

# Overview of the Technologies with a focus on Data Analytics



# Topic List

**Topic 1:** Overview of Data Analytics

**Topic 2:** Level 1 – Operational Reporting

**Topic 3:** Level 2 – Advanced Reporting

**Topic 4:** Level 3 - Advanced Analysis

**Topic 5:** Level 4 – Predictive Analytics

# Overview of Analytics Maturity

## 4 Levels of Analytics Maturity

Source: Bersin

: Analytics Maturity Model



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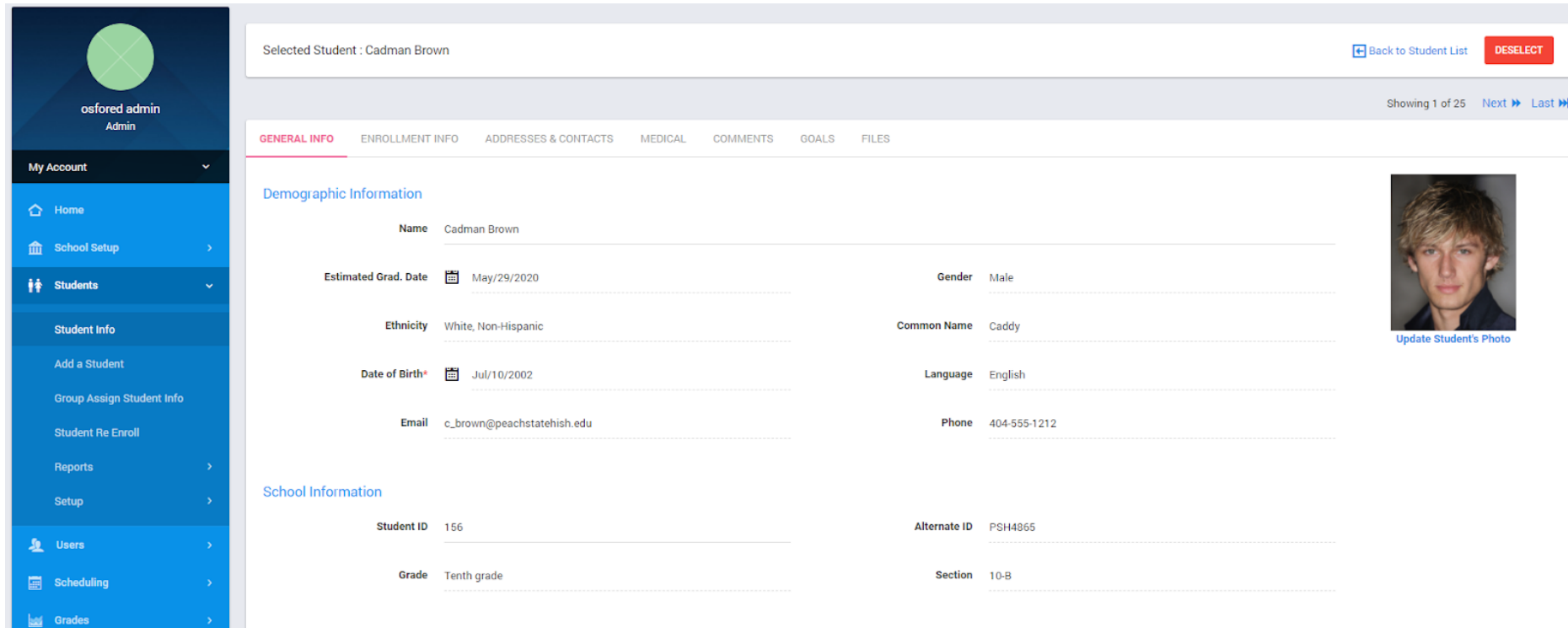
# Operational Reporting

How do you store your data? Do you have a system to hold information? Do you still use Excel / Google Sheets?

- **Human Resource Information System:** Workday / OrangeHRM / Peoplesoft
- **Student Information System:** OpenSIS / Oracle Campus / Powerschool

# Student Information System

- Store information on records, birthday, demographics, learning styles, etc.
- **Free Version: OpenSIS**



The screenshot displays the OpenSIS interface for a student profile. On the left is a dark blue sidebar with a user profile for 'osford admin Admin' and a menu with options like 'My Account', 'Home', 'School Setup', 'Students', 'Student Info', 'Add a Student', 'Group Assign Student Info', 'Student Re Enroll', 'Reports', 'Setup', 'Users', 'Scheduling', and 'Grades'. The main content area shows the selected student 'Cadman Brown' with a 'Back to Student List' link and a 'DESELECT' button. Below this is a navigation bar with tabs for 'GENERAL INFO', 'ENROLLMENT INFO', 'ADDRESSES & CONTACTS', 'MEDICAL', 'COMMENTS', 'GOALS', and 'FILES'. The 'GENERAL INFO' tab is active, showing 'Demographic Information' and 'School Information'. A student photo is visible on the right with an 'Update Student's Photo' link. The page indicates 'Showing 1 of 25' records.

Demographic Information	
Name	Cadman Brown
Estimated Grad. Date	May/29/2020
Ethnicity	White, Non-Hispanic
Date of Birth*	Jul/10/2002
Email	c_brown@peachstatehish.edu
Gender	Male
Common Name	Caddy
Language	English
Phone	404-555-1212

School Information	
Student ID	156
Grade	Tenth grade
Alternate ID	PSH4865
Section	10-B

# Human Resource Information System

- Store records on employee 201 files, leaves, competencies, SSS numbers, etc
- **Free Version: OrangeHRM**



The screenshot displays the OrangeHRM Employee Management interface. The user is Jack Wagner, Global HR Manager. The dashboard features several key sections:

- My Actions:** A list of leave requests, including:
  - Leave Request: Ma Aylwin (Half Pay Leave) (Mar 2021)
  - Leave Request: Kevin Mathewes (Individual training leave)(CF) (Mar 2021)
  - Attendance Sheet: Mike Mathewes (Jan 1st to Jan 31st)
  - Attendance Sheet: Kevin Mathewes (Jan 1st to Jan 31st)
  - Attendance Sheet: Mahabida Barnastala (Jan 1st to Jan 31st)
  - Attendance Sheet: Paul Collings (Past Employee) (Jan 1st to Jan 31st)
  - Attendance Sheet: Tobe Conyers (Jan 1st to Jan 31st)
- Quick Access:** A grid of icons for: Approve Leave, Leave List, Leave Calendar, Attendance, Apply Leave, and My Leave.
- Buzz Latest Posts:** A post titled "Inspirational Leader" by Royal Brunei.
- Employee Subunits:** A pie chart showing the distribution of employees across various subunits.
- Time At Work:** A section showing "Punched In" for Mar 22nd at 08:31:44 (GMT 3:0) and "11h 56m Today".
- Latest News:** A list of announcements, including "to all CC" (Week 33/1st 2021), "Best Department Decorations - Engineering Department" (Week 02 Jan 2021), "Promotion Announcement" (Tue, 05 Jan 2021), and "Employee Promotions" (Tue, 02 Jan 2021).

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# Advanced Reporting

- **Advanced Reporting** is a tool you can use to run reports on demand, making it easy to analyze your data, identify insights and trends, create charts, and measure your impact and results

## Options

Google Data Studio (FREE)

AWS Quicksight

SAP Business Objects

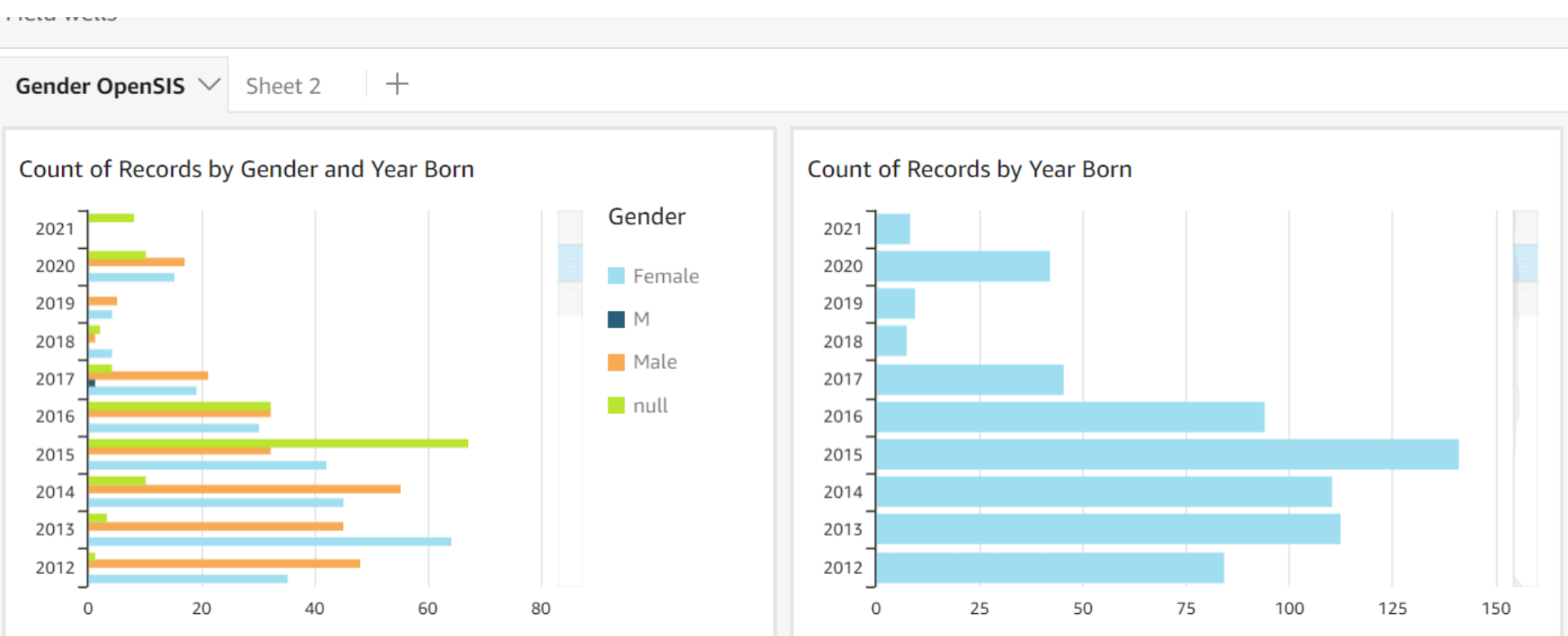
# Google Data Studio

Free tool from Google that you can use to connect various data sources and create Dashboards from (including Google Sheets)



# AWS Quicksight

For institutions using AWS (Cloud provider) – they can use AWS Quicksight. On the left would be Level 2 advanced graph (from the free OpenSIS software) / On the right is a level 1 chart



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# Advanced Analysis

- Advanced statistical methodologies are the foundation for leveraging big data and meaningful analytics in order to make better and faster decisions that further organizational goals.

Software that can do this:

- IBM SPSS
- IBM AMOS

Some statistical techniques:

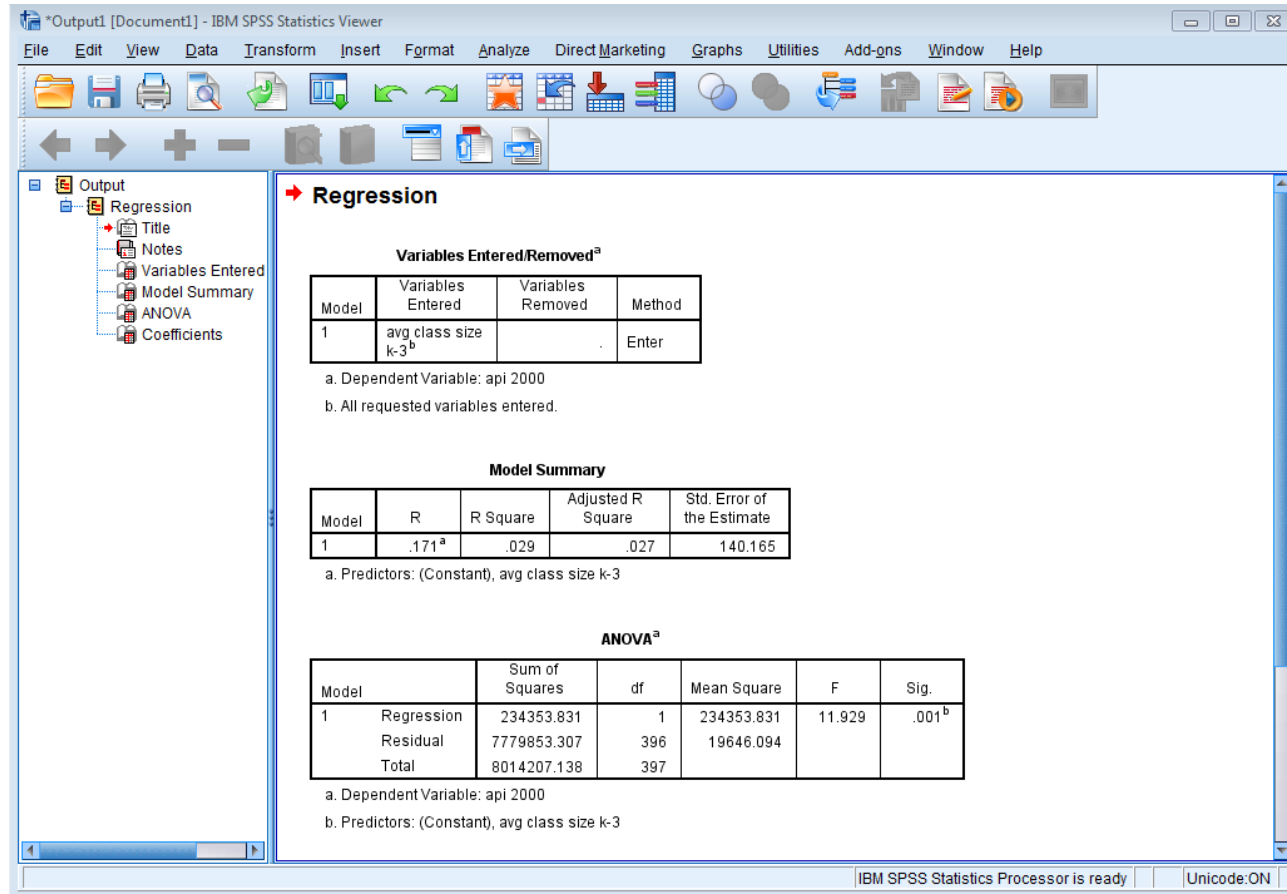
- Multivariate regression
- Structured Equation modelling

# IBM SPSS: Regression modelling

Using SPSS, you can analyze the factors that most influence a certain outcome.

What drives student satisfaction?  
Employee engagement?

**NOT ALL  
FACTORS  
EQUAL IN  
WEIGHT**



\*Output1 [Document1] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Output

- Regression
  - Title
  - Notes
  - Variables Entered
  - Model Summary
  - ANOVA
  - Coefficients

**Regression**

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	avg class size k-3 <sup>b</sup>		Enter

a. Dependent Variable: api 2000  
b. All requested variables entered.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.171 <sup>a</sup>	.029	.027	140.165

a. Predictors: (Constant), avg class size k-3

**ANOVA<sup>a</sup>**

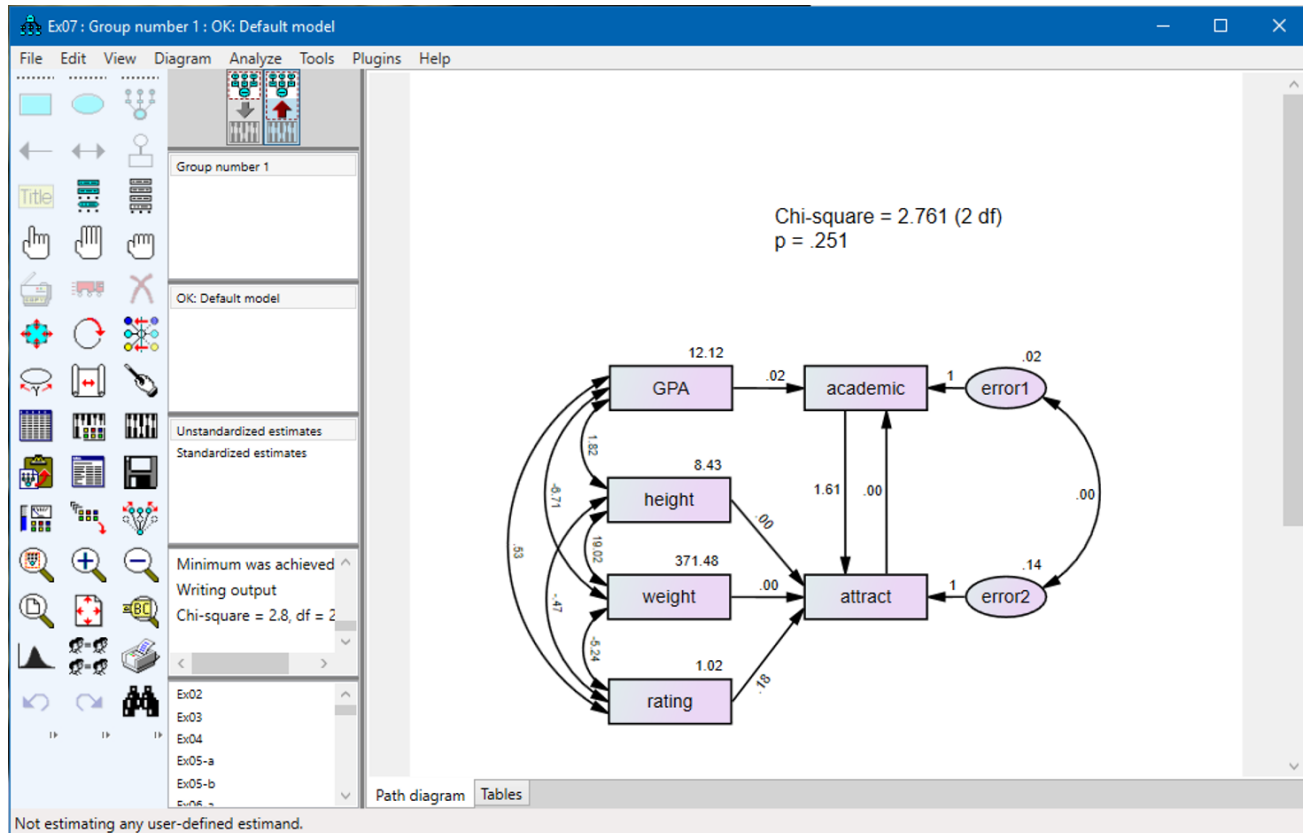
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	234353.831	1	234353.831	11.929	.001 <sup>b</sup>
	Residual	7779853.307	396	19646.094		
	Total	8014207.138	397			

a. Dependent Variable: api 2000  
b. Predictors: (Constant), avg class size k-3

IBM SPSS Statistics Processor is ready | Unicode:ON

# IBM SPSS AMOS - SEM

Using IBM SPSS Amos – you can model how different factors influence an outcome (such as employee retention, student engagement, etc)



# Case study: APSA on Student Satisfaction

What factors if changed will likely make the students more likely to promote the school? (Different to correlation, this is looking at causation).

There are **6 significant factors** with p values < 0.05 (highlighted in green) with the 3 most significant being.....

**Factor 1:** Ask teng@apsa.ph

**Factor 2:** Anti-bullying culture

**Factor 3:** Ask www.apsa.ph

Factor	Beta	T-Value	Significance
	0.269	8.116	0.000
	0.208	5.102	0.000
	0.13	3.839	0.000
	0.114	3.008	0.003
	0.085	2.182	0.029
	0.105	2.973	0.003
	0.079	1.894	0.059
	0.001	0.028	0.978
	-0.01	-0.274	0.784
	-0.022	-0.682	0.495
	-0.045	-1.27	0.205
	-0.035	-0.956	0.339
	-0.073	-1.794	0.073

The R-squared value of the model explains **38.6% of variability.**

The p-value in the ANOVA table is less than 0.0005 which signals that these factors are significant and a “good fit” for the data

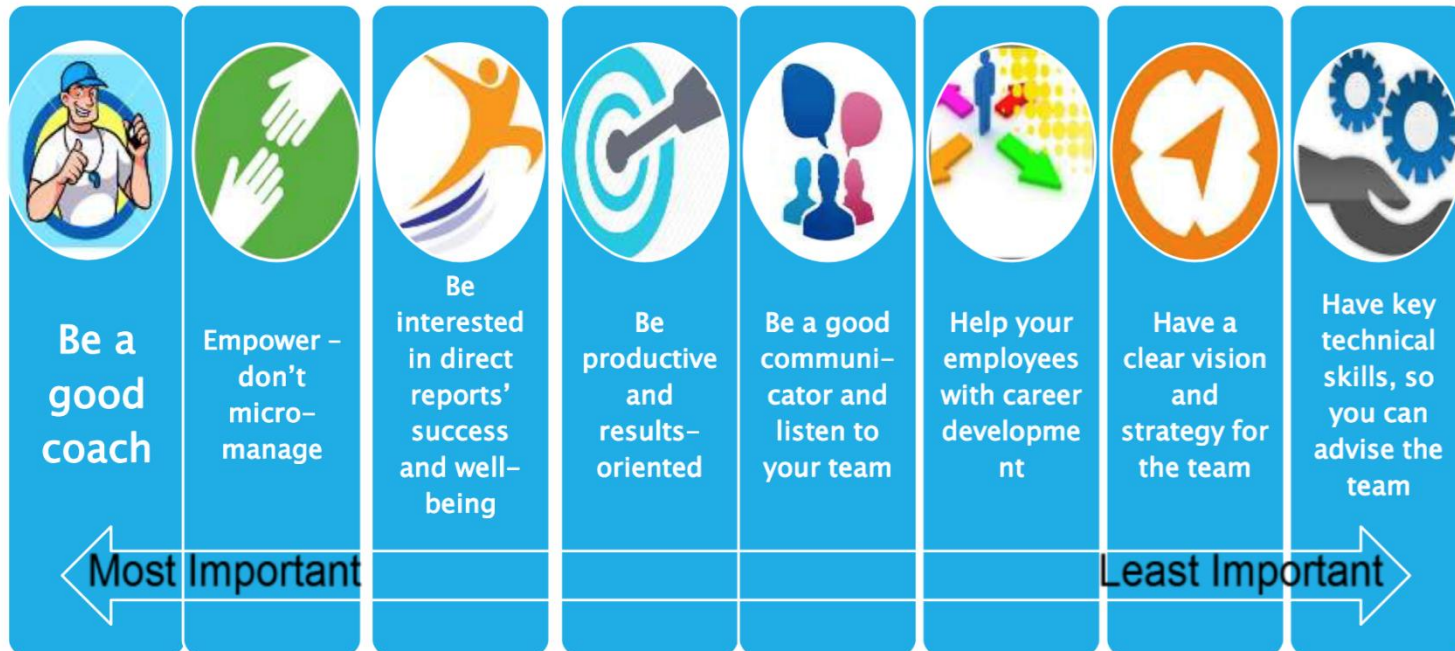
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.621 <sup>a</sup>	.386	.376	.902

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	436.016	13	33.540	41.178	.000 <sup>b</sup>
	Residual	694.773	853	.815		
	Total	1130.789	866			

# Google Project Oxygen Framework

Google  
PROJECT  
OXYGEN

**8 Habits of Highly Effective Managers**  
Managers demonstrating these behaviours had teams with better performance, retention, and work attitudes



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# Predictive Models

Making predictions based on existing data – on what can be done next.

As it applies to education/HR: Can predict things such as employee retention, student drop out rates.

Up to 75% of what consumers watch comes from the recommender system



**NETFLIX**

Amazon credits recommender systems with 35% of revenue



amazon.com

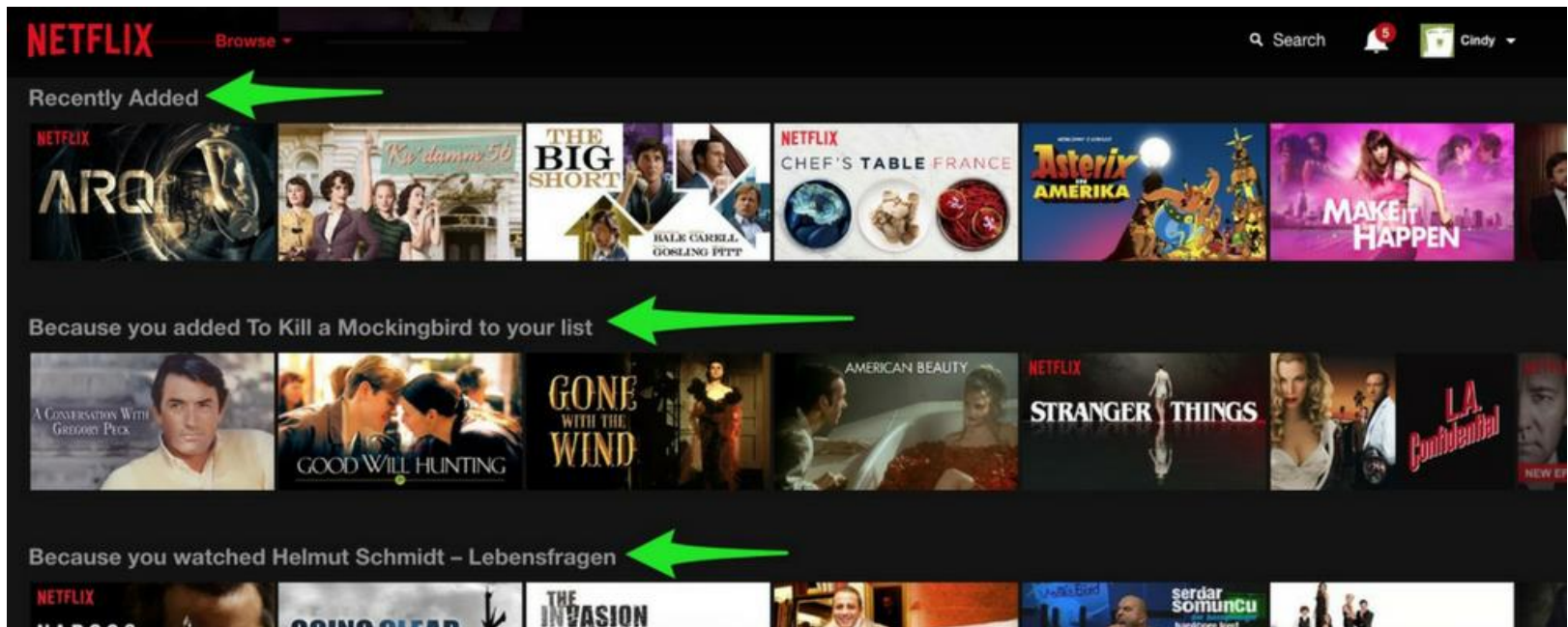
Recommendations are responsible for 70% of the time people spend on YouTube



**YouTube**

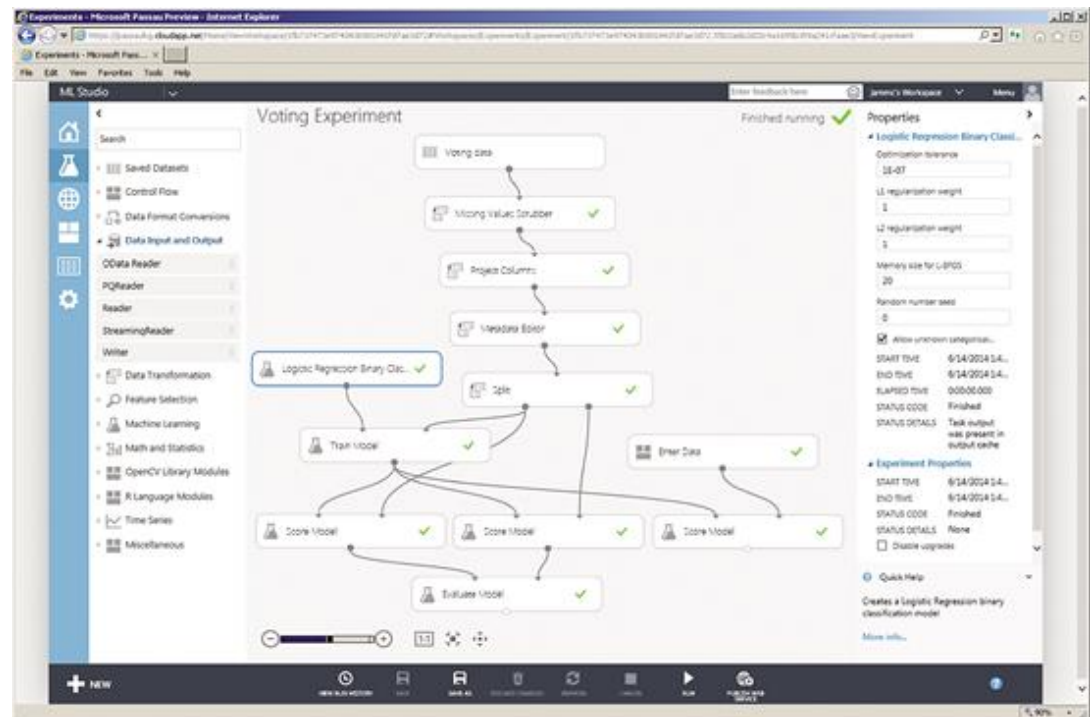
# Case study: Netflix

Once you interact with the Netflix platform, it uses that data to make predictions on what you would like to watch next



# Microsoft Machine Learning Studio

- [Microsoft Machine Learning Studio \(classic\)](https://studio.azureml.net)
- <https://studio.azureml.net>
- **Azure Machine Learning Studio** is a GUI-based integrated development environment for constructing and operationalizing Machine Learning workflow on Azure.



# Summary of Technologies for Analytics

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