ABSTRACT
The financial meltdown created an uncertain and competitive environment, making it important for our institution to provide our executives insight into critical key metrics. The decision to create executive dashboards at Pace University set in motion events that caused the collapse of the information silos. This presentation provides insight into the reporting infrastructure, its implementation, lessons learned, consequences, questions raised, and how to navigate the road ahead of us to get to the finish line.

INTRODUCTION
Data needed by executives and decision makers is often not readily available because the existing information is compartmentalized and cannot be easily integrated with other functional areas. Given the financial recession, the university’s executives made it a priority to build a real-time or near real time Executives Dashboard with a set of critical Key Performance Indicators (KPIs) to provide them information to make decisions. This paper describes the initial goal and scope of the Executive Dashboard initiative along with a view into the different stages and transformations.

Background
Complex ERP data models have made it difficult for the functional areas to interact directly with the university’s transactional database to create their own reports. Migration, policies, and portability issues associated with adding or changing native tables led the functional areas to rely on their own resources to extract data from the transactional system, load it into their own servers, and create their own systems to transform data into desired information. As a result, the derived information, business processes, and knowledge are kept local within each functional area.

The initial scope and goal of this initiative was to provide a view into the university’s enrollment, revenue, and applicants with comparisons within a short amount of time. We decided to use SAS BI Dashboard over SAS Graph to build the presentation layer because we needed a framework that facilitates faster development of reports, dashboards, and cubes and is easier to maintain. The entire implementation relied on the following tools:

- SAS BI Dashboards
- SAS OLAP cube Studio
- SAS Information Maps
- Web Reports Studio
- SAS OLAP Viewer

Our original dashboard implementation retrieved data from different functional areas and processed it to meet our use cases. This data however, was not integrated; enrollment, revenue, and financial aid had separate processes and as a result, the implementation was not able to support our future needs. Each indicator bundled a number of KPIs which was easier
to build and maintain; but, did not provide intuitive drill down capabilities. We had to regroup and perform further analysis.

Analysis & Findings
In order to populate the dashboard and the different reports with consistent and reliable information, we had to capture and integrate the business processes from the different functional areas. The absence of a central reporting system with which the functional areas can interact to collect, process and store results, created the need for each functional area to build its own data processing system (silo). Each silo would provide the required information to operate and report on. The business logic, data, and processes are compartmentalized and have limited built-in capabilities to extend beyond their business needs. Furthermore, a functional area’s business process may not have all the data needed for other functional areas.

The existence of the functional silos and the lack of a coordination process to ensure consistent definitions, documentation, and metrics across the enterprise contributed in process duplication and made it difficult to perform analysis across the functional boundaries to look for cause and effect and historical trending.

Given that Enrollment Management has a mature business process and is the authority in identifying and categorizing students to determine their full time, part time status, combined degree, special program, cohort, total number of students, number of undergraduate, graduate students, part time, full time, etc…, we worked closely with them, redesigning and implementing a solution using SAS Data Integration Studio and SAS programs. We built a datamart, added additional data, fields, and indicators to ensure data integration across functional boundaries and to close existing data gaps.

Our strategy was based on the fact that once we have a solid and consistent business practice around students and applicants, the rest will follow, and can be easily integrated. We leveraged the student datamart to pull in corresponding revenue and financial aid information for each student. The end result is a comprehensive and integrated datamart based on one set of business rules that includes students, applicants, revenue, and financial aid information. In order to maintain data integrity, ensure aggregations are always in sync, and provide users with the ability to create their own reports, we implemented and deployed SAS OLAP cubes. The use of OLAP cubes shifts the need to create and customize reports from IT resources to the functional areas. This solution leverages SAS OLAP capabilities and empowers users to create their own reports by manipulating dimensions, measures, and filters. It's important to impress upon the different areas that OLAP cubes creation requires higher technical skills often found in IT and therefore, IT should own that responsibility.
Design and Implementation

Summary Dashboard

The Dashboard’s summary view tracks critical enrollment, revenue, and applicant KPIs for undergraduate, graduate, and Law. The enrollment view utilizes dynamic dial indicators with the capability to compare actual enrollment levels against both the established goals and against same day last year’s levels. Each gauge is also color coded to give a quick up or down view. Furthermore, each indicator is mouse over enabled to provide numerical information such as current and last year levels, and goal. For ease of use, all indicators share the same look and feel where goals are always in middle: markers on the right side of the goal would indicate levels above goals; similarly, markers on the left side of the goal would indicate levels below goal. Black markers indicate last year’s level.

Summary Dashboard containing enrollment, revenue and Application information
Summary Data Model

The current design relies on the (SQL/JDBC) Dashboard Library Query to retrieve data from the datamart. The advantage of this method over Information Maps-based data models is the ability to leverage SQL to create complex queries that can support multiple indicators. As an example only one data model is used to support all the main indicators on the enrollment dashboard: Total, Undergraduate, Graduate, Law, Full Time, Part Time, New, Returning, etc…. For each indicator, the data model retrieves enrollment data for today, last year-same day, yesterday, today vs. yesterday’s difference.

Data Models
### Dashboard Library [SQL/DBC] Query

**Query:**
```sql
as LWDiff, y as LastYear, 'Goal 09' as LWDGoal FROM (select counts as today from DBOARD.dashboard_aggregations where term_code_key=(select max(term_code_key) from DBOARD.dashboard_aggregations) and date=today()) and aggregation='Full Time') a, (select counts as yesterday from DBOARD.dashboard_aggregations where term_code_key=(select max(term_code_key) from DBOARD.dashboard_aggregations) and date=today()-1 and aggregation='Full Time') b, (select counts as today from DBOARD.dashboard_aggregations where term_code_key=(select max(term_code_key) from DBOARD.dashboard_aggregations) and date=today() and aggregation='Part Time') c, (select counts as yesterday from DBOARD.dashboard_aggregations where term_code_key=(select max(term_code_key) from DBOARD.dashboard_aggregations) and date=today()-1 and aggregation='Part Time') d, (select counts as today from DBOARD.dashboard_aggregations where term_code_key=(select max(term_code_key) from DBOARD.dashboard_aggregations) and date=today() and aggregation='New') e, (select counts as yesterday from DBOARD.dashboard_aggregations where term_code_key=(select max(term_code_key) from DBOARD.dashboard_aggregations) and date=today()-1 and aggregation='New') f, (select counts as today from
```

### Available:
- FTODAY
- FTYESTERDAY
- FTDIFF
- FTLASTYEAR
- FTGOAL
- FTPTODAY
- FTYESTERDAY
- FTDIFF
- FTLASTYEAR
- FTGOAL
- NEWSDAY
- NEWSYESTERDAY
- NEWDIFF
- NEWLASTYEAR
- NEWSGOAL
- RETURNINGTODAY
Drill Down

Each indicator on the main page can provide more detailed information about the selected indicator through its built-in drill down capabilities. This level provides specific details about the selected indicator. The example below illustrates drilling into the Undergraduate indicator on the main dashboard.


**Linking indicators to dashboards for drill down**

The type of link used to support this functionality is a Portal Page link and is configured from the Links tab under the Indicator properties:
Undergraduate and Graduate Data model
The Undergraduate dashboard uses one data model to collect all required data. In fact, the same data model is also used for collecting data for the graduate level.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Data Model</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Part Time Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>New Total Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Returning Total Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Full Time Undergrad Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Part Time Undergrad Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>New Undergraduate Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Returning Undergrad Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Freshmen Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Transfers Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>NYC Total Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>PLV Total Undergrad</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Freshmen Undergrad Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>Transfers Undergrad Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
<tr>
<td>NYC Undergraduate Today vs. Yesterday</td>
<td>Registrations Grad and Undergrad</td>
<td>KPI</td>
</tr>
</tbody>
</table>
Drill down to a more Granular level
The Undergraduate Dashboard provides an additional level of drill down and links the selected indicator to a Web Report. These reports are created using SAS OLAP to leverage its built-in drill down capabilities to facilitate data exploration and analysis. Each Web Report contains complementing trending graphs for historical comparison and analysis.

Data Exploration report

<table>
<thead>
<tr>
<th>College</th>
<th>Degree</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult and Continuing Education</td>
<td>Associate in Arts</td>
<td>Fine Arts</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Arts</td>
<td>General Arts and Sciences</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Fine Arts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor of Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Designated</td>
<td></td>
</tr>
<tr>
<td>Dyson College of Arts &amp; Sciences</td>
<td>Pre-Baccalaureate Certificate</td>
<td></td>
</tr>
<tr>
<td>Lubin School of Business</td>
<td>Associate in Applied Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor of Business Administration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Designated</td>
<td></td>
</tr>
</tbody>
</table>

College | Degree | Major
---------|--------|--------
Adult and Continuing Education
Dyson College of Arts & Sciences
Lubin School of Business

Semester | Spring 2010 | Spring 2009
---------|-------------|-------------
College | Degree | Major
---------|--------|--------
Adult and Continuing Education
Dyson College of Arts & Sciences
Lubin School of Business

Data selected from: Registered Students
Web Report for Trending and historical comparison

Undergraduate Students Full Time Trend

Revenue Reports
Conclusion
The Dashboard initiative has caused us to develop new business practices to support the need for consistent metrics and goals across the entreprise. It is forcing us to identify and implement solutions that span across functional boundaries that can facilitate correlation, trending, and provide relevant information to our decision makers. In order for such an initiative to be successful, it must be backed by high level management that can lend support and guidance when needed.

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