AUDIT AND ADVISORY SERVICES

Enterprise Data Warehouse and Business Intelligence Tools Audit
Project No. 18-713

May 31, 2018

Prepared by:

Chad Edwards
Auditor-in-Charge

Reviewed by: Approved by:

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Jaime Jue   Wanda Lynn Riley
Associate Director   Chief Audit and Risk Executive

May 31, 2018

Rosemarie Rae
Vice Chancellor and Chief Financial Officer
Finance

Vice Chancellor Rae:

We have completed our audit of the Enterprise Data Warehouse and business intelligence tools as per our annual service plan in accordance with the Institute of Internal Auditors' *Standards for the Professional Practice of Internal Auditing* and the University of California Internal Audit Charter.

Our observations with management action plans are expounded upon in the accompanying report. Please destroy all copies of draft reports and related documents. Thank you to the staff of Information Services and Technology – Enterprise Data and Financial Planning & Analysis for their cooperative efforts throughout the audit process. Please do not hesitate to call on Audit and Advisory Services if we can be of further assistance in this or other matters.

Respectfully reported,

Wanda Lynn Riley
Chief Audit and Risk Executive

cc: Executive Vice Chancellor and Provost Paul Alivisatos
      Vice Chancellor Marc Fisher
      Associate Vice Chancellor Chris Stanich
      Associate Vice Chancellor Larry Conrad
      Assistant Vice Chancellor Lyle Nevels
      Executive Director Jon Bain-Chekal
      Manager Mark Chiang
      Director Teal Sexton
      Senior Vice President and Chief Compliance and Audit Officer Alexander Bustamante
      Associate Chancellor Khira Griscavage
      Assistant Vice Chancellor and Controller Delphine Regalia

University of California, Berkeley
Audit and Advisory Services
Enterprise Data Warehouse and Business Intelligence Tools

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OVERVIEW

Executive Summary

The purpose of this audit was to assess the current state of institutional data management for enterprise financial, human resource, and student information systems against the stated goal of the Institutional Data Management and Governance initiative to make "institutional data easily accessible, reliable, consistent and secure to support informed planning, decision making, and communication by campus leaders."

We considered the following elements in conducting our audit:

- executive oversight of management reporting systems;
- planning for new or updated services;
- monitoring the technology environment;
- handling customer relationships;
- preparing service agreements;
- ensuring data quality and timeliness; and
- training end-users and IT staff.

Our audit was conducted between July 2017 and February 2018.

Based upon our audit procedures performed, we observe that management's current approach to replacing BAIRS with Cal Answers appears reasonable. Key reporting functionality of BAIRS has been maintained in new Cal Answers reports but with a more modern interface and better ability to drill down on transaction detail. Change management procedures related to stakeholder communication, end-user training, and incorporating continual feedback appear reasonable. The underlying campus data warehouse which draws from separate transaction systems is generally unchanged.

A process improvement opportunity was noted to improve capabilities for identifying, evaluating and prioritizing informational needs, particularly with potentially underserved campus functions.

Source and Purpose of the Audit

The purpose of this audit was to assess the current state of institutional data management for enterprise financial, human resource, and student information systems against the stated goal of the Institutional Data Management and Governance initiative to make "institutional data easily accessible, reliable, consistent and secure to support informed planning, decision making, and communication by campus leaders."

Scope of the Audit

Our audit planning steps included obtaining an understanding of Information Services and Technology – Enterprise Data (IST-ED) and Financial Planning & Analysis (FP&A) operations, supporting technologies, policies and policies, and any legal and regulatory requirements by reviewing relevant documentation, interviewing auditee management, visiting operational areas, and performing a high-level risk assessment.

Based upon our preliminary risk assessment, we focused on the campus electronic data warehouse and management information and reporting systems that are in place that pull from the warehouse, principally the Berkeley Administrative Initiative Reporting System (BAIRS) and its successor Cal Answers. We did not focus on the underlying transaction systems such as the Berkeley Financial System (BFS), Human Capital Management (HCM), or Payroll Personnel System (PPS) as management reporting in these systems are limited and the campus is directed to BAIRS and Cal Answers for reporting.

We considered the following elements in conducting our audit:

- executive oversight of management reporting systems;
- planning for new or updated services;
- need identification;
- monitoring the technology environment;
- handling customer relationships;
- preparing service agreements;
- ensuring data quality and timeliness; and
- training end-users and IT staff.

Our audit was conducted between July 2017 and February 2018

Background Information

In fiscal year 2017, the Enterprise Data Warehouse Governance group (EGG), a steering committee providing data stewardship, strategic direction, review of project requests, and issue resolution, was created. The EGG is composed of management from IST-ED, Financial Planning & Analysis, the Office of Planning & Analysis, Human Resources, Supply Chain Management, University Development and Alumni Relations, the Financial Aid and Scholarships Office, Graduate Division, and the Controller's Office.

IST-ED and FP&A develop, operate, and manage the enterprise data warehouse and business intelligence service. They collaborate with information system owners and custodians to provide a

full range of institutional reporting and analysis tools including interactive dashboards, reports, and ad-hoc query capabilities.

The Berkeley Administrative Initiative Reporting System (BAIRS) has been around since at least fiscal year 2001 and provides financial and human resources reporting. In fiscal year 2011, under Operational Excellence, Cal Answers, a new business intelligence application, was implemented adding student data reporting. Cal Answers was designed to retire and replace BAIRS, which has reached the software vendor's product end-of-life and is no longer supported. Additional reports have been added to Cal Answers to include procurement, human resource, research, and financial reporting. In fiscal year 2018, the Vice Chancellor – Chief Financial Officer initiated a strategic plan to replace and improve upon the existing reporting capabilities offered in BAIRS. As of our audit, the schedule for replacing BAIRS in Cal Answers is as follows:

Cal Answers Reporting	Go Live Schedule
Financial Management Reporting	Summer 2017
Gift & Endowment Reporting	Fall 2017
Enhanced Financial Management Reporting	Early 2018
Human Resources Reporting	Spring - Summer 2018
General Ledger Reporting	Spring 2018
Foundation Reporting	Spring 2018
Contracts & Grants Reporting	Spring 2018
Fiscal Close Reporting	Summer 2018
Payroll Reporting	Summer 2018
Permanent Budget Reporting	Fall 2018

Further details regarding the Cal Answers service are at (https://calanswers.berkeley.edu/). BAIRS is expected to be decommissioned at the end of 2018.

Summary Conclusion

Based upon our audit procedures performed, we observe that management's current approach to replacing BAIRS with Cal Answers appears reasonable. Key reporting functionality of BAIRS has been maintained in new Cal Answers reports but with a more modern interface and better ability to drill down on transaction detail. Change management procedures related to stakeholder communication, end-user training, and incorporating continual feedback appear reasonable. The underlying campus data warehouse which draws from separate transaction systems is generally unchanged.

An opportunity was noted to improve capabilities for identifying, evaluating and prioritizing informational needs, particularly with potentially underserved campus functions.

SUMMARY OF OBSERVATIONS & MANAGEMENT RESPONSE AND ACTION PLAN

Enhance Practices for Understanding Possibly Underserved Campus Units

Observation

Understanding campus customers and their desired outcomes for the enterprise data warehouse and business intelligence (EDW-BI) service is a key challenge encountered by the service operations team[1]. Many different users and campus units with varying objectives and strategies; perceptions of performance, quality, and value; and desired outcomes are supported.

The service operation teams have regular contact with users in, for example, the Offices of the VC Finance, Administration, and UDAR because they are in the Enterprise Data Warehouse Governance group (EGG), which meets monthly. However, contact with users not represented by the EGG is more challenging due to their numbers and resource constraints. The main sources of input available for non-EGG represented users includes emails, demonstrations of Cal Answers, or ad-hoc meetings and it is difficult to understand how to prioritize these requests.

Suggestions for enhancing capabilities for understanding and prioritizing campus needs include adding representatives to the EGG from other campus functions who are unrepresented[1] and hosting a one-day BI summit to identify opportunities for enhancement, solicit feedback regarding customer requests received throughout the year, and highlight uses of other BI applications such as visualization tools and reports developed by individual campus units for purposes of understanding demand and making prioritization decisions. Another potential improvement is to identify one or two campus units or leaders that are underserved[2] and explore their needs, identify outcomes, and outline a business case describing the opportunity, value proposition, outcomes supported, and investment required for evaluation, decision making, and prioritization by campus IT governance.

Management Response and Action Plan

The Director, Business Intelligence & Finance Systems, will identify one representative from a school or college and one representative from Student Affairs and invite them to become participants in the EDW Governance Group beginning in FY19. The invite will be extended by June 30, 2018.

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[1] The Enterprise Data Warehouse and Financial Planning & Analysis – Financial Systems teams

[2] For example, schools, colleges, Residential and Student Service Programs, Academic Personnel Office, Research Administration and Compliance, Space Utilization, Capital Projects, and Capital Renewal.