Experiences in Using Academic Data for SAS® BI Dashboard Development

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University of Central Florida (UCF)
Enterprise Decision Support (EDS)

- Unit of Institutional Knowledge Management (IKM)
- Support Decision-making and Planning
- Enterprise Data Warehouse
- Business Intelligence (BI) & Information Portal
- Data Integration (DI) Services
- Currently Using SAS® 9.2 Enterprise BI/DI Software
Introduction

- SAS® Information Delivery Portal
- SAS® Web Report Studio
- SAS® Stored Processes
- SAS® BI Dashboard
  - Single Screen Display
  - Key Performance Indicators (KPI’s)
  - Tables and Charts
- Information Requests and Challenges
Retention Dashboard: Background

- **Retention, Graduation, and Attrition**
  - Retention: Student returned to UCF each subsequent Fall term
  - Graduation: Student earned a degree at UCF
  - Attrition: Student did not return to UCF

- **Undergraduate Student Cohorts**
  - Annual and/or term-based full-time and part-time cohorts
  - Transfer and First Time in College (FTIC) students

- **Rates and Alerts**
  - Rates calculated based on number initially in cohort (adjusted)
  - Alerts created based on change over time
Retention Dashboard: Background

Existing Reports
Retention Dashboard: Challenges & Outcomes

**Data Sources**
- 10-year Data Model
- Student Type Categories
- Percent Difference Using the SAS function DIF()
- Stored Process to Generate Data

**Indicator Data and Indicator Development**
- Series of %DO Loops Within a %MACRO
- Generate and Publish a Package (code available in paper)
- Stored Process Errors
- Formats Unavailable or Not Applied Correctly
Retention Dashboard: Challenges & Outcomes

- Stored Process Executed Correctly
- Data Set Created in Physical Path of WORK
- Package Creation Code After the %MEND Statement
Retention Dashboard: Challenges & Outcomes

- Indicator Types Not Applicable to This Data Set
- Display of Values in Indicators
- Limited Formats Available for Data Type
- Create New Variables and Custom Formats
Retention Dashboard: Challenges & Outcomes

/* Create picture formats for numeric variables */
proc format;
    picture pctfmt (round) low-<0 ='009.9%' (prefix='-') mult=1000);
    picture numfmt low-high = '00,009';
run;

<table>
<thead>
<tr>
<th>Cohort Year</th>
<th>Cohort Count</th>
<th>Progression Year</th>
<th>Progression Type</th>
<th>Progression Count</th>
<th>Progression Rate</th>
<th>Prog Rate Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2003</td>
<td>5,298</td>
<td>FirstYear</td>
<td>Retention</td>
<td>4,388</td>
<td>82.8%</td>
<td>-</td>
</tr>
<tr>
<td>2002-2003</td>
<td>5,298</td>
<td>FirstYear</td>
<td>Graduation</td>
<td>0</td>
<td>0.0%</td>
<td>-</td>
</tr>
<tr>
<td>2002-2003</td>
<td>5,298</td>
<td>FirstYear</td>
<td>Attrition</td>
<td>600</td>
<td>17.2%</td>
<td>-</td>
</tr>
<tr>
<td>2003-2004</td>
<td>5,030</td>
<td>FirstYear</td>
<td>Retention</td>
<td>4,040</td>
<td>82.5%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>2003-2004</td>
<td>5,030</td>
<td>FirstYear</td>
<td>Graduation</td>
<td>0</td>
<td>0.0%</td>
<td>-</td>
</tr>
<tr>
<td>2003-2004</td>
<td>5,030</td>
<td>FirstYear</td>
<td>Attrition</td>
<td>680</td>
<td>17.5%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>2004-2005</td>
<td>5,722</td>
<td>FirstYear</td>
<td>Retention</td>
<td>4,747</td>
<td>83.0%</td>
<td>-0.5%</td>
</tr>
<tr>
<td>2004-2005</td>
<td>5,722</td>
<td>FirstYear</td>
<td>Graduation</td>
<td>0</td>
<td>0.0%</td>
<td>-</td>
</tr>
<tr>
<td>2004-2005</td>
<td>5,722</td>
<td>FirstYear</td>
<td>Attrition</td>
<td>575</td>
<td>17.5%</td>
<td>-0.5%</td>
</tr>
<tr>
<td>2005-2006</td>
<td>5,025</td>
<td>FirstYear</td>
<td>Retention</td>
<td>4,941</td>
<td>92.0%</td>
<td>-1.0%</td>
</tr>
<tr>
<td>2005-2006</td>
<td>5,025</td>
<td>FirstYear</td>
<td>Graduation</td>
<td>0</td>
<td>0.0%</td>
<td>-</td>
</tr>
</tbody>
</table>
Retention Dashboard: Design & Development

- Multiple Indicators Viewed At Once
- Multiple Indicator Data Objects Needed
- Interactive Prompts / Client-side Filters
Retention Dashboard: Design & Development
OUR Dashboard: Background

- Office of Undergraduate Research (OUR)
  - Data Collection (3 Years of Historical Data)
  - Goals:
    » Profile of Undergraduate Research at UCF
    » Strategic Goals and Assessments
- More Information Needed
- Information Delivery Method
OUR Dashboard: Challenges & Outcomes

- Data Sources
  - Initial Raw Data Provided by OUR
    » Manually Entered into Excel
    » Various Data Entry Users
  - Data Cleansing and Validation
    » PROC FREQ, CASE Statements, IF-THEN/ELSE Statements
    » Various SAS® Functions
    » State Vetted Demographic/ Enrollment Data for Validation
OUR Dashboard: Challenges & Outcomes

- **Indicator Data Challenges**
  - Character/ Numeric Data Types
  - Structure and Nature of Academic Data

- **Indicator Data Solutions**
  - Convert Variables
  - Create Numeric Columns
  - Filter, Breakout, Aggregate
OUR Dashboard: Challenges & Outcomes

- Indicator Object Challenges
  - Example 1

![Gender Breakdown Chart]

- Gender Breakdown:
  - Male: 0.444
  - Female: 0.556
OUR Dashboard: Challenges & Outcomes

\[ \text{PUT}((\text{INPUT(PUT(t1.Percentage,4.2),best4.2)*100),4.)||'\%') \]
OUR Dashboard: Challenges & Outcomes

- Dashboard Design and Development
  - Flowchart
    - Organizing Areas of interest
    - Indicator Components
    - Client-side Filters/Prompts
OUR Dashboard: Design & Development
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Conclusion

- **Challenges to Overcome – Learning Experiences**
  - **Retention Dashboard**
    » Resolve code placement for STP using %MACRO
    » Create additional variables in the data set to properly format percentages
  - **Undergraduate Research Dashboard**
    » Structural nature of academic data
    » Use labeling to properly format percentages
Conclusion

- Future Recommendations
  - Build Dashboard Backwards
  - Visualize Appropriate Indicators
  - Massage/Format Data to Work Well with Indicators Chosen

- Recommended Reading
  - SAS® BI Dashboard 4.3 User’s Guide
  - Base SAS® 9.2 Procedures Guide
  - SAS® 9.2 Language Reference
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