

National Assessment Governing Board

Developing Achievement Levels on the 2011 National Assessment of Educational Progress in Grades 8 and 12 Writing

Final Submitted: May 20, 2014

BoWTIE Technical User Guide

Submitted to:
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This study was funded by the
National Assessment Governing Board
under Contract ED-NAG-10-C-0003.



Standard Setting Software Deployment June 27, 2014

Availability of Data – Open Data Policy

In accordance with the U.S. government’s Open Government Directive, agencies are directed to share federal government data with the public, to increase transparency, participation, and collaboration (see <http://www.howto.gov/web-content/technology/sharing-government-data>). The Open Data Policy developed by the White House encourages making data available to the public, see <http://project-open-data.github.io/>. The U.S. Department of Education 2012 Open Government Plan can be found at <http://www.ed.gov/sites/default/files/opengov-plan-v20.pdf>.

Pursuant to this guidance, and in accordance with Federal Acquisition Regulations, the National Assessment Governing Board (Governing Board) is providing access to software and data prepared in support of the Governing Board’s contract work on standard setting. This work was performed under the legislative authority of the Governing Board to set achievement levels, see <http://www.nagb.gov/naep/naep-law.html>. More information on the Governing Board’s work is available at www.nagb.gov.

Background

The National Assessment Governing awarded two contracts in Fiscal Year 2010 to conduct standard setting work. Contract number ED-NAG-10-C-0003 was awarded to Measured Progress to develop achievement levels for the 2011 and 2013 National Assessment of Educational Progress (NAEP) writing assessments. Measured Progress developed a computerized process for conducting the achievement levels process.¹ The second contract, ED-NAG-10-C-0004, was awarded to WestEd to conduct Judgmental Standard Setting Studies (JSS) to identify the NAEP scores at the 12th grade representing the knowledge and skills in reading and mathematics needed to qualify for entry-level credit-bearing college courses and for job training programs in five selected occupations.² WestEd subcontracted with Measured Progress to conduct the studies implementing a computerized standard setting method. Both contracts utilized software developed by Measured Progress under contract, as detailed in the final technical and process reports posted on the Governing Board website.

¹ See final reports available at <http://www.nagb.gov/publications/achievement.html>

² <http://www.nagb.gov/what-we-do/preparedness-research/types-of-research/jss.html>

Software Availability under the Federal Open Data Policy

The Governing Board is making the software developed under these two contracts—Computer-Aided Bookmarking (CAB) and Body of Work Technological Integration and Enhancements (BoWTIE) available for public use via our website with a link to an external site for the download. Technical guides and user manuals to accompany the software download are provided via the Governing Board’s website. Please note that the software used for the contracts has been modified to remove confidential and personally identifiable information based on federal privacy and security requirements that can be found at <http://www2.ed.gov/notices/privacy/index.html> and at http://www2.ed.gov/about/offices/list/om/fs_po/ocio/ias.html. This requirement also adheres to OMB Circular A-130 provisions on electronic information dissemination policies and guidelines available at http://www.whitehouse.gov/omb/circulars_a130_a130trans4.

Limitations:

The Governing Board contracted for final products and deliverables that were developed under contract. The custom software developed to conduct the work was proposed by the contractors and accepted by the Governing Board, and the work was conducted with federal funds. The software and source codes are being made available to the public, as developed for the specific purposes specified under the contract, without technical modifications. The contractors, WestEd and Measured Progress have not asserted copyright to the software.

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Technical Support

The Governing Board will not provide technical support to users, and will not respond to queries pertaining to the software based on the fact that this work was completed under contract, and was a tool used to provide contract deliverables. Both contracts have expired. In its current form, the software would require significant modification by end users, as detailed in the technical and user guides. The Governing Board therefore will not be providing any technical support regarding the software. To assist users of the software, user manuals and technical guides provide system requirements in detail, and step by step instructions on downloading the software.

Disclaimer: External Links

The data and external links provided in the software documentation and guides are solely for our readers' use, information, and convenience. When readers select a link to an external website, they are leaving the ww.nagb.gov website and are subject to the privacy and security policies of the owners/sponsors of the external website.

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- Java is a trademark of Sun Microsystems, Inc. in the U.S. and certain other countries.

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Introduction

The BoWTIE Technical User Guide is intended to assist in the installation of the BoWTIE software on the server, administrator, and panelist computers.

This is a Windows application that was coded in C#. It connects to a Microsoft SQL 2005 database.

System Requirements

IMPORTANT: This is the known good environment that the software was developed on. The performed testing indicated that SQL Server® 2012 and Excel® 2010 will **not** work with the current version of the software. Development work will be required to upgrade the software to work with any new versions.

Server Requirements

- Microsoft® SQL Server 2005
- Microsoft Visual Studio® 2005

NOTE: All versions of .NET® Framework listed below are required.

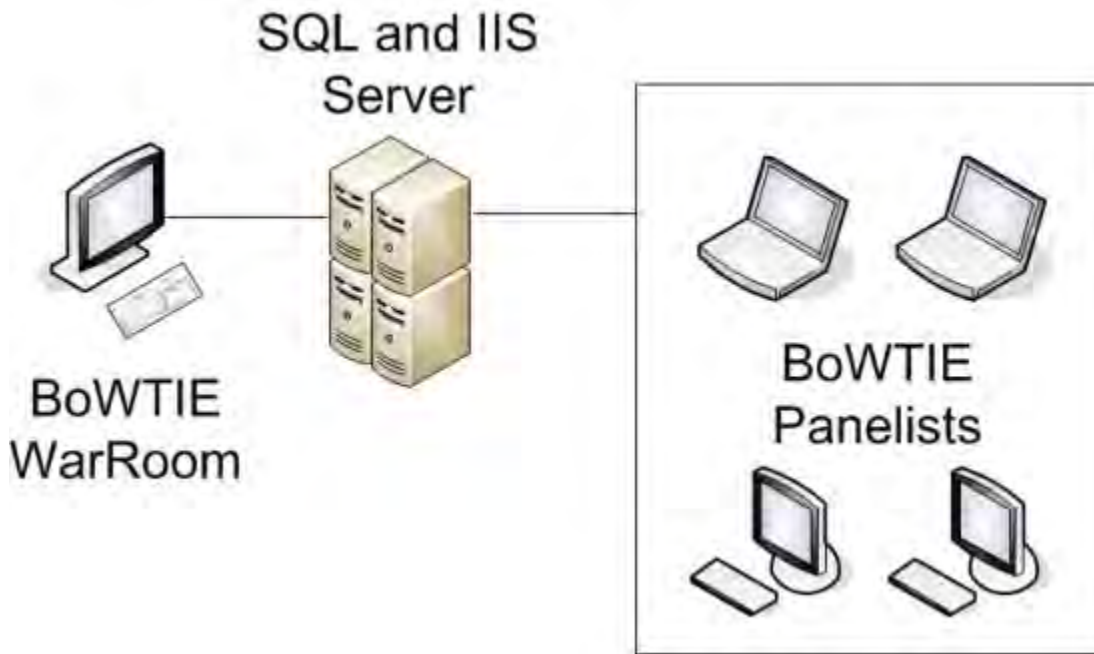
- Microsoft .NET Framework 2
<http://www.microsoft.com/en-us/download/details.aspx?id=6523>
- Microsoft .NET Framework 3.5
<http://www.microsoft.com/en-us/download/details.aspx?id=21>
- Microsoft .NET Framework 4
<http://www.microsoft.com/en-us/download/details.aspx?id=17718>
- Microsoft .NET 4 Extended

NOTE: Ensure that WebORB for .NET is included in the deployment package. WebORB for .NET licensing is for development mode only. Expanded usage will need a licensing agreement purchased from Midnight Coders. For more information visit <http://www.themidnightcoders.com/products/weborb-for-net/licensing.html>.

User Workstation Configuration

- Microsoft Silverlight®
<http://www.microsoft.com/silverlight>
- Microsoft Excel 2007
- Adobe® Flash® Player 11 for ActiveX
<http://helpx.adobe.com/flash-player/kb/archived-flash-player-versions.html#playerglobal>
- Adobe Reader®
<https://get.adobe.com/reader>
- BoWTIE Panelist or WarRoom Application

System Diagram



Included Files

The following files are provided:

- **BoWTIE.db.zip** – Compressed database baseline to restore
 - BoWTIE_backup_baseline.bak – database baseline including minimal information
 - Enable_Service_Broker_BoWTIE.sql – SQL query code used to enable the Service Broker
- **BoWTIE.deploy.zip** – Files used during setup
 - BoWTIE_IDrive folder – folder used to deploy directory structure to server and mapped on individual computers
 - MP.BoWTIE.WarRoom.Templates folder – template files used to import information
- **BoWTIE.src.zip** – Source code - All source files used for the BoWTIE development

Installing the BoWTIE Software

These instructions explain the procedures for installing the BoWTIE application including the database and server setup.

Software requirements: Each computer that will have the WarRoom administration software installed must have a copy of Microsoft Excel 2007 installed. The database server will need to have SQL 2005 installed.

NOTE: Each computer will need to be setup to work for their assigned task.

This section contains the following:

- Setup the BoWTIE Database
- Setup the WarRoom Application
- Setup the Panelist Application

Setup the BoWTIE Database

These instructions explain the procedures for setting up the BoWTIE server. This process should be completed prior to setting up the panelist or WarRoom computers.

Software requirements: The database server will need to have SQL 2005 installed.

IMPORTANT: The following database items must be performed by a professional database administrator and are only intended as guidelines to assist in making the software work.

1. Create a database (e.g. YOUR_DATABASE_NAME_HERE).

NOTE: Make sure that **Mixed Mode authentication** is turned on before performing the next step.

2. Create a SQL login and give it db_owner rights to the database.
3. From the zip file **BoWTIE.db.zip**, restore the database backup **BoWTIE_backup_baseline.bak**.
4. Make note of the credentials and server name as you will need them when setting up the WarRoom and Panelist applications.

NOTE: The **Broker Service** must be enabled in SQL in order for the application to run. The following steps will enable the service.

5. Open the file **enable_service_broker_bowtie.sql** in SSMS.
6. Change the database name to the name from Step 1.
7. Execute the script to enable the service for the database.
8. Check the table shown to ensure the column **IsBrokerEnabled** shows a 1 next to the specified database.

In addition to the steps above, the folder **BoWTIE_IDrive** will need to be setup on a network location and mapped as the **I:** drive on each Panelist and Administrator computer.

Setup the WarRoom Application

These instructions explain the steps to setup the WarRoom application. The database setup must be completed prior to setting up the WarRoom and Panelist applications. See "Setup the BoWTIE Database" on page 6 for more information.

Software requirements: The WarRoom computer must have Microsoft Excel 2007 installed to make use of all application features.

IMPORTANT: You will need to know the user name and password for the BoWTIE server and the name of the server prior to completing the steps below.

NOTE: The configuration file changes can be made prior to copying the folder to the destination computer if desired.

1. An account with System Administrator rights will need to be used to edit the local Windows **hosts** file. Add an entry for the database host that says: **[YOUR SERVER HOST IP ADDRESS]**
[YOUR SERVER HOST NAME #BoWTIE Host]
2. Unzip the folder **BoWTIE.deploy.zip**.
3. Open the **BoWTIE_IDrive** folder and drill down to the folder **BoWTIE\app\WarRoom**.
4. Using Microsoft Notepad or another text editor, edit the file **MP.BoWTIE.WarRoom.exe.config** and make the following changes in the section **BoWTIE_Entities** to change the connection string to:
 - a. Set catalog = **[YOUR DATABASE NAME]**
 - b. Set source = **[YOUR SERVER HOST NAME or IP ADDRESS]**

- c. Set UID = *[YOUR DATABASE CREDENTIALS]*
5. In the file **MP.BoWTIE.WarRoom.exe.config**, make the following changes in the section **BoWTIE_Membership** to change the connection string to:
 - a. Set catalog = *[YOUR DATABASE NAME]*
 - b. Set source = *[YOUR SERVER HOST NAME or IP ADDRESS]*
 - c. Set UID = *[YOUR DATABASE CREDENTIALS]*
6. In the file **MP.BoWTIE.WarRoom.exe.config**, make the following changes in the section **<appender name="AdoNet Appender">** to change the connection string to:
 - a. Set catalog = *[YOUR DATABASE NAME]*
 - b. Set source = *[YOUR SERVER HOST NAME or IP ADDRESS]*
 - c. Set UID = *[YOUR DATABASE CREDENTIALS]*
7. Save your changes. You will make the same changes to the configuration file for the Panelist application.
8. Copy the **BoWTIE_IDrive** folder to the desired location on the hard drive of the destination computer. This can be the desktop, the **C: drive**, or the **Program Files** directory.
9. This folder needs to be mapped as the I: drive on the computer for the software to work correctly. This shared directory will be used on all panelist/WarRoom computers.
10. Create a shortcut on the desktop of the computer that points to the **MP.BoWTIE.WarRoom.exe** file.

Setup the Panelist Application

These instructions explain the steps to setup the Panelist application. The database setup must be completed prior to setting up the WarRoom and Panelist applications. See "Setup the BoWTIE Database" on page 6 for more information.

IMPORTANT: You will need to know the user name and password for the BoWTIE server and the name of the server prior to completing the steps below.

NOTE: The configuration file changes can be made prior to copying the folder to the destination computer(s) if desired.

NOTE: Step 1 is optional if you use the IP address for the server in steps 3, 4, and 5 below.

1. An account with System Administrator rights will need to be used to edit the local Windows **hosts** file. Add an entry for the database host that says: **[YOUR SERVER HOST IP ADDRESS]
[YOUR SERVER HOST NAME #]BoWTIE Host**
2. Open the **BoWTIE_IDrive** folder and drill down to the folder **BoWTIE\app\App**.
3. Using Microsoft Notepad or another text editor, edit the file **MP.BoWTIE.exe.config** and make the following changes in the section **BoWTIE_Entities** to change the connection string to:
 - a. Set catalog = *[YOUR DATABASE NAME]*
 - b. Set source = *[YOUR SERVER HOST NAME or IP ADDRESS]*
 - c. Set UID = *[YOUR DATABASE CREDENTIALS]*
4. In the file **MP.BoWTIE.exe.config**, make the following changes in the section **BoWTIE_Membership** to change the connection string to:
 - a. Set catalog = *[YOUR DATABASE NAME]*
 - b. Set source = *[YOUR SERVER HOST NAME or IP ADDRESS]*
 - c. Set UID = *[YOUR DATABASE CREDENTIALS]*

5. In the file **MP.BoWTIE.exe.config**, make the following changes in the section **<appender name="AdoNet Appender">** to change the connection string to:
 - a. Set catalog = *[YOUR DATABASE NAME]*
 - b. Set source = *[YOUR SERVER HOST NAME or IP ADDRESS]*
 - c. Set UID = *[YOUR DATABASE CREDENTIALS]*
6. Save your changes. You will make the same changes to the configuration file for the WarRoom application.
7. Copy the **BoWTIE_IDrive** folder to the desired location on the hard drive of the destination computer. This can be the desktop, the **C: drive**, or the **Program Files** directory.
8. This folder needs to be mapped as the I: drive on the computer for the software to work correctly. This shared directory will be used on all panelist/WarRoom computers.
9. Create a shortcut on the desktop of the computer that points to the **MP.BoWTIE.exe** file.

Tables

The following list provides the names of the tables in the database that can be modified to change the descriptions of selected items.

BoWTIE WarRoom

Table	Modifies
dbo.panelist	Set panelist Symbol / secret code
dbo.panel	Set grades that panelists can be assigned to (i.e., 8 or 12)
dbo.group	Set groups that panelists can be assigned to (i.e., Group A or Group B)
dbo.table	Set tables that panelists can be assigned to (i.e, Table 1 or Table 2)
dbo.itinerary	Set the itinerary and description
dbo.grade	Set grades

To change the Achievement Level Descriptions (ALDs), a developer will need to edit the **PolicyDefinitionsView.xaml** file in the **MP.BoWTIE.PanelistModule** source code.

Uninstalling the Software

To uninstall BoWTIE, unmap the **I:** drive and delete the shortcut from the desktop of the panelist and WarRoom computers.

Appendix

IMPORTANT: The following appendix items are intended for use by a professional database administrator and are only intended as guidelines to assist in making the software work. **Please note that the original developer was the only one able to make these scripts work.**

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Import Item Statistics

This document explains how to properly load the various BoWTIE database item tables from the spreadsheet files received by the Psychometrics department.

You will need Microsoft Excel 2007 and Microsoft SQL Server 2005 Management Studio version 11.0.3128.0, and the following Excel files:

- **Item Statistics Template.xls** – Template file given to the Psychometrician to be populated
- **Item Statistics.xls** – Populated **Item Statistics Template.xls** file used to import data into the BoWTIE database

IMPORTANT: All columns are required to have a value.

Instruction Summary

Prepare Database

- Clear existing data in the database prior to loading new data
- Check relevant tables for correct data needed

Load spreadsheet data into ItemStatistics table

Loads data into a single table named ItemStatistics

Populate ancillary tables from ItemStatistics

Pulls data from ItemStatistics and populates several other Item related tables

Affects the following tables:

- [dbo].[ItemStatistics]
- [dbo].[ItemData]
- [dbo].[DParameter]

Prepare Database

1. In Microsoft SQL Server 2005 Management Studio, execute the following SQL commands, in order:

```
Use YOUR_DB_NAME_HERE
DELETE FROM ItemStatistics
DELETE FROM ItemData
DELETE FROM DParameter
```

IMPORTANT: Make sure you are pointing to the correct database on the server.

2. Press **F5** to run the SQL commands. This clears out the tables that will be populated with new data in the following steps.
3. Check relevant tables for correct data needed:

Review the Grade and Panel tables

Grade:

1. In SS2005MS run **select * from grade**.
2. Verify that table contains the correct grades for the data you are importing.

Panel:

1. In SS2005MS run **select * from Panel**.
2. Verify that table contains the correct grades for the data you are importing.

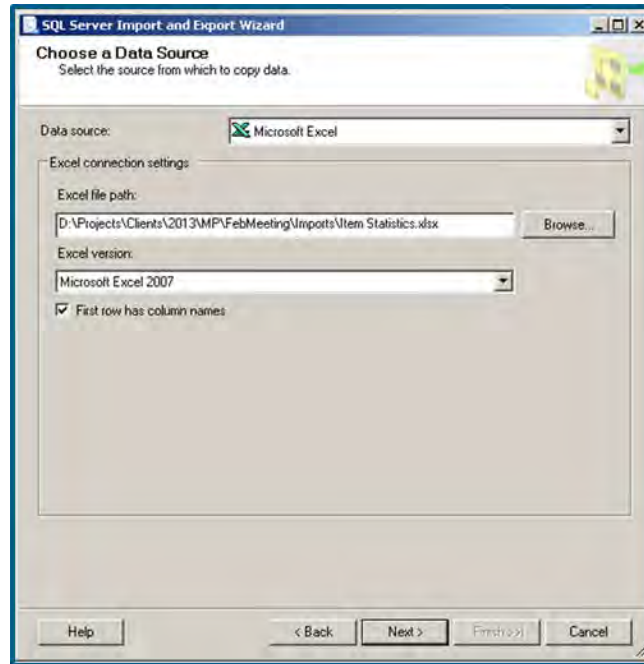
IMPORTANT: If you entered new Grades into the Grade table, you will have to make the appropriate entry in the Panel table.

Load Data Item into the ItemStatistics Table

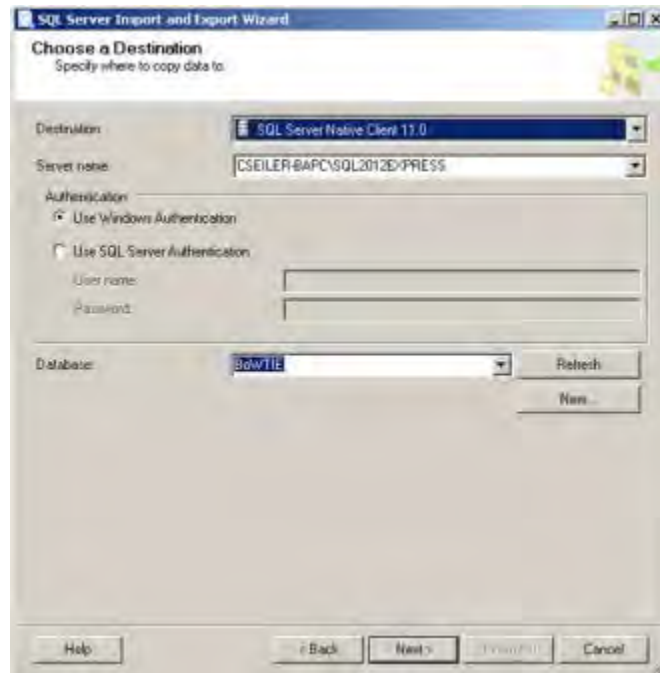
You must load data from **ItemStatistics.xls** into **ItemStatistics** table.

Use SQL Server Management Studio for this step, which will import spreadsheet data.

1. Right-click on database name, select **Tasks**, select **Import Data**.



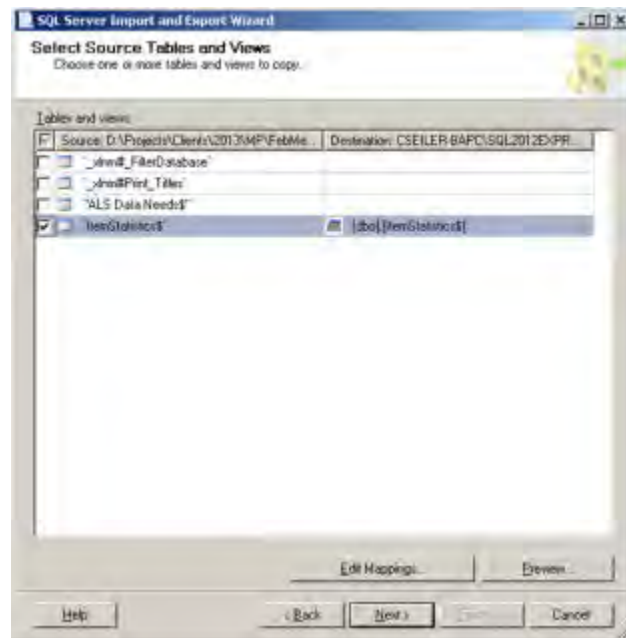
2. Change **Data Source** to Microsoft Excel and enter the path and file name of the Excel spreadsheet.
3. Make sure **First row has column names** check box is checked, then click **Next**.



4. Select the **Server Name**, in this example, **(local)SQLEXPRESS**. Usually MSQL11A is correct.
5. Select the database. For example, BoWTIE_Dev.
6. Click **Next**.



7. Defaults to **Copy data from one or more tables or views**. Keep this setting and click **Next**.

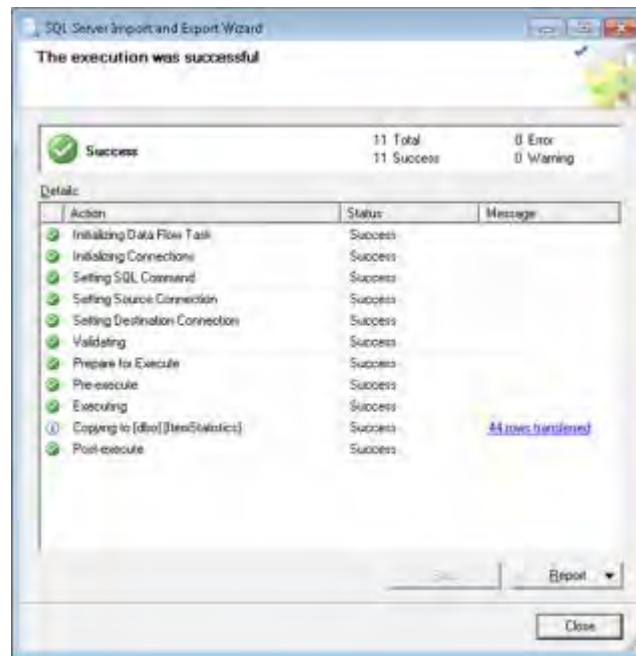


8. Select the worksheet in the Excel spreadsheet that contains the item statistics.

IMPORTANT: Do not click **Next** yet.

9. In the **Destination** column, change the name from **[dbo].[ItemStatistics\$** to **[dbo].[ItemStatistics]** (the actual name of the database table).
10. Click **Next**.
11. Click **Next**.
12. Click **Finish**.

If the load is successful, the following window appears showing no errors:



Data is now in the ItemStatistics table in the database. This table is not used directly by the BoWTIE application, but is a **staging** table for the next set of steps that populate item related data into various tables that will be used by the application.

Populate Ancillary Tables from ItemStatistics

Run the following SQL scripts, in order, using SSMS. To get the script into SSMS, use File > Open, or drag and drop the .sql file from Windows Explorer onto the SSMS window. Make sure that the correct database is selected.

- FillItemDataFromItemStatistics.sql
- FillDParameterFromItemStatistics.sql

Import Student Responses Overview

This document explains how to properly load the various BoWTIE database Student tables from the spreadsheet files received by the Psychometrics department. Another document explains how to load the item tables.

General Information

Tools Used

- Microsoft Excel 2007
- Microsoft SQL Server 2005 Management Studio version 11.0.3128.0

Required Files

- ItemStatisticsTemplate.xls – Template file given to the Psychometrician to be populated
- ItemStatistics.xlsx – Populated Item Statistics Template.xls file used to import data into the BoWTIE database

IMPORTANT: All columns are required to have a value.

Instruction Summary

Database preparation

- Clear existing data in the database prior to loading new data

Loading data from spreadsheet into StudentResponse table

- Loads data into a single table named StudentResponse

Populate ancillary tables from StudentResponse

- Pulls data from StudentResponse and populates several other Student related tables

Loading of EAP and ScaleScore data from spreadsheet

The final step is to load additional spreadsheet data into a temporary table and update the StudentData table with EAP and ScaleScore data.

Affects the following tables:

- [dbo].[StudentData]
- [dbo].[StudentResponse]
- [dbo].[StudentPrompt]
- [dbo].[StudentRawScore]

Response File Format – PromptId_StudentId(10 dig)_PromptedScore(1 dig).pdf

Question File Format – etsId.jpg

Prepare the Database

Execute the following SQL commands, in order, using SQL Server Management Studio (SSMS).

IMPORTANT: Make sure you are pointing to the correct database on the server.

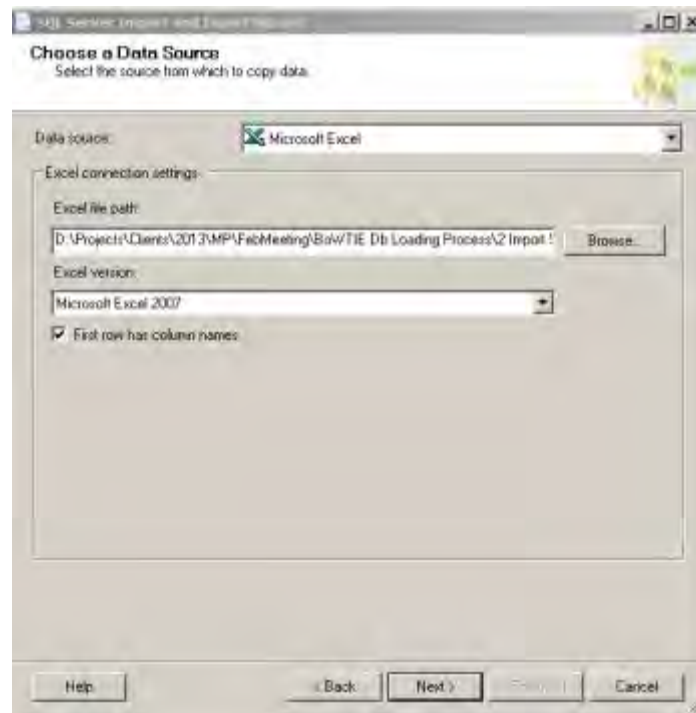
- DELETE FROM StudentResponse
- DELETE FROM StudentPrompt
- DELETE FROM StudentRawScore
- DELETE FROM StudentData

This clears out the tables that will be populated with new data in the following steps.

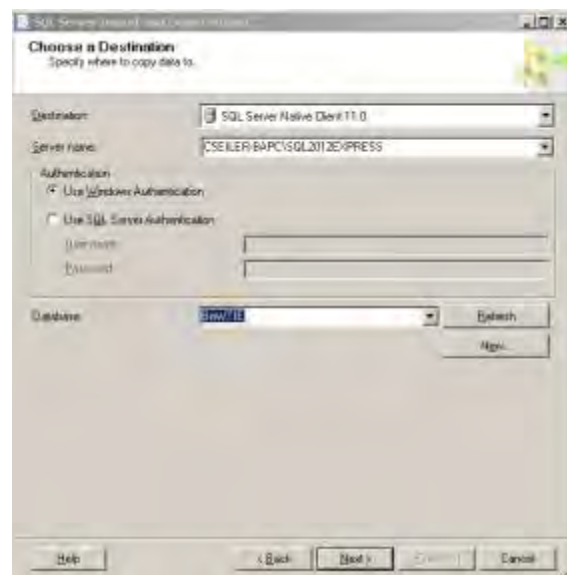
Load Data into the StudentResponseTable

Use SSMS for this step, which will import spreadsheet data.

1. Right-click on the database name, select **Tasks**, and select **Import Data**.



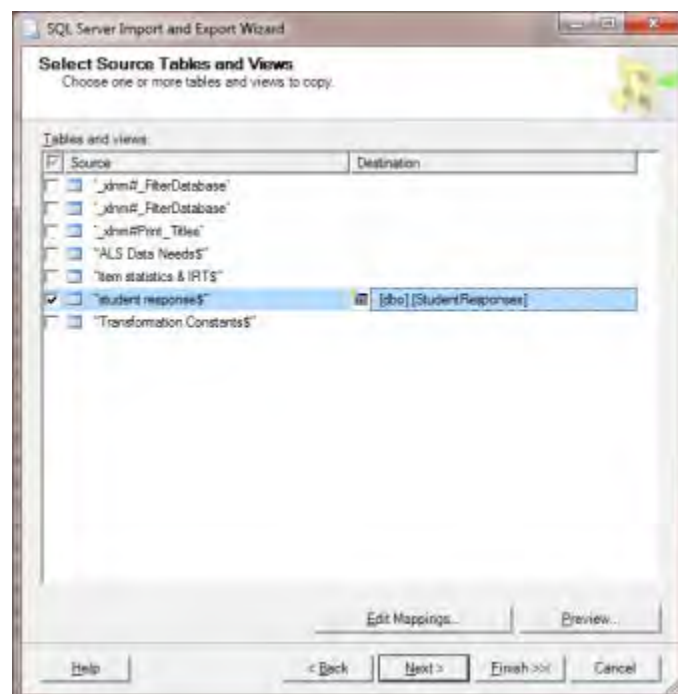
2. Change Data Source to **Microsoft Excel** and enter the path and filename of the Excel spreadsheet.
3. Make sure **First row has column names** check box is checked, then click **Next**.



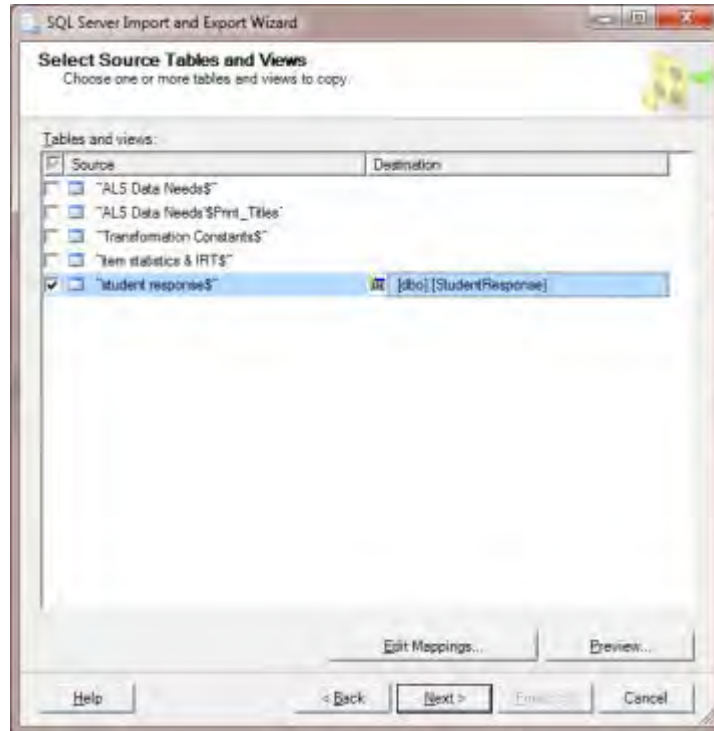
4. Select the **Server Name**, in this example, **(local)SQLEXPRESS**. Usually **MPSQL11A** is correct.
5. Select the **Database**. For example, **BoWTIE_Dev**.
6. Click **Next**.



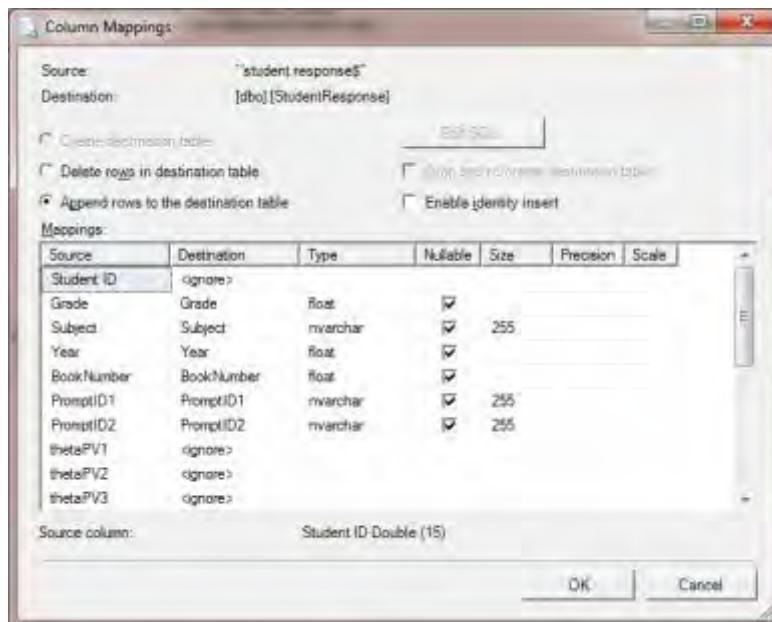
7. Defaults to **Copy data from one or more tables or views**. Keep this setting and click **Next**.



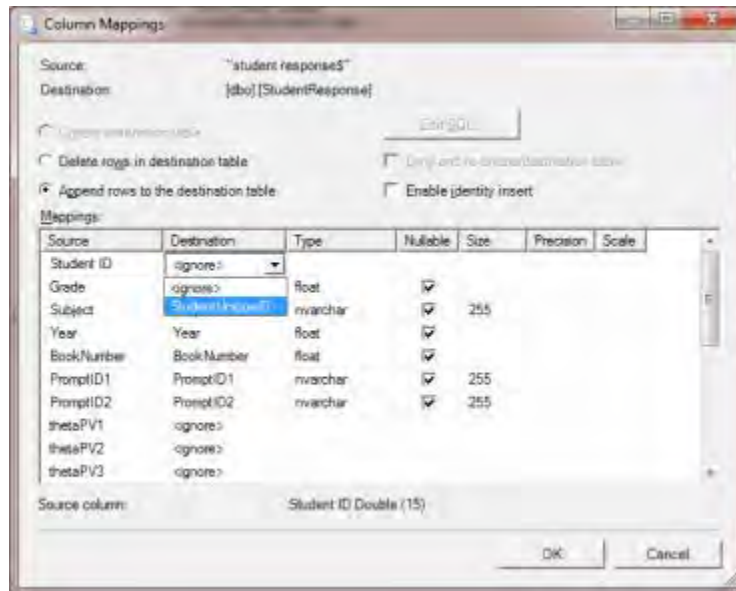
- Select the worksheet in the Excel spreadsheet that contains the student responses.



- In the **Destination** column, change the name from **[dbo].[student response\$]** to **[dbo].[StudentResponse]** (the actual name of the database table).
- Click **Edit Mappings**.



11. On this screen, change the **Destination** of the Student ID column to **StudentUniqueID**. Because the column name in the spreadsheet does not match the column name in the table, the Import Wizard cannot automatically match the source to the destination, and it needs to be done manually.
12. If you have correctly entered the table name from the previous step, you should see that **Append rows to the destination table** radio button is selected. If not, go back and fix the Destination table name on the previous screen.

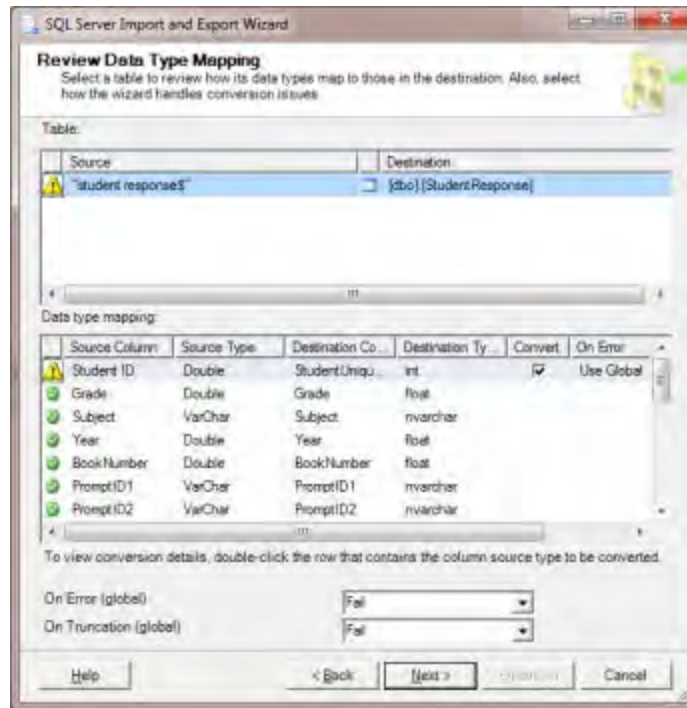


When done, this screen should look like this:



13. Click **OK**.

14. Click **Next**.

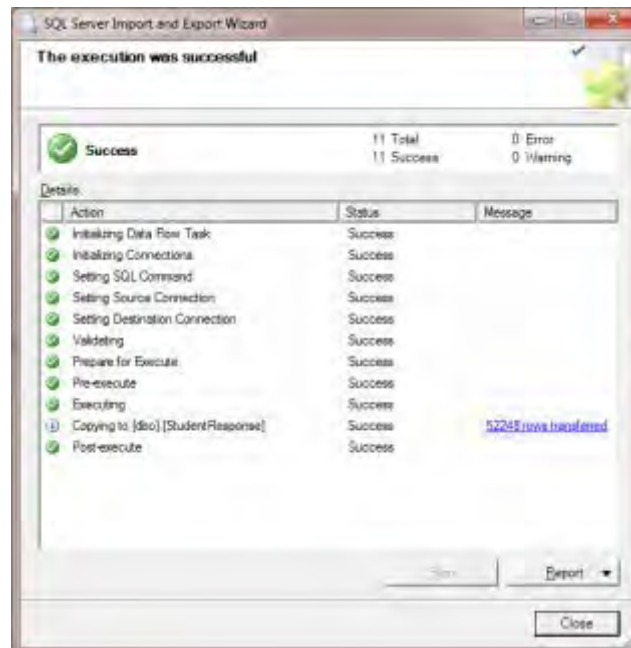


15. If you receive a warning message, click **Next** to continue.

16. Click **Next** on the next screen.

17. Click **Finish**.

18. Your screen should look similar to this, with no errors:



Data is now in the **StudentResponse** table in the database. This table is not used directly by the BoWTIE application, but is a 'staging' table for the next set of steps that populate student related data into various tables that will be used by the application.

Populate Ancillary Tables from StudentResponse

Run the following SQL scripts, in order, using SSMS. To get the script into SSMS, use File > Open, or drag and drop the .sql file from Windows Explorer onto the SSMS window. Make sure that the correct database is selected.

- FillStudentDataFromStudentResponse.sql
- FillRawScoreFromStudentResponse.sql
- FillStudentPromptFromFromItemStudentResponse.sql

Import EAP and ScaleScore

This final step occurs twice. Psychometrics sends two spreadsheet files containing EAP and ScaleScore data - one for 8th grade and one for 12th grade. The process is the same, but with different Excel files.

First, using SSMS, make sure that a temporary table named Sheet1\$ does not exist in the database to be updated. If there is a table named Sheet1\$, run the following SQL command: DROP TABLE [Sheet1\$]. This will delete the table.

The next step is to use the Import Wizard to load the first spreadsheet and then run a SQL script to update the StudentData table. The process is very similar to what was done previously when importing the StudentResponse data from the spreadsheet.

General Information

Tools Used

- Microsoft Excel 2007
- Microsoft SQL Server 2005 Management Studio version 11.0.3128.0

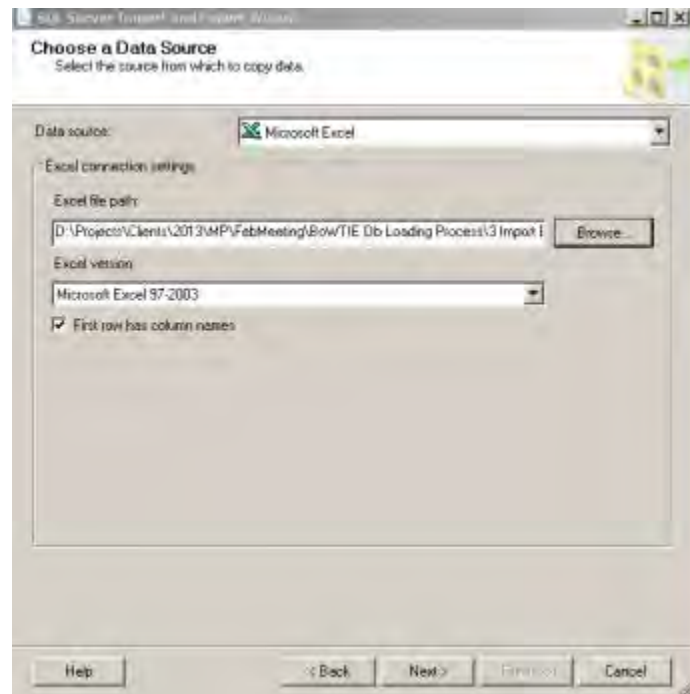
Required Files

- Item Statistics Template.xlsx – Template file given to the Psychometrician to be populated
- Item Statistics.xlsx – Populated Item Statistics Template.xlsx file used to import data into the BoWTIE database

NOTE: All columns are required to have a value.

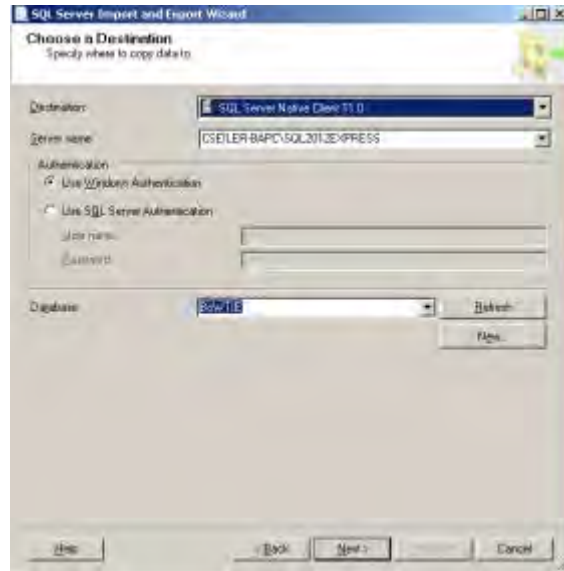
Instruction Overview

- Database preparation
 - Clear existing data in the database prior to loading new data
 - Loading of EAP and ScaleScore data from spreadsheet
 - The final step is to load additional spreadsheet data into a temporary table and update the StudentData table with EAP and ScaleScore data
 - Affects the following tables:
 - o [dbo].[StudentData]
 - o [dbo].[StudentResponse]
 - o [dbo].[StudentPrompt]
 - o [dbo].[StudentRawScore]
1. Start the Import Wizard as before (right-click on database name, select **Tasks**, select **Import Data**).



2. Change Data Source to Microsoft Excel and enter the path and file name of the Excel spreadsheet.

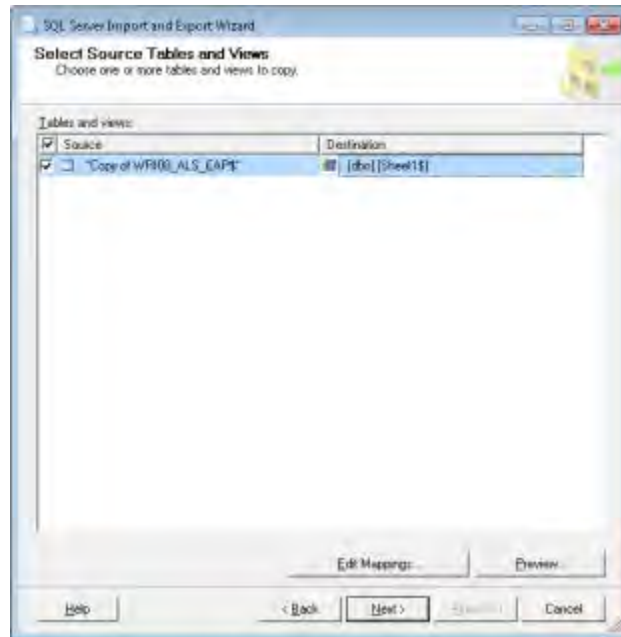
3. Make sure **First row has column names** check box is checked, then click **Next**.



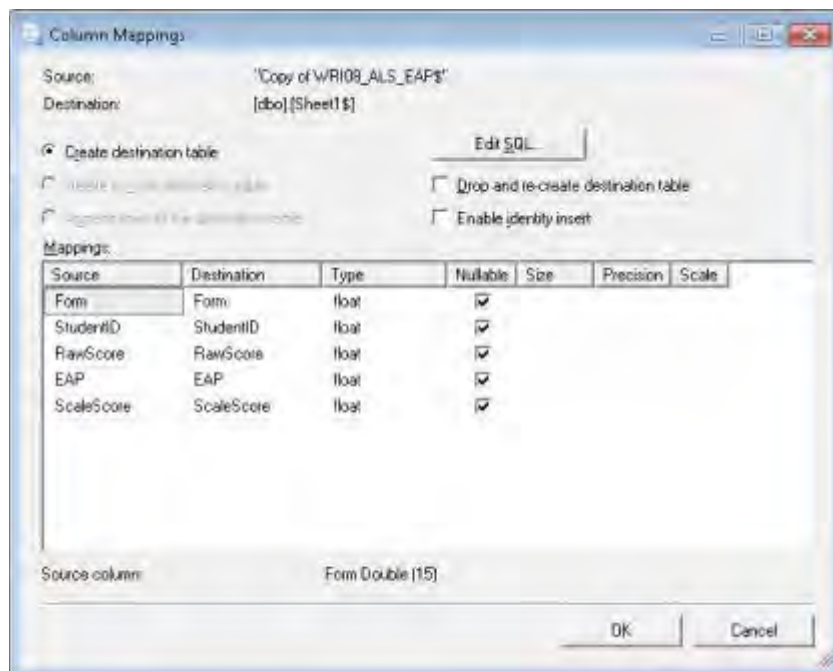
4. Select the **Server Name**. In this example, **(local)SQLEXPRESS**. Usually **MPSQL11A** is correct.
5. Select the **Database**. For example, **BoWTIE_Dev**, and click **Next**.



- Leave the default selection **Copy data from one or more tables or views** and click **Next**.

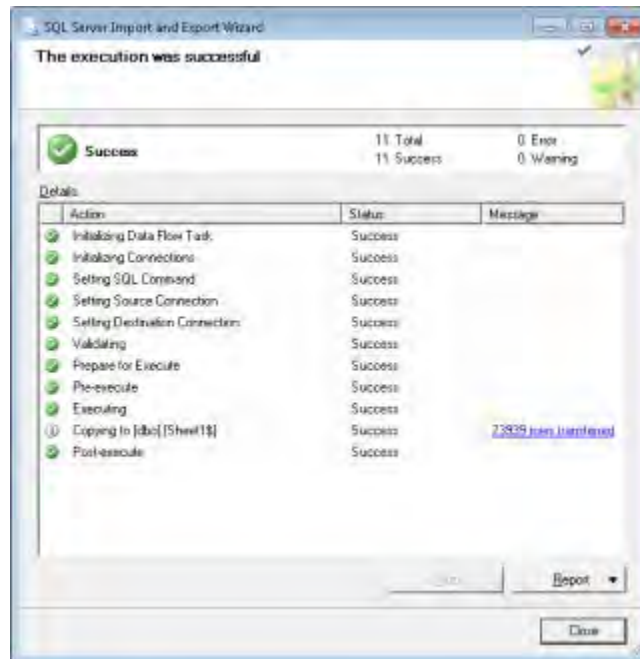


- Select the proper worksheet from the spreadsheet file. In this example, there is only one.
- Change the table name of the **Destination** table to **Sheet1\$**, as shown above.
- Click the **Edit Mappings...** button.



10. Check to make sure the source and destination are correct, and that the **Create Destination table** radio button is selected.
11. Click **OK**.
12. Click **Next**.
13. Click **Finish**.

The Import Wizard will now process the spreadsheet file and display a summary screen:



If there are no errors, there is now a table named **Sheet1\$** containing the data from the spreadsheet.

14. Next, run the following SQL script file from within SSMS, which will add EAP and ScaleScore data:

FillStudentDataWithEAPAndScaleScore.sql

15. Finally, run the above process a second time, using the second spreadsheet. The example above was 8th grade data. Do the same process again for the 12th grade data.

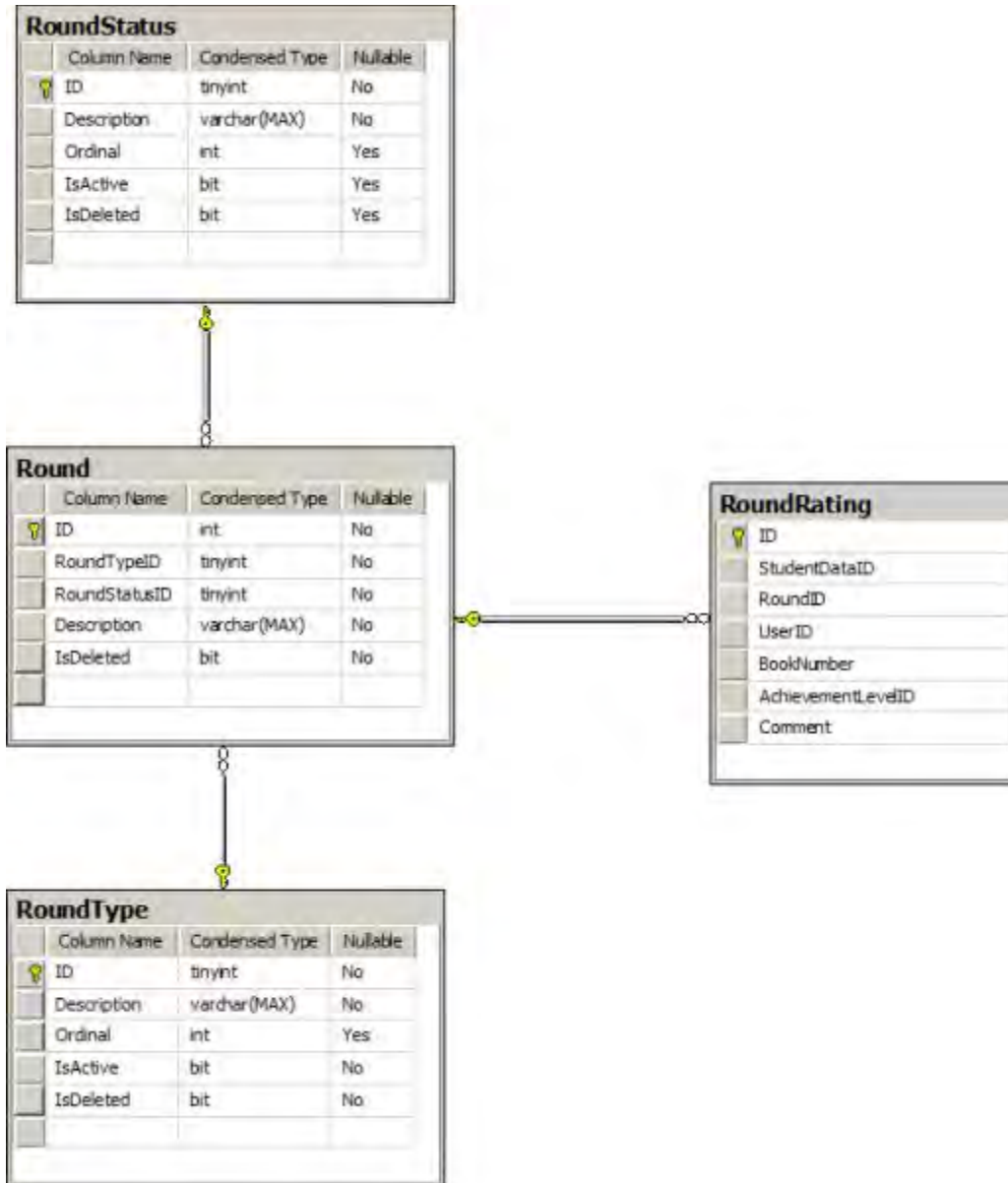
NOTE: The SQL script will automatically delete the Sheet1\$ table after the update completes. There should not be a Sheet1\$ table after running the script the first time.

The spreadsheets can be imported and processed in any order.

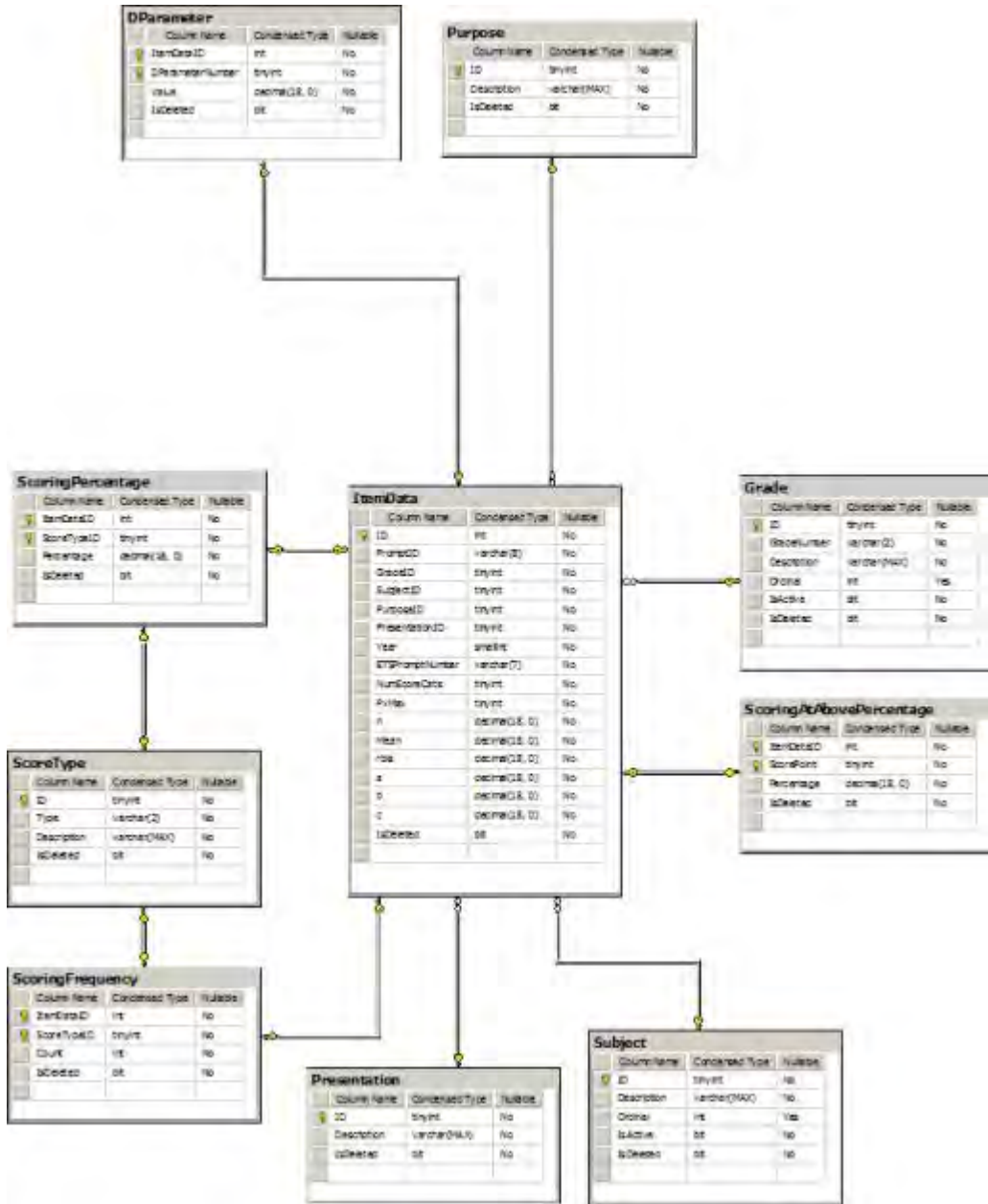
Database Diagrams Appendix

The database diagrams included in this appendix are included for informational purposes only. There is no intent that these diagrams will be used to create a database from scratch. Please follow the installation instructions for the server included in "Setup the BoWTIE Database" on page 6.

Round and Rating Database Diagram



ItemData Database Diagram



StudentData Database Diagram



Session, Panel, Group, Table Database Diagram

