

## **Introduction:**

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.

## **Business Problem:**

This project aims to delve deep into the various aspects of online education, examining its strengths, weaknesses, opportunities, and challenges.

## **Business Requirements:**

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.

In [1], Yousra Banoor Rajabalee et al., coded and analyzed Student feedback for 665 students both from a quantitative and qualitative perspective. It was found that Engagement and contentment have a strong and favourable correlated relationship. Additionally, there was a marginally significant but positive association between involvement and satisfaction with their overall performances. No matter how they performed, students were usually happy with the learning design concept. However, students complained about concerns such as a lack of instructor help and group technological challenges.

In Performance measurement of e-learning using student satisfaction analysis [2] the goal of the analysis was to identify factors which influence student satisfaction and to address heterogeneous styles and needs of both groups of students, so that future pedagogical and motivational methods in teaching and learning can be appropriately selected, developed and implemented. Investigating student

satisfaction with an online study method and e-learning system's quality was of special interest.

In the paper “Monitoring Trends in Student Satisfaction” [3] the results of a research that tracked every aspect of the student experience at a major metropolitan multi-campus institution from 2005 to 2011 are presented. 10,562 students from all major cohorts responded to a specifically created biannual survey that was administered repeatedly throughout the course of the time. The primary concerns the university has been tackling to improve the student experience are also covered in this document, along with trends in perceived significance and performance of various university services. The study comes to the following conclusions: (a) the time series data offer a powerful lens into the university's strategies, initiatives, and actions that worked well and those needing additional work or adjustment; (b) it is the overall experience of the university, not just what occurs in the classroom, that shapes students' judgements.

Using student satisfaction data to evaluate a new online accelerated nursing education program [4] offers a descriptive, cross-sectional research that used student satisfaction as a quality measure to assess the efficacy of a new online accelerated programme. The research included 91 (32% of the 284) students who were enrolled or had been enrolled in a course through the online accelerated degree completion programme during the first semester of autumn 2013 and the second semester of summer 2014. Student satisfaction with the programme and related services was evaluated using the Noel-Levitz Priorities Survey for Online LearnersTM, an electronic version of the survey. The findings gave information on how satisfied the students were with the new programme structure and formed the basis of an interdepartmental programme improvement plan that intended to maintain and raise student happiness and programme quality overall.

In [5] a multivariate linear regression of all the questionnaire items was performed against an overall satisfaction item. It was discovered that five factors made a substantial contribution to a model that predicted around 70% of the reported student happiness. Student confidence in their ability to communicate and learn online, having a clear understanding of what was necessary to succeed in the unit, and how well they believed they were performing in the unit were the main factors that were found to positively influence student satisfaction with studying a wholly online unit. There are also documented other outcomes.

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

### Collect the dataset

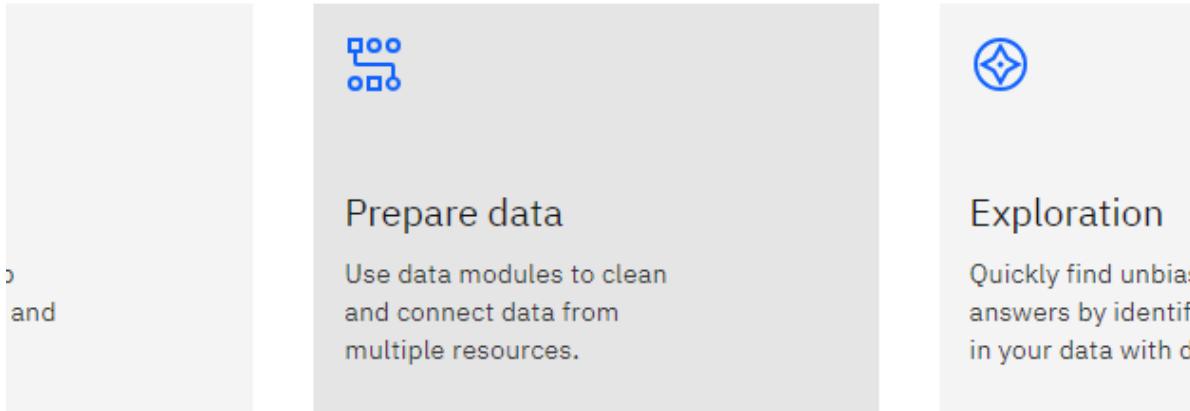
Column Description for Online education system review:

- 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

Connect the Data with IBM Cognos

## Database Connection

Login to IBM Cognos, Launch IBM Cognos, now go to the **prepare data** section, click on upload option and upload the csv file



Select sources

The image shows a screenshot of the "Select sources" dialog in IBM Cognos. At the top, there is a search bar with the placeholder "Type any text to filter items in this folder". Below the search bar, there is a list of files:

- Bookshop.xlsx (uploaded on 4/10/2023, 12:11 AM)
- dash\_new (uploaded on 2/24/2023, 12:06 AM)
- Education data (uploaded on 6/10/2023, 1:08 AM)
- education\_report (uploaded on 6/10/2023, 3:09 AM)
- exp2 (uploaded on 2/23/2023, 11:04 PM)
- global\_fin\_index.csv

A red box highlights the "Upload" icon (a downward arrow) on the far left of the list, indicating where to click to upload a new CSV file.

after the data is uploaded you will see the interface in the below image

The screenshot shows the IBM Cognos Analytics with Watson interface. At the top, there's a navigation bar with icons for search, refresh, and user profile. The main area is titled "Data module" and shows a tree view of data sources. A folder named "New data module" is selected, highlighted with a blue border. Underneath, there are several tables listed: "India Agri...uction.csv" (with columns Row Id, State, District, Crop, Year, Season, Area, Area Units, Production, Production Units), "Navigation paths", and some other entries like "# Row Id", "abc District", etc. To the right of the tree view, there's a "Grid" tab, a "Relationships" tab, and a "Custom tables" tab. Below the tabs, there's a section titled "Preview data" with a placeholder message: "To preview data, select a table, a column in a table, or a folder that contains columns." There's also a circular icon with a grid and a checkmark. At the bottom right, there's a watermark for "Activate Windows" and a link to "Go to Settings to activate Windows".

## 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.

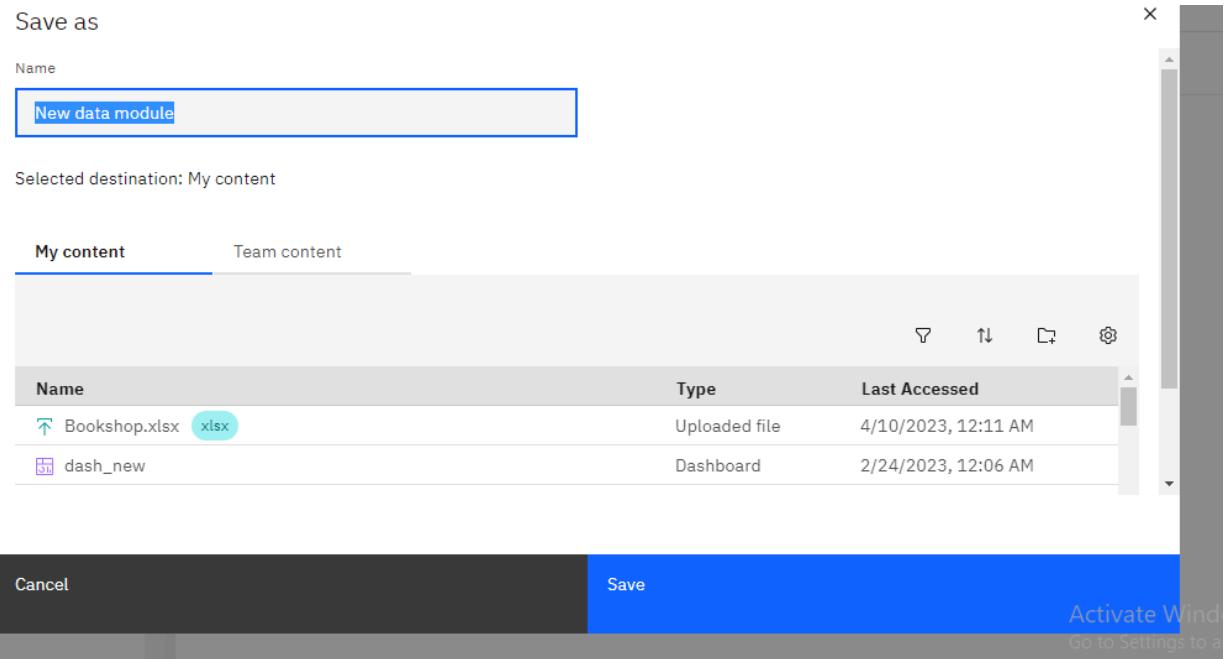
Data preprocessing can be performed in many ways using many different steps depending on your data here, we are going to do some part of data preparation on our data.

Once you upload the data into the data module, you will encounter the interface shown in the below image

The screenshot shows the IBM Cognos Analytics with Watson interface. The top navigation bar includes the product name, a dropdown for the data source ('online\_education'), a notification icon (24), a search bar, and user profile icons. The main area is titled 'Data module' and displays a tree view of data objects under 'online\_education'. The 'Grid' tab is selected, showing a preview icon and a 'Preview data' section with instructions: 'To preview data, select a table, a column in a table, or a folder that contains columns.' A watermark for Windows activation is visible in the bottom right.

Remember to save this data in ‘My content’ section

This screenshot is similar to the previous one but highlights the 'Save' button in the top left corner of the toolbar with a red box. The rest of the interface, including the data module view and preview section, remains the same.



To preview the data , double click on any of the data fields

IBM Cognos Analytics with Watson

Education data

24

Search content

Properties

Data module

Grid Relationships Custom tables

Search

Education data

- Navigation paths
- ONLINE E...VIEW.csv
- # Row Id
- abc Gender
- abc Home Location
- abc Level of Education**
- Age(Years)
- Number o...ubjects
- abc Device ty... classes
- abc Economic status
- Family size
- Internet f... locality
- abc Are you i... v sports?

Row Id Gender Home Location Level of Education Age(Years) Number of Subjects

1	Male	Urban	Under Graduate	18	11
2	Male	Urban	Under Graduate	19	7
3	Male	Rural	Under Graduate	18	5
4	Male	Urban	Under Graduate	18	5
5	Male	Rural	Under Graduate	18	5
6	Male	Urban	Under Graduate	18	5
7	Male	Urban	Under Graduate	19	5
8	Male	Urban	Under Graduate	17	4
9	Female	Urban	Under Graduate	19	5
10	Female	Rural	Under Graduate	18	9
	Female	Urban	Under Graduate	18	9

If you want to rename any field, click on the ‘three dots’ at the right side of the field

IBM Cognos Analytics with Watson

Data module

Search

- Education data
  - Navigation paths
  - ONLINE E...VIEW.csv
    - # Row Id
    - abc Gender
    - abc Home Location
    - abc Level of Education
    - L Age(Years)
    - L Number o...bjects
    - abc Device ty... classes :
    - abc Economic status
    - L Family size
    - L Internet f... locality
    - abc Are you i... sports?

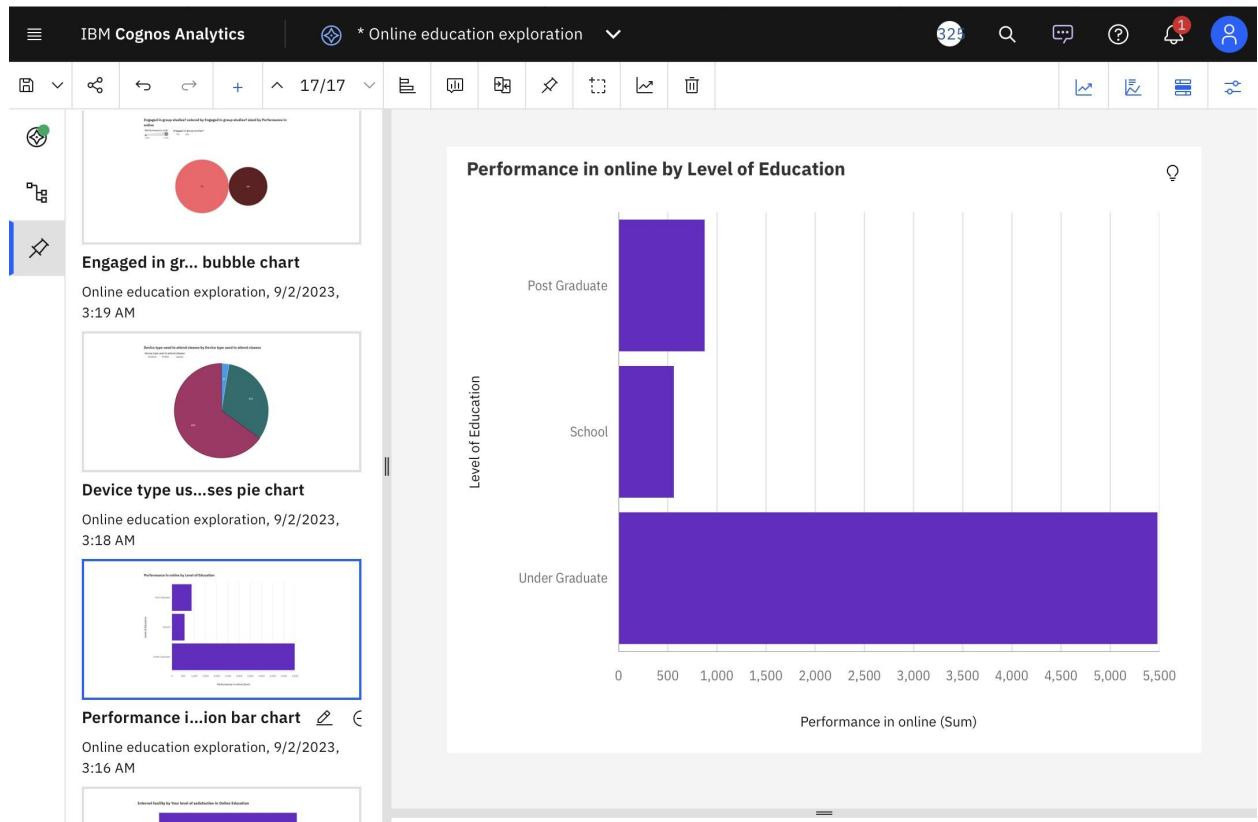
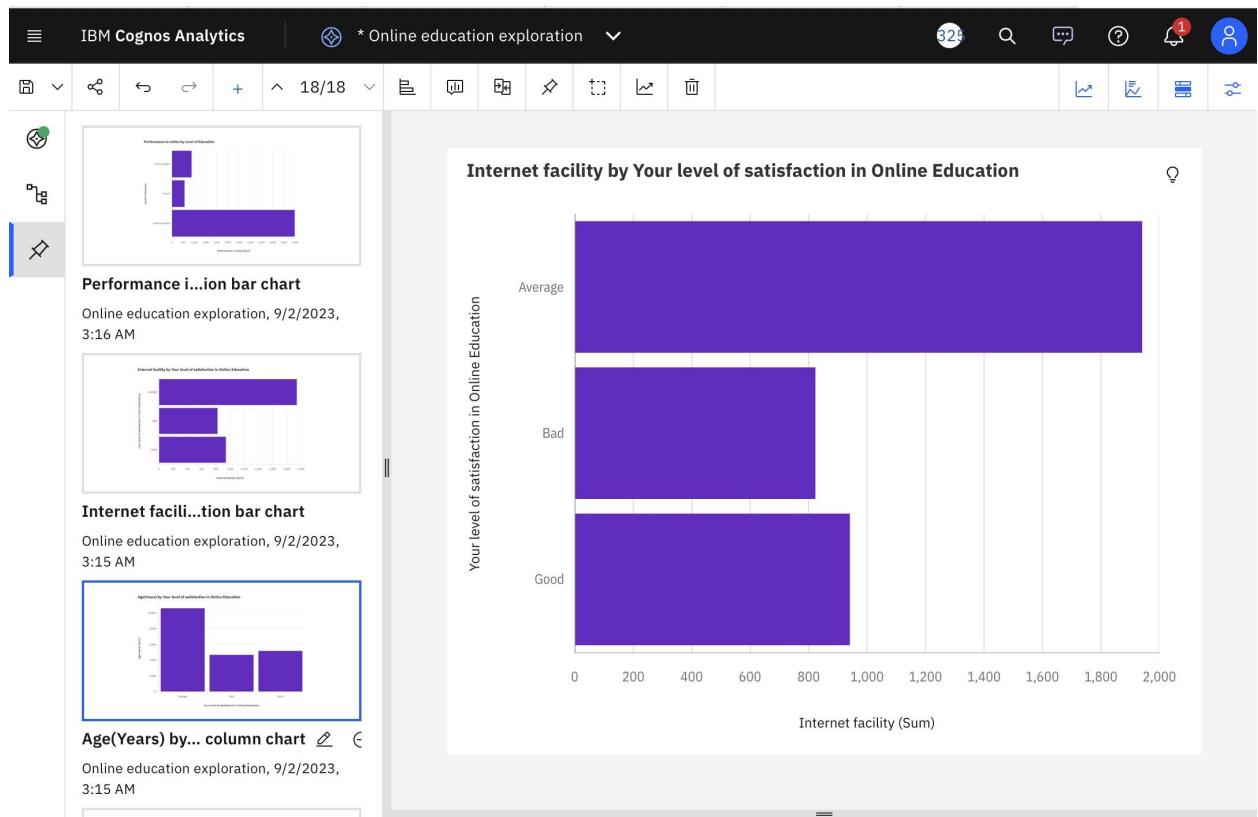
The screenshot shows the IBM Cognos Analytics with Watson interface. At the top, there's a navigation bar with icons for file, search, and navigation, followed by the title "IBM Cognos Analytics with Watson" and a dropdown menu "Education data". Below the title, there's a toolbar with various icons. The main area is a tree view of data modules. A context menu is open over a node in the tree, specifically over a "abc" node under "Device ty... classes". The menu items are:

- Filter...
- Create data group...
- Create navigation path...
- Search for members...
- Refresh members
- Split...
- Hide from users
- Remove
- Refresh properties...
- Format data...
- Clean...
- Rename** (This item is highlighted with a red box)
- Cut
- Copy
- Properties

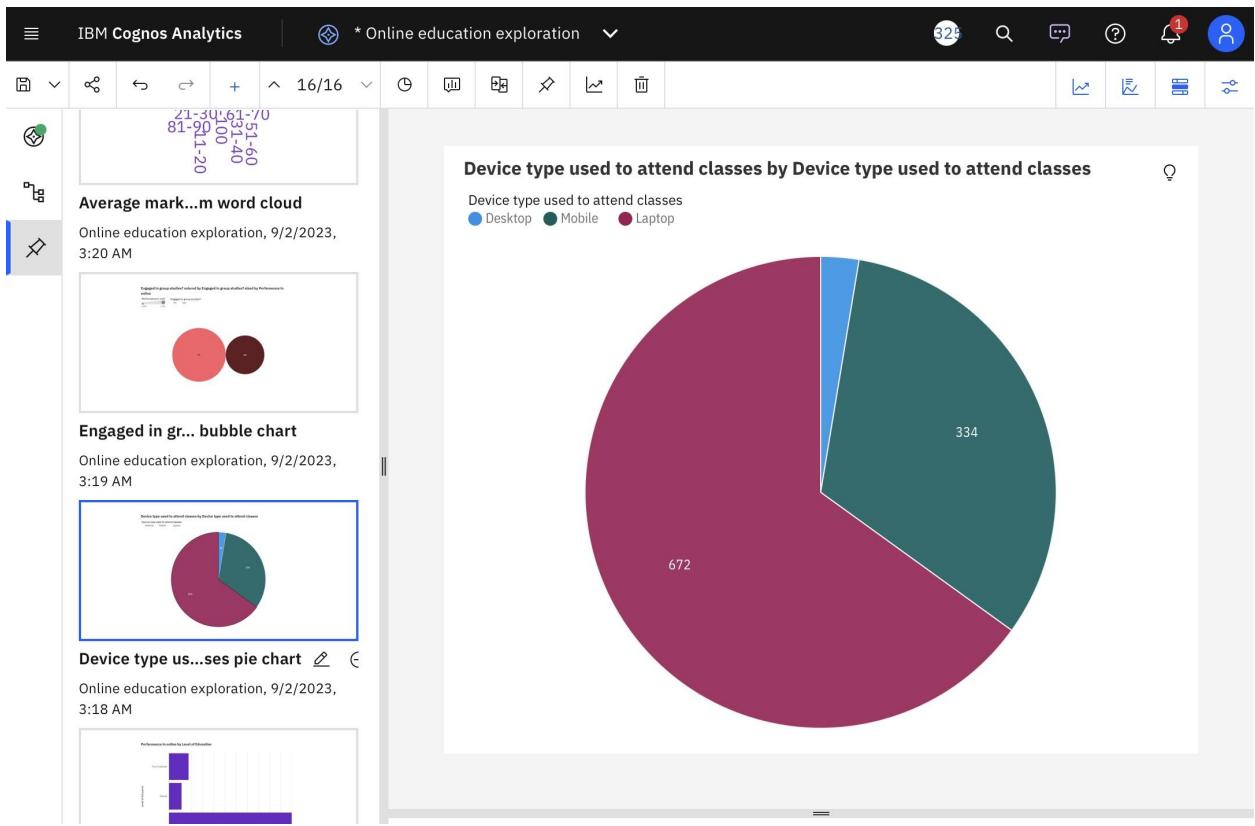
## Data Visualization

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.

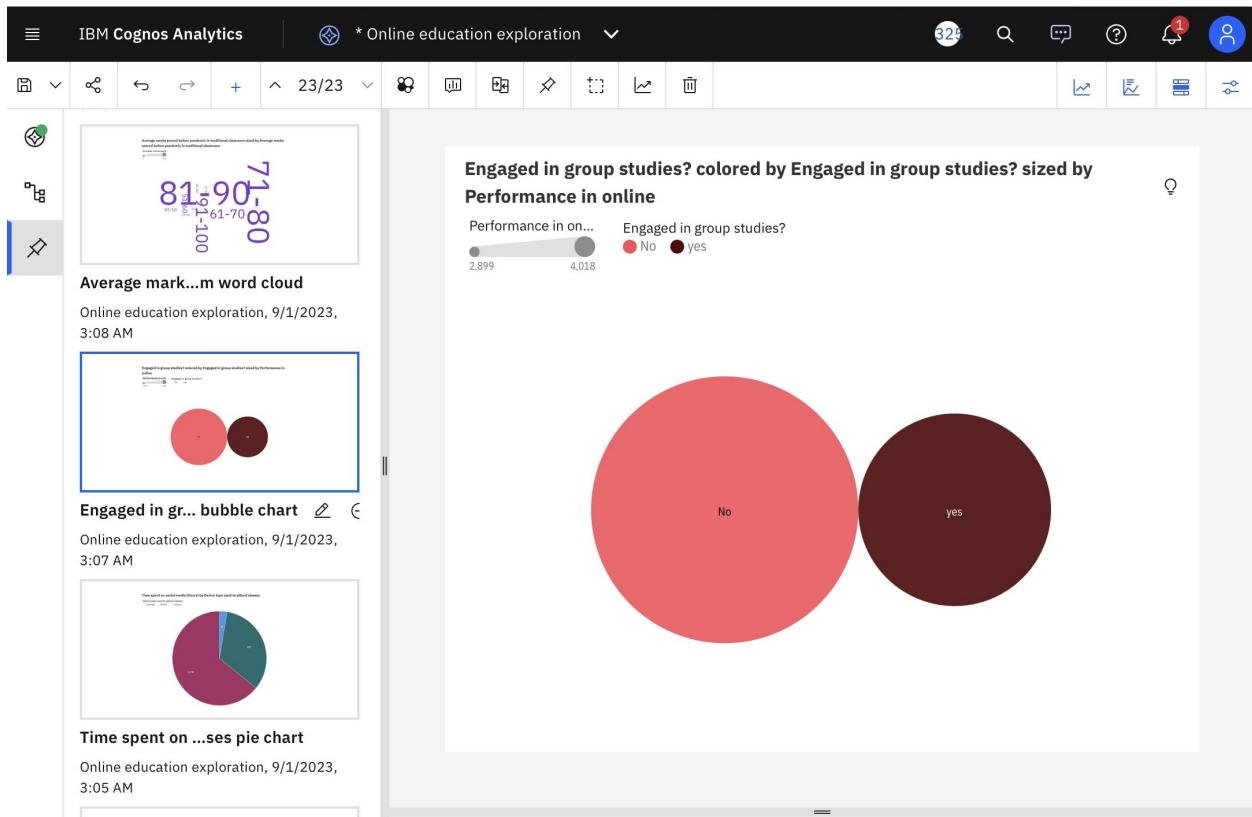
### Column Chart



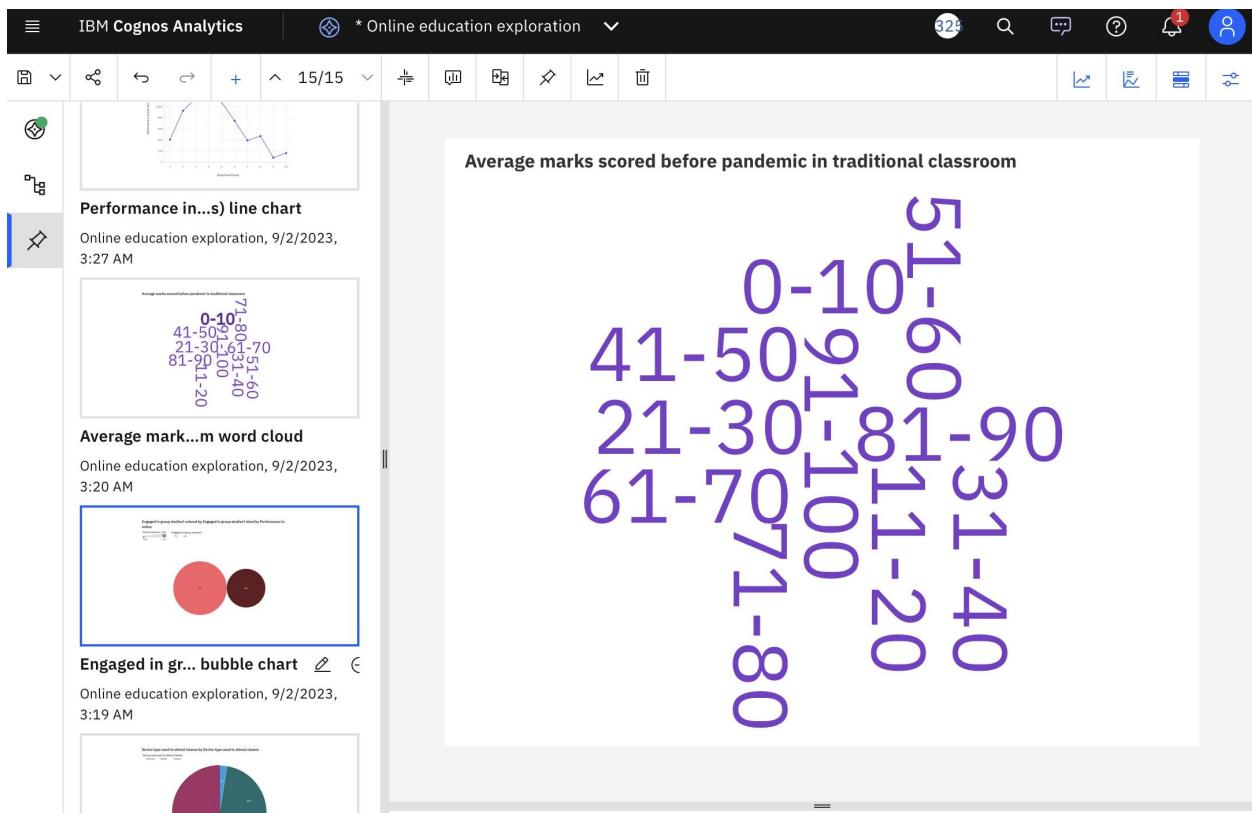
## Pie Chart



## Packed Bubbles



## Word Cloud



## Summary

IBM Cognos Analytics \* Online education exploration 22/22 625 🔍 ⚡ ? 🌐 1 🌐

Economic stat...ocation table

Online education exploration, 9/1/2023, 3:10 AM

Average mark...m word cloud

Online education exploration, 9/1/2023, 3:08 AM

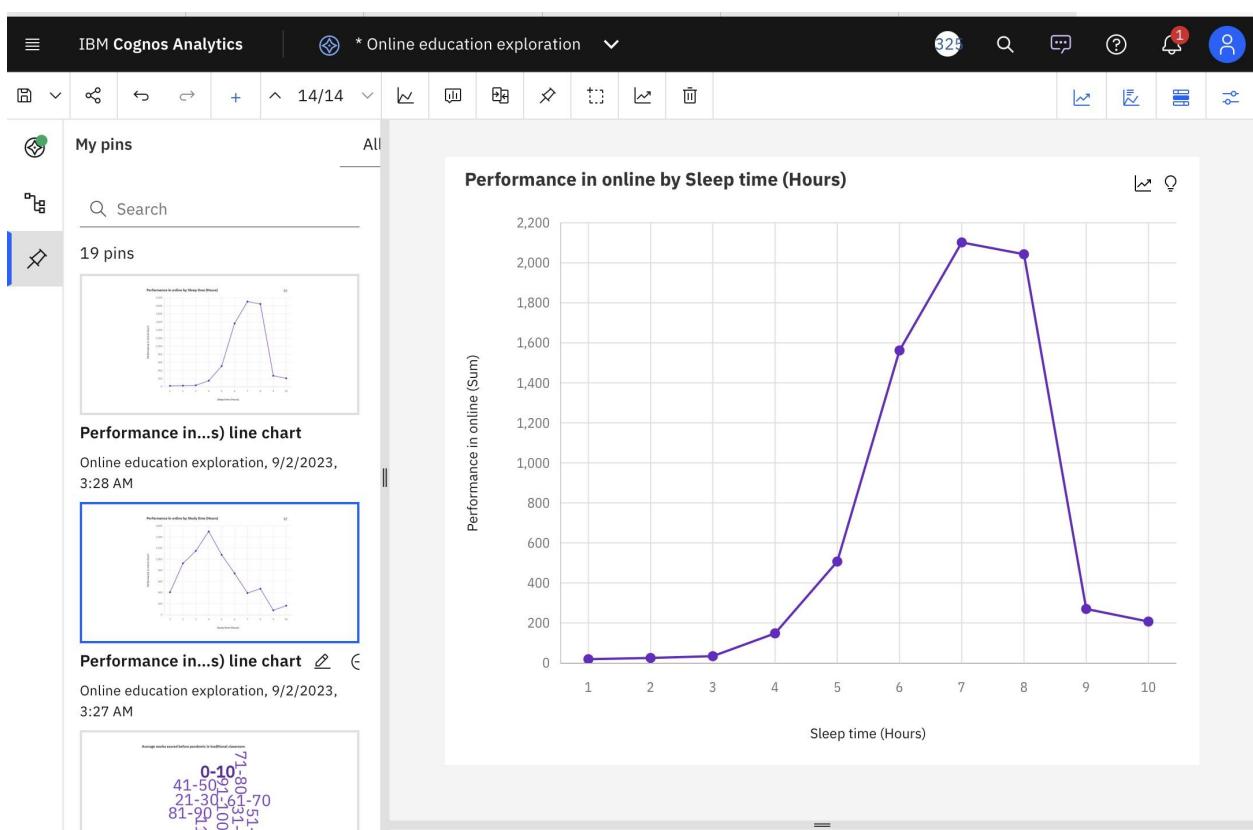
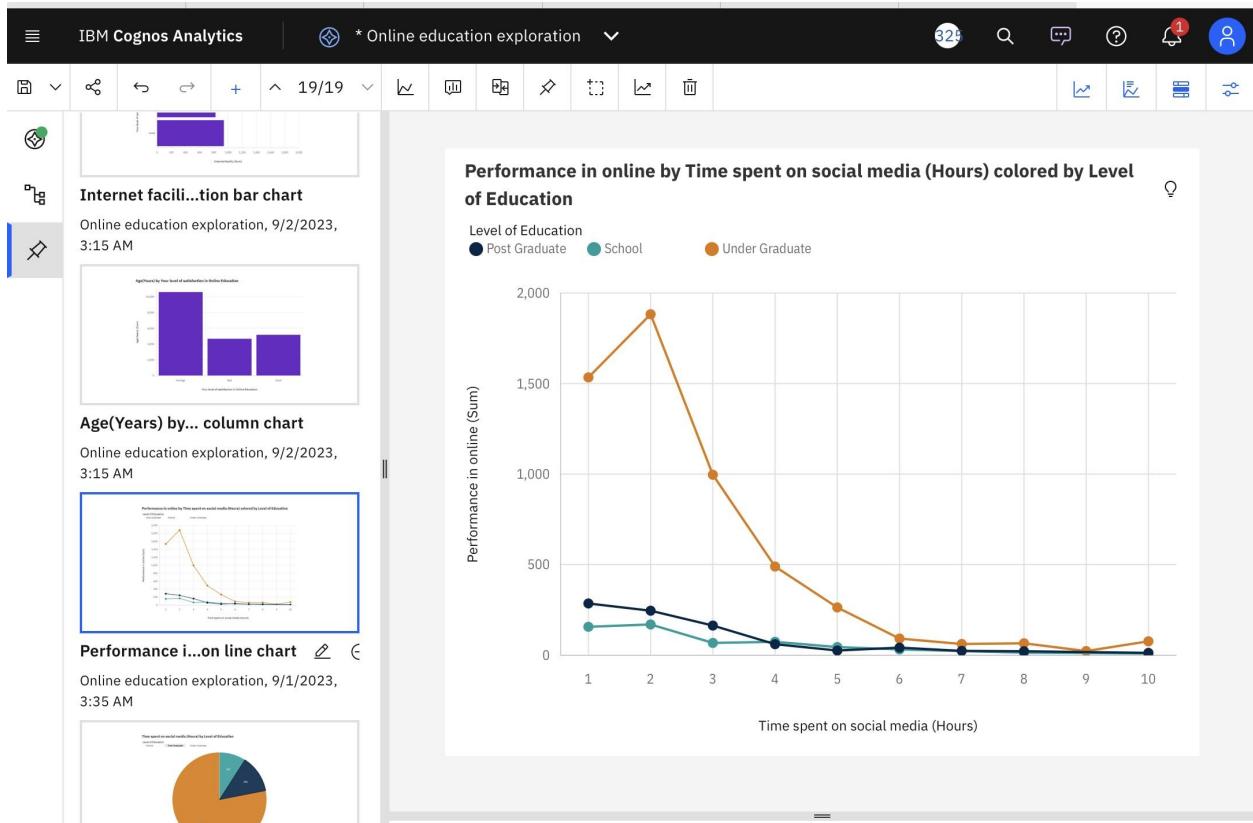
Engaged in gr... bubble chart

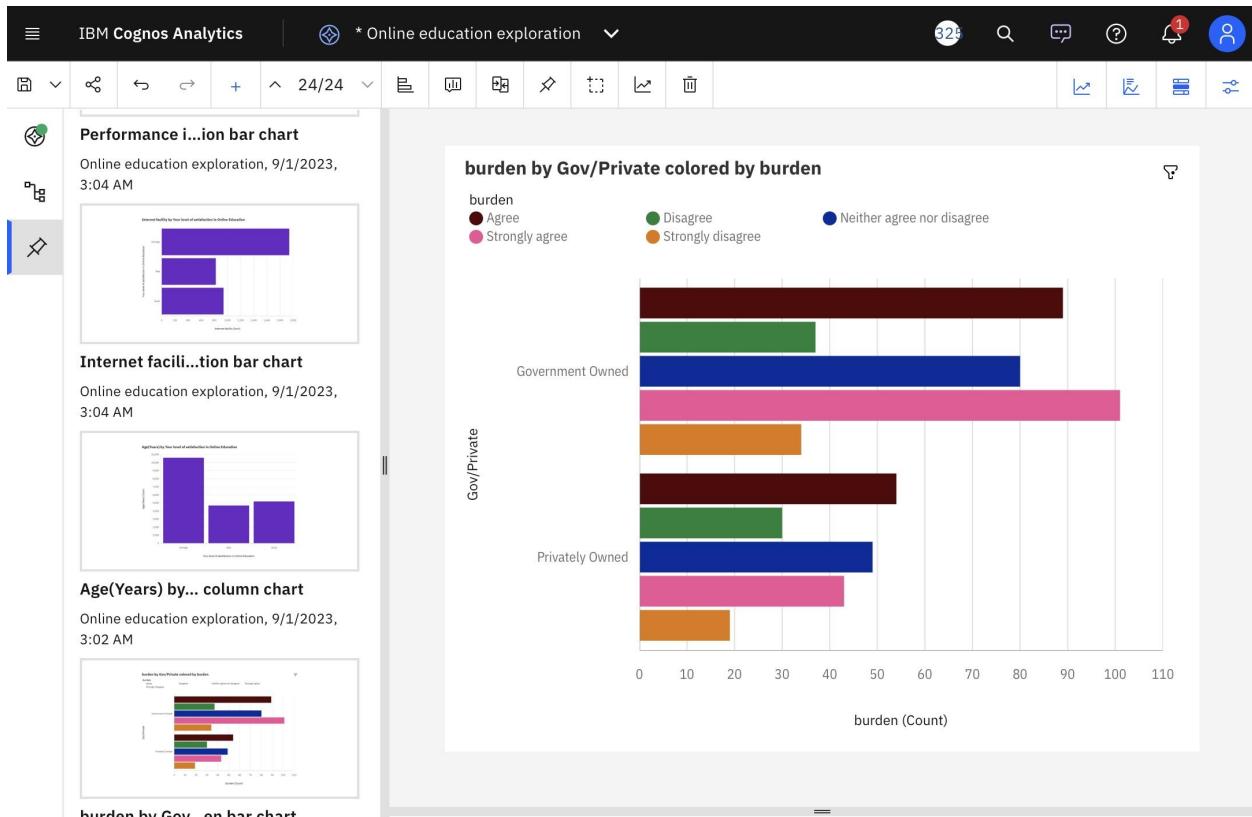
Online education exploration, 9/1/2023, 3:07 AM

**Economic status, Performance in online and Home Location**

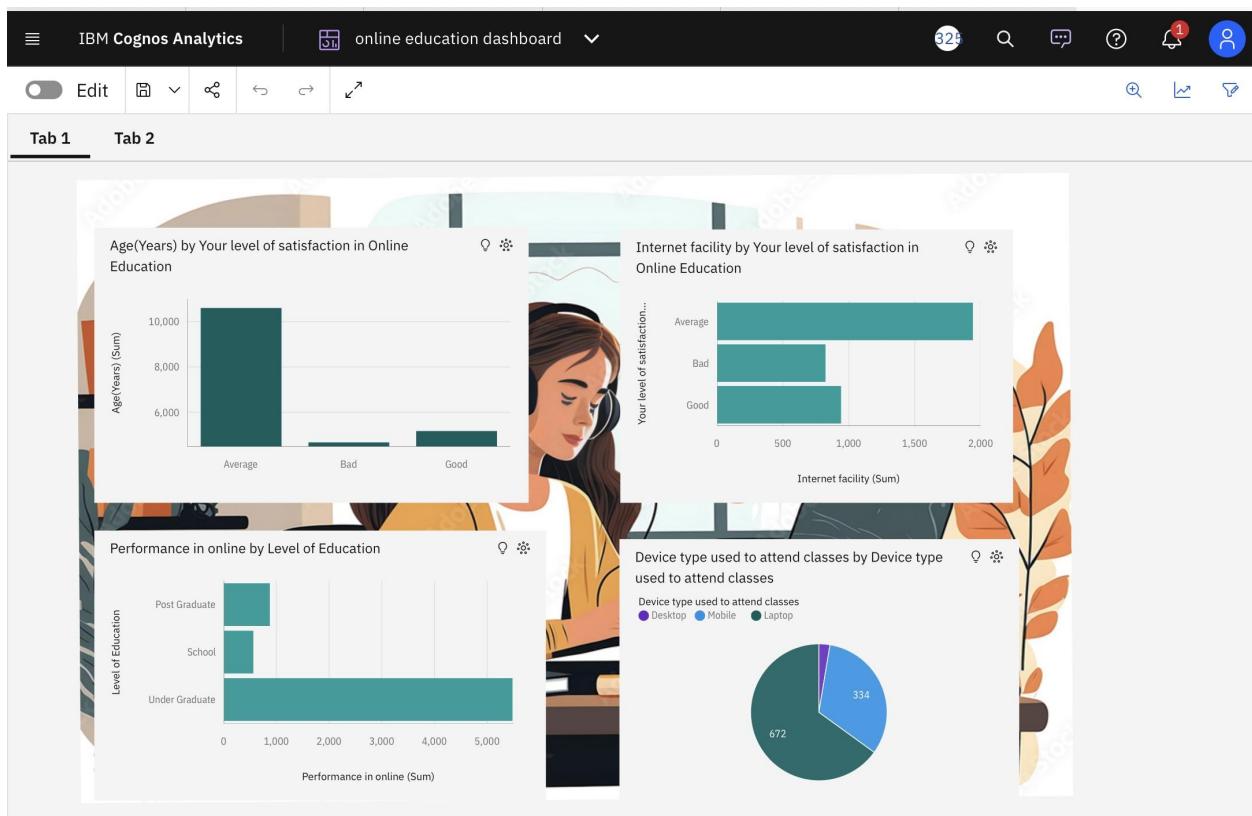
Economic status	Home Location	Performance in online
Middle Class	Rural	6.72
	Urban	6.68
<b>Summary</b>		Processing...
Poor	Rural	6.49
	Urban	6.07
<b>Summary</b>		Processing...
Rich	Rural	9
	Urban	7.11
<b>Summary</b>		Processing...
<b>Summary</b>		Processing...

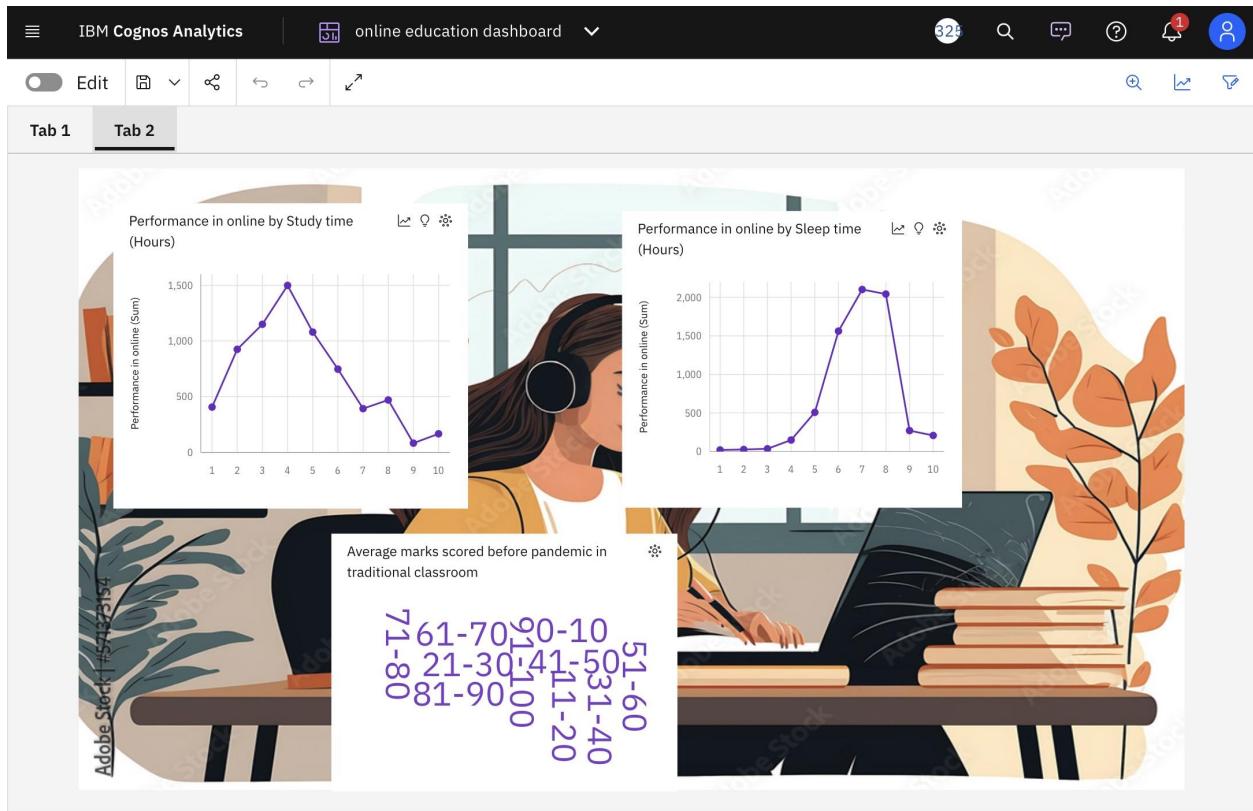
## Line Chart





## Dashboard





## Story



IBM Cognos Analytics | VC Story

**Correlation between Economic status, home and Performance**

According to this rich rural students perform relatively better compared to other students

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

Prev scene | Next scene | Scene 10 of 10 | 0:01.8 ————— 0:10.0 |

IBM Cognos Analytics | VC Story

**Performance and Social Media**

Performance in online by Time spent on social media (Hours) colored by Level of Education

Level of Education

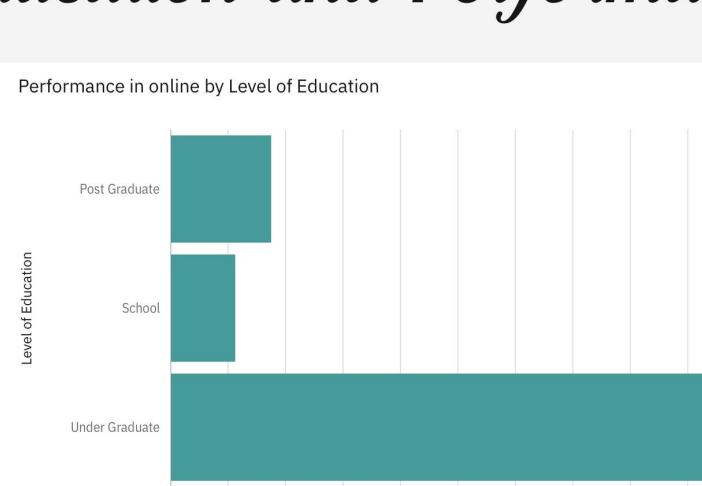
- Post Graduate
- School
- Under Graduate

Time spent on social media (Hours)	Under Graduate (Sum)	Post Graduate (Sum)	School (Sum)
1	~1550	~300	~150
2	~1900	~300	~200
3	~1000	~150	~100
4	~500	~50	~50
5	~300	~50	~50
6	~100	~50	~50
7	~50	~50	~50
8	~50	~50	~50
9	~50	~50	~50
10	~100	~50	~50

Prev scene | Next scene | Scene 9 of 10 | 0:01.6 ————— 0:10.0 |

# Level of Education and Performance

Performance in online by Level of Education



Level of Education	Performance in online (Sum)
Post Graduate	~800
School	~500
Under Graduate	~5,300

Prev scene    Next scene Scene 8 of 10 0:03.4 - 0:10.0

IBM Cognos Analytics | VC Story

**Time spent on social Media**

Time spent on social media (Hours) is unusually high when Level of Education is Under Graduate.

Time spent on social media (Hours) by Level of Education

Level of Education

- School
- Post Graduate
- Under Graduate

Level of Education	Hours
School	247
Post Graduate	351
Under Graduate	2,126

Prev scene | Next scene | Scene 6 of 10 | 0:01.5 | 0:10.0 | Edit |

IBM Cognos Analytics | VC Story

**Study Time vs Performance**

Performance in online is unusually high when Study time (Hours) is 4.

Performance in online by Study time (Hours)

.... Forecast

Study time (Hours)	Performance in online (Sum)
1	400
2	900
3	1150
4	1500
5	1100
6	750
7	400
8	450
9	100
10	150
11	-100
12	-100

Prev scene | Next scene | Scene 5 of 10 | 0:05.0 | 0:05.0 | Edit |

IBM Cognos Analytics | VC Story

325 | Search | Refresh | Help | Logout

Edit | View | Insert | Undo | Redo | Save

## How sleep affects Performance online

Performance in online is unusually high when Sleep time (Hours) is 7 and 8.

Performance in online by Sleep time (Hours)

The chart displays a single data series showing the relationship between sleep time and online performance. The x-axis represents 'Sleep time (Hours)' from 1 to 10. The y-axis represents 'Performance in online (Sum)' from 0 to 2,000. The data points show a sharp increase starting around 4 hours of sleep, peaking at approximately 2,050 at 7 and 8 hours, and then decreasing sharply towards 10 hours.

Sleep time (Hours)	Performance in online (Sum)
1	~50
2	~50
3	~50
4	~150
5	~500
6	~1600
7	~2100
8	~2050
9	~250
10	~180

Prev scene | Next scene | Scene 4 of 10 | 0:03.1 ————— 0:05.0 | Settings

IBM Cognos Analytics | VC Story

824 824 824 824 824 824 824 824 824 824 824

Edit

Which device is used most to spend time online

According to this majority of students use laptop for social media

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

Device type used to attend classes

Desktop Mobile Laptop

Device Type	Time Spent (Hours)
Laptop	1,746
Mobile	907
Desktop	Very Small Fraction

Prev scene |<| >| Next scene Scene 3 of 10 0:06.6 ————— 0:10.0

IBM Cognos Analytics | VC Story

824 824 824 824 824 824 824 824 824 824 824

Edit

Level of Satisfaction by Age

The column chart demonstrates level of satisfaction regarding online by students of different ages

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

Your level of satisfaction in Online Education (Count distinct)

Age Group	Satisfaction Level (Count distinct)
less than 1	2
16 to < 22	3
22 to < 28	3
28 to 34	1
34 and above	3

Prev scene |<| >| Next scene Scene 2 of 10 0:04.8 ————— 0:10.0

# Report

