# SQL 101
## Intro to SQL Programming
## For the Institutional Researcher

By

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# Golden Gate University, & Me

- Private, non-profit, since 1901. Downtown SF
- 5 schools:
  - Undergraduate
  - Tax
  - Accounting
  - School of Business (MBA, H.R., I.T., Psych, Finance, etc.)
  - Law
- About 3,500 active students
  - Adult school, about 1/3 military
  - About 1/3rd of students take classes solely online

## ME?

- Associate Director of Business Analytics and Institutional Research
- IR Professional for 8 years
- Last 2 years, CAIR Board
- Learned SQL solely as an IR professional

# SQL, SQL Server, and *you*

1. How many of you have ever used SQL?
2. How many of you have specifically used a SQL query?
3. How many of you have written a SQL query? In a SQL Server?
4. How many of you work in an IR/IE/IT environment where SQL is used *often*?

# What is data, a database, a database management system, and SQL?

- ***Data*** in simple can be facts related to any object in consideration
  - like your name, age, height, etc, related to you
- A ***Database*** is a systematic collection of data
- A ***Database Management System*** is a collection of programs which enables its users to access a database, manipulate data, and represent data
  - A ***Database engine*** contains databases within a SQL Server Management Studio
  - The SQL Server Management Studio is a *RELATIONAL* database management system (where data is related in tables)
    - Other examples MySQL, Oracle, Microsoft Access, etc.
- ***Structured Query Language (SQL)*** is the standard language for dealing with relational databases
  - Can be used to update, delete, search, insert data, optimizing queries, and maintaining records of data, as well as many other functions.

# Disparate databases in the IR Realm
## *Is your institution similar?*

- University data at GGU lives in separate locations
  - System of record for inquiries to applications (*Recruit*)
  - System of records for admits to graduates (*Colleague*)
  - System of records for alumni (*Raiser's Edge*)
  - Customer relationship management data (*Salesforce*)
  - eLearning data (*Moodle*)
  - Other ad hoc reporting held in silos like disability data, test taking data, etc.
- GGU's issues…*are they your issues?*
  - There is NO linking between any of the above data sources. (*IT/IR has to do this)*
  - Current collaboration between IT & IR is not enough

# The need for an "IR" Database Management System

- The IR professional NEEDS an IR database management system that snapshots data in time
  - Source data is often 'kill and fill' and data gets replaced with no timestamp on changes
- The IR professional needs to have data organized and ready at their hands for quick reporting and analyses
  - Most updated data as of *current day* or as of *end of term*
  - Data archived in a fashion where queries against the database are as simple as possible
  - *Let's take a look at my 'IR Database' in SSMS*

# SQL and the IR Data Analyst: When does an IR analyst need to use SQL

- Good news!!…a typical data analyst will probably ONLY need to use SQL to *retrieve* data from an IR database management system
  - As we saw, SQL can also be used to snapshot and organize source data but that's often IT's job
- Join and query all types of source data
- Clean and compare data
- Automate reports (including IPEDS)
- Create flat file submissions (for IPEDS, etc)

# Parts of a SQL Server: *tables, views, and stored procedures*

- Database engines/Databases exist within the 'Object Explorer'
- Within 'databases' you have
  - Programmability/Stored procedures
  - Tables
  - Views (queries)
- Central dogma of SQL: Stored procedures > Tables > Views
  - At GGU, tables get updated daily data using stored procedure coding
    - Data is organized to create a relational database with similar primary keys that link tables and views
  - Views are stored sets of coding that manipulate tables and other views to create reports
- *Let's take a look at SSMS at some coding*

# Ways in Which a SQL Server helps an IR Analyst

- Organizes basic tables/views used for quick IR computations
  - Unique tables/views that has data organized by row, *updated daily*, where each row has, for example
    - Student matriculations per date
    - Student completions (has completion date, cum program GPA, etc)
    - Student basic term and demographic information per term (has units completed, modality)
    - Funnel basic inquiry to enrollment and demog info per term
  - Relational database management
    - Relating source data, ad hoc data and all data, clean or unclean
- Quick and easy querying/report creating
- Easy integration with Tableau, Power Query, R, other BI tools

# Some helpful SQL tips

1. Save queries as a ‘scripted view’ in SQL server database manager
2. Always save data in long-name form, date mentioned in name (no ver1, ver2, etc)
3. Indent separate sections of data
4. Place comments in code using “--" or “/* */”
5. Get others at your university who are data-minded to use SSMS, start sharing logic. Form data teams.
6. ‘Educate up’ those at your university on the need for the IR database so improvements, etc, can be placed in the budget.

# *Questions?*

1. Does your university have a similar SSMS set up? If not, how differently does it look?
2. Does your university have similar data issues where an SSMS type of solution would make sense
3. Any helpful hints or other examples of SSMS/RDBMS that you have heard of or are interested in?
4. Other questions/comments?

***Feel free to reach me at***
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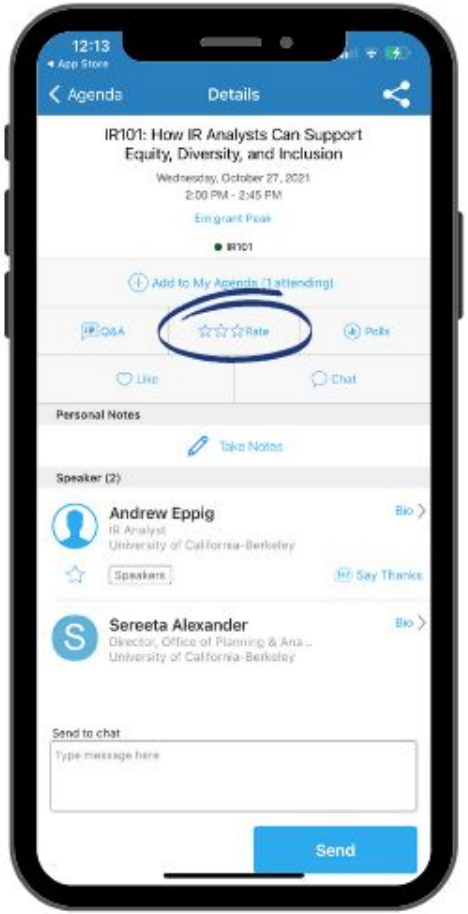


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