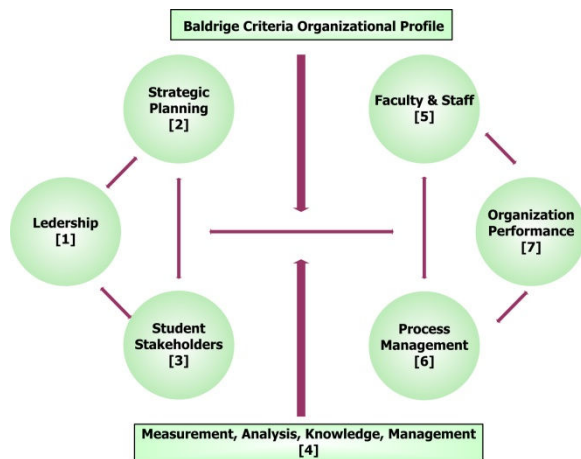
Data elements (activity data) can possibly provide information to answer some questions about broader impacts and institutional effectiveness. These research type questions draw conclusions and sometimes provide recommendations and/or best practices for various types of activities and programs. More straightforward effects on the host academic institutions faculty and teachers, programs, students and other stakeholders may also be revealed by analysis of this type of data over time. All of this requires continuous attention by the project leadership to be sure that good data is collected, recorded, filters/cleaned (if need be) and ultimately, reviewed and analyzed for reporting purposes. Below is a single pass with non feedback loops (although there are many possible) that sampling defines the various steps of an evaluation. Following these steps under the guidance of a trained professional with diligence should provide sufficient meaningful information for a comprehensive report that will satisfy the grant reporting requirements.



Figure 1. Basic steps in an evaluation process (single pass not illustrating feedback loops)

### Baldrige Plan Overview

FLATE uses the Florida Sterling process, which is the state’s implementation of a Malcolm Baldrige Criteria as the model for the Center’s evaluation. FLATE’s implementation of the Sterling process is a plan that consists of 2 interdependent levels with various types of data to validate its performance with respect to its past, present and future goals and objectives and an overarching, strategically-oriented plan and process that ensure that the center continues to strive for improvement in its processes and products. The plan has three phases that are annually cyclical. In the first phase, the foundation of FLATE is established or confirmed and directions are set for where the organization is to go. In the second phase of the evaluation plan, effectiveness measures are developed to align with the strategic hierarchy and subsequent goals and objectives, to monitor FLATE’s progress. The third phase is the assessment and evaluation phase, the results of which supply important feedback to the first phase as the cycle repeats.



The purpose of the cyclical nature of the Evaluation Plan is to ensure that FLATE is accomplishing its mission and meeting the needs of National Science Foundation (NSF), as well as to instill confidence in industry partners that FLATE’s operations are consistent with industry-recognized, good business management practices. This evaluation model combines evaluation plan elements required by NSF within the quality-driven Florida Sterling process familiar to Florida manufacturers. Integrating Sterling quality is vital to FLATE’s success in serving customers and stakeholders.

Figure 2: Baldrige Criteria Organizational Diagram

### Baldrige/Sterling Evaluation Plan Details

The first phase establishes and defines the foundation of FLATE and sets the direction for success for the organization. This initial focus is on the current state of the organization along with the strategies and initiatives to help the organization to live up to its Guiding Principles and to achieve its Vision and Mission. The primary tools for this phase are living documents: the FLATE Organizational Profile and its Strategic Hierarchy. The Organizational Profile defines the challenges faced and the key internal and external environmental influences on how FLATE operates. It describes the working environment internal to the organization and that of the host institution. It also defines the external environment in terms of who the partners, customers, and stakeholders are, as well as how FLATE works with and for them. In the Profile document, strategic challenges and advantages are described, and key success factors in our competitive marketplace. The Profile is reviewed and updated regularly as part of the evaluation cycle.

In the second phase, effectiveness measures are developed to align with the strategic hierarchy and related goals and objectives, to monitor progress. Specific evaluation measures are defined by the Strategic Hierarchy; i.e. measures for Curriculum Activities, Outreach and Recruitment Activities, and Professional Development.

The third phase is assessment and evaluation. After analysis of the data collected in the measurement plan the Center determines whether FLATE is on target to accomplish its strategies, goals, and objectives. Using the Florida Sterling Criteria (a Malcolm Baldrige-based model), FLATE also conducts a self-assessment of our management and business systems and practices. This model assesses strengths and opportunities for improvement in each of seven categories: 1) Leadership, 2) Strategic Planning, 3) Customer Focus, 4) Measurement, Analysis, and Knowledge Management, 5) Workforce Focus, 6) Process Management, and 7) Performance Results. The self-assessment identifies organizational. These seven categories are interdependent shown in Figure 2.

### Project Evaluation and Data

The second step of FLATE’s Sterling process aligns one-to-one with the typical evaluation process defined in the previous section used by many such NSF educationally focused projects, center, and consortiums. This component (category 4) is called “Measurement, Analysis, Knowledge, and Management” in a Baldrige/Sterling organizational profile. It is an integral component of the larger process that includes six other categories, as seen in the typical Baldrige/Sterling organizational diagram shown above in Figure 1. In this category of FLATE’s evaluation plan is the identification of data elements to be collected, how and when to collect and store them; what specific target objective or objectives each measurement supports; how each goal is met by the cumulative and synergistic properties of its target objectives; and how all data elements, target objectives and goals together support the overall organizational effectiveness measures. FLATE has several visual and database strategies to keep focused on the highest level organizational performance measurements, many of which are of organized database files and mapping tables carefully linking various target objectives to goals, effectiveness measurements, and file locations. An overview of FLATE’s Strategic Hierarchy is included below in Figure 3. The overall Organizational Effectiveness Measures are: (1) total number of students placed in manufacturing related industry jobs and (2) total number of students enrolled in manufacturing and related academic secondary and post secondary programs.

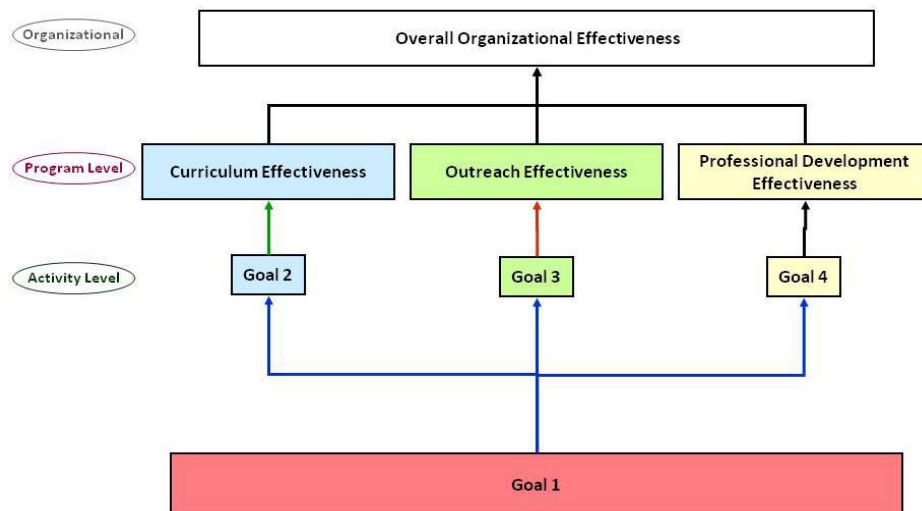


Figure 3. FLATE's Strategic Hierarchy

### **Preliminary Sterling Assessment**

After a first round of defining its organizational profile, FLATE's subjected itself to a "preliminary" Florida Sterling Assessment in 2008, administered informally by a 15 year Sterling Examiner. Despite being a partially incomplete assessment, FLATE scored in the 250 to 350 point range (on a scale of zero to 1000). This indicates that leadership has put in place effective, systematic management approaches with some gaps or early-stage deployment of these approaches. A 150-250 point score is an average score for organization performance while most award winners accumulate between 600-800 points.

The conclusions drawn reported that in FLATE, there is the beginning of a systematic approach to evaluation and improvement of key processes. Overall, FLATE approaches are in the early stages of alignment with basic organizational needs identified in the Organizational Profile. In addition to a raw score, both strengths and opportunities for improvement are reported. FLATE strength's included that its senior leaders demonstrated commitment to organizational values and vision through actions. They consistently reinforce two-way communication with the workforce, customers, volunteers, partners, and other stakeholders, including soliciting input to support consensus decision-making. The FLATE organization also has approaches to building effective relationships with stakeholders. Organizational improvement efforts focus on problem solving, and are generally proactive. Opportunities identified for improvement include developing a timeline and method for regular review by senior leaders of the most important effectiveness measures. Selection and use of contextual comparative data and information are not prevalent, and would help support organizational decision making and continuous improvement.

In its efforts to create a sustainable organization that would support industry needs, FLATE adopted and is implementing the Sterling Quality System. The model is used and respected by industry, and is the same industry that the Center looks to for guidance and support. Although it is sometimes challenging for a very small organization housed inside an large academic institution, FLATE will continue to use this system to evaluate not only its output but its organization.

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FLATE Website, [www.fl-ate.org](http://www.fl-ate.org)