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

Mrs.P.Vidhushini , Assistant Professor, Rajalakshmi Engineering College

Chennai- 602 105, Tamil Nadu,

vidhushini.p@rajalakshmi.edu.in, vidhuprabhu11@gmail.com

1. INTRODUCTION

1.1 Overview

Technology and online classes have emerged as heroic figures during the dark moments. We are all still actively involved in the educational environment despite being under imprisonment at home. Because of the lockdown, students have been unable to maintain communication with the outside world, making the lack of exposure clear. The students' mental health has only improved after the switch to online classrooms. To ensure that learning never stops and that children's learning was not compromised, teachers made a significant advancement in identifying solutions and creating new learning environments for their students. Owing to the recent rapid advancements in technology and the widespread availability of internet connectivity, online education has seen a considerable rise in prominence.

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.

1.2 Purpose

This study aims to completely assess the many aspects of online education while highlighting its positive and negative aspects, possibilities and challenges. The outcomes of this study will give learning organizations, decision-makers, and online learning platforms crucial information that will help boost the effectiveness and accessibility of online education. In order to contribute towards the extending discussion about the future of education and to help create a more diverse, fascinating and effective learning

environment in the digital age, the review of the system of online learning is being made accessible.

2 LITERATURE SURVEY

2.1 Existing problem

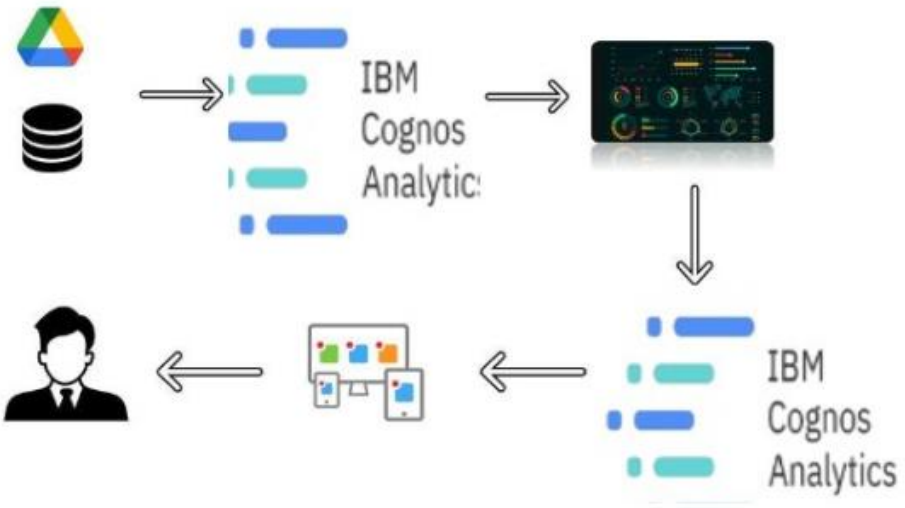
Time management is undoubtedly impacted by the fact that children spend the entire school day on campus and that school days are hectic. The pupils are worn out and spend the remainder of the day sleeping, even if they arrive home in the evening. This could seem like a disadvantage when compared to online learning, which offers more schedule freedom. Since there is no commute time, the time saved can be used for other things, like recreational activities. Online learning is more energy-efficient than traditional classroom instruction because students may spend their time more efficiently. A wholly distinct curriculum that extends beyond reading and textbooks is required for offline education.

2.2 Proposed solution

The proposed solution, which makes utilization of IBM Cognos Analytics' with strong capabilities, aims to improve teaching through the use of sophisticated data analysis and visualization tools. Institutions can gain more knowledge about student performance, course effectiveness, and learning outcomes by incorporating this platform. Faculty and administrators may decide wisely how to spend resources, personalize learning, and make judgments using dynamic dashboards, predictive data analysis, and adaptive learning capabilities. This data-driven strategy elevates academic standards and promotes ongoing development, resulting in a supportive and interesting atmosphere for learning.

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:

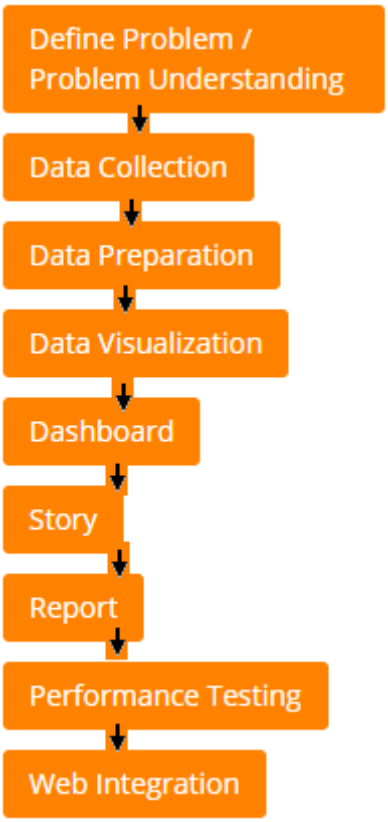
- IBM Cloud
- IBM Cognos Analytics
- Visual Studio Code
- Python

4 EXPERIMENTAL INVESTIGATIONS

, The pilot investigation offers essential information on how IBM Cognos Analytics may impact online learning. Through the evaluation of student performance, the identification of problem areas, and the personalization of learning experiences, the effort attempts to enhance the overall quality of online education. Dynamic dashboards and narrative approaches are used to effectively convey the findings to administrators, educators, and representatives, fostering the use of evidence in decision-making. By making use of IBM

Cognos Analytics' capabilities, this program aspires to further the ongoing discussion about innovations in education and build a more vibrant and effective educational atmosphere in the digital world.

5 FLOWCHART

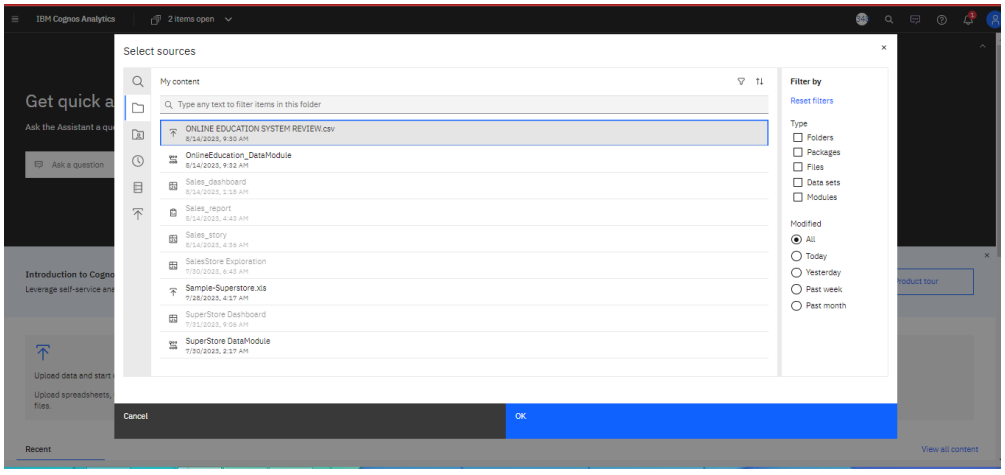


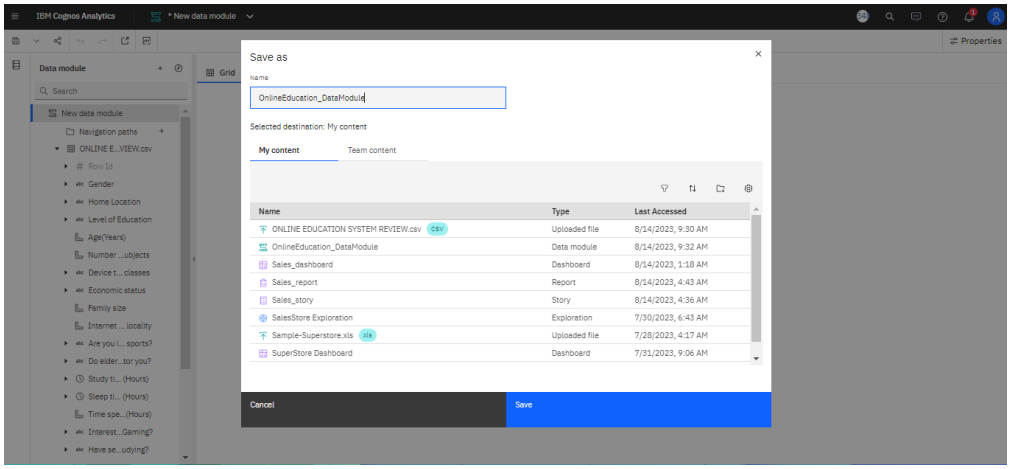
6 RESULT

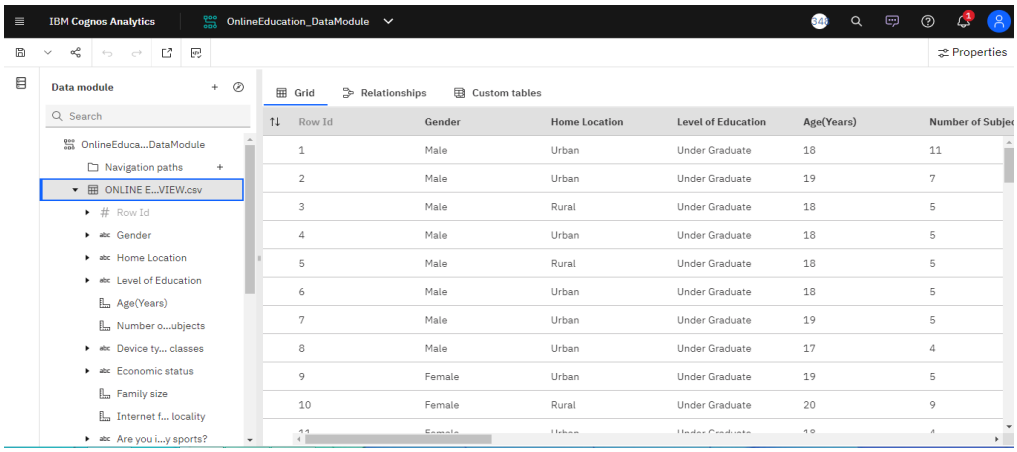
6.1 Data Module – Data Loading – Data Preparation

6.1 Data set Loading

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







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

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)

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

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

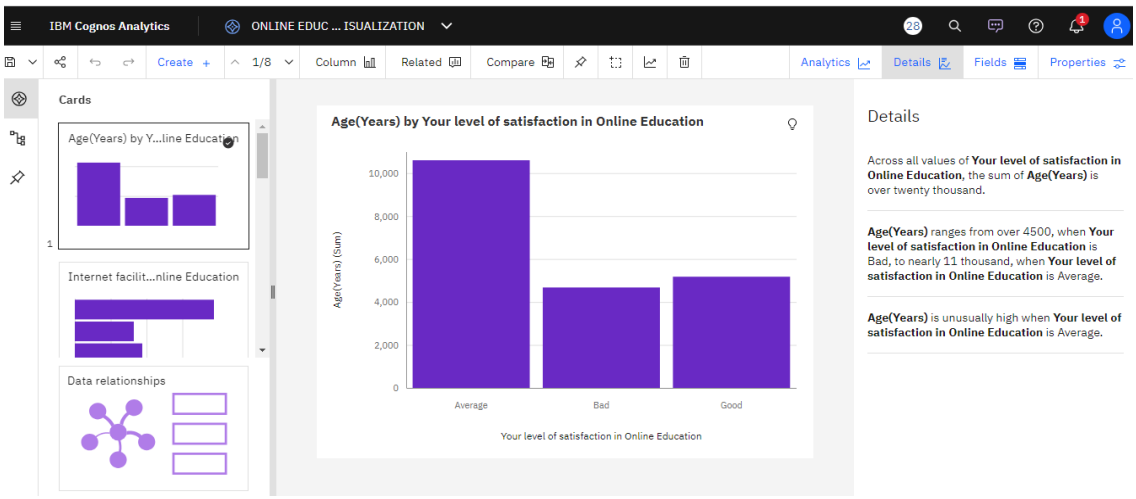
6.2 Preparing Data Set

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

6.3 Data Exploration

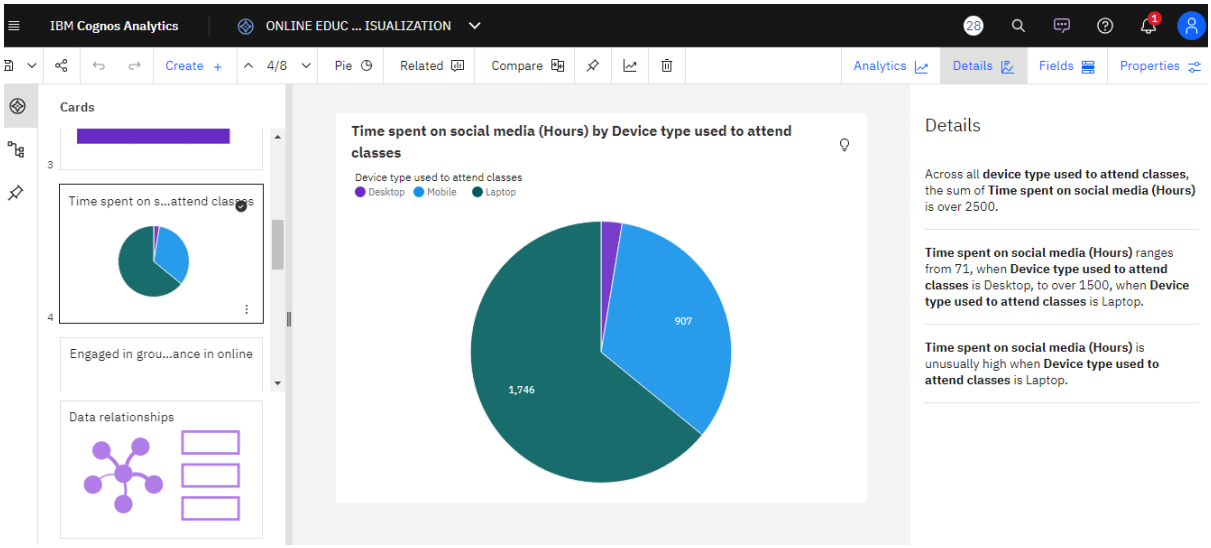
6.3.1 Student Satisfaction from Virtual Class Learning:

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

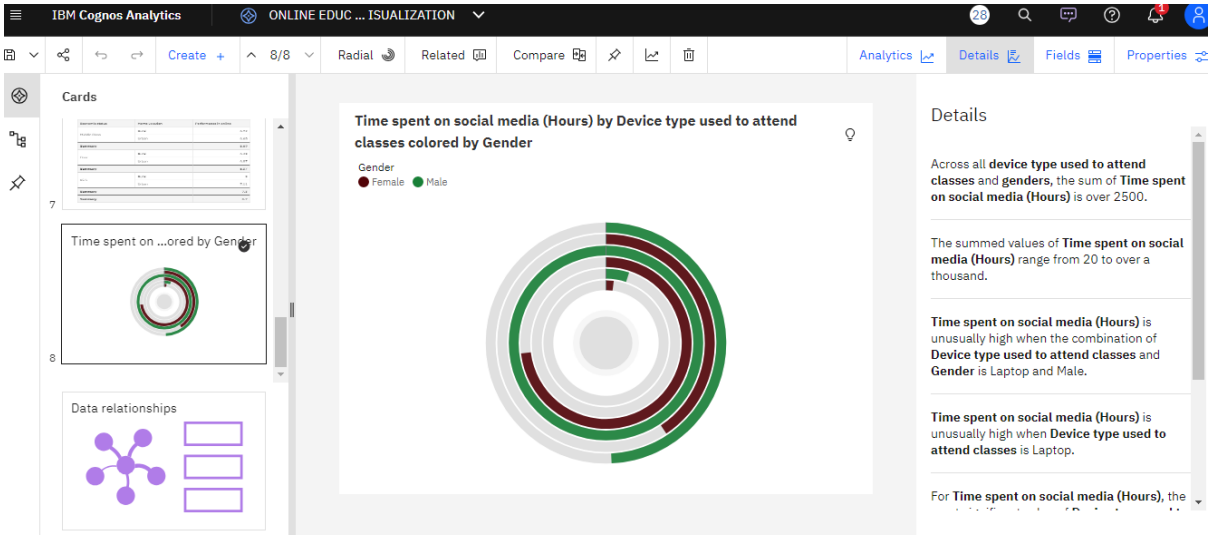
Insight: The counts are unusually high when the values of **Time spent on social media (Hours) +** are 14, 12 and 13.



6.3.3 Gender Ratio

Insight:

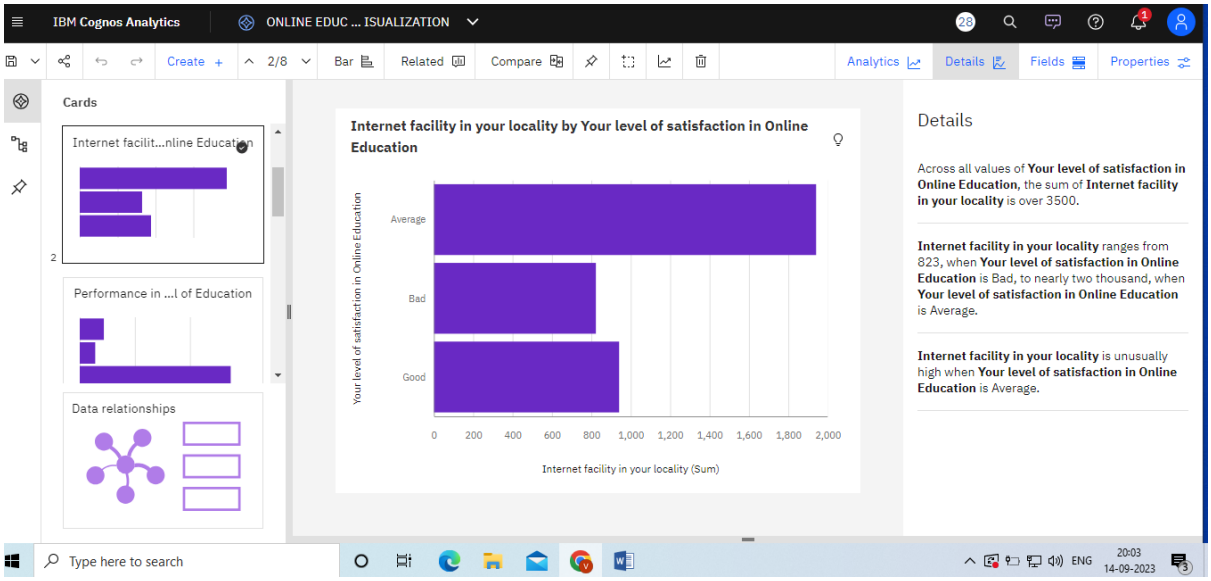
For **Time spent on social media (Hours)**, the most significant value of **Gender** is Male, whose respective **Time spent on social media (Hours)** values add up to over 1500, or 57.2 % of the total.



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.

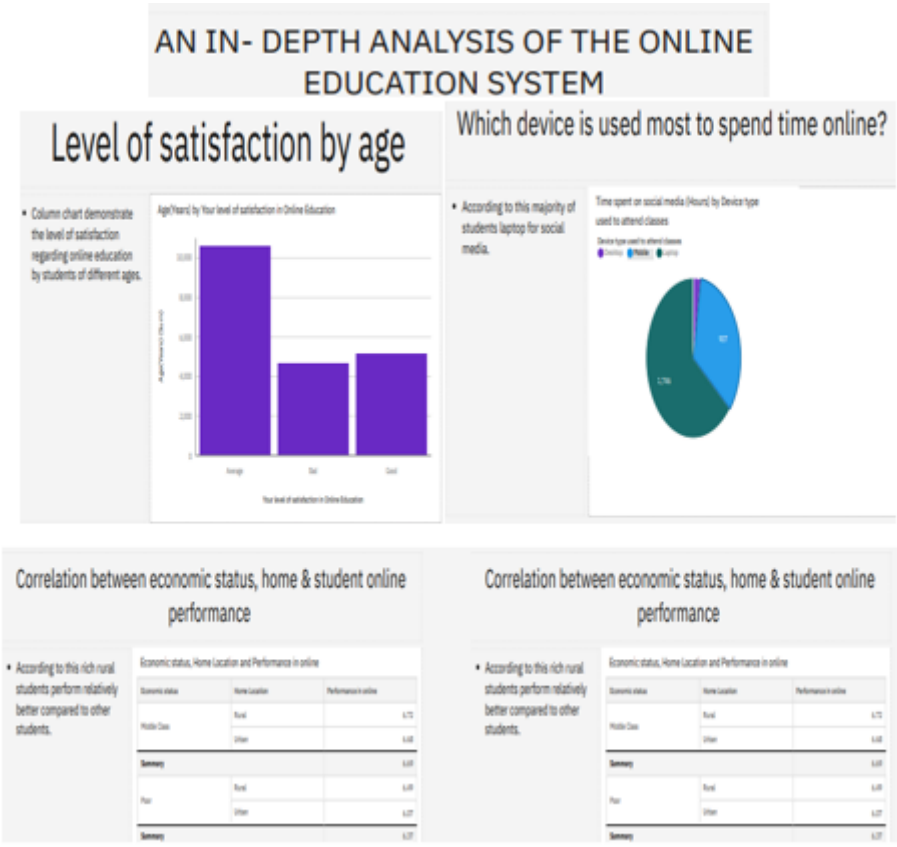


6.4 Dashboard

6.4.1 Dashboard 1: Internet Facility

6.4.2 Dashboard 2 : Performance based on gender and facilities:

6.5 Story Board



6.6 Report

7 ADVANTAGES & DISADVANTAGES

7.1 Advantages of Online Education

- Courses can be attended remotely by students, giving them more scheduling autonomy. 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 participate in extracurricular activities. Anywhere and at any time, as long as there is a reliable internet connection, you can access online education. In contrast to traditional lectures, virtual 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.

- From the aforementioned factors, it is clear why online learning is more practical than traditional learning. Students feel more at ease attending class when it's online. The medium helps both educators and pupils save time as well as resources.

7.2 Disadvantages of Online Education System

- Concerns about connectivity rank highly as a negative. Depending on the area, unheard-of levels of connectivity and electricity may make online education impossible.
- One of the biggest issues with online education for teachers is managing student attentiveness. Focusing on each student individually can be challenging for an online teacher. It might be challenging to tell who is paying attention and who is only attending class. Less interaction between the teacher and the class could make it more difficult to convey the lessons being taught.
- Another significant downside of online education is the amount of time spent on the computer. Students who spend too much time on screens run the risk of developing health problems.
- Regular communication with peers is impossible for students in online learning. A child may speak and interact via video with friends and other children, but it's not like school. Students learn collaboration, leadership, and other skills from their peers. Online learning diminishes the need to attend classes, making it more difficult to interact with peers and deal with experience loss..

8 APPLICATIONS

Through the internet, online education disseminates information and activities. It can broaden the range of educational options available, alter student demographics, develop innovative pedagogical approaches, and assess and analyze classroom instruction.

Applications for online education system analysis include the following:

• It may evaluate the complexity of the online education system.

• Academic achievements and online education can be evaluated.

• Enhance virtual education and assessment of teachers.

9 CONCLUSION

The system of online education has positive and negative implications. IBM Cognos Analytics can provide novel insights on the most crucial elements of accessibility, instructor preparation, and student engagement. By enhancing the aforementioned components, we have the potential to increase the effectiveness of digital classrooms through the integration of data and IBM Cognos Analytics.

10 FUTURE SCOPE

The subsequent investigations will concentrate on improving the proposed system to take into account students' existing knowledge of the subject matter in addition to their preferred method of instruction modality in order to provide students with content that is at an appropriate level of challenge. Additionally, rather than using an exhaustive survey, data mining techniques can be used to analyze a variety of websites that students actively visit to establish their preferred way of learning. 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">

      <div class="row">
        <div class="col-lg-4 col-md-6 d-flex align-items-stretch" data-aos="fade-up" data-aos-delay="100">
          <div class="card">
            <img src="assets/img/about-boxes-1.jpg" class="card-img-top" alt="...">
```

```
<div class="card-icon">
 <i class="ri-brush-4-line"></i>
</div>
<div class="card-body">
 <h5 class="card-title"><a href="">Online Education System</a></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.,

```
<div class="section-title">
 <h2>Online Education System</h2>
 <p> Story</p>
</div>
<p>This story tells a narative about online education system thourh various scenes. </p>
<iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders%2FOnlineEducation_Story&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=view&amp;sceneId=-1&amp;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>
```