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SAN JOSE EVERGREEN COMMUNITY COLLEGE DISTRICT: WEB INTELLIGENCE ADVANCED REPORTING AND QUERY TRAINING

CROA SUPER USER TRAINING

BI Guardian

Version: 3.1

Last updated: March 25, 2019

DOCUMENT CHANGE HISTORY

Document Version	Date	Description of Change	Affected Sections
1.0	January 20, 2014	Initial delivery to SJECCD	All
2.0	June 8, 2015	Updated for retraining	All
3.0	March 13, 2019	Updated for retraining	All
3.1	March 25, 2019	Corrected object names	Adding an Add'l Query to a Report practice steps

CONTENTS

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INTRODUCTION

This document provides an overview of the BusinessObjects term-level universe created by ASR as part of the business intelligence implementation project. To illustrate the available data as well as the reporting and analysis capabilities provided by this universe and the underlying data structure in the ODS, several advanced Web Intelligence report development techniques are used in the creation of a retention report. Each lesson in this document provides an illustration of a specific Web Intelligence reporting technique. These advanced techniques can be applied to many other similar situations to solve the more complicated reporting requirements for SJECCD across different business areas. In some cases, it may be useful to have the guidance of a person familiar with the data in question, or an IT support person, to review the content and structure of what needs to be built.

It cannot be stressed enough that there is no substitute for understanding the data in the context of the reporting requirements. Without knowing the general format of data elements, the possible values for code files and categorical data, or the basic relationships among common data elements in different groups of data, attempting any of these advanced techniques will be a frustrating exercise. To help understand the data, you can view it in its native source context using the screens in Colleague. You can also preview how the data is represented in the reporting environment by creating simple list reports in Web Intelligence using data from a single class (represented as a folder icon and referred to throughout this document as a “class folder”).

Conventions used in this document

The following formatting styles are used to identify different components of the reporting tool. They are supported with screen captures of the actions and results.

- Underlined text within single quotes. For example: ‘OK’, ‘Equal To’.
  These represent buttons, drop down list values, radio button values, or other types of functions that you can work with in the Web Intelligence reporting tool.
- Italicized text within double quotes. For example: “*Student ID*”, “*Query 2*”.
  These represent object names such as a universe, report, tab, data element, variable, text box, dimension, measure, or detail names. These names are unique to what is being created and could be different from report to report. These are the names chosen by the report designer and are not fixed as part of the reporting tool. They may have default values when being used to create a new component in a report.
- The → symbol. For example: ‘Analysis’ → ‘Data Providers’ → ‘Edit’
  This indicates a series of steps or clicks from a menu to perform in sequence.

UNDERSTANDING DATA FLOW

The following diagram (Figure 1) depicts how data flows from the source to the end user viewing it. The most common way to view data is in a Web Intelligence report in the BusinessObjects BI Launch Pad environment. Data can come from any number of sources, but in the current SJECCD BI implementation, it is primarily from Ellucian Colleague. Data is extracted and transformed from Colleague into the ODS database. From there, it is accessed by the BusinessObjects environment.

> ***TIP:*** Because the data in the BusinessObjects reporting environment stems from this data flow, it is not updated in "real time," but is refreshed each night and therefore current as of the previous evening unless otherwise stated by IT. This should be adequate for most types of reporting.

It is also important to understand that at any layer of this flow, data can be filtered or manipulated for a given reporting need. Editing filters for blocks, reports, and documents (which contain the query definition for the universe) is covered in a separate section later in this document. This document does not cover editing filters for universes and databases. Ellucian typically predefines and delivers these filters. In most cases, they should not be changed to ensure the correct operation of the Ellucian–BusinessObjects integration.

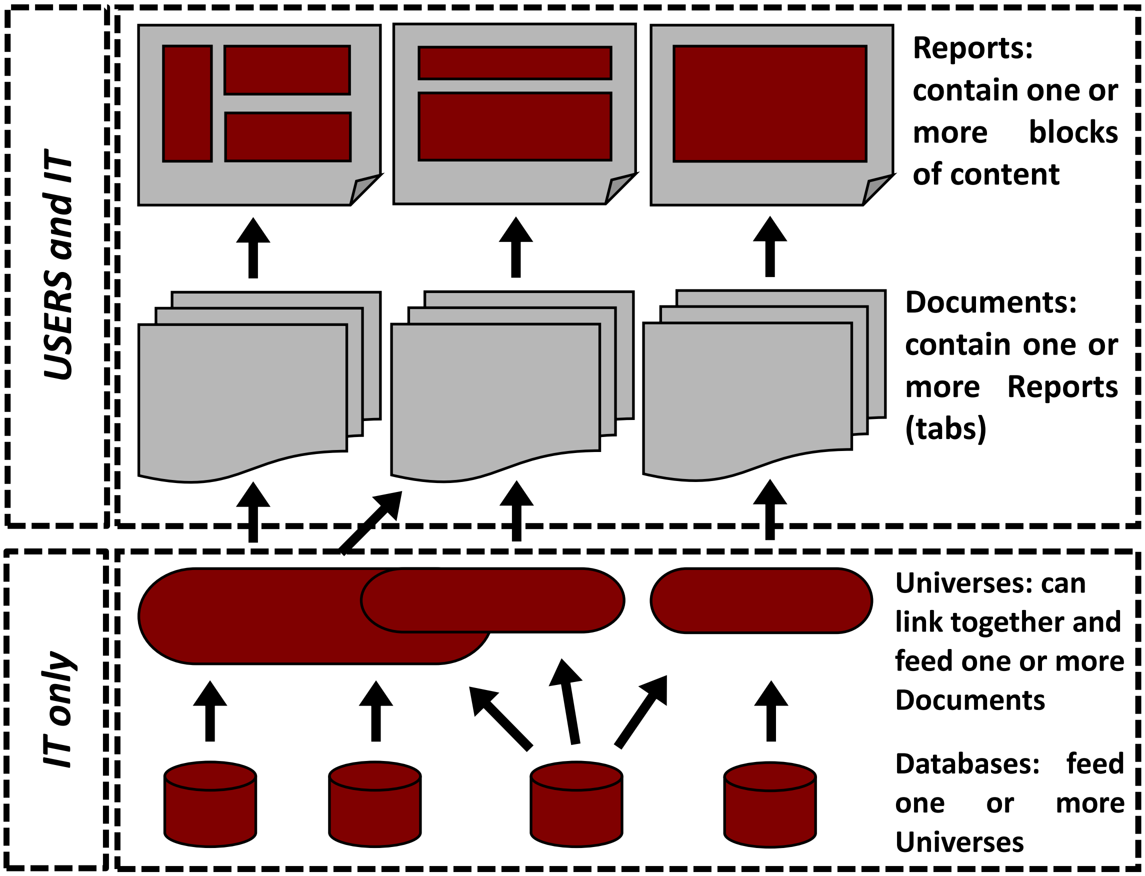

USERS and IT
IT only
Reports: contain one or more blocks of content
Documents: contain one or more Reports (tabs)
Universes: can link together and feed one or more Documents
Databases: feed one or more Universes

Figure 1: Data flow from source to report

TIP: The term Web Intelligence "document" and "report" are often used interchangeably, since it is common for a document to only contain one report (tab). Despite the mixed usage, it is important to understand that the data query is defined at the document level, and the result set can be used by multiple reports (tabs) in a document.

ADDING AN ADDITIONAL QUERY TO A REPORT

A powerful feature of Web Intelligence is the ability to use more than one query to retrieve data for a single Web Intelligence document. The data from the different queries you create in the document can either be used in separate reports (tabs) or combined in a single report. Data from the additional queries can be from the same universe or different universes.

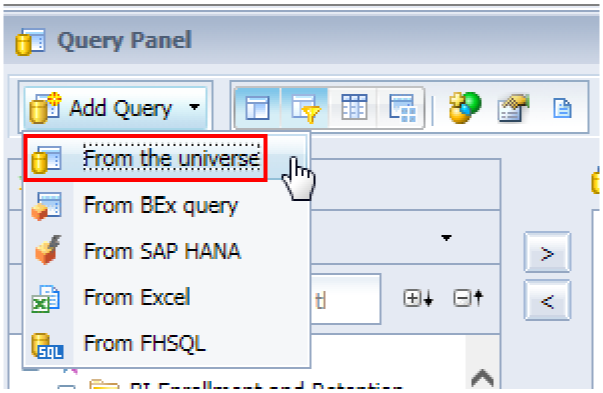
The specific development techniques covered in this section are as follows:

- Process for creating a new query in a Web Intelligence report
- Building a filter comparing two fields from the source universe
- Displaying prompt values in report headers

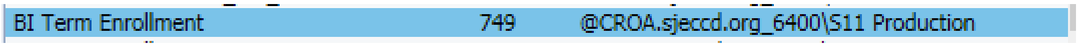
NOTE - all content in this training manual was created using the HTML version of SAP BusinessObjects Web Intelligence (Web Intelligence). If your user is set up to use the Java version of the tool, please see the "Introduction to Reporting and Query Training" guide on how to change your Web Intelligence preferences.

Process for Creating a New Query

Creating a new query within the Web Intelligence document is accomplished by accessing the Query Panel window of the document. When in this editor, the most direct way of creating the new query is to use the 'Add Query' button. Selecting this button will bring up a drop-down list of possible data sources for the new query. Select the 'From the universe' menu entry:

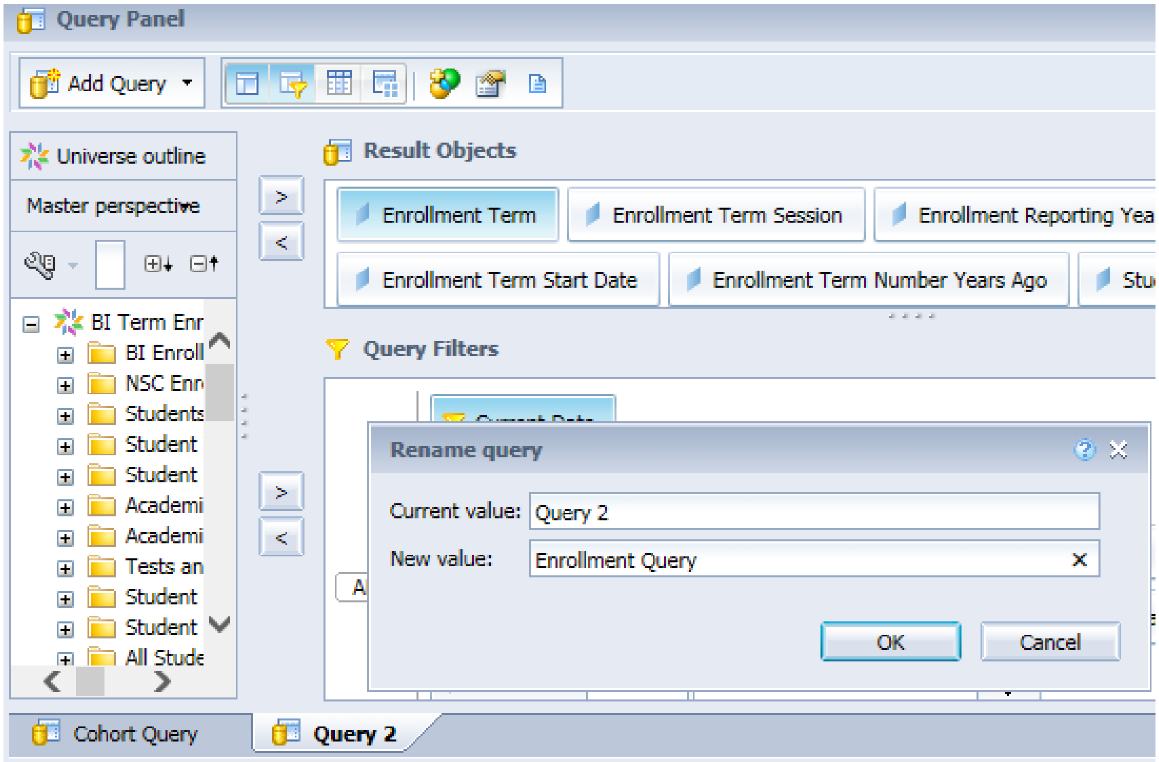


In the pop-up window, click on the universe used by the existing query (in this case, "*BI Term Enrollment*") then click 'Ok' to accept it. Make sure you're selecting the version from the S11 Production folder.



BI Term Enrollment	749	@CROA.sjeccd.org_6400\S11 Production

When working with multiple queries in a Web Intelligence document, it is of considerable help in later development of the report to name each query with a distinguishing name. To do this, simply right click on the tab at the bottom of query editor window and select ‘Rename’. Enter the new name in the “*New value*” field of the pop-up window and click ‘OK’.



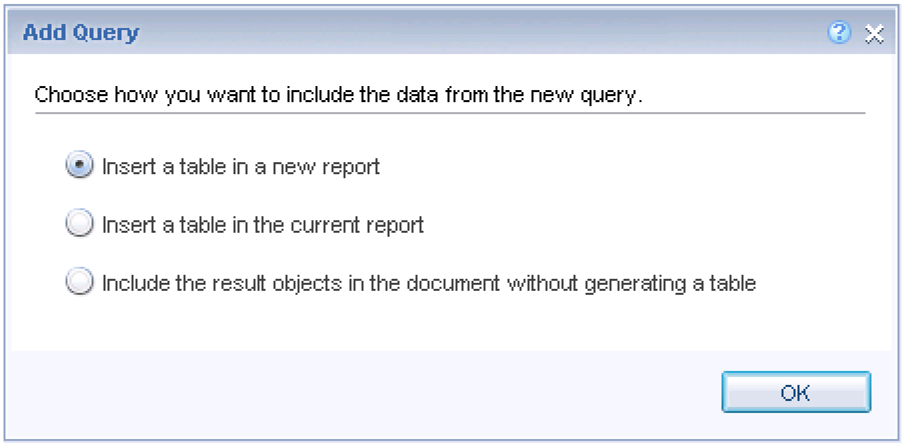
Rename query

Current value: Query 2

New value: Enrollment Query

When constructing multiple queries with the intent of combining data together in a single report tab, it is important to think about how the output columns of the queries can be related to each other when combining the query data. It is generally a good idea to make sure that there is a common dimension (data element) which appears in all the queries you intend to use in combination. In the workshop example, there are several fields in common, but ultimately the *“Student ID”* field will be used.

After defining a new query in a document, you will be prompted when you first run the query as to whether you want to create a new report within the document to contain the new dataset, add a new list object containing the new data to the existing report, or include the new data in the document but not actually display it. Select the option that best fits the way you plan to use this data.



Add Query

Choose how you want to include the data from the new query.

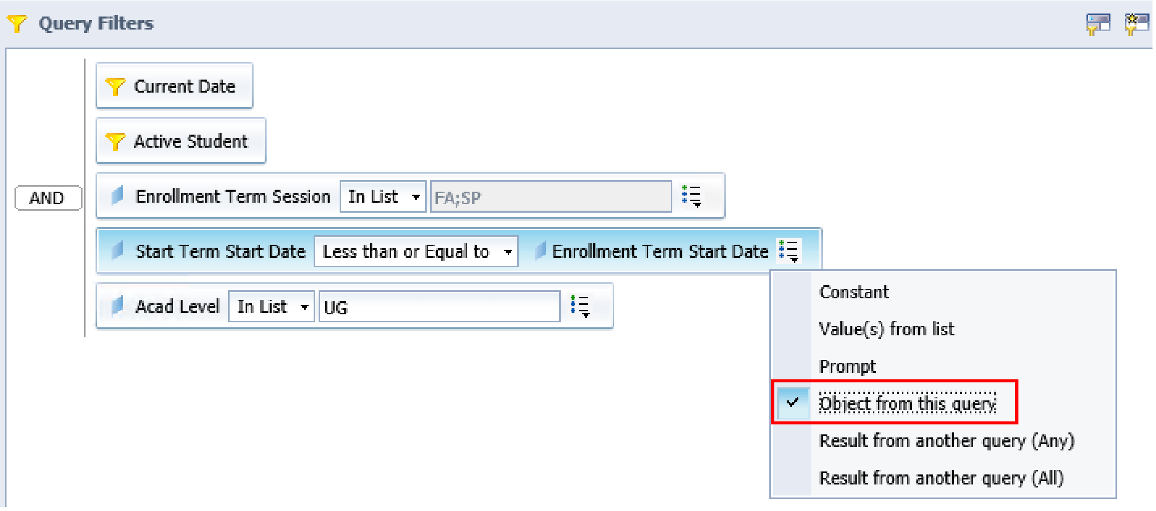
● Insert a table in a new report

○ Insert a table in the current report

○ Include the result objects in the document without generating a table

Building A Filter Comparing Two Fields from the Source Universe

In the introductory course, we covered the use of predefined and custom filters in a report query. In these custom filters, we learned how to filter a report using either a fixed value or list of values or using a user-entered prompt value. However, another custom filtering option available is the ability to limit the rows returned by comparing one report query object to another object from the same query. To do this, you drag an object into the query filter window and select the appropriate comparison operator. Then click on the icon on the right edge of the filter box and select '<u>Object from this query</u>' from the selection list, as follows:



Query Filters

AND

Current Date

Active Student

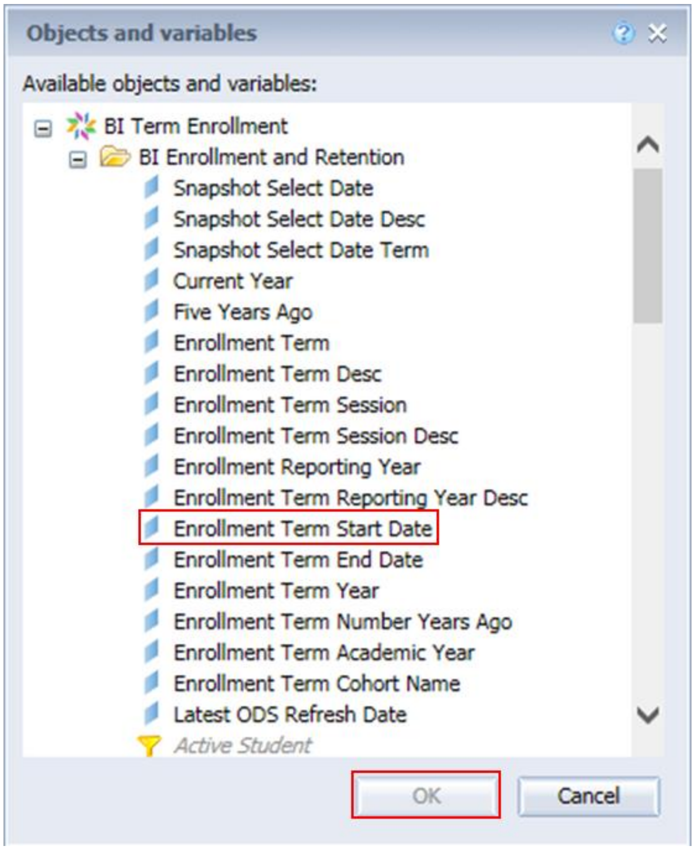
Enrollment Term Session In List FA;SP

Start Term Start Date Less than or Equal to Enrollment Term Start Date

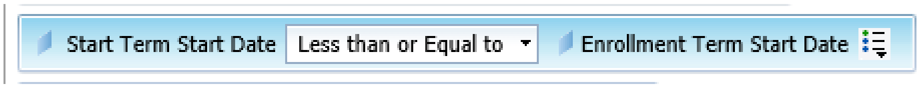
Acad Level In List UG

Constant
Value(s) from list
Prompt
✓ Object from this query
Result from another query (Any)
Result from another query (All)

After selecting this option from the menu, you will be prompted to select another object from the source universe, as follows:


Objects and variables
Available objects and variables:
BI Term Enrollment
BI Enrollment and Retention
Snapshot Select Date
Snapshot Select Date Desc
Snapshot Select Date Term
Current Year
Five Years Ago
Enrollment Term
Enrollment Term Desc
Enrollment Term Session
Enrollment Term Session Desc
Enrollment Reporting Year
Enrollment Term Reporting Year Desc
Enrollment Term Start Date
Enrollment Term End Date
Enrollment Term Year
Enrollment Term Number Years Ago
Enrollment Term Academic Year
Enrollment Term Cohort Name
Latest ODS Refresh Date
Active Student
OK
Cancel

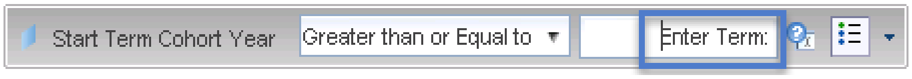
The resulting query filter will then consist of a comparison between two fields of the same source universe and will only return rows when the specified expression is true.


Start Term Start Date | Less than or Equal to | Enrollment Term Start Date

Displaying Prompt Values in Report Headers

It is always a good practice to make sure that it is completely clear when looking at a report what values were selected for the report prompts when it was run. If these values are not obvious from the data that is included in the report, these prompt selections need to be echoed in the report title or in report annotating text.

BusinessObjects provides a function to do this called ‘UserResponse()’. This function can be used either in variable definitions or in the content of text blocks. The function takes one parameter which is the exact text specified as the prompting string for a Web Intelligence filter parameter. Consider the following query filter definition:



To echo the value that a user specifies for this prompt, use the following expression in your Web Intelligence document:

UserResponse ("Enter Term:")

Note that the string provided to UserResponse() must exactly match the string provided in the prompt field, including capitalization and all punctuation marks.

Hands-on Exercise: Learning Objective

In this section, we will start work on a series of cumulative exercises where we will build a report providing insight into the retention of students starting in a series of fall terms across subsequent fall and spring terms. The first step of this process will be to build a simple report providing lists of students starting in recent fall terms. We will then define a new query within this report to obtain the list of fall and spring enrollment terms since 2015 for students who have been enrolled at the institution since their start term.

High Level Overview

1. Create a new Web Intelligence report using the "*BI Term Enrollment*" universe
2. Create a prompt for the query allowing the specification of the earliest cohort year term
3. Customize the title of the report and include the cohort year selected in the query prompt as part of the title
4. Create a new query for the Web Intelligence document and give it a meaningful name
5. Add data elements to the new query's select list from the "*BI Enrollment and Retention*" universe class folder and sub-classes
6. Create a filter for the new query using standard logical expressions
7. Refresh and save the *"Retention Report"* document

Practice Steps

STEP 1: Create a new Web Intelligence report using the *"BI Term Enrollment*" universe as its data source.

STEP 2: Add the following data elements to the 'Results Objects' pane:

From the *“BI Enrollment and Retention"* class folder:

- *“Enrollment Term”*
- *“Snapshot Select Date Desc”*

From the *“Student Information”* class folder:

- *“Student ID”*
- *“Gender Desc”*
- *“IPEDS Race Ethnic Classification”*
- *“Start Term Cohort ID”*
- *“Start Term Cohort Desc”*
- *“Start Term Cohort Year”*
- “*Start Term Session”*
- *“Student Type”*
- *“Student Type Desc”*

From the *“Student Term Information”* Class Folder:

- *“Student Term Status Desc”*

STEP 3: Begin creating the query filters. From the “*Snapshot Filters*” class folder, add the “*Current Date*” predefined filter into the ‘Query Filters’ pane.

STEP 4: Add a filter to limit the terms to fall only (you may use the predefined filter in the “*Term Session Filters*” folder).

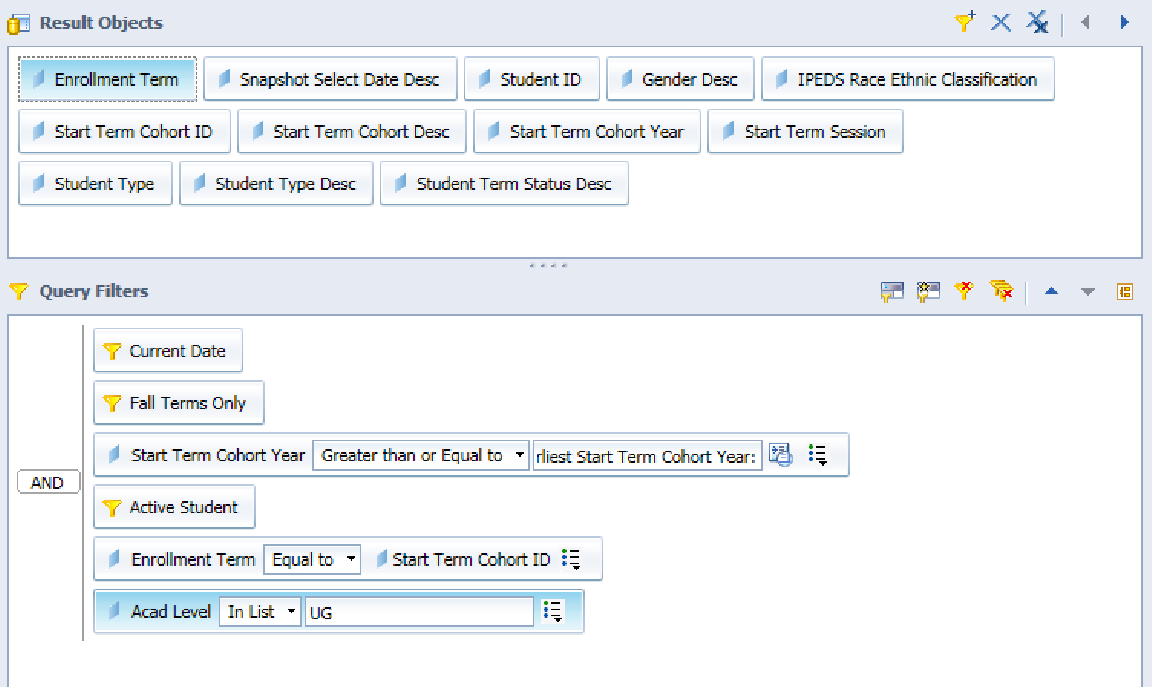
STEP 5: Create a filter prompting for the value of the “*Start Term Cohort Year*” object from the “*Student Information”* class folder. Set the operator to ‘*Greater than or Equal to’* and specify the prompting string as *“Enter earliest Start Term Cohort Year:”* (without the quotes).

STEP 6: Add a filter to ensure only actively enrolled students are included; use the “*Active Student*” predefined filter in the “*BI Enrollment and Retention*” folder.

STEP 7: Create a filter specifying that the “*Enrollment Term”* from the “*BI Enrollment and Retention*” class folder must be equal to the *“Start Term Cohort ID”* under the “*Student Information”* class folder.

STEP 8: Finally, filter the query for “*Acad Level”* from the “*Student Term Information*” folder to be equal to UG.

Your final ‘Result Objects’ and ‘Query Filters’ panes should appear as shown below:



Result Objects

Enrollment Term | Snapshot Select Date Desc | Student ID | Gender Desc | IPEDS Race Ethnic Classification | Start Term Cohort ID | Start Term Cohort Desc | Start Term Cohort Year | Start Term Session | Student Type | Student Type Desc | Student Term Status Desc

Query Filters

AND
- Current Date
- Fall Terms Only
- Start Term Cohort Year Greater than or Equal to rliest Start Term Cohort Year:
- Active Student
- Enrollment Term Equal to Start Term Cohort ID
- Acad Level In List UG

STEP 9: Rename the query by right clicking on the “*Query 1*” tab and select ‘Rename’. Name the new query *“Cohort Query”*.

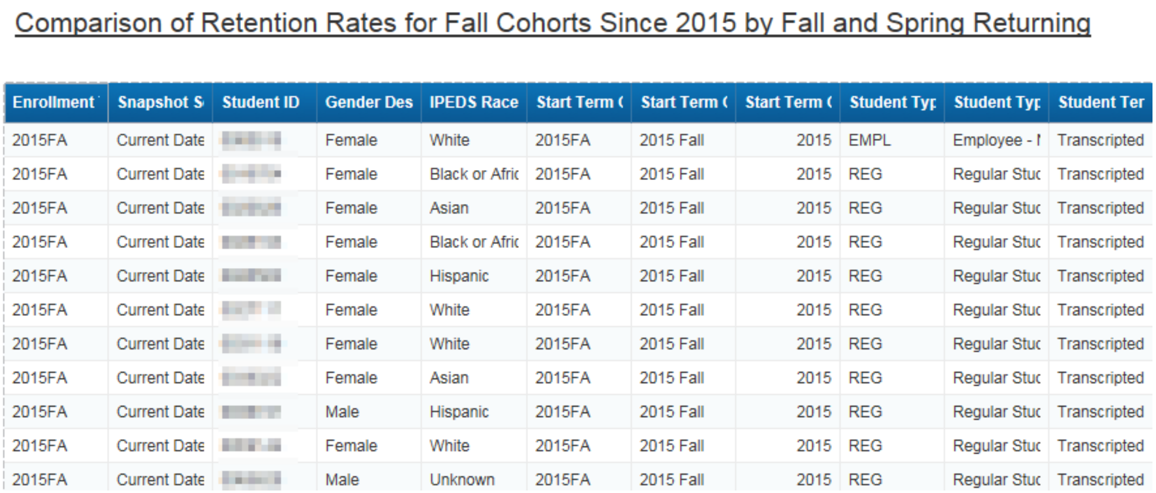
STEP 10: Run the resulting query and enter “2015” for the *“Enter earliest Start Term Cohort Year:”* prompt.

STEP 11: Rename the report itself to be “*Data Validation – Cohort*”.

STEP 12: Change the report title to the following, so that the prompt input value for "*Enter earliest Start Term Cohort Year*” appears in the title: (Note you may have to retype this as the quotes may not copy correctly into Webi.)

> **="Comparison of Retention Rates for Fall Cohorts Since “ + UserResponse (“Enter earliest Start Term Cohort Year:”) + “ by Fall and Spring Returning"**

Move the title text box to the left margin of the report. After doing this, the result should be as shown in the following screenshot:



Comparison of Retention Rates for Fall Cohorts Since 2015 by Fall and Spring Returning

Enrollment	Snapshot S	Student ID	Gender Des	IPEDS Race	Start Term (	Start Term (	Start Term (	Student Typ	Student Typ	Student Ter
2015FA	Current Date	[redacted]	Female	White	2015FA	2015 Fall	2015	EMPL	Employee - I	Transcripted
2015FA	Current Date	[redacted]	Female	Black or Afric	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	Asian	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	Black or Afric	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	Hispanic	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	White	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	White	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	Asian	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Male	Hispanic	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Female	White	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted
2015FA	Current Date	[redacted]	Male	Unknown	2015FA	2015 Fall	2015	REG	Regular Stuc	Transcripted

STEP 13: Save the Web Intelligence document in your 'My Favorites' folder as "*Retention Report*" followed by your initials.

STEP 14: Return to the report query panel, and then add a new query to the report. Use the same universe as the first query as the data source.

STEP 15: Rename the new query "*Enrollment Query*".

STEP 16: Add the following data objects to the 'Results Objects' pane:
From the *"BI Enrollment and Retention"* class folder:

- *"Enrollment Term"*
- *"Enrollment Term Session"*
- *"Enrollment Term Reporting Year"*
- *"Enrollment Term Start Date"*
- *"Enrollment Term Number Years Ago"*

From the "*Student Information"* class folder:

- *"Student ID"*
- *"Start Term Cohort ID"*
- *"Start Term Cohort Desc"*
- *"Start Term Cohort Year"*
- *"Start Term Session"*
- *"Start Term Start Date"*

From the *"Student Term Information"* Class Folder:

- *"Student Term Status Desc"*

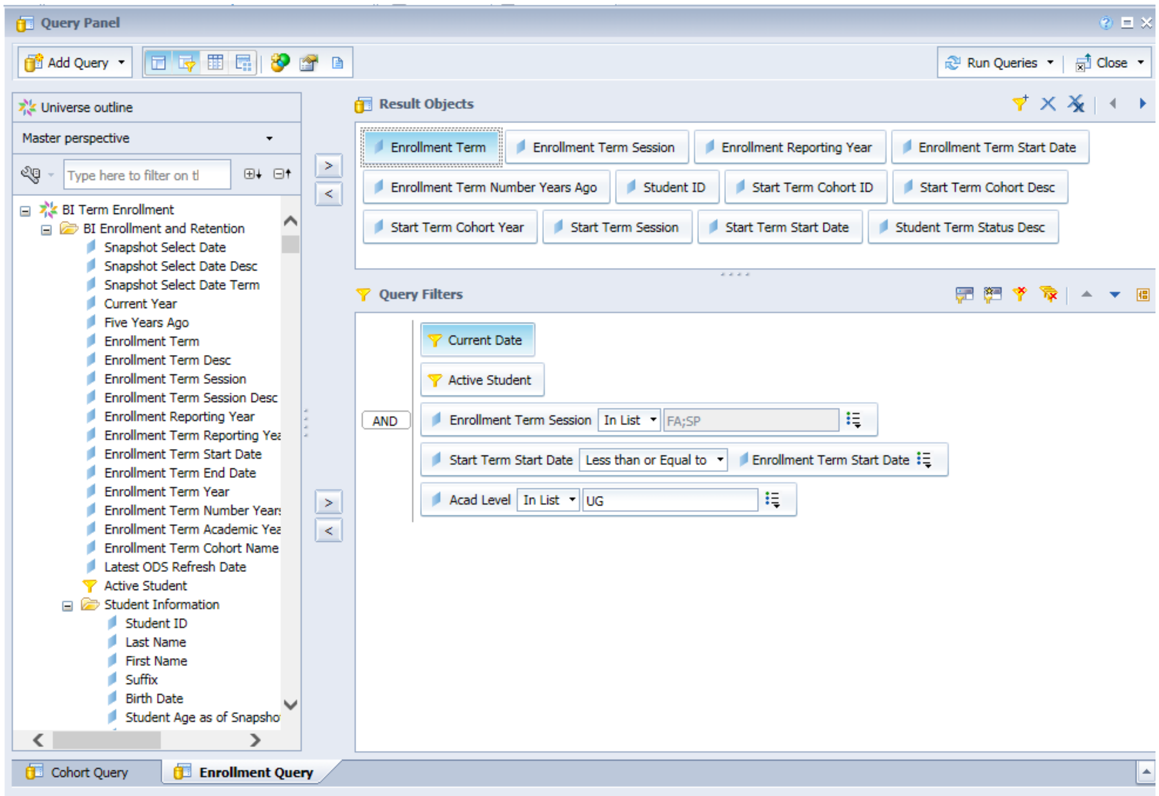
STEP 17: Add the "*Current Date*" predefined snapshot filter object to the 'Query Filters' pane.

STEP 18: Add a filter to ensure only actively enrolled students are included; use the "*Active Student*" predefined filter in the "*BI Retention and Enrollment*" folder.

STEP 19: Add a filter on the "*Enrollment Term Session*" from the "*BI Enrollment and Retention*" class folder limiting the values to *"FA"* and *"SP"*.

STEP 20: Add a filter to prevent the inclusion of any enrollment records for a student that occur before their official start term. To do this, create a filter on the "*Start Term Start Date" object* specifying that it is less than or equal to the *"Enrollment Term Start Date"* object from the "*BI Enrollment and Retention*" class folder in the same query.

STEP 21: Add a filter to include only the UG "*Acad Level*" from *"Student Term Information"*. When completed, your query panel should look like the following:



Result Objects

Enrollment Term | Enrollment Term Session | Enrollment Reporting Year | Enrollment Term Start Date | Enrollment Term Number Years Ago | Student ID | Start Term Cohort ID | Start Term Cohort Desc | Start Term Cohort Year | Start Term Session | Start Term Start Date | Student Term Status Desc

Query Filters

AND
- Current Date
- Active Student
- Enrollment Term Session In List FA;SP
- Start Term Start Date Less than or Equal to Enrollment Term Start Date
- Acad Level In List UG

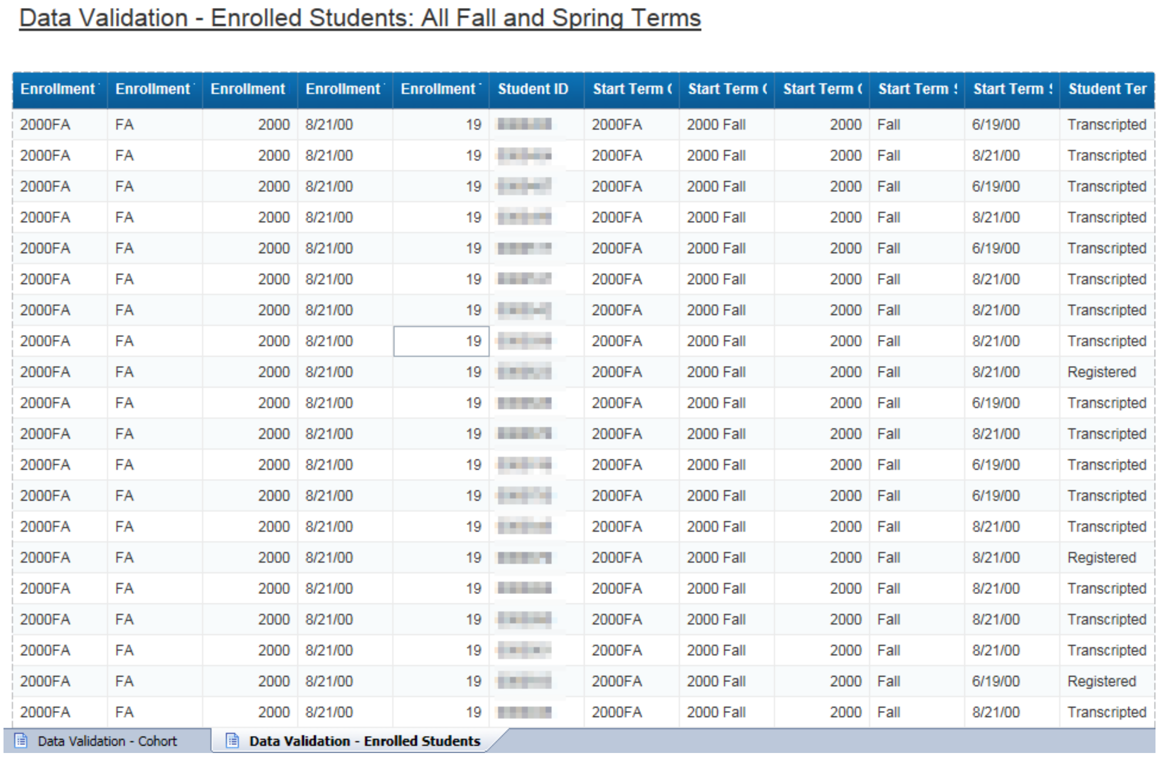
STEP 22: Run both the queries using the ‘Run Queries’ button on the title bar of the ‘Query Panel’. Answer the earliest cohort start year prompt using the same value from the previous refresh.

STEP 23: When prompted with the ‘Add Query’ dialog box, select the radio button indicating that you want to ‘Insert a table in a new report’. After the refresh of data is complete, save the Web Intelligence document by clicking on the ‘Save’ button (💾).

STEP 24: Rename the new “*Report 2*” report tab ***“Data Validation – Enrolled Students”***.

STEP 25: Modify the heading on this new report to be “**Data Validation – Enrolled Students: All Fall and Spring Terms**”. Move the title text box to the left margin of the report.

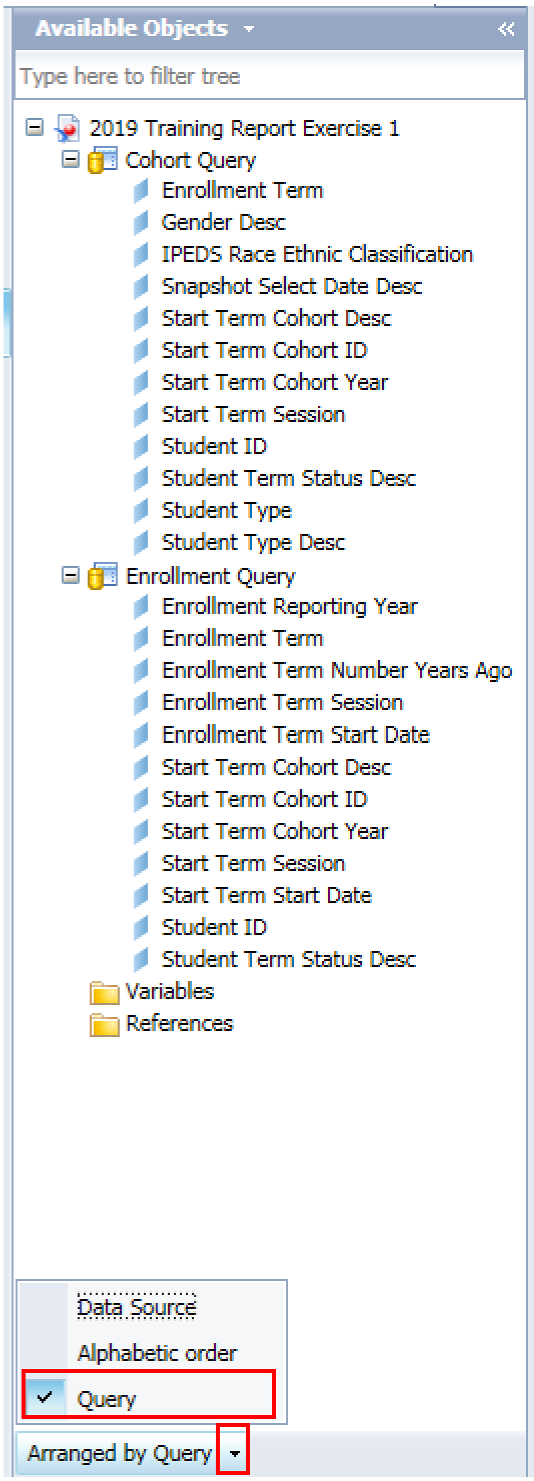
STEP 26: The report should now look something like the following screen shot:



Data Validation - Enrolled Students: All Fall and Spring Terms

Enrollment	Enrollment	Enrollment	Enrollment	Enrollment	Student ID	Start Term (	Start Term (	Start Term (	Start Term !	Start Term !	Student Ter
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Registered
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Registered
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	6/19/00	Registered
2000FA	FA	2000	8/21/00	19	[redacted]	2000FA	2000 Fall	2000	Fall	8/21/00	Transcripted

TIP: When working with multiple queries, the ‘Available Objects’ panel can become confusing, especially if your queries have objects in them that share the same name, as they do in this report. The default sort of the ‘Available Objects’ panel is in alphabetic order. It is useful to change this to ‘Arranged by: Query’.



STEP 27: Click the '<u>Save</u>' button on the Web Intelligence document to save the latest changes in your '<u>My Favorites</u>' folder with the name given earlier in this exercise.

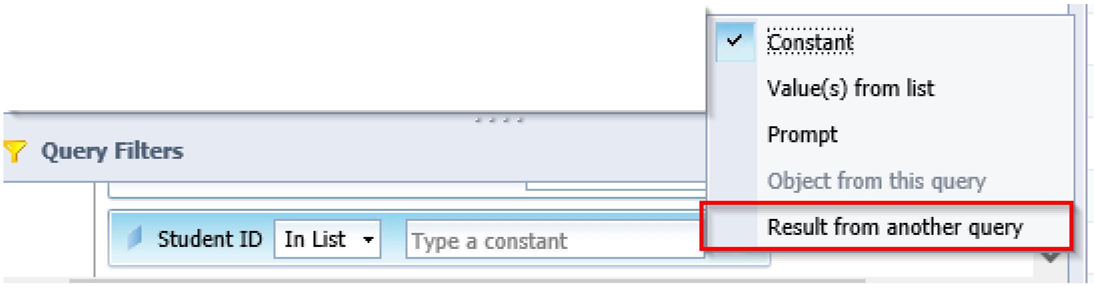
FILTERING USING RESULTS FROM ANOTHER QUERY

Once you have defined multiple queries in a Web Intelligence document, you can relate them to each other in a number of different ways. One powerful way of using results from multiple queries in a single Web Intelligence document is the ability to reference the returned values from one query in the filter of another. If you are familiar with the UniData database and UniQuery or QueryBuilder, this technique is very similar to using a "savedlist" before running a SELECT statement.

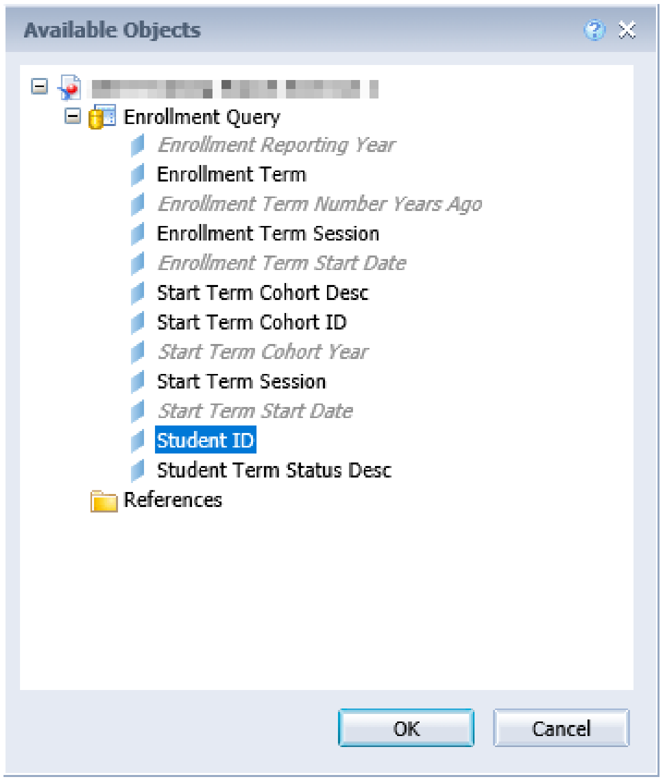
In this lesson, we will see how the rows returned from a query can be filtered by the result set of another query. Since each individual query can have a different and unique universe as its data source, this can be a powerful mechanism to determine subset populations of data based on different subject areas. For example, you could filter the list of students with a Term GPA of less than 2.0 by those who are receiving student work-study payments derived from a human resources universe. This could then provide a list for academic probation or work study review.

Filtering One Query by the Values Returned in Another Query

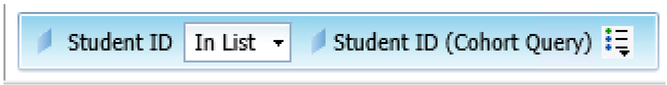
Assuming you have two queries defined in your Web Intelligence report, you can set up a filter in one query limiting the results to values returned by the other query using the following steps. First, open the query panel in the Web Intelligence report. Drag a query object to be filtered into the filter panel as with any other query. Specify the filter condition in the filter box drop-down field (NOTE – When filtering based on result from another query, this operation will usually, but not always, be 'In List'). Next, click on the argument drop-down box to the right of the operator in the expression box and select 'Result from another query'.



You should receive an 'Available objects' dialog box as shown below. You may need to expand all the folders to see all the data elements in all queries in the document.



Select the object from the other query that you want to use to filter the results of the current query and click ‘OK’. Your filter will indicate both the name of the object with the name of the query containing it, as below:



Note that that there is an upper limit on the number of objects that Web Intelligence will allow to be in the referenced list of values returned from the other query. This number will depend on the underlying database that you are using, but in the SJECCD BusinessObjects configuration is approximately 35,000 records.

In the following exercise, student IDs returned from the “*Cohort Query*” we built in the first lesson will be used to filter the “*Enrollment Query*” so that we are only counting enrolled students from Fall cohorts since 2015.

Hands-on Exercise: Learning Objective

Be able to modify an existing query (or create a new one) to filter (restrict) the list of all enrolled students in the result of the “*Enrollment Query*” to only those from the “*Cohort Query*”. This will ensure when counting retained students, we are only considering those same students from fall cohorts since 2015.

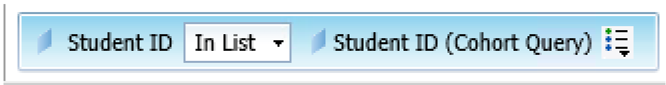
High Level Overview

1. Modify the existing Web Intelligence "*Enrollment Query*"
2. Create a filter that limits the student IDs to just those resulting from another query
3. Run the query and review the updated report
4. Save the Web Intelligence document

Practice Steps

STEP 1: Continuing to work with the report built in the previous lesson, determine the number of output pages in the "*Data Validation – Enrolled Students*" report tab. Write down that number here: ________________________

STEP 2: Edit the "*Enrollment Query*" and add the "*Student ID"* field from the "*Student Information"* class to the 'Query Filters'. Limit the values returned by this filter to be ONLY those "*Student ID*" values returned in the "*Cohort Query*". Use the 'In List' operation and then select 'Result from another query' from the drop-down menu on the filter operand. Select the "*Student ID*" from the "*Cohort Query*" as the right-hand operand for the filter. When complete, your new filter should look like the following:



STEP 3: Rerun the report queries and save the resulting Web Intelligence document.

STEP 4: Recheck the number of pages in the "*Data Validation – Enrolled Students*" report tab and verify that this has been considerably restricted by limiting the number of students to those in the "*Cohort Query*".

STEP 5: Update the title of the "*Data Validation - Enrolled Students*" report tab to reflect the new filter by adding the text **"In Cohort**" to it. Save the report.

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INITIAL REPORT AND CROSSTAB FORMATTING

The resulting data validation table from the above exercises needs to be enhanced to make the data more readable and usable for analysis purposes. The real purpose of the "*Retention Report*" is to provide a means to quickly see the rates of student retention over time by start term cohort. To achieve this, instead of using separate lists of start cohorts and enrollment cohorts, we will combine them in a crosstab (pivot table) to compare them in the same view and create a chart to show the relationships over time.

This section reinforces some basic principles of creating crosstabs and headings, but also adds some additional advanced techniques for formatting data and creating simple variables (formulas).

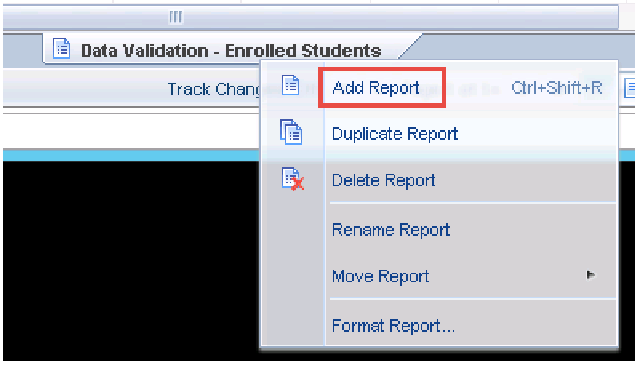
The specific development techniques covered in this section are as follows:

- Creating a new report tab in a web intelligence document
- Creating and populating a crosstab visualization
- Creating variables from report formulas
- Viewing reports in structure mode

Creating a New Report Tab in a Web Intelligence Document

There are two commonly used methods of creating a new report tab in a Web Intelligence document: creating a new empty report tab and duplicating an existing tab.

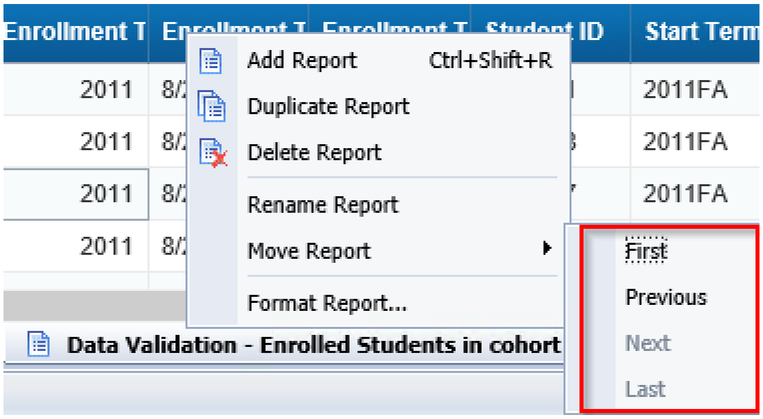
To create a new empty report tab, simply right click on any of the existing report tabs and select '<u>Add Report</u>', as below:



Note that in the technical nomenclature of Web Intelligence, each report tab within a Web Intelligence document is considered a separate "report", which can be confusing to many users.

Another frequently useful approach to creating a new report tab is to repurpose an existing report tab. To do this, simply select the ‘Duplicate Report’ option from the right-click menu.

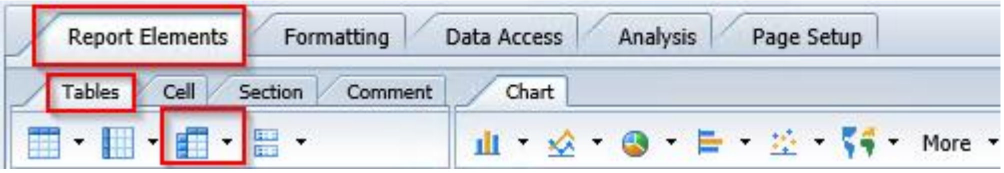
Note that the new report tab will always be created to the right of all existing report tabs within the Web Intelligence document. Should you want to reorder the report tabs, you can select the ‘Move Report’ option from the right-click menu on the report tab to be moved, and then select the sub-menu entry for ‘Next’, ‘Previous’, ’First’ or ‘Last’, as below:



Note that in this case the ‘Next’ and ‘Last’ options are disabled as this report tab is already the right-most tab.

Creating and Populating a Crosstab

Similarly, there are two ways to create a crosstab visualization on a Web Intelligence report tab. The most direct method is to create an empty crosstab and populate it with query items and variables directly. To do this, click on the crosstab button (▦) on the ‘Tables’ mini-tab within the ‘Report Elements’ tab, as below:



When you move the cursor onto your report, the cursor will be shown as a cross-shaped locator with the crosstab icon appearing next to it. Click anywhere in the report pane and the new crosstab visualization will be placed there.

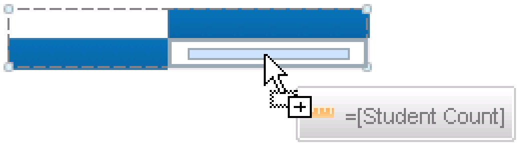
Note that if the crosstab creation wizard is shown, simply hit ‘Cancel’, as it is easier to build the crosstab directly by dragging and dropping objects than by using the wizard.

The actual construction of the crosstab is straightforward. Fundamentally, a crosstab (similar to an Excel pivot table) consists of one or more measures in the central area of the crosstab which are aggregated according to the values of dimension that are placed on the vertical and horizontal axes of the crosstab. The process of creating a crosstab consists of dragging report dimensions and measures into these areas of the crosstab visualization.

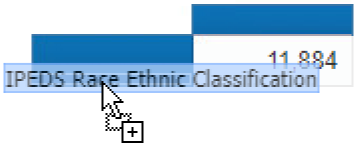
As an example, to present distinct counts of students categorized by their Start Terms and their IPEDS Ethnic Race Categorization, first create a variable in your report called "*Student Count*" with the following definition:

=Count([Cohort Query].[Student ID])

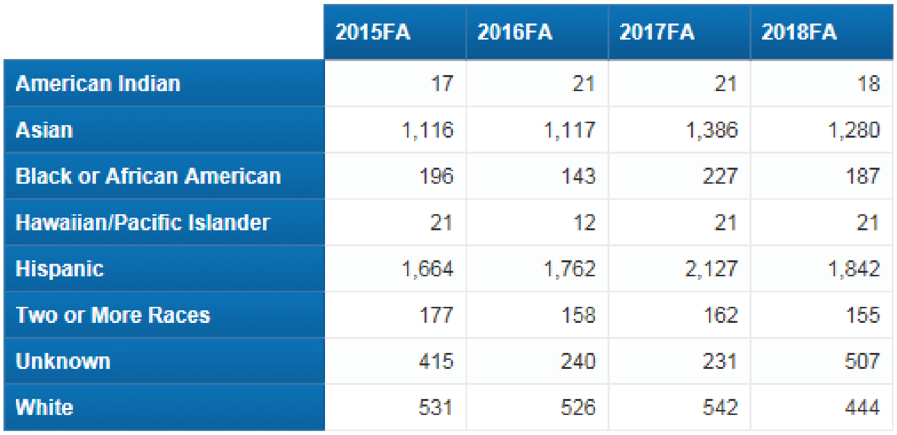
Drag the new variable and drop it in the central cell of the crosstab, as follows:



Now drag the "*IPEDS Race Ethnic Classification*" object from the same query into the blank cell on the vertical axis, as follows:

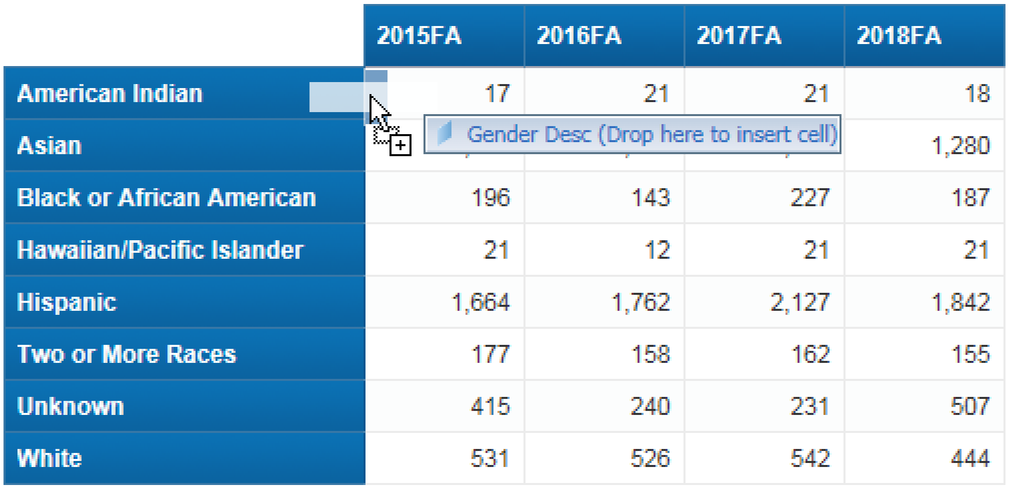


After dragging the "*Start Term Cohort ID*" object to the blank cell on the horizontal axis, the resulting crosstab looks something like this:



	2015FA	2016FA	2017FA	2018FA
American Indian	17	21	21	18
Asian	1,116	1,117	1,386	1,280
Black or African American	196	143	227	187
Hawaiian/Pacific Islander	21	12	21	21
Hispanic	1,664	1,762	2,127	1,842
Two or More Races	177	158	162	155
Unknown	415	240	231	507
White	531	526	542	444

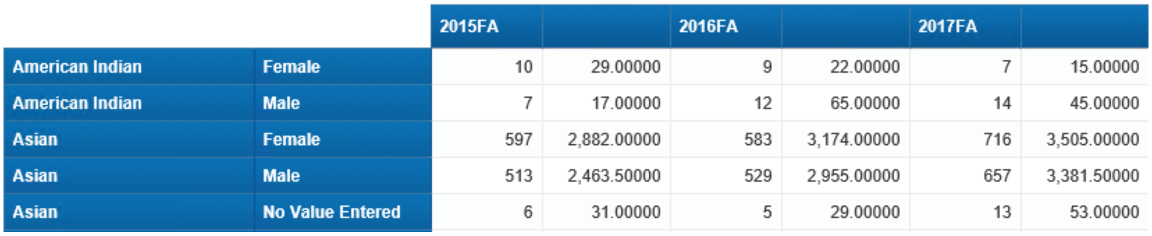
Note that you can also add additional dimensions to either the horizontal or vertical axes of the crosstab. For example, to add a categorization of each "*IPEDS Race Ethnic Classification*" by gender, drag the "*Gender Desc*" object to the right of the existing vertical axis cells, as below:



Gender Desc (Drop here to insert cell)

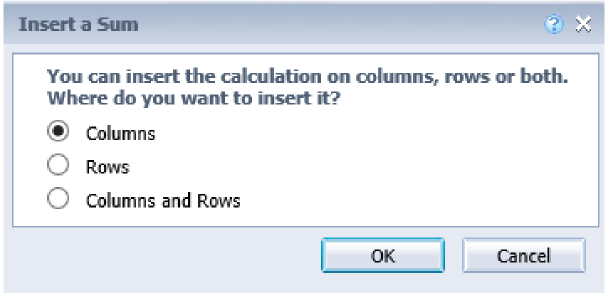
	2015FA	2016FA	2017FA	2018FA
American Indian	17	21	21	18
Asian				1,280
Black or African American	196	143	227	187
Hawaiian/Pacific Islander	21	12	21	21
Hispanic	1,664	1,762	2,127	1,842
Two or More Races	177	158	162	155
Unknown	415	240	231	507
White	531	526	542	444

Similarly, you can add additional measures to the crosstab for analysis. As an example, if you pulled in the "*Term College Level Completed Units*" object into the query, you could drag this into the crosstab to the right of the "*Student Count*" measure, as below:



		2015FA		2016FA		2017FA	
American Indian	Female	10	29.00000	9	22.00000	7	15.00000
American Indian	Male	7	17.00000	12	65.00000	14	45.00000
Asian	Female	597	2,882.00000	583	3,174.00000	716	3,505.00000
Asian	Male	513	2,463.50000	529	2,955.00000	657	3,381.50000
Asian	No Value Entered	6	31.00000	5	29.00000	13	53.00000

You can create summary rows and columns for your crosstab exactly as with a list object. Select a measure in the crosstab and then select the 'Sum' function under the 'Functions' sub-tab in the 'Analysis' tab. You will be prompted as to whether you want to create a summary row at the bottom of the crosstab or a summary column to the right, as below:

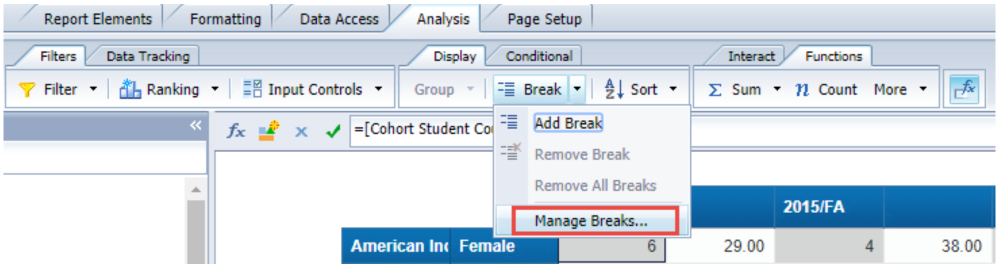


Insert a Sum

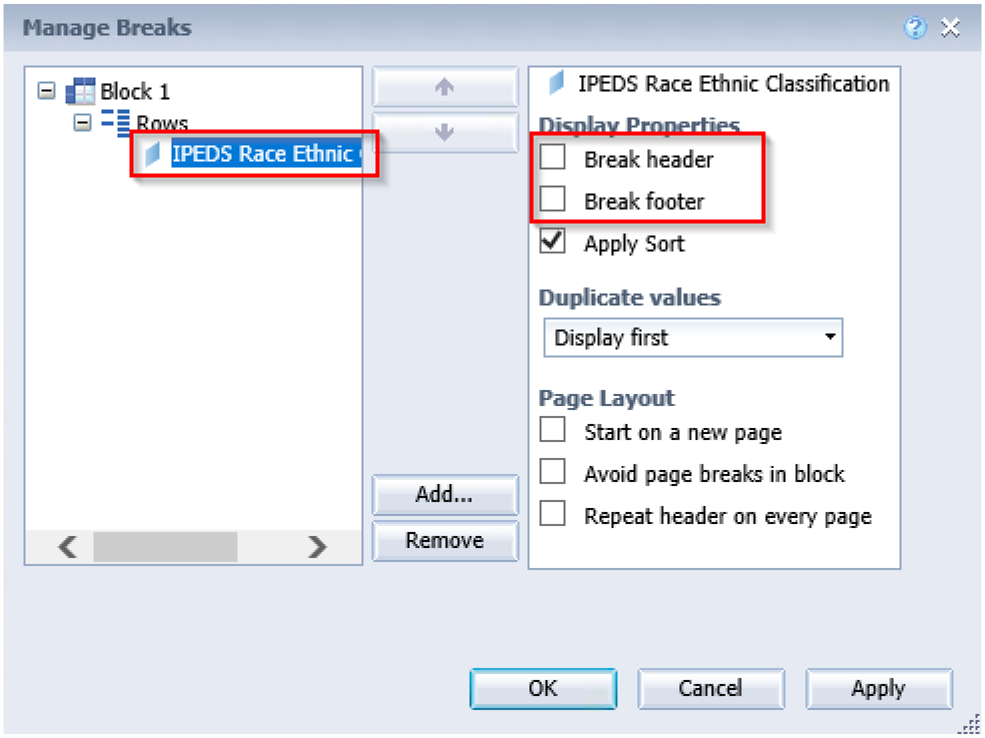
You can insert the calculation on columns, rows or both.
Where do you want to insert it?

● Columns
○ Rows
○ Columns and Rows

Finally, where you have multiple dimensions on an axis, you can apply a report ‘Break’ to clarify the presentation. To do this for the example crosstab, select the dropdown next to the ‘Break’ button from the ‘Display’ sub-tab under the ‘Analysis’ tab. Then, select the ‘Manage Breaks…’ selection from the ‘Break’ drop-down menu as below:



In the ‘Manage Breaks’ window, click ‘Add’ to add a break dimension (in this case, choose “*IPEDS Race Ethnic Classification*”), and then unselect the ‘Break footer’ and ‘Break header’ checkboxes in the righthand panel:



IPEDS Race Ethnic Classification

Display Properties

□ Break header

□ Break footer

☑ Apply Sort

Duplicate values

Display first

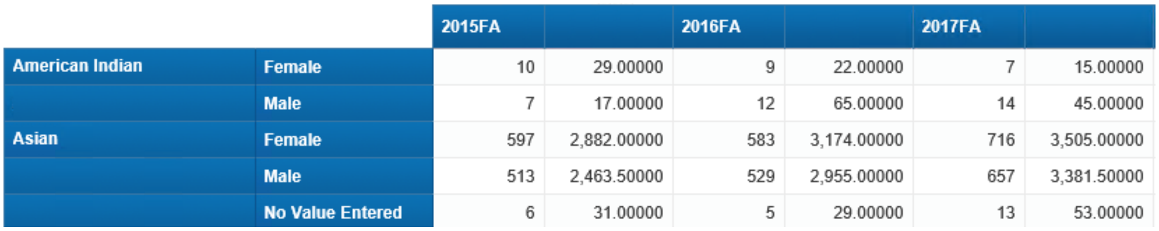
Page Layout

□ Start on a new page

□ Avoid page breaks in block

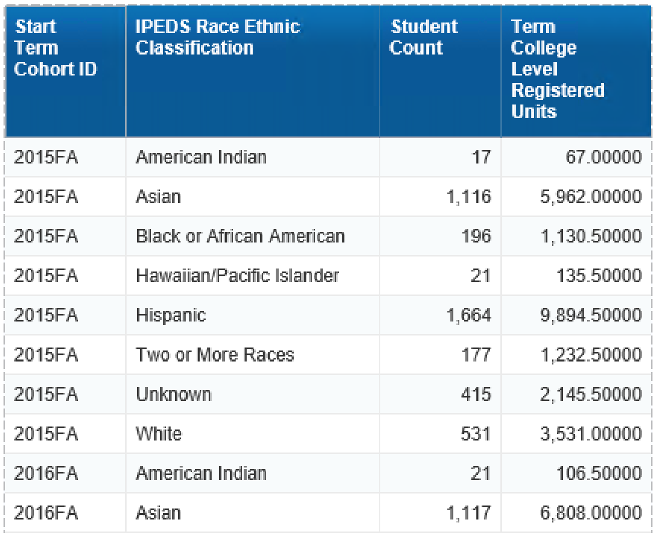
□ Repeat header on every page

After all these updates (and a couple of formatting operations and the application of a filter to minimize the data shown), the crosstab will look something like the following:



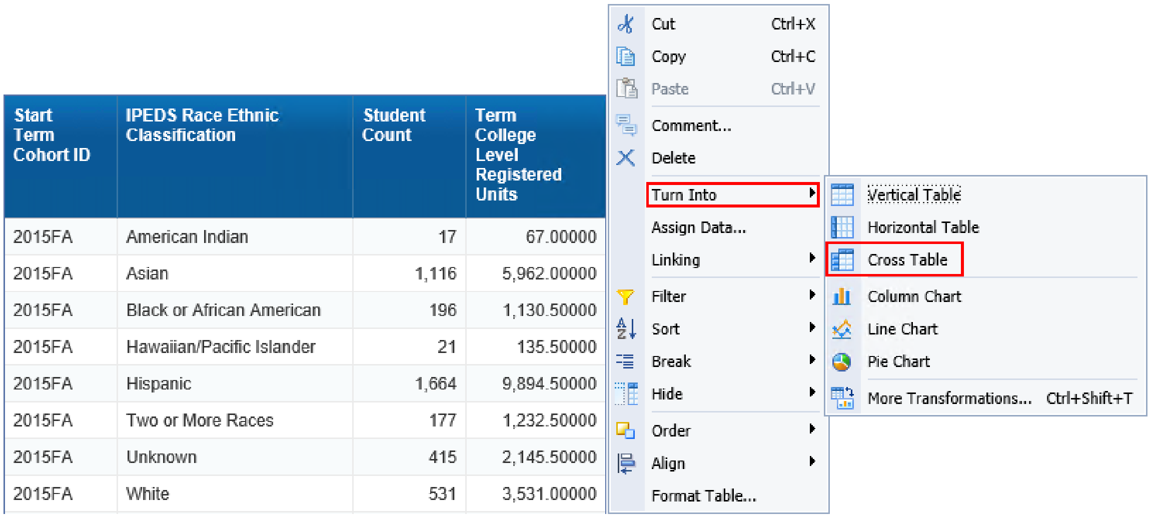
		2015FA		2016FA		2017FA	
American Indian	Female	10	29.00000	9	22.00000	7	15.00000
	Male	7	17.00000	12	65.00000	14	45.00000
Asian	Female	597	2,882.00000	583	3,174.00000	716	3,505.00000
	Male	513	2,463.50000	529	2,955.00000	657	3,381.50000
	No Value Entered	6	31.00000	5	29.00000	13	53.00000

Another method of creating a crosstab is to transform an existing data visualization into one. To do this, start with a list report containing the dimensions and measures you would like to see in your crosstab, as in the following example:



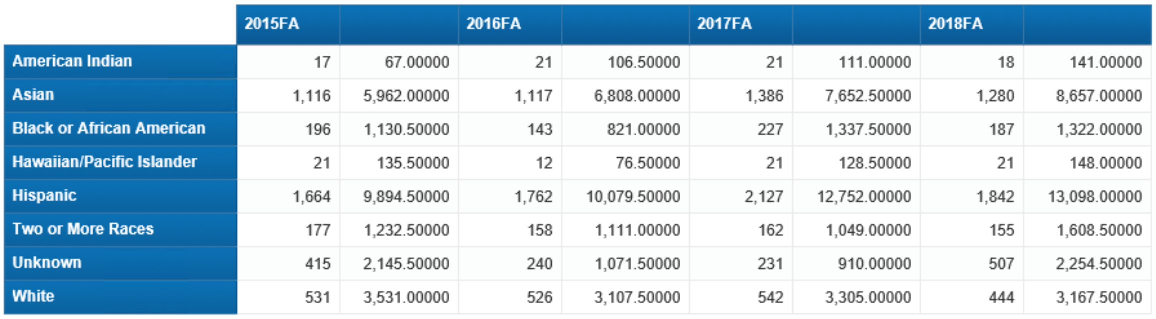
Start Term Cohort ID	IPEDS Race Ethnic Classification	Student Count	Term College Level Registered Units
2015FA	American Indian	17	67.00000
2015FA	Asian	1,116	5,962.00000
2015FA	Black or African American	196	1,130.50000
2015FA	Hawaiian/Pacific Islander	21	135.50000
2015FA	Hispanic	1,664	9,894.50000
2015FA	Two or More Races	177	1,232.50000
2015FA	Unknown	415	2,145.50000
2015FA	White	531	3,531.00000
2016FA	American Indian	21	106.50000
2016FA	Asian	1,117	6,808.00000

Then right click on any cell in the list object and select ‘Turn Into’ from the menu and then ‘Cross Table’ from the sub-menu:



Start Term Cohort ID	IPEDS Race Ethnic Classification	Student Count	Term College Level Registered Units
2015FA	American Indian	17	67.00000
2015FA	Asian	1,116	5,962.00000
2015FA	Black or African American	196	1,130.50000
2015FA	Hawaiian/Pacific Islander	21	135.50000
2015FA	Hispanic	1,664	9,894.50000
2015FA	Two or More Races	177	1,232.50000
2015FA	Unknown	415	2,145.50000
2015FA	White	531	3,531.00000

This will reformat the query objects selected into a crosstab format as follows:



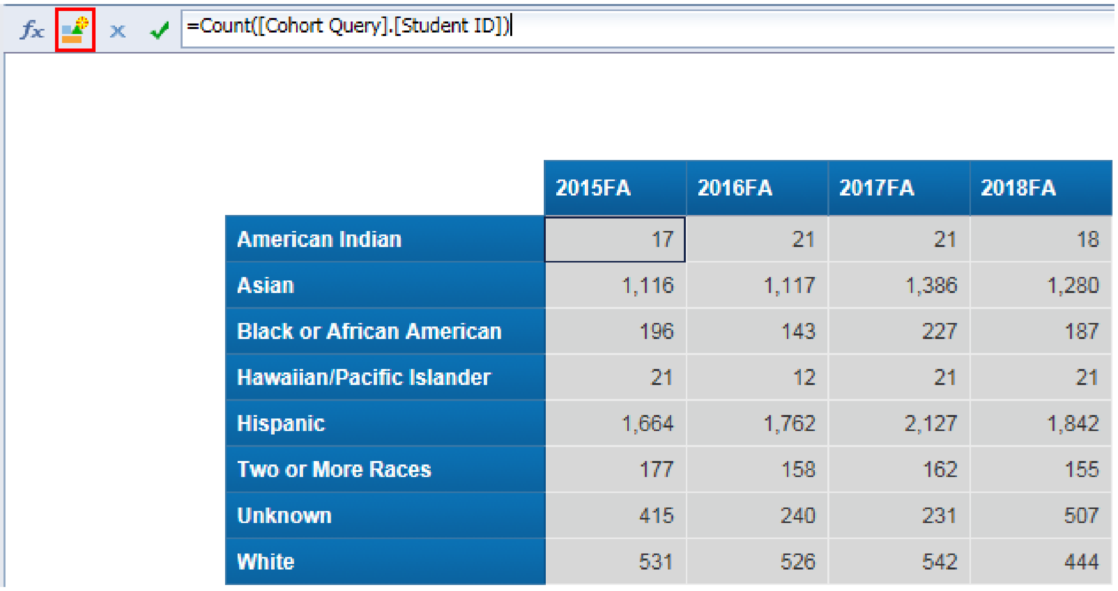
	2015FA		2016FA		2017FA		2018FA	
American Indian	17	67.00000	21	106.50000	21	111.00000	18	141.00000
Asian	1,116	5,962.00000	1,117	6,808.00000	1,386	7,652.50000	1,280	8,657.00000
Black or African American	196	1,130.50000	143	821.00000	227	1,337.50000	187	1,322.00000
Hawaiian/Pacific Islander	21	135.50000	12	76.50000	21	128.50000	21	148.00000
Hispanic	1,664	9,894.50000	1,762	10,079.50000	2,127	12,752.00000	1,842	13,098.00000
Two or More Races	177	1,232.50000	158	1,111.00000	162	1,049.00000	155	1,608.50000
Unknown	415	2,145.50000	240	1,071.50000	231	910.00000	507	2,254.50000
White	531	3,531.00000	526	3,107.50000	542	3,305.00000	444	3,167.50000

Note that while this approach can be convenient, it is not obvious which dimensions Web Intelligence will choose for the horizontal and vertical axes. This can be used as a method to start the construction of a crosstab but will typically involve additional modification to result in the desired configuration of report objects.

Creating Report Variables from Report Cell Expressions

We have learned in previous sections how to write expressions to create calculations within report cells. However, it is very often the case that once you create an expression in a report, such as a distinct student count, you find that you need to re-use that same calculation elsewhere in the report. A very simple way of doing this is to create a report variable from your report cell expression.

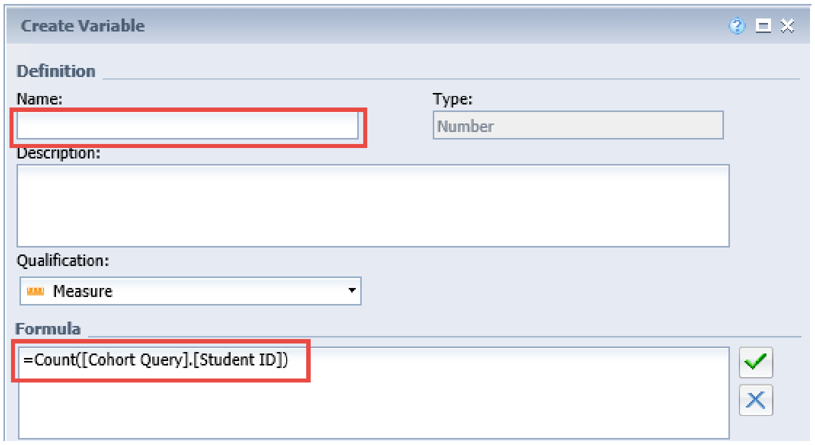
To do this, simply click on the cell containing the expression. You will then see the expression in the formula definition field of the report editor, as below:



```
=Count([Cohort Query].[Student ID])
```

	2015FA	2016FA	2017FA	2018FA
American Indian	17	21	21	18
Asian	1,116	1,117	1,386	1,280
Black or African American	196	143	227	187
Hawaiian/Pacific Islander	21	12	21	21
Hispanic	1,664	1,762	2,127	1,842
Two or More Races	177	158	162	155
Unknown	415	240	231	507
White	531	526	542	444

Then click on the 'Create Variable' button to the left of the formula definition box, as indicated above. This will bring up the normal 'Create Variable' window with the report expression pre-populated in the formula box.



Type: Number

Qualification: Measure

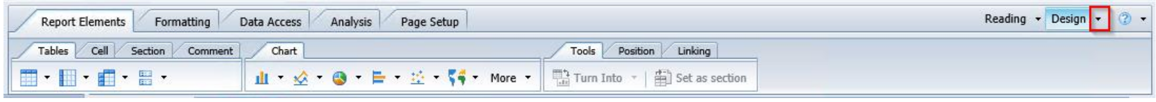
=Count([Cohort Query].[Student ID])

All you need to do to create the variable is to enter a name (and an optional description) and click on the 'Ok' button.

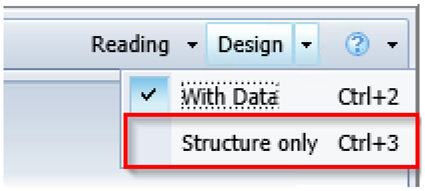
Viewing Reports in Structure Mode

Up to now, we have worked with Web Intelligence reports using a "what you see is what you get" approach to report construction. In other words, we have been viewing reports as they will look to the user, fully populated with report data. However, it is sometimes the case that it is easier to work with reports while directly looking at the underlying structure of the report in the report designer window. This could be the case where the amount of data in the report makes it hard to navigate the report to make necessary modifications or in situations where we it may not be obvious where specific data elements on the report come from or, if calculated cells, what the calculations are.

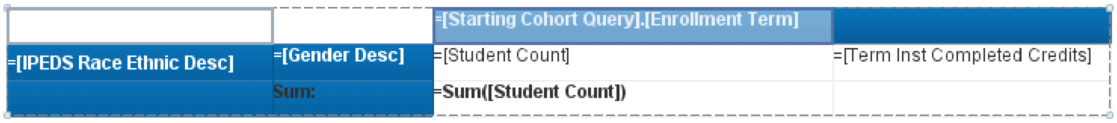
In this case, we can change the design mode of the report to 'Structure only'. To do this, click on the drop-down arrow on the right-hand side of the 'Design' button on the upper right side of the report designer window.



This will bring up a drop-down menu allowing you to select either 'With Data' (the default mode we have been working with) or 'Structure only' as the design mode for the window.



After selecting 'Structure only', you will see that the report now shows the report with the data item or cell expression displayed in each cell, in place of the report data we have seen up to this point, as below for a simple crosstab:



		=[Starting Cohort Query].[Enrollment Term]	
=[IPEDS Race Ethnic Desc]	=[Gender Desc]	=[Student Count]	=[Term Inst Completed Credits]
	Sum:	=Sum([Student Count])	

Hands-on Exercise Learning Objective

Create a simple crosstab from the "*Data Validation – Cohort*" report tab and show a count of the number of students in each cohort broken out by their IPEDS Race/Ethnic categorization.

High Level Overview

1. Copy the *"Data Validation - Cohort"* report tab as the initial starting point for a new summary crosstab analysis
2. Create a variable to represent the number of students in each cohort in each subsequent enrollment term
3. Format the crosstab report
4. Save the Web Intelligence document

Practice Steps

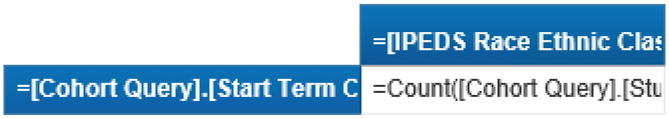
STEP 1: Continuing to work with the report built in the previous lesson, ensure you are in the report panel. Duplicate the "*Data Validation – Cohort*" report tab and rename it "*Race Ethnicity Crosstab*"

STEP 2: Delete the list report and create a blank crosstab report in its place.

STEP 3: Create and validate a formula in the measure cell of the crosstab so that it will display the number of students from the "Cohort Query" categorized by the selected attributes in the crosstab. Use the following formula to do this:

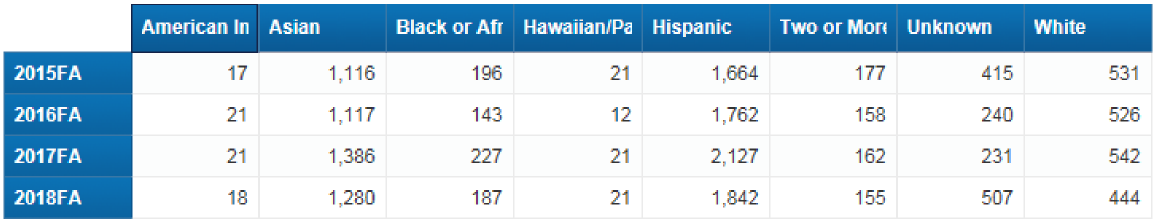
=Count([Cohort Query].[Student ID])

STEP 4: Change the view of the report to view it as 'Structure Only'. Drag the "*Start Term Cohort ID"* object from the Cohort Query into the leftmost cell of the crosstab. Drag "*IPEDS Race Ethnic Classification"* into the top blue cell. At this point, your crosstab on your report should look something like the following:



	=[IPEDS Race Ethnic Clas
=[Cohort Query].[Start Term C	=Count([Cohort Query].[Stu

Switch the report designer back to 'With Data' and verify that the crosstab now shows the count of students broken out by their cohort and race ethnic classification, as follows:

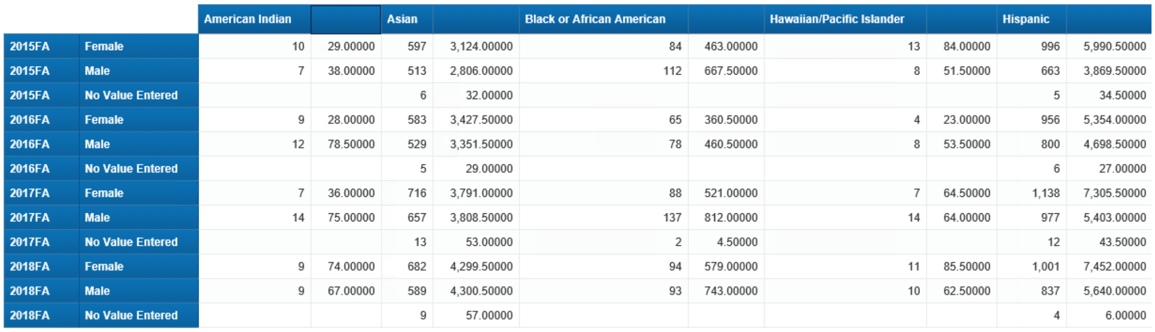


	American In	Asian	Black or Afr	Hawaiian/Pa	Hispanic	Two or More	Unknown	White
2015FA	17	1,116	196	21	1,664	177	415	531
2016FA	21	1,117	143	12	1,762	158	240	526
2017FA	21	1,386	227	21	2,127	162	231	542
2018FA	18	1,280	187	21	1,842	155	507	444

STEP 5: Convert the distinct count of student's expression into a report variable and name it "*Cohort Student Count*".

STEP 6: Add the "*Term College Level Registered Units*" measure object from the universe into the "Cohort Query". Rerun the query and then add the new object as a second measure in the crosstab, to the right of the existing "*Cohort Student Count*" measure.

STEP 7: Add the "*Gender Desc*" object as an additional attribute on the vertical (left-hand) axis of the crosstab, to the right of the existing "*Start Term Cohort ID*" object. At this point your report should look something like this:



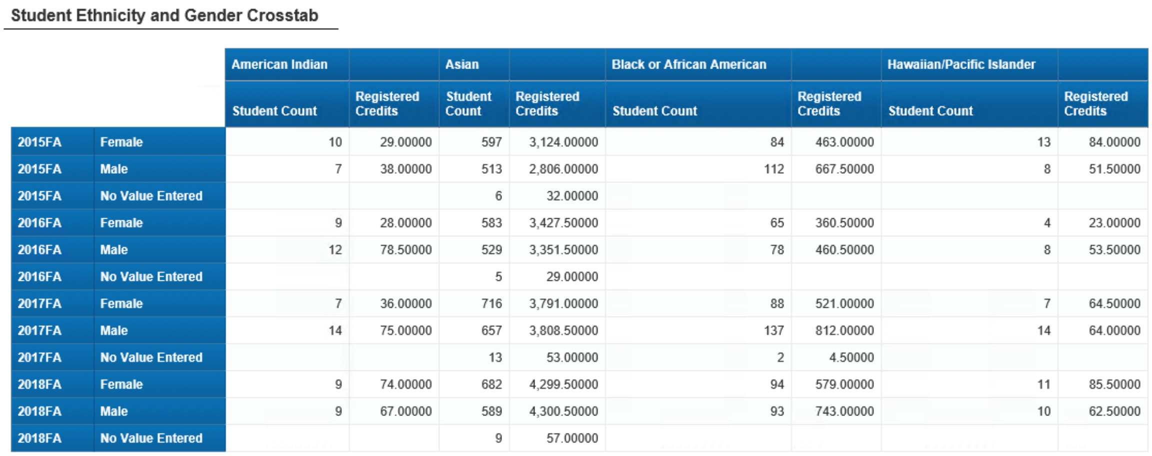
		American Indian		Asian		Black or African American		Hawaiian/Pacific Islander		Hispanic	
2015FA	Female	10	29.00000	597	3,124.00000	84	463.00000	13	84.00000	996	5,990.50000
2015FA	Male	7	38.00000	513	2,806.00000	112	667.50000	8	51.50000	663	3,869.50000
2015FA	No Value Entered			6	32.00000					5	34.50000
2016FA	Female	9	28.00000	583	3,427.50000	65	360.50000	4	23.00000	956	5,354.00000
2016FA	Male	12	78.50000	529	3,351.50000	78	460.50000	8	53.50000	800	4,698.50000
2016FA	No Value Entered			5	29.00000					6	27.00000
2017FA	Female	7	36.00000	716	3,791.00000	88	521.00000	7	64.50000	1,138	7,305.50000
2017FA	Male	14	75.00000	657	3,808.50000	137	812.00000	14	64.00000	977	5,403.00000
2017FA	No Value Entered			13	53.00000	2	4.50000			12	43.50000
2018FA	Female	9	74.00000	682	4,299.50000	94	579.00000	11	85.50000	1,001	7,452.00000
2018FA	Male	9	67.00000	589	4,300.50000	93	743.00000	10	62.50000	837	5,640.00000
2018FA	No Value Entered			9	57.00000					4	6.00000

STEP 8: Modify the title of the report to be "*Student Ethnicity and Gender Crosstab*"

STEP 9: Add an additional title row to the horizontal axis below the "*IPEDS Race Ethnic Classification*" object. Enter "*Student Count*" and "*Registered Credits*" as titles for the two measures objects in the crosstab. NOTE – To do this, right click on the existing title row and select 'Insert' -> 'Insert Row Below'.

STEP 10: Format the "*Student Count*" and "*Registered Credits*" title cells so that the text content wraps to a second line.

STEP 11: Click the 'Save' button on the Web Intelligence document to save the latest changes in your 'My Favorites' folder with the name given earlier in the first exercise. Your final report should look something like the following:



Student Ethnicity and Gender Crosstab

		American Indian		Asian		Black or African American		Hawaiian/Pacific Islander	
		Student Count	Registered Credits	Student Count	Registered Credits	Student Count	Registered Credits	Student Count	Registered Credits
2015FA	Female	10	29.00000	597	3,124.00000	84	463.00000	13	84.00000
2015FA	Male	7	38.00000	513	2,806.00000	112	667.50000	8	51.50000
2015FA	No Value Entered			6	32.00000				
2016FA	Female	9	28.00000	583	3,427.50000	65	360.50000	4	23.00000
2016FA	Male	12	78.50000	529	3,351.50000	78	460.50000	8	53.50000
2016FA	No Value Entered			5	29.00000				
2017FA	Female	7	36.00000	716	3,791.00000	88	521.00000	7	64.50000
2017FA	Male	14	75.00000	657	3,808.50000	137	812.00000	14	64.00000
2017FA	No Value Entered			13	53.00000	2	4.50000		
2018FA	Female	9	74.00000	682	4,299.50000	94	579.00000	11	85.50000
2018FA	Male	9	67.00000	589	4,300.50000	93	743.00000	10	62.50000
2018FA	No Value Entered			9	57.00000				

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USING RESULTS FROM MULTIPLE QUERIES IN A REPORT

The “*Retention Report*” document now contains two separate (though inter-related) queries and two report tables containing output fields from each of these queries. There is also a third report tab for summarizing the data from a single query using a crosstab. The requirements for this report state that there needs to be a comparison of the original start term cohorts to ongoing term enrollments. In other words, we need to combine the data from the two different queries in a single report block. As we shall see, problems can occur when trying to combine data from two separate queries on a single report or chart.

In this lesson, you will learn how the two queries can be linked so that they can be used in a single output table on a report. You will also learn one of several different techniques of combining fields from multiple queries into a single report table. This lesson will also illustrate the common issues you may encounter when trying to combine data from multiple queries and mitigation techniques.

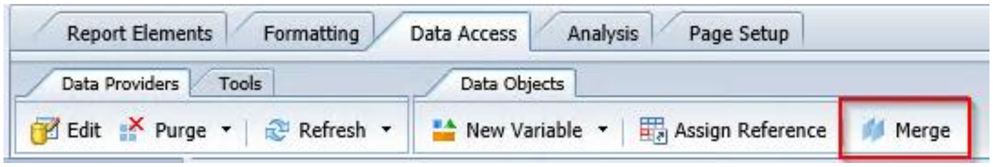
The linking of multiple queries through a field common to more than one of them is called **merging** the dimensions (data elements or objects) of the queries. You can think of this as defining how the result sets of the queries are joined, as in an SQL statement, although we will see that there are significant differences between this combining of multiple query data and the way SQL joins tables together.

We will then look at how we can use the fields from each query in the same table once the queries have been merged. We will see that measure objects (which are typically aggregated numerical values indicated by a yellow box that looks like a ruler in the data pane) from any query can be used without restriction in the report table. Adding dimension objects (those non-aggregated fields indicated by blue boxes) from the different queries, however, requires special handling, which will be covered in a future lesson.

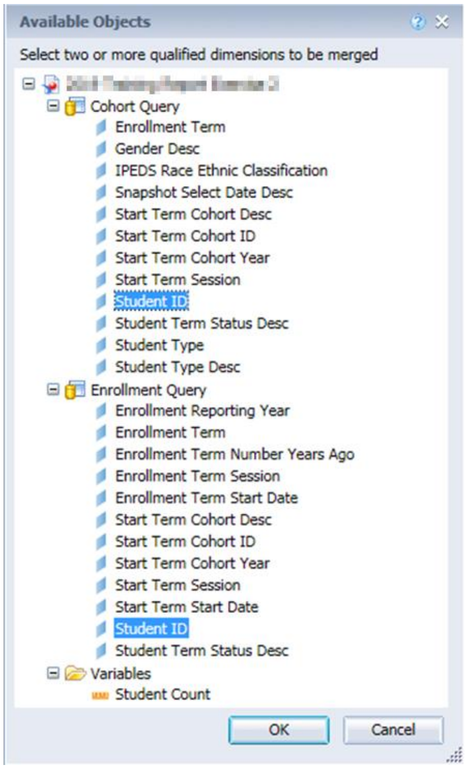
Merging Web Intelligence Document Queries

When you have defined multiple queries within a Web Intelligence report AND you want to use the results of those queries together in a single data block, you need to explicitly indicate to Web Intelligence how the data elements in the two queries relate to each other. This process is called “merging” the results of the queries. The point of the “merging” process is to identify the field(s) that match between the two queries.

There are several techniques to do this in Web Intelligence but the most straightforward is to navigate to the ‘Data Access’ tab. Under the ‘Data Objects’ sub-tab, click on the ‘Merge’ button.



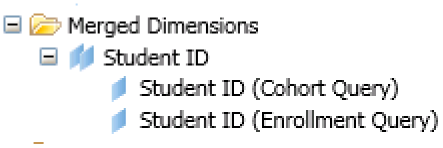
An ‘Available objects’ box will pop up and all the dimensions from the queries in the Web Intelligence document will be listed. Hold down the CTRL key and left-click on *“Student ID”* so that the *“Student ID”* objects from both queries are highlighted and then click ‘OK’. The dimension is now merged.


Available Objects

Select two or more qualified dimensions to be merged

- Cohort Query
  - Enrollment Term
  - Gender Desc
  - IPEDS Race Ethnic Classification
  - Snapshot Select Date Desc
  - Start Term Cohort Desc
  - Start Term Cohort ID
  - Start Term Cohort Year
  - Start Term Session
  - Student ID
  - Student Term Status Desc
  - Student Type
  - Student Type Desc
- Enrollment Query
  - Enrollment Reporting Year
  - Enrollment Term
  - Enrollment Term Number Years Ago
  - Enrollment Term Session
  - Enrollment Term Start Date
  - Start Term Cohort Desc
  - Start Term Cohort ID
  - Start Term Cohort Year
  - Start Term Session
  - Start Term Start Date
  - Student ID
  - Student Term Status Desc
- Variables
  - Student Count

After merging these fields, you will see them associated together in the ‘Available Objects’ pane of your report, as follows:

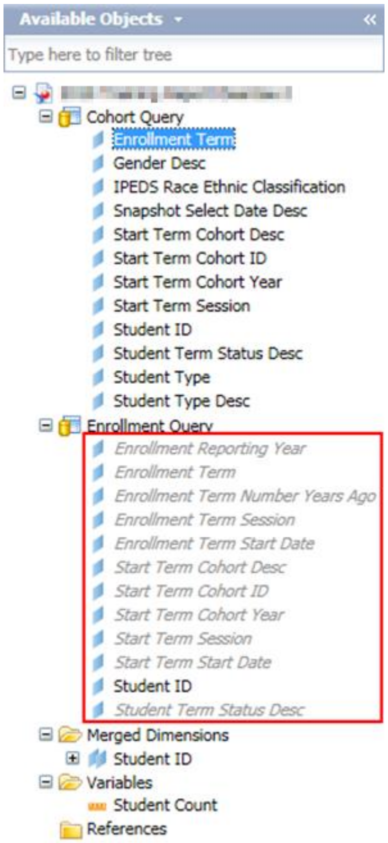

- Merged Dimensions
  - Student ID
    - Student ID (Cohort Query)
    - Student ID (Enrollment Query)

From this point onward, you will use the merged “*Student ID*” object rather than either of the query objects from the individual queries in situations where you want to combine data from the two queries. As an example, if we wanted to see a list of students that were in EITHER of the two queries, I could drag the merged object into a report.

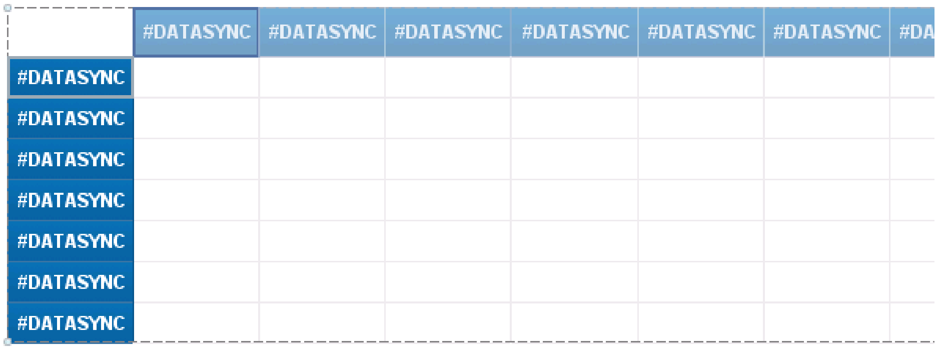
However, defining this correlation between the two queries in the merge ONLY allows me to use the merged attributes together in the resulting Web Intelligence report. To use other dimensions and measures from the two queries together, we need to take some additional steps.

Using Dimensions from Merged Queries – Creating Detail Variables

If we attempt to combine dimensions from different report queries into the same report visualization (such as a crosstab or list), we will encounter some issues. Attempting to drag the *“Enrollment Term”* from the *“Enrollment Query*” into the same crosstab as the “*Start Term*” from the “*Cohort Query*” illustrates the issue. What happens when you try to do this? Web Intelligence refuses to play along – it will not allow you to drop the object. (Note: in the Java version, it gives you an error – “Cannot drop here” – but in HTML it simply does nothing.) In fact, even highlighting dimensions from one query in the Available Objects pane causes the objects from the other query to be grayed out:



We can actually force this combination of dimensions in the report by clicking on a cell in the top of the crosstab and typing in the dimension that we want to put there explicitly (without the quotes): *"[Enrollment Query].[Enrollment Term]"*. However, this will result in this display:

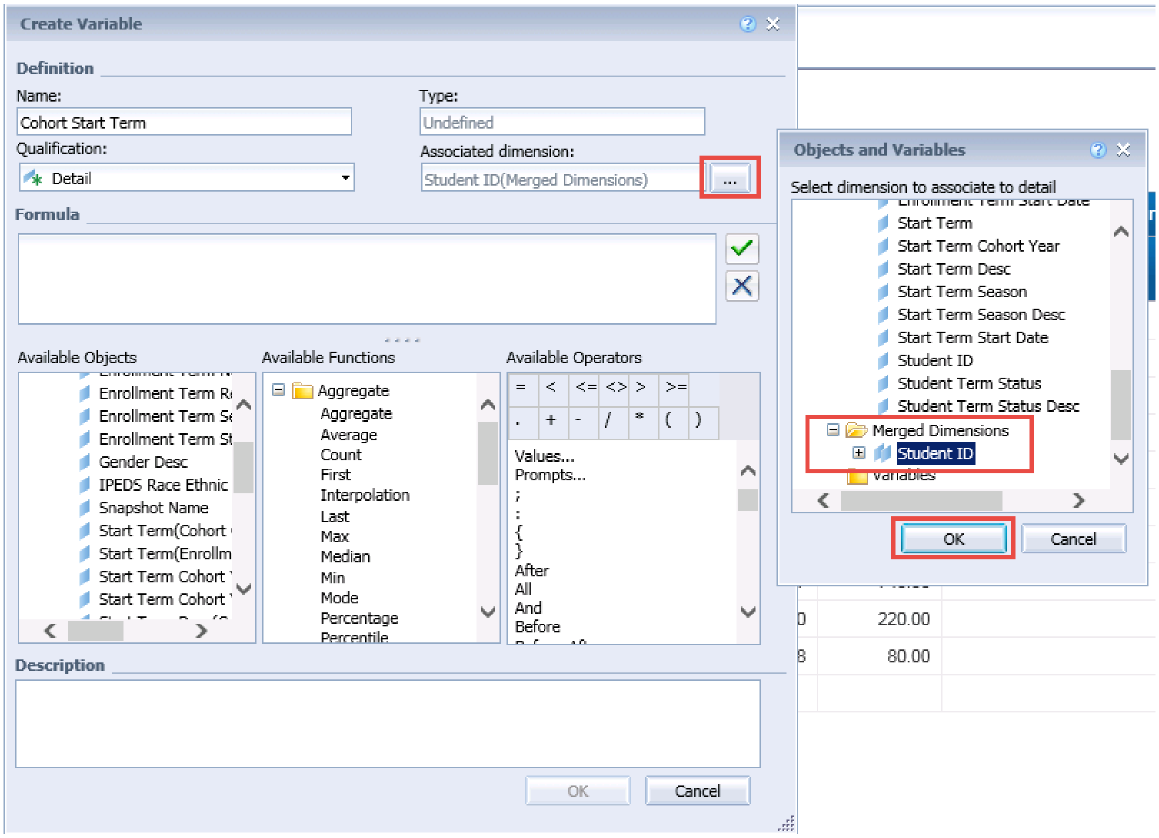


	#DATASYNC	#DATASYNC	#DATASYNC	#DATASYNC	#DATASYNC	#DATASYNC	#DA
#DATASYNC							
#DATASYNC							
#DATASYNC							
#DATASYNC							
#DATASYNC							
#DATASYNC							
#DATASYNC							

Even though we told Web Intelligence what the two queries have in common (*"Student ID"*), the tool does not know what relationship exists between *"Student ID"* and the other dimensions in the queries. It does not know that every student has a single Start Term, (i.e., that it is a 1-to-1 relationship) – we have to tell it that explicitly.

To fix this issue, there is a special type of variable object called a 'Detail' object to relate a field from a query to the merged dimension. To create the detail object, navigate to the 'Data Access' tab → 'Data Objects' sub-tab and click on the 'New Variable' button (). In the variable editor, create an object with the name "*Cohort Start Term*". Select 'Detail' from the 'Qualification:' dropdown box. Click the '...' ellipsis button next to the 'Associated Dimension' box and select the "*Student ID*" object towards the bottom of the list.

Note that it is essential to select the merged dimension object name and not the Student ID object(s) underneath in the hierarchy when the plus sign is expanded. Click 'OK' to close that object selection dialog box.



Create Variable

Definition

Name: Cohort Start Term

Type: Undefined

Qualification: Detail

Associated dimension: Student ID(Merged Dimensions)

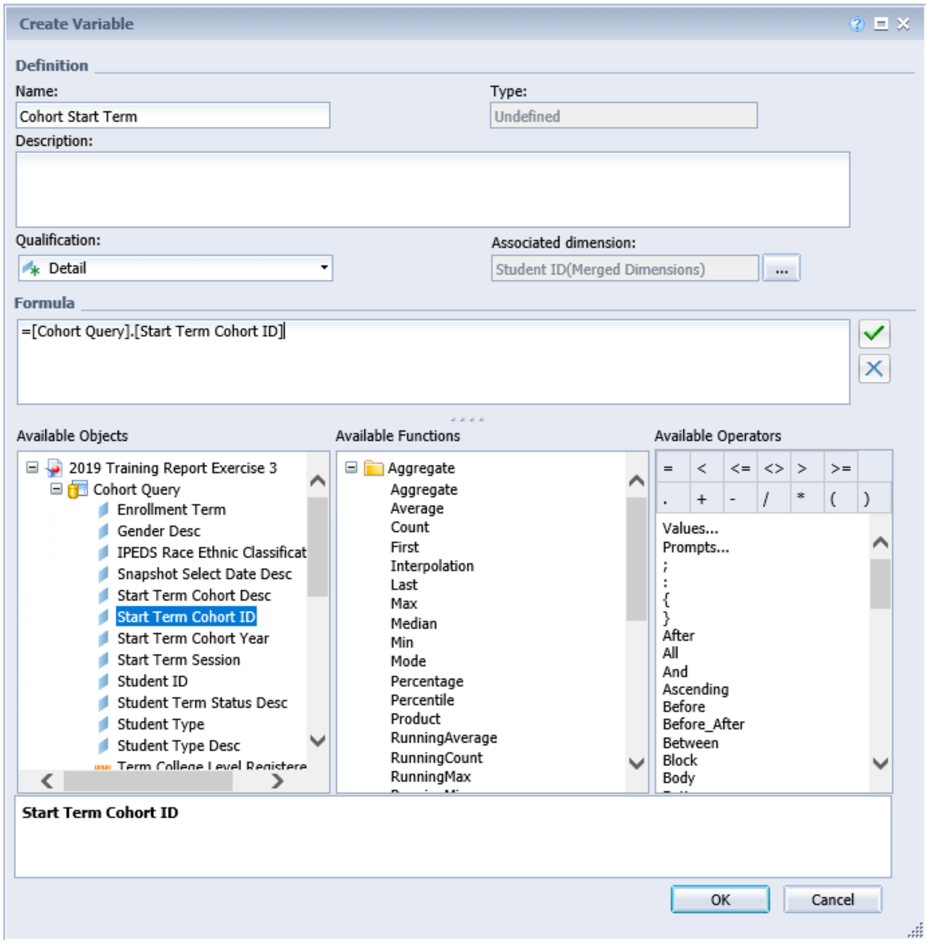
Objects and Variables

Select dimension to associate to detail

Merged Dimensions > Student ID

‘Details’ are a somewhat tricky/counter-intuitive concept because it seems like if you merge two dimensions, Web Intelligence should be able to figure out which elements have a one-to-one mapping, and which are multi-value, and return an error if you attempt to use a multi-value element. That is the whole point of merging them, right? But for whatever reason, Web Intelligence does not currently figure that out on its own, so we have to explicitly say “it’s okay to use this data element, there is a one-to-one relationship here.” And that’s what we’re doing by creating a ‘Detail’.

In the ‘Available Objects’ box, scroll down to the “*Start Term Cohort (Cohort Query)*” object and double-click to place it in the ‘Formula’ box. Click the green checkmark to validate the formula and then click ‘Close’. The final result should be as shown below. Click ‘OK’ to finish.



Create Variable

Definition

Name: Cohort Start Term

Type: Undefined

Description:

Qualification: Detail

Associated dimension: Student ID(Merged Dimensions)

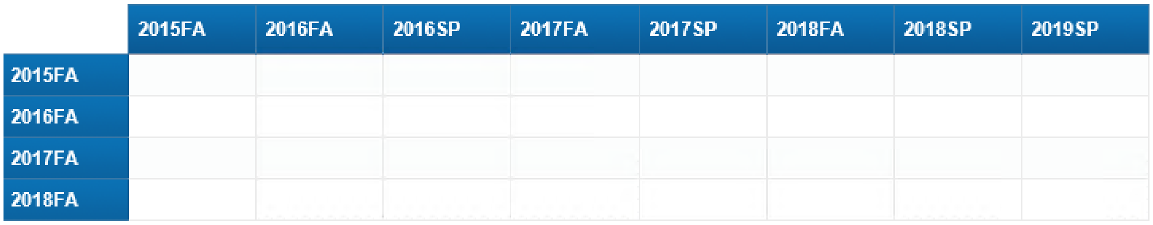
Formula

=[Cohort Query].[Start Term Cohort ID]

Start Term Cohort ID

TIP: There **MUST** be a one-to-one relationship between the detail object and the merged dimension for this technique to work. Consider our crosstab having start cohorts down the left and enrollment terms across the top; in this case, we have the "*Start Term*" field for this purpose. Because we have limited the query to only UG students, a student is only ever in one start term cohort, whereas they may have multiple enrollment terms. Also, it is generally a good practice to select a key or ID field for the merged dimension field. Description fields are not good "join" fields, although we will make many detail description fields later in this course to allow for proper filtering and slicing of joined data.

Drag the newly created detail variable "*Cohort Start Term*" into the vertical (left hand) axis to replace the #DATASYNC that is currently displayed. Observe what happens to the table:



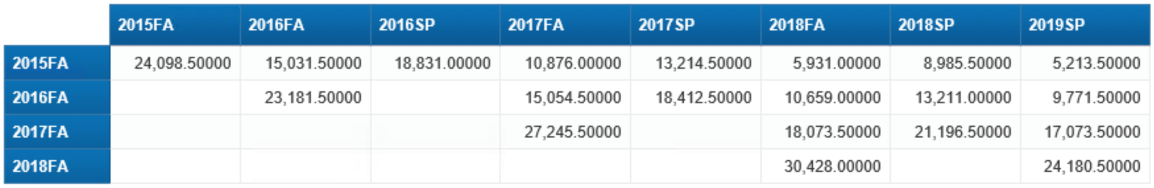
	2015FA	2016FA	2016SP	2017FA	2017SP	2018FA	2018SP	2019SP
2015FA								
2016FA								
2017FA								
2018FA								

Also, note that when you highlight any of the dimensions from the "*Enrollment Query*", the newly created "*Cohort Start Term*" detail variable is NOT grayed out, verifying that it is compatible with any of these query objects.

Using Measures from Merged Queries

Working with measure query objects from multiple queries within a report is simple: either the measures are compatible with the objects in the report or they are not. For a measure to be compatible with the current objects in the report, it must either be from the same query as the dimensions in the report, or the dimensions must consist of the merged dimension or details of the merged dimension. For measures that are variables or formulas, they must be constructed of dimensions and objects that are compatible with the objects in the report.

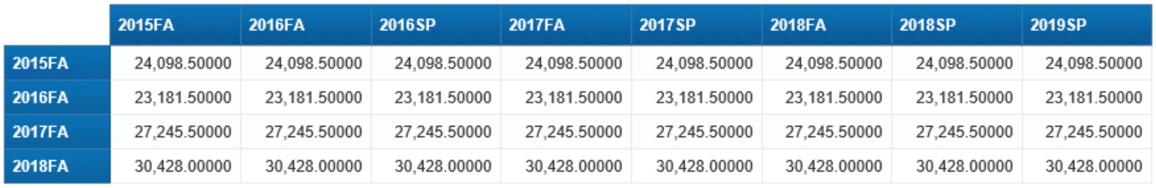
As an example of a compatible measures, let's add the "*Term College Level Registered Units*" measure object from the "*Student Term Information"* universe folder into the "*Enrollment Query*". After rerunning the report, we can drag this measure into the crosstab we just built and get the following accurate breakout of completed credits aggregated according to the enrollment terms in which they were earned, broken out by the student's cohort start terms. The resulting crosstab looks like the following:



	2015FA	2016FA	2016SP	2017FA	2017SP	2018FA	2018SP	2019SP
2015FA	24,098.50000	15,031.50000	18,831.00000	10,876.00000	13,214.50000	5,931.00000	8,985.50000	5,213.50000
2016FA		23,181.50000		15,054.50000	18,412.50000	10,659.00000	13,211.00000	9,771.50000
2017FA				27,245.50000		18,073.50000	21,196.50000	17,073.50000
2018FA						30,428.00000		24,180.50000

This measure is compatible since it comes from the same query as the "*Enrollment Term*" listed on the upper axis of the crosstab and since the object on the vertical axis, "*Start Term Cohort*", is a detail of the merged "*Student ID*" dimension.

Now look what happens when we try to bring in the same measure from the "Cohort Query" report query. Web Intelligence allows us to bring the measure object into the report, but the results are clearly not meaningful:



	2015FA	2016FA	2016SP	2017FA	2017SP	2018FA	2018SP	2019SP
2015FA	24,098.50000	24,098.50000	24,098.50000	24,098.50000	24,098.50000	24,098.50000	24,098.50000	24,098.50000
2016FA	23,181.50000	23,181.50000	23,181.50000	23,181.50000	23,181.50000	23,181.50000	23,181.50000	23,181.50000
2017FA	27,245.50000	27,245.50000	27,245.50000	27,245.50000	27,245.50000	27,245.50000	27,245.50000	27,245.50000
2018FA	30,428.00000	30,428.00000	30,428.00000	30,428.00000	30,428.00000	30,428.00000	30,428.00000	30,428.00000

Note that the totals are not related to the values on the horizontal axis of the crosstab at all; in fact, the credit totals are simply repeated for every listed enrollment term. This is because the measure comes from a different query than the "*Enrollment Term*" object on that axis.

Hands-on Exercise Learning Objectives

At the end of this section, you will be able to build a report using output fields from multiple queries. You will also understand in more detail the relationships between the various data results sets and how the behavior of how they display on a single report.

High Level Overview

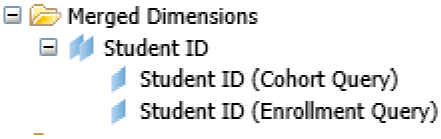
1. Open the "*Retention Report"* Web Intelligence document and create a new "*Retention Rate Summary*" report tab
2. Open the 'Merge' dialog box and merge the two queries on *"Student ID"*
3. Create a detail dimension of the "*Student ID*" field and add it to the summary report
4. Add the "*Cohort Student Count*" measure to the crosstab
5. Save the updated report

Practice Steps

STEP 1: Open the "*Retention Report*" Web Intelligence document. Create a new report tab in the document and call it "*Retention Rate Summary*".

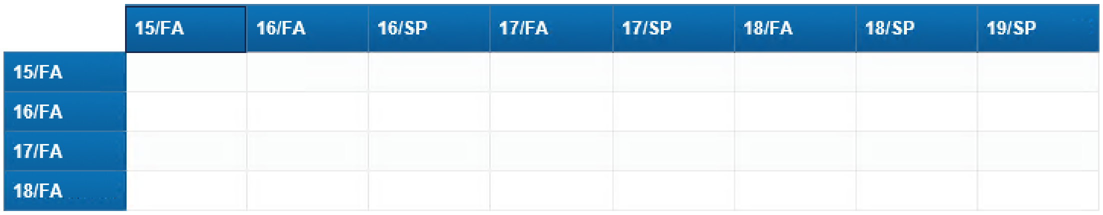
STEP 2: Create an empty crosstab on the new report.

STEP 3: Merge the two report queries on the "*Student ID*" dimension from each query. Verify that the 'Available Objects' pane presentation of the "*Student ID"* reflects the merge as follows:



STEP 4: Create a detail variable with the name "*Cohort Start Term*". This detail should be associated with the merged "*Student ID*" dimension. The formula for the variable should simply be a reference to the "*Start Term Cohort ID*" from the "*Cohort Query*" report query.

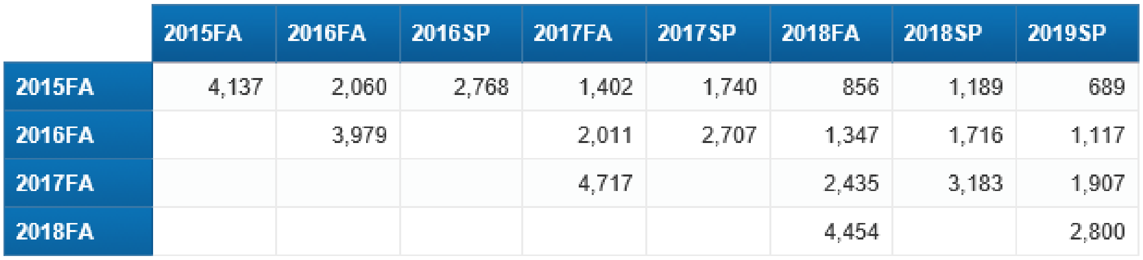
STEP 5: Drag the newly created detail variable "*Cohort Start Term*" into the vertical axis of the crosstab. Drag the "*Enrollment Term*" object from the "*Enrollment Query*" report query to the horizontal axis of the crosstab. Your report should look something like the following:



	15/FA	16/FA	16/SP	17/FA	17/SP	18/FA	18/SP	19/SP
15/FA								
16/FA								
17/FA								
18/FA								

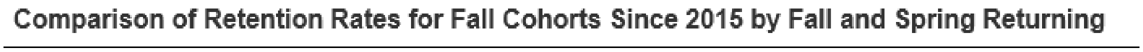
STEP 6: Create a variable called "*Student Enrollment Count*" which does a distinct count of the "*Student ID*" dimension object from the "*Enrollment Query*".

STEP 7: Drag the "*Student Enrollment Count*" measure variable to the center of the crosstab. Verify that the result looks like the following:



	2015FA	2016FA	2016SP	2017FA	2017SP	2018FA	2018SP	2019SP
2015FA	4,137	2,060	2,768	1,402	1,740	856	1,189	689
2016FA		3,979		2,011	2,707	1,347	1,716	1,117
2017FA				4,717		2,435	3,183	1,907
2018FA						4,454		2,800

STEP 8: Add a new title to the report indicating the analysis shown in the crosstab. Reflect the selected prompt value for the "*Enter earliest Start Term Cohort Year*" prompt in the title using the UserResponse() function. The title should appear as follows:



Comparison of Retention Rates for Fall Cohorts Since 2015 by Fall and Spring Returning

STEP 9: Click the '<u>Save</u>' button on the Web Intelligence document to save the latest changes in your '<u>My Favorites</u>' folder with the name given earlier in the first exercise.

> ***<u>TIP:</u>*** Web Intelligence has the ability to auto-merge dimensions. In fact, in versions prior to SAP BusinessObjects 4.x, this happened by default. We believe that the new approach - having users explicitly choose the dimensions they wish to merge on - is a better approach. Auto-merge could lead to a false sense that the report was actually working, when in fact you would not have correct data. Detailed information on the use of these options is explained in the BusinessObjects documentation and training references at the end of this document. Additionally, this may be an area where seeking the help of IT support would be useful if you cannot get a report and query to work as expected.

TIP: When working with multiple queries within a Web Intelligence document, you may want to review the following checklist to make sure you are handling data from each query correctly:

- Have you pulled in the correct dimensions and measures in each query?
- Do the measures and dimensions in each query make sense on their own?
- Have you merged on the correct common field of the two queries?
- Have you created the correct details on the merged dimensions?
- Have you chosen the query which only has one value for each value of the merged dimension as the query to use as the source for the detail variables?
- Are you using the merged dimensions and details on your report visualization (crosstab, list, etc.)?

ADDITIONAL REPORT FORMATTING

At this point, we have the data in place and a crosstab needed to meet the basic requirements. However, there are a number of issues we still need to address to improve readability and usability. Specifically, you may have noticed that the enrollment terms across the top are not sorting in chronological order, but rather in alphabetic order, so that FA comes before SP. This makes the table show data in an erratic pattern. Also, we need to create a formula that calculates the percent of the original cohort across enrollment terms.

Overall, this lesson will introduce the following techniques:

- Using If-Then-Else Logic in report variables
- Several useful formatting techniques for crosstabs, specifically merging crosstab header cells and formatting percentages
- Sorting crosstabs and other visualizations by data fields that are not displayed in the visualization
- Conditional formatting of crosstab cells to highlight exceptional data conditions

Using If-Then-Else Logic in Report Variables

When creating formulas in Web Intelligence reports, it is frequently necessary to do conditional logic, that is perform a logical test that determines what the output of the formula will be. The most straightforward way to accomplish this is to use the 'If' function. The format of this function is as follows:

If <Condition> **Then** <Expression1> **Else** <Expression2>

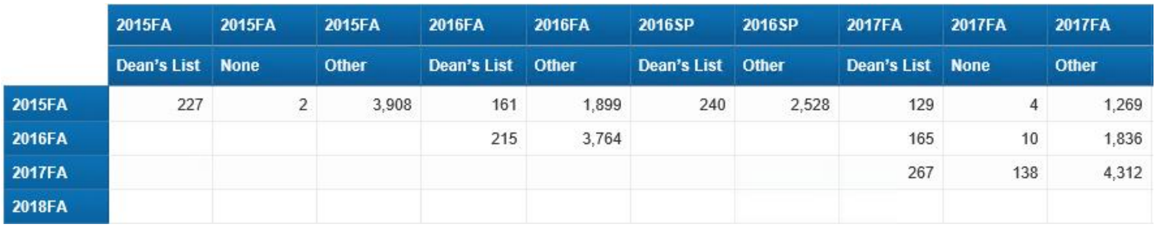
In this definition, <Condition> is a logical True/False expression and <Expression1> and <Expression2> are any formulas that return numeric, string, or date results. Note that you can also embed another 'If' formula surrounded by parenthesis in place of either <Expression1> or <Expression2> to express more complex logical constructs.

For example, we may want to create a dimension on our crosstab that characterizes students according to a higher-level categorization of their academic standings. In this case, assume that if we bring in the "*Standing*" object into the "*Enrollment Query*" in our report, that we want to display the counts of students who have no academic standing, who are on the Dean's list or who have some other standing.

This could be accomplished by creating a variable called "*Term Standing Categorization*" which would have the following definition:

=If IsNull ([Standing]) Then "None" ElseIf [Standing] = "DEAN" Then "Dean's List" Else "Other"

Dragging this new variable to the horizontal axis of our crosstab would result in the following:

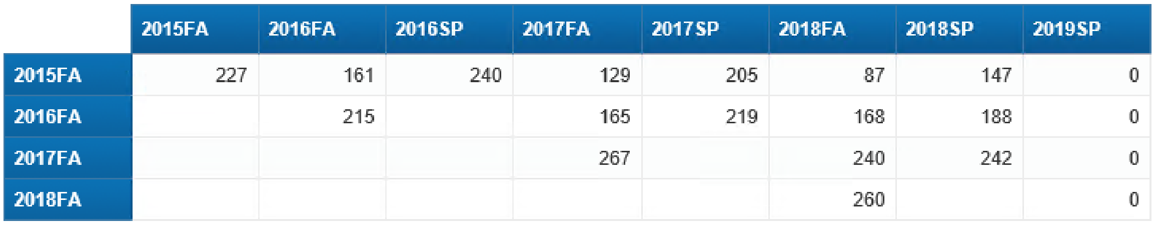


	2015FA	2015FA	2015FA	2016FA	2016FA	2016SP	2016SP	2017FA	2017FA	2017FA
	Dean's List	None	Other	Dean's List	Other	Dean's List	Other	Dean's List	None	Other
2015FA	227	2	3,908	161	1,899	240	2,528	129	4	1,269
2016FA				215	3,764			165	10	1,836
2017FA								267	138	4,312
2018FA										

Another very useful application of conditional logic is to use it to conditionally count or aggregate values. As an example of this technique, imagine that we wanted a count only of students on the Dean's List for a particular term. We previously used the 'Count' function to create our "*Cohort Student Count*". We could use the same function to create a new "*Dean's List Count*" but only include the individual "*Student ID*" value if the "*Standings*" dimension for that student in the term equals "DEAN". To do this, you would embed the 'If' statement WITHIN the 'Count' function call, as below:

=Count (If [Standing] = "DEAN" Then [Student ID])

After defining this measure variable, we could drag it into our crosstab as an additional measure, as below:



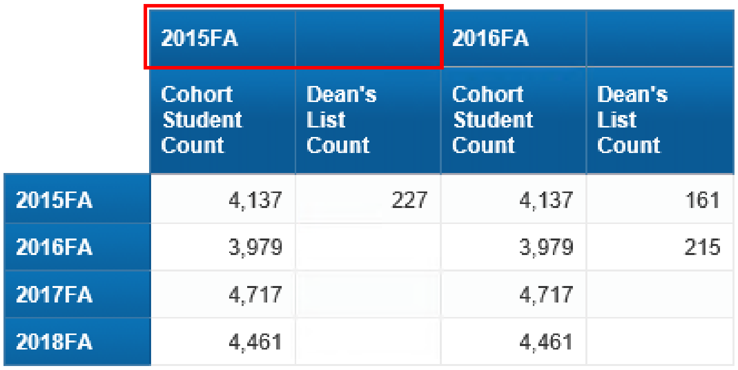
	2015FA	2016FA	2016SP	2017FA	2017SP	2018FA	2018SP	2019SP
2015FA	227	161	240	129	205	87	147	0
2016FA		215		165	219	168	188	0
2017FA				267		240	242	0
2018FA						260		0

Note that since there is no 'Else' clause on our 'If' statement within the 'Count' function, in the case where the "*Standings*" object does not equal "DEAN", there is no "*Student ID*" value returned and hence no value added to the overall count.

Formatting Techniques for Crosstabs

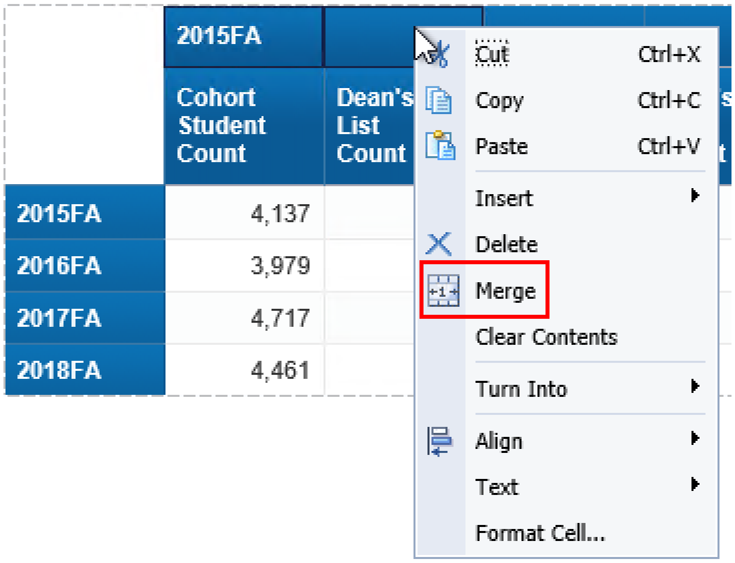
There are several basic formatting steps for crosstabs that can greatly enhance the clarity of the data presented. The first of these is the ability to merge cells in the crosstab header. When there are multiple measures shown in a crosstab, a blank cell is shown in the top (horizontal) axis of the crosstab for all but one of the measures shown. As an example, adding Cohort Student

Count to the crosstab from the previous example (after adding a new row to show the measure names), results in the following, where the cells circled in red both represent data associated with “2015FA”:



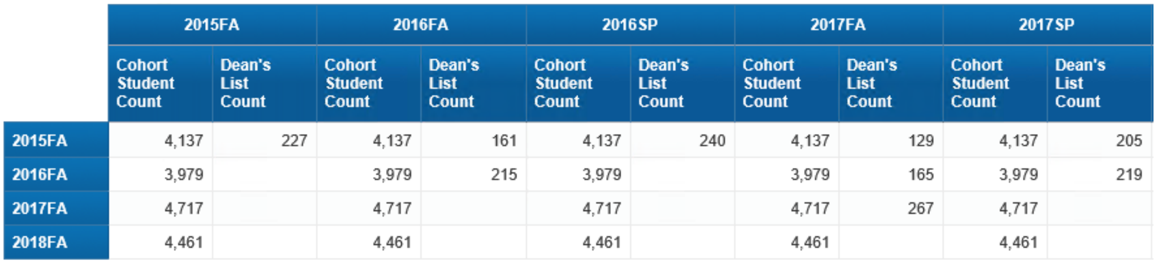
	2015FA		2016FA	
	Cohort Student Count	Dean's List Count	Cohort Student Count	Dean's List Count
2015FA	4,137	227	4,137	161
2016FA	3,979		3,979	215
2017FA	4,717		4,717	
2018FA	4,461		4,461	

It can help the clarity of the report to merge these two cells into one, with the dimension text value contained in the resulting combined cell. To do this, highlight both cells by clicking while holding down the **CTRL** key and right-click on either cell. Then select ‘Merge’ from the drop-down menu:



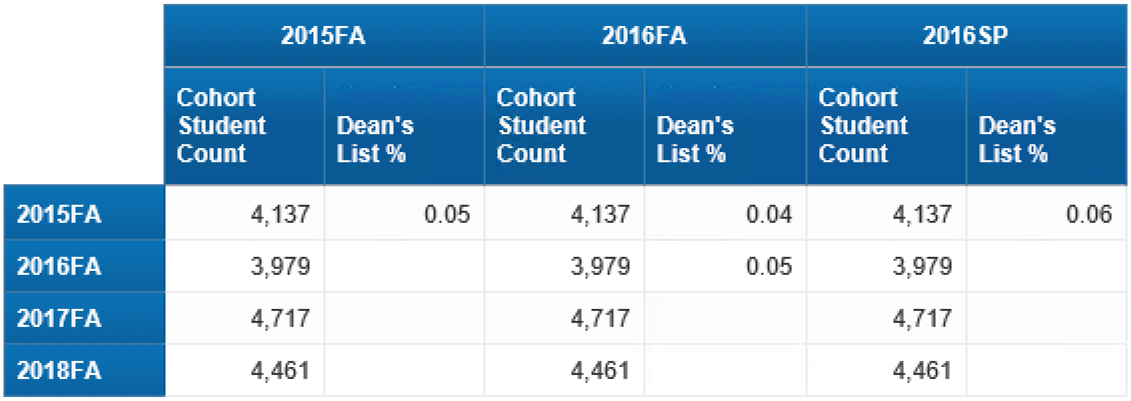
	2015FA	
	Cohort Student Count	Dean's List Count
2015FA	4,137	
2016FA	3,979	
2017FA	4,717	
2018FA	4,461	

The resulting report has the two cells merged into one. Centering the text in this combined field results in a very clear association of the two measures with each value of the “*Enrollment Term*” dimension:



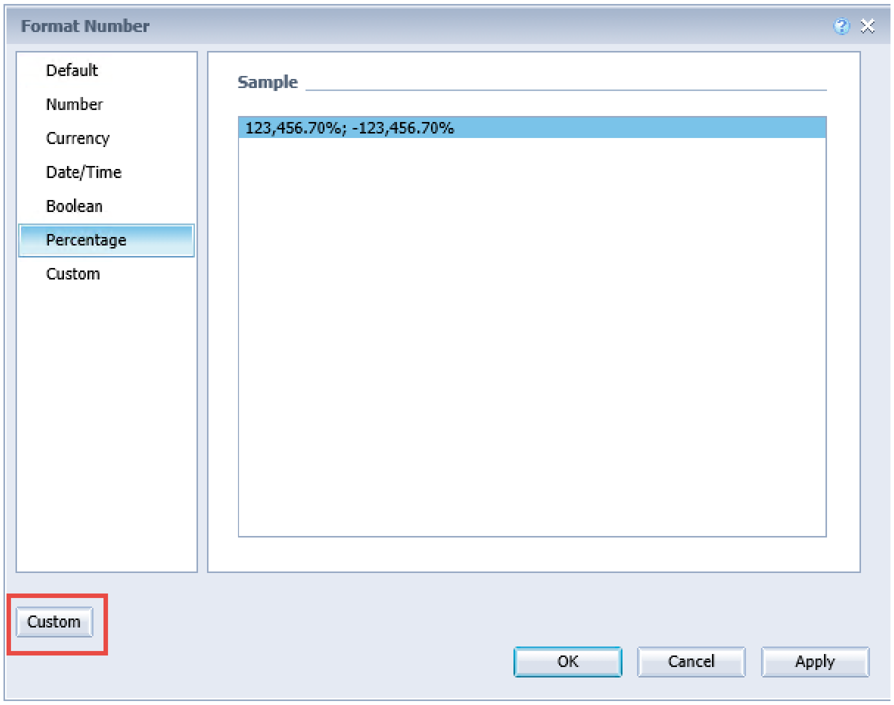
	2015FA		2016FA		2016SP		2017FA		2017SP	
	Cohort Student Count	Dean's List Count	Cohort Student Count	Dean's List Count	Cohort Student Count	Dean's List Count	Cohort Student Count	Dean's List Count	Cohort Student Count	Dean's List Count
2015FA	4,137	227	4,137	161	4,137	240	4,137	129	4,137	205
2016FA	3,979		3,979	215	3,979		3,979	165	3,979	219
2017FA	4,717		4,717		4,717		4,717	267	4,717	
2018FA	4,461		4,461		4,461		4,461		4,461	

Another necessary formatting step in any Web Intelligence report is to format fractions as percentages. If we replace the "*Dean's List Student Count*" in our crosstab with a calculation giving the proportion of students on the Dean's list by simply dividing the "*Dean's List Count*" by the overall "*Student Count*" we get a simple fractional decimal value, as below:



	2015FA		2016FA		2016SP	
	Cohort Student Count	Dean's List %	Cohort Student Count	Dean's List %	Cohort Student Count	Dean's List %
2015FA	4,137	0.05	4,137	0.04	4,137	0.06
2016FA	3,979		3,979	0.05	3,979	
2017FA	4,717		4,717		4,717	
2018FA	4,461		4,461		4,461	

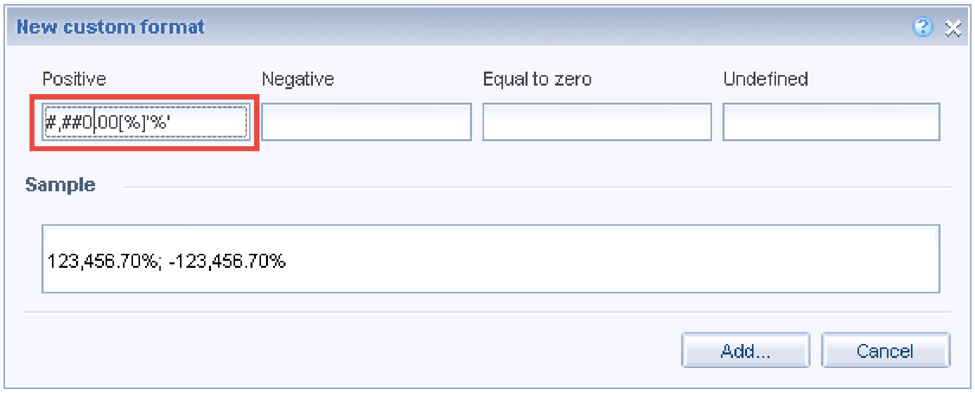
To format this value as a percentage, right click on the cell and select 'Format Number…' then select 'Percentage' from the left panel and select the available option under 'Sample' as follows:



123,456.70%; -123,456.70%

The default percentage presentation provided shows two digits to the right of the decimal point. If that is the representation you need, simply select that row in the selection list and click the 'OK' button. However, in many cases, this overstates the level of precision needed for your visualization.

To adjust this, select ‘Custom’ from the bottom left corner of the window, as seen outlined in red in the screenshot above, which opens the ‘New custom format’ sub-window:

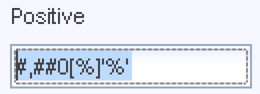


Positive	Negative	Equal to zero	Undefined
#,##0.00[%]'%'			

Sample

123,456.70%; -123,456.70%

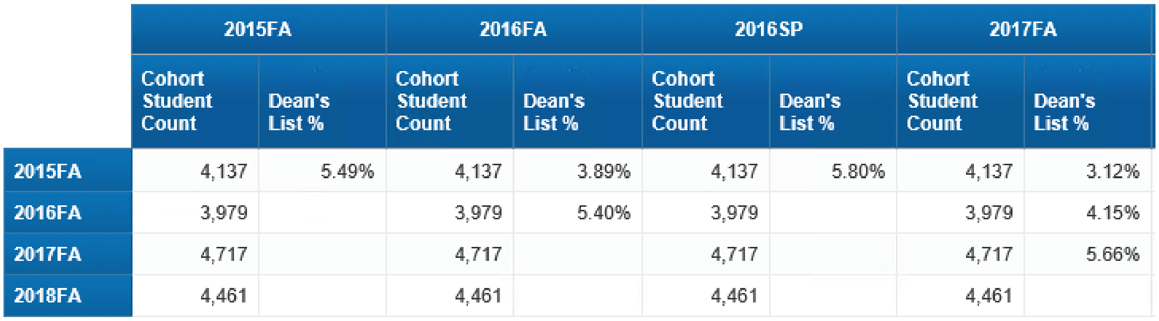
Adjust the template format in the highlighted box. To eliminate the decimal points, delete the ‘.00’ string in the format as follows:



Positive

#,##0[%]'%'

Click the ‘Add…’ button to add this altered format as a new custom format in your report, then click ‘OK’ to close the ‘Format Number’ window. The newly formatted field will now show as follows (with the appropriate adjustment to the column title):



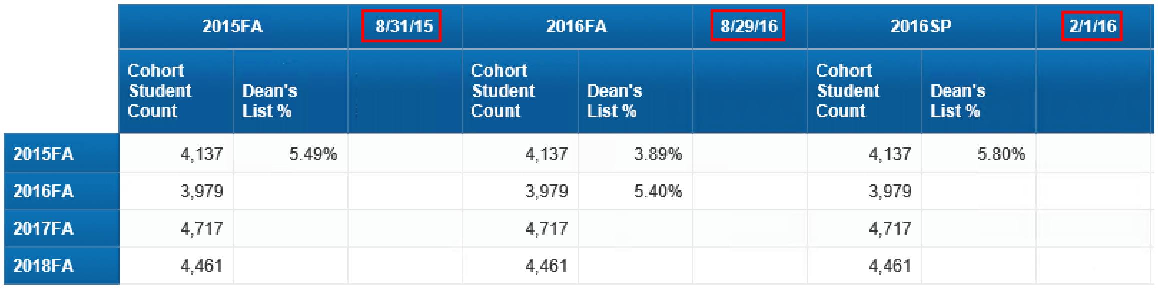
	2015FA		2016FA		2016SP		2017FA	
	Cohort Student Count	Dean's List %	Cohort Student Count	Dean's List %	Cohort Student Count	Dean's List %	Cohort Student Count	Dean's List %
2015FA	4,137	5.49%	4,137	3.89%	4,137	5.80%	4,137	3.12%
2016FA	3,979		3,979	5.40%	3,979		3,979	4.15%
2017FA	4,717		4,717		4,717		4,717	5.66%
2018FA	4,461		4,461		4,461		4,461	

Sorting Report Visualizations by Hidden Columns

Another extremely useful capability which Web Intelligence provides is the ability to sort a data visualization on a query object that does not appear in the report itself. In order to do this, we need to add the query object to the visualization and then hide it, so that it is available for sorting purposes but is not seen by the report user.

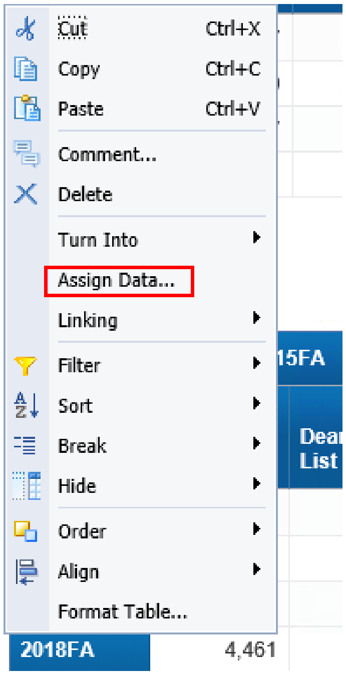
One issue with the report we have been building in this exercise is that the academic terms are not sorted correctly. The only truly chronological data value we have for the term representation is the “*Enrollment Term Start Date*”. Drag that object from the Enrollment Query

'Available Objects' data panel into the top row (merged cells) of the heading, next to the "*Enrollment Term*" object.

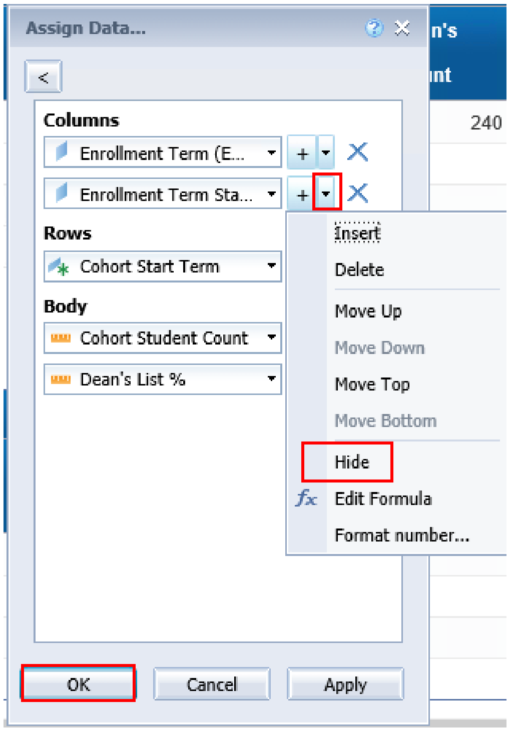


	2015FA		8/31/15	2016FA		8/29/16	2016SP		2/1/16
	Cohort Student Count	Dean's List %		Cohort Student Count	Dean's List %		Cohort Student Count	Dean's List %	
2015FA	4,137	5.49%		4,137	3.89%		4,137	5.80%	
2016FA	3,979			3,979	5.40%		3,979		
2017FA	4,717			4,717			4,717		
2018FA	4,461			4,461			4,461		

Right click on the border of the table and select 'Assign Data…' from the context menu.

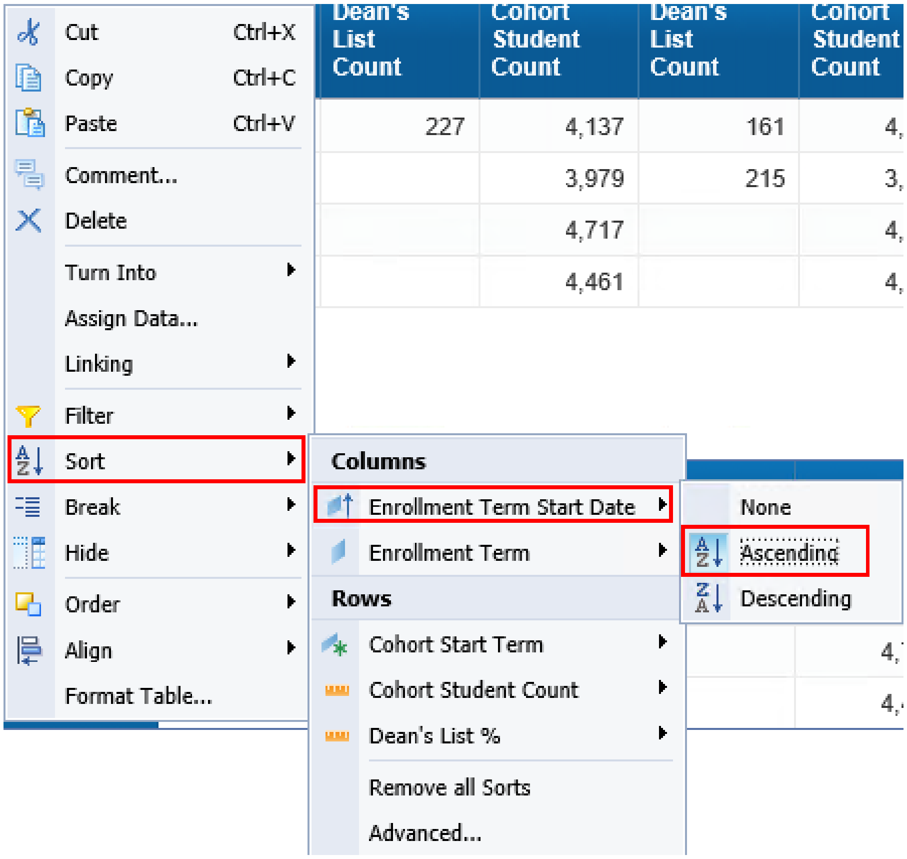


Click on the dropdown arrow next to "*Enrollment Term Start Date"* and select 'Hide' from the context menu. Notice that once you do that, "*Enrollment Term Start Date"* is grayed out, as in the screenshot below. Click 'OK' to finish.

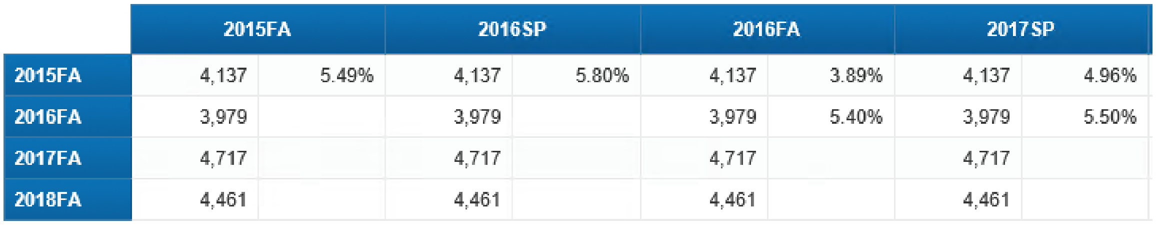


Columns
Enrollment Term (E...
Enrollment Term Sta...
Rows
Cohort Start Term
Body
Cohort Student Count
Dean's List %

The date is hidden from the table now, but the terms may still be out of order. Right click on the border of the table again and select ‘Sort’ → *“Enrollment Term Start Date”* → ‘Ascending’.



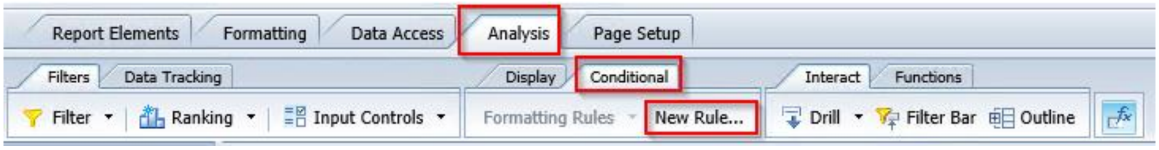
The terms should now display in chronological order, as shown below:



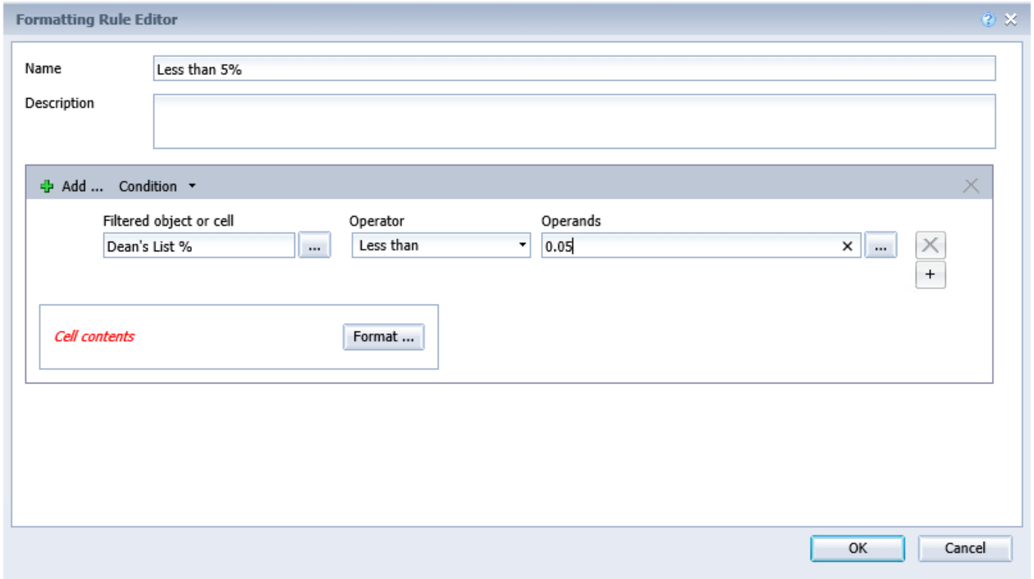
	2015FA		2016SP		2016FA		2017SP	
2015FA	4,137	5.49%	4,137	5.80%	4,137	3.89%	4,137	4.96%
2016FA	3,979		3,979		3,979	5.40%	3,979	5.50%
2017FA	4,717		4,717		4,717		4,717	
2018FA	4,461		4,461		4,461		4,461	

Conditional Formatting

There is a powerful feature in Web Intelligence called ‘Conditional Formatting’ that can be used to highlight data, change the colors or formatting of data based on certain conditions, or even display different data. We are going to use ‘Conditional Formatting’ to highlight the “*Dean’s List %*” when it drops below 5 percent and replace the value with text. Under the ‘Analysis’ tab, select the ‘Conditional’ sub-tab, and then click on ‘New Rule…’



In the ‘Formatting Rule Editor’ window, name the rule “*Less Than 5%*”. Click the ‘…’ next to *“Cell contents”* and select ‘Select object or variable’. From the ‘Available objects’ pop-up window, select “*Dean’s List Percentage”*. Select ‘Less than’ for the ‘Operator’. Type “0.05” in the “*Type a value*” ‘Operands’ box.



Name: Less than 5%

Description:

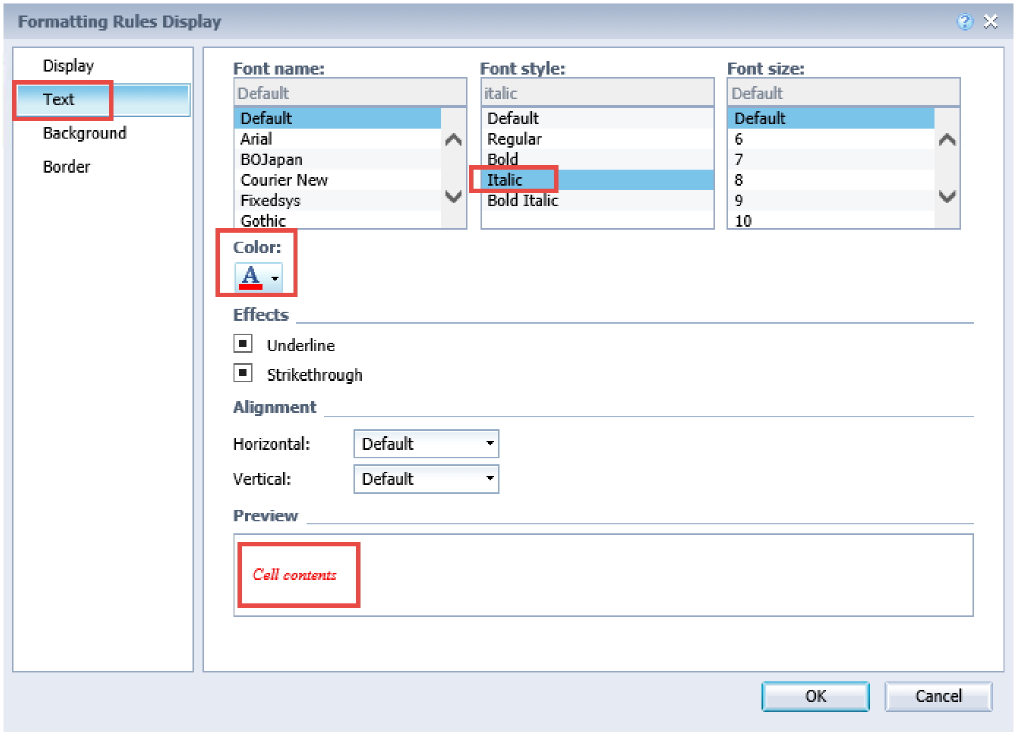
Filtered object or cell: Dean's List %

Operator: Less than

Operands: 0.05

Cell contents

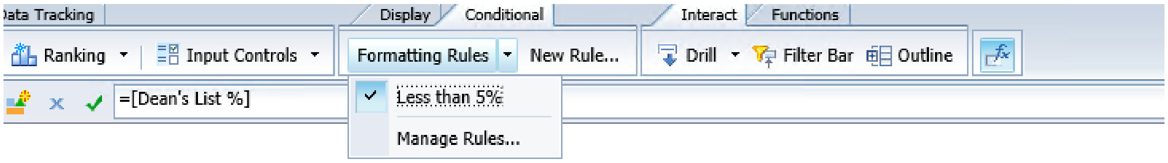
Click the 'Format…' button. Located on the left panel of the box, click on the 'Text' link. Select 'Italic for the 'Font Style'.



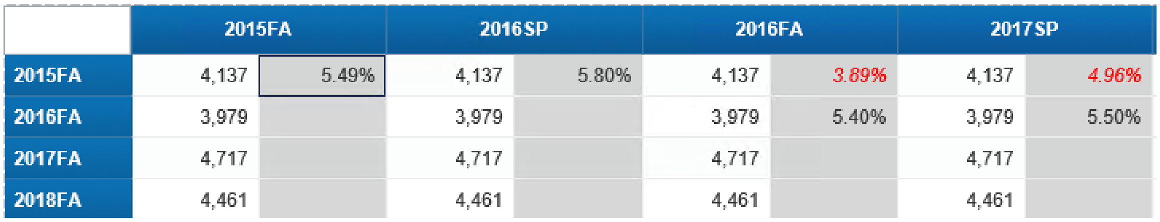
Formatting Rules Display

Click 'OK' to on the 'Formatting Rules Display' and 'OK' again on the 'Formatting Rule Editor' to finish.

Now we must apply this formatting rule to the "*Dean's List %*" cells. Highlight the "*Dean's List %*" column on the table. Click the 'Formatting Rules' button again and you should see a check box beside the new "*Less Than 5%*" format rule. Click the check box to apply. The resulting report looks like the following, with all percentages less than 5% are italicized with red text.



=[Dean's List %]



	2015FA		2016SP		2016FA		2017SP	
2015FA	4,137	5.49%	4,137	5.80%	4,137	*3.89%*	4,137	*4.96%*
2016FA	3,979		3,979		3,979	5.40%	3,979	5.50%
2017FA	4,717		4,717		4,717		4,717	
2018FA	4,461		4,461		4,461		4,461	

Hands-on Learning Objective

At the end of this section, you will be able to create a new calculated measure, modify the layout of the table to include this in a new row or column, and improve the sorting and display of chronological data.

High Level Overview

1. Create new report variables called "*Orig Cohort Count*" and *"Pct of Orig Enrollment"*
2. Add the new variables to the report table as either a row or column
3. Add and hide the "*Enrollment Term Start Date*" object to the table in order to sort terms chronologically
4. Add a conditional formatting rule to highlight when the "*Pct of Orig Enrollment*" drops below 30%
5. Save the report

Practice Steps

STEP 1: Open the "*Retention Report*" Web Intelligence document and make sure you are working with the "*Retention Rate Summary*" report tab.

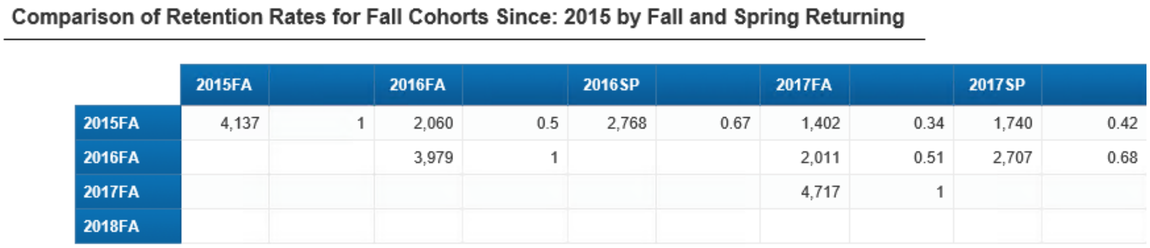
STEP 2: Create a new report variable called "*Cohort Student Count*". This new variable should count the number of students in the "Cohort Query". The formula for this variable should be:

=Count([Cohort Query].[Student ID])

STEP 3: Create a new measure variable called "*Pct of Orig Enrollment*" which calculates the percentage of the current student enrollment as a proportion of the original count of students in the cohort. Ensure that the formula checks to see if the denominator (the original cohort count) is greater than 0. The formula for this variable is:

=If [Cohort Student Count] = 0 Then 0 Else [Student Enrollment Count]/[Cohort Student Count]

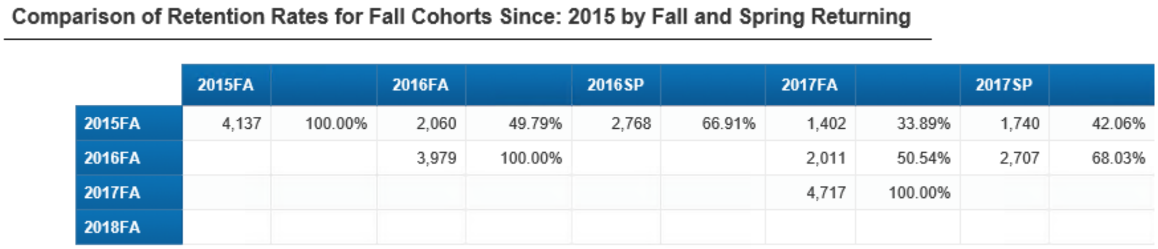
STEP 4: Add the new "*Pct of Orig Enrollment*" to the crosstab next to the "S*tudent Enrollment Count*" measure. Notice how the value is *not* formatted as a percentage.



Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016FA		2016SP		2017FA		2017SP	
2015FA	4,137	1	2,060	0.5	2,768	0.67	1,402	0.34	1,740	0.42
2016FA			3,979	1			2,011	0.51	2,707	0.68
2017FA							4,717	1		
2018FA										

STEP 5: Change the cell formatting for the new column to be a percentage with 2 decimal places. Your report should look like this:

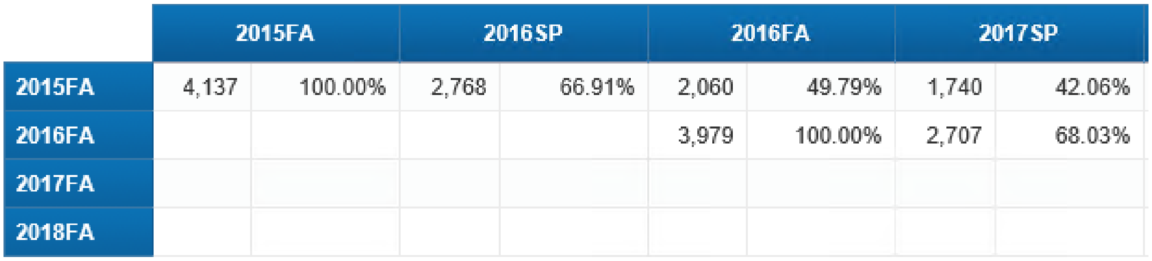


Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016FA		2016SP		2017FA		2017SP	
2015FA	4,137	100.00%	2,060	49.79%	2,768	66.91%	1,402	33.89%	1,740	42.06%
2016FA			3,979	100.00%			2,011	50.54%	2,707	68.03%
2017FA							4,717	100.00%		
2018FA										

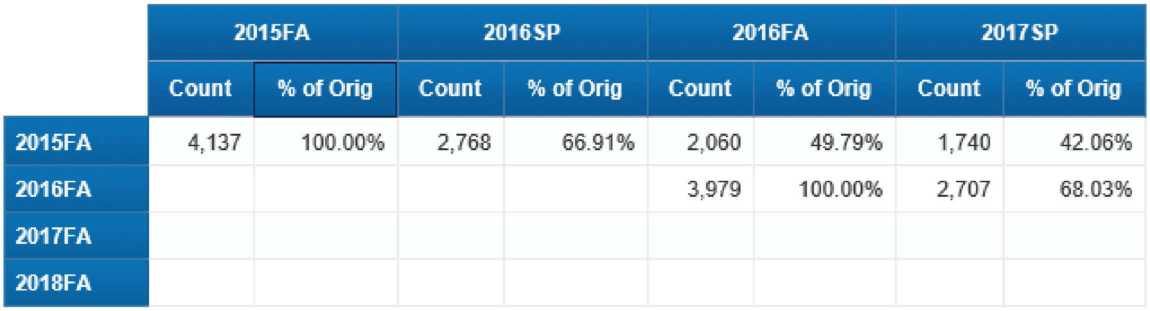
STEP 6: Merge the two cells representing the "*Enrollment Term*" query object in the top axis of the crosstab. Center the text in the merged cell.

STEP 7: Add the "*Enrollment Term Start Date*" to the top axis of the crosstab and then hide it. Sort by this new field so the terms will appear in their correct order on the axis:



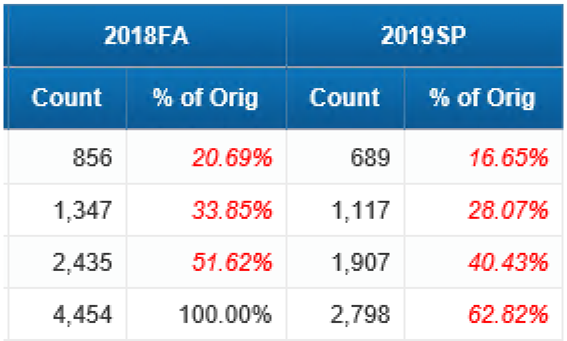
	2015FA		2016SP		2016FA		2017SP	
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%
2016FA					3,979	100.00%	2,707	68.03%
2017FA								
2018FA								

STEP 8: Add column headings for the student count and percentage of the original cohort displayed on the table. Use the text "*Count"* and *"% of Orig"* for these headers. At this point, your report should look like the following screen shot:



	2015FA		2016SP		2016FA		2017SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%
2016FA					3,979	100.00%	2,707	68.03%
2017FA								
2018FA								

STEP 9: Add conditional formatting to your report so that all cells where the *"% of Orig"* measure is less than 65 percent will display the text in red italics. Check the term columns on the crosstab for recent years, which should look something like this, since the retention rates will drop over time:



2018FA		2019SP	
Count	% of Orig	Count	% of Orig
856	*20.69%*	689	*16.65%*
1,347	*33.85%*	1,117	*28.07%*
2,435	*51.62%*	1,907	*40.43%*
4,454	100.00%	2,798	*62.82%*

STEP 10: Click the 'Save' button on the Web Intelligence document to save the latest changes in your 'My Favorites' folder with the name given earlier in the first exercise.

ADDING A CHART

Now that we have our crosstab created and styled, we want to provide a graphic representation of the data to go along with the tabular presentation. This will help end-users better visualize what is going on with retention over time.

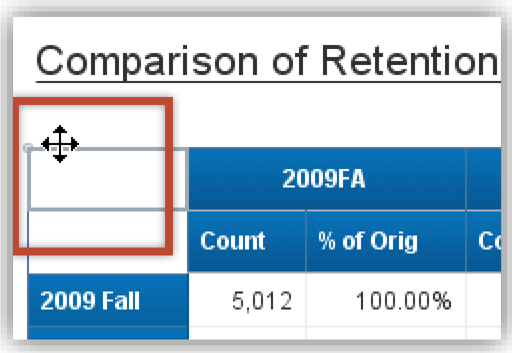
This lesson will introduce the following techniques:

- Arranging multiple visualizations on a single report tab and defining their position relative to one another
- Creating and formatting chart visualizations of data

Working with Multiple Reporting Visualizations on a Single Report Tab

The simplest way to create a new visualization of an existing set of data on an existing report tab is to simply copy one that is already there. As an example of how to do this, we will simply copy the crosstab visualization from the previous exercise.

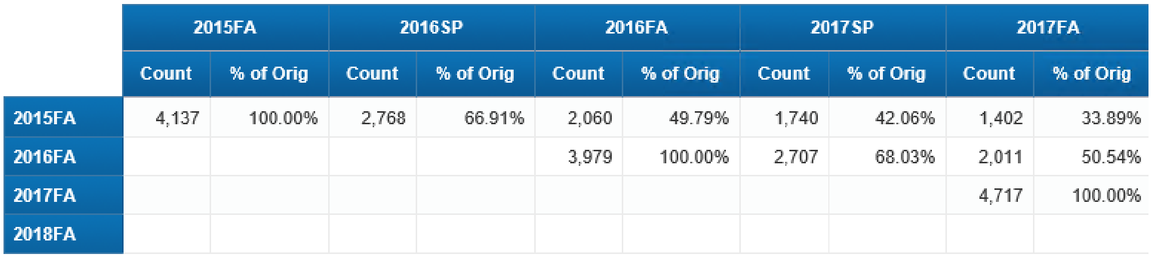
First, select the border of the crosstab to select the table. Ensure the entire border is highlighted in grey and that the cross arrows appear.



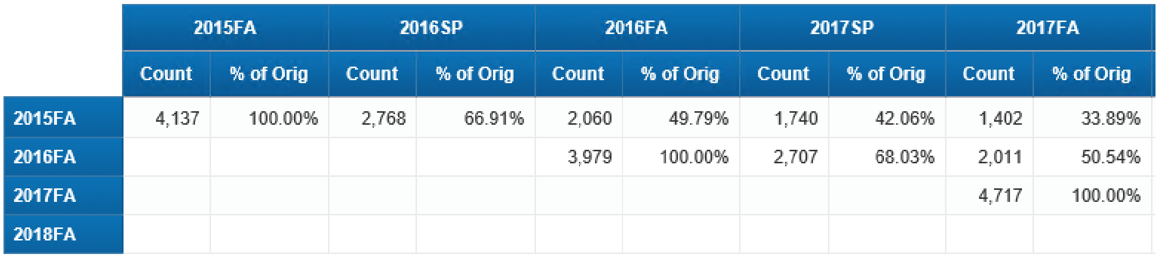
Comparison of Retention

	2009FA		
	Count	% of Orig	Co
2009 Fall	5,012	100.00%	

Right click on the selected border and choose ‘Copy’ from the context menu. Below the table in an open space of the report page, right click and select ‘Paste’. The table should now be repeated below.

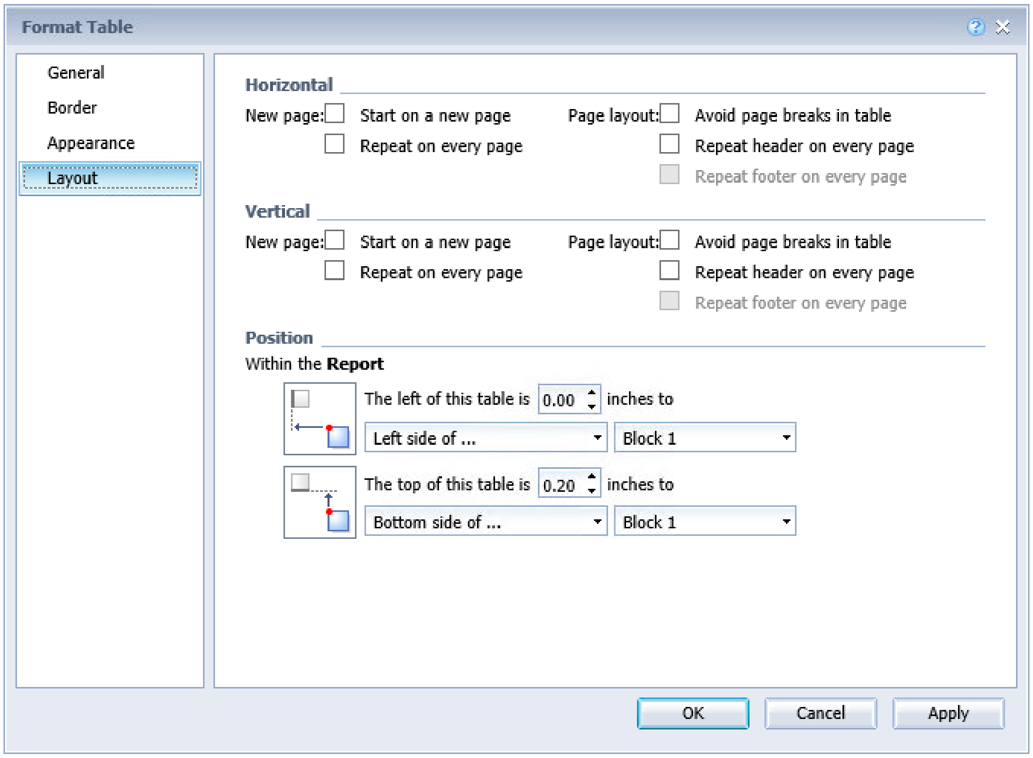


	2015FA		2016SP		2016FA		2017SP		2017FA	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%	1,402	33.89%
2016FA					3,979	100.00%	2,707	68.03%	2,011	50.54%
2017FA									4,717	100.00%
2018FA										



	2015FA		2016SP		2016FA		2017SP		2017FA	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%	1,402	33.89%
2016FA					3,979	100.00%	2,707	68.03%	2,011	50.54%
2017FA									4,717	100.00%
2018FA										

First, we are going to position it relative to the table above so that they will always be the same relative distance from each other. Right click on the border of the second table and select 'Align' → 'Relative Position' from the context menu. A dialog box should appear as shown below:



Format Table

General
Border
Appearance
Layout

Horizontal

New page: □ Start on a new page Page layout: □ Avoid page breaks in table

□ Repeat on every page □ Repeat header on every page

□ Repeat footer on every page

Vertical

New page: □ Start on a new page Page layout: □ Avoid page breaks in table

□ Repeat on every page □ Repeat header on every page

□ Repeat footer on every page

Position

Within the **Report**

The left of this table is 0.00 inches to Left side of ... Block 1

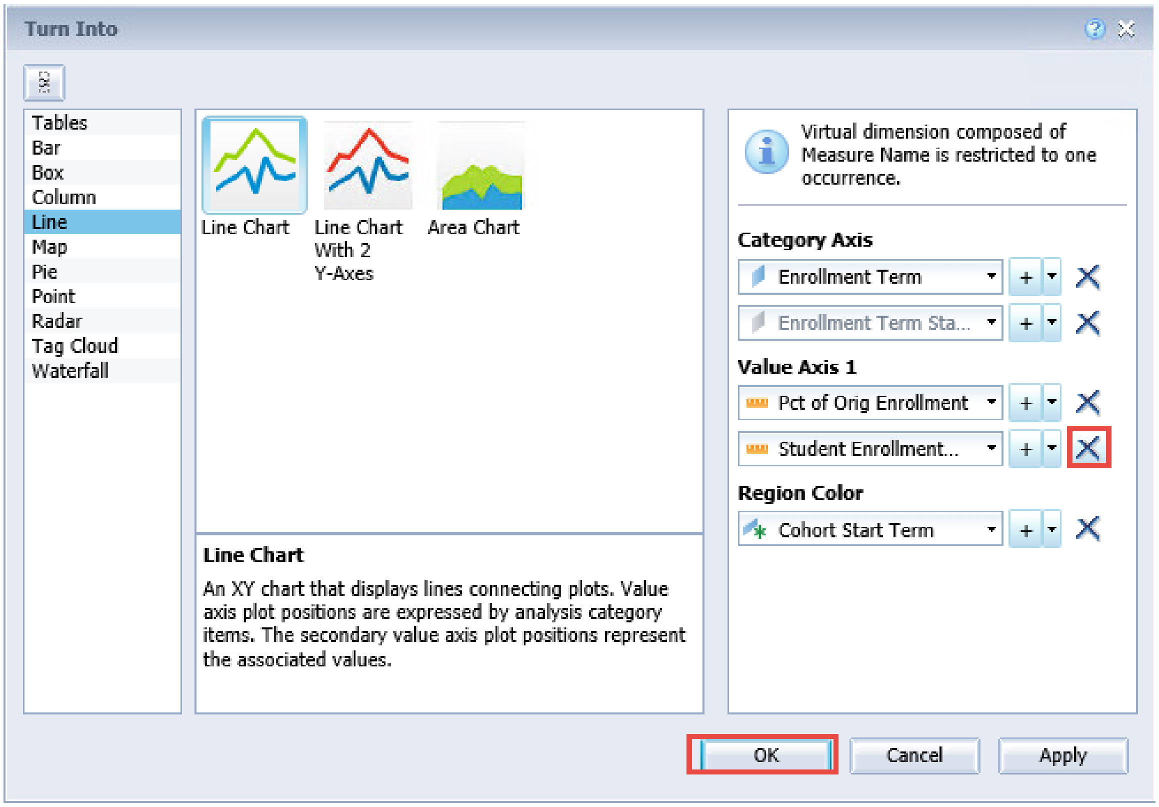
The top of this table is 0.20 inches to Bottom side of ... Block 1

Make the second duplicated table object 0 inches from the 'Left side of' *"Block 1"* (the original table) and .2 inches from the 'Bottom side of' *"Block 1"*. Click 'OK'.

Creating and Formatting Charts in Web Intelligence

As we have seen when creating crosstabs, charts can either be created from scratch or can be created by transforming an existing tabular representation into a graphic one. This lesson will use the latter technique, starting with the duplicate crosstab created and positioned in the previous example.

Right click on the border of the second table and select 'Turn Into'. From the selection pop up window, select the 'More Transformations' charts tab. Select the 'Line' ribbon. Under 'Value Axis 1' delete the *"Student Enrollment Count"* by clicking on the 'X' next to it. Then click 'OK'.



Virtual dimension composed of Measure Name is restricted to one occurrence.

Category Axis

- Enrollment Term
- Enrollment Term Sta...

Value Axis 1

- Pct of Orig Enrollment
- Student Enrollment...

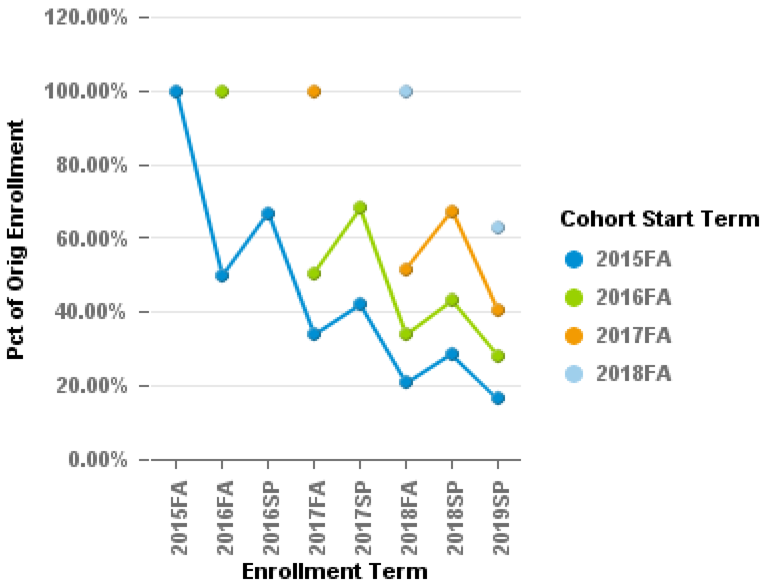
Region Color

- Cohort Start Term

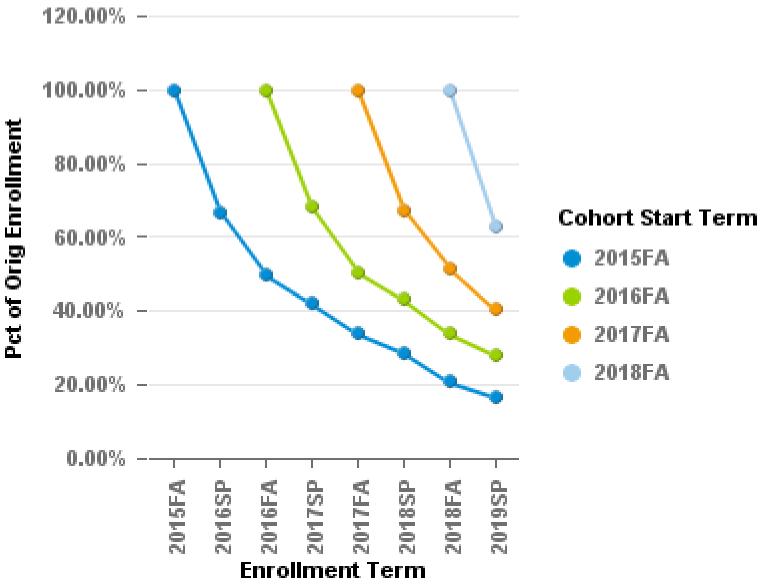
Line Chart

An XY chart that displays lines connecting plots. Value axis plot positions are expressed by analysis category items. The secondary value axis plot positions represent the associated values.

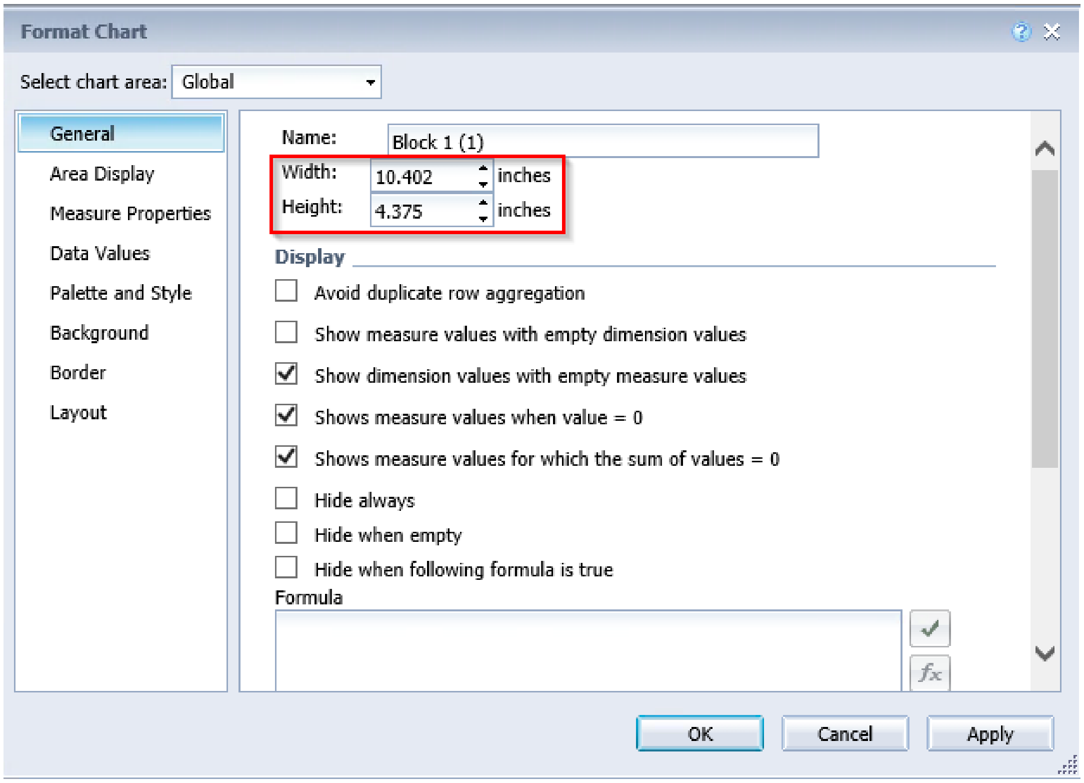
Your chart should look similar to the image below:



You may have noticed that the terms are out of chronological order on the chart. Select the chart and then select ‘Sort’ → “*Enrollment Term Start Date*” → ‘Ascending’. Now the chart should make more sense:



You can resize the chart by selecting on the right edge and top/bottom and expanding the chart to the desired width and height. You can also change the size by right-clicking on the chart and selecting ‘Format Chart’ → ‘Global’ → ‘General’ and then specifying the ‘Width’ and ‘Height’.



Select chart area: Global

Name: Block 1 (1)

Width: 10.402 inches

Height: 4.375 inches

□ Avoid duplicate row aggregation

□ Show measure values with empty dimension values

☑ Show dimension values with empty measure values

☑ Shows measure values when value = 0

☑ Shows measure values for which the sum of values = 0

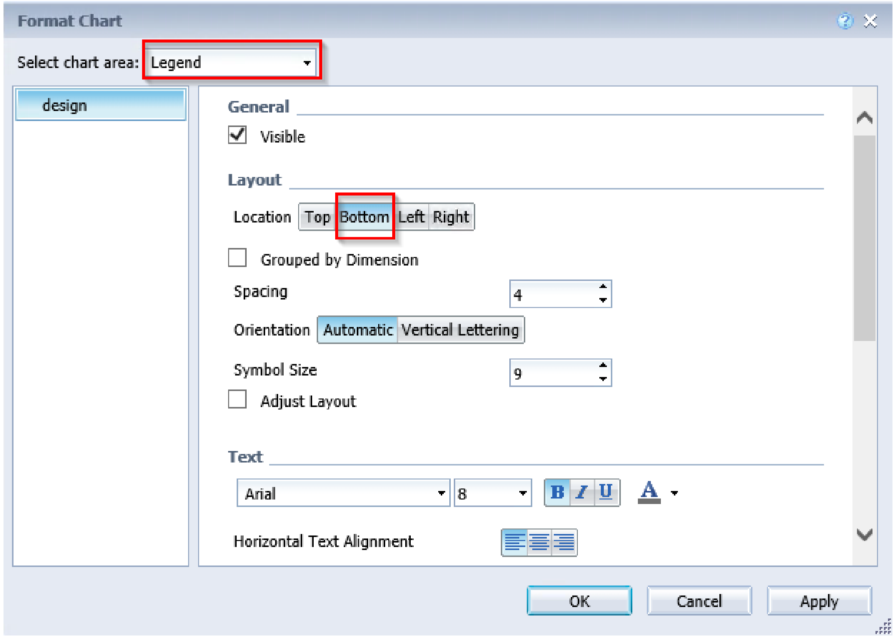
□ Hide always

□ Hide when empty

□ Hide when following formula is true

There are a number of basic changes you can make to the chart on the '<u>Format Chart</u>' window to improve its formatting:

- You can move the chart legend to the bottom of the chart. Select '<u>Legend</u>' → '<u>Design</u>' → '<u>Layout</u>' and change the '<u>Location</u>' to '<u>Bottom</u>'.



Select chart area: Legend

☑ Visible

Location: Bottom

□ Grouped by Dimension

Spacing 4

Orientation Automatic

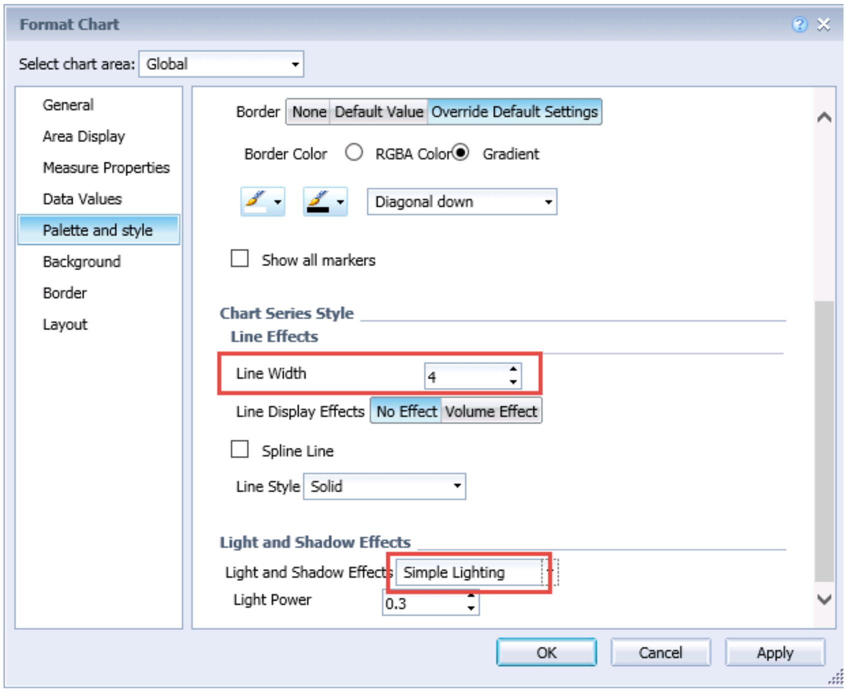
Symbol Size 9

□ Adjust Layout

Arial 8

Horizontal Text Alignment

- You can also style the lines of the chart. Select ‘Global’ → ’Palette and Style’ and change the ‘Line Width’ to “*4*” and ‘Light and Shadow Effects’ to ‘Simple Lighting’.


Format Chart

Select chart area: Global

Border: None | Default Value | Override Default Settings

Border Color ○ RGBA Color ● Gradient

Diagonal down

□ Show all markers

Chart Series Style

Line Effects

Line Width: 4

Line Display Effects: No Effect | Volume Effect

□ Spline Line

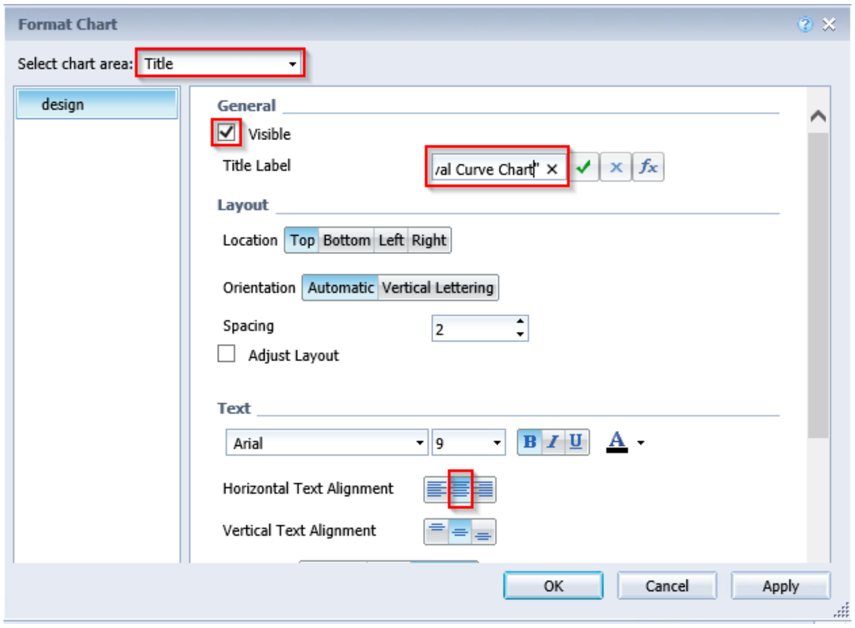
Line Style: Solid

Light and Shadow Effects

Light and Shadow Effects: Simple Lighting

Light Power: 0.3

- To change the title of the chart, select ‘Title’ → ‘Design’. Check the ‘Visible’ box, change the ‘Title Label’ to “*Survival Curve Chart”* and center the title by selecting the center “button.


Format Chart

Select chart area: Title

General

☑ Visible

Title Label: /al Curve Chart

Layout

Location: Top | Bottom | Left | Right

Orientation: Automatic | Vertical Lettering

Spacing: 2

□ Adjust Layout

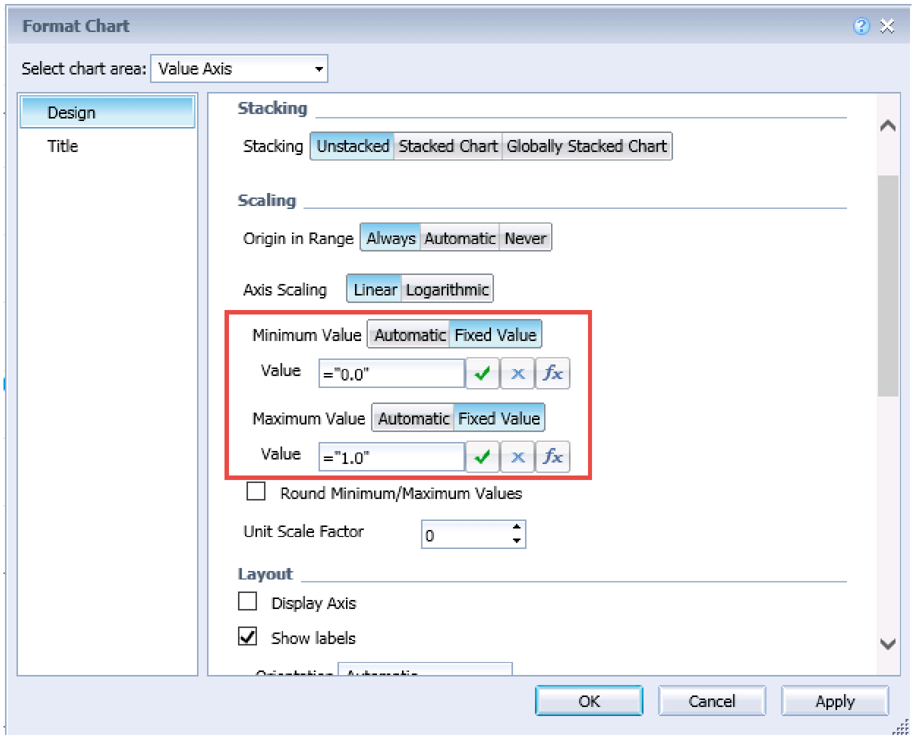
Text

Arial 9 B I U A

Horizontal Text Alignment

Vertical Text Alignment

- Since we would not want the chart to ever go above 100% (and most people want to see scaling starting at 0), change the automatic nature of the value axis scale. Select 'Value Axis' → 'Design' → 'Minimum Value' → 'Fixed Value' and set it to "*0.0*". For 'Maximum Value', also select 'Fixed Value' set it to "*1.0*".



Format Chart

Select chart area: Value Axis

Design
Title
Stacking
Stacking Unstacked Stacked Chart Globally Stacked Chart
Scaling
Origin in Range Always Automatic Never
Axis Scaling Linear Logarithmic

Minimum Value: Fixed Value

Value ="0.0"

Maximum Value: Fixed Value

Value ="1.0"

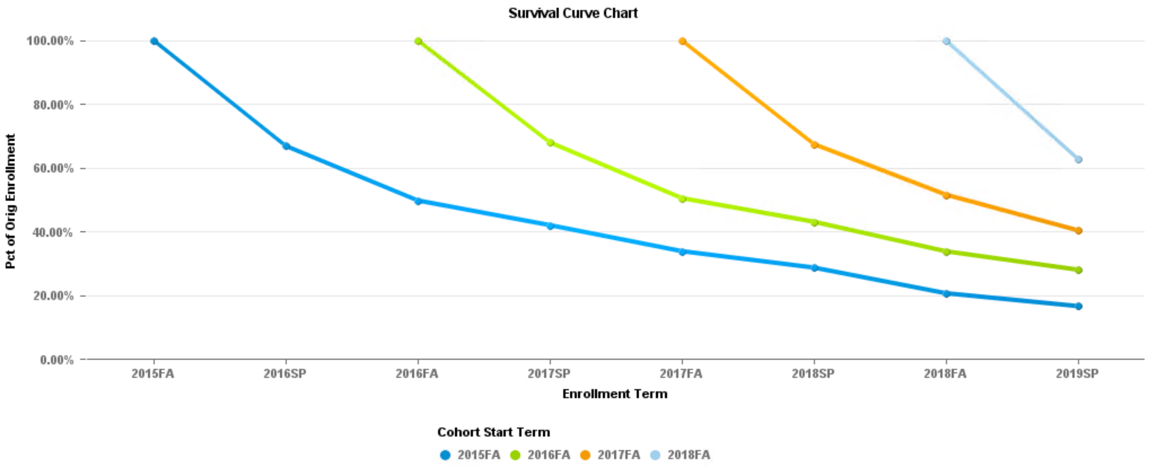
☐ Round Minimum/Maximum Values

Unit Scale Factor 0

☐ Display Axis

☑ Show labels

Click 'OK'. The chart now appears as below. As you can see, Web Intelligence allows a considerable amount of control over data visualizations.



Hands-on Exercise Learning Objective

At the end of this section you will know how to create a data visualization starting with a crosstab.

High Level Overview

1. Copy the crosstab
2. Turn it into a line chart
3. Format the chart
4. Save the document

Practice Steps

STEP 1: Open the "*Retention Report*" Web Intelligence document and make sure you are working with the "*Retention Rate Summary*" report tab.

STEP 2: Make a copy of the crosstab and place it below the existing crosstab.

STEP 3: Position the newly created crosstab aligned to the left edge of the existing one and exactly 0.2 inches below it.

STEP 4: Change the existing crosstab into a chart using the 'Turn To' drop-down menu selection. When doing this, remove the "*Student Enrollment Count*" object from the Value Axis.

STEP 5: Sort the chart according ascending values of the "*Enrollment Term Start Date*".

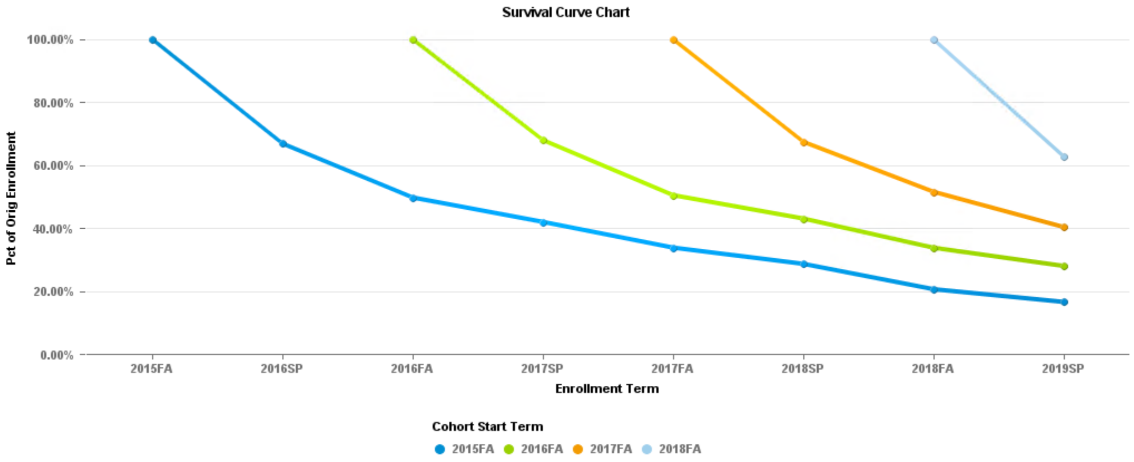
STEP 6: Resize the chart, making it wider and taller so that it is easier to differentiate the slope of each of the chart lines representing the retention survival curve for each cohort.

STEP 7: Move the chart legend to the bottom of the chart.

STEP 8: Style the lines of the chart to set the line width to "4" and the light and shadow effects to Simple Lighting'.

STEP 9: Change the title to be "*Survival Curve Chart"* and center the title by selecting the center button.

STEP 10: Since we would not want the chart to ever go above 100% (and most people want to see scaling starting at 0), change the value axis scaling to be manual for both maximum and minimum. Set the fixed minimum at “0.0” and the maximum at “1.0”. After all these changes, your chart should now look similar to the image below:



STEP 11: Click the ‘Save’ button on the Web Intelligence document to save the latest changes in your ‘My Favorites’ folder with the name given earlier in the first exercise.

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FILTERING DATA FROM MULTIPLE QUERIES

There is an additional consideration when displaying data from multiple queries. The behavior of report filters may not be as expected. Understanding the behavior of the Web Intelligence tool can help ensure correct display of data and getting the expected results. There are, in fact, other considerations such as the behavior of automatically aggregating measures, but they are beyond the scope of this report example and training.

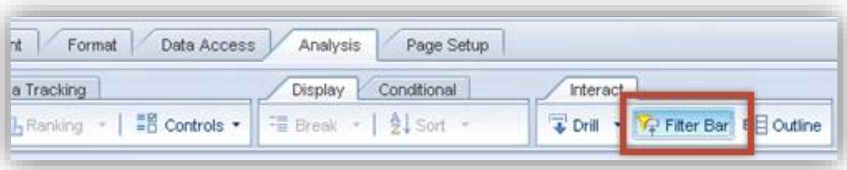
The following specific techniques are addressed in this section:

- Creating detail objects for multi-query report filtering
- Advanced filtering with input controls

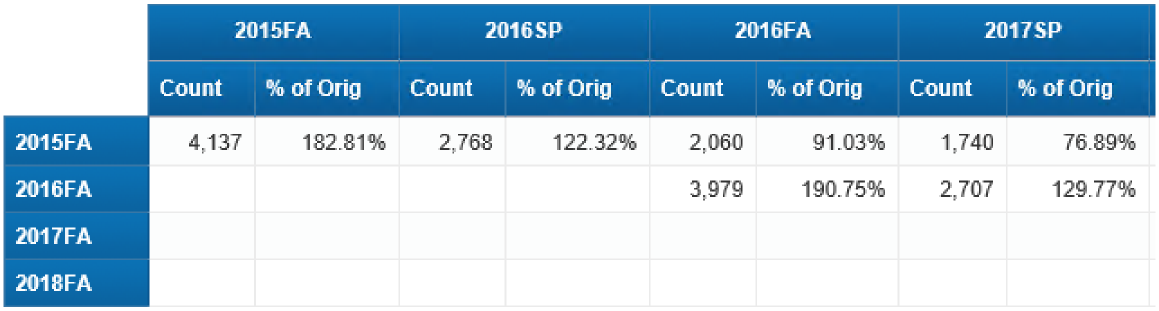
Creating Detail Objects for Multi-query Report Filtering

We have previously seen that providing drop-down filters on the report filter bar provides report users with a simple but powerful analytic capability. However, when working with multi-query reports, there are some additional considerations that need to be taken into account when thinking about using this capability.

To see this, turn on the filter bar in the report by navigating to the '<u>Analysis</u>' tab → '<u>Interact</u>' sub-tab and select the '<u>Filter Bar</u>'.

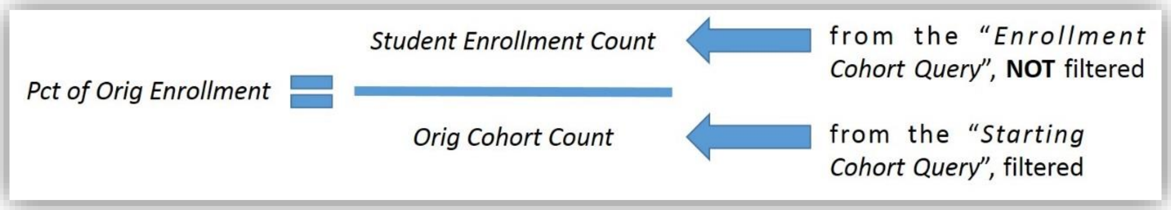


Add the "*Gender Desc*" dimension from the drop-down in the Filter Bar and select one of the values. You will see that the percentages no longer make sense and the counts have not changed at all:



	2015FA		2016SP		2016FA		2017SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	182.81%	2,768	122.32%	2,060	91.03%	1,740	76.89%
2016FA					3,979	190.75%	2,707	129.77%
2017FA								
2018FA								

“*Gender Desc*” comes from the “Cohort Query” while the *“Student Enrollment Count”* comes from the “*Enrollment Query*”, so the filter from one query has no effect on the measure from another. However, the filter *does* affect the “*Cohort Student Count*”, which comes from the same “Cohort Query” as “*Gender Desc*”. This is why we see an illogical jump in the percentages – the top half of the equation is not filtered and the bottom half is filtered.



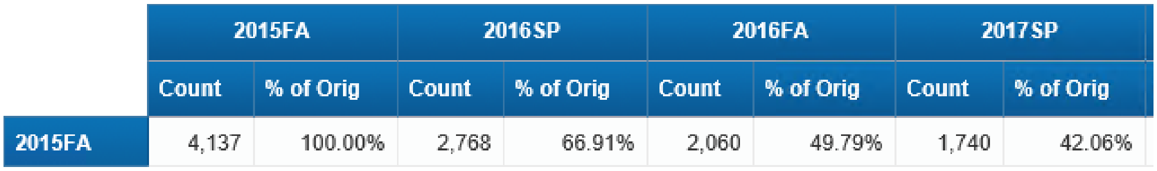
Pct of Orig Enrollment = *Student Enrollment Count* / *Orig Cohort Count*

Student Enrollment Count ← from the “*Enrollment Cohort Query*”, **NOT** filtered

Orig Cohort Count ← from the “*Starting Cohort Query*”, filtered

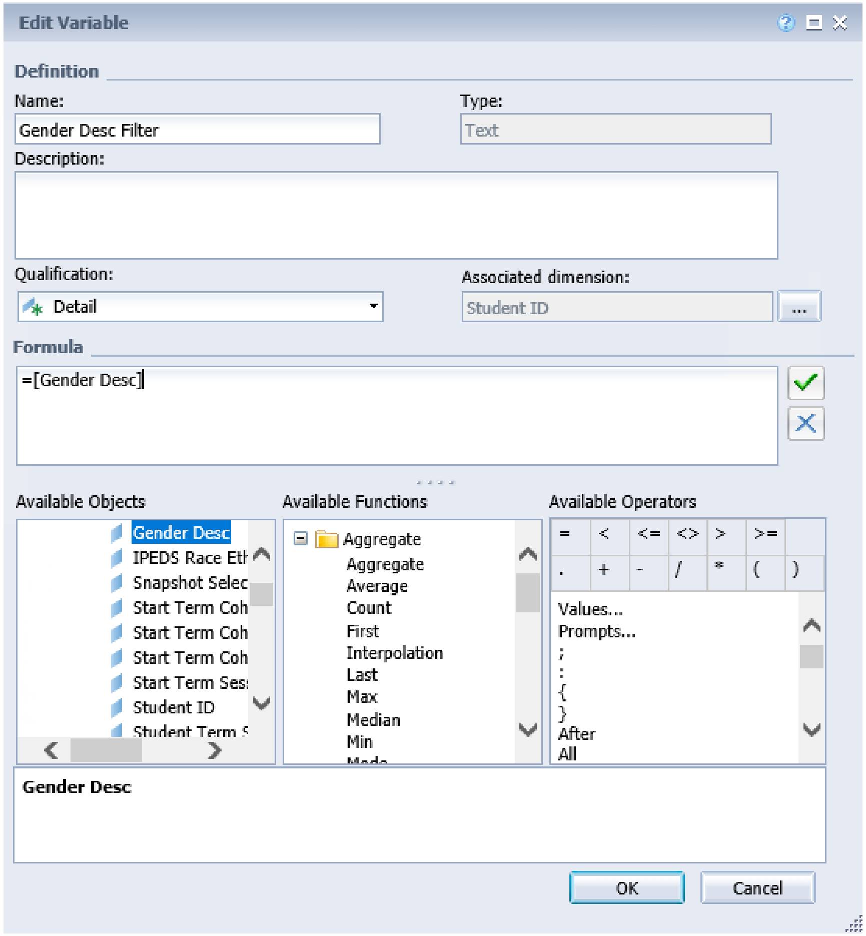
The “*Cohort Student Count*” is reduced by roughly half when filtered to one gender, while the “*Student Enrollment Count*” stays the same and now we have impossibly high percentages. It is important to note this problem, because Web Intelligence does not create an error here – it filters only on the query objects that match the query filter and counts on the human report builder to know if that makes sense or not.

How do we solve this? We already have a merged “*Student ID*” between the two queries, but we still need to explicitly define the relationship between gender and the student for Web Intelligence. Just like we did with “*Cohort Start Term*”, we need to create a ‘Detail’. Notice that if you add “*Cohort Start Term*” to the filter bar and select a term, it effectively filters the report:



	2015FA		2016SP		2016FA		2017SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%

To add a detail, create a variable with the name “*Gender Desc Filter*”. As with the other details you have created, click the ‘...’ ellipsis button next to the ‘Associated Dimension’ box, and select the “*Student ID*” object towards the bottom of the list. Note that it is essential to select the merged dimension object name and not the Student ID object(s) underneath in the hierarchy when the plus sign is expanded. Select the “*Gender Desc*” as the formula for the variable, as below:



Edit Variable

Definition

Name: Gender Desc Filter

Type: Text

Description:

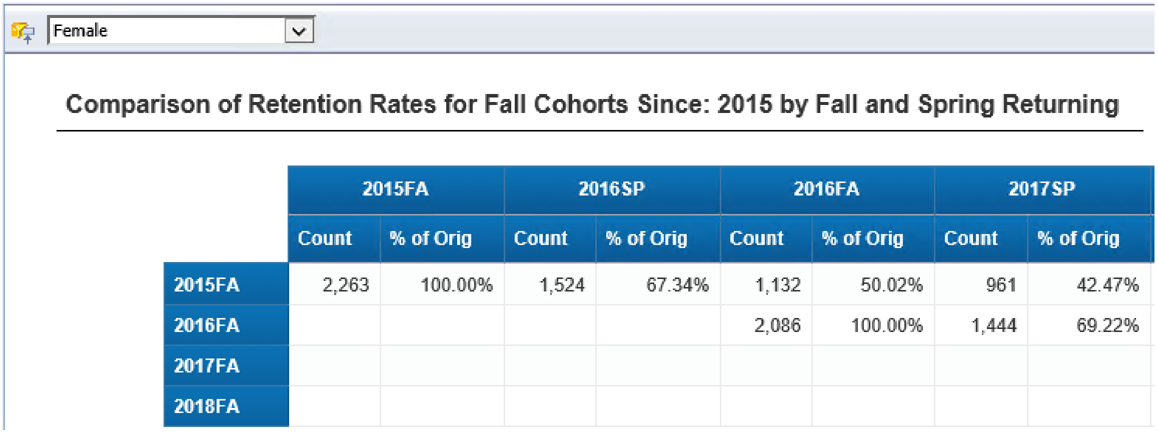
Qualification: Detail

Associated dimension: Student ID

Formula

=[Gender Desc]

Now add the new newly created “*Gender Desc Filter*” object you have created onto the ‘Filter Bar’. Select one of the values and observe the result:



Female

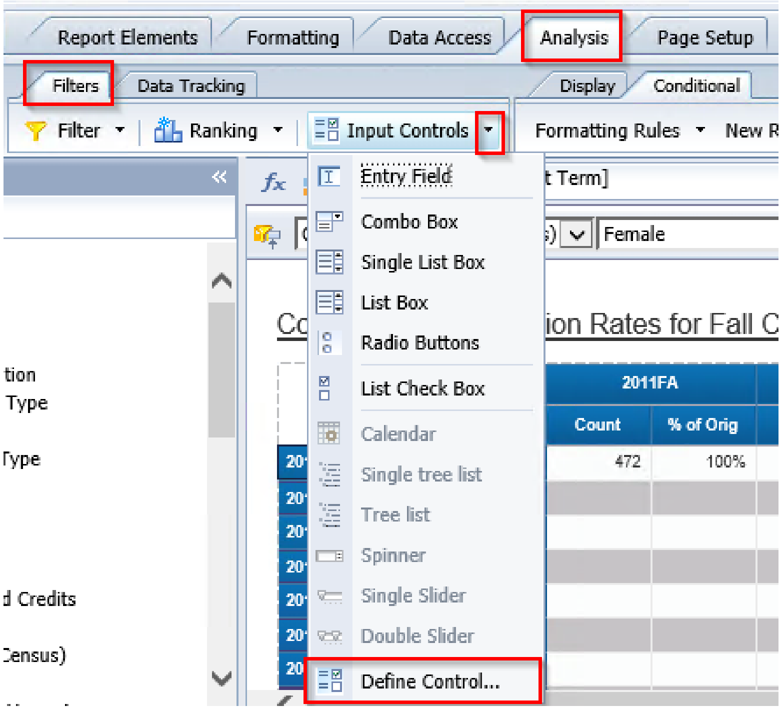
Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016SP		2016FA		2017SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	2,263	100.00%	1,524	67.34%	1,132	50.02%	961	42.47%
2016FA					2,086	100.00%	1,444	69.22%
2017FA								
2018FA								

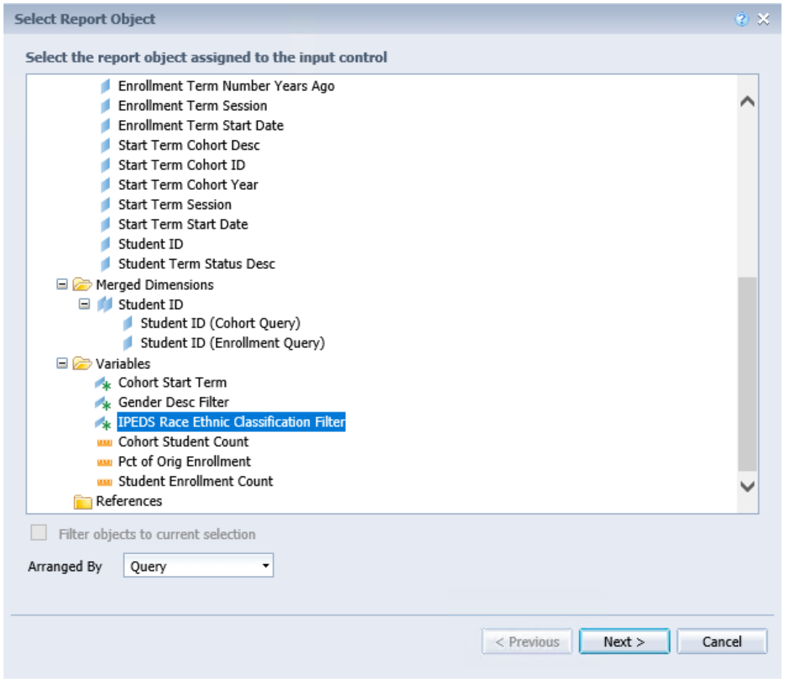
Advanced Filtering with Input Controls

The ‘Filter Bar’ is a useful option to select a single value of a dimension. It can also be used in combination with other dimensions to create “and” conditions of a single value. However, there are times when it may be useful to select multiple dimension values for a filter. Web Intelligence has a feature called ‘Input Controls’ to allow selection of multiple dimension values for filtering.

To create an input control to filter the report by “*IPEDS Race Ethnic Classification*” query object, we first need to create a detail variable called “*IPEDS Race Ethnic Classification Filter*” in exactly the same way we created the “*Gender Desc Filter*” above. Note that just as with a drop-down filter, we need to create a detail to filter so that it will filter the contents of both report queries. After having done this, and with the “*Retention Rate Summary*” report tab active, navigate to ‘Analysis’ → ‘Filters’ and click the ‘Input Controls’ down arrow. Select ‘Define Control’ from the context menu.



In the dialog box, select “*IPEDS Race Ethnic Classification Filter*” (make sure you select the detail variable filter and not the original query object, which will appear first in the list) and click ‘Next’.



Select Report Object

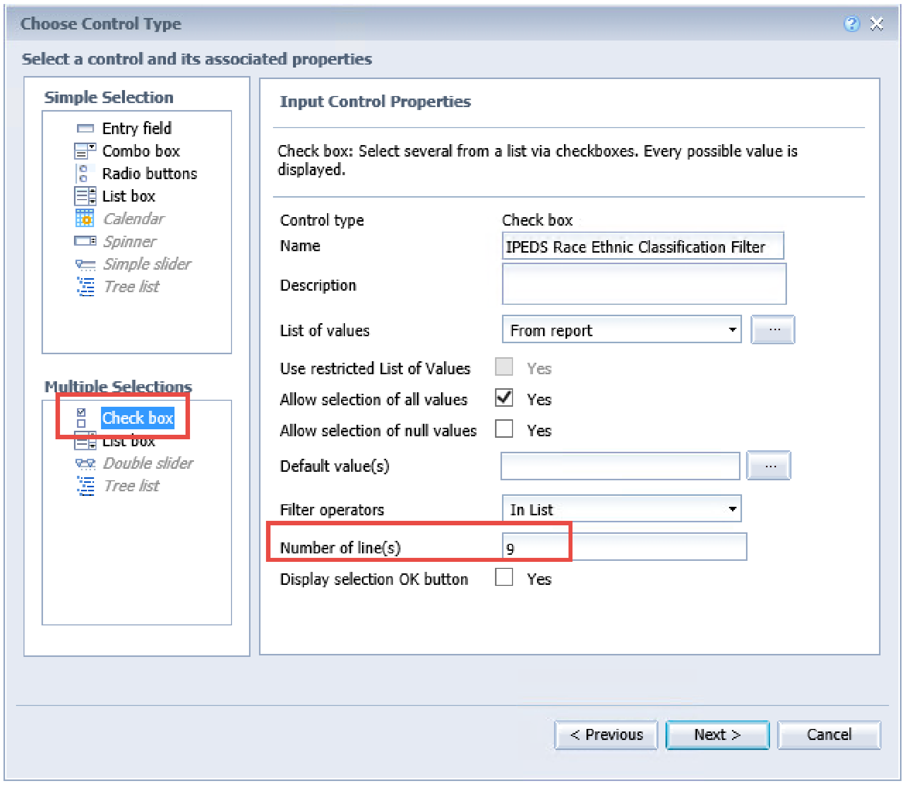
Select the report object assigned to the input control

- Enrollment Term Number Years Ago
- Enrollment Term Session
- Enrollment Term Start Date
- Start Term Cohort Desc
- Start Term Cohort ID
- Start Term Cohort Year
- Start Term Session
- Start Term Start Date
- Student ID
- Student Term Status Desc
- Merged Dimensions
  - Student ID
    - Student ID (Cohort Query)
    - Student ID (Enrollment Query)
- Variables
  - Cohort Start Term
  - Gender Desc Filter
  - IPEDS Race Ethnic Classification Filter
  - Cohort Student Count
  - Pct of Orig Enrollment
  - Student Enrollment Count
- References

□ Filter objects to current selection

Arranged By: Query

Under ‘Multiple Selections’, select the ‘Check box’ option for the control type.



Choose Control Type

Select a control and its associated properties

Input Control Properties

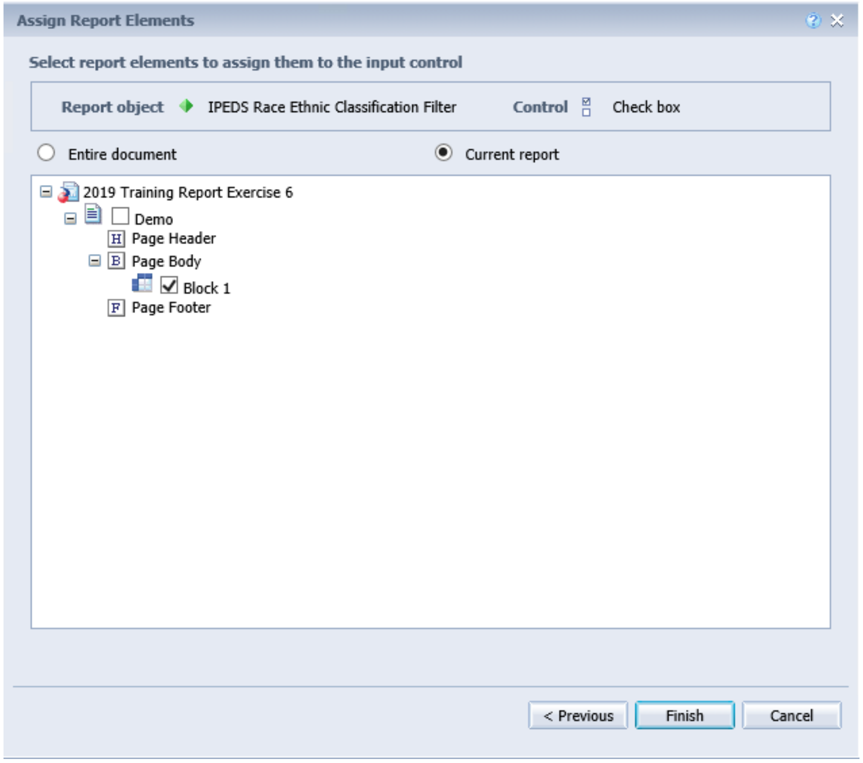
Check box: Select several from a list via checkboxes. Every possible value is displayed.

Control type	Check box
Name	IPEDS Race Ethnic Classification Filter
Description	
List of values	From report
Use restricted List of Values	□ Yes
Allow selection of all values	☑ Yes
Allow selection of null values	□ Yes
Default value(s)	
Filter operators	In List
Number of line(s)	9
Display selection OK button	□ Yes

In the ‘Input control properties’ box in the same window, change the number of lines if desired. The default is five lines, but if you know there are more possible values for the filter than that, you can increase the number to avoid having to scroll through the list. For this example, if the

IPEDS object has eight possible values and input controls include a default 'Select All' option, choose "*9*" for the number of lines. Click 'Next'.

Select the report element(s) to which this control applies. This is another powerful feature of 'Input Controls'. You can apply the filter ONLY to the table and see the selected values compared to all unfiltered values in the chart. Or you could have two comparative tables side by side, one filtered, one not. You can also apply it to the whole report body. Uncheck 'Page Body', select 'Block 1' and then click 'Finish'.



Assign Report Elements

Select report elements to assign them to the input control

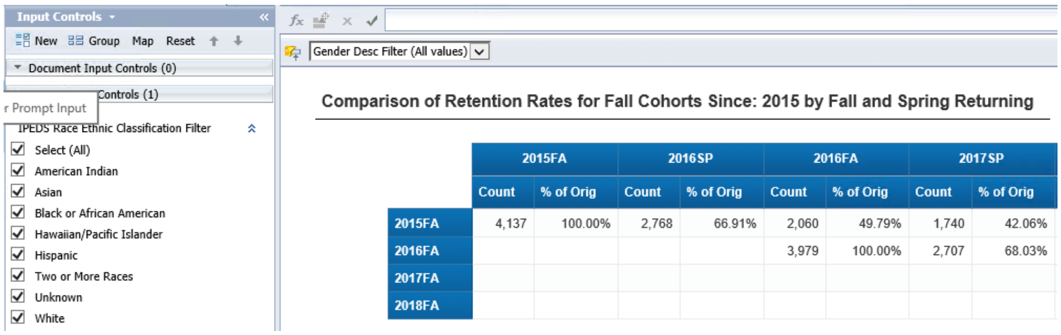
Report object: IPEDS Race Ethnic Classification Filter

Control: Check box

○ Entire document ● Current report

- 2019 Training Report Exercise 6
  - □ Demo
    - Page Header
    - Page Body
      - ☑ Block 1
    - Page Footer

Now choose one or more of the *"IPEDS Race Ethnic Classification Filter"* from the 'Input Controls' pane and observe the behavior of the data. With all filters selected:



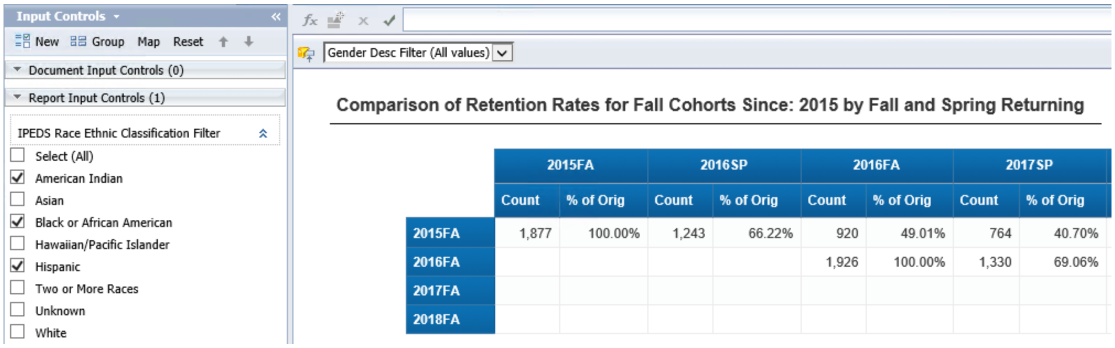
IPEDS Race Ethnic Classification Filter

- ☑ Select (All)
- ☑ American Indian
- ☑ Asian
- ☑ Black or African American
- ☑ Hawaiian/Pacific Islander
- ☑ Hispanic
- ☑ Two or More Races
- ☑ Unknown
- ☑ White

Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016SP		2016FA		2017SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%
2016FA					3,979	100.00%	2,707	68.03%
2017FA								
2018FA								

With only certain filters selected:


Input Controls
New
Group
Map
Reset
Document Input Controls (0)
Report Input Controls (1)
Gender Desc Filter (All values)

IPEDS Race Ethnic Classification Filter

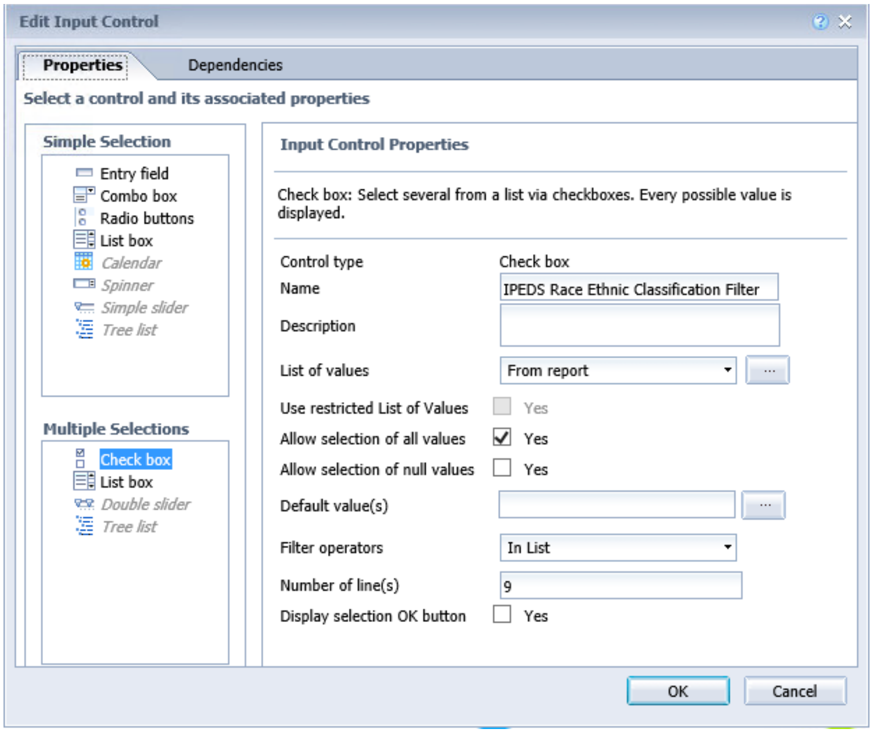
- □ Select (All)
- ☑ American Indian
- □ Asian
- ☑ Black or African American
- □ Hawaiian/Pacific Islander
- ☑ Hispanic
- □ Two or More Races
- □ Unknown
- □ White

Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016SP		2016FA		2017SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	1,877	100.00%	1,243	66.22%	920	49.01%	764	40.70%
2016FA					1,926	100.00%	1,330	69.06%
2017FA								
2018FA								

Also note that 'Input Controls' can be used in conjunction with the 'Filter Bar'.

NOTE: If you want to edit your 'Input Controls' for any reason, the functionality is a little bit tricky. Hover over the title of your 'Input Control' (in this case, *"IPEDS Race Ethnic Classification Filter"*) and you will see three small circles pop up. Click the circle with the wrench to edit the 'Input Control' parameters. You will then be able to edit the 'Control' or the 'Dependencies'.

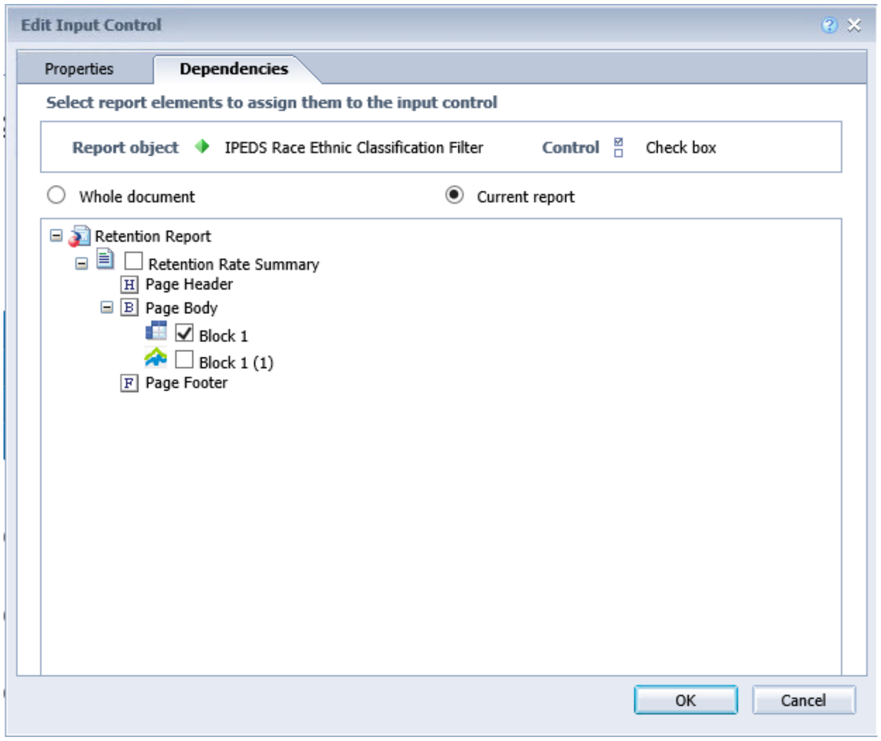


Select a control and its associated properties

Input Control Properties

Check box: Select several from a list via checkboxes. Every possible value is displayed.

Control type	Check box
Name	IPEDS Race Ethnic Classification Filter
Description	
List of values	From report
Use restricted List of Values	□ Yes
Allow selection of all values	☑ Yes
Allow selection of null values	□ Yes
Default value(s)	
Filter operators	In List
Number of line(s)	9
Display selection OK button	□ Yes



Edit Input Control

Properties | **Dependencies**

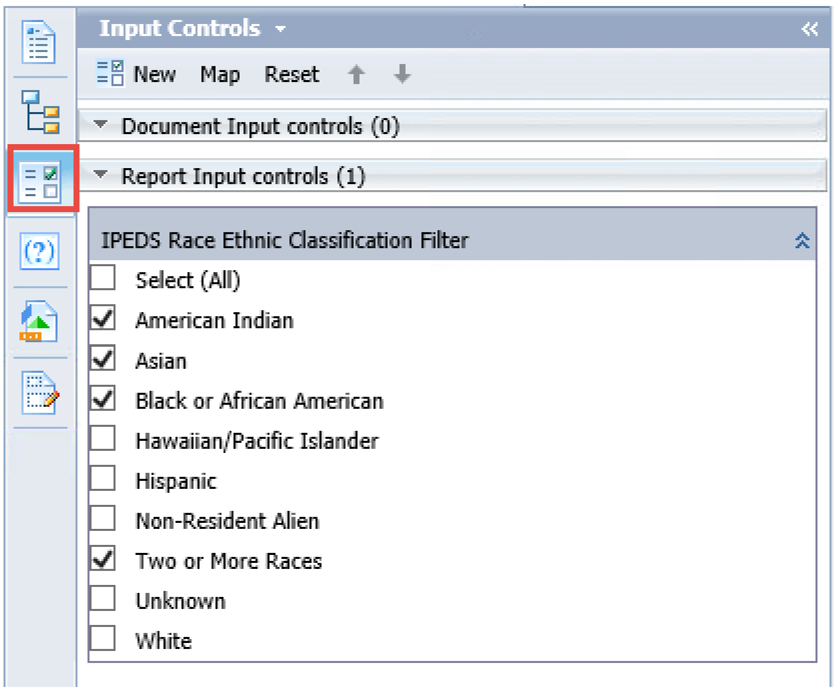
Select report elements to assign them to the input control

Report object: IPEDS Race Ethnic Classification Filter Control: Check box

○ Whole document ● Current report

- Retention Report
  - □ Retention Rate Summary
    - Page Header
    - Page Body
      - ☑ Block 1
      - □ Block 1 (1)
    - Page Footer

If you click away from the ‘Input Controls’ panel for any reason, you can get back to it by clicking once on the checkbox icon (☑) on the far left of the window:



Document Input controls (0)

Report Input controls (1)

IPEDS Race Ethnic Classification Filter

□ Select (All)
☑ American Indian
☑ Asian
☑ Black or African American
□ Hawaiian/Pacific Islander
□ Hispanic
□ Non-Resident Alien
☑ Two or More Races
□ Unknown
□ White

Hands-on Exercise Learning Objective

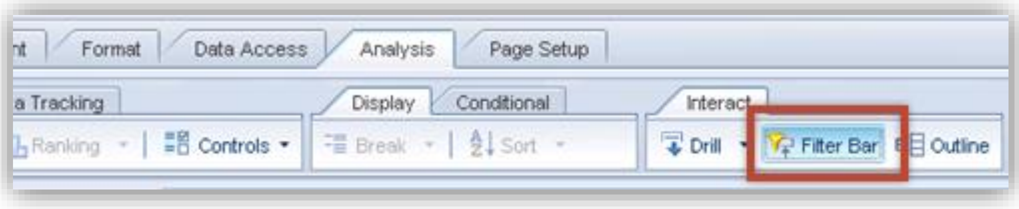
At the end of this section, you will understand the behavior of filters when used with multiple queries, be able to create additional detail objects for the purpose of filtering to improve the ability to analyze subsets of combined data and be able to create input controls to allow more flexible filtering of your reports.

High Level Overview

1. Add new detail variables to the report for a set of attributes to be used for report filtering
2. Place the detail variables as simple report filters or input controls to allow further analysis
3. Define an input control for the "*Student Type*" query object
4. Save the document

Practice Steps

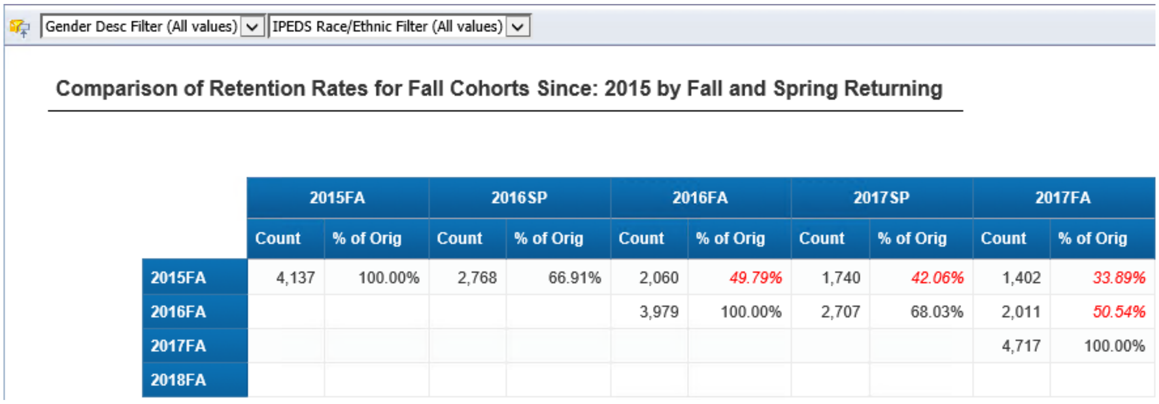
STEP 1: Open the "*Retention Report*" Web Intelligence document. Open the 'Filter Bar' for the report called "*Retention Rate Summary*".



STEP 2: Create a detail variable named "*Gender Desc Filter*" from the "*Gender Desc*" query object. Make the new variable a detail of the merged "*Student ID*" field.

STEP 3: Add the new "*Gender Desc Filter*" variable as a drop-down filter on the 'Filter Bar'. Verify that it correctly filters the contents of both the crosstab and the chart.

STEP 4: Repeat the above step and create filters for the other student dimensional attributes: *"IPEDS Race Ethnic Classification"* and *"Student Type Desc"*. Add *"IPEDS Race Ethnic Classification filter"* to the filter toolbar. A selection of various filters may look as follows:



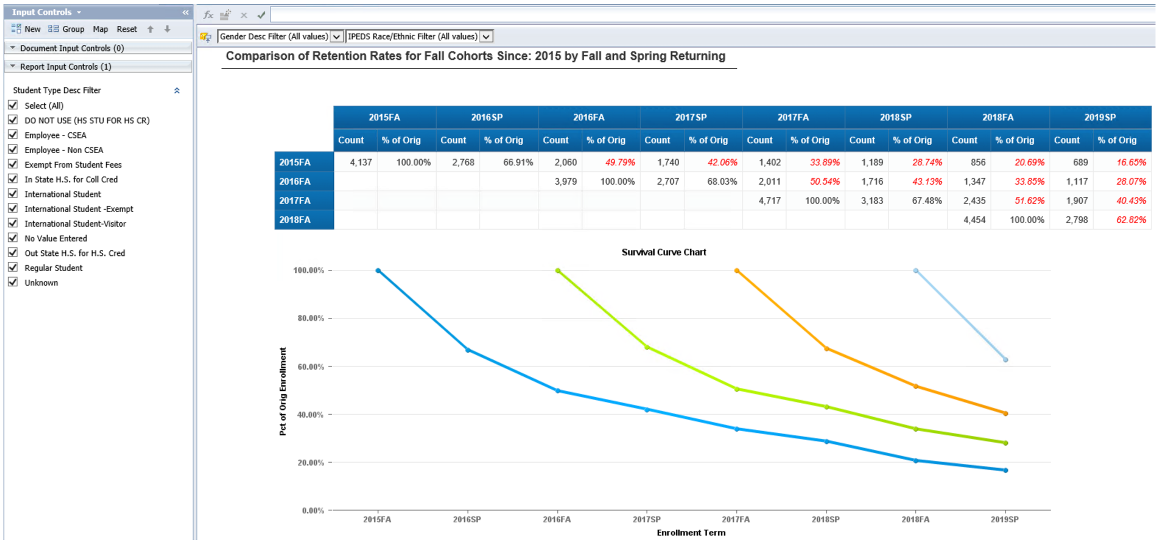
Gender Desc Filter (All values) IPEDS Race/Ethnic Filter (All values)

Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016SP		2016FA		2017SP		2017FA	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%	1,402	33.89%
2016FA					3,979	100.00%	2,707	68.03%	2,011	50.54%
2017FA									4,717	100.00%
2018FA										

STEP 5: Define a new Input Control for the report, using the "*Student Type Desc Filter*" you created in the previous step as the underlying filtering attribute. Define this as a checkbox control with six lines of data. Define the input control so that it filters both the chart and the crosstab. Verify that when you select values in the "*Student Type Filter*" checkboxes, the chart and the crosstab both reflect the entered selections.

STEP 6: Change the number of lines displayed for your input control checkbox so that the scroll bar is not needed on the control, as below:



Student Type Desc Filter

- ☑ Select (All)
- ☑ DO NOT USE (HS STU FOR HS CR)
- ☑ Employee - CSEA
- ☑ Employee - Non CSEA
- ☑ Exempt From Student Fees
- ☑ In State H.S. for Coll Cred
- ☑ International Student
- ☑ International Student -Exempt
- ☑ International Student-Visitor
- ☑ No Value Entered
- ☑ Out State H.S. for H.S. Cred
- ☑ Regular Student
- ☑ Unknown

Gender Desc Filter (All values) IPEDS Race/Ethnic Filter (All values)

Comparison of Retention Rates for Fall Cohorts Since: 2015 by Fall and Spring Returning

	2015FA		2016SP		2016FA		2017SP		2017FA		2018SP		2018FA		2019SP	
	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig	Count	% of Orig
2015FA	4,137	100.00%	2,768	66.91%	2,060	49.79%	1,740	42.06%	1,402	33.89%	1,189	28.74%	856	20.69%	689	16.65%
2016FA					3,979	100.00%	2,707	68.03%	2,011	50.54%	1,716	43.13%	1,347	33.85%	1,117	28.07%
2017FA									4,717	100.00%	3,183	67.48%	2,435	51.62%	1,907	40.43%
2018FA													4,454	100.00%	2,798	62.82%

Survival Curve Chart

STEP 7: Save your report.

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EFFECTIVE SHARING OF REPORTS AND ANALYSES

Once you develop Web Intelligence reports to provide the visualizations and analyses that you need to manage your institution's business processes, there are a number of factors you need to consider to effectively share this data across the institution. These include:

- Ensuring that users are seeing up-to-date data when they look at reports
- Ensuring that long-running reports are refreshed ahead of time
- Ensuring that reports are scheduled on a regular basis
- Allowing inspection of previous executions of reports
- Ensuring the users have reports and analyses delivered to them in the most convenient method and format

The following specific techniques to address these factors are explained in this section:

- Setting up reports to automatically refresh on open
- Exporting Web Intelligence report content to PDF and Excel format
- Working with the Web Intelligence report scheduler
- Looking at historic instances of reports

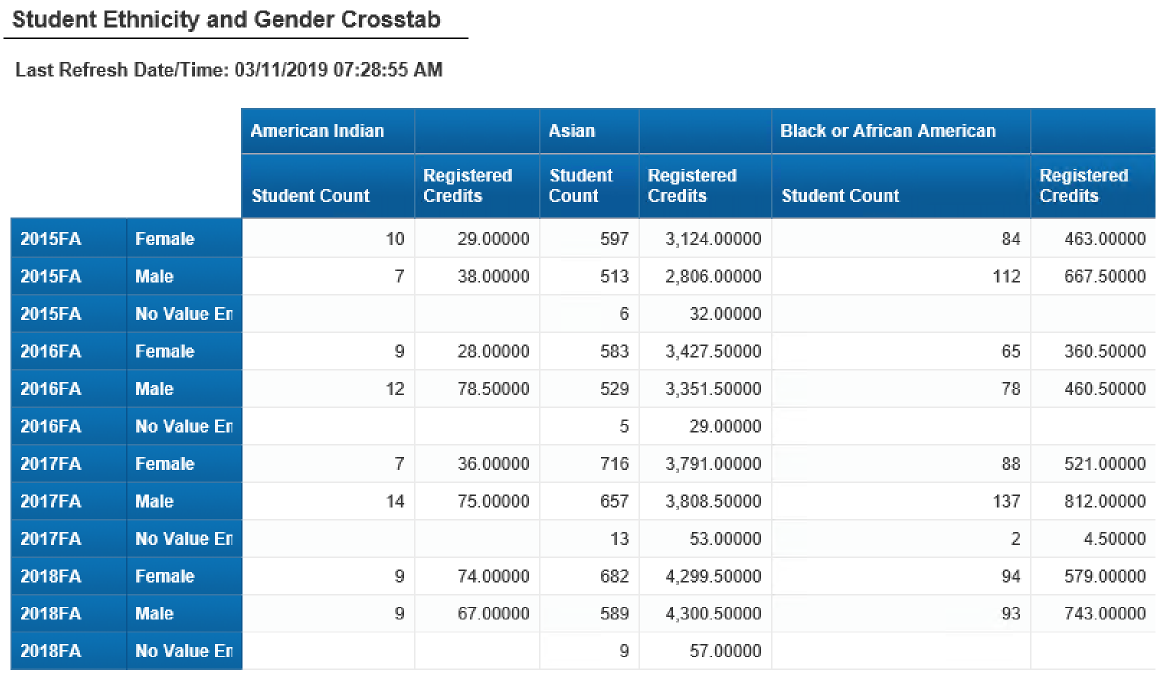
Setting Up Web Intelligence Reports to Refresh on Open

When business users access Web Intelligence reports through the BI Launchpad, there is always the risk that the information in a given report will be out of date. There are several techniques you can use to help alleviate this problem.

The first of these is to clearly display the latest refresh date on your report, using the function that Web Intelligence provides to display the last execution date and time of the report. To create this display in your report, first drag an empty text cell into the header area of the report. Then enter the following formula for the new cell:

=”Last Refresh Date/Time: “ + FormatDate (LastExecutionDate ();”MM/dd/yyyy hh:mm:ss A”)

Note that this formula also uses the ‘FormatDate’ function which allows you to format a date/time value (which is returned from the ‘LastExecutionDate’ function) however you want, as specified by a passed formatting string. This will result in the following text notification being displayed on your report:



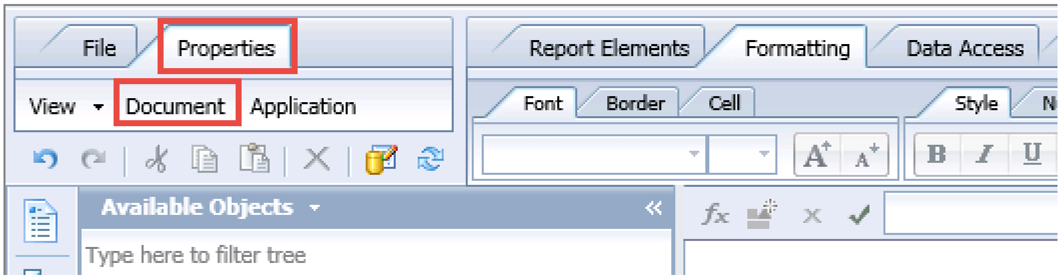
Student Ethnicity and Gender Crosstab

Last Refresh Date/Time: 03/11/2019 07:28:55 AM

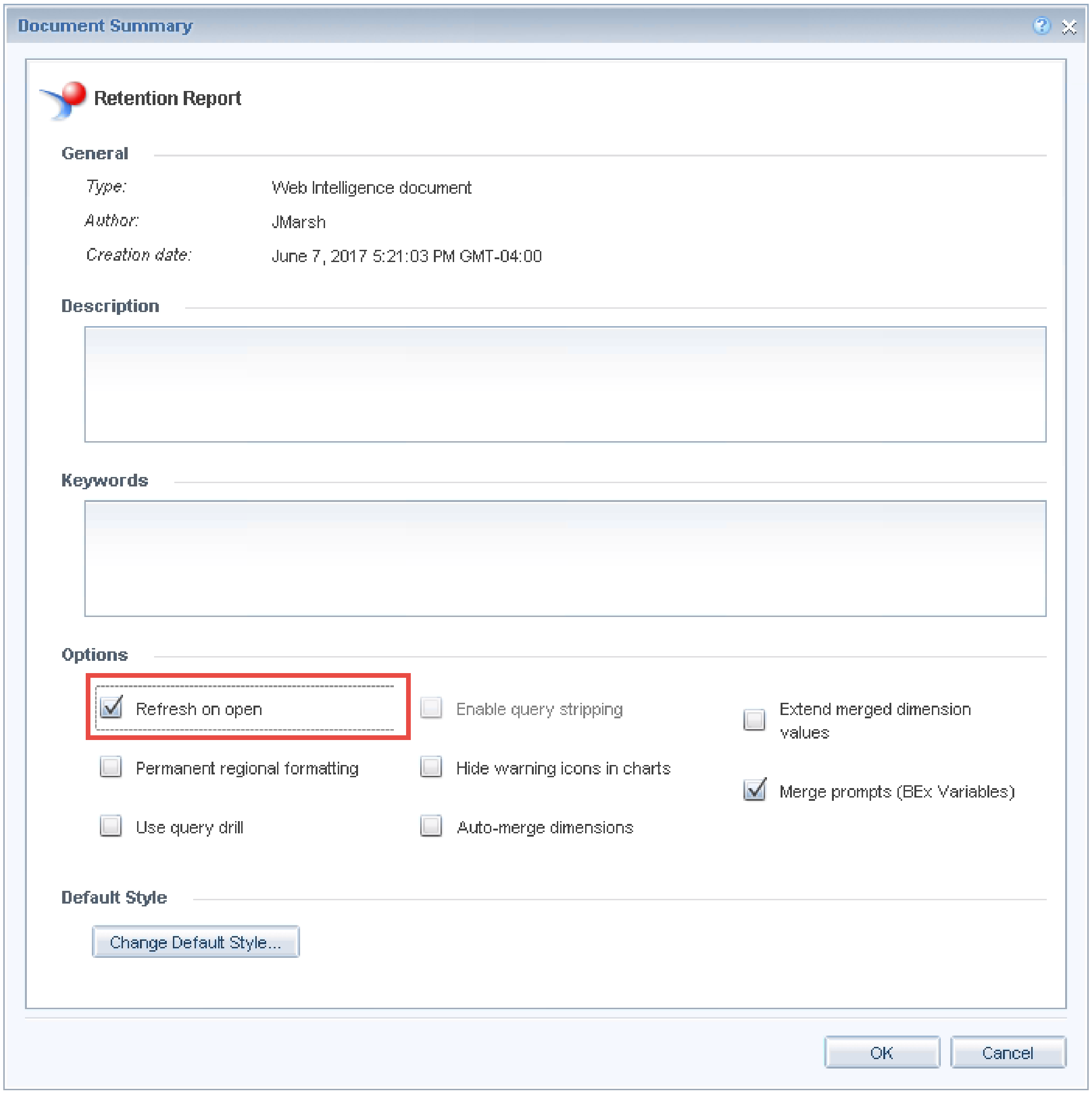
		American Indian		Asian		Black or African American	
		Student Count	Registered Credits	Student Count	Registered Credits	Student Count	Registered Credits
2015FA	Female	10	29.00000	597	3,124.00000	84	463.00000
2015FA	Male	7	38.00000	513	2,806.00000	112	667.50000
2015FA	No Value Er			6	32.00000		
2016FA	Female	9	28.00000	583	3,427.50000	65	360.50000
2016FA	Male	12	78.50000	529	3,351.50000	78	460.50000
2016FA	No Value Er			5	29.00000		
2017FA	Female	7	36.00000	716	3,791.00000	88	521.00000
2017FA	Male	14	75.00000	657	3,808.50000	137	812.00000
2017FA	No Value Er			13	53.00000	2	4.50000
2018FA	Female	9	74.00000	682	4,299.50000	94	579.00000
2018FA	Male	9	67.00000	589	4,300.50000	93	743.00000
2018FA	No Value Er			9	57.00000		

However, this merely informs the user of the last refresh, but still allows an unobservant user to continue with “stale” data. A second technique that is very effective is to set up each Web Intelligence report so that whenever it is accessed through the BI Launchpad, it automatically causes the report to be refreshed. Obviously, this requires that the execution time of the report be reasonable. But in this case, this absolutely guarantees that users are looking at the latest data available in the underlying ODS database.

To set this up, open the report you want to auto-refresh, and select the ‘Properties’ tab above the left panel of the report window. Then select the ‘Document’ tab on the sub-menu:



This will bring up the ‘Document Summary’ window:



Document Summary

Retention Report

General

Type: Web Intelligence document

Author: JMarsh

Creation date: June 7, 2017 5:21:03 PM GMT-04:00

Description

Keywords

Options

☑ Refresh on open

□ Enable query stripping

□ Extend merged dimension values

□ Permanent regional formatting

□ Hide warning icons in charts

☑ Merge prompts (BEx Variables)

□ Use query drill

□ Auto-merge dimensions

Default Style

Click on the ‘Refresh on Open’ checkbox on this window, click ‘OK’ and save your report.

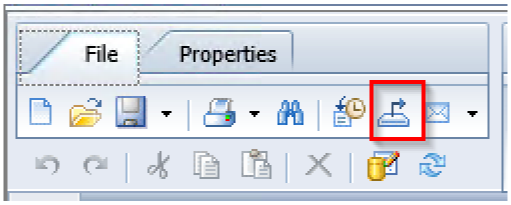
Now, when you open your report, either for editing or simply to view it, the queries associated with the report will be automatically run before the user is shown the report content. This guarantees that the reporting user will see only report data that is up to date.

Exporting Web Intelligence Content to PDF or Excel Format

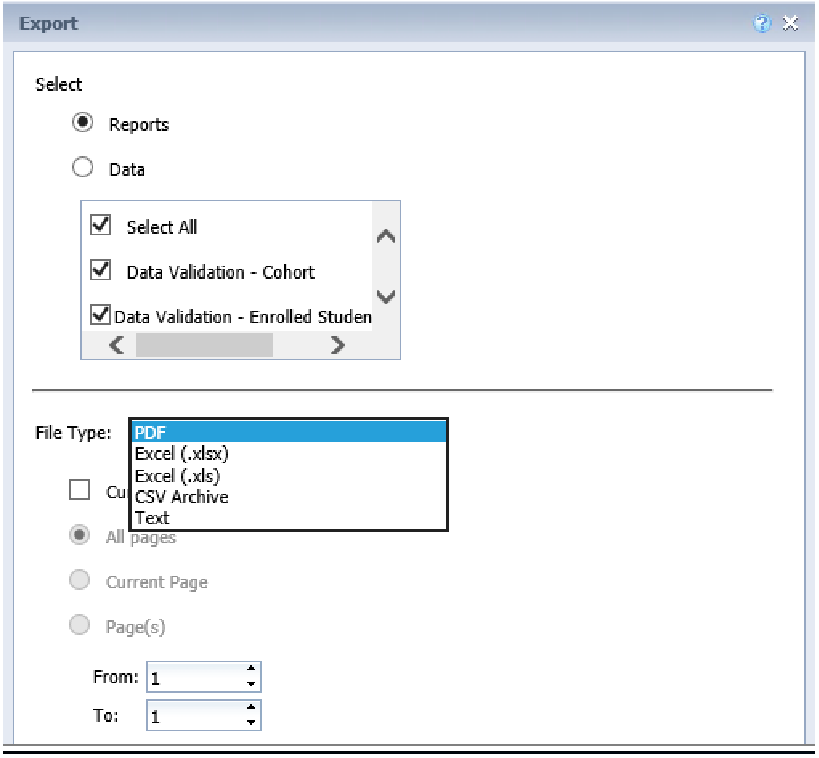
One of the key challenges in any BI environment is making reports and analyses available to information consumers who don’t have access to the BI environment. Therefore, it can be essential to provide the information from Web Intelligence reports in externally accessible formats. Web Intelligence provides the ability to export report content to PDF, Excel and comma-delimited data files.

It is strongly recommended that this capability only be used to share the results of analysis done within Web Intelligence reports with non-BusinessObjects users. It is NOT recommended that these exported datasets be used for further analyses.

At any rate, to do this, select the 'Export' button in the 'File' tab:



Selecting this provides a number of options:



Export

Select

● Reports

○ Data

☑ Select All

☑ Data Validation - Cohort

☑ Data Validation - Enrolled Studen

File Type: PDF
Excel (.xlsx)
Excel (.xls)
CSV Archive
Text

□ Cu

● All pages

○ Current Page

○ Page(s)

From: 1

To: 1

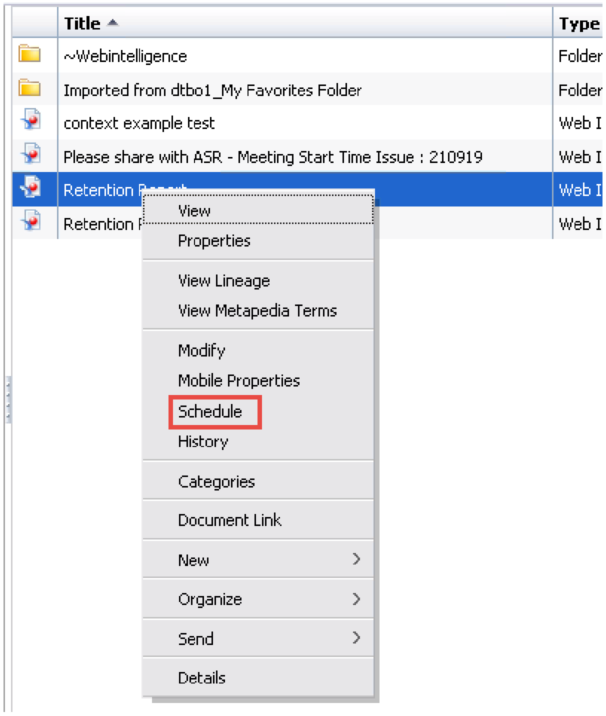
You can export the reports or just the data, the entire document (as a multi-page PDF or multi-spreadsheet Excel document) or just the current report tab, as Excel, CSV, PDF, or text file.

All these options will result in the creation of a file on the default location of the computer which is running the browser being used to access Web Intelligence. You can experiment with the different output formats to see how Web Intelligence maps the formatting and data into the various formats.

Working with The Web Intelligence Scheduler

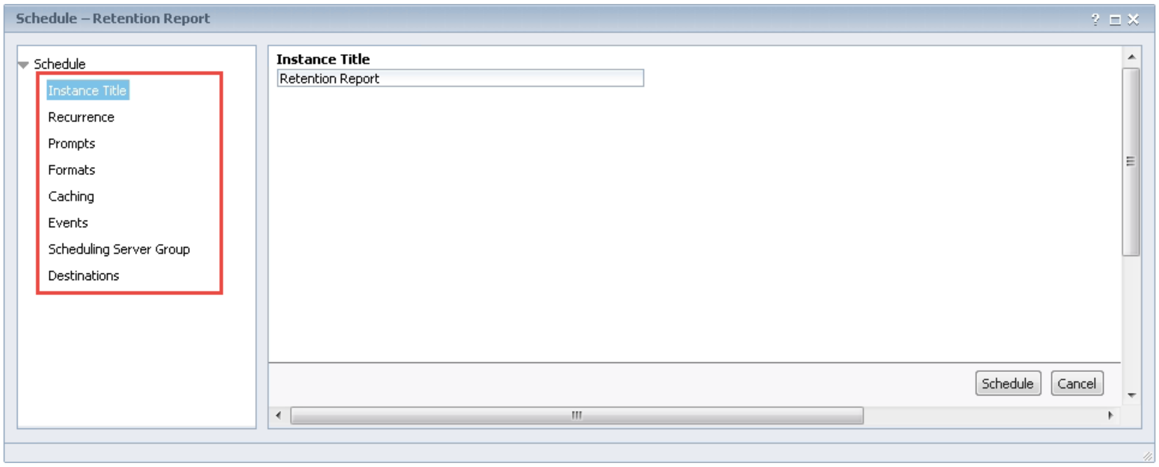
BusinessObjects provides a very convenient report execution scheduling tool that you can use to run reports immediately or on a regular scheduled basis. It also provides the ability to output the results of the reports in various supported formats and a variety of destinations for report output, including email to specific user email addresses. Note that the capabilities of Web Intelligence in this regard are quite extensive; we are only going to address some basic capabilities in this section.

To schedule the execution of a Web Intelligence report, right click on a report in the BI Launchpad and select ‘Schedule’:



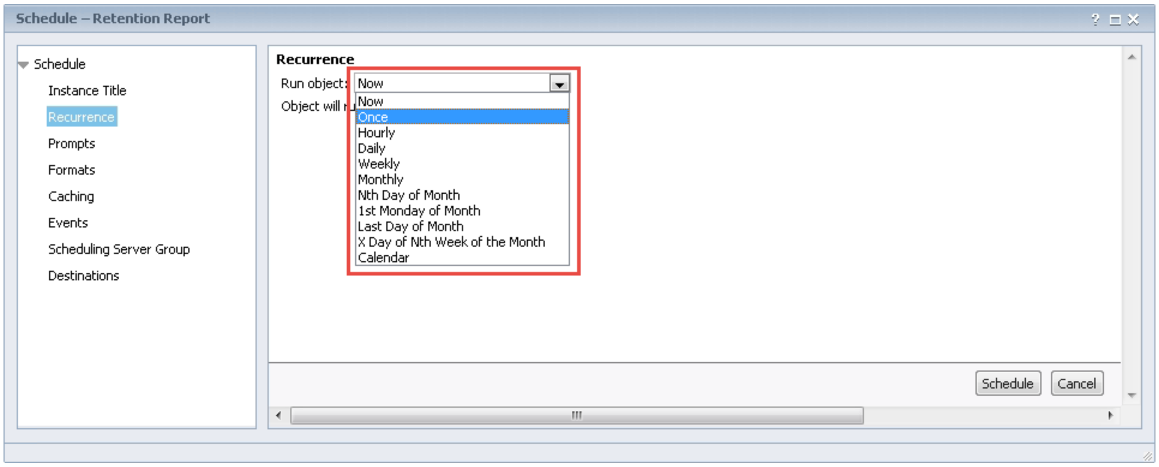
Title	Type
~Webintelligence	Folder
Imported from dtbo1_My Favorites Folder	Folder
context example test	Web I
Please share with ASR - Meeting Start Time Issue : 210919	Web I
Retention	Web I
Retention	Web I

This will bring up the ‘Schedule’ window, which has a set of sub-window selections on the left-hand side:



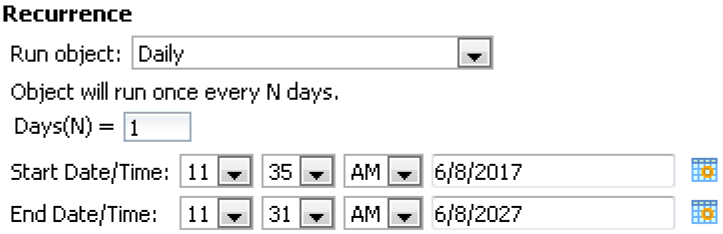
Instance Title
Retention Report

The most important of these is the ‘Recurrence’ sub-window, which you can bring up by clicking on the ‘Recurrence’ selection. This window allows you to either run the report immediately or set up a recurring execution at a specified interval:



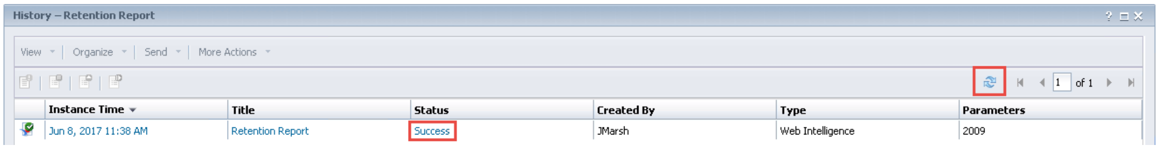
Recurrence
Run object: Now
Object will r

The parameters for each selection vary, but those for the ‘Daily’ interval show a typical set:



Recurrence
Run object: Daily
Object will run once every N days.
Days(N) = 1
Start Date/Time: 11 35 AM 6/8/2017
End Date/Time: 11 31 AM 6/8/2027

Selecting the ‘Now’ selection and then the ‘Schedule’ button, will immediately start the execution of the report. It will place the user immediately into the ‘History’ screen, which will allow you to monitor the current status of the execution. Click the refresh icon to update the listed status for the report:

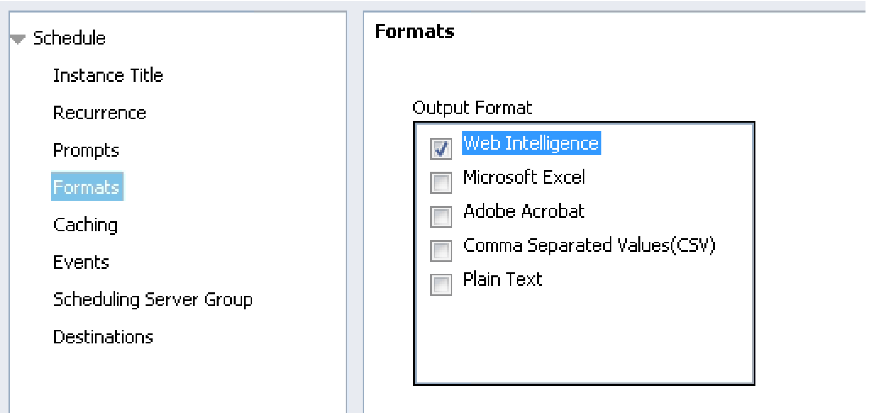


History – Retention Report

Instance Time	Title	Status	Created By	Type	Parameters
Jun 8, 2017 11:38 AM	Retention Report	Success	JMarsh	Web Intelligence	2009

Eventually the ‘Status’ field will show ‘Success’ or ‘Failure’. Clicking on the status value will provide further information on the execution of the report. Note that the parameters supplied to the report are listed in the ‘Parameters’ column.

Another important sub-window selection of the ‘Schedule’ window is the ‘Formats’ sub-window. This allows you to specify the form of the output of the report:

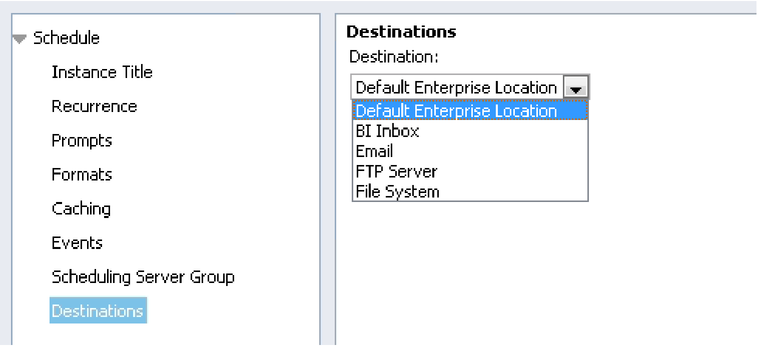


Formats

Output Format

☑ Web Intelligence
□ Microsoft Excel
□ Adobe Acrobat
□ Comma Separated Values(CSV)
□ Plain Text

Finally, the ‘Destinations’ sub-window allows you to specify where the selected output should be stored or delivered:



Destinations

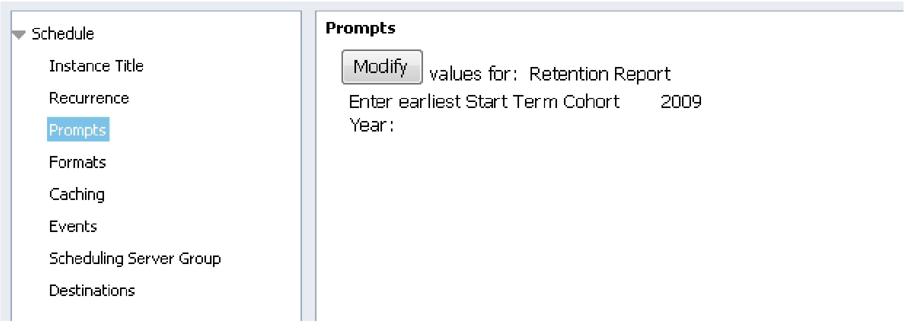
Destination: Default Enterprise Location

The options all depend somewhat on the ‘Format’ selected in the previous window, but general are the following:

- Default Enterprise Location – the BI Launchpad folder where the original report is stored, typically

- BI Inbox – The BI Launchpad 'Inbox' folder of one or more selected users in the BusinessObjects system
- Email – The output can be included in an email sent to one or more addresses. For the Web Intelligence format, this would send a URL in the email which links into the BusinessObjects system. For the various file formats (i.e. PDF, Excel, Text), this would include the report as an attachment to the email
- FTP Server – sends the output to an FTP server connection that has been configured for the system
- File System – A specific folder on a file system accessible from the BusinessObjects server using the network userid/password provided. Note that this will NOT default to the user's workstation as does the 'Export' functionality

The parameters used to run the report will be whatever the saved prompt values are from the saved report. If you want to change those parameters for the scheduled run, select the 'Prompts' sub-window, which will display the saved values of each prompt and allow you to modify those values for the scheduled report.



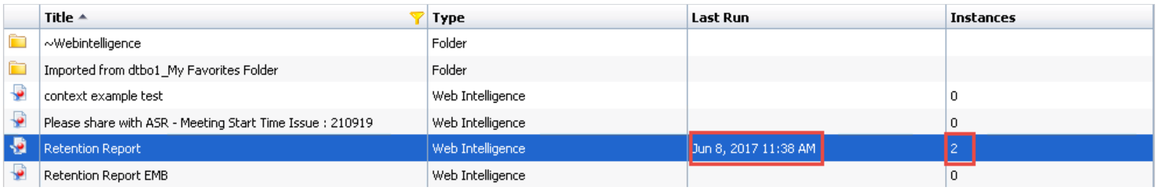
Prompts

values for: Retention Report

Enter earliest Start Term Cohort Year: 2009

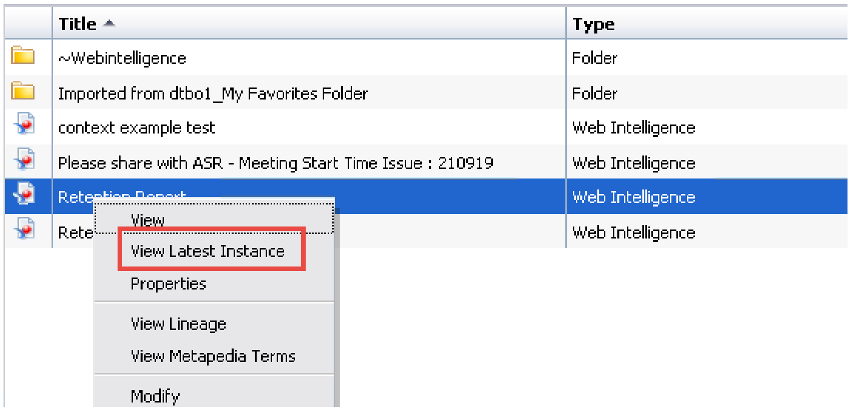
When all settings are entered, click on 'Schedule' button to initiate the scheduled execution of the report.

After a report has been run as a scheduled job, you will see that its display in the BI Launchpad will have changed a little. In particular, you will see values in the 'Last Run' column and the 'Instances' column:



Title	Type	Last Run	Instances
~Webintelligence	Folder		
Imported from dtbo1_My Favorites Folder	Folder		
context example test	Web Intelligence		0
Please share with ASR - Meeting Start Time Issue : 210919	Web Intelligence		0
Retention Report	Web Intelligence	Jun 8, 2017 11:38 AM	2
Retention Report EMB	Web Intelligence		0

When you right click on the report itself, you will now see 'View Latest Instance' as a new selection:



Title	Type
~Webintelligence	Folder
Imported from dtbo1_My Favorites Folder	Folder
context example test	Web Intelligence
Please share with ASR - Meeting Start Time Issue : 210919	Web Intelligence
Retention Report	Web Intelligence
Rete	Web Intelligence

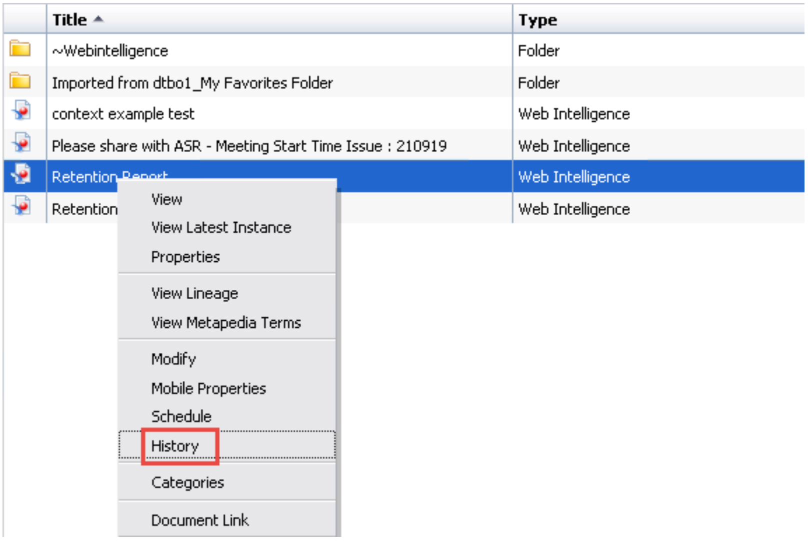
Clicking on this selection will bring up the most recently refreshed version of the report in '<u>View</u>' mode. Note that this is a "report instance", something a little different than the editable version of the report we have been working with up to now in this course. It is a read-only version of a specific execution of the report and is not an editable version that we can use to modify the original report in any way. You can think of this "report instance" as something similar to a PDF created from a Microsoft Word file.

Looking at Historic Instances of Reports

As we have seen in the previous section, when reports are scheduled we typically look at the most recent instance of that report, showing the report with the most recently refreshed data. However, the question frequently arises as to what previous instances of the report looked like, typically to understand whether exception situations reflect a current event or have occurred in the past.

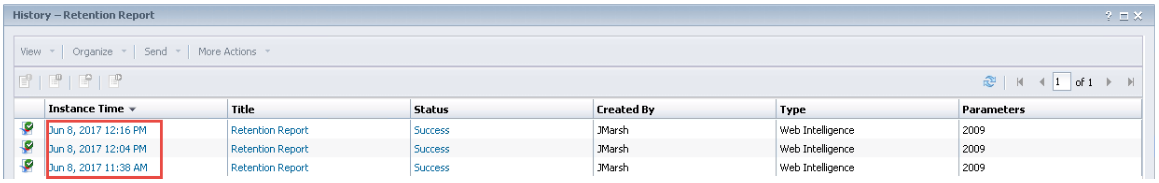
BusinessObjects provides the ability to save a set of previous instances of a report, complete with all the data generated when the report was run at the previous time. The number of these historic instances that are maintained can be set on a report or system basis.

To access the previous instances of the report, right click on the report and click on the '<u>History</u>' menu selection:



Title	Type
~Webintelligence	Folder
Imported from dtbo1_My Favorites Folder	Folder
context example test	Web Intelligence
Please share with ASR - Meeting Start Time Issue : 210919	Web Intelligence
Retention Report	Web Intelligence
Retention	Web Intelligence

This will bring up the same form that was displayed when we scheduled a report to run immediately. Note that all the historical instances of the report are listed here and that the values in the date field are active links. Clicking on any of the values in the date field will bring up the corresponding instance of the report in ‘View’ mode.

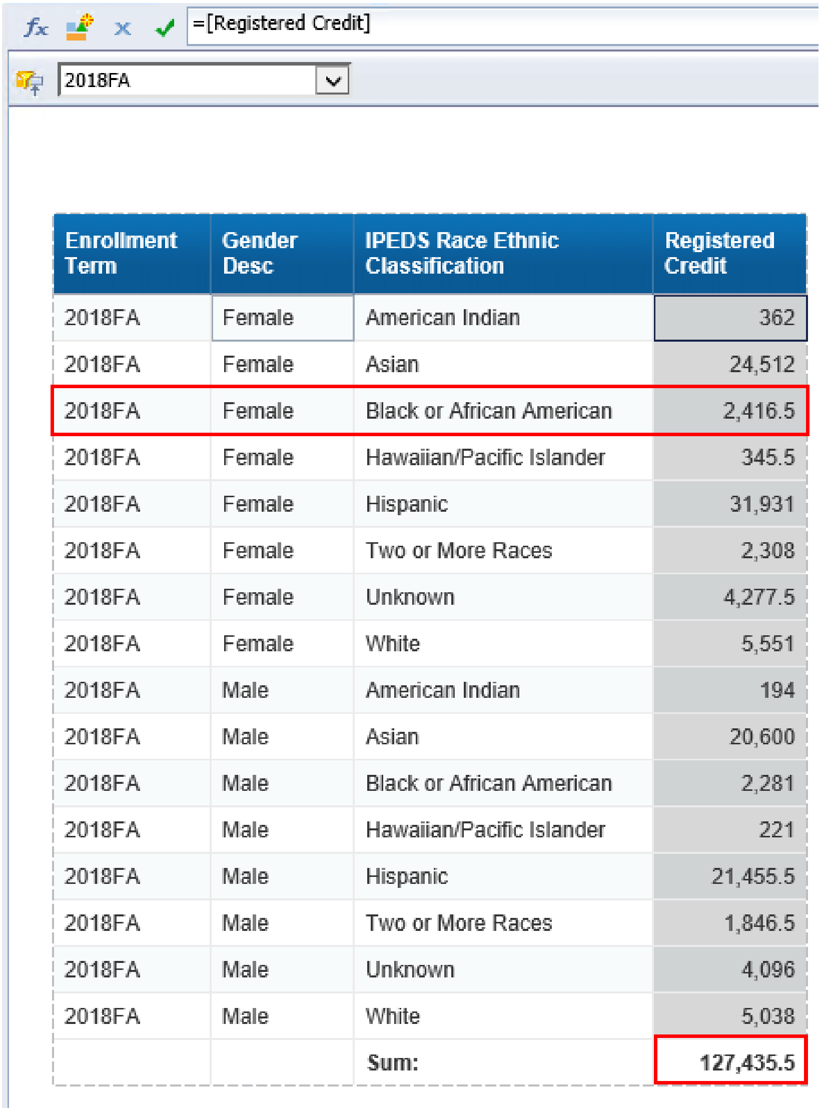


History – Retention Report

Instance Time	Title	Status	Created By	Type	Parameters
Jun 8, 2017 12:16 PM	Retention Report	Success	JMarsh	Web Intelligence	2009
Jun 8, 2017 12:04 PM	Retention Report	Success	JMarsh	Web Intelligence	2009
Jun 8, 2017 11:38 AM	Retention Report	Success	JMarsh	Web Intelligence	2009

CALCULATION CONTEXTS

By default, Web Intelligence determines the result of a measure using (1) the dimension objects placed in the same table block and (2) the level of placement in a report. The measure will default to the lowest level of aggregation depending on where it is placed. The set of relevant dimensions for which a measure is aggregated, based on its position in a block on a report, is called the “calculation context” for the measure. As an example, if a measure is included as a column of a ‘List’ block with a set of dimensions, then the measure will be aggregated by each combination of values of those dimensions (i.e. for every row in the list) and that set of dimensions is the calculation context for the measure in the block. If the measure is placed on the summary line of a ‘List’ block, then the measure is aggregated independent of the dimensions in the list, which are no longer part of its calculation context, as below:



=[Registered Credit]

2018FA

Enrollment Term	Gender Desc	IPEDS Race Ethnic Classification	Registered Credit
2018FA	Female	American Indian	362
2018FA	Female	Asian	24,512
2018FA	Female	Black or African American	2,416.5
2018FA	Female	Hawaiian/Pacific Islander	345.5
2018FA	Female	Hispanic	31,931
2018FA	Female	Two or More Races	2,308
2018FA	Female	Unknown	4,277.5
2018FA	Female	White	5,551
2018FA	Male	American Indian	194
2018FA	Male	Asian	20,600
2018FA	Male	Black or African American	2,281
2018FA	Male	Hawaiian/Pacific Islander	221
2018FA	Male	Hispanic	21,455.5
2018FA	Male	Two or More Races	1,846.5
2018FA	Male	Unknown	4,096
2018FA	Male	White	5,038
		Sum:	**127,435.5**

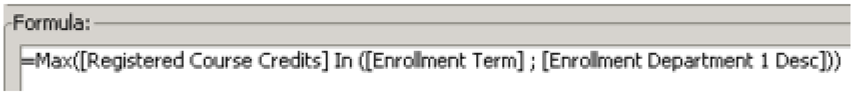
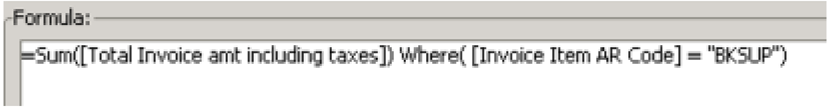
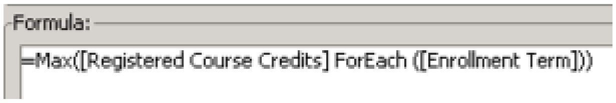
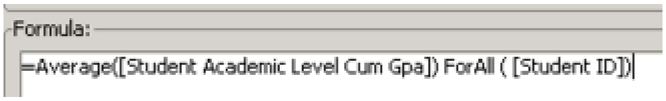
In the example above, when the "*Registered Credits*" measure viewed in the table, its calculation context is the combination of values of the "*Enrollment Term*", "*Gender Desc*", and "*IPEDS Race Ethnic Classification*" dimensions. When it is in the summary row of the 'List' table, the calculation context doesn't contain any dimensions, and it is just aggregated for all values of all dimensions.

For the vast majority of cases, the default calculation context determined by Web Intelligence is the one you probably want to use. However, there are a number of reporting circumstances where you may actually want to alter or specifically define the calculation context to be used for a measure in your report. Examples of when you might want to do this might include:

- You want each line of your report to compare the enrollment for a specific term with the average enrollment for all terms in the report (i.e. are we above or below the average for this term)
- You want to create a report with a single row with the summarized enrollment for a term but also include columns providing data about subtotals of that enrollment, such as the total enrollment of certain student types
- You want to calculate a delta value between the total enrollment in the first term included in a report with the enrollment for the last term included in the report

A complete review of the capabilities that Web Intelligence provides to work with calculation contexts would require a separate course in of itself and is well out of the scope of this one. However, this section will include a brief overview of the functions provided for report designers to define and modify calculation contexts and will present a couple of specific examples of their use.

Calculation context specifications are expressed in Web Intelligence as additional keywords and query object expressions in the aggregation functions you are already used to, such as 'Count' or 'Sum'. The following table summarizes the options for these calculation context expressions, along with the meaning and a simple example:

Operator	Definition
In – can be used for both input and output contexts	Used to specify dimensions explicitly – must include dimensions in the formula even if they are in the table/block. Can be used with extended syntax words (Report, Section, Break, block, body – see Keywords Table below for definitions)  Formula: =Max([Registered Course Credits] In ([Enrollment Term] ; [Enrollment Department 1 Desc]))
Where	Specifies limiting conditions on the data:  Formula: =Sum([Total Invoice amt including taxes]) Where([Invoice Item AR Code] = "BKSUP")
ForEach – use as an input context	Adds dimensions to the context (Automatically takes dimensions into consideration that are already in the table/block)  Formula: =Max([Registered Course Credits] ForEach ([Enrollment Term]))
ForAll – use as an output context	Removes dimensions from the context – provides a more global calculation at a granular, row-by-row level  Formula: =Average([Student Academic Level Cum Gpa]) ForAll ([Student ID])

The 'In' calculation context keyword allows you to express the complete list of dimensions for which you are aggregating the measure. In many cases, you want to specify that the context is that of an enclosing report structure, such as a report break or section, without specifying a particular list of dimensions. To support this, the 'In' calculation context keyword supports the following options:

Environment Level	Effect
Report	The projected value of the measure is aggregated for all dimensions contained within the page of the report
Section (Same result as Block)	The projected value of the measure is aggregated for all dimensions contained within the section of the report
Break	The projected value of the measure is aggregated for all dimensions contained within the break of the table **must use as input context (syntax) in order to get this to work**
Block (Same result as Section)	The projected value of the measure is aggregated across all values for dimensions contained within the block
Body	The projected value of the measure is aggregated for all dimensions **at the level in the report that it is placed**

Finally, there are two basic types of calculation contexts: Input Contexts and Output Contexts. The difference is subtle and somewhat technical. An input calculation context consists of any dimension objects that need to be included directly IN the calculation itself and cause aggregation to happen at a finer level of detail than what is in the table/block. An output calculation takes dimension objects out of the default context calculation and causes the aggregation of the results at a higher or more global level of detail.

The syntax of the two types is slightly different, but very important as it will cause very different behaviors of the aggregating measure. The key syntax difference between input and output contexts is the position of the operator relative to the parenthesis.

- Input context:
  - Operator is placed **within** the parenthesis of the aggregate:
    - Aggregate **(**measure **OPERATOR** (dimension)**)**
    - =Max**(**[Registered Course Credits] **In** (Enrollment Term] ; [Enrollment Department 1 Desc])**)**
- Output context:
  - Operator is placed **outside** of the parenthesis that contain the aggregate:
    - Aggregate **(**measure**) OPERATOR** (dimension)
    - =Average **(**[Student Academic Level Cum Gpa]**) ForAll** ([Student ID])

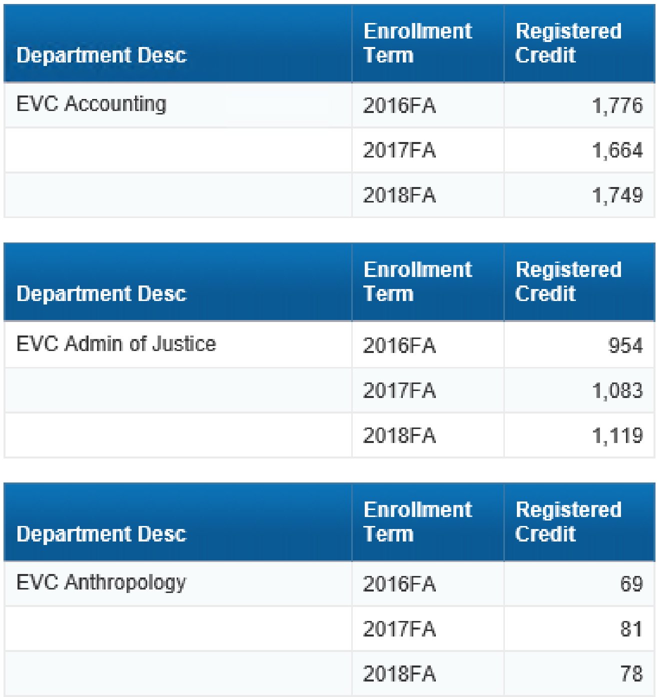
We are going to look at the following specific applications of the calculation context functionality:

- Using the 'IN' context operator – input context
- Using the 'ForAll' context operator – output context
- Using the 'Where' conditional context operator – output context
- Using the 'In Report' context operator – output context

Using the IN Context Operator

You would use the 'IN' context operator when you want to aggregate a measure by additional dimensions than what is in your table/block. If the dimension is available from your query it can be used in your calculation. The IN operator requires all dimensions needed in the calculation context to be listed in the formula even if they already exist in the table/block.

To see the use of this context operator, consider a simple report where we have a list of registered credit totals for departments by term. We have a break on department and have a descending sort on registered credits:

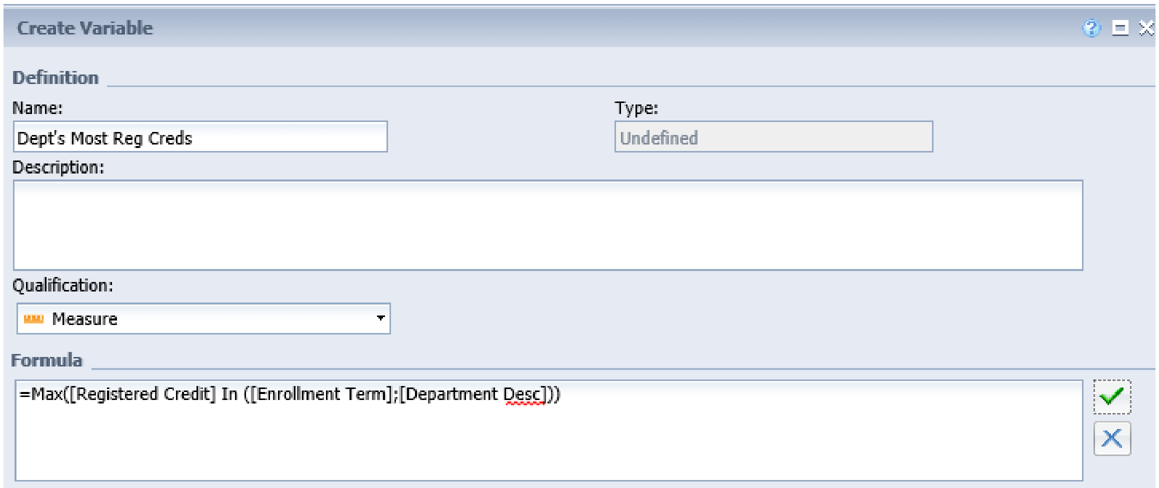


Department Desc	Enrollment Term	Registered Credit
EVC Accounting	2016FA	1,776
	2017FA	1,664
	2018FA	1,749

Department Desc	Enrollment Term	Registered Credit
EVC Admin of Justice	2016FA	954
	2017FA	1,083
	2018FA	1,119

Department Desc	Enrollment Term	Registered Credit
EVC Anthropology	2016FA	69
	2017FA	81
	2018FA	78

We want to see for each department, for three consecutive fall terms, the highest number of registered credits in any one term. To do this, create a new table in the report to the right of the current table; this new table will contain the department object and an object you will create with the following formula:



Create Variable

Definition

Name: Dept's Most Reg Creds

Type: Undefined

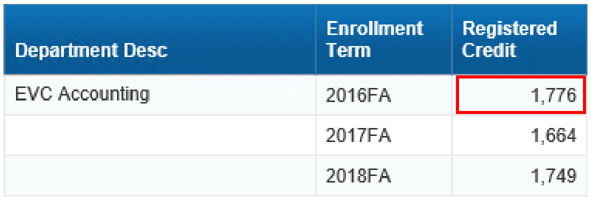
Description:

Qualification: Measure

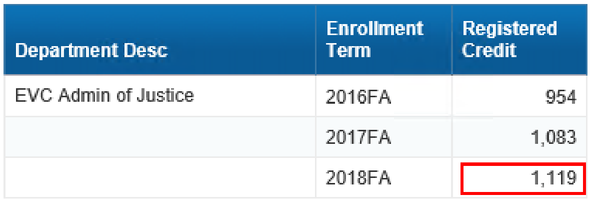
Formula

```
=Max([Registered Credit] In ([Enrollment Term];[Department Desc]))
```

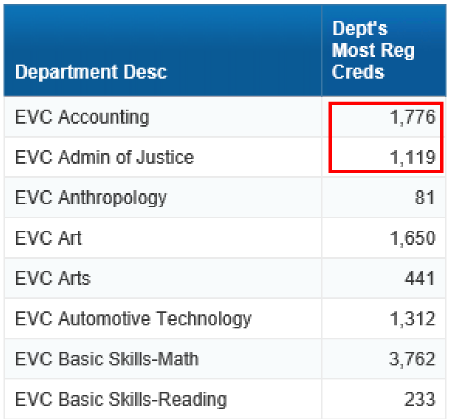
The resulting report should look like the following:



Department Desc	Enrollment Term	Registered Credit
EVC Accounting	2016FA	1,776
	2017FA	1,664
	2018FA	1,749



Department Desc	Enrollment Term	Registered Credit
EVC Admin of Justice	2016FA	954
	2017FA	1,083
	2018FA	1,119



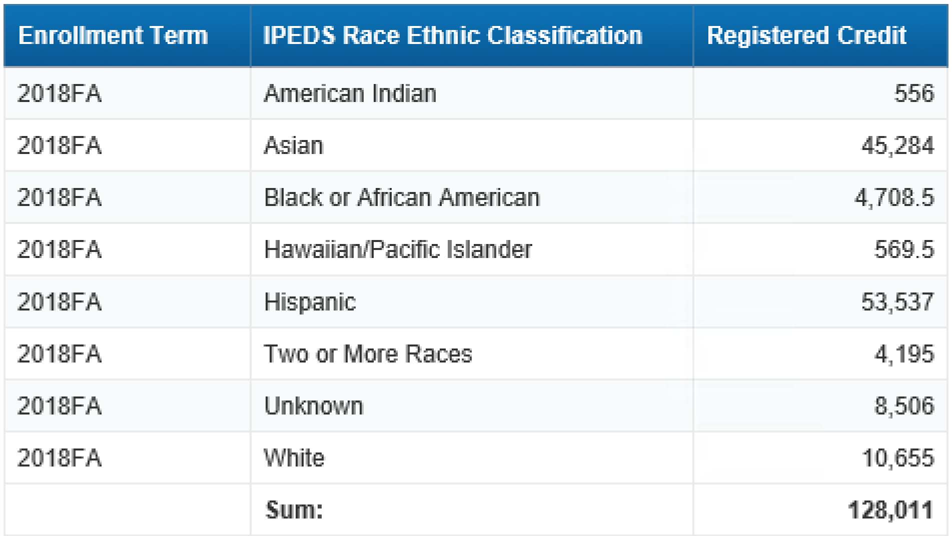
Department Desc	Dept's Most Reg Creds
EVC Accounting	1,776
EVC Admin of Justice	1,119
EVC Anthropology	81
EVC Art	1,650
EVC Arts	441
EVC Automotive Technology	1,312
EVC Basic Skills-Math	3,762
EVC Basic Skills-Reading	233

The table on the left serves as a truth set to ensure our calculation context variable is working as expected.

Using the ForAll Context Operator

Use the 'ForAll' context operator where you want to aggregate a measure for ALL values of a dimension in a place in a report where you would typically aggregate to a SPECIFIC value of that dimension. In other words, you are removing the dimension from the calculation context for the measure.

To see the use of this context operator, consider a simple report where we have a list of the registered credit totals for enrolled students in the 2018FA term categorized by the student's IPEDS Race Ethnic Classification:

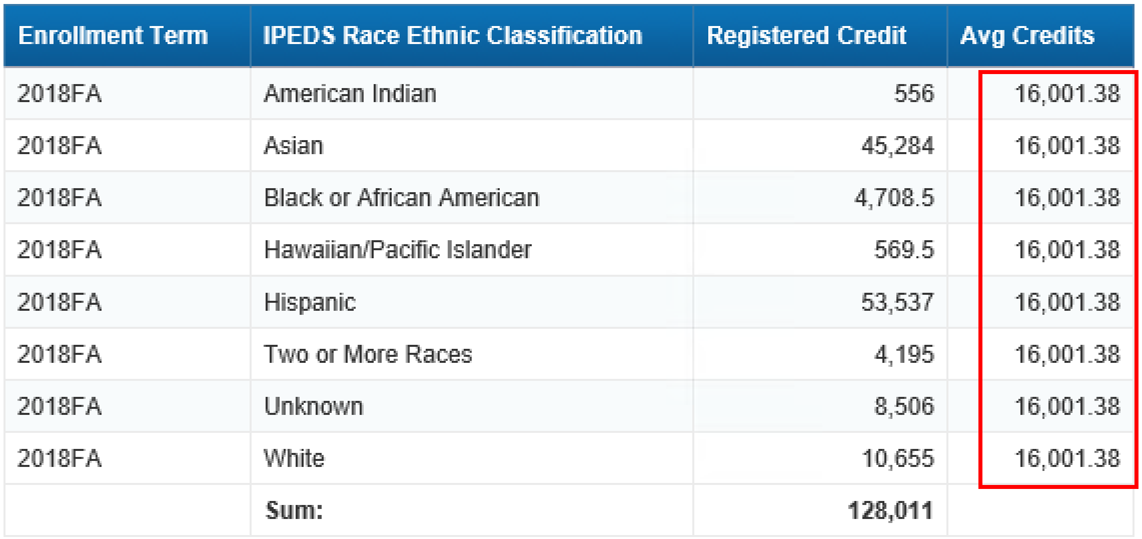


Enrollment Term	IPEDS Race Ethnic Classification	Registered Credit
2018FA	American Indian	556
2018FA	Asian	45,284
2018FA	Black or African American	4,708.5
2018FA	Hawaiian/Pacific Islander	569.5
2018FA	Hispanic	53,537
2018FA	Two or More Races	4,195
2018FA	Unknown	8,506
2018FA	White	10,655
	Sum:	**128,011**

We want to figure out what the average registered credits are per IPEDS Race Ethnic Classification, so we can easily determine whether each IPEDS Race Ethnic Classification has more or less than the average. To do this, create a new column in the report to the right of the current column. In the formula box at the top, specify an average of the "*Registered Credit*" measure over ALL the values of the “*IPEDS Race Ethnic Classification”* dimension, using the following formula:

=Average ([Registered Credit]) ForAll ([IPEDS Race Ethnic Classification])

The resulting report looks like the following:



Enrollment Term	IPEDS Race Ethnic Classification	Registered Credit	Avg Credits
2018FA	American Indian	556	16,001.38
2018FA	Asian	45,284	16,001.38
2018FA	Black or African American	4,708.5	16,001.38
2018FA	Hawaiian/Pacific Islander	569.5	16,001.38
2018FA	Hispanic	53,537	16,001.38
2018FA	Two or More Races	4,195	16,001.38
2018FA	Unknown	8,506	16,001.38
2018FA	White	10,655	16,001.38
	Sum:	**128,011**	

Then, with the tools we learned earlier in this training, we could easily create a variable text string indicating whether or not a specific department is above or below the average amount.

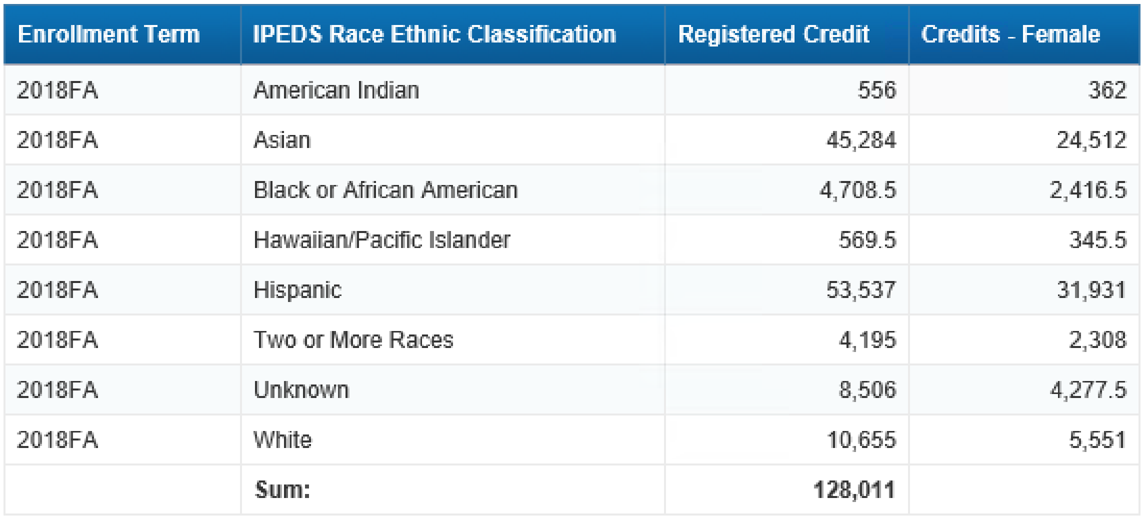
Using the Where Conditional Context Operator

The ‘Where’ context operator works in a slightly different way than all the other operators. It allows the user to specify a logical expression which must evaluate to true for a particular row of data to be added to the specified aggregate. An example would be if you wanted to break out the “*Registered Credit*” measure into two columns according to whether the student was male or female. Each of these new columns would contain a measure with a conditional context operator with the appropriate test of the “*Gender Desc*” dimension.

To do this, starting with the previous example, create a new column to the right of the list. Specify the following formula for the new cell:

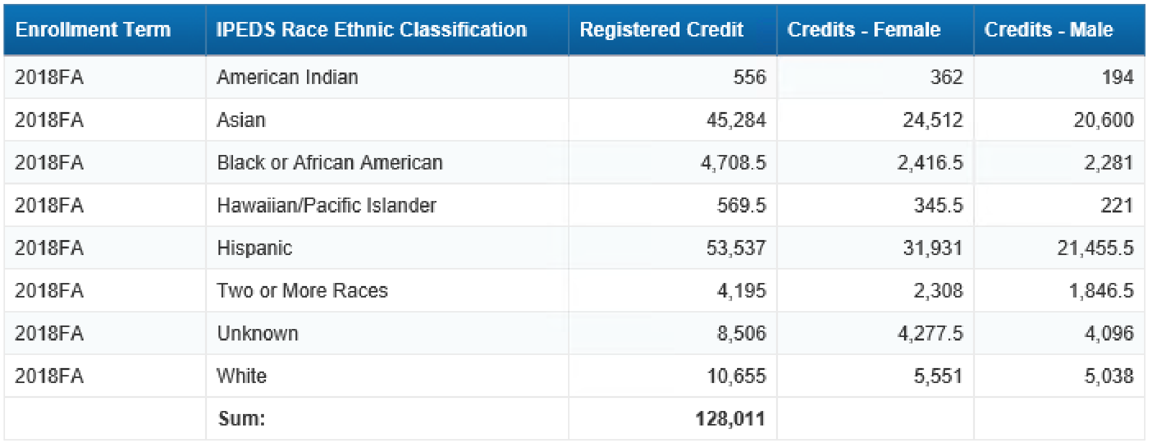
=Sum ([Registered Credit]) Where ([Gender Desc] = "Female")

The resulting report shows a new column only for registered credits summed for female students:



Enrollment Term	IPEDS Race Ethnic Classification	Registered Credit	Credits - Female
2018FA	American Indian	556	362
2018FA	Asian	45,284	24,512
2018FA	Black or African American	4,708.5	2,416.5
2018FA	Hawaiian/Pacific Islander	569.5	345.5
2018FA	Hispanic	53,537	31,931
2018FA	Two or More Races	4,195	2,308
2018FA	Unknown	8,506	4,277.5
2018FA	White	10,655	5,551
	Sum:	**128,011**	

After adding another column for male students, and adjusting column headers:

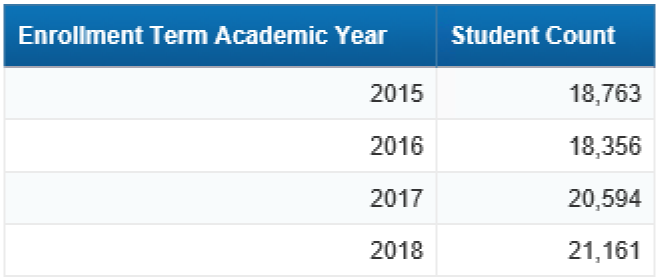


Enrollment Term	IPEDS Race Ethnic Classification	Registered Credit	Credits - Female	Credits - Male
2018FA	American Indian	556	362	194
2018FA	Asian	45,284	24,512	20,600
2018FA	Black or African American	4,708.5	2,416.5	2,281
2018FA	Hawaiian/Pacific Islander	569.5	345.5	221
2018FA	Hispanic	53,537	31,931	21,455.5
2018FA	Two or More Races	4,195	2,308	1,846.5
2018FA	Unknown	8,506	4,277.5	4,096
2018FA	White	10,655	5,551	5,038
	Sum:	**128,011**		

Using the In Report Context Operator

Another alternative to the 'ForAll' context operator is the 'In Report' operator. When using the 'ForAll' operator, you need to explicitly identify one or more dimensions which you want to drop from the calculation context. The 'In Report' operator will always simply aggregate a measure to the highest level of aggregation on a report.

As an example, consider a report listing the distinct student enrollment counts for a set of years, as follows:

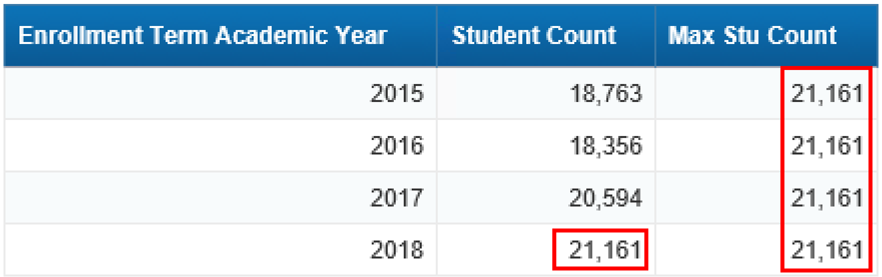


Enrollment Term Academic Year	Student Count
2015	18,763
2016	18,356
2017	20,594
2018	21,161

Assume that we want to compare each year's enrollment count with the highest aggregate student enrollment count in the report. If the variable "*Student Count*" is defined as the distinct count of "*Student ID"*, we can add a column to the report with the following formula:

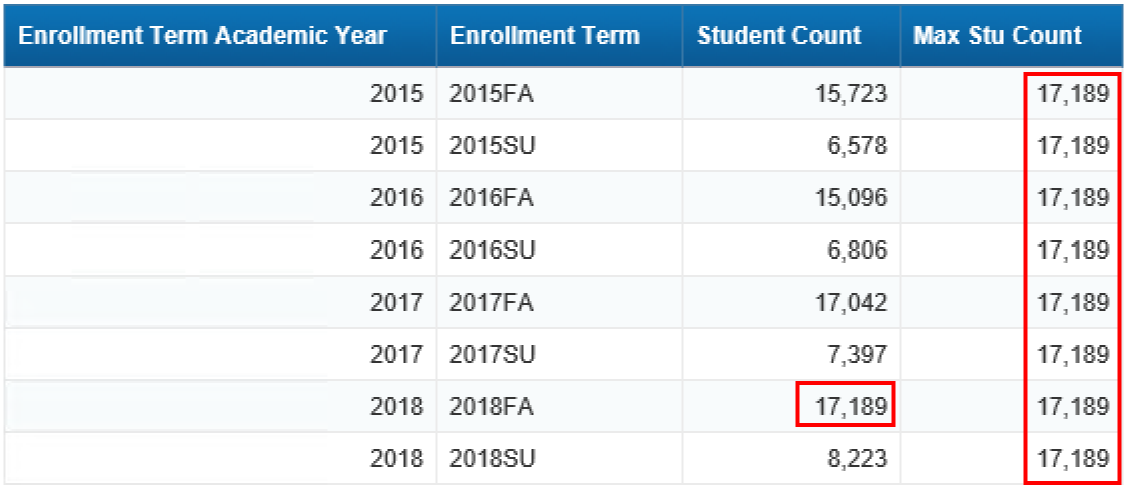
=Max ([Student Count]) In Report

This will result in the following report (with a small adjustment to the column title):



Enrollment Term Academic Year	Student Count	Max Stu Count
2015	18,763	21,161
2016	18,356	21,161
2017	20,594	21,161
2018	21,161	21,161

The aggregate maximum calculation will always return the maximum individual total within the report. Adding in another dimension, such as the "*Enrollment Term*" query object, will cause the expression to reflect the maximum aggregate value in the report, as below:



Enrollment Term Academic Year	Enrollment Term	Student Count	Max Stu Count
2015	2015FA	15,723	17,189
2015	2015SU	6,578	17,189
2016	2016FA	15,096	17,189
2016	2016SU	6,806	17,189
2017	2017FA	17,042	17,189
2017	2017SU	7,397	17,189
2018	2018FA	17,189	17,189
2018	2018SU	8,223	17,189

Learning Objective

At the end of this section, you will understand how to apply several of the calculation context modification operators in Web Intelligence to change the way aggregation happens within a Web Intelligence report. This section will allow you to apply the 'ForAll', 'In Report', and 'Where' operators to build a simple report analyzing student enrollment by enrolled course departments across multiple academic terms and years.

High Level Overview

1. Create a new Web Intelligence report
2. Select basic section enrollment dimensions and measures into report query
3. Build a list report comparing enrollment by department compared to the overall student enrollment for each term
4. Create a new report tab
5. Build a crosstab report showing enrollment by department over consecutive fall terms selected for the report providing a delta calculation comparing the enrollment for the first year with the enrollment for the last year
6. Save the document

Practice Steps

STEP 1: Create a new Web Intelligence report. Use the production version of "*BI Section Enrollment*" as the universe data source for the report.

STEP 2: In the query panel, add the following results objects from the source universe:

From the main "*BI Course Success and Enrollment*" folder:

- "*Enrollment Term"*
- *"Enrollment Term Academic Year"*
- *"Enrollment Term Year"*
- *"Enrollment Term Session Desc*"

From the "*Student Information*" sub-folder:

- "*Student ID*"

From the "*Student Enrollment Information*" sub-folder:

- *"Registered Credit*"

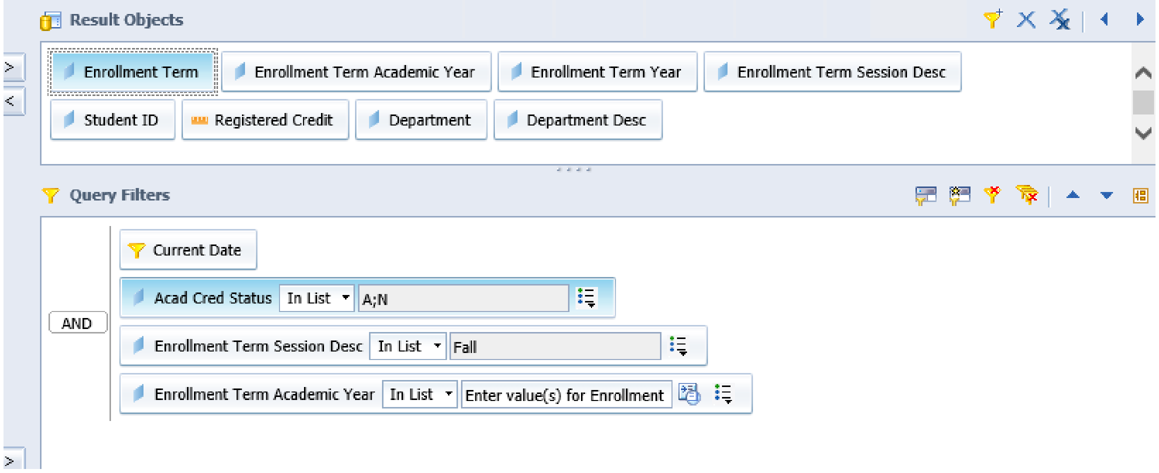
From the "*Section Information*" sub-folder:

- *"Department"*
- *"Department Desc"*

STEP 3: Add the following query filters for the report:

- The predefined "*Current Date*" filter
- A filter specifying that the "*Acad Cred Status*" from the "*Student Enrollment Information*" folder is A or N
- A filter specifying that the "*Enrollment Term Session Desc*" is "Fall"
- A filter prompting for a list of values for the "*Enrollment Term Academic Year*" object

When complete, your query panel should look something like this:



Result Objects

Enrollment Term | Enrollment Term Academic Year | Enrollment Term Year | Enrollment Term Session Desc
Student ID | Registered Credit | Department | Department Desc

Query Filters

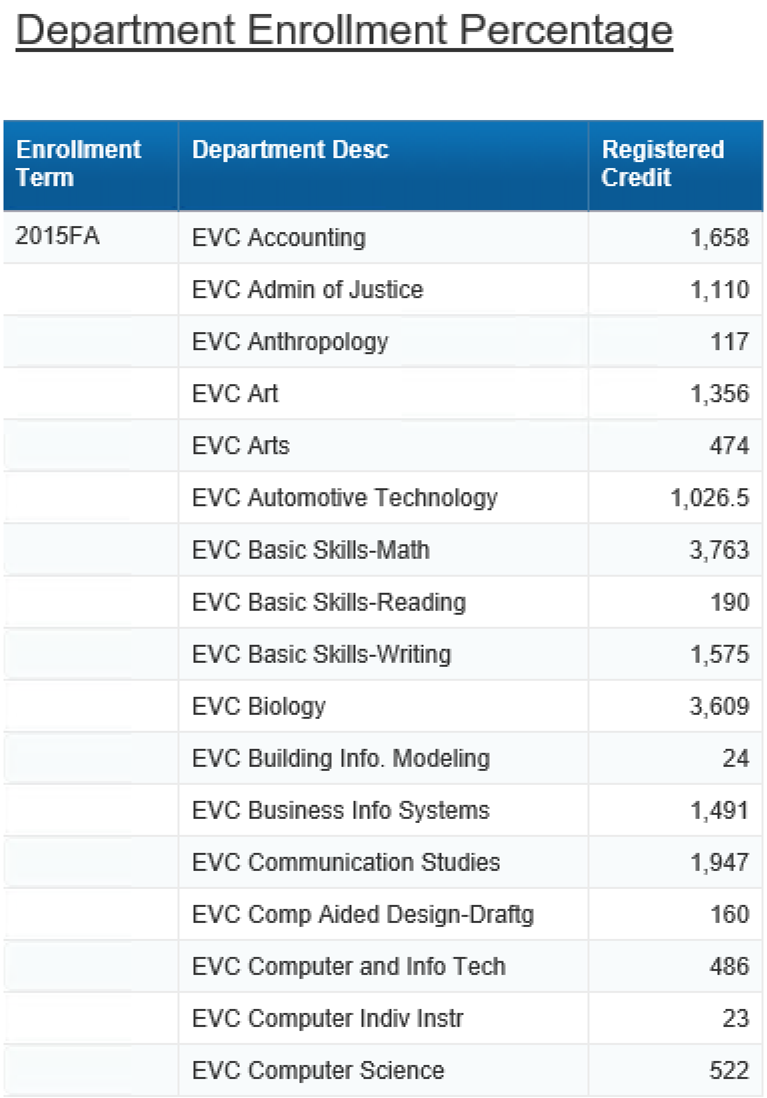
AND
Current Date
Acad Cred Status In List A;N
Enrollment Term Session Desc In List Fall
Enrollment Term Academic Year In List Enter value(s) for Enrollment

STEP 4: Run the query, selecting the most recent five academic years at the prompt. Modify the default table on the report so that it only contains the following fields, in this order:

- *"Enrollment Term"*
- *"Department Desc"*
- *"Registered Credit"*

STEP 5: Change the name of the new report tab to be "*Department Enrollment Percentage*".

STEP 6: Select the "*Enrollment Term*" column and create a report break on this column. At this point your report should look something like this:



Department Enrollment Percentage

Enrollment Term	Department Desc	Registered Credit
2015FA	EVC Accounting	1,658
	EVC Admin of Justice	1,110
	EVC Anthropology	117
	EVC Art	1,356
	EVC Arts	474
	EVC Automotive Technology	1,026.5
	EVC Basic Skills-Math	3,763
	EVC Basic Skills-Reading	190
	EVC Basic Skills-Writing	1,575
	EVC Biology	3,609
	EVC Building Info. Modeling	24
	EVC Business Info Systems	1,491
	EVC Communication Studies	1,947
	EVC Comp Aided Design-Draftg	160
	EVC Computer and Info Tech	486
	EVC Computer Indiv Instr	23
	EVC Computer Science	522

STEP 7: Create a new report variable called "*Student Count*" providing the distinct count of enrolled students. Use the following formula for this variable:

=Count([Student ID])

STEP 8: Create a new report variable called "*Student Count for All Departments*". This variable will use the 'ForAll' calculation context modification keyword to provide the distinct count of students independent of what department their enrolled course was in. Use the following formula for this variable:

=Count([Student ID]) ForAll ([Enrollment Term];[Department Desc])

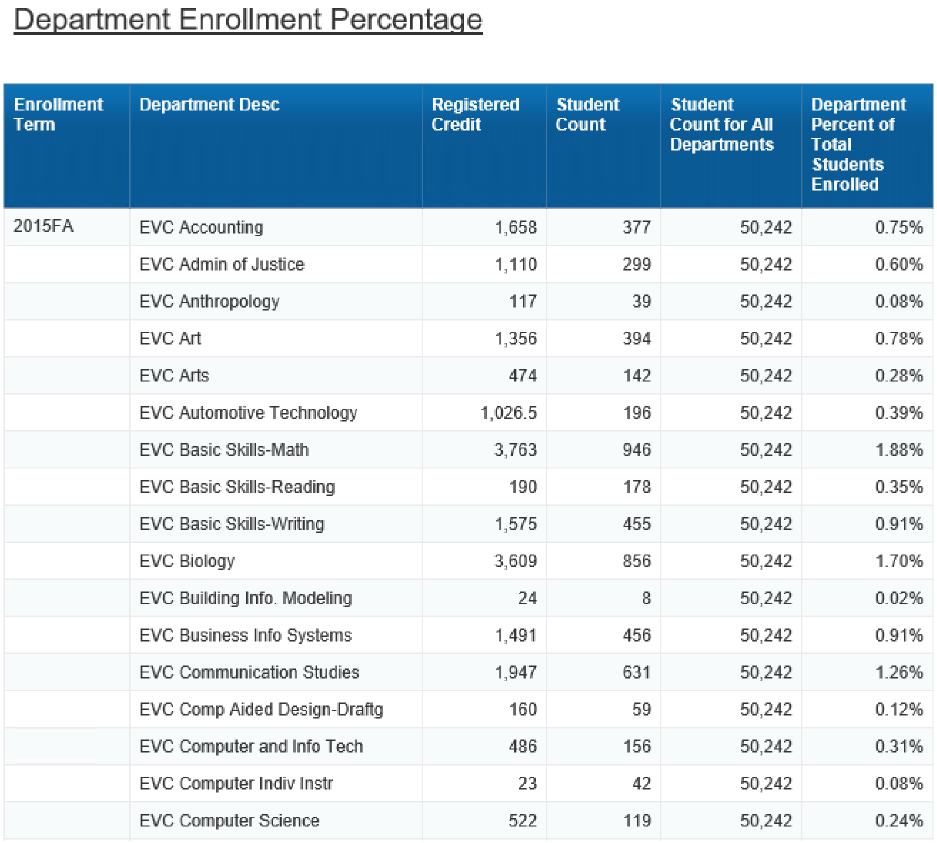
STEP 9: Create a new report variable called "*Department Percent of Total Students Enrolled*". This variable shows the proportion of the total distinct number of enrolled students that are enrolled in a course for specific department. Use the following formula for this variable:

=[Student Count] / [Student Count for All Departments]

STEP 10: Drag the “*Student Count*”, “*Student Count for All Departments*”, and “*Department Percent of Total Students Enrolled*” variable into the table.

STEP 11: Format the last column of the report as a percentage.

The completed report tab should look something like the following:



Department Enrollment Percentage

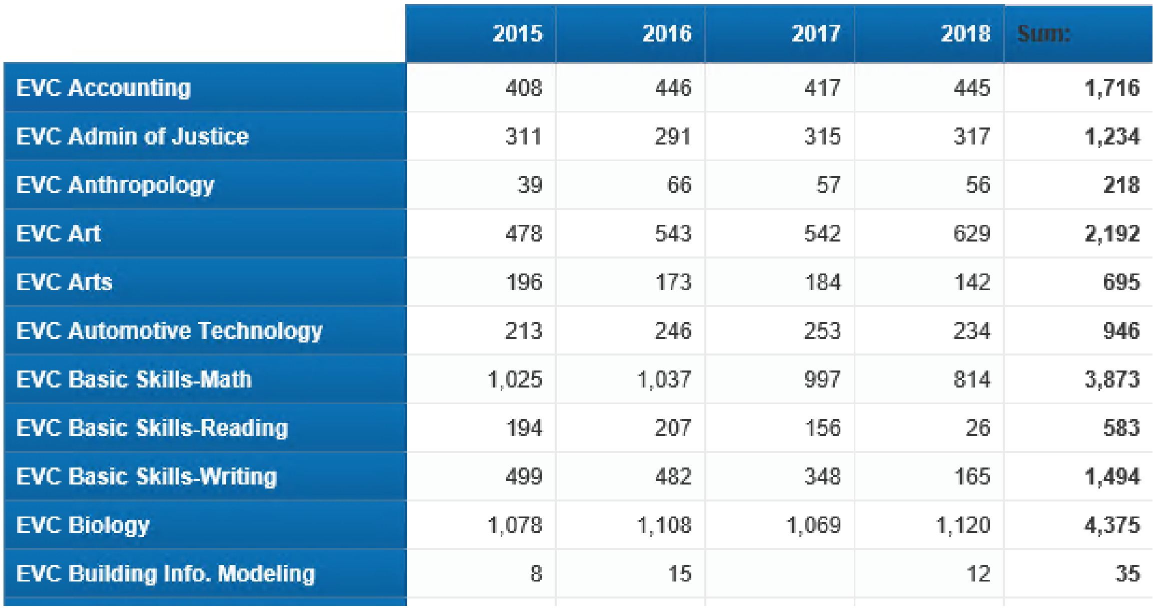
Enrollment Term	Department Desc	Registered Credit	Student Count	Student Count for All Departments	Department Percent of Total Students Enrolled
2015FA	EVC Accounting	1,658	377	50,242	0.75%
	EVC Admin of Justice	1,110	299	50,242	0.60%
	EVC Anthropology	117	39	50,242	0.08%
	EVC Art	1,356	394	50,242	0.78%
	EVC Arts	474	142	50,242	0.28%
	EVC Automotive Technology	1,026.5	196	50,242	0.39%
	EVC Basic Skills-Math	3,763	946	50,242	1.88%
	EVC Basic Skills-Reading	190	178	50,242	0.35%
	EVC Basic Skills-Writing	1,575	455	50,242	0.91%
	EVC Biology	3,609	856	50,242	1.70%
	EVC Building Info. Modeling	24	8	50,242	0.02%
	EVC Business Info Systems	1,491	456	50,242	0.91%
	EVC Communication Studies	1,947	631	50,242	1.26%
	EVC Comp Aided Design-Draftg	160	59	50,242	0.12%
	EVC Computer and Info Tech	486	156	50,242	0.31%
	EVC Computer Indiv Instr	23	42	50,242	0.08%
	EVC Computer Science	522	119	50,242	0.24%

STEP 12: Save your report with the name “*Enrollment Analysis by Department*”.

STEP 13: Create a new report tab in the Web Intelligence report. Rename this new tab “*Enrollment Delta over Report Period*”.

STEP 14: Create a crosstab on the new report. Drag the “*Department Desc*” object onto the vertical axis, the “*Enrollment Term Year*” object onto the horizontal axis, and the “*Student Count*” object into the center of the crosstab. Create totals for the rows and columns of the crosstab.

At this point the crosstab should look like this:



	2015	2016	2017	2018	Sum:
EVC Accounting	408	446	417	445	1,716
EVC Admin of Justice	311	291	315	317	1,234
EVC Anthropology	39	66	57	56	218
EVC Art	478	543	542	629	2,192
EVC Arts	196	173	184	142	695
EVC Automotive Technology	213	246	253	234	946
EVC Basic Skills-Math	1,025	1,037	997	814	3,873
EVC Basic Skills-Reading	194	207	156	26	583
EVC Basic Skills-Writing	499	482	348	165	1,494
EVC Biology	1,078	1,108	1,069	1,120	4,375
EVC Building Info. Modeling	8	15		12	35

STEP 15: Create a new report variable called "*First Year in Report*". This variable will determine the value of the earliest enrollment term year included in the report regardless of where it is placed in the report. The formula for the variable will use the 'In Report' calculation context keyword to do this. Use the following formula for this variable:

=Min ([Enrollment Term Year]) In Report

STEP 16: Similarly, create a new report variable called "*Last Year in Report*" using the Max() function.

STEP 17: Create a new report variable called "*First Year Count*". This variable will count the number of students enrolled during the first academic year included in the report. The formula for the variable will use the 'Where' conditional calculation context keyword to do this. Use the following formula for this variable:

=Count ([Student ID]) Where ([Enrollment Term Year] = [First Year in Report])

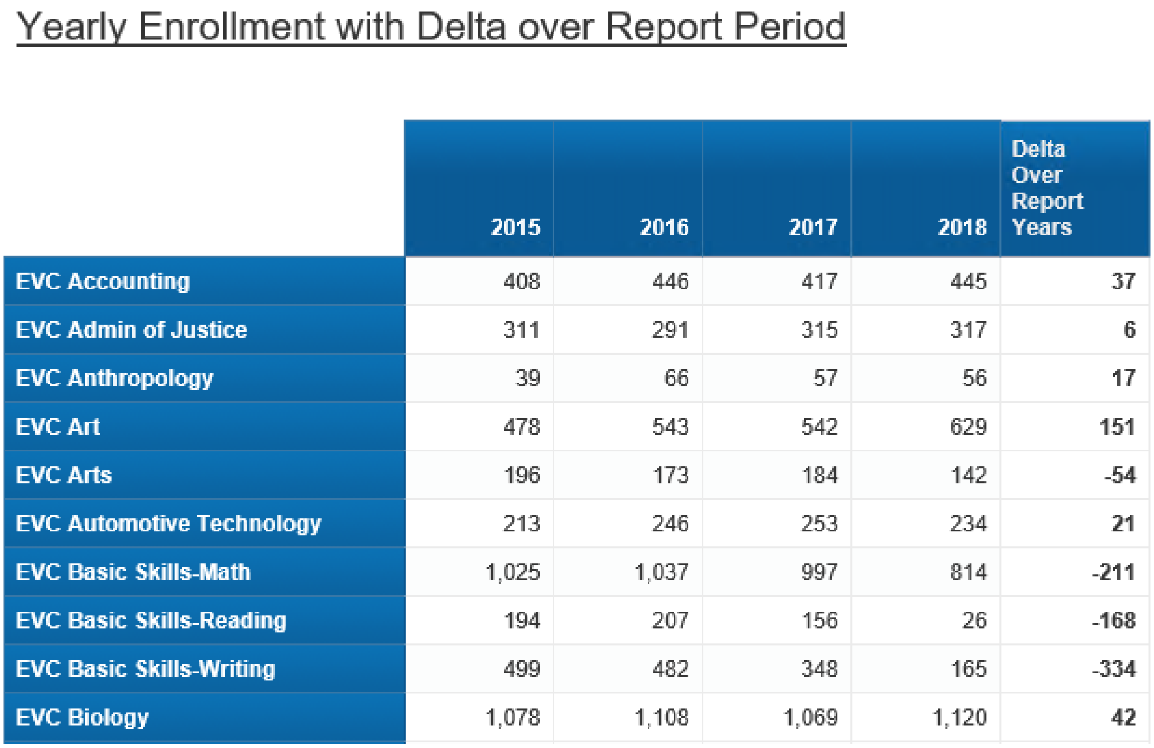
STEP 18: Similarly, create a new report variable called "*Last Year Count*".

STEP 19: Finally, create a variable called "*Delta Count*" which is simply the difference between "*Last Year Count*" minus "*First Year Count*".

STEP 20: Drag the new "*Delta Count*" variable over the top of the right-most column on the crosstab (replacing the sum of the crosstab row values that is already there). Change the title of the column to be "**Delta Over Report Years**".

STEP 21: Add a title to the crosstab with the text "**Yearly Enrollment with Delta Over Report Period**".

Your final crosstab should look something like this:



Yearly Enrollment with Delta over Report Period

	2015	2016	2017	2018	Delta Over Report Years
EVC Accounting	408	446	417	445	37
EVC Admin of Justice	311	291	315	317	6
EVC Anthropology	39	66	57	56	17
EVC Art	478	543	542	629	151
EVC Arts	196	173	184	142	-54
EVC Automotive Technology	213	246	253	234	21
EVC Basic Skills-Math	1,025	1,037	997	814	-211
EVC Basic Skills-Reading	194	207	156	26	-168
EVC Basic Skills-Writing	499	482	348	165	-334
EVC Biology	1,078	1,108	1,069	1,120	42

STEP 22: Save your report.

ADDITIONAL REFERENCES

Independent Materials

SAP BusinessObjects BI 4.0: The Complete Reference 3/E, Cindi Howson

SAP BusinessObjects Web Intelligence (Webi) 4.2: The Comprehensive Guide (4th Edition), Jim Brogden

BusinessObjects Designer XI v3, Robert Schmidt

SAP Documentation

SAP BusinessObjects Web Intelligence User's Guide 4.2

Using Functions, Formulas and Calculations in SAP BusinessObjects Web Intelligence 4.2

Check here for updates to these documents.

SAP online learning courses

(BOE310) SBOP BI PLATFORM 4.2 – Business Intelligence Platform: Administration and Security

(BOW310) SBOP BI PLATFORM 4.2 – Web Intelligence: Report Design 1

Ellucian Documentation

Using the DataOrchestrator ODS

Reporting from the DataOrchestrator ODS Data Models

Acronyms and Glossary

BI – Business Intelligence: a term used to describe all the activities and technologies involved in providing query and reporting and analysis to answer the business questions of an organization

Class – a folder in a Universe that is a collection of related data elements

Hierarchy – an order of precedence of data elements that implies a drill path such as Year → Month → Week → Day

Measure – a predefined calculation of a Universe class, such as a sum, average, etc.

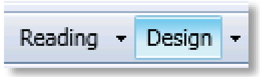
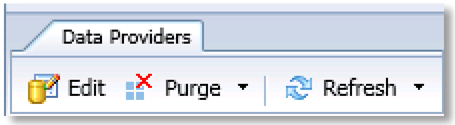
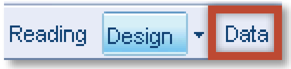
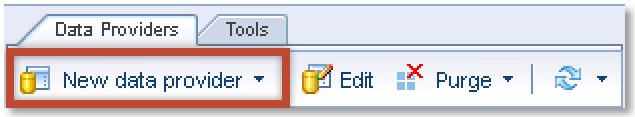
Object – a data element in a Universe class

ODS – Operational Data Store: a database containing data from one or more source systems organized in a way to support reporting and analysis

Universe(s) – file(s) in the BusinessObjects platform that provide a representation of data for reporting that hides the technical complexities behind the scenes and makes reporting easier.

APPENDIX 1: HTML VS. JAVA

After the release of 4.2 sp5 the Applet/Java and HTML version of Web Intelligence have almost reached feature parity. One functionality difference between Applet/Java and HTML is detailed in the table below. We find that HTML will suffice for report development/interaction, with its biggest advantage being that it is more stable than Java.

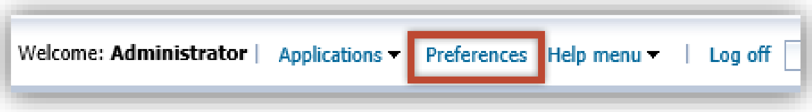
	HTML	Java
Data Source Changes	HTML does not provide a Data Panel view .  HTML does not provide the capability to add new data providers.  	Java provides ‘Data’ mode in addition to ‘Reading’ and ‘Design’. This allows the user to view the raw data underlying the query.  A new data provider can be selected directly from the report editor (without having to access the ‘Query Panel’).  Data Providers Tools New data provider Edit Purge

Sources: SAP Community Network, SAP Community Blog

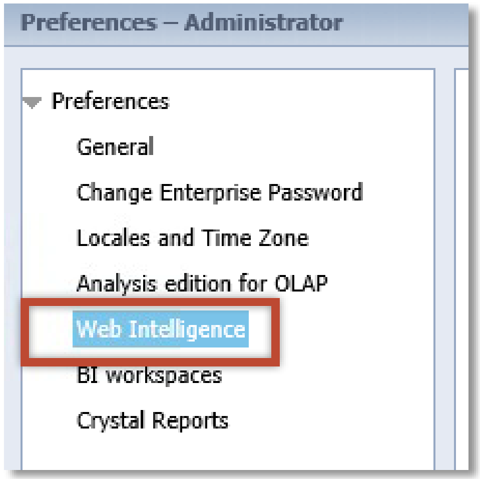
APPENDIX 2: ENABLING APPLET/JAVA

If you require any of the features exclusive to Java/Applet, below are the steps to enable it.

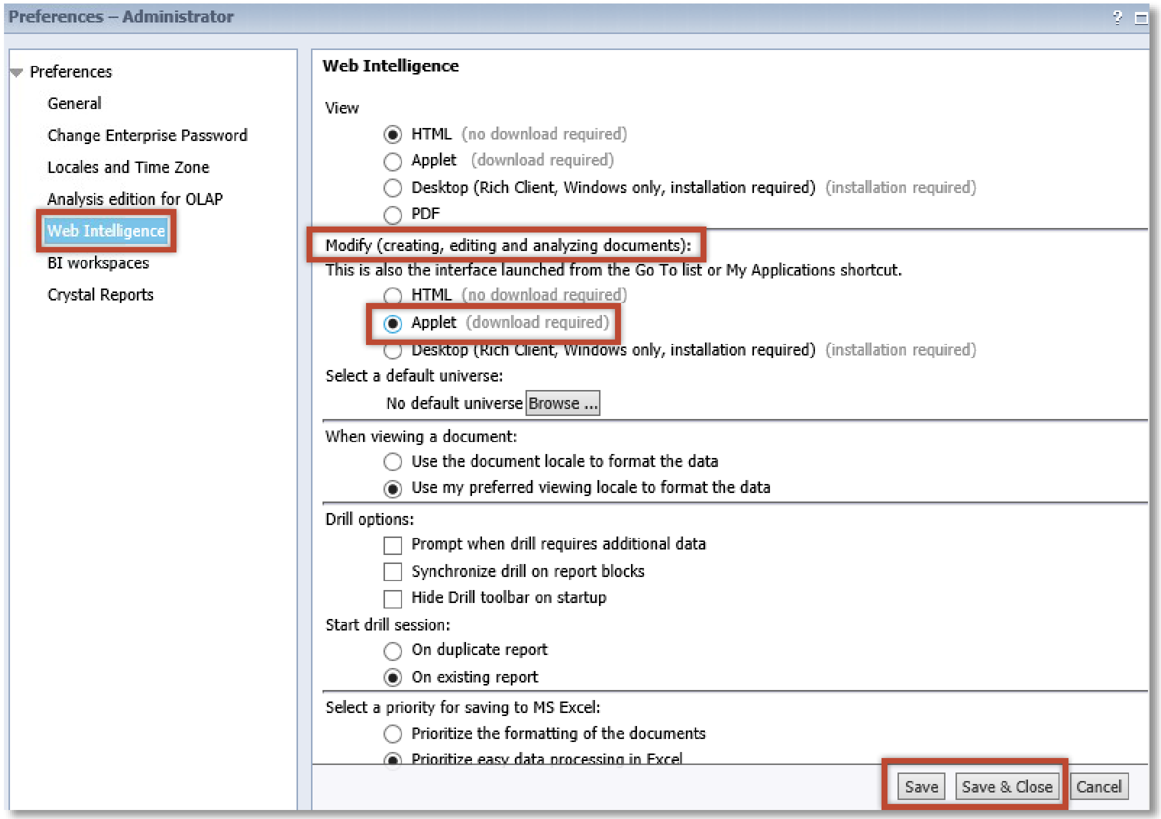
STEP 1: Click on 'Preferences' at the top right of your screen.



STEP 2: In the left navigation pane of the 'Preferences' dialog box, select 'Web Intelligence'.



STEP 3: Under *"Modify (creating, editing and analyzing documents):"*, change the selection from "*HTML*" to "*Applet*" and click '<u>Save</u>' or '<u>Save & Close</u>'.



Preferences – Administrator

Web Intelligence

View

- ● HTML (no download required)
- ○ Applet (download required)
- ○ Desktop (Rich Client, Windows only, installation required) (installation required)
- ○ PDF

Modify (creating, editing and analyzing documents):

This is also the interface launched from the Go To list or My Applications shortcut.

- ○ HTML (no download required)
- ● Applet (download required)
- ○ Desktop (Rich Client, Windows only, installation required) (installation required)

Select a default universe:

No default universe Browse ...

When viewing a document:

- ○ Use the document locale to format the data
- ● Use my preferred viewing locale to format the data

Drill options:

- □ Prompt when drill requires additional data
- □ Synchronize drill on report blocks
- □ Hide Drill toolbar on startup

Start drill session:

- ○ On duplicate report
- ● On existing report

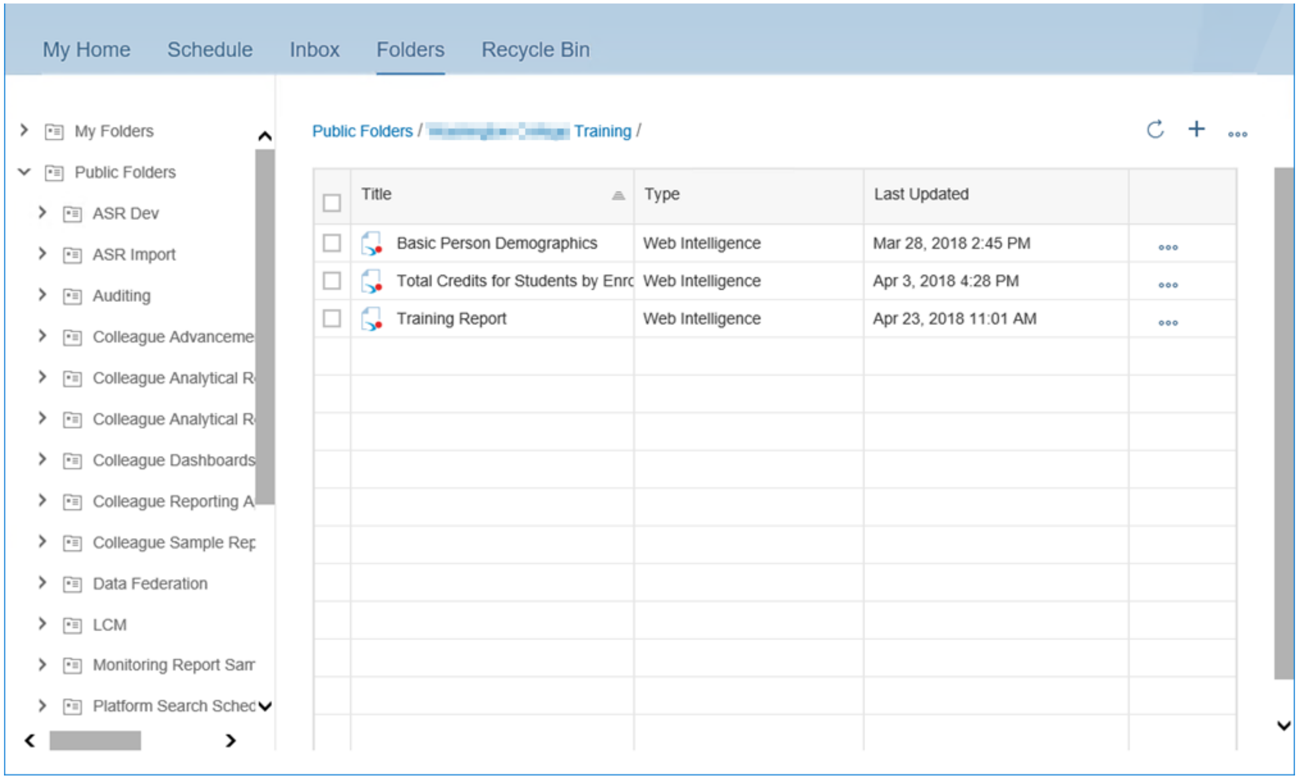
Select a priority for saving to MS Excel:

- ○ Prioritize the formatting of the documents
- ● Prioritize easy data processing in Excel

NOTE: You will have to install Java if you do not already have it on your computer to access this tool. In our experience, Mozilla Firefox is the browser that works best with Java. Again, the difference in presentation between HTML and Java are subtle but significant enough to be confusing so bear that in mind if you decide to change your preferences.

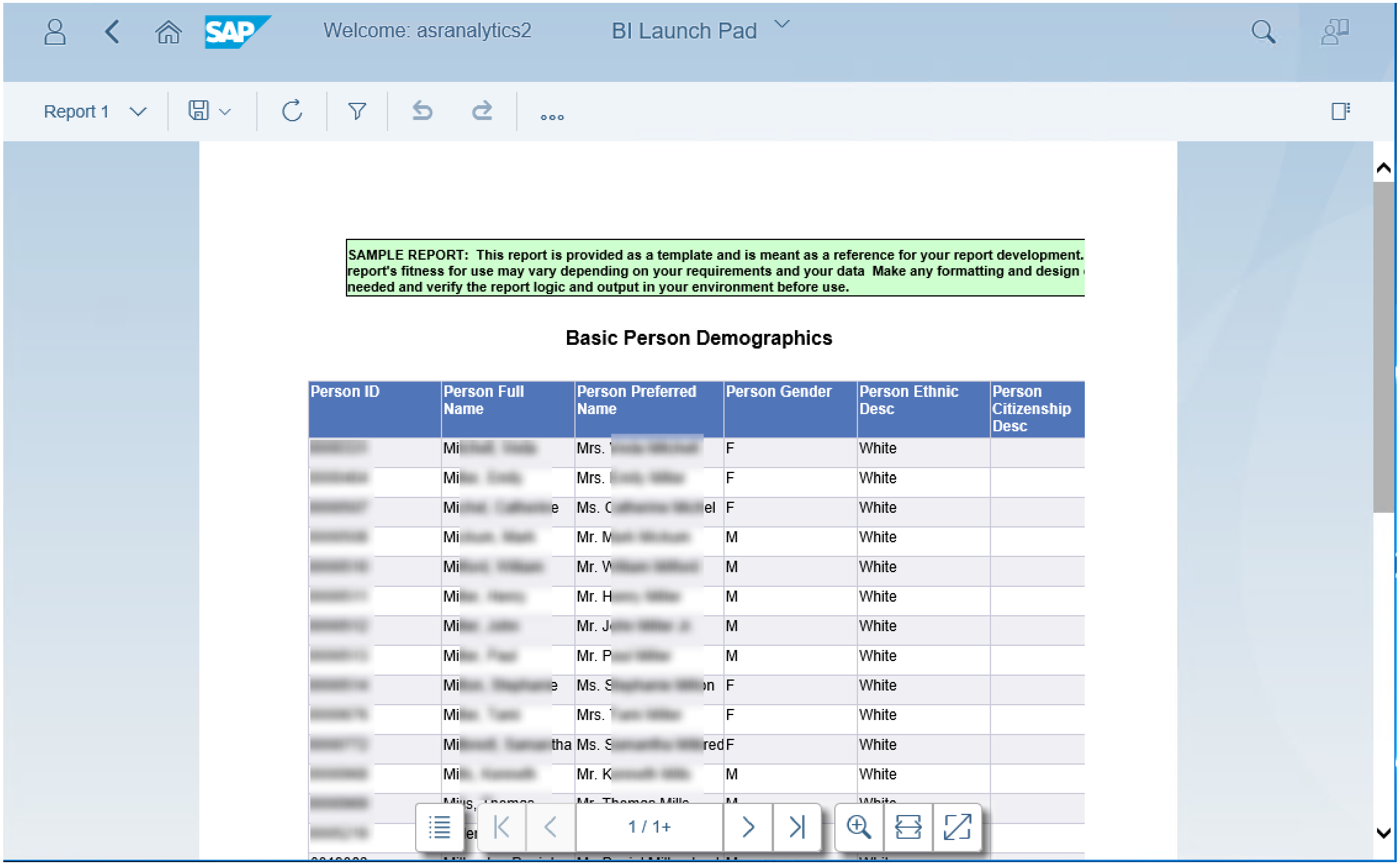
APPENDIX 3: WEB INTELLIGENCE INTERACTIVE VIEWER

The Web Intelligence Interactive View was released with SAP BI 4.2 SP04. The Interactive Viewer is a modernized interface designed to work on mobile devices with touch input and standard desktop browsers. The new BI Launch Pad with the Web Intelligence Interactive Viewer can be accessed through http://croa.sjecd.org:8080/BOE/BILaunchpad.



Public Folders / [redacted] Training /

□	Title	Type	Last Updated	
□	Basic Person Demographics	Web Intelligence	Mar 28, 2018 2:45 PM	•••
□	Total Credits for Students by Enrc	Web Intelligence	Apr 3, 2018 4:28 PM	•••
□	Training Report	Web Intelligence	Apr 23, 2018 11:01 AM	•••



SAMPLE REPORT: This report is provided as a template and is meant as a reference for your report development. report's fitness for use may vary depending on your requirements and your data Make any formatting and design needed and verify the report logic and output in your environment before use.

Basic Person Demographics

Person ID	Person Full Name	Person Preferred Name	Person Gender	Person Ethnic Desc	Person Citizenship Desc
[redacted]	Mi[redacted]	Mrs. [redacted]	F	White	
[redacted]	Mi[redacted]	Mrs. [redacted]	F	White	
[redacted]	Mi[redacted]e	Ms. C[redacted]el	F	White	
[redacted]	Mi[redacted]	Mr. M[redacted]	M	White	
[redacted]	Mi[redacted]	Mr. W[redacted]	M	White	
[redacted]	Mi[redacted]	Mr. H[redacted]	M	White	
[redacted]	Mi[redacted]	Mr. J[redacted]	M	White	
[redacted]	Mi[redacted]	Mr. P[redacted]	M	White	
[redacted]	Mi[redacted]e	Ms. S[redacted]n	F	White	
[redacted]	Mi[redacted]	Mrs. [redacted]	F	White	
[redacted]	Mi[redacted]tha	Ms. S[redacted]red	F	White	
[redacted]	Mi[redacted]	Mr. K[redacted]	M	White	
[redacted]	Mills, Thomas	Mr. Thomas Mills	M	White	
[redacted]	er				

Note: The Interactive Viewer directs report editors back to the HTML or Java version of Web Intelligence for editing reports.