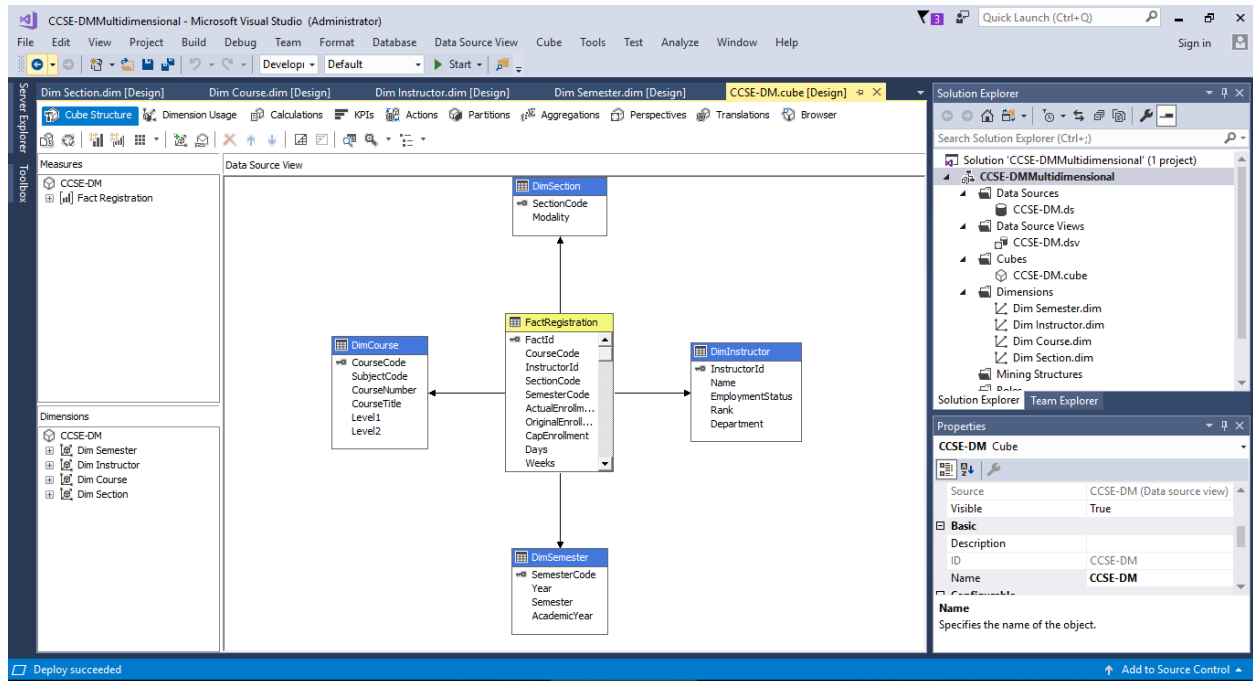


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## Cube Design

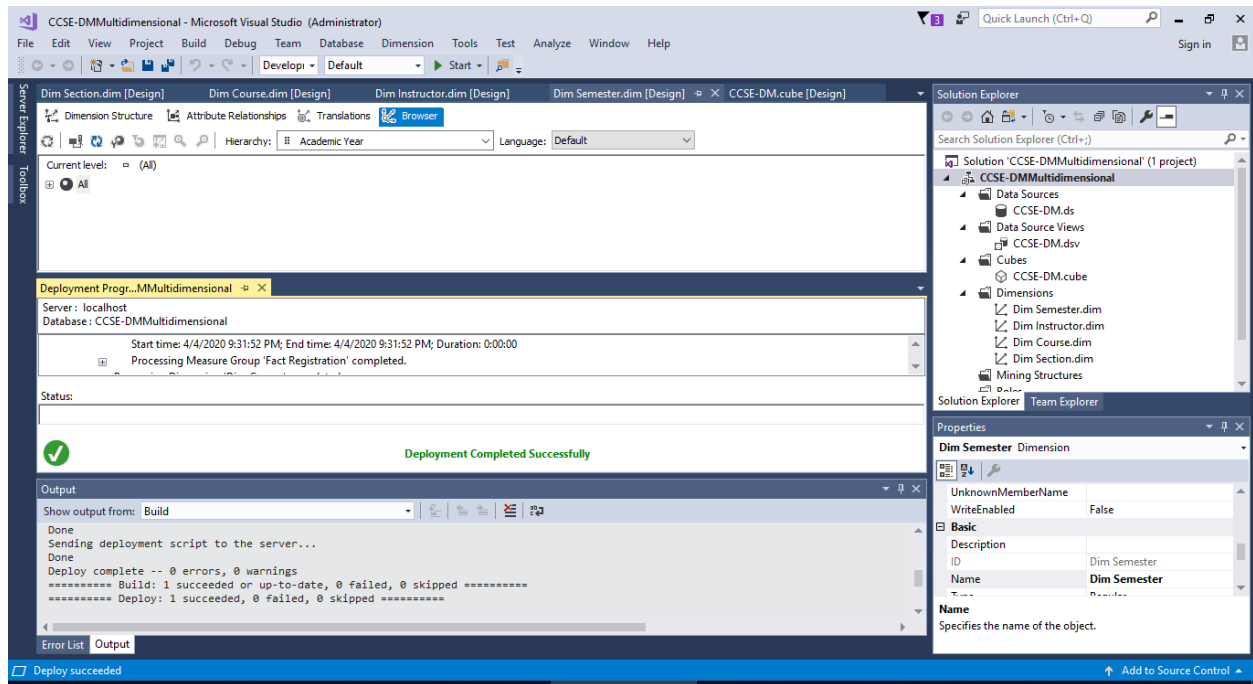


Pictured is the design of the data cube for the CCSE-DM database. For queries that I would need to perform I would utilize each of the dimension tables within the original database. The FactRegistration table included all of my measures for the data. The dimensions tables included all of my dimensions for the data.

Although I would not need attributes such as cap enrollment and course title for the 5 queries that I would need to perform, these attributes seemed like they would be useful if I were to access this data cube later on.

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## Deployment



The deployment of the data cube was a success and I was able to access the data cube within the SQL Server Management Studio.

## Query 1

```
select ([Measures].[Fact Registration Count],[Dim Instructor].[Employment Status].&[Adjunct],[Dim Instructor].[Department].[Department]) on columns, ([Dim Semester].[Semester].[Semester],[Dim Semester].[Year].[Year]) on rows from [CCSE-DM];
```

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The screenshot displays the Microsoft SQL Server Management Studio interface. The central pane shows the results of a query executed against the 'CCSE-DM' database. The query is a SELECT statement that filters for 'Fact Registration Count' by department (CSE, CSWE, IT) and semester (Fall, Spring, Summer) for the years 2009 through 2012. The results are presented in a table with columns for 'Fact Registration Count', 'Adjunct', and 'Fact Registration Count' (repeated for each department). The status bar at the bottom indicates 'Query executed successfully'.

		Fact Registration Count	Fact Registration Count	Fact Registration Count
		Adjunct	Adjunct	Adjunct
		CSE	CSWE	IT
Fall	2009	(null)	(null)	(null)
Fall	2010	(null)	10	17
Fall	2011	(null)	17	6
Fall	2012	(null)	(null)	(null)
Spring	2010	(null)	(null)	(null)
Spring	2011	1	7	13
Spring	2012	(null)	12	6
Summer	2010	(null)	(null)	(null)
Summer	2011	(null)	(null)	1
Summer	2012	(null)	(null)	(null)

For query 1 the number of classes taught by each part time instructor by semester is returned. The columns include the part time professors designated by department. The rows designate the date by semester.

### Query 2

select ([Measures].[Actual Enrollment],[Dim Course].[Level1].[Level1]) on columns,  
[Dim Semester].[Academic Year].[Academic Year] on rows  
from [CCSE-DM];

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The screenshot shows the Microsoft SQL Server Management Studio (SSMS) interface. The main window displays an MDX query in the 'Query Editor' pane. The query is as follows:

```
select ([Measures].[Actual Enrollment],[Dim Course].[Level1].[Level1]) on columns,  
[Dim Semester].[Academic Year].[Academic Year] on rows  
from [CCSE-DM];
```

The 'Results' pane shows the output of the query, which is a table with columns 'Actual Enrollment' and 'Academic Year'. The data is as follows:

Actual Enrollment	Academic Year
Grad	Undergrad
(null)	(null)
1595	2491
1781	2612
(null)	(null)

The 'Properties' pane on the right shows the 'Current query window options' and 'Current connection parameters'. The 'Current connection parameters' section shows the following values:

- Initial Database: CCSE-DMMultidimensional
- Server: STANDARD-49
- User: WIN\TCuffie1

The 'Current query status' section shows the 'Current Status' as 'Query executed successfully'.

Query 2 reflects the actual enrollment for sections by level of course and academic year. The columns designate the level of the course, graduate or undergraduate. The rows designate the academic year in which the course was held.

### Query 3

with member [Measures].[credits] as ([Measures].[Actual Enrollment]\*3)  
select [Measures].[credits] on columns,  
[Dim Semester].[Academic Year].[Academic Year] on rows  
from [CCSE-DM]  
where [Dim Section].[Modality].&[Online];

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The screenshot displays the Microsoft SQL Server Management Studio interface. The central pane shows a query window with the following SQL code:

```
with member [Measures].[credits] as ([Measures].[Actual Enrollment]*3)
select [Measures].[credits] on columns,
[Dim Semester].[Academic Year].[Academic Year] on rows
from [CCSE-DM]
where [Dim Section].[Modality].[Online];
```

The query results are displayed in a table with the following data:

Academic Year	credits
2009-2010	(null)
2010-2011	3510
2011-2012	4065
2012-2013	(null)

The Properties pane on the right shows the current query window options, connection parameters (Initial Database: CCSE-DMMultidimensional, Server: STANDARD-49, User: WIN\TCuffie1), and the current query status (Query executed successfully).

Query 3 displays the number of credits that were generated for online courses by academic year. The number of credits is the number of students enrolled multiplied by 3. The rows designate this data by academic year. The course is online where the modality of the course in the section table is listed as online.

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#### Query 4

SELECT [Measures].[Actual Enrollment] ON 0,

TOPCOUNT([Dim Instructor].[Name].[Name], 10, [Measures].[Actual Enrollment])

ON 1

FROM [CCSE-DM]

The screenshot shows the Microsoft SQL Server Management Studio interface. The query editor displays the following SQL query:

```
SELECT [Measures].[Actual Enrollment] ON 0,  
TOPCOUNT([Dim Instructor].[Name].[Name], 10, [Measures].[Actual Enrollment])  
ON 1  
FROM [CCSE-DM]
```

The query results are displayed in the Results pane, showing a table with two columns: Name and Actual Enrollment. The data is sorted in descending order of Actual Enrollment.

Name	Actual Enrollment
Vande Ven S	737
Brown R	538
Rutherford R	506
Halstead-N R	493
Peltzverge S	467
Lo C	442
Bernal B	416
Hung C	326
Karam O	326
Pourmaghsh H	326

The Properties pane on the right shows the current query window options, connection parameters, and status. The status indicates that the query was executed successfully.

Query 4 displays the 10 instructors with the most students from most to least. The first attribute of topcount is how the data should be separated. the argument's center attribute is the number of elements that should be returned, and the final attribute is what the ranking of the data should be based on.

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### Query 5

with member [Measures].[Average Enrollment] as ([Measures].[Actual Enrollment]/[Measures].[Fact Registration Count])  
select [Measures].[Average Enrollment] on columns,  
([Dim Course].[Level1].[Level1],[Dim Course].[Subject Code].[Subject Code]) on rows  
from [CCSE-DM];

The screenshot shows the Microsoft SQL Server Management Studio (SSMS) interface. The main window displays an MDX query in the 'Query Editor' pane. The query is as follows:

```
with member [Measures].[Average Enrollment] as ([Measures].[Actual Enrollment]/[Measures].[Fact Registration Count])  
select [Measures].[Average Enrollment] on columns,  
([Dim Course].[Level1].[Level1],[Dim Course].[Subject Code].[Subject Code]) on rows  
from [CCSE-DM];
```

The 'Properties' pane on the right shows the 'Current query window options' and 'Current connection parameters'. The 'Current connection parameters' section indicates the initial database is 'CCSE-DM', the server is 'STANDARD-49', and the user is 'WIN\vcuffie1'. The 'Current query status' section shows 'Query executed successfully'.

The 'Results' pane at the bottom displays the query results in a table format:

		Average Enrollment
Grad	CS	6.66929133858268
Grad	IT	12.2
Grad	SWE	5.75949367088608
Undergrad	CS	15.3709677419355
Undergrad	IT	13.8625
Undergrad	SWE	15.0615384615385

The status bar at the bottom indicates 'Query executed successfully' and 'STANDARD-49 WIN\vcuffie1 CCSE-DMMultidimensional 00:00:01'.

Query 5 returns the average enrollment of the courses by course level and subject. Average enrollment is a created member. It is the actual enrollment for a course divided by the number of sections of a course. The rows designate the course level and subject.

### Bonus Query

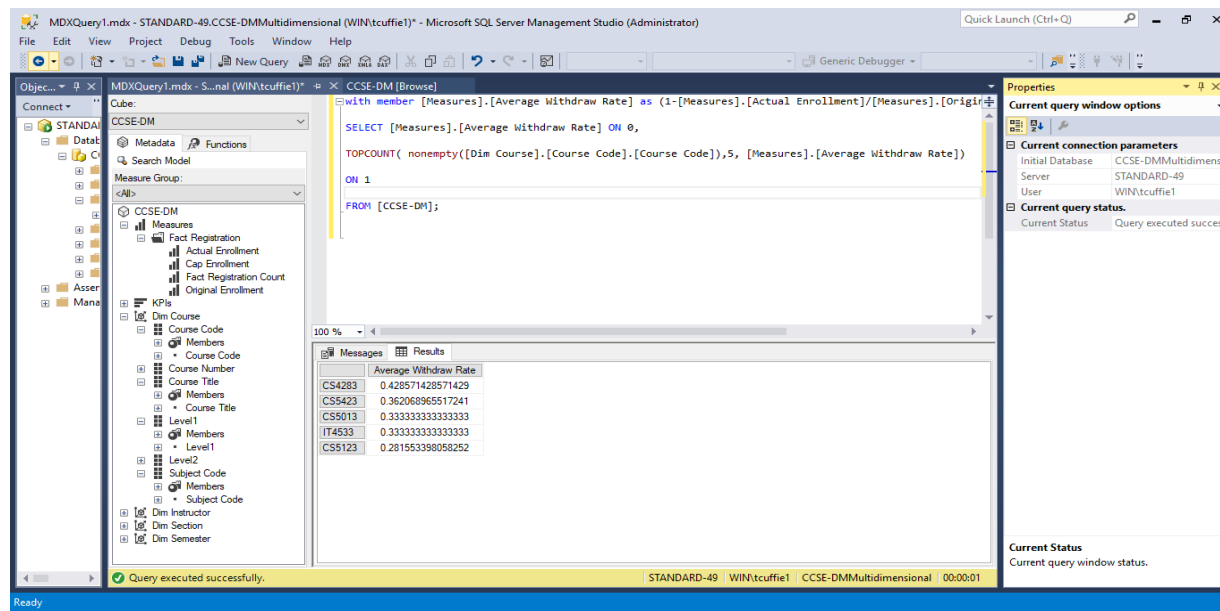
with member [Measures].[Average Withdraw Rate] as (1-[Measures].[Actual Enrollment]/[Measures].[Original Enrollment])

SELECT [Measures].[Average Withdraw Rate] ON 0,

TOPCOUNT( nonempty([Dim Course].[Course Code].[Course Code]),5, [Measures].[Average Withdraw Rate])

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ON 1

FROM [CCSE-DM];



Query 6 lists the top 5 courses with the highest withdraw rate. The withdraw rate is a created member found by subtracting the actual enrollment divided by the original enrollment from 1. The nonempty argument is used to weed out courses that simply did not have any sections listed in the data. For these courses, the withdraw rate came out to be 1. This is inaccurate because the actual enrollment/ the original enrollment falsely appear to be zero because there are no values for these date to begin with. The original enrollment itself is zero because the course was not offered. So without the nonempty argument the top 5 courses with the highest withdraw rate included 4 courses that had a withdraw rate of 1 because they were not offered. Weeding out these courses creates a more useful picture of what courses are actually being withdrawn from most frequently.

## Text Queries

### **Query 1**

select ([Measures].[Fact Registration Count],[Dim Instructor].[Employment Status].&[Adjunct],[Dim Instructor].[Department].[Department]) on columns, ([Dim Semester].[Semester].[Semester],[Dim Semester].[Year].[Year]) on rows from [CCSE-DM];

### **Query 2**



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```
select ([Measures].[Actual Enrollment],[Dim Course].[Level1].[Level1]) on columns,  
[Dim Semester].[Academic Year].[Academic Year] on rows  
from [CCSE-DM];
```

### Query 3

```
with member [Measures].[credits] as ([Measures].[Actual Enrollment]*3)  
select [Measures].[credits] on columns,  
[Dim Semester].[Academic Year].[Academic Year] on rows  
from [CCSE-DM]  
where [Dim Section].[Modality].&[Online];
```

### Query 4

```
SELECT [Measures].[Actual Enrollment] ON 0,  
  
TOPCOUNT([Dim Instructor].[Name].[Name], 10, [Measures].[Actual Enrollment])  
  
ON 1  
  
FROM [CCSE-DM]
```

### Query 5

```
with member [Measures].[Average Enrollment] as ([Measures].[Actual  
Enrollment]/[Measures].[Fact Registration Count])  
select [Measures].[Average Enrollment] on columns,  
([Dim Course].[Level1].[Level1],[Dim Course].[Subject Code].[Subject Code]) on rows  
from [CCSE-DM];
```

### Bonus Query

```
with member [Measures].[Average Withdraw Rate] as (1-[Measures].[Actual  
Enrollment]/[Measures].[Original Enrollment])  
  
SELECT [Measures].[Average Withdraw Rate] ON 0,  
  
TOPCOUNT( nonempty([Dim Course].[Course Code].[Course Code]),5, [Measures].[Average  
Withdraw Rate])  
  
ON 1  
FROM [CCSE-DM];
```