

Page 131-2010

## **Executive Dashboard: A Driver for Institutional Change and a Means to Broaden Understanding**

Said Reda, Pace University, Briarcliff Manor, NY

### **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

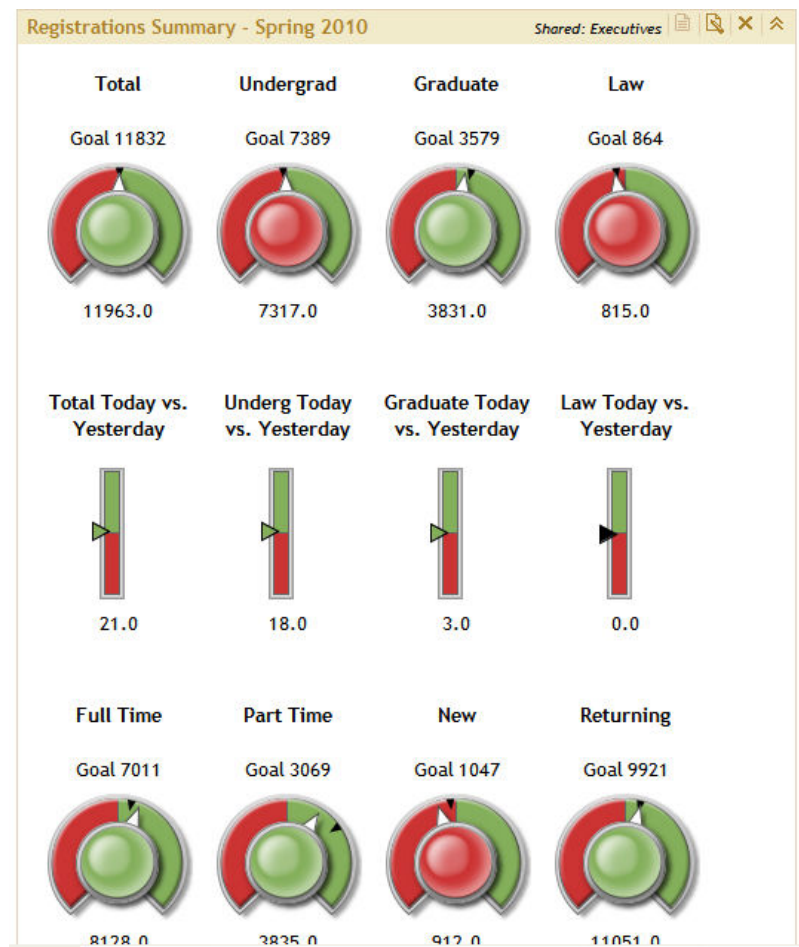
### Summary Dashboard

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

Dashboards
Indicators

[New Indicator](#) | [Manage Data Models](#) | [Manage Ranges](#) | [Refresh](#)

Filter by dashboard:  | Rows displayed:

	Indicator	Data Model	Display	Range / Gauge Type	
<input type="checkbox"/>	Graduate Today vs. Yesterday	Total Fall 09	KPI	Registration Trend / Dynamic Slider	<input type="checkbox"/>
<input type="checkbox"/>	Law	Total Fall 09	KPI	Law Goal Fall 09 / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	New	Total Fall 09	KPI	New / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	Part Time	Total Fall 09	KPI	Part Time / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	Returning	Total Fall 09	KPI	Returning Fall 09 / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	Total	Total Fall 09	KPI	Total Fall 09 / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	Undergrad	Total Fall 09	KPI	Undergrad Fall 09 / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	Total Today vs. Yesterday	Total Trend Fall 09	KPI	Registration Trend / Dynamic Slider	<input type="checkbox"/>
<input type="checkbox"/>	Total vs Fall 08	Total vs Fall 08	KPI	Undergrad Fall 09 vs Fall 08 / Dynamic Slider	<input type="checkbox"/>
<input type="checkbox"/>	Registrations Fall 09 vs. Fall 08 Over 2% Down	Trend Fall 09	KPI Table	BI SP09 / Arrows	<input type="checkbox"/>
<input type="checkbox"/>	Undergrad Today vs. Yesterday	Undergrad Trend Fall 09	KPI	Registration Trend / Dynamic Slider	<input type="checkbox"/>
<input type="checkbox"/>	Undergrad Gender Fall 09	Undergrad Trend Fall 09	KPI	Registration Trend / Dynamic Slider	<input type="checkbox"/>
<input type="checkbox"/>	Voids	Voids_Spring_Current	KPI	BI_Voids / Cylinders	<input type="checkbox"/>
<input type="checkbox"/>	White Plains	White Plains Fall 09	KPI	White Plains Fall 09 / Dynamic Dial	<input type="checkbox"/>
<input type="checkbox"/>	zzz available datasets	zzz available datasets	KPI Table	Adult and Continuing Ed Undergrad Fall 09 / Dynamic Speedometer	<input type="checkbox"/>

Name: Data source: 

Dashboard Library (SQL/JDBC) Query

```
Query: as LAWDiff,y.LastYear as LAWLastYear,'Goal 864' as LAWGoal 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:

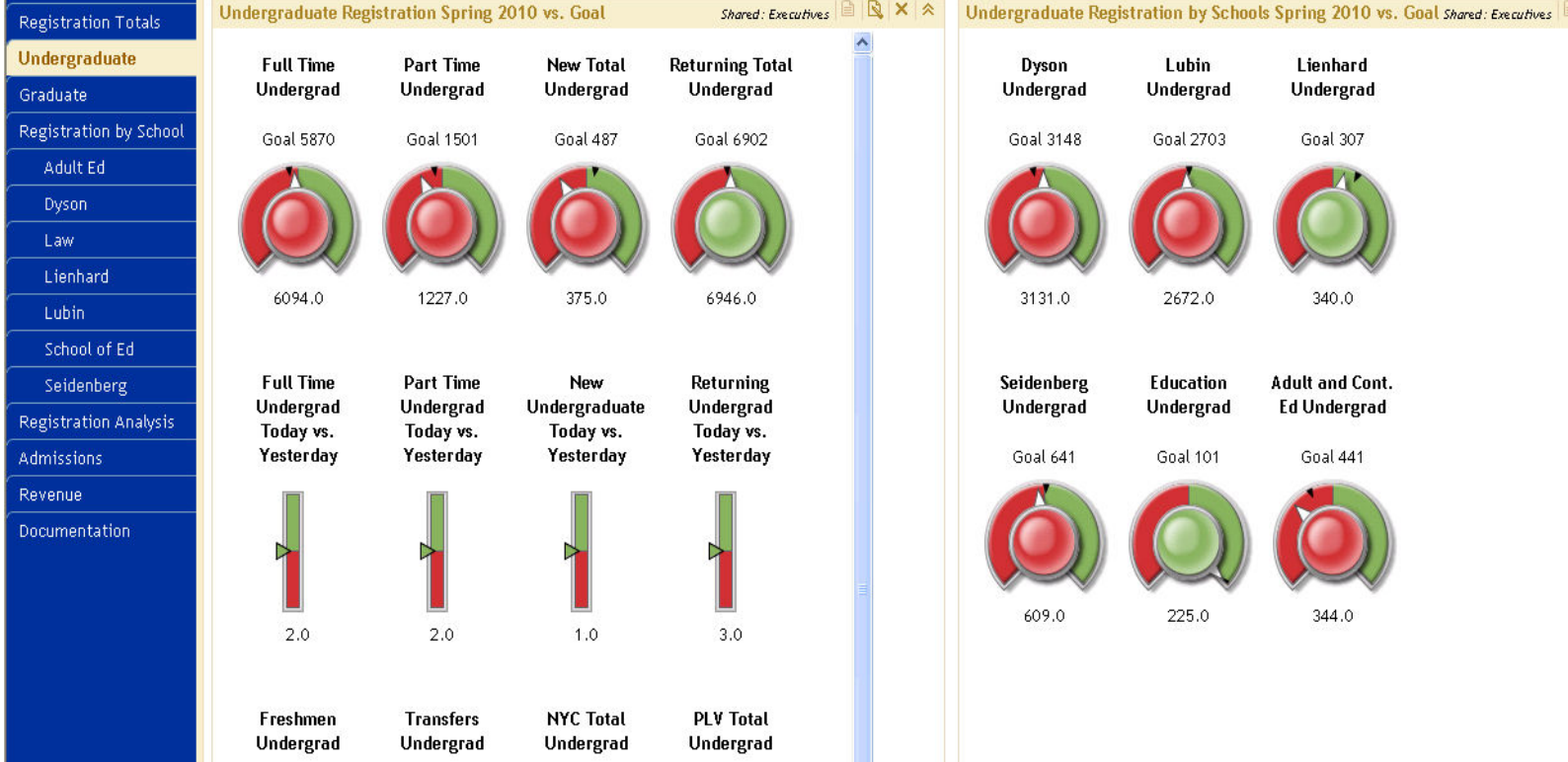
Selected:

```
FTTODAY
FTYESTERDAY
FTDIFF
FTLASTYEAR
FTGOAL
PTTODAY
PTYESTERDAY
PTDIFF
PTLASTYEAR
PTGOAL
NEWTODAY
NEWYESTERDAY
NEWDIFF
NEWLASTYEAR
NEWGOAL
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.

### Specialized Dashboard with undergraduate enrollment information



### 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:

The screenshot shows the 'Indicator Properties' dialog box for 'Undergrad'. The 'Display' tab is selected. The 'Name' field is 'Undergrad'. The 'Data model' is 'Total Fall 09'. The 'Display' is 'KPI'. The 'Display Settings' section includes 'Definition name: Value', 'Range: Undergrad Fall 09', 'Gauge type: Dynamic Dial', and 'Set the range data source properties.' with 'Primary: UGTODAY' and 'Secondary: UGLASTYEAR'. Buttons for 'Edit...', 'New...', and 'Select...' are visible. 'OK' and 'Cancel' buttons are at the bottom.

The screenshot shows the 'Indicator Properties' dialog box for 'Undergrad' with the 'Links' tab selected. The 'Hypertlink' section has 'Type: Portal Page', 'Open in: This window', and 'Link: Undergraduate'. The 'Parameters' section has 'Parameter passing:' with radio buttons for 'Do not pass parameters' (selected) and 'Pass parameters to links that support parameters'. There is a 'Link Parameter Set' field and an 'Add Parameter' button. 'OK' and 'Cancel' buttons are at the bottom.

## 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.

Portal

### Manage Indicators

Dashboards **Indicators**

[New Indicator](#) | [Manage Data Models](#) | [Manage Ranges](#) | [Refresh](#)

Filter by dashboard:  Rows displayed:  [Go](#)

	Indicator	Data Model	Display	Range / Gauge Type
	◆ Full Time Undergrad	Registrations Grad and Undergrad	KPI	page 3 FT UNF Fall 09 / Dynamic
	◆ Part Time Undergrad	Registrations Grad and Undergrad	KPI	Undergrad Part Time Fall 09 / Dy
	◆ New Total Undergrad	Registrations Grad and Undergrad	KPI	Undergrad New Fall 09 / Dynamic
	◆ Returning Total Undergrad	Registrations Grad and Undergrad	KPI	Undergrad Returning Fall 09 / Dy
	◆ Full Time Undergrad Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli
	◆ Part Time Undergrad Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli
	◆ New Undergraduate Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli
	◆ Returning Undergrad Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli
	◆ Freshmen Undergrad	Registrations Grad and Undergrad	KPI	Undergrad Freshmen Fall 09 / Dy
	◆ Transfers Undergrad	Registrations Grad and Undergrad	KPI	Undergrad Transfers Fall 09 / Dy
	◆ NYC Total Undergrad	Registrations Grad and Undergrad	KPI	Undergrad NYC Fall 09 / Dynamic
	◆ PLV Total Undergrad	Registrations Grad and Undergrad	KPI	Undergrad PLV Fall 09 / Dynamic
	◆ Freshmen Undergrad Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli
	◆ Transfers Undergrad Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli
	◆ NYC Undergraduate Today vs. Yesterday	Registrations Grad and Undergrad	KPI	Registration Trend / Dynamic Sli



### 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.

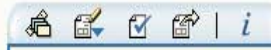
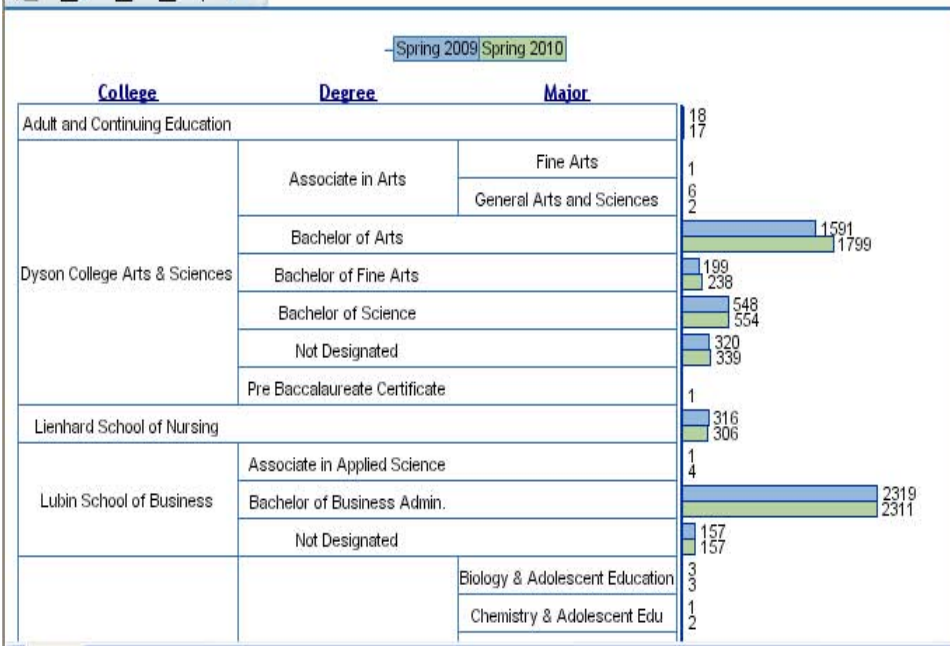
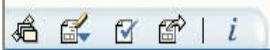
### Data Exploration report

Full Time Registrations | **Full Time Trend** | Part Time Registrations | Part Time Trend

Refresh Data

Data selected from: Registered Students

### Undergraduate Students Full Time



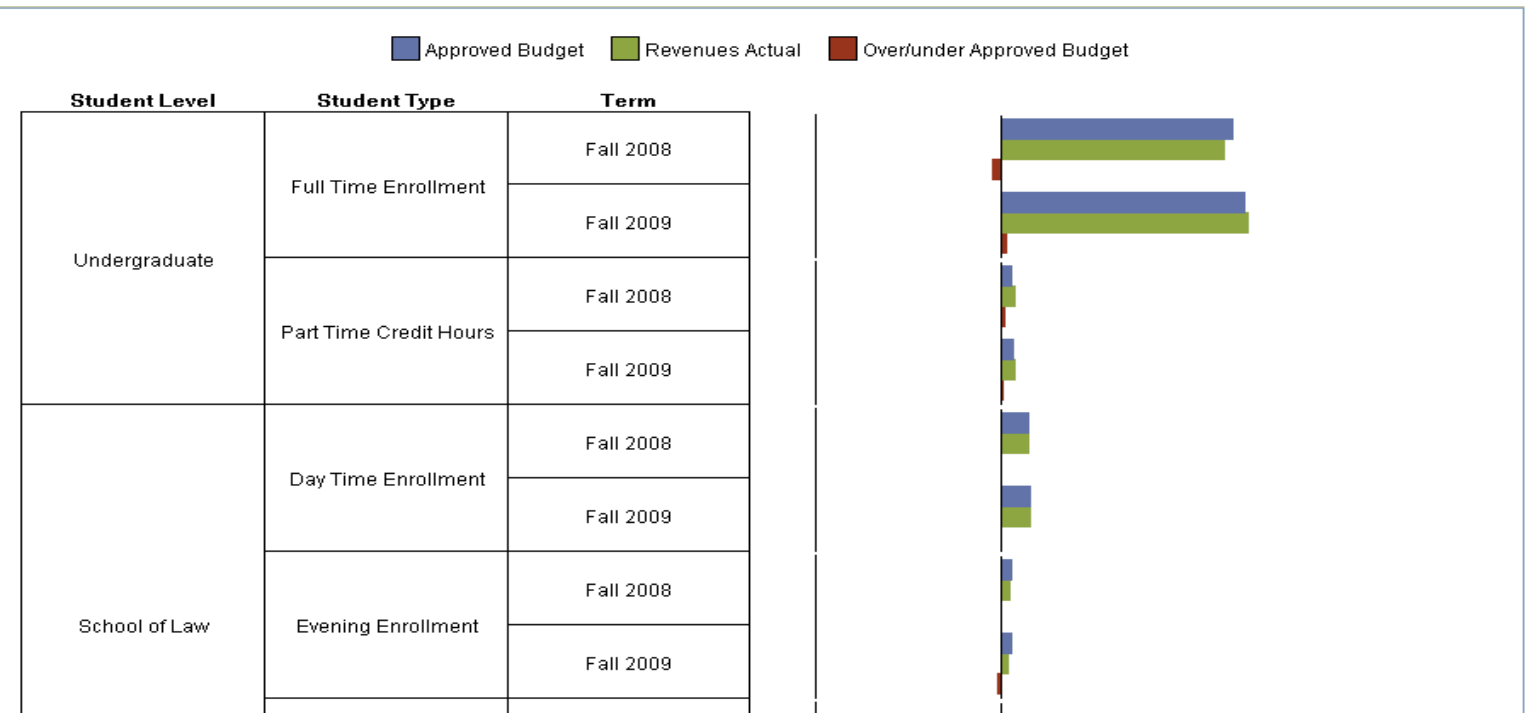
Semester			Spring 2010	Spring 2009
			Head Count	Head Count
College	Degree	Major		
+ Adult and Continuing Education			17	18
- Dyson College Arts & Sciences	- Associate in Arts	Fine Arts	1	1
		General Arts and Sciences	2	6
	+ Bachelor of Arts		1799	1591
	+ Bachelor of Fine Arts		238	199
	+ Bachelor of Science		554	548
+ Not Designated		339	320	

## 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 enterprise. 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.

**Contact Information**

In case a reader wants to get in touch with you, please put your contact information here.

Your comments and questions are valued and encouraged. Contact the author at:

Name: Said Reda

Enterprise: Pace University

Address: 235 Elm Road, West Hall, room 114

City, State ZIP: Briarcliff Manor, NY, 10540

Work Phone: (914) 923-2376

Fax:

E-mail: [sreda@pace.edu](mailto:sreda@pace.edu)

Web:

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.