

Online Education System Review

By: Sagarika Ghosh

I) Problem Understanding

Online education is operationally defined as a format used in learning when learners do not need to be in bricks-and-mortar classrooms. In this project we are going to focus on the various aspects of online education, examining its strengths, weaknesses, opportunities, and challenges.

a) Specify the business problem: Find the contribution of online education system on the future of education and help shape a more inclusive, engaging, and effective learning environment in the digital age. So that it will provide valuable insights for educational institutions, policymakers, and online learning platforms to enhance the effectiveness and accessibility of online education.

b) 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.

c) Literature Survey: In 2016 Anna Sun and Xiufang Chen described a review paper on online education and its effective practice in the journal of Information Technology Education: Research. In this paper they have reviewed 47 published studies and re-search on online teaching and learning since 2008, primarily focusing on how theories, practices and assessments apply to the online learning environment. They also provide practical suggestions for those who are planning to develop online courses so that they can make informed decisions in the implementation process. Based on the findings, the authors argued that effective online instruction is dependent upon 1) well-designed course content, motivated interaction between the instructor and learners, well-prepared and fully-supported instructors; 2) creation of a sense of online learning community; and 3) rapid advancement of technology. In 2020 Jhon L. Taylor have written an article “Online Distance Learning: A Literature Review”. Taylor mainly focus on the efficacy of online distance learning, the importance of building a learning community, and the impact of online learning over students and the development of self-regulated learning’.

In this article, mainly focus on the online performance of various categories of students as per their degree, economic status, internet facility and so on. Also identified the level of our satisfaction on their online performance.

d) Social or Business Impact: Social Impact: Understanding the pros and cons of e-learning and making it better for future generations. Business Model/Impact: Ed-tech companies and other organizations can capitalize on this.

II) 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.

a) Collect the dataset: I have collect the dataset from the smartinternz.com over the Online Education System Review. Data contains all the meta information regarding the columns described in the CSV files. 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

b) Connect data with IBM cognos: For Database Connection I have to Login to IBM Cognos, Launch IBM Cognos, now go to the prepare data section, click on upload option and upload the csv file. Following figure1 and 2 shown the upload of csv file in IBMcognos.

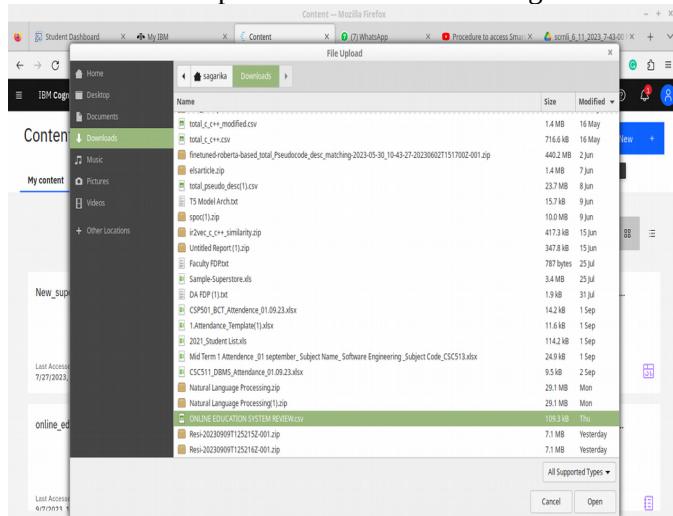


Figure1

Figure2

III) Data Preparation

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

a) 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. For this, create a datamodule through IBMcognos. Figure3,4 shown this.

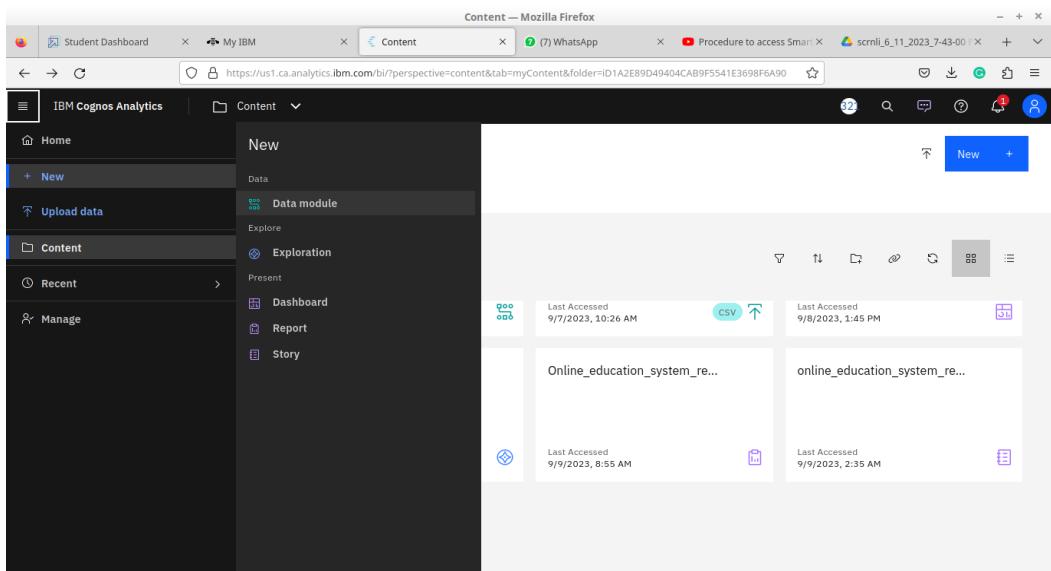


Figure3:Data module creation

This screenshot shows the configuration of the 'online_education_system_review_data_module'. The left sidebar lists 'Navigation paths' containing 'ONLINE EDUCATION REVIEW.csv' with various columns like Row Id, Gender, Home Location, Level of Education, Age(Years), Number of Subjects, Types of D...d classes, Economic status, Family size, Internet fa...ur locality, Are you in...ny sports?, and Do elderly...nitor you?. The right side features a 'Grid' view showing a preview of the data with a table icon and a 'Preview data' section below it. A note says: 'To preview data, select a table, a column in a table, or a folder that contains columns.'

Figure4:After Data module creation

IV)Data Visualizations:

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. For visualization, create data exploration through IBMcognos. Figure 5 shown this.

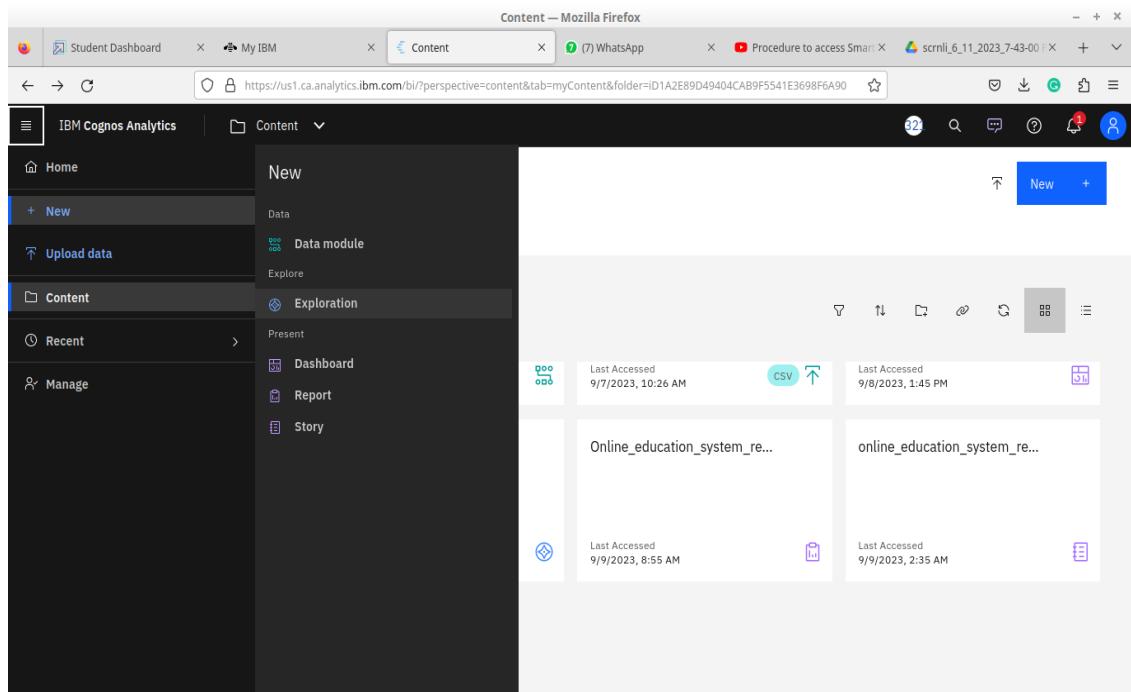


Figure5:data exploration creation

a) 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, column chart, line charts, radial chart, wordcloud, pie charts 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. Here I have create 8 unique visualizations. Figure 6-13 shown the different visualizations.

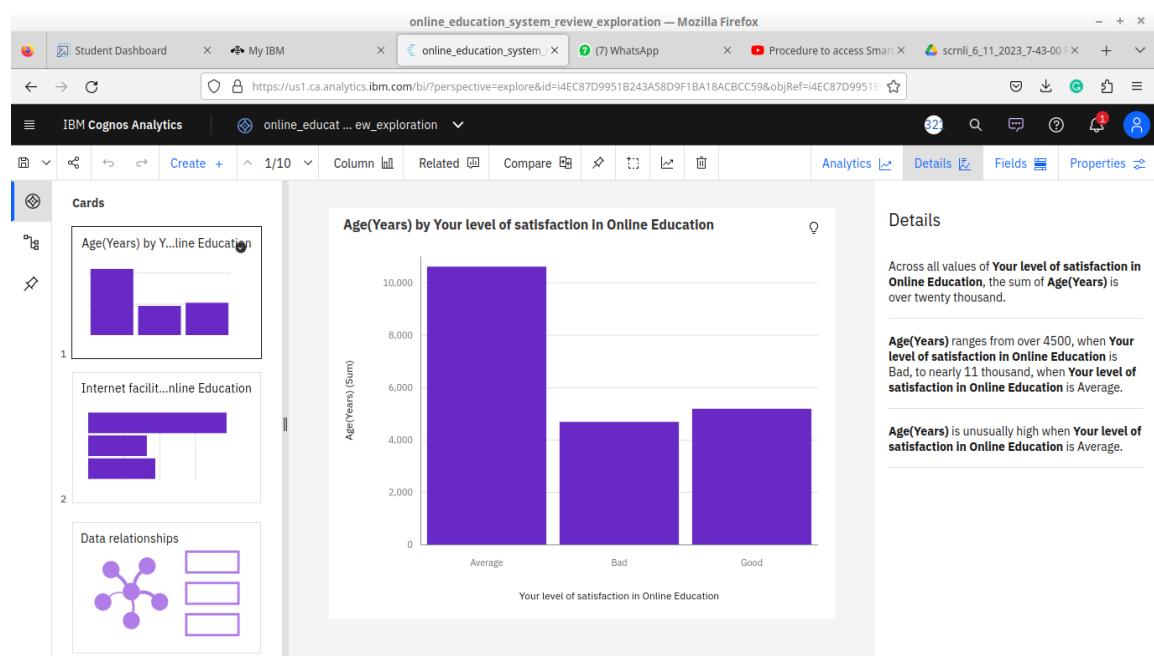


Figure 6: Column Chart

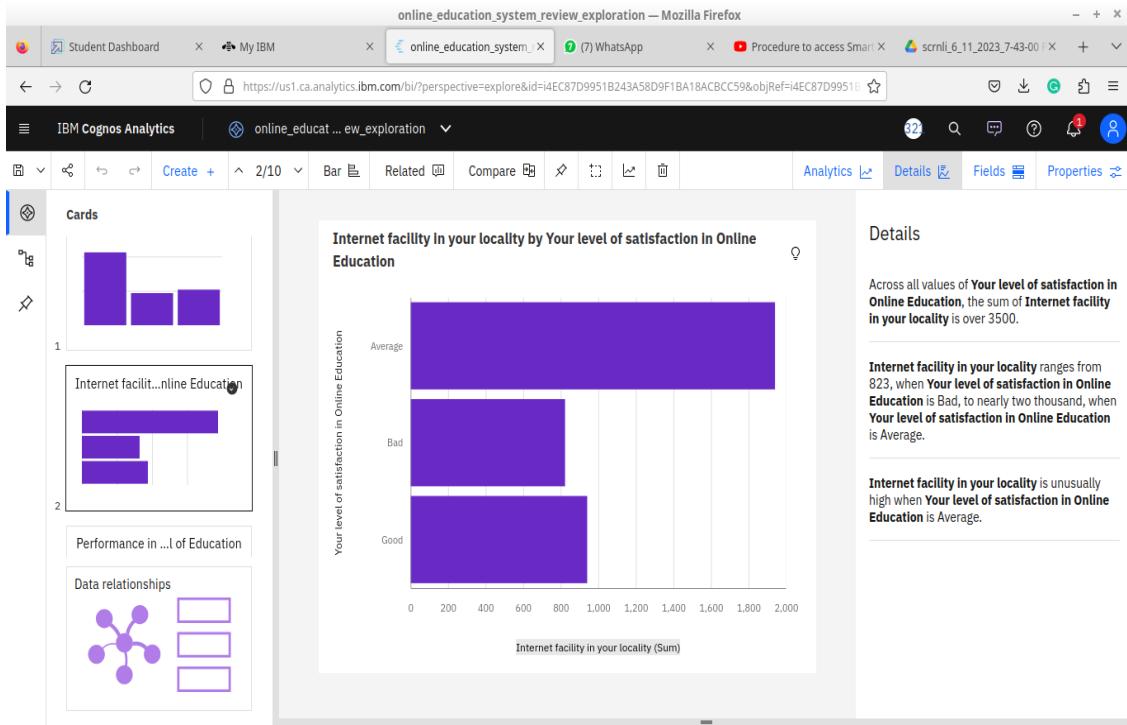


Figure 7:Bar chart

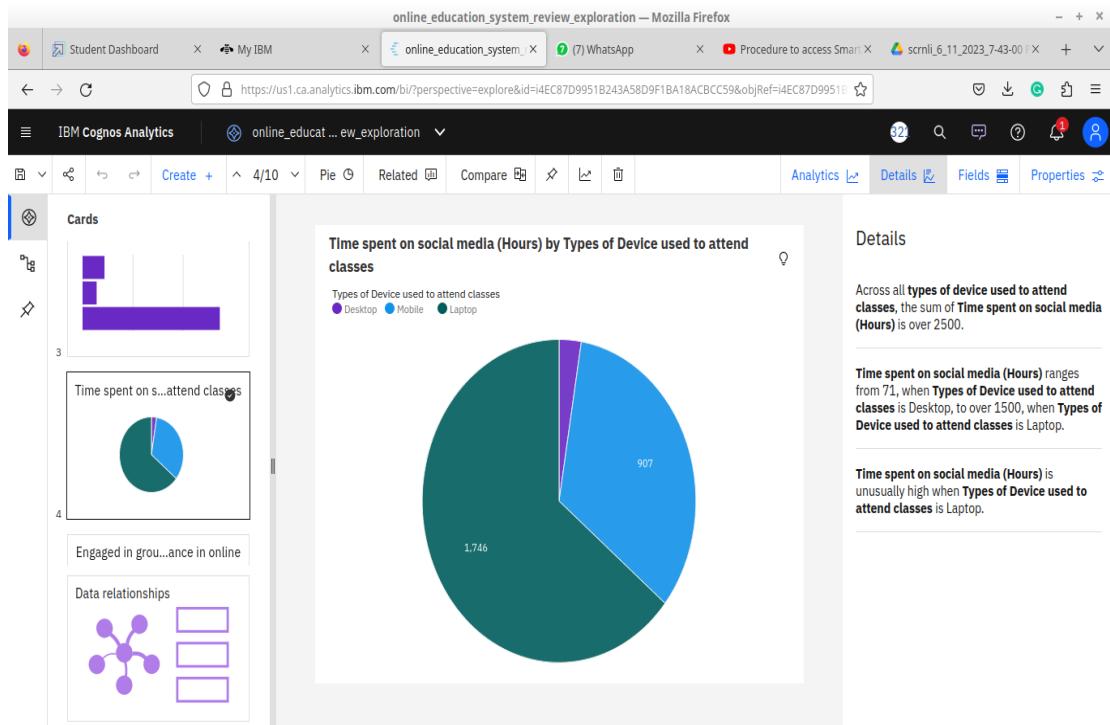


Figure 8: Pie chart

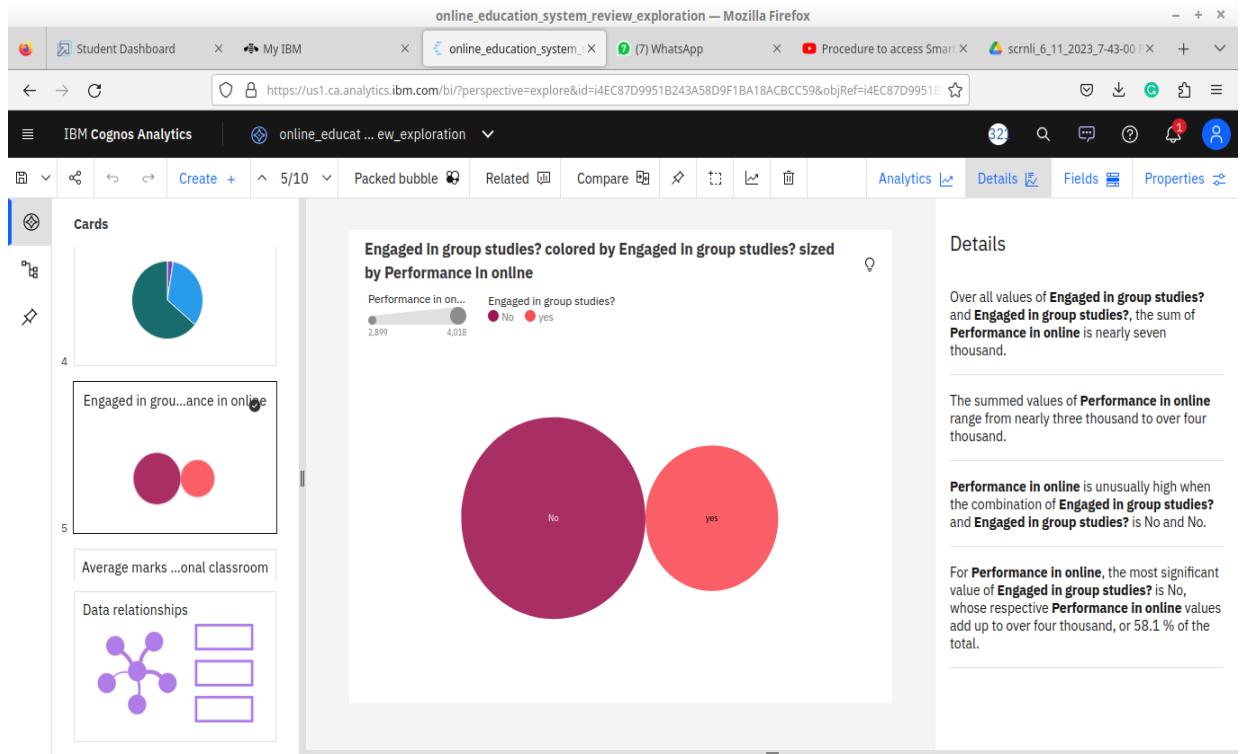


Figure 9: Packed bubbles

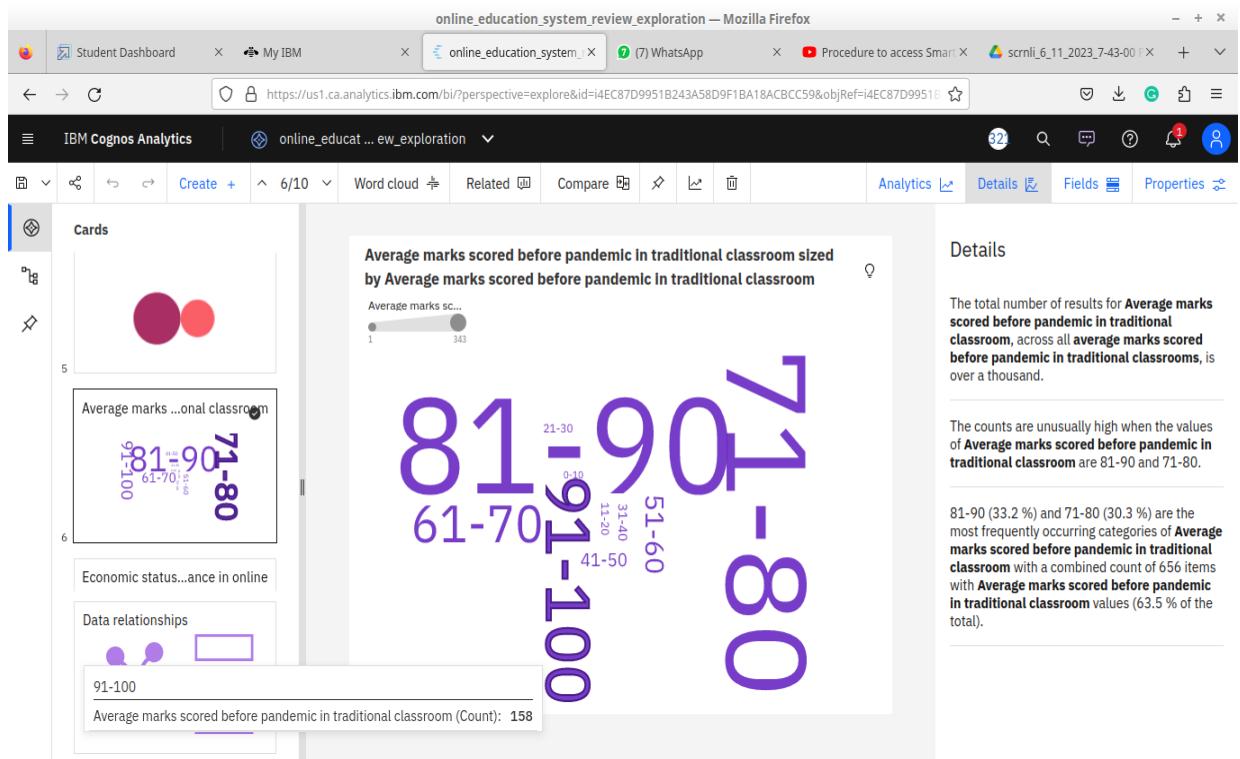


Figure10: Wordcloud

online_education_system_review_exploration — Mozilla Firefox

Student Dashboard My IBM online_education_system_review_exploration (7) WhatsApp Procedure to access Smart... scrnli_6_11_2023_7-43-00

IBM Cognos Analytics | online_education_system_review_exploration

Cards Create + 7/10 Table Related Compare Analytics Details Fields Properties

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

Fields

Columns* Required field

- Economic status
- Home Location
- Performance in online

Local filters

Click or drag data here

Figure 11:Table

online_education_system_review_exploration — Mozilla Firefox

Student Dashboard My IBM online_education_system_review_exploration (7) WhatsApp Procedure to access Smart... scrnli_6_11_2023_7-43-00

IBM Cognos Analytics | online_education_system_review_exploration

Cards Create + 8/10 Radial Related Compare Analytics Details Fields Properties

Performance in online by Interested in?

Fields

Bars Required field

- Interested in?

Length* Required field

- Performance in online

Color

Maximum value

Repeat (column)

Click or drag data here

Figure 12: Radial chart

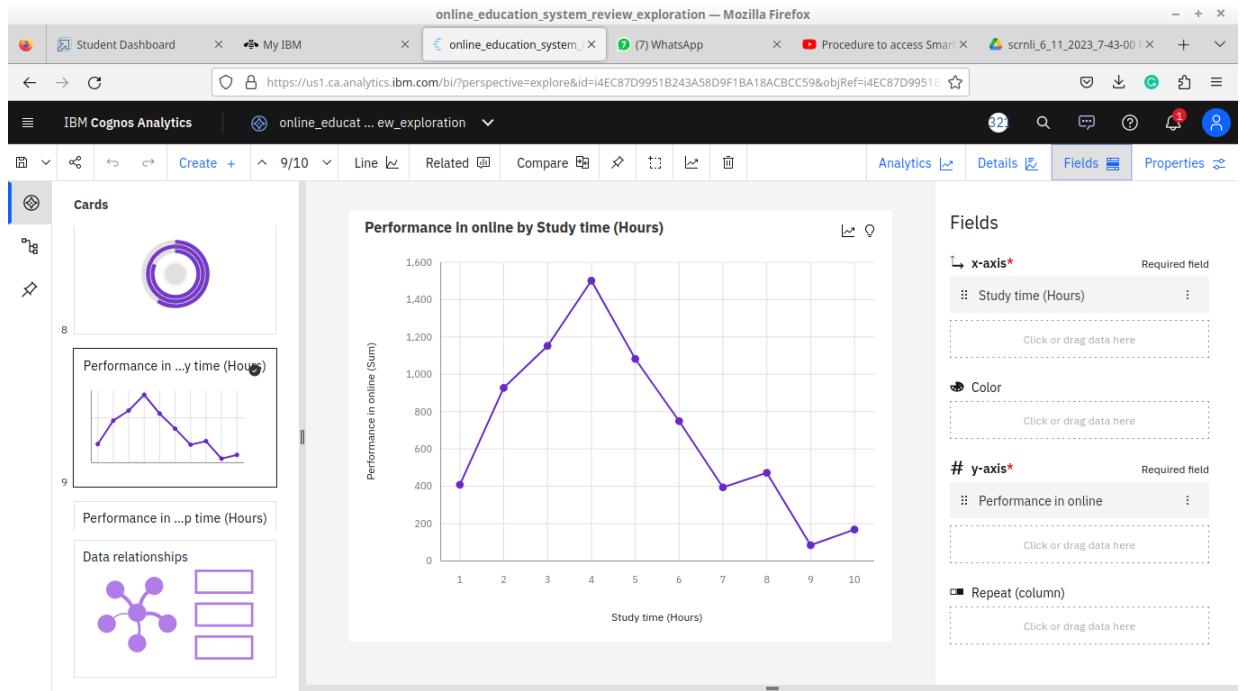


Figure 13:Line chart

V) 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. After creation of the explorations, can create a dashboard by clicking the "present data" option & selecting the dashboard. Figure 14 shown the creation of dashboard.

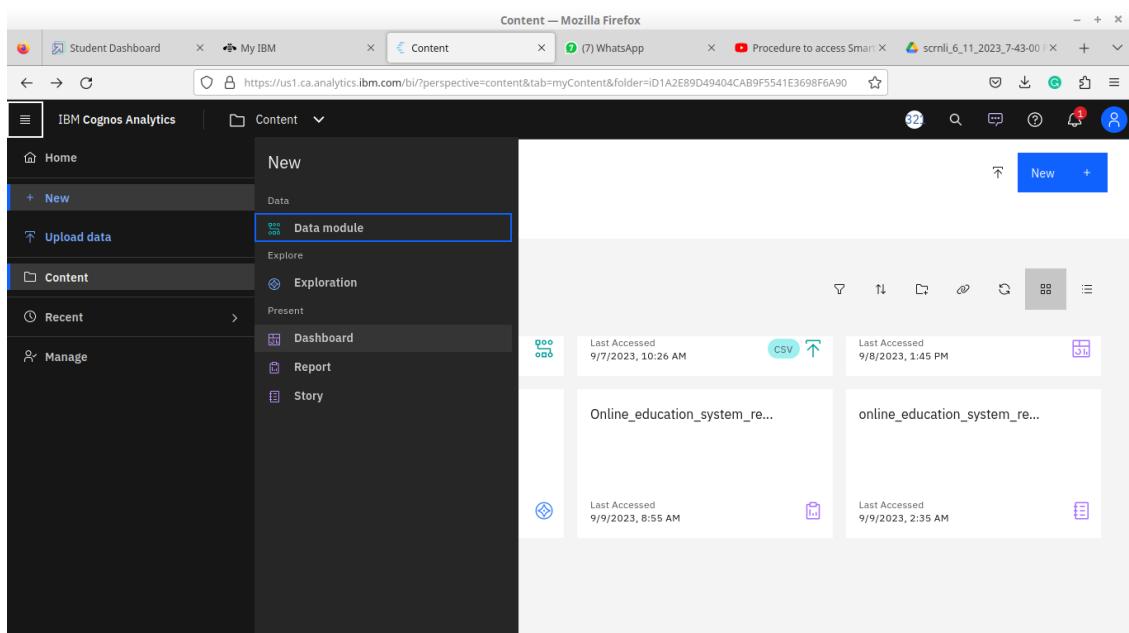


Figure 14: Creation of Dashboard

a) Responsive 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. Here I have designed a dashboard by dragging the visualizations from the 'pin' option present at the left side of the screen. I have created 3 'Tabs' in dashboard. Figure 15-17 shows different tabs of the dashboard.

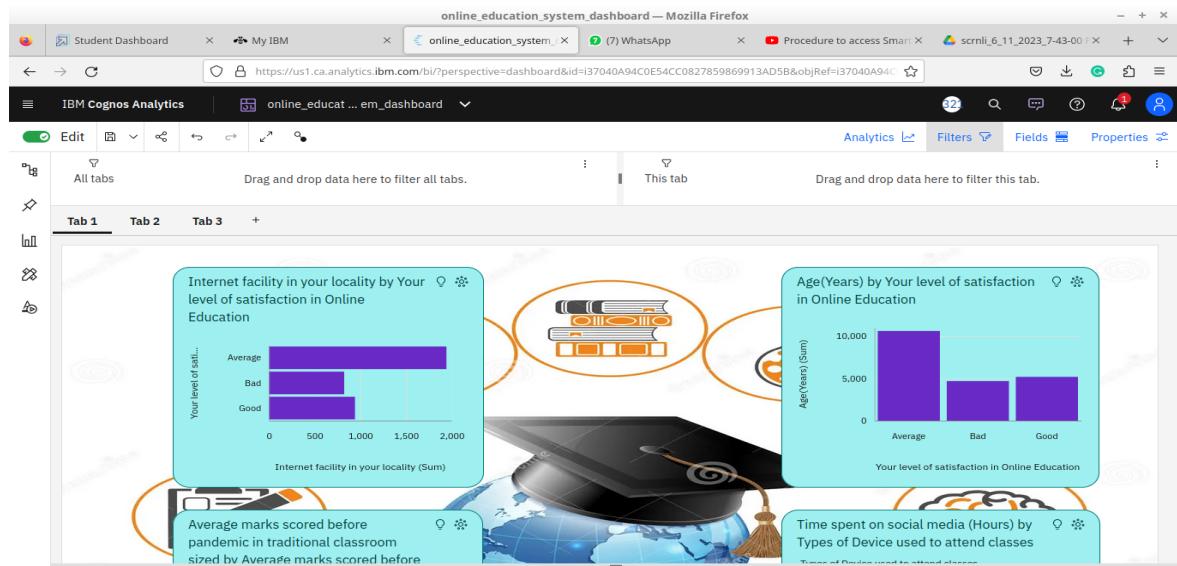


Figure 15: Tab1 of the dashboard

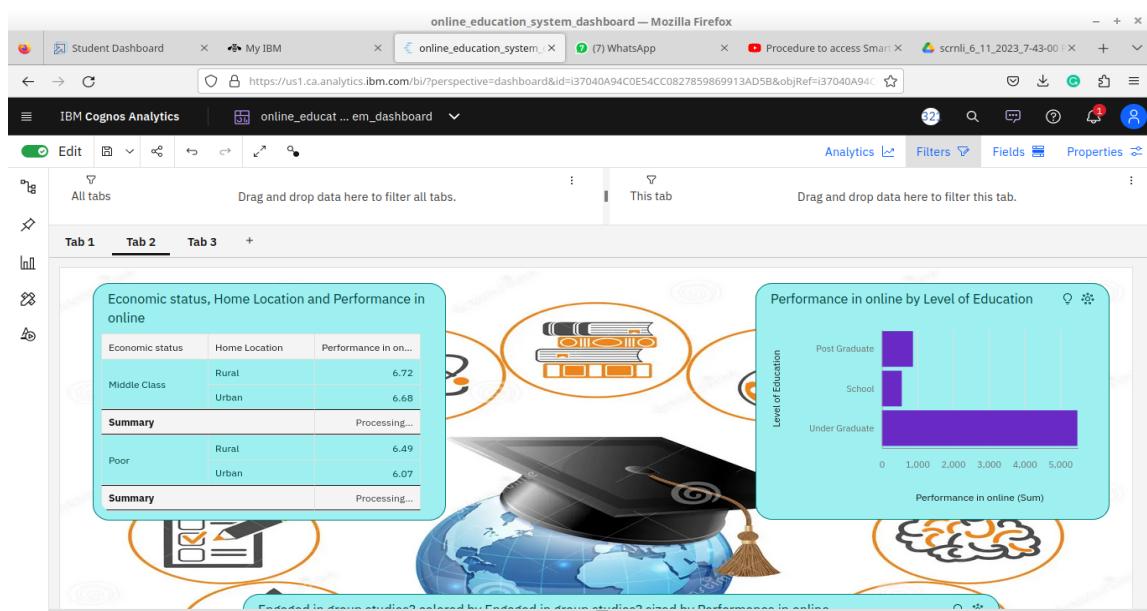


Figure 16: Tab2 of the dashboard

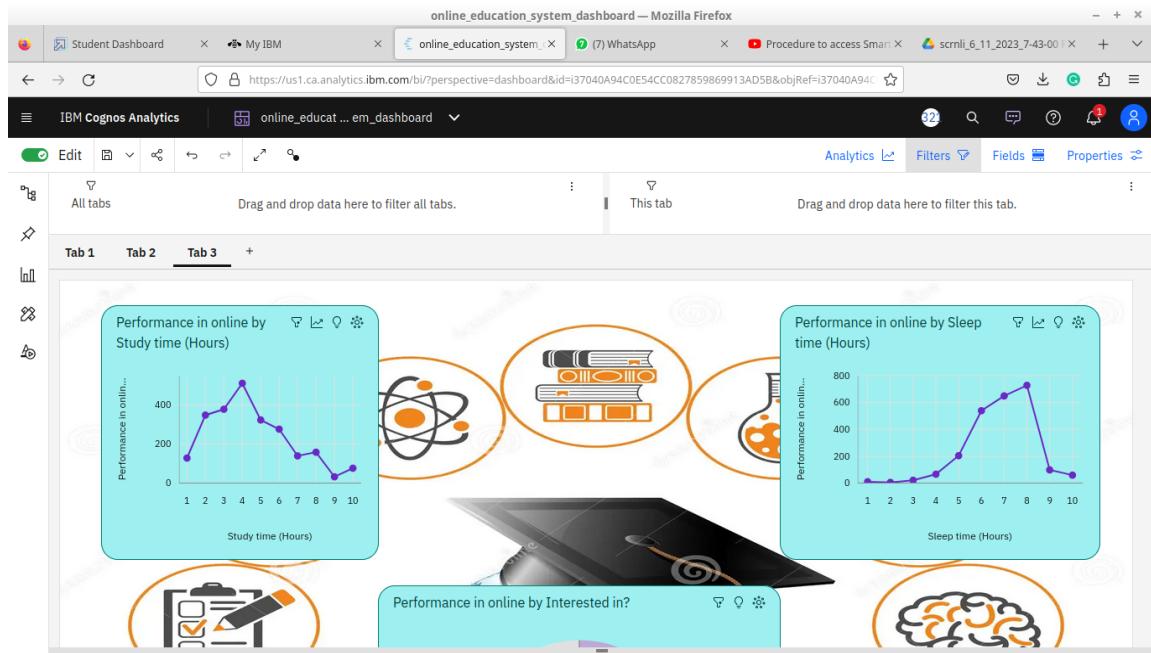
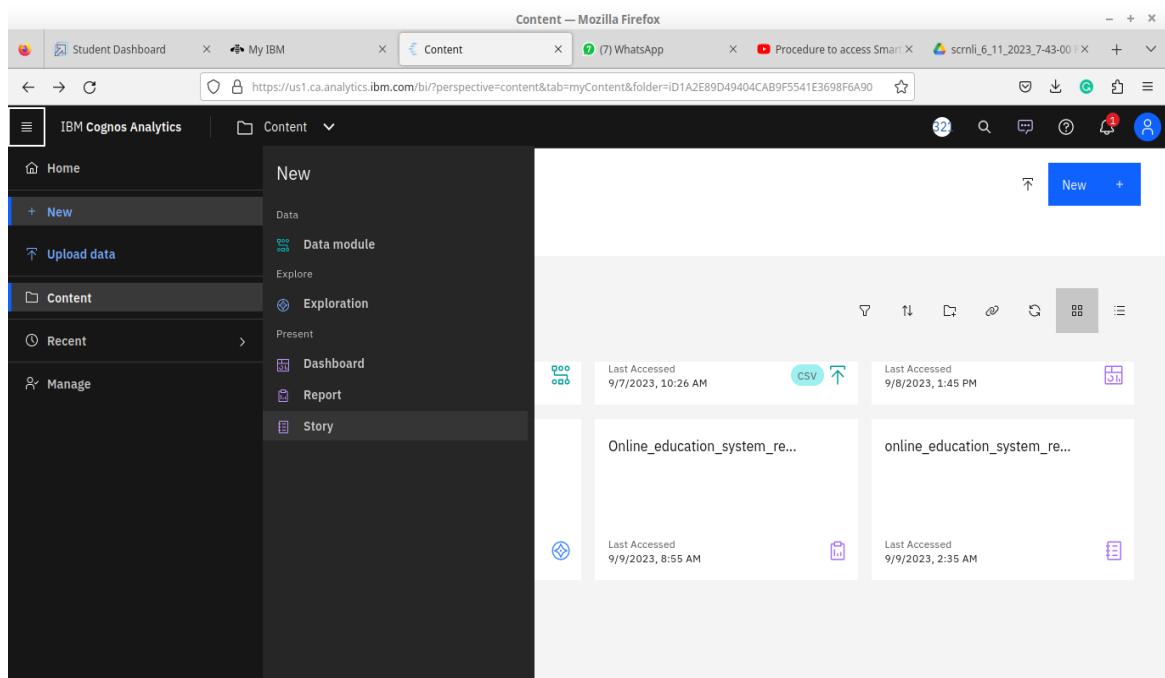


Figure 17: Tab 3 of the dashboard

VI) 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. After creation of the explorations, can create a dashboard by clicking the "present data" option & selecting the story. Figure 18 shows the creation of



story.

Figure 18: Creation of story

a) 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. Here I have created 11 scenes for the story. Figure 19-29 shows different scenes of the story.

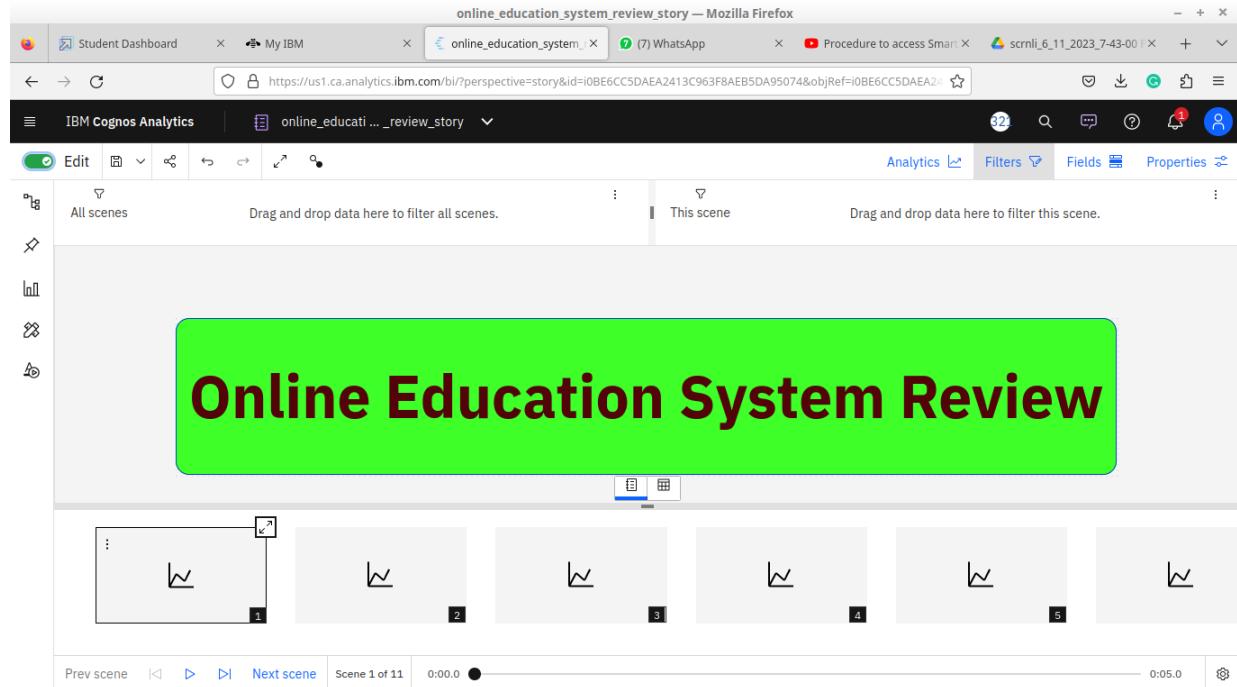


Figure 19: 1st scene of the story

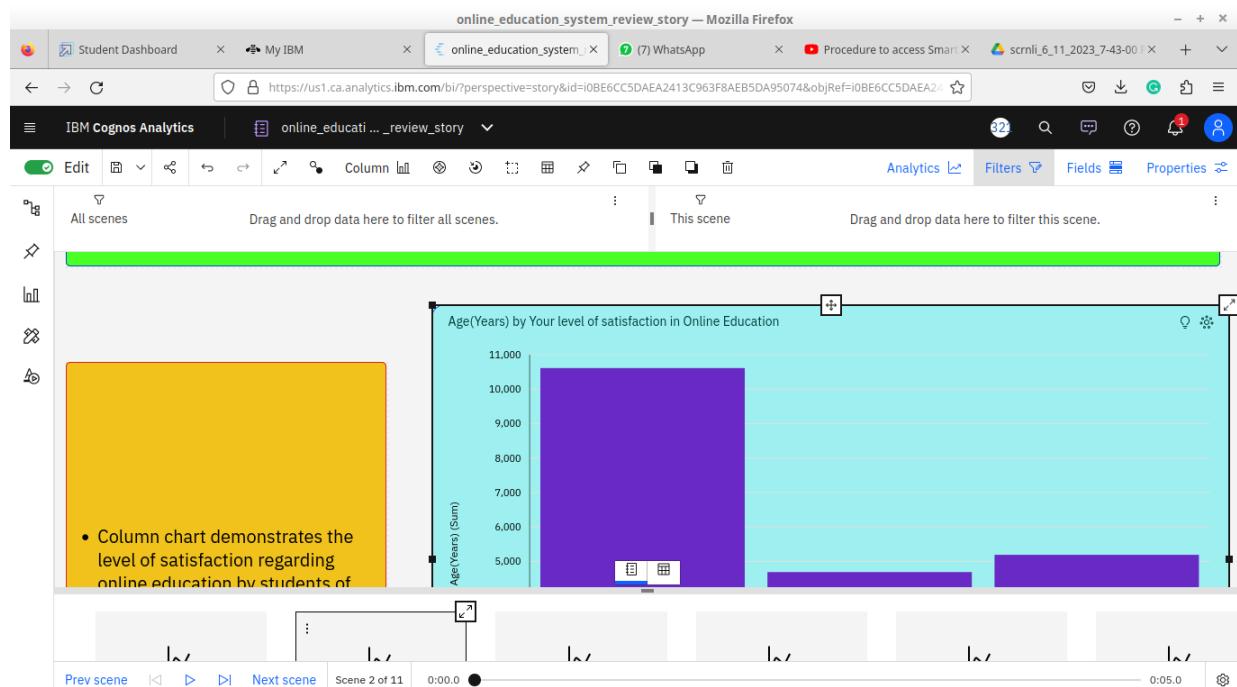


Figure 20: 2nd scene of the story

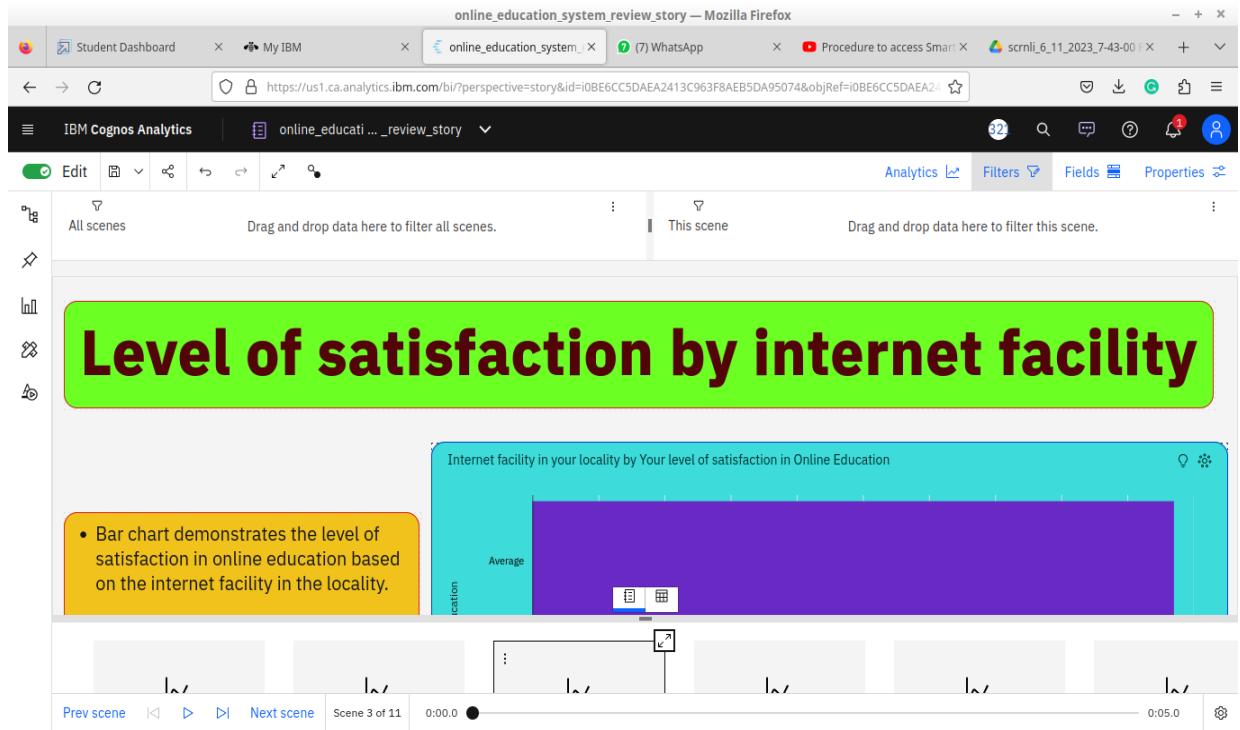


Figure 21: 3rd scene of the story

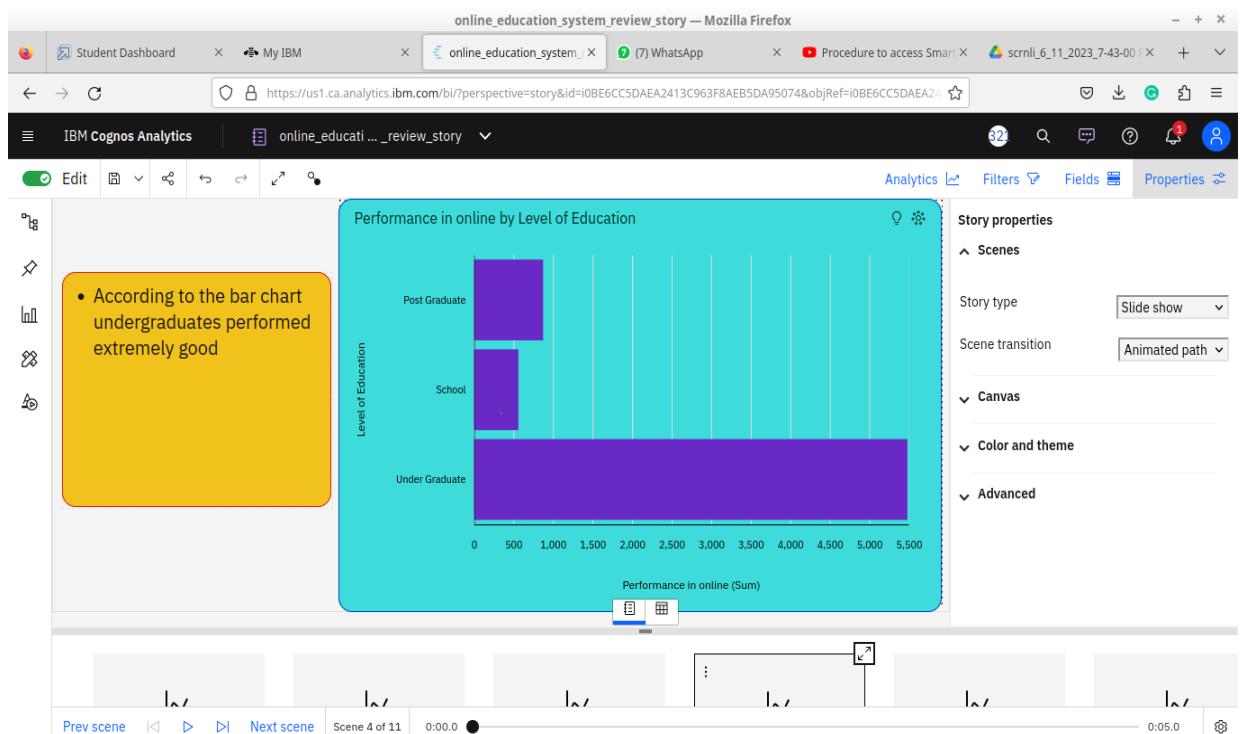


Figure 22: 4th scene of the story

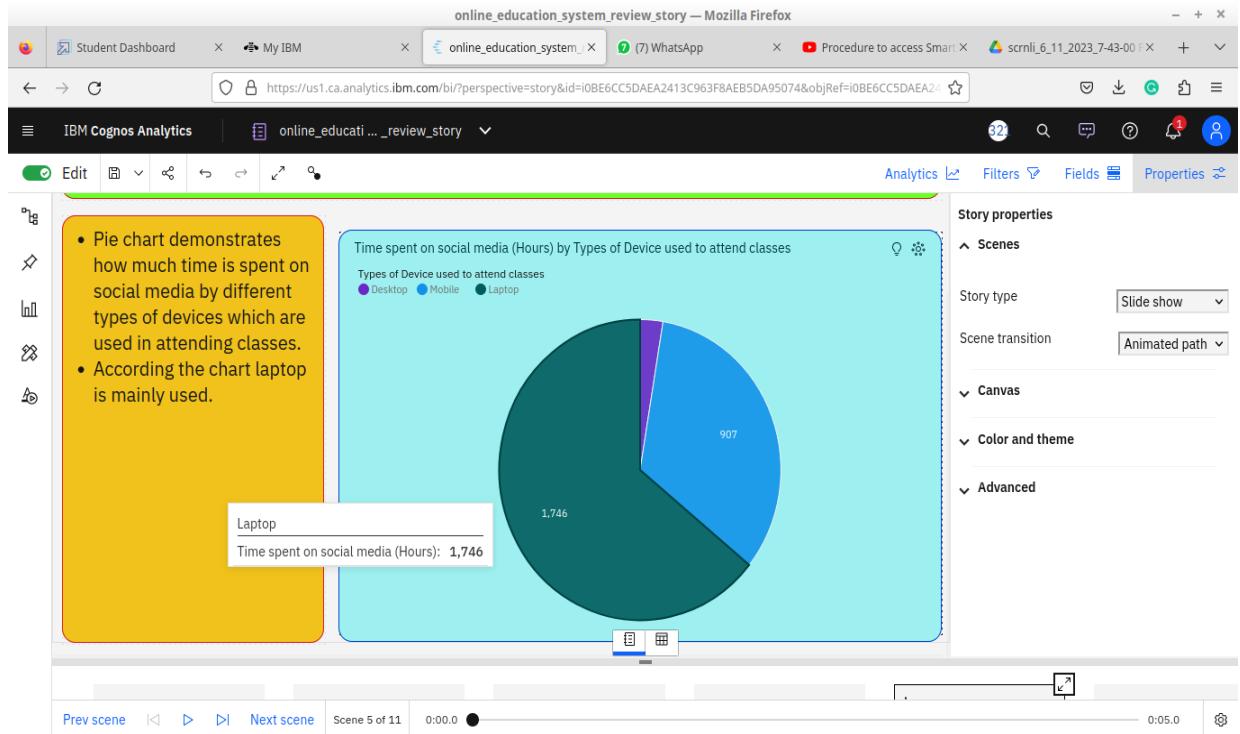


Figure 23: 5th scene of the story

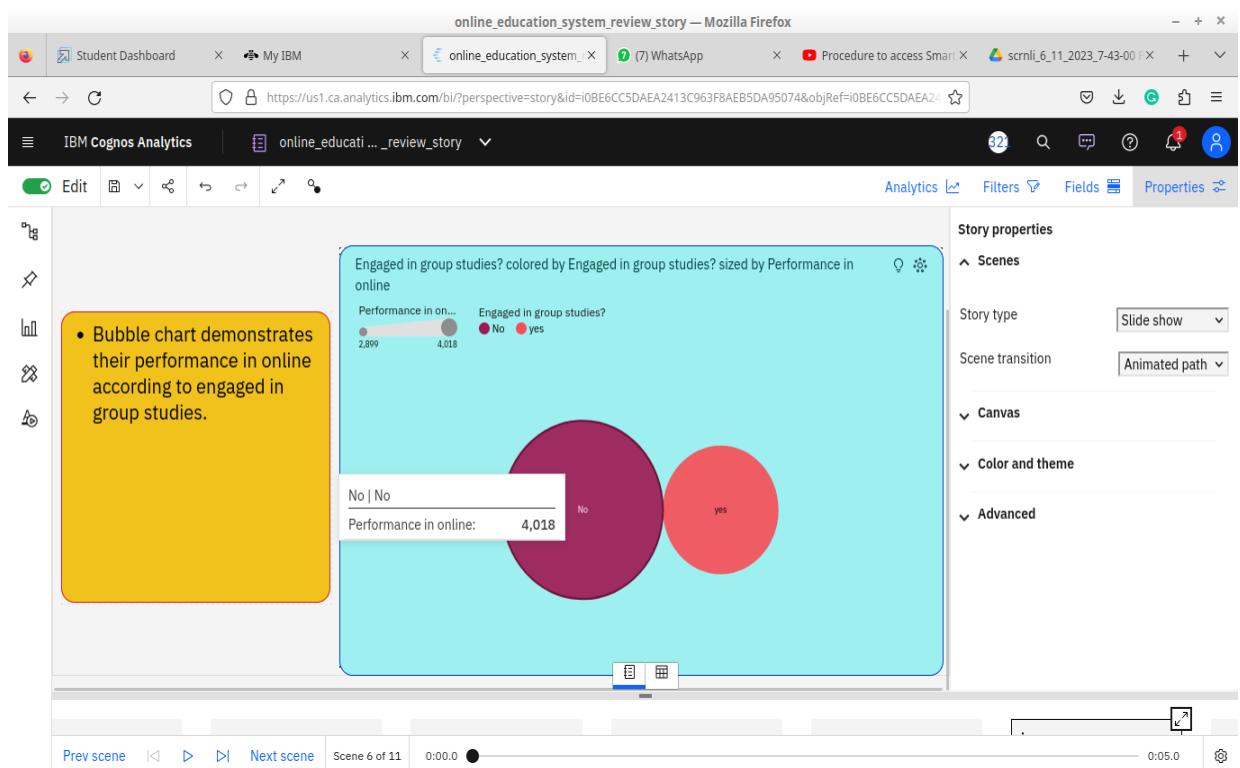


Figure 24: 6th scene of the story

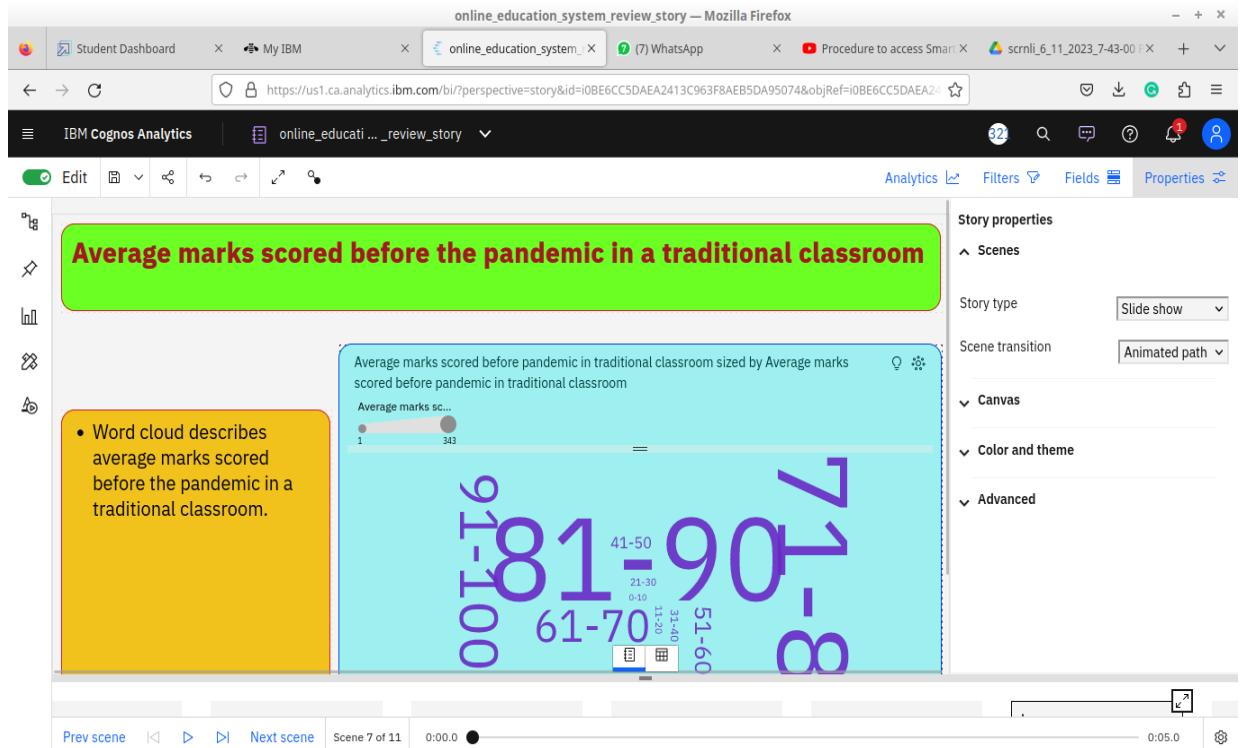


Figure 25: 7th scene of the story

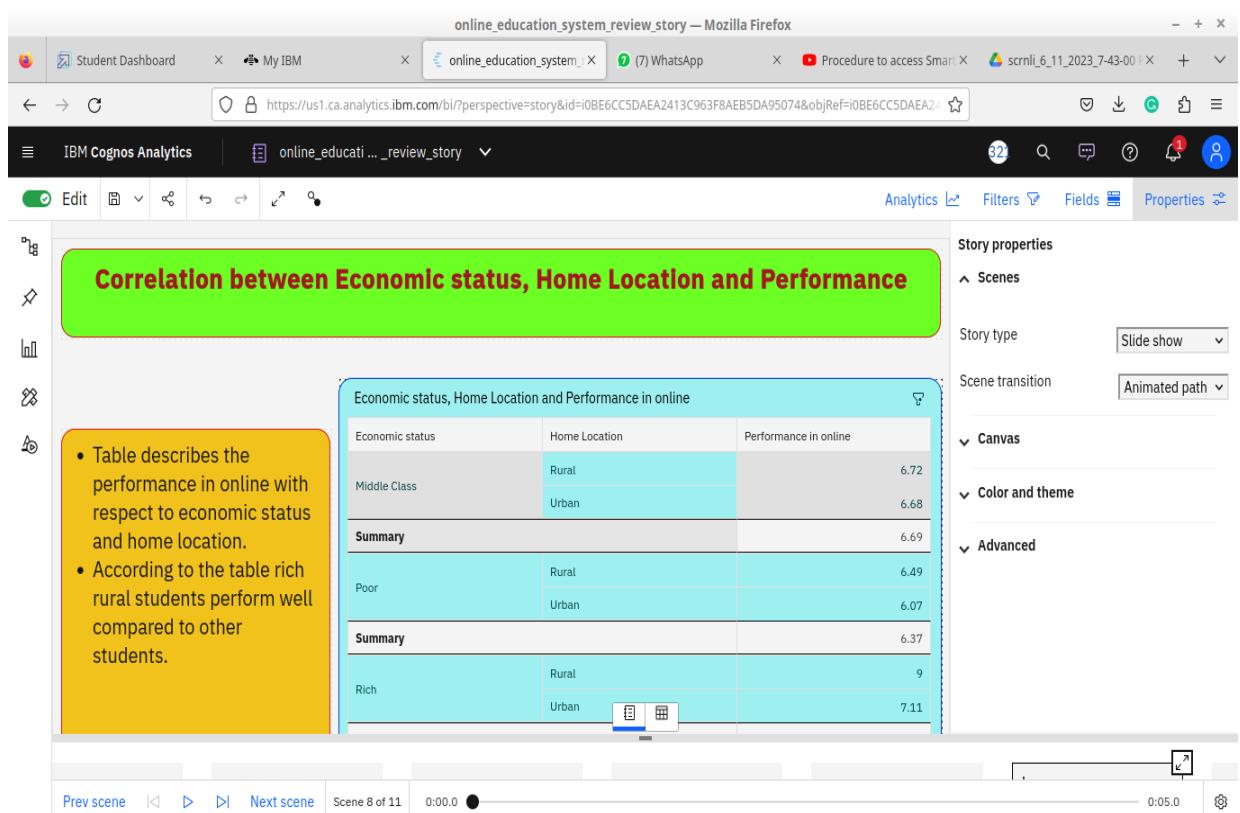


Figure 26: 8th scene of the story

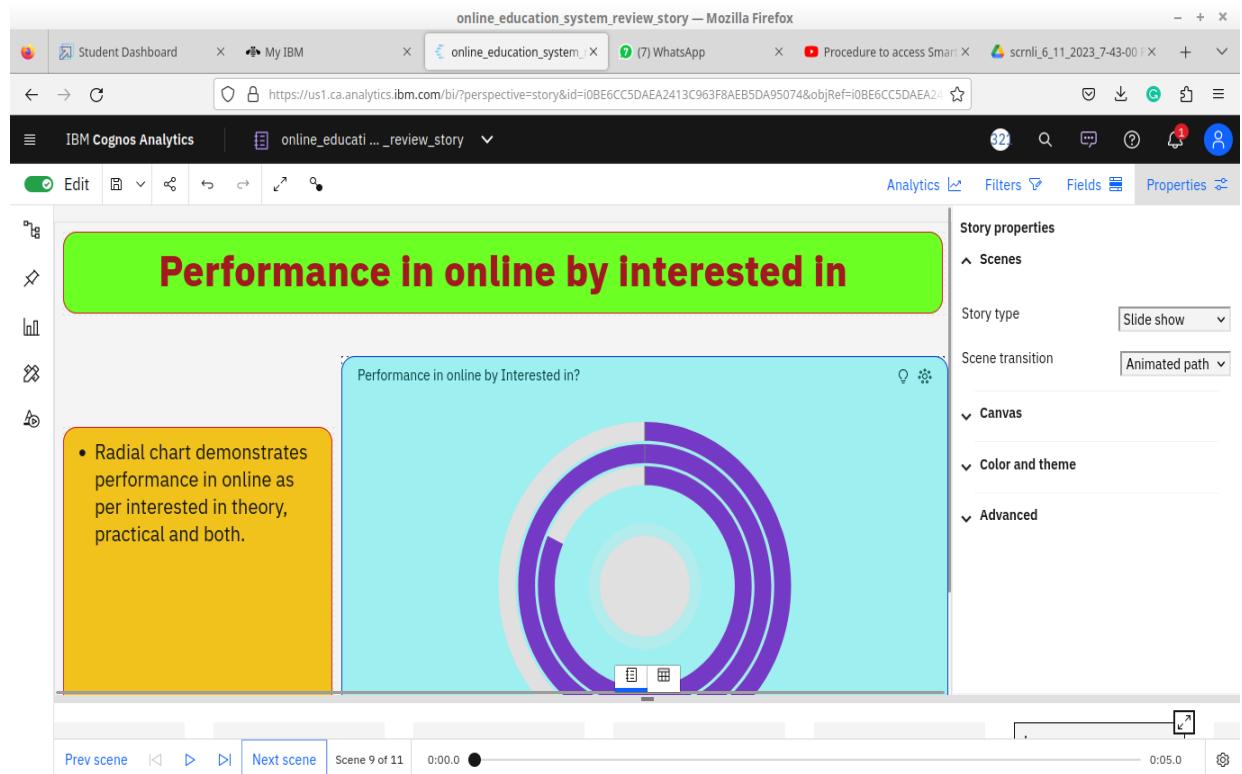


Figure 27: 9th scene of the story

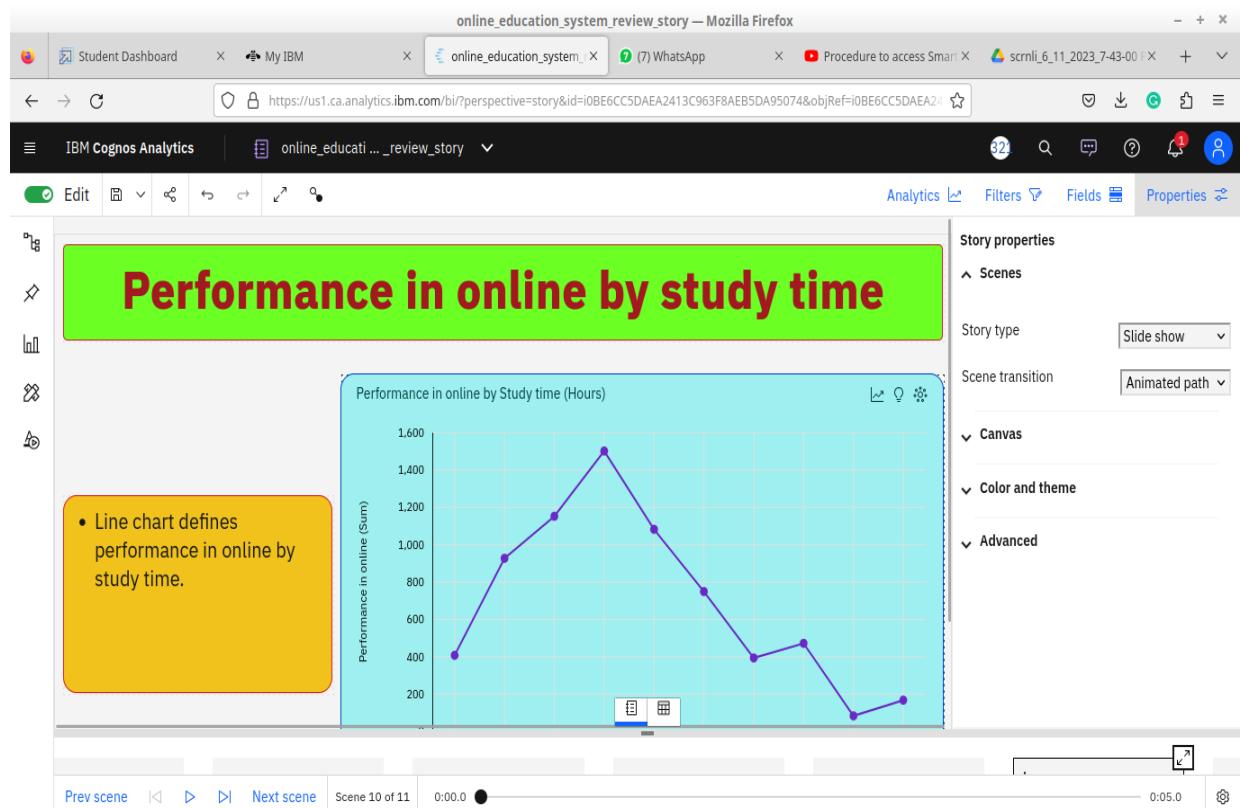


Figure 28: 10th scene of the story

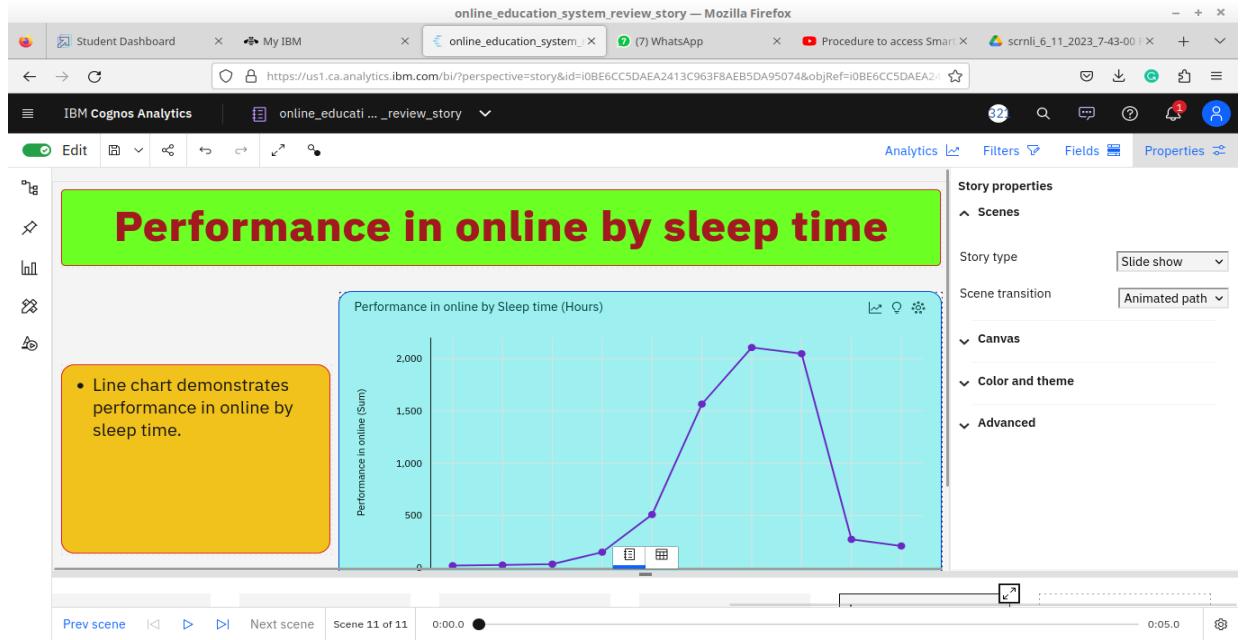


Figure 29: 11th scene of the story

VII) 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.

After creation of the explorations, can create a dashboard by clicking the "present data" option & selecting the report. Figure 30 shows the creation of report.

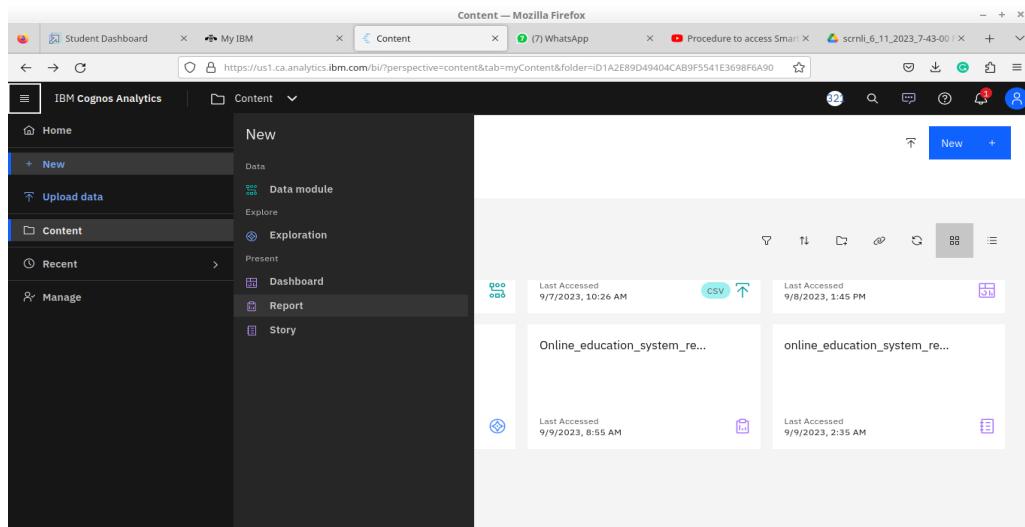


Figure 30: Creation of report

a)Creating a report: I have created six visualizations in the report. Figure 31 shows the report. But figure 31 shows only two visualizations.

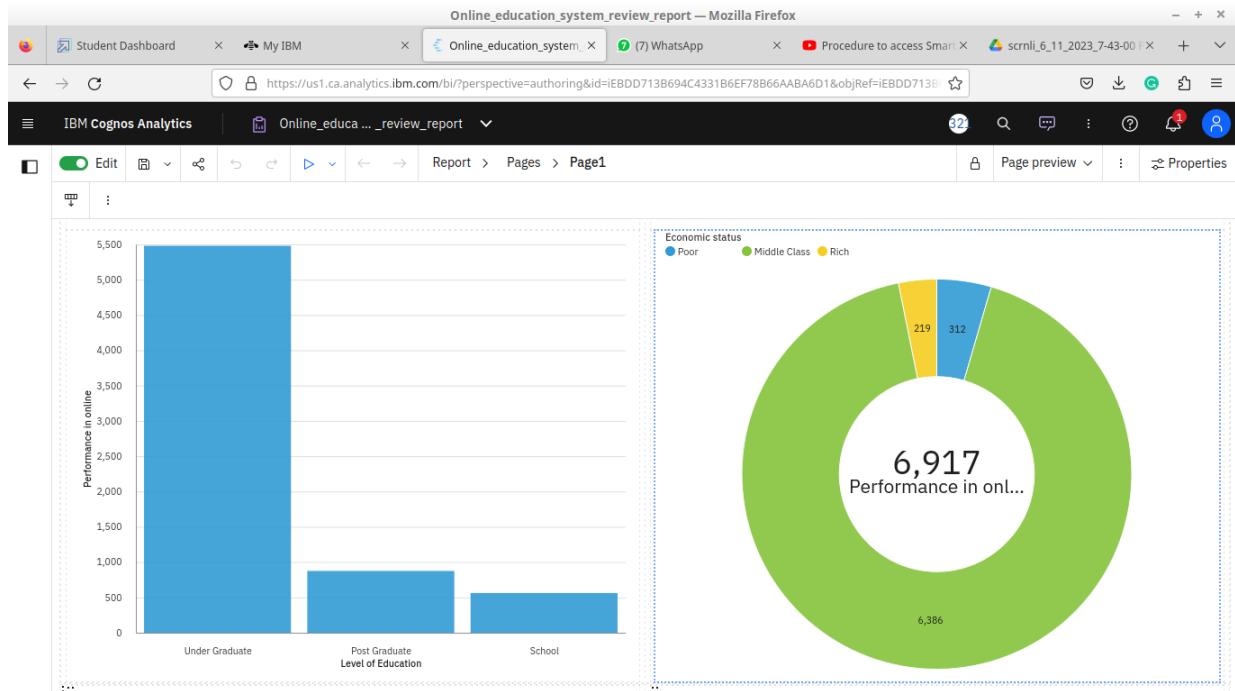


Figure 31: Report with different visualization.

VIII)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.

a) Utilization of Data Filters: Data filters are used to customize our visualization to achieve desired output. Filters can be applied during building visualizations . It is generally present in the bottom of the fields option in the exploration. In this dataset filters are not required because data are well organized.

b) No of Calculation Fields: Here I have used the following fields.

- Gender
- Home Location
- Level of Education
- Age(Years)
- Number of subjects
- Device Type Used
- Economic status
- 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

c) No of Visualizations/ Graphs: Here I have create the following 10 visualizations. Figure 6-13 and Figure 32-33 shows different visualizations.

- Figure 6 shows Column Chart: Age(Years) by Your level of satisfaction in Online Education.
- Figure 7 shows Bar Chart: Internet facility in your locality by Your level of satisfaction in Online Education
- Figure 32 shows Bar chart: Performance in online by Level of Education
- Figure 8 shows Pie Chart: Time spent on social media (Hours) by Device type used to attend classes
- Figure 9 shows Packed bubbles : Engaged in group studies? colored by Engaged in group studies? sized by Performance in online
- Figure 10 shows Wordcloud: Average marks scored before pandemic in traditional classroom
- Figure 11 shows Table: Economic status, Home Location and Performance in online
- Figure 12 shows Radial Chart: Performance in online by interested in
- Figure 13 shows Line Chart: Performance in online by study time(hours)
- Figure 33 shows Line Chart: Performance in online by sleep time(hours)

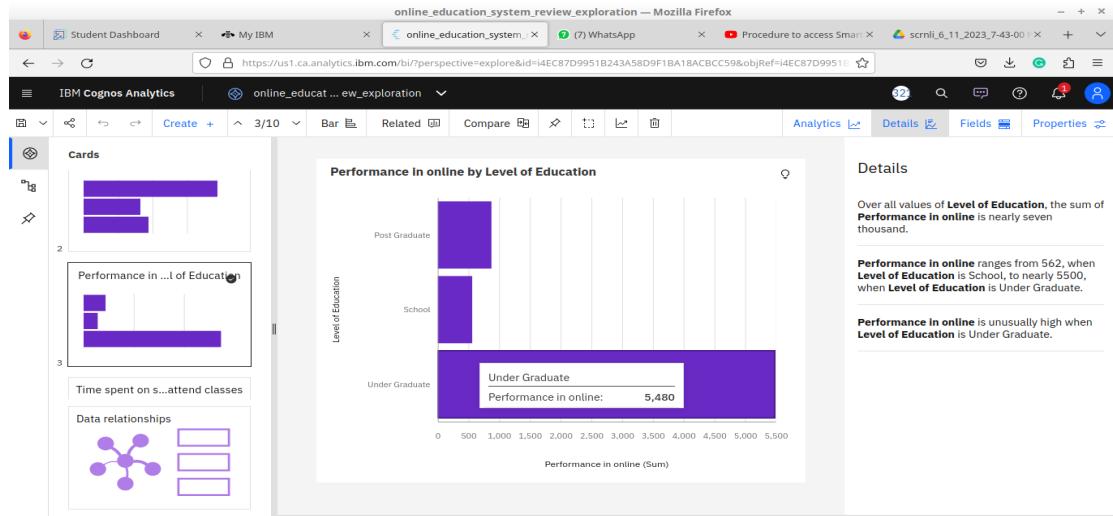


Figure 32: Bar chart: Performance in online by Level of Education

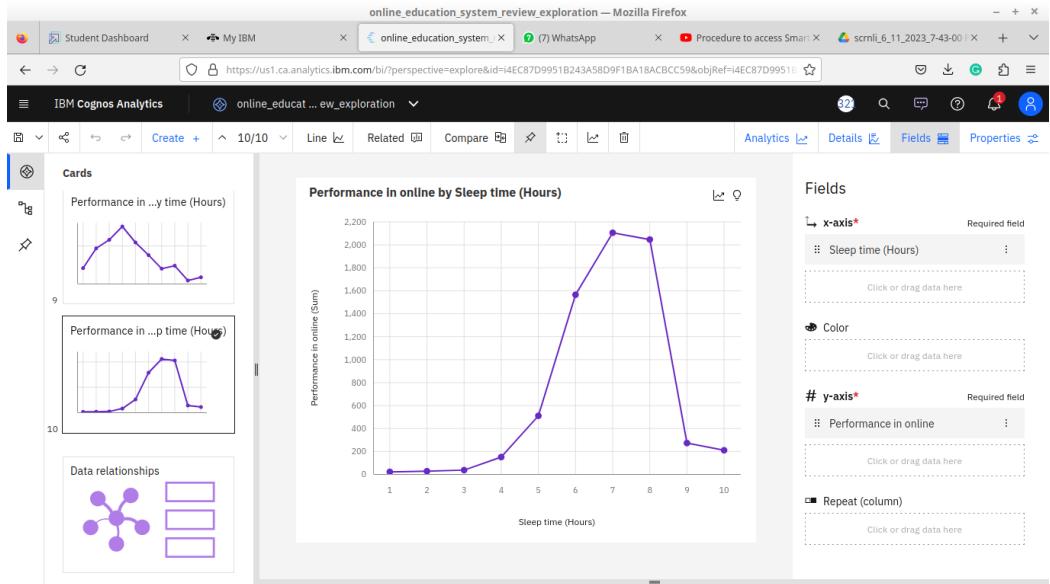


Figure 33: Line Chart: Performance in online by sleep time(hours)

IX)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, so web integration is required.

a)Dashboard and Story embed with UI With Flask: For this go to dashboard/story/report and click on share button on the top ribbon and then go to the ‘link’ option and copy the embed code and then using bootstrap loader and visual studio code share the embed code.