Unveiling the Virtual Classroom: An In-depth Analysis of the Online Education System

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1. INTRODUCTION

1.1 Overview

During the lockdown days, technology and online classes have become super heroes. Despite being under house arrest, we are all still involved in the educational community. The lack of exposure is obvious because pupils have been unable to maintain contact with the outside world due to the lockdown. The change to online classes has been the only relief for the pupils' mental health. Teachers took a big step forward to identify answers and design new learning environments for their students to ensure that learning never ceases to ensure that kids' learning was not compromised. Online education has significantly increased in popularity over the past few years thanks to the rapid improvements in technology and the general availability of internet connection.

This study attempts to examine the many facets of online education in-depth, highlighting its advantages, disadvantages, opportunities, and difficulties. The results of this study will give educational institutions, decision-makers, and online learning platforms useful information to improve the efficacy and accessibility of online education. In order to contribute to the continuing discussion about education's future and to help create a more inclusive, interesting, and productive learning environment in the digital age, this analysis of the online education system is being published.

1.2 Purpose

This study makes an effort to thoroughly evaluate the numerous dimensions of online education, stressing its benefits, drawbacks, prospects, and challenges. In order to increase the effectiveness and accessibility of online education, the findings of this study will provide educational institutions, decision-makers, and online learning platforms with essential information. This review of the online education system is being released to add to the ongoing conversation about education's future and to aid in the

development of a more diverse, engaging, and effective learning environment in the digital era.

2 LITERATURE SURVEY

2.1 Existing problem

The fact that students spend the full school day on campus and that school days are busy has an unmistakable impact on time management. Even if the students get home in the evening, they become exhausted and spend the rest of the day sleeping. When compared to online learning, which allows for more time flexibility, this could appear to be a drawback. The time saved can be used for other activities, like hobby classes, as there is no commuting time. Students can save energy and use it more wisely when learning online as opposed to in a traditional classroom. For offline education, a completely separate curriculum that goes beyond reading and textbooks is needed.

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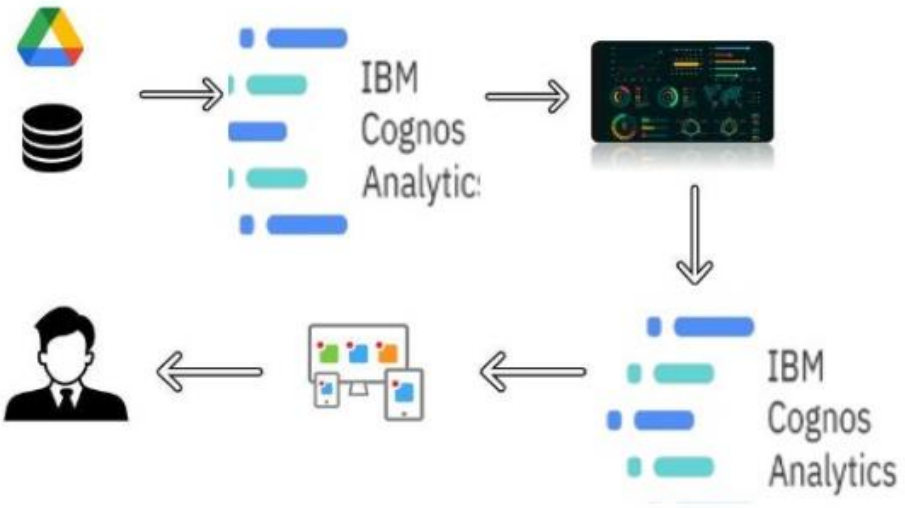
2.2 Proposed solution

The suggested system, which makes use of the potent capabilities of IBM Cognos Analytics, promises to enhance education through rich data analysis and visualization tools. By integrating this platform, institutions can learn more about student performance, course efficacy, and learning outcomes. Using interactive dashboards, predictive analytics, and adaptive learning features, teachers and administrators can make educated decisions, allocate resources effectively, and customize learning. This data-driven approach raises educational standards and encourages continuous improvement, creating a positive and engaging learning environment.

3 THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software System Requirements

Hardware Requirements:

Operating System: Windows 8 or higher

RAM : 8 GB

Hard Disk : 10GB

Graphics Card : 2GB

Software Requirements:

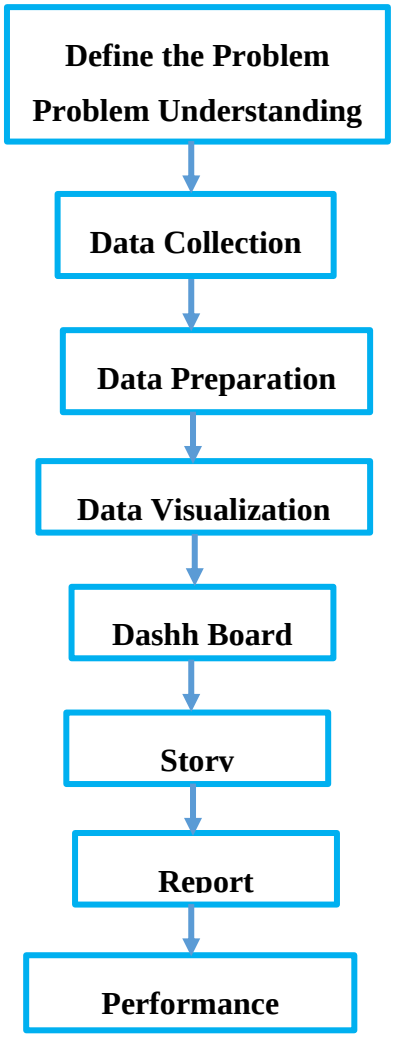
- IBM Cloud
- IBM Cognos Analytics
- Visual Studio Code
- Python

4 EXPERIMENTAL INVESTIGATIONS

The experimental study provides crucial information on how IBM Cognos Analytics might affect online learning. The initiative seeks to improve the general quality of online education through the assessment of student performance, the pinpointing of problem areas, and the customizing of learning experiences. The results are effectively communicated to educators, administrators, and lawmakers through the use of interactive dashboards and storytelling approaches, promoting the use of evidence in

decision-making. This program intends to further the continuing conversation about educational innovation and create a more active and productive learning environment in the digital world by utilizing the capabilities of IBM Cognos Analytics.

5 FLOWCHART

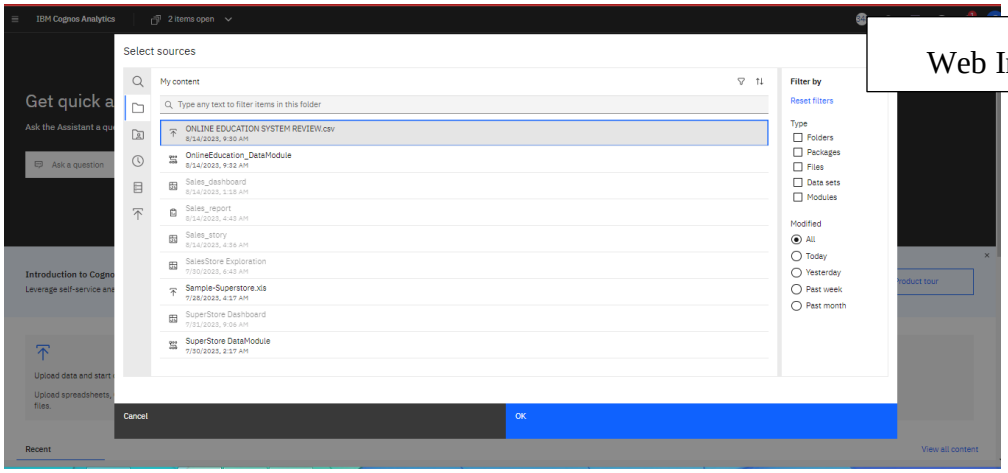


6 RESULT

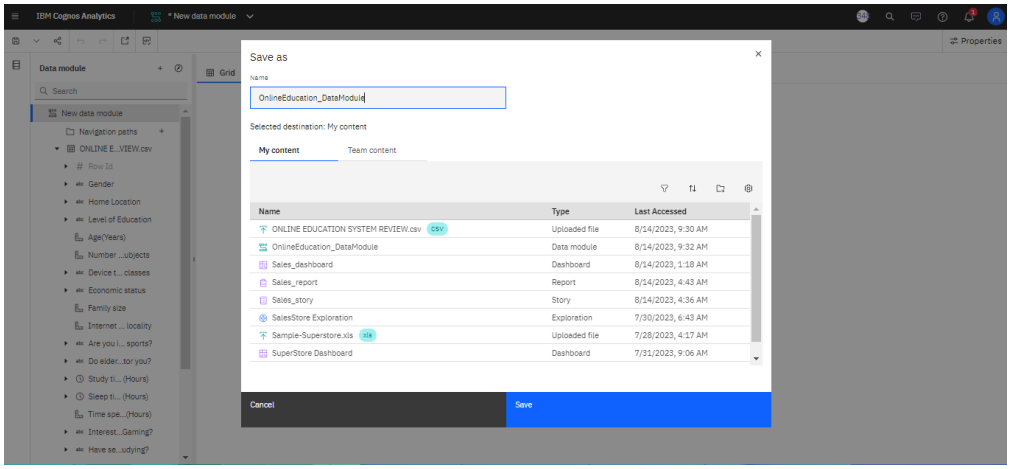
6.1 Data Module – Data Loading – Data Preparation

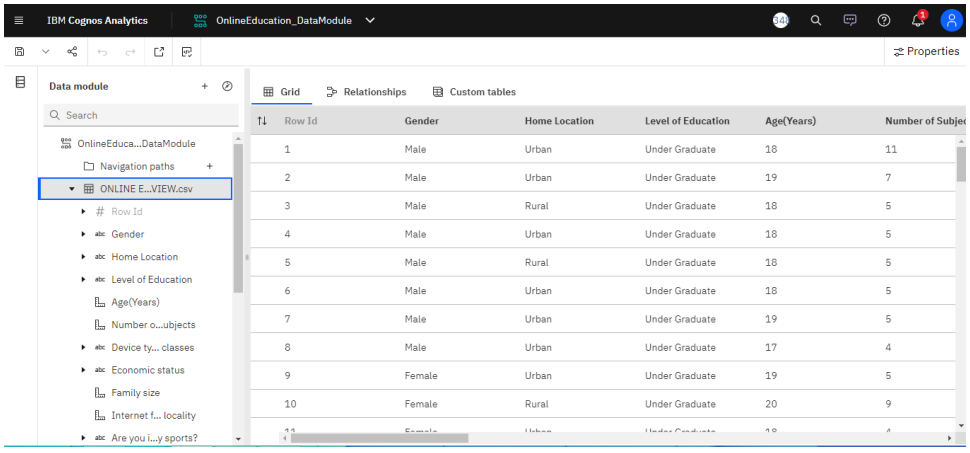
Data set Loading

To create a module first we have to select data source.



Web Integration





The columns mentioned in the dataset says

1.Gender – Male, Female.

2.Home Location – Rural, Urban

3.Level of Education – Post Graduate, School, Under Graduate

4.Age – Years

5.Number of Subjects – 1- 20

6.Device type used to attend classes – Desktop, Laptop, Mobile

7.Economic status – Middle Class, Poor, Rich

8.Family size – 1 -10

9.Internet facility in your locality – Number scale (Very Bad to Very Good)

10.Are you involved in any sports? – Yes, No

11.Do elderly people monitor you? – Yes, No

12.Study time – Hours

13.Sleep time – Hours

14.Time spent on social media – Hours

15.Interested in Gaming? – Yes, No

16.Have separate room for studying? – Yes, No

17.Engaged in group studies? – Yes, No

18.Average marks scored before pandemic in traditional classroom – range

19.Your interaction in online mode - Number scale (Very Bad to Very Good)

20.Clearing doubts with faculties in online mode - Number scale (Very Bad to Very Good)

21.Interested in? – Practical, Theory, Both

22.Performance in online - Number scale (Very Bad to Very Good)

23.Your level of satisfaction in Online Education – Average, Bad, Good

6.2 Data Set Preparation

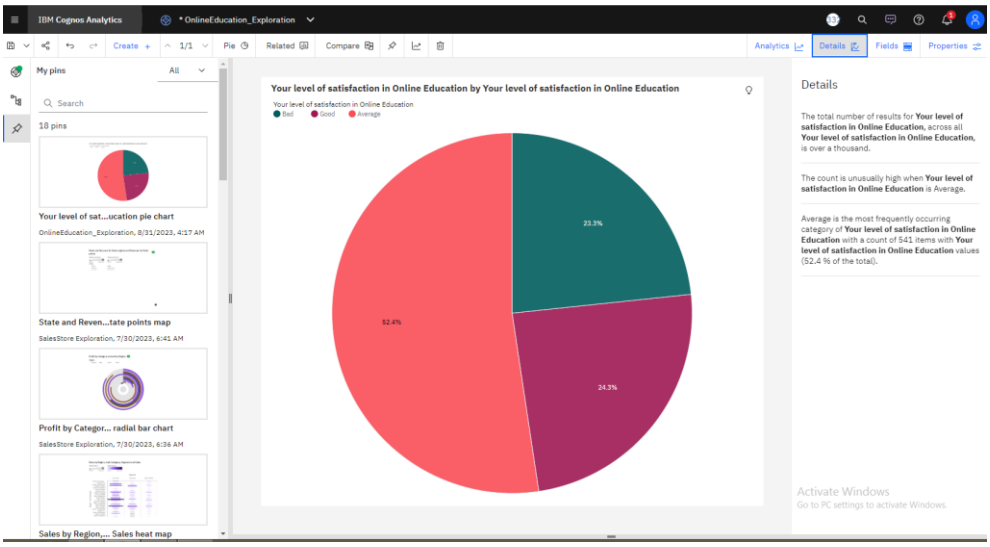
We must prepare the dataset after it has been uploaded to the IBM Cognos dashboard. Data cleanup, null value removal, duplicate value removal, and data structuring are all included in the preparation. such that exploration and analysis of the data can be done with confidence.

6.3 Exploration of Data

6.3.1 Virtual Class Learning- Students Satisfaction

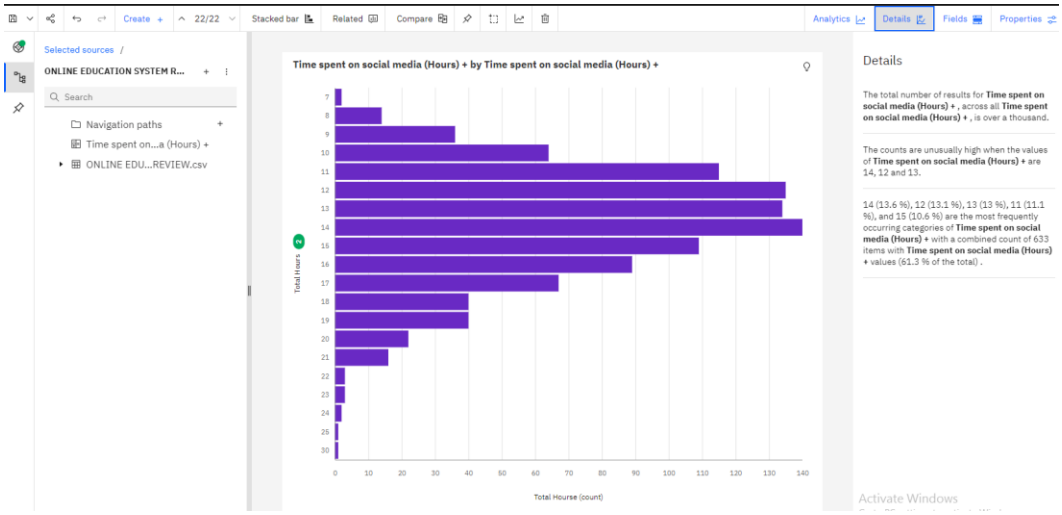
Insight:

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



6.3.2 Total Hours Accounted

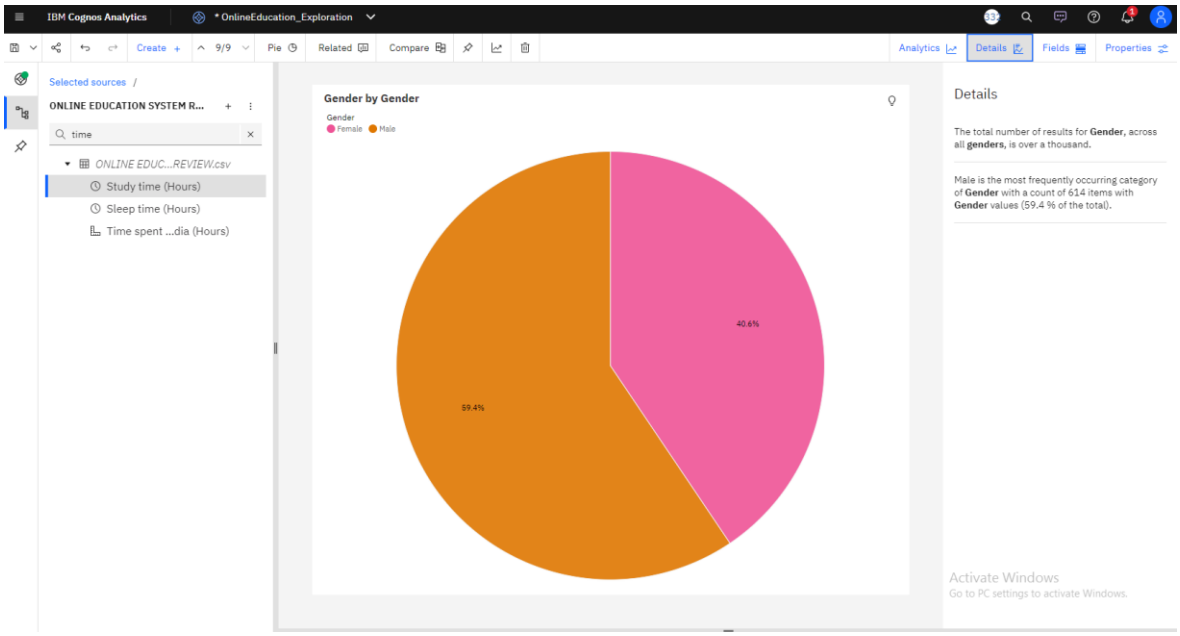
Insight: The counts are unusually high when the values of **Time spent on social media (Hours) +** are 14, 12 and 13.



6.3.3 Gender Ratio

Insight:

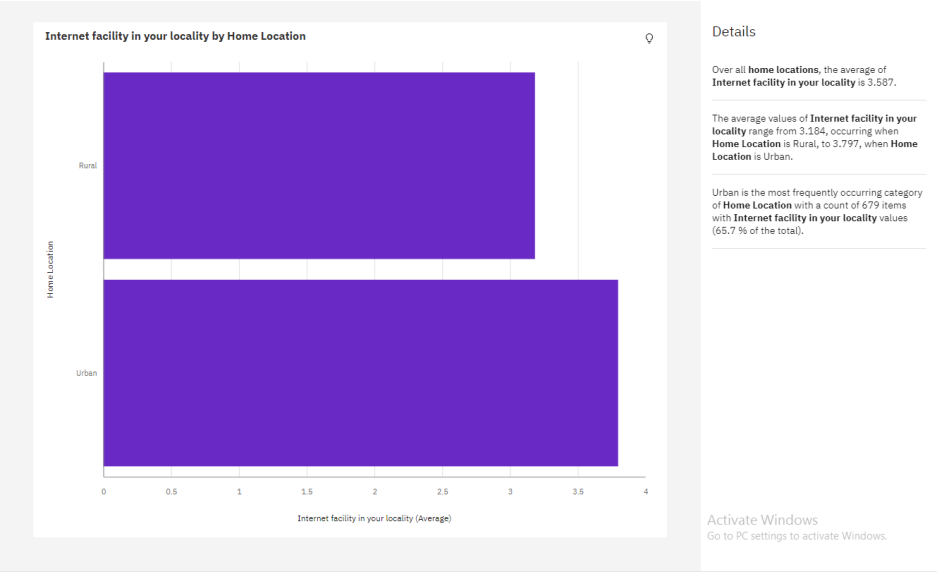
Male is the most frequently occurring category of **Gender** with a count of 614 items with **Gender** values (59.4 % of the total).



6.3.4 Quality of Internet in Urban and Rural Areas:

Insight:

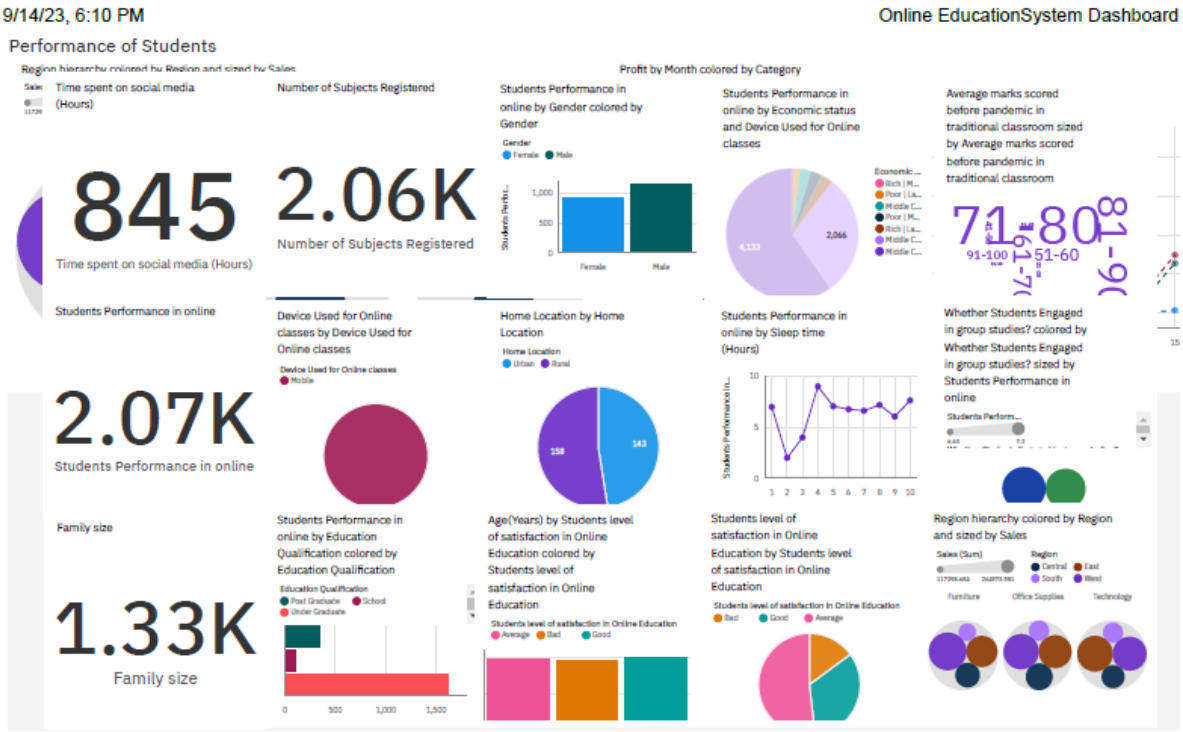
The average values of **Internet facility in your locality** range from 3.184, occurring when **Home Location** is Rural, to 3.797, when **Home Location** is Urban.

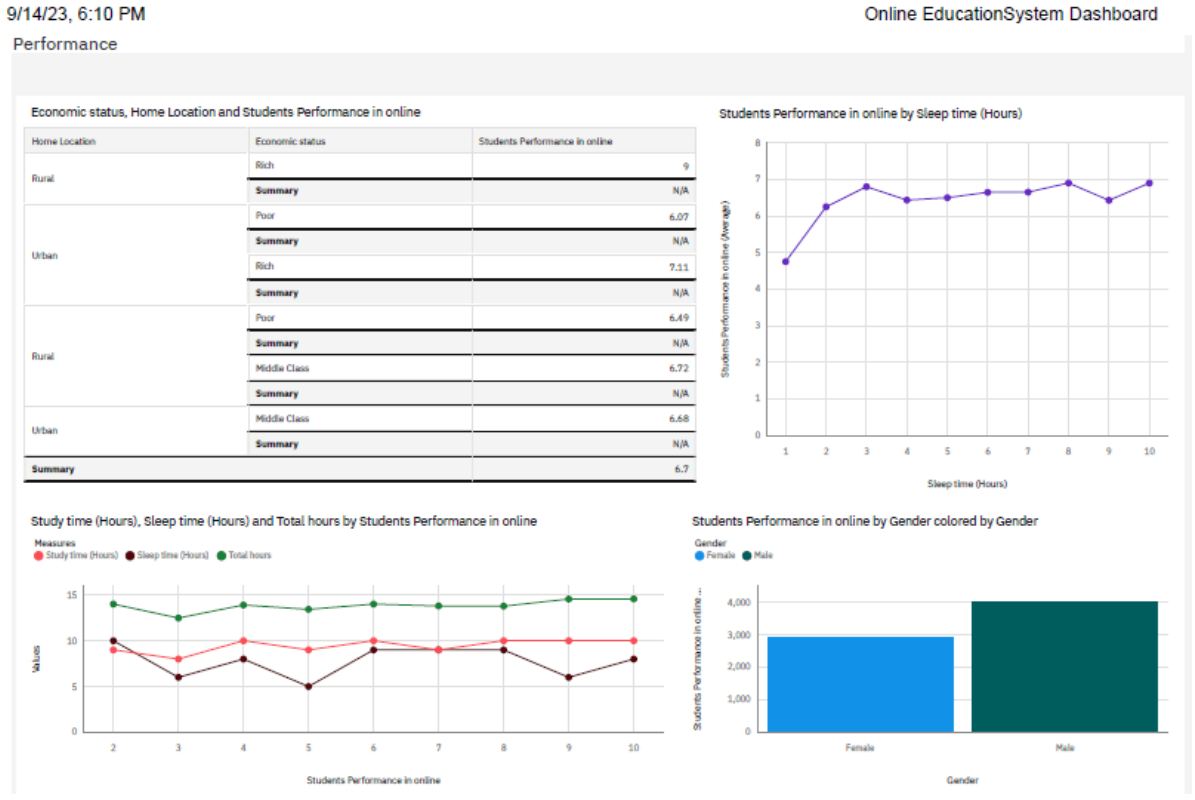


6.4 Dashboard

6.4.1 Dashboard 1: Internet Facility

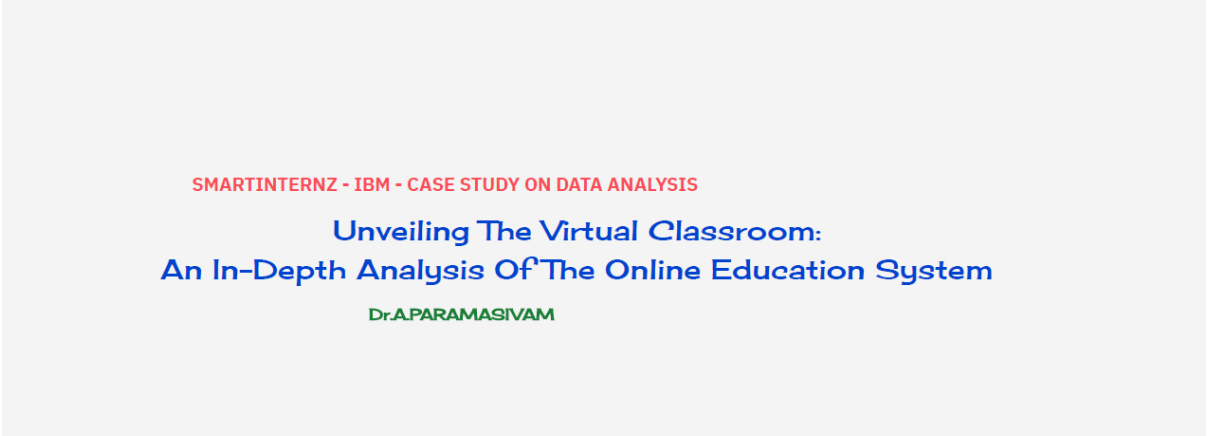
6.4.2 Dashboard 2 : Performance based on gender and facilities:

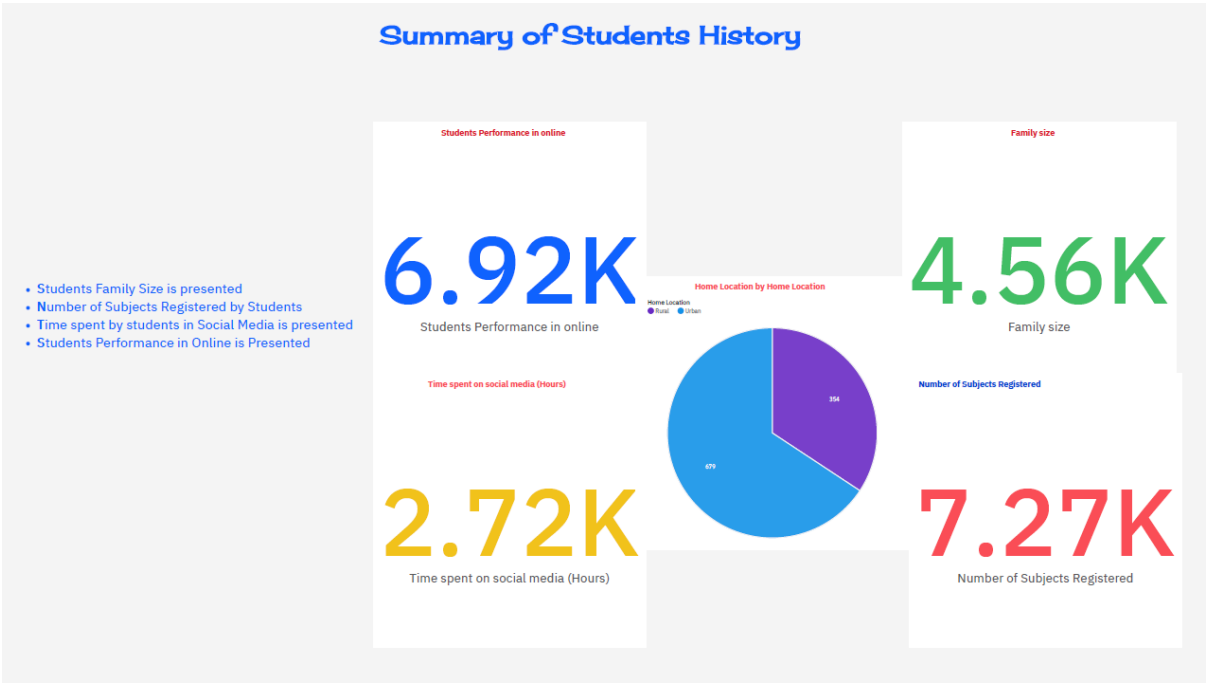




Home Location	Economic status	Students Performance in online
Rural	Rich	9
	Summary	N/A
Urban	Poor	6.07
	Summary	N/A
	Rich	7.11
	Summary	N/A
Rural	Poor	6.49
	Summary	N/A
	Middle Class	6.72
	Summary	N/A
Urban	Middle Class	6.68
	Summary	N/A
Summary		6.7

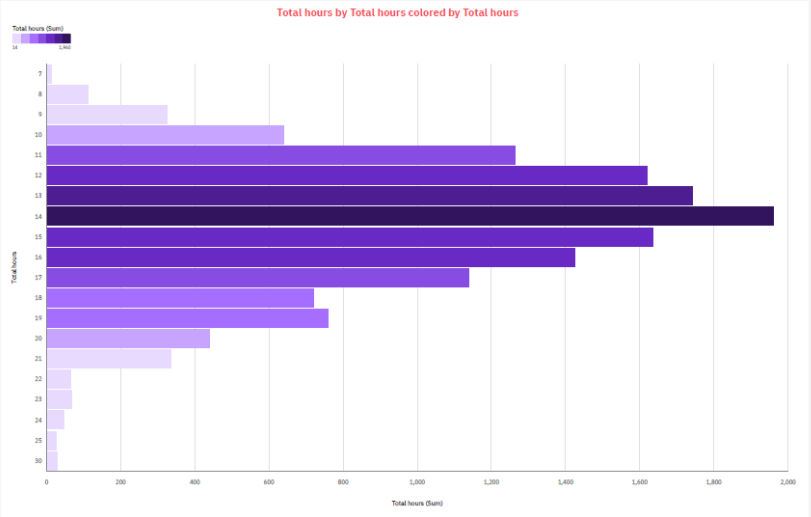
6.5 Story Board





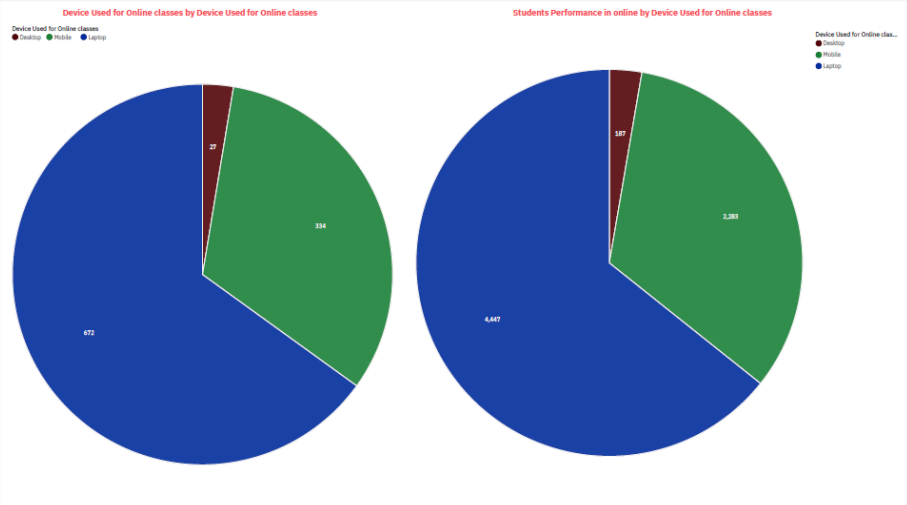
Time Spent on Social Media

- The counts are Usually High when the values of Time spent on Social Media are 14, 13, 15 and 12



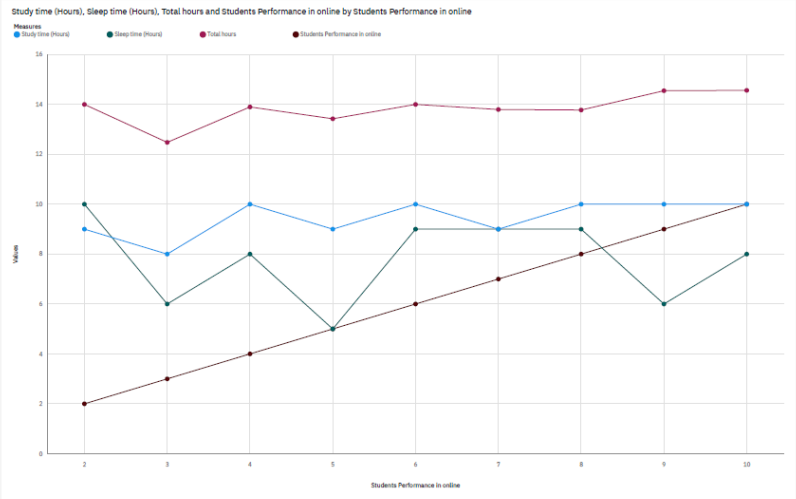
Which Device is Used More for Online Class for Higher Performance?

- From this visuavilization chart, mostly used device for online classes is Laptop
- Students performance is higher when they use the device - Laptop



Correlation between Study Time / Sleep Time / Total Hours - Students Performance

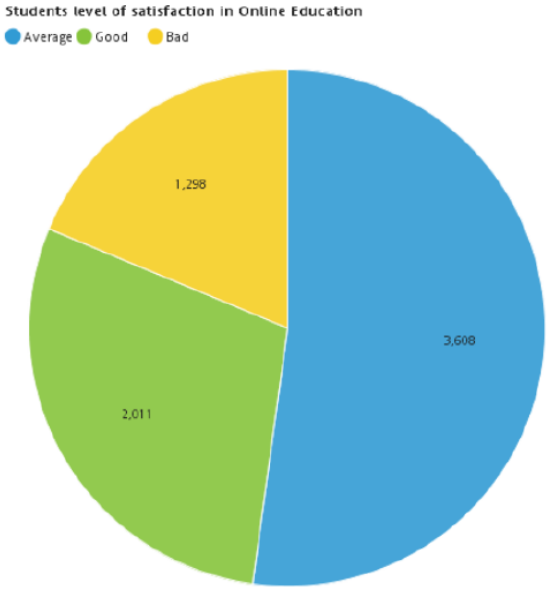
- **This correlation depicts the relationship between total hours, sleep time and study time of students with their perfomance**



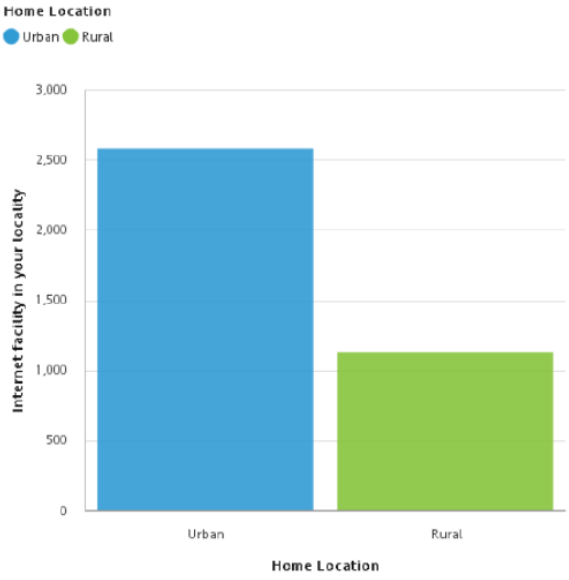
6.6 Report

Online Education System - Repor

Level of Satisfaction in Online Education based on Performance in Online Class

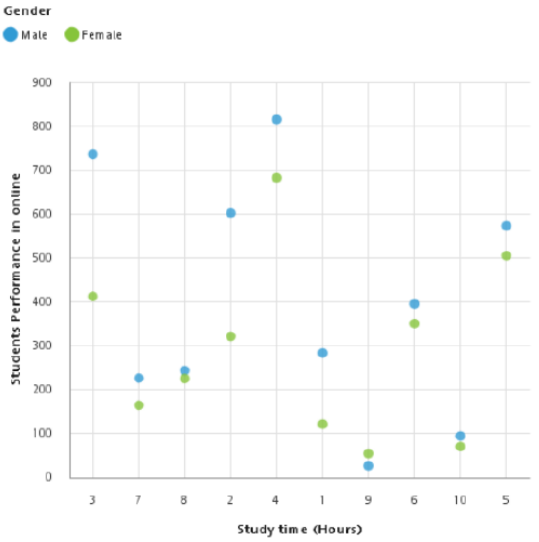


Comparison of Internet Facility in Various Home Location



Students Gaming Addiction

Performance of Students Compare with Study Time based on Gender



7 ADVANTAGES & DISADVANTAGES

7.1 Advantages of Online Education

- Classes can be attended remotely by students, giving them more scheduling freedom. They can divide their time and plan their day. This flexibility enables students to enroll in additional courses or attend online lessons to learn about a variety of interests. Their knowledge and personality are expanded by this. Students can also engage in offline activities. Anywhere and at any time, as long as there is a solid internet connection, you can access online education. In contrast to traditional lectures, online classes and sessions can be recorded for later use.
- When compared to traditional schools, which charge for things like transportation, uniforms, extracurricular activities, and more, online education is more affordable. The only charges are for internet and gadgets, which are typically included in household budgets anyhow.
- Based on the aforementioned arguments, we can conclude that online learning is more practical than traditional learning. Students feel more at ease attending class when it's online. The medium helps teachers and students save time and money.

7.2 Disadvantages of Online Education System

- Connectivity concerns are a major drawback. Technical issues may prevent online schooling due to unprecedented electricity and connectivity, depending on the location.
- Manage student focus is a major drawback of online education for teachers. It can be hard for an online teacher to focus on each pupil. Who is focused and who is just attending class can be hard to determine. It means less teacher-student interaction, which may make it harder to communicate what is being taught.
- The time spent on the computer is another major drawback of online classes. Students spend too much time on screens, which may impair their health.
- Students cannot interact with peers regularly in online schooling. A kid can video chat and call friends and peers, but it's not like school. Schoolmates teach students leadership, teamwork, and more. Online education reduces the requirement to attend school, making peer contact and experience loss difficult.

8 APPLICATIONS

Through the internet, online education disseminates information and activities. It can broaden the range of educational options available, alter student demographics,

develop fresh pedagogical approaches, and assess and analyze classroom instruction. Applications for online education system analysis include the following:

- It can analyze the complexity of the online education system.
- Academic accomplishment and online education can be compared.
- Improves online learning and teacher evaluation

9 CONCLUSION

The system of online education has both advantages and disadvantages. IBM Cognos Analytics can provide fresh viewpoints on the most crucial elements of accessibility, instructor preparation, and student engagement. By enhancing the aforementioned components, we are able to increase the effectiveness of virtual classrooms through the use of data and IBM Cognos Analytics.

10 FUTURE SCOPE

Future research will concentrate on improving the proposed system to take into account students' existing knowledge of the subject matter in addition to their preferred learning modality in order to provide students with content that is at the proper level of challenge. Additionally, rather than using a time-consuming questionnaire, data mining techniques can be used to analyze a variety of websites that students actively visit to establish their preferred learning style. In addition to the course materials that are currently available, instructors can suggest relevant e-book and online links for the course. The system would become comprehensive and self-sufficient with these improvements, making it a benefit to a learning management system.

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APPENDIX

A. Source Code

app.py

```
from flask import Flask, render_template


app = Flask(__name__)


@app.route("/")
def home():
   return render_template(r"index.html")


if __name__ == "__main__":
```

```
    app.run(debug=False, port=5000)
```

index.html (Web integration Sample Code)

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>Data Analytics</title>
  <meta content="" name="description">
  <meta content="" name="keywords">

  <!-- Favicons -->
  <link href="assets/img/favicon.png" rel="icon">
  <link href="assets/img/apple-touch-icon.png" rel="apple-touch-icon">

  <!-- Google Fonts -->
</head>

<body>

  <!-- ======= Header ======= -->
```

```
<header id="header" class="fixed-top ">
  <div class="container d-flex align-items-center justify-content-between">

    <h1 class="logo"><a href="index.html">Surya Kameswari Uduga</a></h1>
    <!-- Uncomment below if you prefer to use an image logo -->
    <!-- <a href="index.html" class="logo"><img src="assets/img/logo.png" alt="" class="img-fluid"></a>-->

    <nav id="navbar" class="navbar">
      <ul>
        <li><a class="nav-link scrollto active" href="#hero">Home</a></li>
        <li><a class="nav-link scrollto" href="#about">About</a></li>
        <li><a class="nav-link scrollto" href="#services">Dashboard</a></li>
        <li><a class="nav-link scrollto " href="#reports">Report</a></li>
        <li><a class="nav-link scrollto" href="#team">Story</a></li>
        <li><a class="nav-link scrollto" href="#contact">Contact</a></li>
      </ul>
    </nav><!-- .navbar -->

  </div>
</header><!-- End Header -->


  <!-- ======= About Boxes Section ======= -->
  <section id="about-boxes" class="about-boxes">
    <div class="container" data-aos="fade-up">
```

<img src="assets/img/about-boxes-1.jpg" class="card-img-top" alt="...">

<h5 class="card-title">Online Education System</h5>

  Online education refers to a method of carrying out teaching and learning processes through technology. Students can access teaching materials and interact with teachers using the internet. Online education can be more flexible and efficient than traditional classroom courses.
 Online education in India started in 2005. E-learning in India started in 2008.
 The governemnt initiated a holistic set of measure under one umbrella schme PM eVIDYA in 2020 which has various initiatives like DIKSHA, SwayamPrabha, Shiksha Vani, DAISY, e-kaksha etc.,

<h2>Online Education System</h2>

 Story

This story tells a narative about online education system thourh various scenes.

<iframe src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2FOnlineEducation_Story&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&sceneId=-1&sceneTime=0" width="1220" height="800" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

```
      </div>
    </section><!-- End Team Section -->

  <!-- Vendor JS Files -->
  <script src="assets/vendor/purecounter/purecounter_vanilla.js"></script>
  <script src="assets/vendor/aos/aos.js"></script>
  <script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
  <script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
  <script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
  <script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
  <script src="assets/vendor/php-email-form/validate.js"></script>
  <!-- Template Main JS File -->
  <script src="assets/js/main.js"></script>

</body>  </html>
```