

# Analytical Exercise Report

## Test Score Analysis

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### Objective:

To examine the impact of the Type of Student, Learning Resources, and Historical EOC Data on a particular Test Score.

### Data Sources:

- Student Information System Database (SIS DB)
- Special Education File as an Excel spreadsheet
- Online Resource Gradebooks as Excel spreadsheets

### Tools (used in the original analysis):

- Microsoft SQL Management Studio: Utilized to create views from SIS DB to be exported to a local database for further consolidation with the other data sources joined using the unique student ID.
- Excel: Used to create pivot tables and charts to make dashboards to present to stakeholders
- PowerPoint: to present a quick user manual on how to use and interpret the visualization, and to summarize the insights and recommendations gather from the analysis.

### Stakeholders:

The stakeholders were the upper management of the school (Principal, Assistant Principal, and Curriculum Coaches).

### Metadata:

Data Source	Fields	Description
From SIS DB	Student ID	Unique Student Identifier
Special Education file	Type of Student	GIFTED: Students that shows a high ability to reason or a rapid rate of learning as compared to their peers. ESE: are children with disabilities who need specially designed instruction and related services or accommodations. ESOL: Student with English as a second language. REGULAR: Students that does not required special accommodations.
From SIS DB (Enrollment)	Subject (Example for Highschool Math)	A1 – Algebra 1 (9th Grade) GE – Geometry (10 <sup>th</sup> Grade)

		A2 – Algebra 2 (11 <sup>th</sup> Grade) PC – Precalculus (12 <sup>th</sup> Grade)* CR – Math for College Readiness (12 <sup>th</sup> Grade)*  * In 12 <sup>th</sup> grade students can choose to enroll in PC or CR.
Excel or SVC file downloaded from the different online resource's gradebook	Learning Resources Average Grade (AvgLR#)	3 to 5 columns with the average grade obtain as practice before a specific test of interest (0-100%)
Created category	Learning Resources Letter Grade (LetterGradeLR#)	A – 90% to 100% B – 80% to 89% C – 70% to 79% D – 60% to 69% F – 0% to 59%
From Student Information System DB (Historical Data)	Historic EOC data (EOC-#ofYearsOld)	Historic data of 3 previous years of End of Course (EOC) State Exams**. Classified from 1 to 5 (lowest to Highest). Where 3 or more indicates that the student passed the exam.  Cases: - If the student is enrolled in Algebra 1 we will need the score of the End of Course exam for 6 <sup>th</sup> , 7 <sup>th</sup> , and 8 <sup>th</sup> grade Math. - If the student is enrolled in Geometry, we will need the score of the End of Course exam for 7 <sup>th</sup> , 8 <sup>th</sup> grade Math, and Algebra 1. - The rest (Algebra 2, Precalculus, and Math for College Readiness) will need 8 <sup>th</sup> grade Math, Algebra 1, and Geometry.  ** The average test scores on EOC are one of the factors used to rate a school.
From Student Information System (Gradebook)	Test Score	Test grade of interest (0% to 100%)

#### Description:

For this project, Excel was utilized to create a simulated dataset presented in Table Format (Figure 1). The data was generated using the RANDBETWEEN function to produce random numeric values, and an IF function was nested within to convert these scores into letter grades (refer to Figure 2 for the specific references used).

In a separate sheet named "Pivot Tables and Charts," visualizations were created to be used in the Dashboards. Two Dashboards were developed to showcase trends and insights. The first Dashboard (Figure 3) provides an overview of general information, such as the number of students with different abilities and the corresponding codes used to identify them in the Sample Data (Figure 1). The second Dashboard (Figure 4) focuses on highlighting the correlation between each learning resource and its alignment with test scores. This analysis can also be extended to historical data on End of Course (EOC) Exams and the Test Score. To provide interactive exploration, a slicer was included in the second dashboard, allowing users to observe how the patterns change across different types of students.

It's important to note that the data presented in these visualizations and Dashboards is fabricated and serves as illustrative examples rather than actual data.

StudentID	TypeofStudent	Subject	AvgLR1	AvgLR2	AvgLR3	AvgAllResources	LetterGradeLR1	LetterGradeLR2	LetterGradeLR3	AvgAllResourcesLetter	EOC-1	EOC-2	EOC-3	TestScore	TestScoreLetter
9474162348	REGULAR	A1	68	90	21	60	D	A	F	F	2	5	3	27	F
1054207930	REGULAR	A1	99	91	29	73	A	A	F	C	2	5	2	72	C
6370787313	ESE	A1	82	83	75	80	B	B	G	B	2	2	1	23	F
5670917585	ESOL	A1	89	81	44	71	B	B	F	C	5	5	4	52	F
3267581084	REGULAR	GE	66	88	39	64	D	B	F	D	1	3	1	65	D
4279733407	ESE	A1	98	89	46	78	A	B	F	C	3	2	2	53	F
5850932144	REGULAR	GE	74	97	43	71	C	A	F	C	5	1	3	91	A
5911057458	REGULAR	GE	82	97	38	72	B	A	F	C	2	3	2	70	C
2118757625	ESOL	GE	66	99	51	72	D	A	F	C	2	3	3	89	B
3657696641	ESE	GE	83	86	43	71	B	B	F	C	1	3	3	56	F
9251273766	REGULAR	A2	97	81	36	71	A	B	F	F	1	3	1	93	A
6985702553	ESOL	A2	82	91	4	59	B	A	F	F	4	5	5	78	C
2251686230	REGULAR	A1	81	86	22	63	B	B	F	D	4	1	5	77	C
7836238208	REGULAR	A1	65	96	60	74	D	A	D	C	4	5	1	73	C
6307048882	REGULAR	A1	83	91	10	61	B	A	F	D	1	1	1	59	F
1120763904	REGULAR	GE	95	84	58	79	A	B	F	C	1	1	4	43	F
5551397430	REGULAR	GE	78	93	62	78	C	A	D	C	4	4	2	95	A
8151299873	ESE	PC	78	93	62	78	C	A	D	C	1	3	1	92	A
8712247235	ESE	PC	78	93	62	78	C	A	D	C	3	4	1	93	F
6817785384	REGULAR	GE	78	93	62	78	C	A	D	C	1	3	2	93	A
9342972668	REGULAR	A2	78	93	62	78	C	A	D	C	3	4	1	79	C
5247528528	REGULAR	A1	78	93	62	78	C	A	D	C	3	3	3	69	D
5311667857	GIFTED	GE	78	93	62	78	C	A	D	C	5	5	3	95	A
9792546523	REGULAR	GE	78	93	62	78	C	A	D	C	2	5	3	99	F
3485651197	REGULAR	GE	78	93	62	78	C	A	D	C	4	4	5	91	A
1033425515	ESE	PC	78	93	62	78	C	A	D	C	1	1	3	74	C
1832847443	ESE	PC	78	93	62	78	C	A	D	C	2	3	1	44	F
4291260922	ESOL	CR	78	93	62	78	C	A	D	C	5	3	4	52	F
7790566213	REGULAR	CR	78	93	62	78	C	A	D	C	3	2	5	95	A
1398608527	REGULAR	CR	78	93	62	78	C	A	D	C	5	2	5	55	F

Figure 1. Example created with fake data to demonstrate how the data looks like in the original analysis after consolidation and cleaning

	A	B	C	D	E	F
1	TypeOfStudent	Code		LetterGrade	GradeInterval	
2	Students with disabilities that need specially designed instruction and accommodations	ESE		A	90% to 100%	
3	Students with English as a Second Language	ESOL		B	80% to 89%	
4	Students that shows a high ability to reason or a rapid rate of	GIFTED		C	70% to 79%	
5	Students that does not required special accommodations.	REGULAR		D	60% to 69%	
6				F	0% to 59%	
7						
8						
9	SubjectName	GradeLvl	Code	EOC-1	EOC-2	EOC-3
10	Algebra 1	9	A1	6th grade Math	7th grade Math	8th grade Math
11	Geometry	10	GE	7th grade Math	8th grade Math	Algebra 1
12	Algebra 2	11	A2	8th grade Math	Algebra 1	Geometry
13	Precalculus	12	PC	8th grade Math	Algebra 1	Geometry
14	Math for College Readiness	12	CR	8th grade Math	Algebra 1	Geometry
15						
16						
17	OnlineResourcesName	Code				
18	IXL	LR1				
19	Khan Academy	LR2				
20	Math Nation	LR3				
21						

Figure 2. Tables used as references for Data Validation and relevant information.

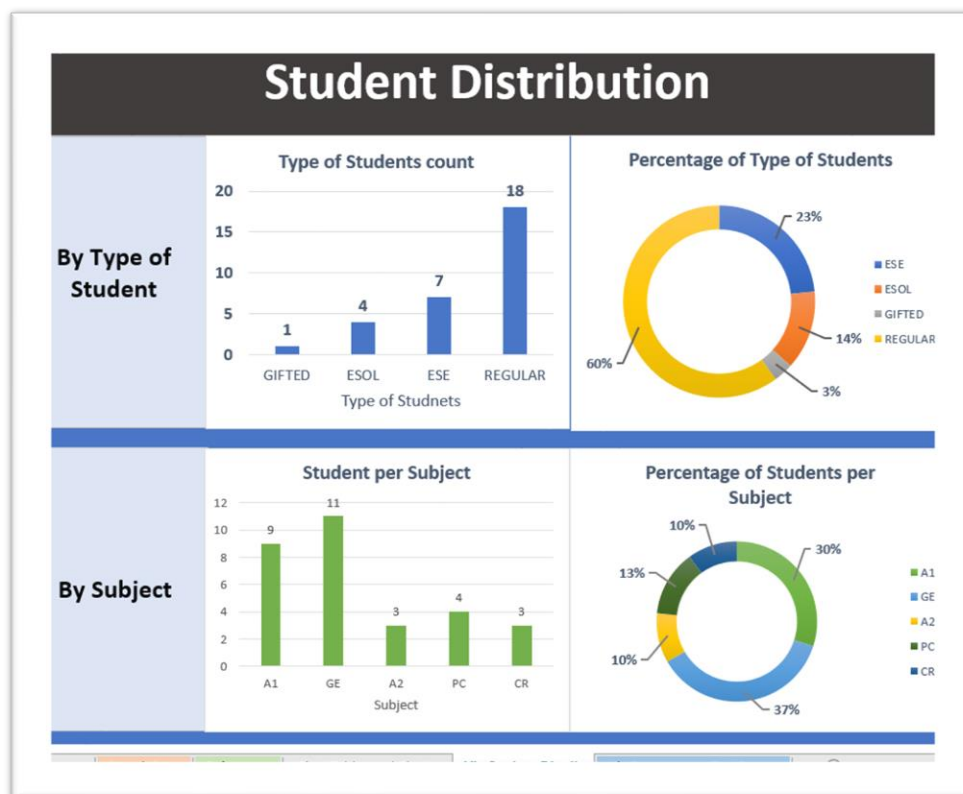


Figure 3. Dashboard 1: Student distribution by Type of Student and by Subject.

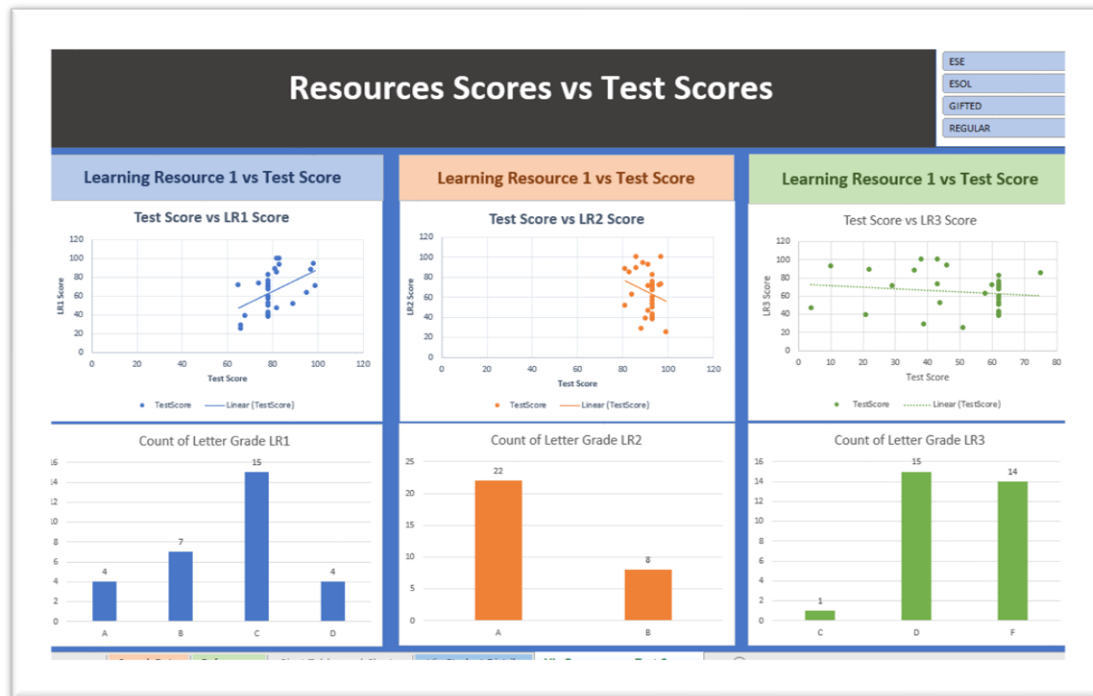


Figure 4. Dashboard 2: Student distribution by Type of Student and by Subject.

### Report Analysis:

This example should be understood as a hypothetical scenario since the data used was randomly generated. However, based on this analytical exercise, several conclusions and insights can still be derived:

1. Insight can be gained regarding the distribution of students based on their learning needs and subjects of study.
2. The correlation between each Learning Resource and the Test Score can be examined both for all students collectively and for each type of student individually. This analysis can provide valuable insights into which Learning Resources are more effective for different types of learners.
3. The level of difficulty associated with each Learning Resource can be assessed by examining the distribution of grades (A, B, C, D, and F) received by students. For example, LR1 shows a range of grades from A to D, without any failing grades (F). On the other hand, LR2 appears relatively easier, as most students received grades of A or B. Meanwhile, LR3 seems to be more challenging, with only one student receiving a C grade, while the rest received either D or F grades, indicating a higher level of difficulty.

Please note that while these insights can be extracted from the provided data, it's important to remember that the data was randomly generated and may not reflect actual student performance or learning conditions.

### Impact on the Company:

The insights from this Test Score Analysis can be utilized in the decision-making process in different ways. Some of them are as follows:

1. For Academic Program Evaluation: By examining the performance of different type of students learning needs, educational institutions can evaluate how effective are their programs and make decision regarding resource allocation, curriculum enhancements, or tailored support for specific group of students.
2. Learning Resources Analysis: Analyzing the average scores for different Learning Resources can help to identify which resources are more effective in supporting student learning. This can lead to guided decisions on resource selection, investment in specific materials or technologies, or adjustment to teaching methodologies.
3. Comprehensive Performance Assessment: The average score across all resources provides an overall assessment of student's performance. This metric can assist in identifying students who might need additional support or intervention and inform decision-making regarding targeted interventions or personalized learning plans.

Overall, this insights support evidence-based decision-making processes in education. The provide valuable information to administrators, educators, and policymakers for designing effective educational strategies, identifying areas of improvement, allocating resources efficiently, and enhancing student outcomes.