PCM Name: Manage Data Analytics Projects

Organization Responsible for Process Cycle:

- US Department of Education
  550 12th Street SW
  Washington, D.C. 20024

Process Cycle Point of Contact (POC):

- Hilary Cronin
  Program Risk Management and Monitoring Team (PRMMT)
  202-245-6246
  Hilary.Cronin@ed.gov

Purpose: To ensure that PRMMT's data analytics projects are managed in a manner that is consistent with industry best practices and standards, and helps ensure that that strategic business initiatives are supported, resources are appropriately utilized, and resultant applications or solutions consistently satisfy business requirements.

Process Cycle Memorandum Prepared By:
Cairo Srey (contractor)

Date Prepared: 03/16/16

Business Cycle Team Leads:

- <tbd>

ORGANIZATIONS:

- Program Risk Management and Monitoring Team (PRMMT)

SYSTEMS AND TOOLS USED BY (ORGANIZATION NAME):

- SAS (PRMMT)

LINKAGE TO OTHER PCMs:

- N/A

FUNCTIONAL DECOMPOSITION LEVEL 3S AFFECTED:

- 3.4 – Manage Data Analytics Projects

REGULATORY GUIDANCE:

- N/A

SOP / DESKTOPs/Systems Documentation

- SOPs for all phases for managing Data Analytics projects, which include the following:
  - .1 Business Understanding (Initiation and Planning)
  - .2 Data Understanding (Analysis and Design)
  - .3 Data Preparation and Modeling (Construction)
  - .4 Evaluation (Testing)

.5 Deployment (Implementation)

PROCESS OVERVIEW:

This end-to-end process enables PRMMT to consistently conduct and manage data analytics projects, which aligns with the phases and processes of the Cross Industry Standard Process for Data Mining (CRISP-DM) process model. CRISP-DM provides a framework for carrying out data mining projects, independent of the industry section and technology used. In addition, the process adheres with good industry practices including SDLC and the Department of Education's LCM framework.

In general, projects of greater scope and complexity require a correspondingly large volume of documentation and/or process rigor. Conversely, smaller or lower risk projects generally require less documentation. Therefore, the minimum required documentation and required process steps shall be based on project type, scope and complexity. The Project Manager designates the project type, large, medium or small, based on a set of criteria.

PROCESS DESCRIPTION **(to include internal controls):**

Manage Data Analytics Projects

Business Understanding (Initiation and Planning)

1. Determine business objectives
   1.1. PRMMT Project Sponsor or RMS management identifies a potential need for data analytics work or a business unit approaches RMS or PRMMT requesting data analytics support.
   1.2. PRMMT Project Sponsor assigns a PRMMT Project Manager (PM) to discuss, understand and capture details of the business objectives.

2. Assess situation
   2.1. PM determines resource needs (sw, hw, and personnel)
   2.2. PM identifies assumptions and risks
   2.3. PM determines project type (small, medium, large)

3. Obtain approval
   3.1. PM submits Work Request for approval
   3.2. PM informs stakeholders of decision (approved, denied, or deferred)

   Control Objective:
   To ensure proper sponsorship of project, consensus on business objectives, and commitment to dedicate resources into effort. Artifacts: Approved Work Request.

4. Form project team
   4.1. PM identifies team roles
   4.2. PM assigns members to roles
   4.3. PM establishes key milestones for projects

   Control Objective:
   To ensure that roles and resources are clearly identified along with key milestones prior to initiating

the project.

5. Prepare for project initiation
   5.1. PM conducts ROM estimate for project
   5.2. PM constructs a high-level project plan
   5.3. PM develops a Project Management Plan (PMP), to include approach in the following areas: Project management, change management, configuration management, risk management, communications management

   Control Objective:
   To ensure that the approach for running the project is clearly defined. Artifacts: Work Order form, Project Management Plan.

6. Kick off project
   6.1. PM conducts project kick-off with team
   6.2. PM prepares a detailed project plan

   Control Objective:
   To ensure that the project team understands roles and responsibilities, as well as rules of engagement.

Data Understanding (Analysis and Design)

7. Define requirements
   7.1. Business Analyst (BA) collects and reviews relevant materials
   7.2. BA meets with business stakeholders to elicit requirements iteratively
   7.3. BA conducts walkthrough of requirements with project team
   7.4. BA conducts final walkthrough of requirements with business stakeholder(s)
   7.5. PM assesses possible impact to overall project schedule, if requirements have changed
   7.6. BA obtains approval of requirements from business stakeholder

   Control Objective:
   To obtain requirements approval by the business stakeholder and provide the project team with complete and sufficiently detailed information to move forward with their designated activities, such as design and development. Note: Not all requirements may necessarily need to be fully documented and approved prior to design and development work, particularly if the PM decides to adopt an agile or more iterative approach. Artifacts: Baselined requirements approved by business stakeholder.

8. Assess data availability
   8.1. BA identifies associated data by identifying or defining business terms and clarifying with business stakeholder to gain clearer understanding of terms, if gaps exist
   8.2. Developer (Dev) checks for accessibility and availability of data. If source(s) of data is not available, advise PM to determine the proper course of action
   8.3. Dev collects initial data by create dataset(s) from relevant data source(s)
   8.4. Dev explores data to verify that relevant requirements can be satisfied
   8.5. Dev verifies data quality to confirm that the data is complete, i.e. covers all cases required, and missing and blank fields or missing attributes

8.6. Dev documents findings in gaps in data quality

Control Objective:
To help ensure that the right data is available in order to move forward with project downstream activities.

9. Design solution
   9.1. Tech Lead defines application architecture, as appropriate based on project type. This is accomplished by identifying relevant systems, tools, and databases, as well as determining how the systems will interact.
   9.2. Tech Lead and BA performs UI design (only applicable for interactive solutions)
   9.3. Tech Lead designs solution, prepares the technical design document and conducts walkthrough with the team

Control Objective:
To help ensure that the design is in place to enable development to proceed with an understanding on what is to be built and how it is expected to be built.

Data Preparation and Modeling (Construction)

10. Set up developer workspace
    10.1. System Administrator (SA) creates workspace on server for each individual developer, provides full access rights for the developer to the workspace, and creates common workspace on the server for code integration
    10.2. Dev copies relevant production program files to designated workspace

11. Program solution
    11.1. Lead Developer assigns development tasks
    11.2. Dev creates data sets and develops software changes
    11.3. Dev conducts peer code review for adherence to standards and clarity
    11.4. Dev performs development (unit) testing. (Note: This is performed by owner of program files.)
    11.5. Dev conducts peer code review for adherence to standards and clarity

Control Objective:
To help ensure that the code is tested for defects and adheres to standards.

12. Integrate code
    12.1. Dev creates datasets in common development environment, as applicable
    12.2. Dev copies program files to development environment
    12.3. Dev conducts integration testing

Control Objective:
To help ensure that the code is tested for defects in an integrated environment.

Evaluation (Testing)

13. Prepare for QA Testing
    13.1. QA Tester develops QA Test Plan
    13.2. QA Tester develops test cases and verifies that all requirements are fully represented in the test cases
    13.3. SA provides access rights to QA testers in the Test environment
    13.4. Lead Dev promotes code to the Test environment
    13.5. Lead Dev sets up datasets in the Test environment

    Control Objective:
    To help ensure that all requirements will be tested. Artifacts: QA Test Plan, QA test cases.

14. Conduct QA Testing
    14.1. QA Tester executes test cases, reports findings to project team
    14.2. Project team assesses findings to determine if findings are defects and assess the level of effort to address them
    14.3. Dev updates code to address findings
    14.4. Dev redeploys code to the Test environment
    14.5. QA Tester conducts targeted testing of updates
    14.6. QA Tester prepares report of test findings or test results

    Control Objective:
    To ensure that all requirements are satisfied, i.e. QA certification. Artifacts: Test results.

15. Prepare for User Acceptance Testing (UAT)
    15.1. QA Tester executes test cases, reports findings to project team

16. Conduct User Acceptance Testing
17.
18.

FORMS AND REPORTS:

- N/A

IDENTIFICATION OF GAPS:

	Process Gaps and Documentation Deficiencies
Process	•
Systems	• •

Controls	• For each new application, updates to the Continuity of Operations Plan must be made.
Other	• Create a formal SDLC plan for PRMMT's systems. The plan should include the phases of analysis, design, development, testing, implantation, training, and continuous improvement. • Create formal weighted scoring matrix in order to properly choose solutions. The weighted scoring matrix should have input from all stakeholders and should not be altered without proper change control. • Create a formalized code testing plan for each application that PRMMT owns • Create a formalized User Acceptance Testing plan for each application that PRMMT owns. • PRMMT-owned applications should have multiple environments(for production, testing, and development.)