

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

K.Renuka Devi

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INTRODUCTION

1.1 Overview

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.

During lockdown period, online classes and technology played a significant role in students' lives. The people were not allowed outside or accessed to physical world, yet despite this, we have remained linked to the educational community. They were also unable to maintain their connection with the outside world as a result of the lockdown, which has resulted in a noticeable lack of exposure. The shift to online education has been the only source of relief for the students' mental health since the change. Teachers made it their priority to guarantee that their students' educational opportunities were not hindered in any way, and as a result, they made significant strides forward in their search for answers and the development of innovative educational settings for their students to ensure that education is continuous. Online education has seen substantial growth in popularity over the past several years as a result of rapid technological improvements and the increasingly broad availability of internet connectivity.

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.

1.2 Purpose

The purpose of this project was to overcome the bottleneck issues faced by education sector especially during covid -19 days. The large part of students gets affected due to the inefficient internet facility, mobile shortage etc., the online education data has been analysed and the result has been carried out. The purpose of this project is to find out what are the barriers in online education by analysing visualizations, dashboards etc.,

This project has been carried out in IBM cognos analytics platform where the data has been presented by means of visualizations, story, dashboard. This project largely helps for educators to get an idea where the students are lagging, how to improve it, how the students performed in online education and before covid.

Moreover, this project helps the training centres and education institutions to analyse the individuals' performance and how to improve them. This analysis plays a major role to get the result about their performance in online and offline education

2 LITERATURE SURVEY

2.1 Existing problem

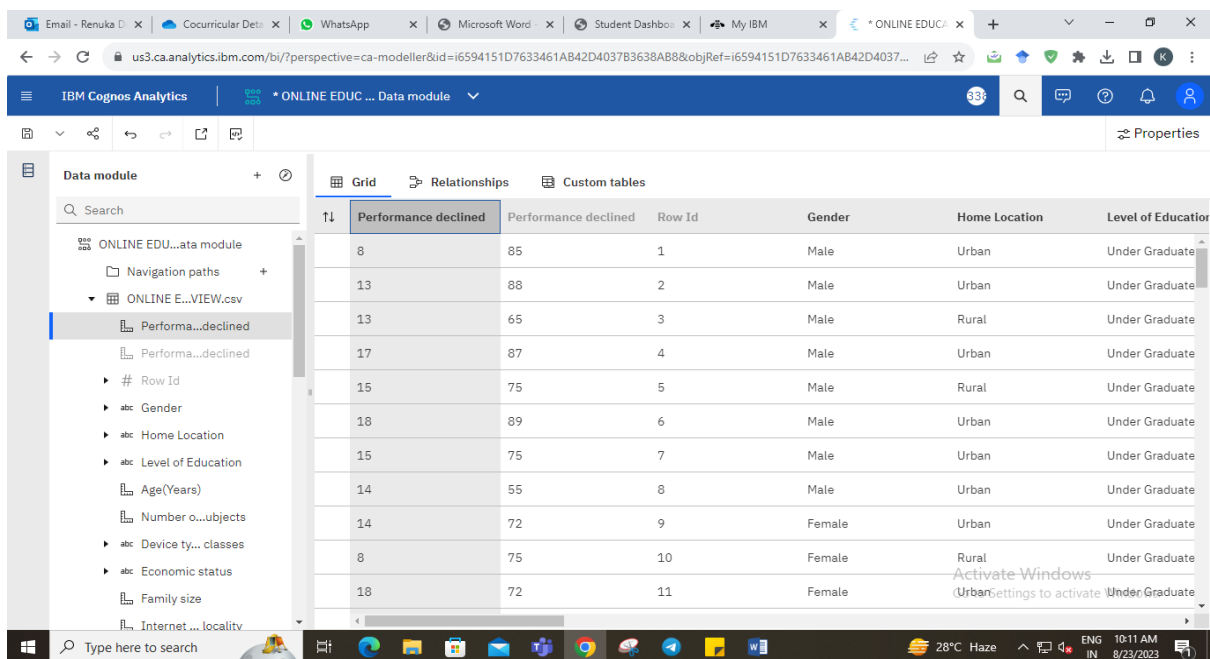
- The unprecedented situation of uncertainty caused by the COVID-19 pandemic in 2020 forced the Indian education system to move to digital learning and teaching to fill the gap created by suspending classroom teaching across the country. Technological development and the Internet have changed the lives of people immensely and have also brought a huge change in various fields (Nadikattu, 2020).
- The majority of countries worldwide temporarily closed educational institutions to contain the spread of the COVID-19. According to UNESCO (2020), 191 countries have implemented nationwide or localized school closures, resulting in over 91% of enrolled students, or 1.5 billion people, not being able to go to school as of April 20, 2020 (Lamrabat, 2020). UNESCO has supported countries in their efforts to mitigate the immediate impact of school closures, particularly for more vulnerable and disadvantaged communities, and to facilitate the continuity of education for all through remote learning (UNESCO, 2020).
- Fast research growth and technology have made distance education easy (McBrien et al., 2009). "Most of the terms (online learning, open learning, web-based learning, computer-mediated learning, blended learning, m-learning, for ex.) have in common the ability to use a computer connected to a network, that offers the possibility to learn from anywhere, anytime, in any rhythm, with any means" (Cojocariu et al., 2014).
- Not only the teachers but also the students are facing challenges due to a deficiency in proper learning attitudes, lack of suitable materials for learning, more involvement in classroom learning, lack of self-discipline, and the inadequate learning environment at some of their homes during self-isolation (Brazendale et al., 2017).
- Using a qualitative content analysis approach, the study conducted by Sun and Chen (2016) reviewed 47 published studies and research regarding online teaching and learning since 2008. Their study primarily focuses on how theories, practices, and assessments apply to an online learning environment. Some prominent factors required for effective online instruction included well-designed course content,

motivating interaction between the instructor and learners, well-prepared and fully supported instructors, creation of a sense of online learning community, and rapid advancement of technology Sun and Chen (2016).

- In their systematic analysis, Navarro and Shoemaker (2000) observed that the learning outcomes of students having online classes were as good as or better than traditional classroom learning, irrespective of the background characteristics of the students. The student learners were highly satisfied with online learning.
- Videoconferencing tools such as Google Meet, Zoom, and Microsoft Teams have been playing important roles in delivering online lectures and organizing discussion sessions. In fact, these platforms typically support slideshows and have several useful features. A number of universities and institutions of higher education have been disseminating course material through their official websites (Chatterjee & Chakraborty, 2020).
- Several countries were equipped with significant infrastructure for online education before the pandemic hit the world (Mishra et al., 2020). Despite this, not all universities were prepared to shift to complete online education. There are some empirical studies that suggest that students have a better learning experience in a physical classroom than through online education (Bojović et al., 2020). Students miss the assistance they obtain from their peers in classrooms and laboratories and access to a library (Aguilera-Hermida, 2020). However, students believe that online education facilitated the continuation of their studies during the pandemic (Mishra et al., 2020).

2.2 Proposed solution

This project aims to overcome various issues faced by online education and it helps to analyse the performance of students before and after pandemic by using IBM cognos analytics platform and aims to take steps based on it. The performance declined after online education has been calculated using the below formula.



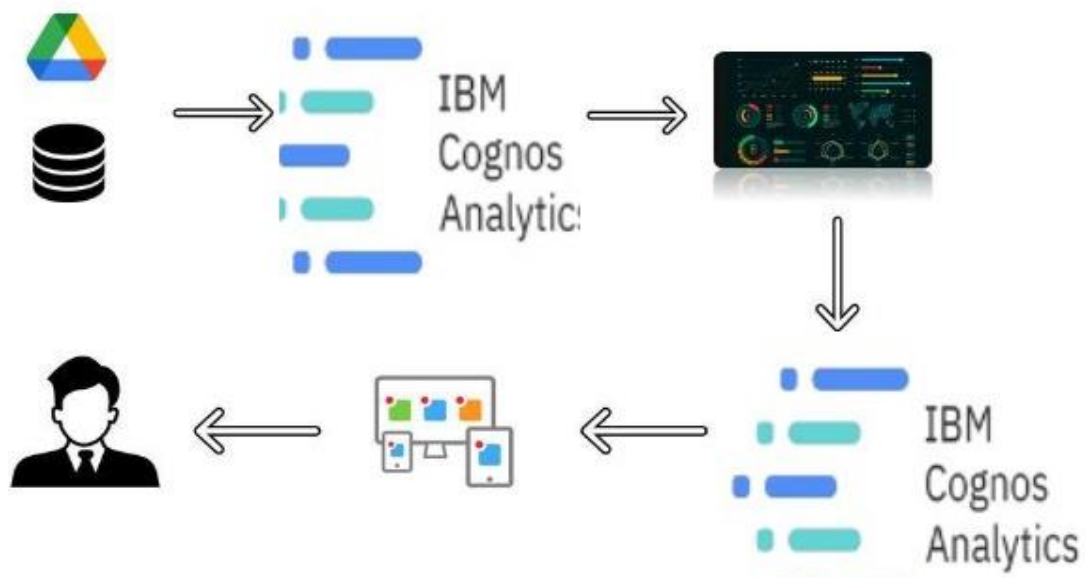
The screenshot displays the IBM Cognos Analytics interface. The top navigation bar shows the 'IBM Cognos Analytics' logo and the current data module, '* ONLINE EDUC ... Data module'. The main workspace is divided into a left-hand 'Data module' pane and a central 'Grid' view. The 'Data module' pane lists various data sources, including 'ONLINE EDU...ata module', 'Navigation paths', and 'ONLINE E...VIEW.csv'. The 'Grid' view displays a table with the following columns: 'Performance declined', 'Performance declined', 'Row Id', 'Gender', 'Home Location', and 'Level of Education'. The table contains 11 rows of data, with the first row having a 'Performance declined' value of 85 and the last row having a value of 72. The bottom of the screen shows a Windows taskbar with various application icons and system information, including the date and time (10:11 AM, 8/23/2023).

Performance declined	Performance declined	Row Id	Gender	Home Location	Level of Education
8	85	1	Male	Urban	Under Graduate
13	88	2	Male	Urban	Under Graduate
13	65	3	Male	Rural	Under Graduate
17	87	4	Male	Urban	Under Graduate
15	75	5	Male	Rural	Under Graduate
18	89	6	Male	Urban	Under Graduate
15	75	7	Male	Urban	Under Graduate
14	55	8	Male	Urban	Under Graduate
14	72	9	Female	Urban	Under Graduate
8	75	10	Female	Rural	Under Graduate
18	72	11	Female	Urban	Under Graduate

$$\text{Performance declined} = \frac{(\text{Average_marks_scored_before_pandemic_in_traditional_classroom}_1 - \text{Performance_in_online})}{\text{number of subjects}}$$

3 THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software designing

Hardware requirements:

1. Laptop/Desktop
2. 8.00 GB RAM
3. Minimum 100 GB HDD

Software requirements:

1. Windows operating system
2. Chrome browser

Tools used:

1. IBM cognos analytics

4 EXPERIMENTAL INVESTIGATIONS

Online education plays a vital role during covid days and from analysing the offline education and online education, students were studious in offline education and the use of gadgets has been increased in online methodology so that performance in online education got reduced tremendously. From the figure 1, it is depicted more precisely. However, the internet usage in urban has been increased rather than in rural and this has been depicted through the graph 2.

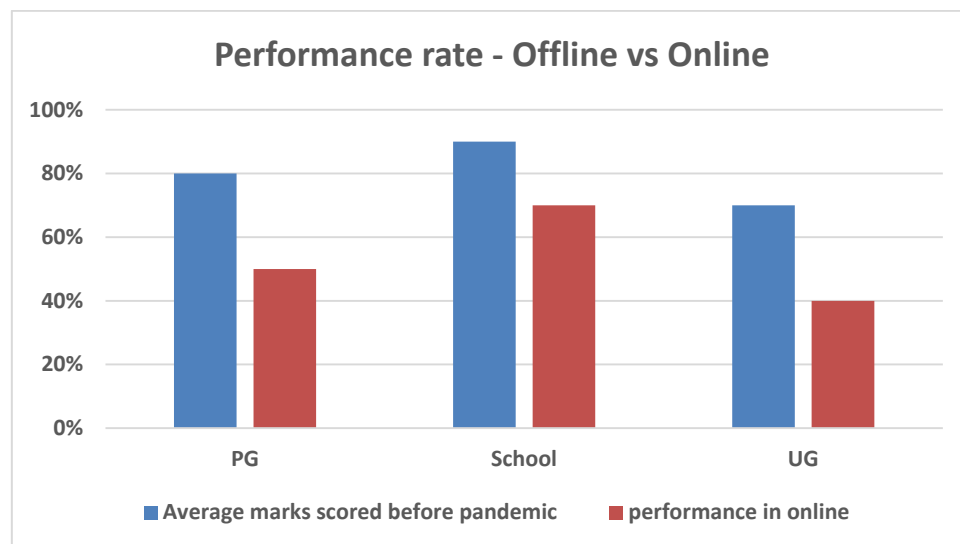


Fig 1. Performance rate - Offline vs Online

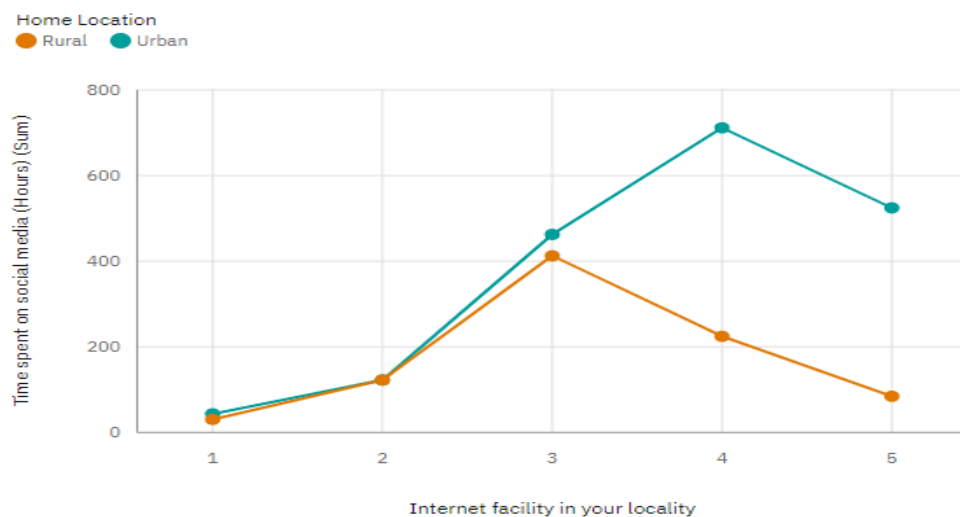
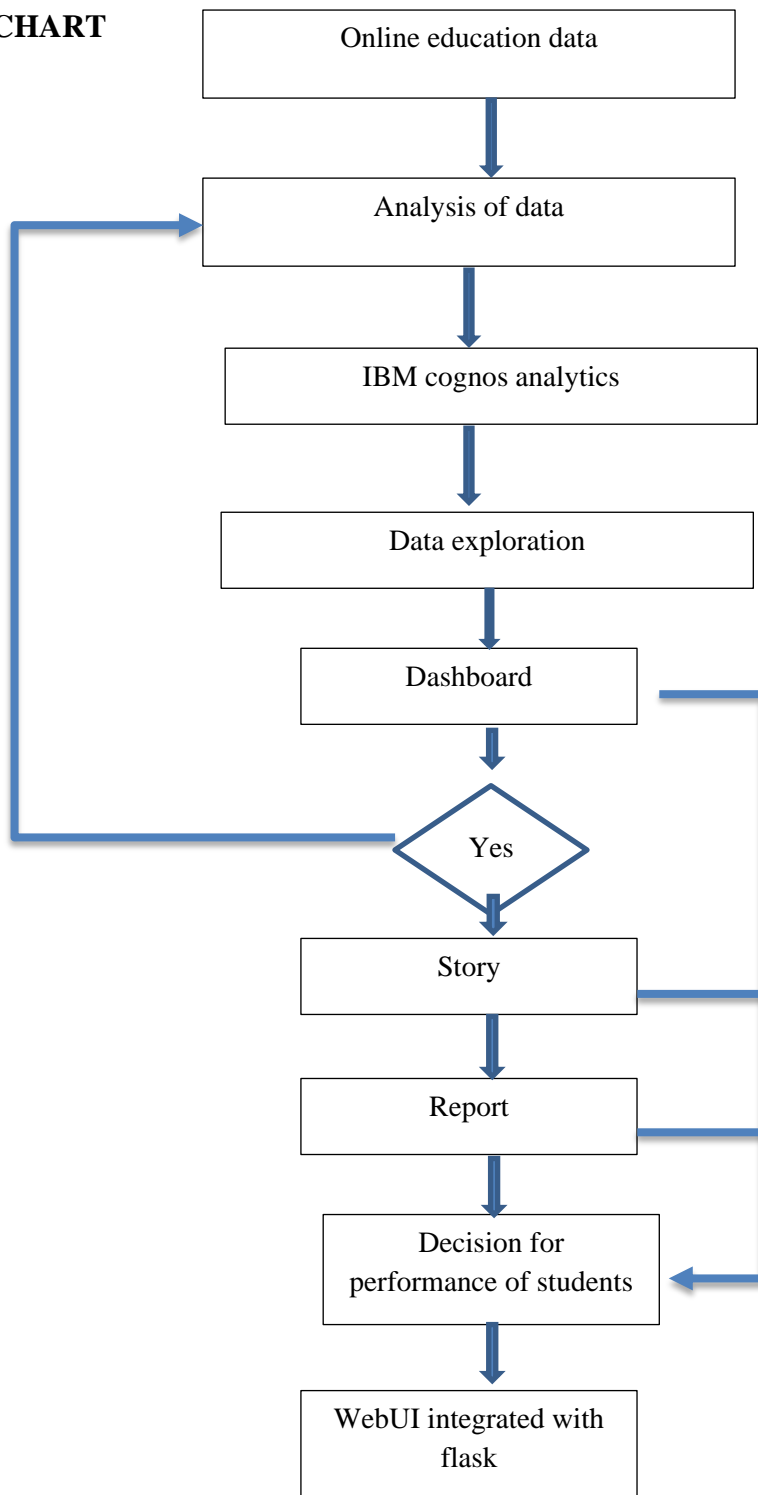


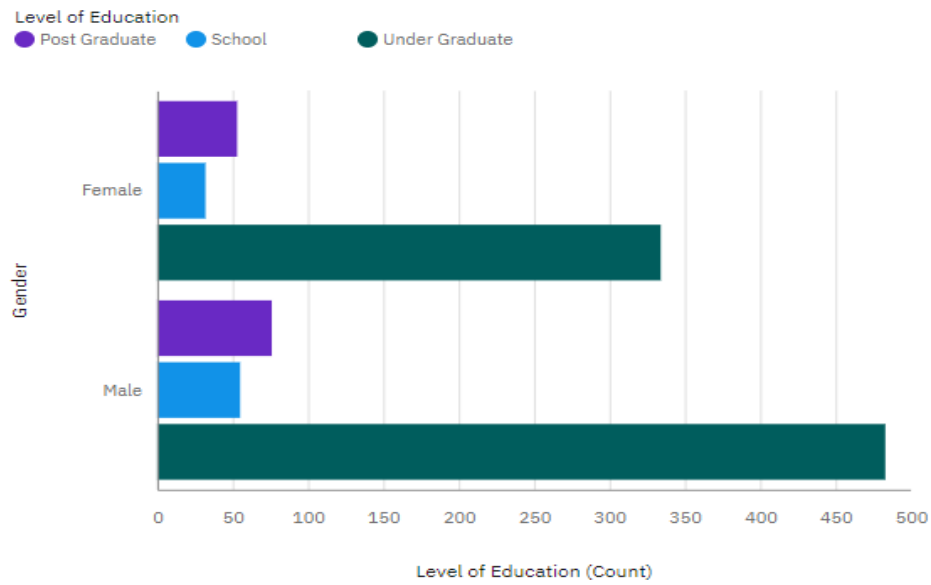
Fig 2. Internet usage in urban vs rural

5 FLOWCHART

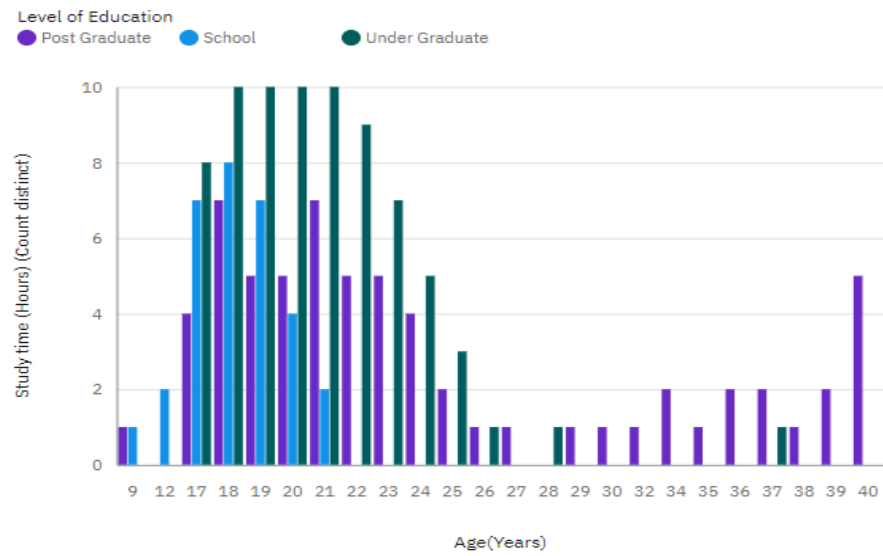


6 RESULT

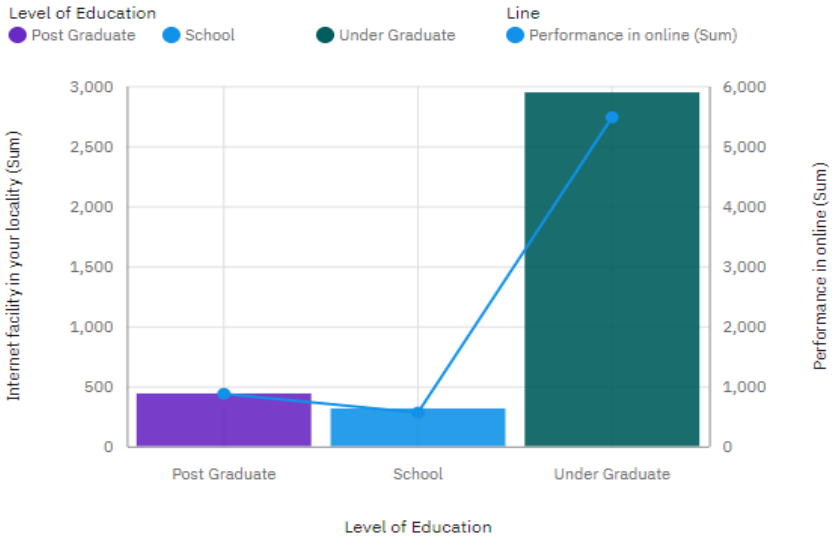
Level of Education by Gender colored by Level of Education



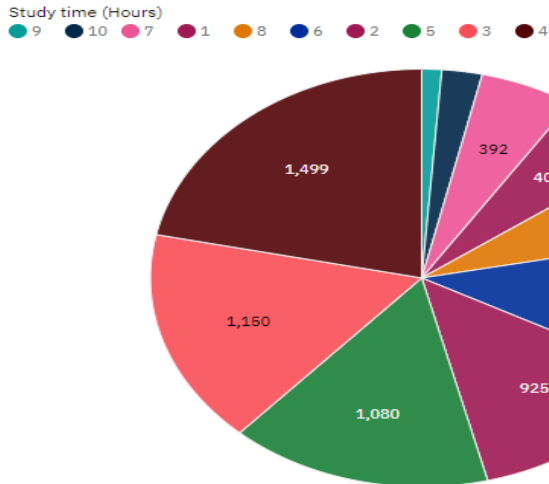
Study time (Hours) by Age(Years) colored by Level of Education



Performance in online and Internet facility in your locality for Level of Education colored by Level of Education



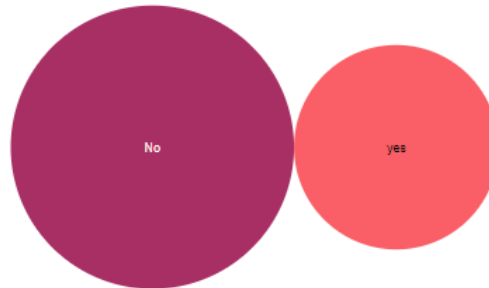
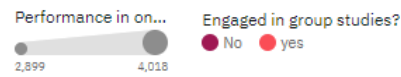
Performance in online by Study time (Hours)



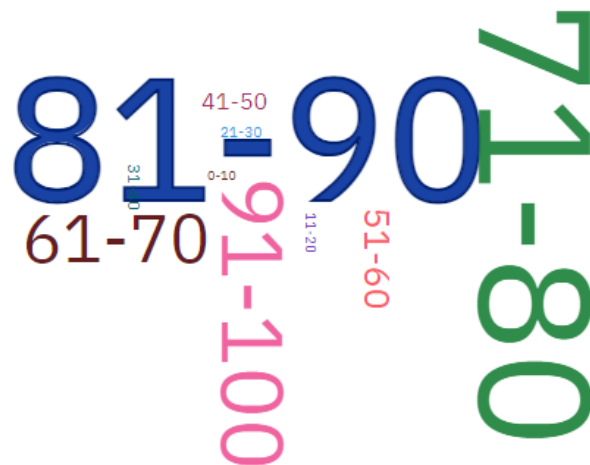
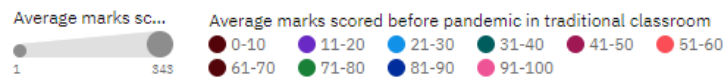
Average marks scored before pandemic in traditional classroom by Number of Subjects



Engaged in group studies? colored by Engaged in group studies? sized by Performance in online

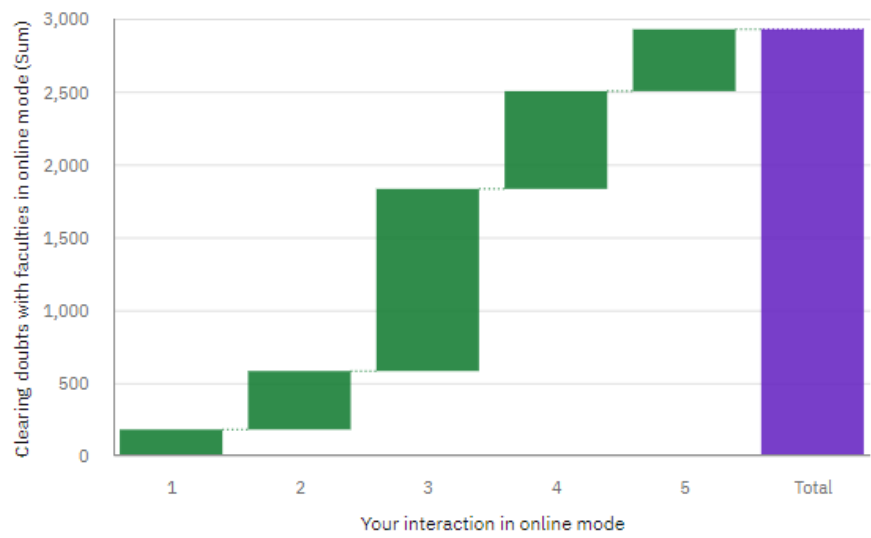


Average marks scored before pandemic in traditional classroom colored by Average marks scored before pandemic in traditional classroom sized by Average marks scored before pandemic in traditional classroom



Clearing doubts with faculties in online mode for Your interaction in online mode

Column values
● Increase ● Decrease ● Total

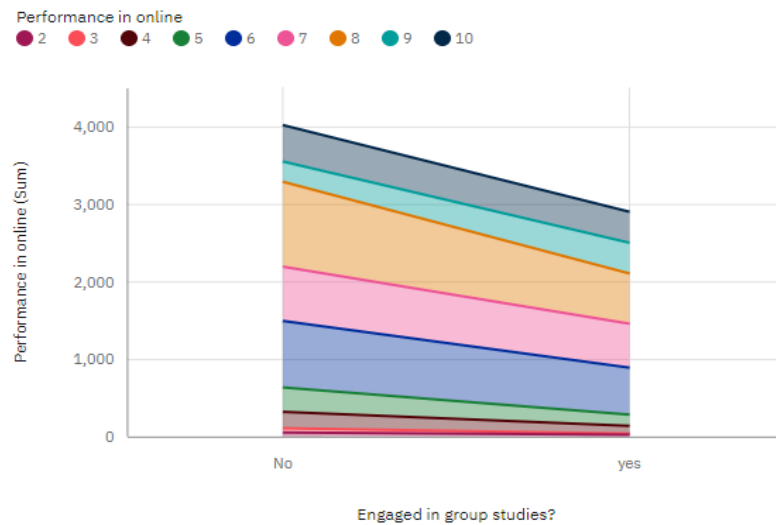


Time spent on social media (Hours) by Internet facility in your locality colored by Home Location

Home Location
● Rural ● Urban



Performance in online by Engaged in group studies? colored by Performance in online



7 ADVANTAGES & DISADVANTAGES

ADVANTAGES:

1. Helps to analyse the performance of the students
2. Used to compare the knowledge level of students

DISADVANTAGES:

1. Real time data can't be analysed, analysis can be done only for available data

8 APPLICATIONS

The areas where this solution can be applied

1. Applied in education sectors
2. Training institutes
3. Student analysis environment

9 CONCLUSION

Learning is considered to be a social process, and online learning involves all of the social elements and factors at the heart of the learning process. Social presence, interaction, space, and connectivity are all considered as an important determinant of online learning success. This project aims to overcome various issues faced by online education and it helps to analyse the performance of students before and after pandemic by using IBM cognos analytics platform and aims to take steps based on it. The performance declined after online education has been calculated using the below formula.

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10 FUTURE SCOPE

This project moreover helps to overcome various issues faced by education sectors and as a future perspective, the real time analysis can be performed so that it will be more useful for the training institutes makes critical decisions.

11 BIBLIOGRAPHY

1. Handbook of Online Learning in Higher Education by Kjell E. Rudestam, Judith Judith Schoenholtz-Read, Monique L. Snowden
2. Deepening In-Class and Online Learning by Larry Swartz, Debbie Nyman, Magdalin Livingston
3. How Organizations Can Make the Most of Online Learning by Dr. David Guralnick

APPENDIX

<!DOCTYPE html>

<html lang="en">

<head>

```
<meta charset="utf-8">

<meta content="width=device-width, initial-scale=1.0" name="viewport">

<title> Unveiling The Virtual Classroom </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 -->

<link
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Nunito:300,300i,400,400i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">

<!-- Vendor CSS Files -->

<link href="assets/vendor/aos/aos.css" rel="stylesheet">

<link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">

<link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">

<link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">

<link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">

<link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">

<!-- Template Main CSS File -->

<link href="assets/css/style.css" rel="stylesheet">

</head>

<body>

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

<header id="header" class="header fixed-top">

    <div class="container-fluid container-xl d-flex align-items-center justify-content-between">
```

```

<a href="index.html" class="logo d-flex align-items-center">
  
  <h1><b><center>Unveiling the Virtual Classroom</center></b></h1>
</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">Report</a></li>
    <li><a class="nav-link scrollto" href="#services">Dashboard</a></li>
    <li><a class="nav-link scrollto" href="#portfolio">Story</a></li>
    <li><a class="nav-link scrollto" href="#team">Visualization</a></li>
  </ul>
  <i class="bi bi-list mobile-nav-toggle"></i>
</nav><!-- .navbar -->

</div>

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

<section id="hero" class="hero d-flex align-items-center">
  <div class="container">
    <div class="row">
      <div class="col-lg-6 d-flex flex-column justify-content-center">
        <h2><b> <data-aos="fade-down" data-aos-delay="400"><center>An In-Depth
Analysis Of The Online Education System</center></h2></b>

        <h2 data-aos="fade-up" data-aos-delay="400" align="justify">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. </h4>

        <h2 data-aos="fade-up" data-aos-delay="400" align="justify"> After deep analysis
and processing, various kinds of visualizations for online education has been carried out by

```

utilizing IBM cognos analytics. It brings out various conclusions by referring dashboard, story and report.</h2>

```
<div data-aos="fade-up" data-aos-delay="600">
```

```
<div class="text-center text-lg-start">
```

```
<a href="#about" class="btn-get-started scrollto d-inline-flex align-items-center justify-content-center align-self-center">
```

```
<span>Get Started</span>
```

```
<i class="bi bi-arrow-right"></i>
```

```
</a>
```

```
</div>
```

```
</div>
```

```
</div>
```

```
<div class="col-lg-6 hero-img" data-aos="zoom-out" data-aos-delay="200">
```

```

```

```
</div>
```

```
</div>
```

```
</div>
```

```
</section><!-- End Hero -->
```

```
<main id="main">
```