

Report on Unveiling The Virtual Classroom An In-Depth Analysis Of The Online Education System

Online classes and technology have emerged as a superhero during the lockdown days. We have all been under house arrest but are still connected with the world of education. Due to the lockdown, students have not been able to stay connected with the outer world and the lack of exposure is evident. The only reprieve for the students' mental well-being has been the transition to online classes. Teachers made sure that the learning for students was not compromised, so they took a great leap forward to find solutions and create new learning environments for their students to ensure that learning never stops. With the rapid advancements in technology and the widespread availability of internet access, online education has gained significant popularity in recent years.

This project aims to delve deep into the various aspects of online education, examining its strengths, weaknesses, opportunities, and challenges. The outcomes of this project will provide valuable insights for educational institutions, policymakers, and online learning platforms to enhance the effectiveness and accessibility of online education. This analysis of the online education system aims to contribute to the ongoing dialogue on the future of education and help shape a more inclusive, engaging, and effective learning environment in the digital age.

Project Flow :

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding
 - Specify the business problem
 - Business requirements
 - Literature Survey
 - Social or Business Impact.
- Data Collection
 - Collect the dataset
 - Connect data with IBM cognos
- Data Preparation
 - Prepare the Data for Visualization
- Data Visualizations
 - No of Unique Visualizations
- Dashboard
 - Responsive and Design of Dashboard
- Story
 - No of Scenes of Story
- Report
 - Creating a report
- Performance Testing

- Amount of Data Rendered to DB ‘
 - Utilization of Data Filters
 - No of Calculation Fields
 - No of Visualizations/ Graphs
- Web Integration
 - Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation
 - Record explanation Video for project end to end solution
 - Project Documentation-Step by step project development procedure

Define Problem / Problem Understanding

A problem statement is a short, clear explanation of an issue or challenge that sums up what you want to change.

Business Requirements

Business requirements for a problem statement like this would include taking student and teacher surveys, understanding student needs , and having an efficient feedback system. There is a need to update the content that is being taught to students based on the feedback .These requirements are necessary to ensure that students are able to find it easy to adjust with online education / e-learning. Specific requirements may vary depending on the student demographic, their needs and their interests

Literature Survey

A literature survey for online education would involve reviewing existing research on topics related to ed tech and student behavior . The survey would involve defining a research question, identifying relevant sources, reading and analyzing the literature, organizing and summarizing the literature, identifying gaps in the literature, and providing recommendations for e-learning/online education based on the findings. The goal of the literature survey is to understand the current state of knowledge on a topic and to identify areas where further research is needed. It also helps to build upon the existing knowledge and avoid duplication of effort.

Data Collection

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

Collect The Dataset

You can find the data in the references !

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files. we have provided 1 CSV files:

Online Education System Review

ONLINE EDUCATION SYSTEM REVIEW.csv

Column Description for Online education system review:

- Gender: Gender of the student
- Home Location : Rural or Urban.
- Level of Education : UG, PG or school
- Age : age of the student
- Number of subjects :
- Device Type Used : device used to attend the online classes
- Economic status : economic status of the family
- Internet facility in your locality
- Are you involved on any sports
- Family Size
- Do elderly people monitor you ?.
- Study Time(hours)
- Sleep time (hours)
- Time spent on social media(hours)
- Interested in gaming ?
- Have a separate room for studying ?
- Engaged in group studies ?
- Average marks scored before pandemic in traditional classroom
- Your interaction in online mode
- Clearing doubts with faculties online ?
- Interested in ?
- Performance in online
- Your level of satisfaction in online education

Data Preparation

Data preparation is the process of preparing raw data so that it is suitable for further processing and analysis

Prepare The Data For Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

Data preprocessing can be performed in many ways using many different steps depending on your data here, we are going to do some part of data preparation on our data.

Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

No Of Unique Visualizations

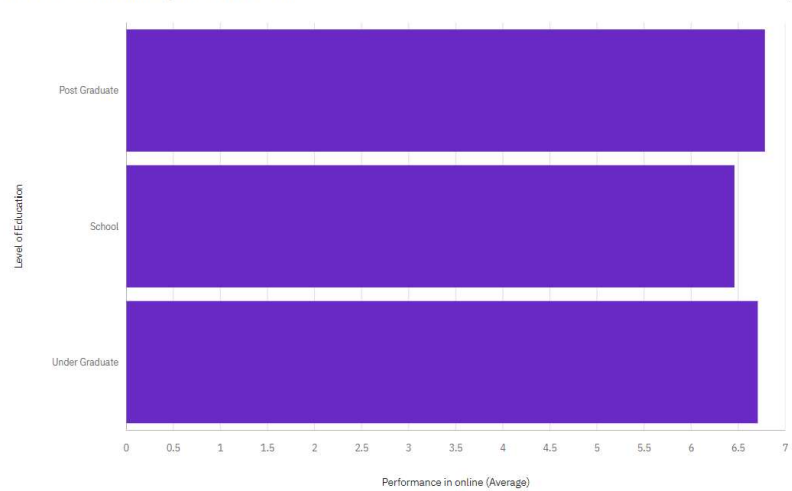
The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the online education data include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of hotels.

Activity 1.1: Column Chart:



Activity 1.2: Bar Chart:

Performance in online by Level of Education



Details

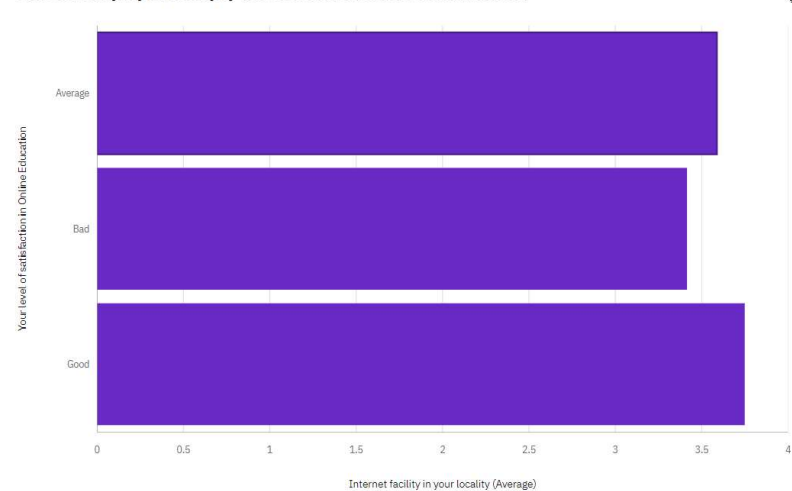
Over all values of **Level of Education**, the average of **Performance in online** is 6.696.

The average values of **Performance in online** range from 6.46, occurring when **Level of Education** is School, to 6.783, when **Level of Education** is Post Graduate.

Under Graduate is the most frequently occurring category of **Level of Education** with a count of 817 items with **Performance in online** values (79.1 % of the total).

Activity 1.3: Bar chart:

Internet facility in your locality by Your level of satisfaction in Online Education



Details

Over all values of **Your level of satisfaction in Online Education**, the average of **Internet facility in your locality** is 3.587.

The average values of **Internet facility in your locality** range from 3.415, occurring when **Your level of satisfaction in Online Education** is Bad, to 3.749, when **Your level of satisfaction in Online Education** is Good.

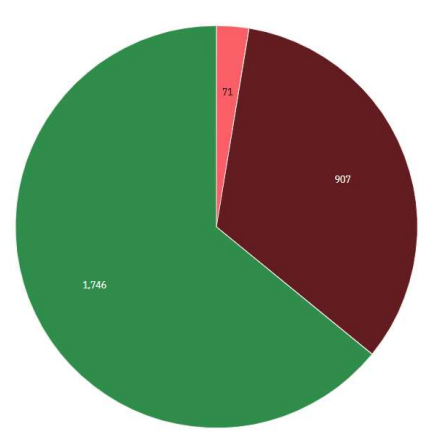
Internet facility in your locality is unusually low when **Your level of satisfaction in Online Education** is Bad.

Average is the most frequently occurring category of **Your level of satisfaction in Online Education** with a count of 541 items with **Internet facility in your locality** values (52.4 % of the total).

Activity 1.4: Pie Chart:

Time spent on social media (Hours) by Device type used to attend classes

Device type used to attend classes
● Desktop ● Mobile ● Laptop



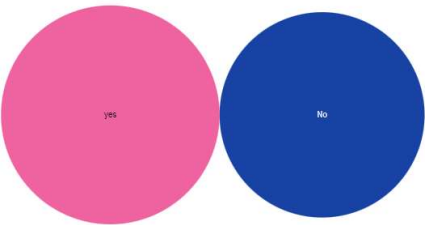
Details

Across all **device type used to attend classes**, the sum of **Time spent on social media (Hours)** is over 2500.

Time spent on social media (Hours) ranges from 71, when **Device type used to attend classes** is Desktop, to over 1500, when **Device type used to attend classes** is Laptop.

Time spent on social media (Hours) is unusually high when **Device type used to attend classes** is Laptop.

Activity 1.5: Packed Bubble:



Details

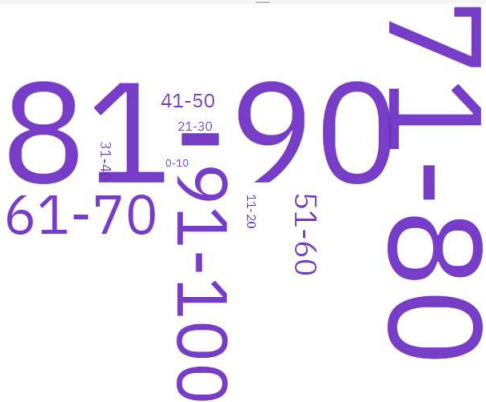
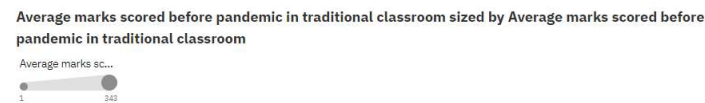
Over all values of **Engaged in group studies?** and **Engaged in group studies?**, the average of **Performance in online** is 6.696.

The average values of **Performance in online** range from 6.523 to 6.952.

Performance in online is unusually high when the combination of **Engaged in group studies?** and **Engaged in group studies?** is yes and yes.

No is the most frequently occurring category of **Engaged in group studies?** with a count of 616 items with **Performance in online** values (59.6 % of the total).

Activity 1.6: Word Cloud:



Details

The total number of results for **Average marks scored before pandemic in traditional classroom**, across all **average marks scored before pandemic in traditional classrooms**, is over a thousand.

The counts are unusually high when the values of **Average marks scored before pandemic in traditional classroom** are 81-90 and 71-80.

81-90 (33.2 %) and 71-80 (30.3 %) are the most frequently occurring categories of **Average marks scored before pandemic in traditional classroom** with a combined count of 656 items with **Average marks scored before pandemic in traditional classroom** values (63.5 % of the total).

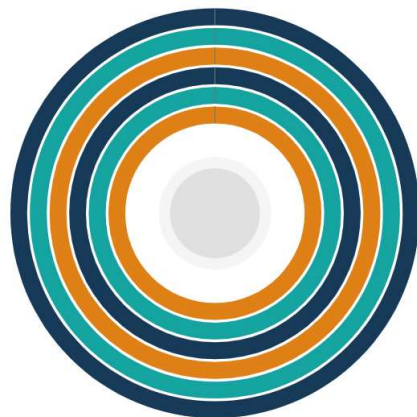
Activity 1.7:Table

| Economic status, Home Location and Performance in online | | |
|--|---------------|-----------------------|
| Economic status | Home Location | Performance in online |
| Middle Class | Rural | 6.72 |
| | Urban | 6.68 |
| Summary | | 6.69 |
| Poor | Rural | 6.49 |
| | Urban | 6.07 |
| Summary | | 6.37 |
| Rich | Rural | 9 |
| | Urban | 7.11 |
| Summary | | 7.3 |
| Summary | | 6.7 |

Activity 1.8: Radial Chart :

Your level of satisfaction in Online Education by Do elderly people monitor you? colored by Economic status

Economic status
● Middle Class ● Poor ● Rich



Details

The overall number of results for **Your level of satisfaction in Online Education** is over a thousand.

Yes is the most frequently occurring category of **Do elderly people monitor you?** with a count of 545 items with **Your level of satisfaction in Online Education** values (52.8 % of the total).

Middle Class is the most frequently occurring category of **Economic status** with a count of 954 items with **Your level of satisfaction in Online Education** values (92.4 % of the total).

Dashboard

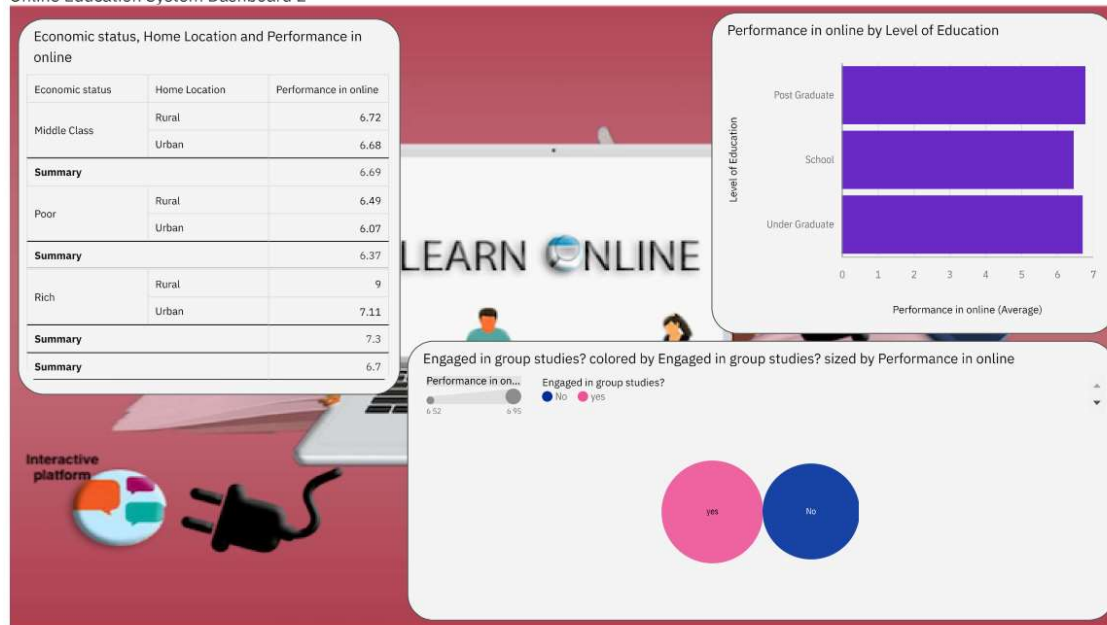
A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Responsiveness And Design Of Dashboard

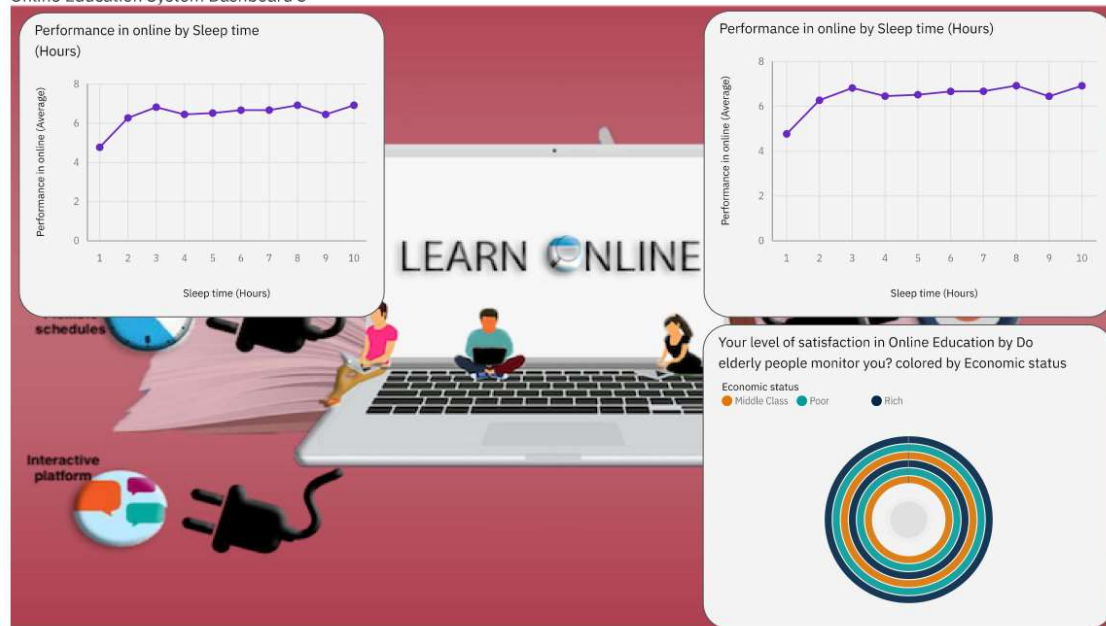
The responsiveness and design of a dashboard for online education review data is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centered design, clear and concise information, interactivity, data-driven approach, accessibility, customization, and security. The goal is to create a dashboard that is user-friendly, interactive, and data-driven



Online Education System Dashboard 2



Online Education System Dashboard 3



Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

No Of Scenes Of Story

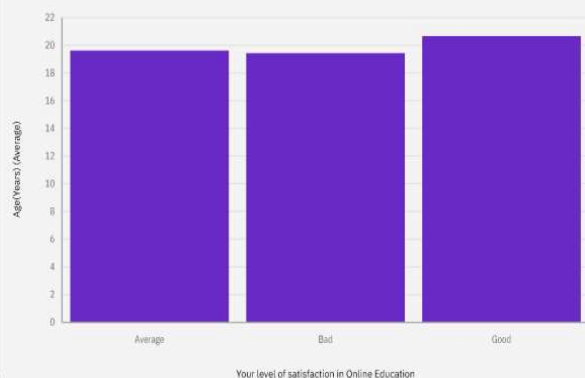
The number of scenes in a storyboard for a data visualization analysis of the performance and efficiency of online education will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

- **Level of satisfaction regarding online education by age**

Level of satisfaction regarding online education by age

- Age(Years) is unusually high when Your level of satisfaction in Online Education is Good.
- Average is the most frequently occurring category of Your level of satisfaction in Online Education with a count of 541 items with Age(Years) values (52.4 % of the total).
- Over all values of Your level of satisfaction in Online Education, the average of Age(Years) is 19.8.
- The average values of Age(Years) range from 19.4, occurring when Your level of satisfaction in Online Education is Bad, to 20.63, when Your level of satisfaction in Online Education is Good.

Age(Years) by Your level of satisfaction in Online Education



- Time spent on social media with different devices

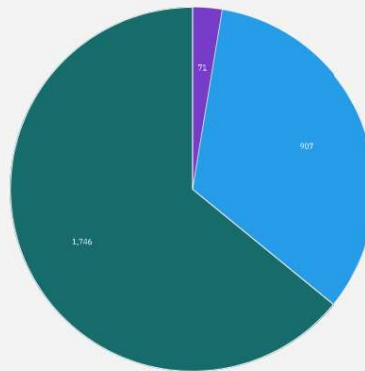
Time spent on social media with different devices

- Device type used to attend classes Laptop has the highest total Time spent on social media (Hours) due to Gender Male.
- Time spent on social media (Hours) is unusually high when Device type used to attend classes is Laptop.
- Gender Male has the highest Time spent on social media (Hours) at over 1500, out of which Device type used to attend classes Laptop contributed the most at over a thousand.
- Across all device type used to attend classes, the sum of Time spent on social media (Hours) is over 2500.

Time spent on social media (Hours) by Device type used to attend classes

Device type used to attend classes

Desktop Mobile Laptop



- Correlation between economic status, home & student online performance

Correlation between economic status, home & student online performance

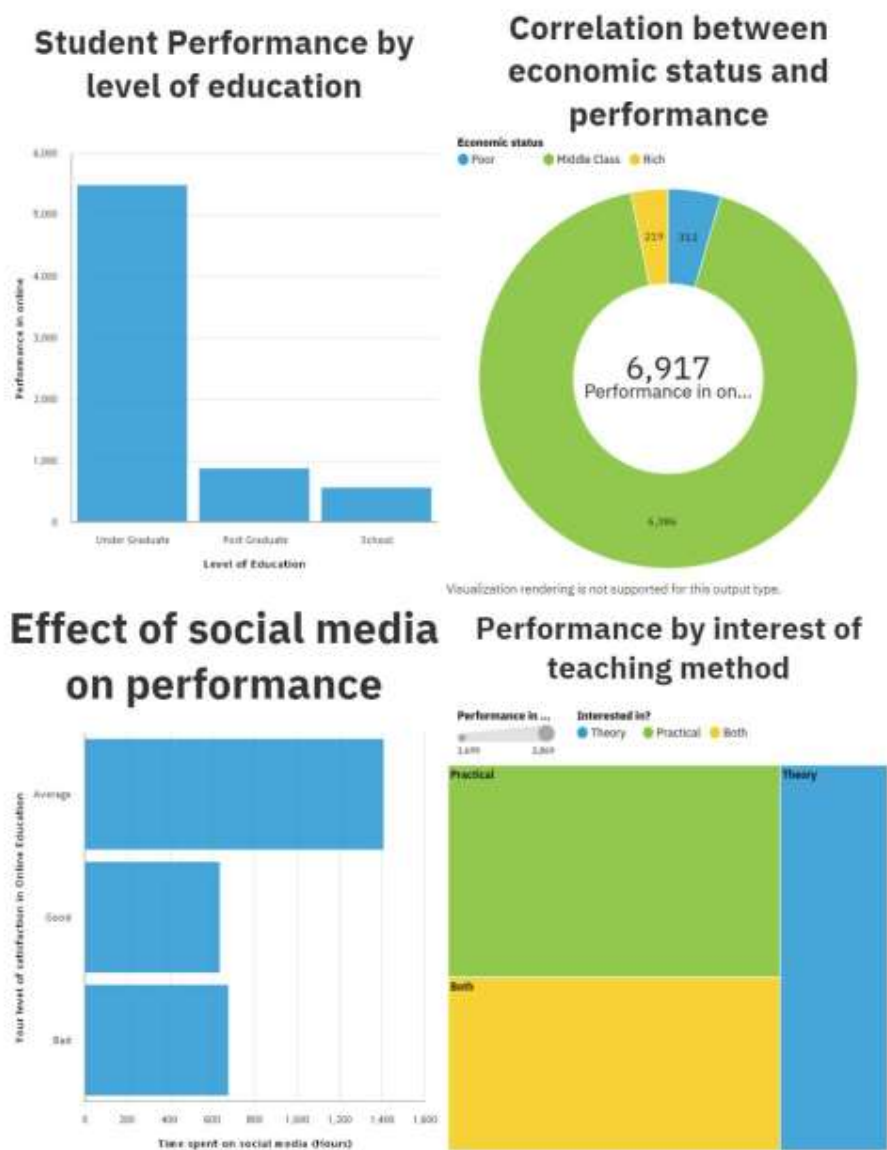
- According to this rich rural students are performing relatively better compared to the other students.

Economic status, Home Location and Performance in online

| Economic status | Home Location | Performance in online |
|-----------------|---------------|-----------------------|
| Middle Class | Rural | 6.72 |
| | Urban | 6.68 |
| Summary | | 6.69 |
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| Rich | Rural | 9 |
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| Summary | | 7.3 |
| Summary | | 6.7 |

Report

A report is a document that presents information in a specific format and layout, usually based on data from a database or other data source. A report in IBM Cognos can contain various elements, such as tables, charts, graphs, and images, as well as text and data elements, and it is designed to be used by business users to help them better understand their data and make informed decisions. There are several different types of reports available in IBM Cognos, including list reports, crosstab reports, chart reports, and report studio reports, among others. The type of report that you choose will depend on the specific needs and requirements of your organization, as well as the data that you need to present.



Performance Testing

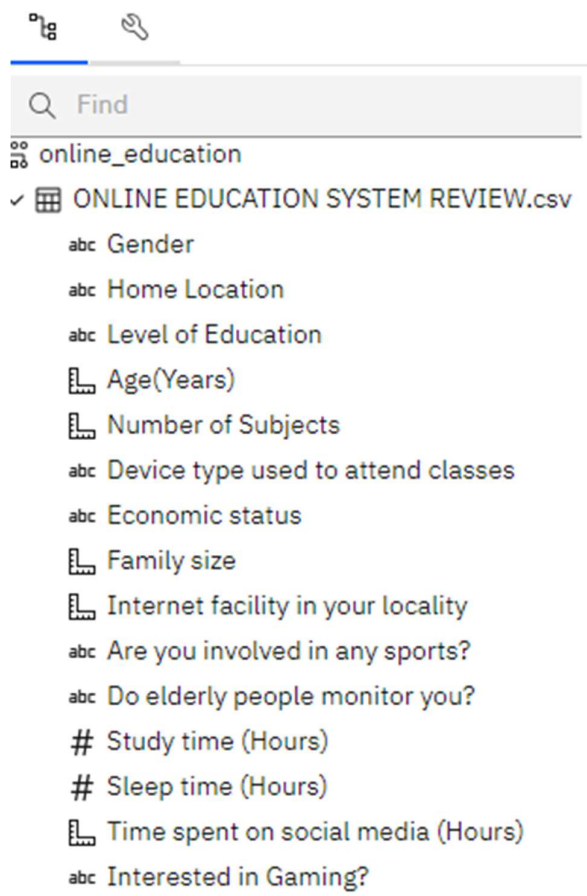
Performance testing is a non-functional software testing technique that determines how the stability, speed, scalability, and responsiveness of an application holds up under a given workload.

Utilization Of Data Filters

- Data filters are used to customize our visualization to achieve desired output
- We can apply filters while building visualizations . In explorations, filters are present at bottom of the 'Fields' option

No Of Calculation Fields

Insertable objects



No Of Visualizations/ Graphs

- Column Chart: Age(Years) by Your level of satisfaction in Online Education

- Bar Chart: Internet facility in your locality by Your level of satisfaction in Online Education
- Bar chart: Performance in online by Level of Education
- Pie Chart: Time spent on social media (Hours) by Device type used to attend classes
- Packed bubbles : Engaged in group studies? colored by Engaged in group studies? sized by Performance in online
- Wordcloud: Average marks scored before pandemic in traditional classroom
- Table: Economic status, Home Location and Performance in online
- Radial Chart:
- Line Chart: Performance in online by study time(hours)
- Line Chart: Performance in online by sleep time(hours)

Web Integration

Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

Dashboard And Story Embed With UI With Flask

Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables

Record Explanation Video For Project End To End Solution

Record explanation Video for project end to end solution

Project Documentation-Step By Step Project Development Procedure

Create document as per the template provided