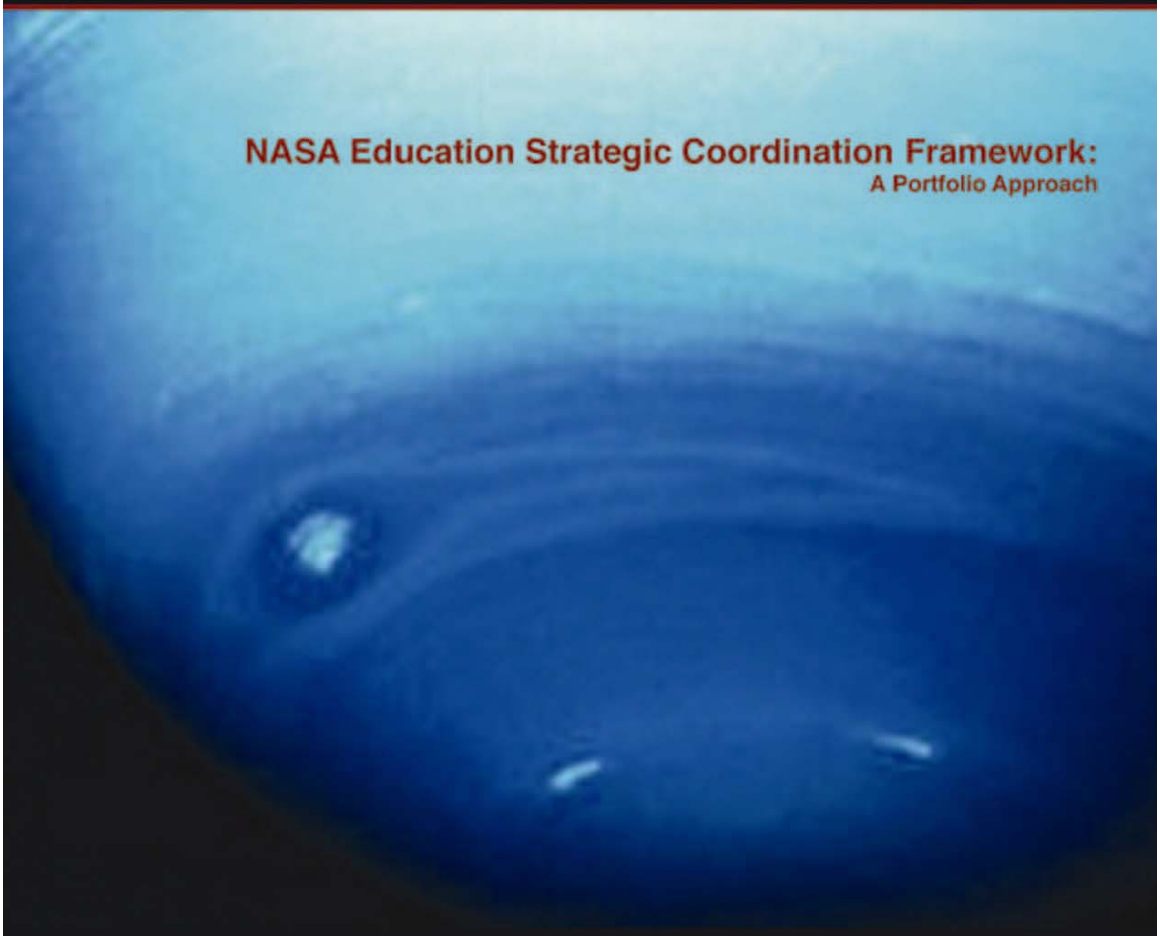
National Aeronautics and Space Administration



NASA Education Strategic Coordination Framework:
A Portfolio Approach

www.nasa.gov

The NASA Education Strategic Coordination Framework: A Portfolio Approach was approved by NASA's Strategic Management Council on February 23, 2006. It was adopted as the framework for all NASA education programs, projects, products and activities by the Education Coordinating Committee on February 24, 2006.

NASA Mission

To pioneer the future in space exploration, scientific discovery, and aeronautics research

NASA Core Values

Safety – NASA's constant attention to safety is the cornerstone upon which we build mission success. We are committed, individually and as a team, to protecting the safety and health of the public, our team members, and those assets that the Nation entrusts to us.

Teamwork – NASA's most powerful tool for achieving mission success is a multi-disciplinary team of competent people. The Agency will build high-performing teams that are committed to continuous learning, trust, and openness to innovation and new ideas.

Integrity – NASA is committed to an environment of trust, built upon honesty, ethical behavior, respect, and candor. Building trust through ethical conduct as individuals and as an organization is a necessary component of mission success.

Mission Success – NASA's reason for being is to conduct successful space missions on behalf of this Nation. We undertake missions to explore, discover, and learn. And we believe that mission success is the natural consequence of an uncompromising commitment to safety, teamwork, and integrity.

Table of Contents

1.0 Introduction **2**

2.0 Guiding the Education Portfolio in Support of the Agency Strategic Plan **4**

2.1 Supporting the NASA Strategic Plan 4

2.2 Outcomes that Align the Education Portfolio 4

2.3 The Guiding Education Strategic Framework 4

2.4 Philosophy and Principles that Guide the Operation of the Portfolio 6

2.4.1 Overarching Philosophy 6

2.4.2 Operating Principles 6

2.5 The Education Strategic Framework: the Total Picture 6

3.0 Mechanisms for Portfolio Coordination and Integration in a Distributed System **8**

3.1 Roles and Responsibilities 8

3.1.1 Assistant Administrator for Education 8

3.1.2 Office of Education 8

3.1.3 Mission Directorates and Other Headquarters Funding Organizations 8

3.1.4 Center Education Offices 9

3.1.5 NASA Education Program/Project Managers 9

3.1.6 External Education Implementing Partners 9

3.2 Portfolio Coordination and Integration via the Education Coordinating Committee 9

3.2.1 Responsibilities of the ECC 10

3.2.2 ECC Membership 10

4.0 Monitoring and Control **11**

4.1 Assessment, Review, and Evaluation 11

4.2 Assessment of the Portfolio 12

4.3 Outcome-Level Metrics and Reviews 12

4.4 Program/Project/Activity Evaluation 13

5.0 Summary **13**

6.0 Reference Documents and Glossary **14**

6.1 Reference Documents 14

6.2 Glossary 15

1.0 Introduction

As we begin the second century of flight and approach half a century of space exploration, our Nation maintains its commitment to excellence in science, technology, engineering, and mathematics (STEM) education to ensure that the next generation of explorers and innovators is fully prepared to join our workforce while contributing to national needs.

The May 2005 report by the National Academies, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, proposes four broad recommendations to enhance the science and technology enterprise so that the United States can successfully compete, prosper, and be secure in the global community of the 21st century: 1) increase America's talent pool by vastly improving K-12 science and mathematics education; 2) sustain and strengthen the Nation's traditional commitment to long-term basic research; 3) make the United States the most attractive setting in which to study and perform research; and 4) ensure that the United States is the premiere place in the world to innovate. NASA is taking a leading role to inspire interest in science, technology, engineering, and mathematics, as few other organizations can through its unique mission, workforce, facilities, research, and innovations. The agency is also taking a leading role to make significant impacts in engaging underserved and underrepresented communities in STEM.

The success of NASA's education portfolio depends upon strategic planning across the Agency. Close coordination through high-performing teams is required among NASA's Office of Education, Mission Directorates, Centers, the Office of Human Capital Management, the Office of Diversity and Equal Opportunity, and other Mission Support offices to ensure that workforce requirements are identified and met, and that education efforts are aligned and focused on building the future workforce.

This document serves as the education strategic coordination framework for an Agency portfolio approach to education. It aligns NASA's total education portfolio with the Agency's Strategic Plan, provides a coordination structure, and creates an Agency-wide strategic planning, implementation, and evaluation framework for the Agency's investments in education. The document builds on the education goals identified in the Agency 2006 Strategic Plan *(see box)* and identifies three specific and measurable Outcomes to allow achievement of those goals. The plan encompasses all education efforts undertaken by the Agency, and guides our relationships with external education partners, including Minority Serving Institutions, professional associations, universities, school systems, industry, and other federal agencies. The requirements and management principles contained in this framework will instill the discipline and organizational rigor needed for education's role in inspiring students toward the path to the Moon, Mars, and other exploration objectives.

The NASA Education Strategic Coordination Framework defines the operational methodology, the role of key officials and entities, and the coordination structure for all NASA education efforts. The purpose of this framework is to present the following:

- Alignment of NASA education with the Agency Strategic Plan.
- A framework and specific and measurable outcomes to guide the education portfolio.
- Principles by which NASA education is managed.
- Roles and responsibilities of the Assistant Administrator for Education, the Office of Education, Mission Directorate Education Leads, and Center Education Offices.
- Guidelines consistent with government requirements for strategic planning.

- Key Agency stakeholders responsible for strategic coordination and requirements development.
- Processes by which strategy is converted into implementation and outcomes.
- Guidance for implementation offices to execute programs and projects.
- Approaches for goals, measurements, and feedback on progress.
- A monitoring and control structure for determining the impacts and outcomes of NASA's education portfolio across the Agency.

A highly educated and well-prepared workforce has been and continues to be critical to the success of the Agency's mission. NASA's investment in education is directly linked to inspiring the next generation of explorers and innovators. This document describes the processes and principles of strategic planning and management for all of NASA's education efforts. It is intended to give a basic understanding of how NASA education is governed and managed and what internal and external requirements drive this strategy.

Strategic Communications: Education Initiatives

For nearly 50 years, NASA's journeys into air and space have deepened humankind's understanding of the universe, advanced technology breakthroughs, enhanced air travel safety and security, and expanded the frontiers of scientific research. These accomplishments share a common genesis: education. NASA will continue the Agency's tradition of investing in the Nation's education programs and supporting the country's educators who play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will manage and lead the Nation's laboratories and research centers of tomorrow.

In 2006 and beyond, NASA will continue to pursue three major education goals:

- **Strengthen NASA and the Nation's future workforce**— NASA will identify and develop the critical skills and capabilities needed to achieve the Vision for Space Exploration. To help meet this demand, NASA will continue contributing to the development of the Nation's science, technology, engineering, and mathematics (STEM) workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- **Attract and retain students in STEM disciplines**—To compete effectively for the minds, imaginations, and career ambitions of America's young people, NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines critical to NASA's future engineering, scientific, and technical missions.
- **Engage Americans in NASA's mission**—NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive, educational activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase Americans' science and technology literacy.

As the United States begins the second century of flight, the Nation must maintain its commitment to excellence in STEM education to ensure that the next generation of Americans can accept the full measure of their roles and responsibilities in shaping the future.

NASA 2006 Strategic Plan

2.0 Guiding the Education Portfolio in Support of the Agency Strategic Plan

Strategic planning is an essential component of strategic management. It is the process of identifying strategic goals and objectives and then developing and implementing plans to reach them. This section documents a portfolio approach that facilitates strategic planning for NASA's education programs, including the goals and outcomes that align the portfolio with the NASA Strategic Plan, the overarching philosophy, operating principles, and framework that guide developing and implementing the portfolio.

2.1 Supporting the NASA Strategic Plan

NASA's founding legislation, the Space Act of 1958, directs the Agency to expand human knowledge of Earth and space phenomena and to preserve the role of the United States as a leader in aeronautics, space science, and technology. High achievement in STEM education is essential to the accomplishment of NASA's mission. The Strategic Management of Human Capital initiative under the President's Management Agenda requires agencies to "build, sustain, and effectively deploy the skilled, knowledgeable, diverse, and high-performing workforce needed" to meet agency core competencies. Our education investments will contribute to the Agency's human capital needs.

In 2004, the President charged NASA with planning and implementing an exploration program to achieve the Vision for Space Exploration. To achieve the Vision and on-going science and aeronautics activities, the Agency requires a highly skilled and diverse workforce. Our education investments are an important component to ensuring the availability of that workforce.

All of NASA's education efforts are part of an integrated Agency-wide approach to human capital management. Within the NASA Strategic Plan, Education is identified as a cross-cutting function that supports all of the Agency's strategic goals and objectives. The NASA Strategic Management and Governance Handbook (NPD 1000.0) requires the Office of Education to submit a plan for Agency education implementation that provides guidance for the execution of programs and projects, supporting those strategic goals and objectives. The input is submitted annually as part of the single Institutional Implementation Plan for the Agency.

2.2 Outcomes that Align the Education Portfolio

NASA delivers a comprehensive Agency education portfolio implemented by the Office of Education, the Mission Directorates, and the NASA Centers. Through the portfolio, NASA contributes to our Nation's efforts in achieving excellence in STEM education. Three Outcomes serve to align all Agency education activities:

Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals through a portfolio of investments.

Outcome 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission.

2.3 The Guiding Education Strategic Framework

The Education Strategic Framework depicted in Figure 1 provides a conceptual basis for examining, guiding, and coordinating the NASA education portfolio.

The Education Strategic Framework is a strategic management tool that allows the Agency to monitor participant movement through education activities, with each category leading to the next. Education programs and projects draw from the category below them – as a key source for participants – and they connect participants to the category above them – providing a more experienced and focused group and creating a measurable pipeline. If

a participant's imagination is captured by an inspirational activity, it will be far easier to interest that individual in more interactive engagement activities. As that individual becomes more engaged, he or she may search for opportunities to learn and eventually become employed in the aerospace industry - either in the private or public sector (e.g., NASA). Student opportunities at NASA include internships, scholarship programs, and student education employment programs (e.g., cooperative education). No matter where the individual decides to pursue their career, the goal is to direct a subset of the original audience through the pipeline to pursue a career in science, technology, engineering, or mathematics while drawing in new participants along the way.

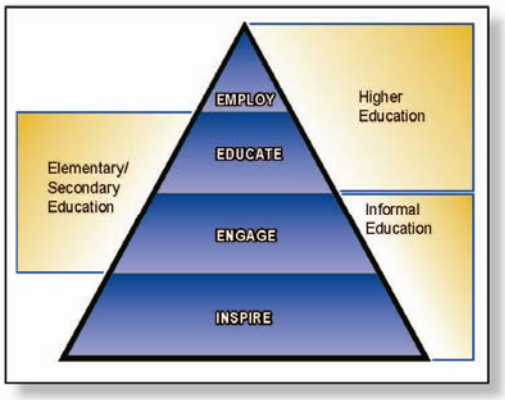


Figure 1—Education Strategic Framework

Four Categories of Involvement

Inspire—Activities focused on promoting awareness of NASA's mission among the public, primarily through informal education and outreach activities. This category is heavily supported by the outreach activities of other NASA organizations, such as the Office of Public Affairs. *Inspire* level efforts are broad, with the goal of reaching a large number of people, but are not limited to "in-person." This category forms the base of an education structure that becomes more focused at progressively higher levels of the framework "pyramid".

Engage— Education activities that in some manner incorporate participant interaction with NASA content for the purpose of developing a deeper understanding. Participants are strategically identified and targeted.

Educate—Focused education support that promotes learning among targeted populations. Education activities focus on student learners, or pre- and in-service educators, and are designed to develop and/or enhance specific STEM knowledge and skills using NASA resources. *Educate* activities promote new knowledge acquisition and strengthen an individual's skills. NASA's elementary and secondary education efforts are supplementary to formal classroom instruction. NASA's higher education efforts may include development of specific university curricula in support of the NASA mission and student-built instruments.

Employ—Targeted development of individuals who prepare for employment in disciplines needed to achieve NASA's mission and strategic goals. Through internships, fellowships, and other professional training, individuals become participants in the Vision for Space Exploration and NASA science and aeronautics research. At the apex, they have acquired sufficient mastery of knowledge for employment with NASA, academia, industry, or within STEM fields of teaching.

2.4 Philosophy and Principles that Guide the Operation of the Portfolio

In addition to the Agency Core Values (see Inside Front Cover) and Strategic Management Principles (see Inside Back Cover) described in the NASA Strategic Management and Governance Handbook (NPD 1000.0), the NASA education portfolio is established upon an Overarching Philosophy and six Operating Principles to ensure program alignment and excellence. The philosophy and principles are integral to the conduct of, and apply collectively to, all NASA education programs. They form the foundation for evaluation of both new and existing education investments.

2.4.1. Overarching Philosophy

Cultivate Diversity— The cultivation of diversity is both a management philosophy and core value for all NASA education efforts. Diversity of skills and talents needed in our future workforce is critical to our success. Potential at both the individual and organizational levels will be maximized by fostering awareness, understanding, and respect for individual differences. The knowledge, expertise, and unique background and life experiences - including ethnic, gender, racial, religious, and cultural identity – of each individual strengthen the Agency.

2.4.2 Operating Principles

Relevance: To effectively strengthen the Nation's STEM workforce, NASA must implement activities that are useful to the education community and that strengthen their ability to engage students in the STEM pipeline.

Content: Education investments use NASA content, people or facilities to involve educators, students, and/or the public in NASA science, technology, engineering, and mathematics.

Diversity: NASA strives to ensure that underrepresented and underserved students participate in NASA education and research programs to encourage more of these students to pursue STEM careers. Programs and projects are representative of American demographics, engage underrepresented and underserved minorities, women, and persons with disabilities, and reflect an atmosphere of equity, balance, and inclusiveness. NASA will continue to focus on enhancing the capabilities of Minority Serving Institutions to contribute to the research needs of the Agency.

Evaluation: Education investments document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and annual performance goals. Evaluation methodology is based on reputable models and techniques appropriate to the content and scale of the targeted activity, product, or program.

Continuity: Projects and activities draw from audiences that have already demonstrated interest in NASA and connect participants to the next level of engagement. A blend of projects and activities encourage continued student affiliation with NASA throughout their academic career.

Partnerships/Sustainability: Education investments leverage and achieve sustainability through their intrinsic design and the involvement of appropriate local, regional, and/or national partners in their design, development, or dissemination. As appropriate, key aspects of projects and activities are replicable, scalable, and demonstrate potential for continuation beyond the period of direct NASA funding.

2.5 The Education Strategic Framework: The Total Picture

The NASA Education Outcomes, Overarching Philosophy, and Operating Principles can be mapped onto the Education Strategic Framework Pyramid (Figure 2). This framework serves to guide the planning, implementation, and assessment of the NASA Education Portfolio. The Education Strategic Framework provides a single coordinated programmatic tool that enables examination of the

NASA education portfolio in its entirety. The portfolio approach to the management of NASA's education efforts provides a holistic view of all NASA education programs, projects, products, and activities that:

- Ensures that all education programs, projects, products and activities are aligned with the Education Outcomes and Agency Strategic Plan.
- Coordinates programs, projects, products, and activities in a broader context so that they work together to achieve NASA's Education Outcomes.
- Guides selection and assessment of new and ongoing education investments.
- Facilitates performance evaluation, assessment, and accountability reporting, as well as communication of program status within NASA and to external stakeholders.
- Identifies programmatic gaps and/or redundancies and guides investment strategies.
- Aids in development of annual performance goals.

Industry partners, academic institutions, museums, science centers, and federal agencies such as the National Science Foundation and National Institutes of Health, the Department of Education, and the Department of Energy, all invest in programs to enhance STEM education. The strategic framework and portfolio approach enable NASA to proactively seek strategic partnerships, cooperative agreements, and entrepreneurial relationships, and utilize announcements of opportunity to address continuity gaps in the portfolio.

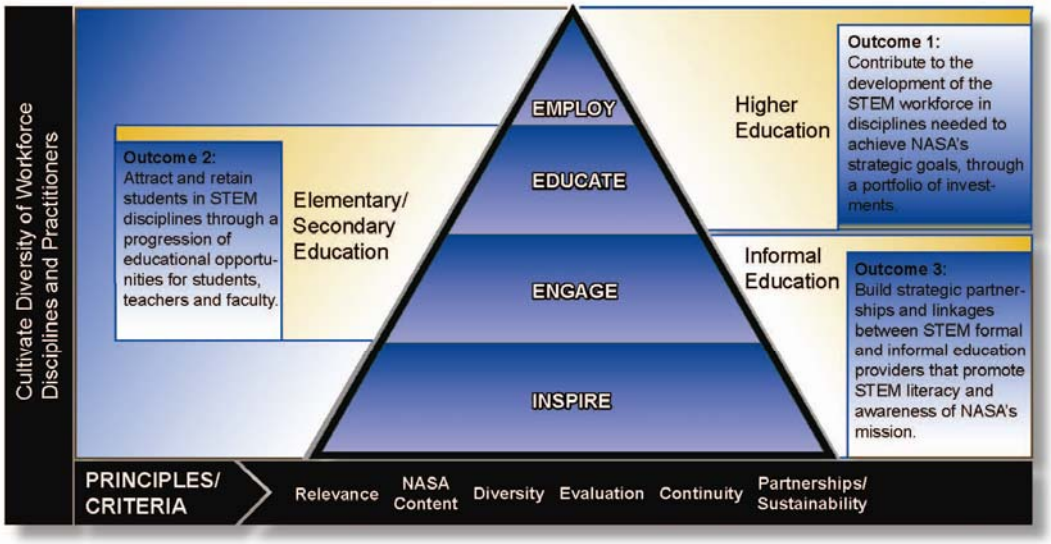


Figure 2 – Outcomes Mapped to the Education Strategic Framework

3.0 Mechanisms for Portfolio Coordination and Integration in a Distributed System

Strategic management of the NASA education portfolio requires the participation of the Office of Education, the four Mission Directorates, and all ten NASA Centers. This extensive participation provides broad education engagement with NASA content, people, and facilities. Close and effective consultation, coordination, and cognizance among all entities are critical to the optimal fulfillment of NASA's objectives relative to its education investment.

3.1 Roles and Responsibilities

An effective and coordinated Agency education portfolio requires clear roles and responsibilities.

3.1.1 Assistant Administrator for Education

The **Assistant Administrator (AA) for Education** is responsible to the NASA Administrator for the NASA Education Portfolio, reporting directly to the Chief of Strategic Communications. The AA for Education serves a dual role for the Agency. First, the individual serves as the head of the Office of Education and manages all responsibilities assigned to the Office. Second, the AA for Education serves as the Chair of the Education Coordinating Committee (ECC), ensuring the overall planning, coordination, and integration of the Agency's entire education portfolio, including development of the education portion of the Agency Institutional Office Implementation Plan (see section 3.2).

3.1.2 Office of Education

The **Office of Education (OE)** administers national education efforts that draw on content from across the Agency. As an institutional management office, the OE is responsible for ensuring compliance with external requirements and laws, NASA-wide processes, procedures, standards, audits, and accounting related to Education (NPD 1000.0). It also provides the leadership for coordinating and integrating NASA's education strategic framework, implementation approach, and policies. The OE provides national partnership networks and infrastructure to disseminate NASA education content and activities developed by the Mission Directorates, Centers, and education partners. It solicits external advice, and represents the Agency externally, especially in interactions with Congress, the Office of Management and Budget, and other Federal agencies. The OE refers external inquiries to specific managers within its own office or any of the Mission Directorate or Center Education Offices as appropriate.

The Office of Education provides integration and evaluation support to the ECC (see section 3.2). As such, the OE maintains a centralized database of all NASA education activities and investments, and coordinates the evaluation and assessment of the Agency education portfolio. The integration and evaluation results are aggregated to demonstrate the total impact of NASA education efforts and assessed to provide data to the ECC to improve the effectiveness of the overall Agency education investment strategic framework.

3.1.3 Mission Directorates and Other Headquarters Funding Organizations

The Mission Directorates — Aeronautics Research (ARMD), Exploration Systems (ESMD), Science (SMD), and Space Operations (SOMD) — and other HQ organizations that fund education efforts are responsible for embedding education components into their research and development programs and flight missions, for administering the discipline/content-specific activities for which they provide funding, and for ensuring meaningful collaboration between the NASA science/engineering community and the education community. Each Mission Directorate supports the NASA education portfolio by providing discipline-specific content, funding, and

human resources to plan and implement educational programs, projects, products, and services. Additionally, Mission Directorates and other HQ organizations that fund education at NASA develop partnerships specific to their disciplines and needs, including discipline-specific interactions with other federal agencies. Each Mission Directorate identifies an Education Lead, who represents their Associate Administrator to the Office of Education and to the Education Coordinating Committee with the authority to commit resources. The Education Leads reside in Mission Directorate office space and work for the Mission Directorates. Education Leads are responsible for program coordination with the Office of Education and the Centers, program evaluation using ECC criteria, and data distribution to the central Agency education database.

3.1.4 Center Education Offices

Center Education Offices are responsible for implementing NASA education programs, projects and activities for the Mission Directorates and the Office of Education, as well as planning and implementing education programs that are unique to and funded by their Centers. Centers are responsible for execution of programs and projects and for institutional assets. The Center Education Offices provide expertise in state standards and requirements in their area of geographic responsibility for K-12 education, and provide valuable field-based input into education program planning. Center Education Offices work closely with their regional customer base in support of systemic reform initiatives in formal education, assist with the generation and communication of knowledge for their unique research and technology development requirements by involving colleges and universities across the country, and establish linkages with informal education networks in support of Agency national STEM education initiatives. Center Education Offices maintain cognizance of all NASA-funded education efforts that take place in their geographic region and/or programmatic areas of responsibility regardless of funding source.

Center Education Directors report administratively to their Center management and functionally to the Office of Education, as well as receiving programmatic direction from the Headquarters organizations that provide education funding to their Center. Center Education Directors are functionally responsible for all Center education efforts.

3.1.5 NASA Education Program/Project Managers

Managers are responsible for making and executing decisions within their authority. Accordingly, they have authority over the budgets, schedules, and human and capital assets for their programs or projects. Program and project managers are responsible for working across organizational lines to perform appropriate integration functions. In general, management decisions are not subject to higher governance (see NPD 1000.0, Section 3.2.2).

3.1.6 External Education Implementing Partners

External Education Partners include organizations that implement education activities for the Agency. The implementing partners including contractors, academic institutions, museums, science centers, and other outside entities. Most external education implementing partners are competitively selected and offer specific areas of expertise of use to the Agency. They report to the Office of Education, Mission Directorates, or Center Education Offices according to the origin of their funding.

3.2 Portfolio Coordination and Integration via the Education Coordinating Committee

The Education Coordinating Committee (ECC) is a collaborative structure that maximizes NASA's ability to maintain an integrated education portfolio and strategically manage the implementation of numerous programs, projects and activities in a distributed system. To achieve

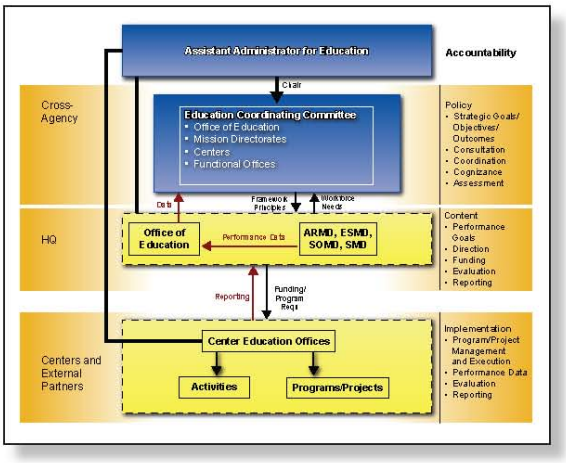


Figure 3 – Educational Portfolio Coordination Framework

the Education Outcomes, the ECC plans and strategizes collaboratively, allowing the Assistant Administrator of Education to assess and evaluate the health of the entire Agency education portfolio. The ECC provides an overarching Agency structure where issues are fully discussed to guide the AA for Education in making decisions. The ECC also provides checks and balances for effective internal control and ensures the successful achievement of education goals and portfolio effectiveness. In accordance with the Balance of Power described in NPD 1000.0, Section 3.2.4, the Office of Education AA, with input from the ECC, maintains control of strategy and top-level requirements, while Mission Directorates and the Office of Education maintain control of schedules and budgets for their own programs. Centers execute programs and projects and have a voice on the ECC to ensure coordination, integration, and teamwork. The ECC will meet monthly, or as requested by the Chair. Functional support for the ECC is provided by the Office of Education.

3.2.1 Responsibilities of the ECC

- Develops the overarching Agency education strategic framework and policies to meet Agency needs.
- Ensures an integrated portfolio and a coordinated investment strategy for education programs across NASA.
- Maintains cognizance of all Agency education projects, major milestones, major evaluations/ reviews, and investment plans.
- Establishes criteria for evaluation of education efforts and assesses the results of those evaluations.

3.2.2 ECC Membership

To ensure a true collaboration and an integrated approach to education, the Education Coordinating Committee requires broad cross-Agency representation. Members of the ECC speak authoritatively on behalf of their organizations, and include:

- Assistant Administrator for Education (Chair)
- Deputy Assistant Administrator for Education
- Executive Secretary to the Committee (appointed by the AA for Education)
- The Education Lead identified by each Mission Directorate (4)
- All Center Education Office Directors (10)
- Representatives from the Offices of Diversity and Equal Opportunity, Human Capital Management, Public Affairs, Legislative Affairs, External Relations and the Astronaut Office

4.0 Monitoring and Control

NASA's success in implementing its education portfolio is determined by the Agency's ability to achieve the desired Outcomes outlined in Section 2.2. NASA uses objective and verifiable performance metrics, regular review processes, and defined tools to assess its performance at all levels—portfolio, Outcome, and the individual program/project/product/activity (Figure 4). Individual program evaluations are consolidated by Outcome across the Agency and then the three Outcomes are bundled for assessment by the ECC as a complete portfolio. Performance measures are vigilantly and circumspectly chosen and applied in accordance with accepted norms. Regular performance evaluation at each level becomes one of our most important means of identifying problem areas and opportunities for better management, leading to greater organizational effectiveness and guiding investment strategies.

All implementing organizations (NASA Centers and NASA's external partners) conduct program/project/activity level evaluations and support the Office of Education and the Mission Directorates in conducting outcome-level and portfolio assessment. Effectual consultation, coordination, and cognizance among all entities are critical to the optimal fulfillment of NASA's education investment.

4.1 Assessment, Review, and Evaluation

Monitoring and Control is the process by which the Agency receives quantitative or qualitative data collected from the planning and implementation phases and determines the level of success in executing the Agency's education portfolio. Feedback is received through evaluation of programs, projects, products, and activities; review of the three individual Outcomes and; assessment of the entire NASA education portfolio.

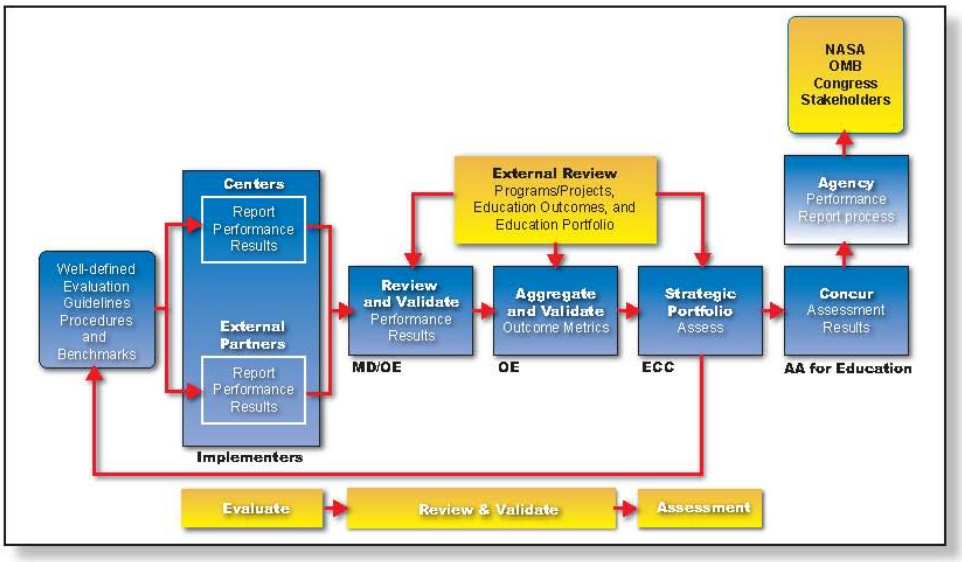


Figure 4 – Monitoring and Evaluation

4.2 Assessment of the Portfolio

In carrying out its role of assessing and guiding the total portfolio, the ECC must have the ability to:

- Gauge the overall health of Agency education efforts.
- Measure performance, including key performance indicators and metrics.
- Monitor ongoing status of operations, events, and resources.
- Set overall performance goals for the organization.
- Establish measures and criteria for monitoring progress.
- Solicit input from external reviewers on the status of the overall portfolio and future trends/needs in STEM education related to NASA's workforce needs.

Further, assessing the effectiveness of NASA education's portfolio requires on-line, near-real-time access to planning, budgeting, analytical, and programmatic information to enable rapid decision-making, corrective actions, and the ability to respond in a timely manner to Agency and external stakeholder requests. The decision-making environment requires:

- The use of one common database and format.
- The ability to trace budget and actual costs from a single project up through the Agency Education Outcomes with linkage to the NASA Strategic Plan.
- A link between budgeting and both operational and strategic planning.
- Connectivity with the Core Financial system used by the Finance Organization, Mission Directorates, Mission Support Offices, and Centers.
- Assessments and audits using this same database.

A range of processes will be used to capture the total picture of education across NASA and to assess the education portfolio for effectiveness in achieving the Outcomes, linkages within the framework, quality, impact, and comprehensiveness. The ECC will employ an appropriate mix of methodologies, ranging from basic quantitative data to qualitative information, to assess the overall condition of the education portfolio.

Relevant information will be centrally aggregated, readily accessible, and carefully analyzed in order to provide responses to requests from a variety of organizations for information concerning NASA education. This information will be used to measure the accomplishment of outcomes for NASA management, OMB, Congress, and other stakeholders. The database will be maintained by the Office of Education and utilized to centrally aggregate information. The database should be readily available to the entire Agency, including Mission Directorates and Centers for decision-making.

The NASA Policy Directives (NPD) developed by the ECC ensure implementation of this strategic coordination plan and offer expanded detail to the standards identified in current NASA policies.

4.3 Outcome-Level Metrics and Reviews

Managing each of the three Outcomes within the Agency education portfolio requires a cross-cutting review that encompasses all projects, products, and activities, whether originating in the Office of Education, the Mission Directorates, or the Centers. The Office of Education will assign a staff member for each Outcome to lead the conduct of strategic analysis and planning, establishment of measurable metrics, and implementation of a review plan. The staff member for each Outcome will report on the Agency's progress toward achieving that outcome to the AA for the ECC.

Outcome reviews will employ a variety of mechanisms to assure that activities associated with each Education Outcome align with the Education Operating Principles, yield demonstrable results, and reach intended audiences. Use of external reviewers will be an integral part of outcome reviews to provide NASA with credible

information regarding how well its education efforts meet customer needs.

Outcome reviews include the results, findings, or conclusions of individual program, project, product, and activity evaluations from within the portfolio. These evaluation results should be used as the foundation to guide funding organizations in making adjustments in the portfolio where appropriate.

4.4 Program/Project/Activity Evaluation

NASA's education portfolio depends on the management of programs and projects for ultimate implementation and specific Outcomes. Through programs, projects, products and activities, the Outcomes are translated into specific objectives and measurable outputs. Management of education programs/projects, complies with current NASA directives on program and project management, processes, and requirements.

Education program, project, product, and activity evaluation are based on a common set of criteria including performance alignment with the Education Overarching Philosophy and Operating Principles (see Sections 2.3.1 and 2.3.2). Evaluation plans will measure intended impact and be scaled appropriately to the size of the investment—"one size does not fit all." Mission Directorates, Centers and the Office of Education regularly monitor and evaluate the programs, projects, products and activities they fund and report the results of those evaluations to their funding organizations and the Office of Education for review by the ECC.

5.0 Summary

The success of NASA's education portfolio depends upon strategic coordination and a single guiding framework that enables portfolio planning across the Agency. Close coordination is required among the Office of Education, Mission Directorates, Centers, the Office of Human Capital Management, the Office of Diversity and Equal Opportunity, and other functional offices to ensure that workforce requirements are identified and met, and that education efforts are aligned and focused on building the future workforce through strengthening the pipeline in STEM disciplines and building strategic partnerships and linkages across all components of education. The coordination is carried out through the ECC, which oversees the Education Strategic Framework. The Framework is a strategic management tool that allows the Agency to monitor participant movement through education activities, with each category leading to the next. NASA's success in implementing its education portfolio is determined by the Agency's ability to achieve the Outcomes outlined in this strategic framework.

6.0 Reference Documents and Glossary

6.1 Reference Documents

- **NPD 1000.0** - The NASA Strategic Management and Governance Handbook sets forth principles by which NASA will strategically manage the Agency and describes the means for doing so; and identifies the specific requirements that drive NASA's strategic planning process, leading to products such as the Strategic Plan and the annual Performance and Accountability Report.
- **NPR 7120.5C** – NASA's Program and Project Management Processes and Requirements. Agency policy governing management of programs and projects.
- **National Aeronautics and Space Act** Pub. L. No. 85 568, 72 Stat. 426 438 (Jul. 29, 1958) As Amended
- **Civil Rights Act of 1964** prohibits discrimination in, among other areas, public accommodations (Title II), employment (Title VII), and programs and activities receiving Federal financial assistance (Title VI).
- **Title IX of the Education Amendments of 1972** prohibits discrimination on the basis of sex in federally assisted education programs.
- **Rehabilitation Act of 1973** prohibits discrimination on the basis of disability in Federally assisted and conducted programs (Section 504) and requires comparable access for individuals with disabilities to information and electronic technology (Section 508 as Amended).
- **Age Discrimination Act of 1975** prohibits discrimination on the basis of age in Federally assisted programs.
- **National Space Grant College and Fellowship Program** Public Law 100-147 and Code of Federal Regulations (14CFR1259)
- **Experimental Program to Stimulate Competitive Research** Public Law 102-588
- **Education Technology: Ensuring Opportunity for All Children in the Next Century** Executive Order 12999
- **Nondiscrimination on the Basis of Race, Sex, Color, National Origin, Disability, Religion, Age, Sexual Orientation, and Status as a Parent in Federally Conducted Education and Training Programs** Executive Order 13160,
- **President's Advisory Commission on Educational Excellence for Hispanic Americans** Executive Order 13230
- **President's Board of Advisors on Historically Black Colleges and Universities** Executive Order 13256
- **Tribal Colleges and Universities** Executive Order 13270
- **Government Performance and Results Act of 1993** provides a measurement for strategic planning and performance throughout the Federal Government.

6.2 Glossary

Activity – An educational process or procedure intended to stimulate learning through actual experience.

Assessment – The classification of a program or project with respect to its accomplishments and performance in meeting requirements.

Audit – An examination of records or financial accounts to check their accuracy.

Authoritative Data Source – The approved and configuration-controlled source that the Agency uses to measure and monitor programs and projects. This allows organizational consolidation, reporting, and analysis for rapid decision-making.

Customer – Any individual, organization, or other entity to which a program or project provides a product(s) and/or service(s).

Evaluation – The process used to provide independent assessments of the continuing ability of the program/project to meet its technical and programmatic commitments. Evaluation also provides value-added assistance to the program/project managers.

Governance – The process by which Agency-level decisions are made above the level of line organizations. Governance is used only in those cases where the decisions require a high degree of visibility, integration, and approval. Governance has a role in the approval and oversight of strategic planning; implementation of the Agency's education portfolio; and in monitoring and controlling activities for which operational baselines have been established. As such, governance touches all of the major processes of strategic management.

Implementation – To put in place the necessary resources and take action to perform a program or project. Implementation plans are developed with clear requirements and traceability to the Agency Strategic Plan in order to verify compliance to the plan, to define the baseline from which monitoring and evaluation will occur, and to enable the development of performance reporting to external stakeholders.

Informal Education – The process of acquiring new knowledge and skills without the benefit of structured teaching. An educational setting that encourages and facilitates self-directed learning.

Institutional Management – Institutional management is located at Headquarters as a G&A function. These offices are responsible for ensuring compliance with external requirements and laws, NASA-wide processes, procedures, standards, audits, and accounting.

Integration – a process for examining synergy, redundancies, and the effectiveness of resource utilization. Primarily done during Implementation Plan development, but also includes development of the annual budget, audits, and assessments.

Metric – The various parameters or features of a process that are measured. A standard of measurement.

Mission – The core function(s) and primary job(s) of the Agency.

Monitoring and Control – The process by which the Agency receives quantitative or qualitative data collected from the planning and implementation phases and evaluates the level of success in executing the

Strategic Plan. At the level of governance, feedback is received in the form of audits and assessments of program, project, and institutional activities and in the form of metrics from the performance goals that are used in the Annual Performance and Accountability Report to Congress.

Objective – A specific milestone or target level necessary to realize goals.

Outcome – An assessment of the results of a program activity compared to its intended purpose.

Performance Goal – A target level of performance at a specified time or period expressed as a tangible, measurable outcome, against which actual achievement can be compared, including a goal expressed as a quantitative standard, value, or rate. A performance goal consists of a performance measure with targets and time frames. The distinction between "long-term" and "annual" refers to the relative time frames for achievement of the goals.

Portfolio – A collection of investments and strategies, such as R&D, managed to further a common goal or goals.

Program – A strategic investment by a Mission Directorate or Mission Support Office that has defined goals, objectives, architecture, a funding level, and a management structure that supports one or more projects.

Program Assessment – A determination, through objective measurement and systematic analysis, of the manner and extent to which federal programs achieve intended objectives.

Project – A specific investment identified in a Program Plan having defined goals, objectives, requirements, life cycle costs, a beginning, and an end. A project yields new or revised products or services that directly address NASA's strategic needs. They may be performed wholly in-house, by government, industry, academic partnerships, or through contracts with private industry.

STEM – The disciplines of Science, Technology, Engineering, and Mathematics.

Strategic Goal or Strategic Objective – A statement of aim or purpose included in a strategic plan (required under GPRA) that defines how an Agency will carry out a major segment of its mission over a period of time.

Strategic Management – A series of integrated activities that enable the Agency to establish and execute strategy, make decisions, allocate resources, formulate and implement programs and projects, and measure their performance.

Strategic Planning – A disciplined effort to produce fundamental decisions and actions that shape and guide what an organization is, what it does, and why it does it with a focus on the future.

Underrepresented - Populations that are not present in the STEM professions relative to the size of the population at large. Refers to racial and ethnic populations as well as women and persons with disabilities.

Underserved – Often used interchangeably with "underrepresented," particularly as it relates to the sciences and engineering. Specifically, it is used to promote access and opportunity to persons of diverse backgrounds - racial/ethnic, gender, religious, age, sexual orientation, disabled, and other populations with limited access - to decent and affordable housing, gainful employment, and other services. In the STEM arena, "under-served" has typically referred to women and persons with disabilities.