Report: Online Education System

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Submitted By:

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1 INTRODUCTION

1.1 Overview

Analyzing the performance of online education and understanding its usage across different age groups can provide valuable insights into the effectiveness and reach of online learning platforms. An overview of how to approach performance analysis and usage patterns across age groups based on various factors are listed below:

A) Performance Analysis:

Assessment Outcomes: Examine the academic performance of students across age groups. Compare their grades, test scores, and completion rates to identify any age-related trends.

Engagement Metrics: Analyze how different age groups engage with online course materials. This can include participation rates, discussion forum activity, and time spent on various activities.

Retention Rates: Calculate and compare the retention rates for students of different age groups. Are older or younger students more likely to complete courses or programs?

Learning Outcomes: Assess whether different age groups achieve similar learning outcomes. Do older students fare better in certain subjects or courses? Are there variations in skill development?

Feedback and Satisfaction: Collect feedback from students of various age groups regarding their satisfaction with the online learning experience. Are there differences in their perceptions of course quality and effectiveness?

Intervention Needs: Identify if certain age groups require specific interventions or support to succeed in online education. For example, older learners may need assistance with technology adoption.

B) Usage Patterns Across Age Groups:

Age Distribution: Analyze the distribution of students across different age groups within the online education platform. This can provide insights into the platform's user demographics.

Device and Technology Preferences: Determine which devices (e.g., laptops, tablets, smartphones) students from various age groups use to access online courses. This can influence platform design and optimization.

Course Selection: Explore the types of courses or subjects that different age groups tend to enroll in. Are there age-related preferences or trends in course selection?

Learning Habits: Investigate the preferred learning hours and study habits of students in different age brackets. Do older students prefer self-paced courses, while younger ones opt for live sessions?

Interaction and Collaboration: Analyze how students across age groups engage in collaborative activities, such as group projects or peer discussions. Are there age-related differences in social learning behavior?

Access to Support Services: Determine if there are variations in the utilization of support services like tutoring, counseling, or career guidance among students of different ages.

Retention Strategies: Develop tailored retention strategies for different age groups based on their usage patterns and needs. For example, younger students might benefit from gamified elements, while older ones may prefer mentorship opportunities.

Lifelong Learning: Assess the extent to which online education serves as a platform for lifelong learning across age groups. Are older individuals using online courses for career transitions or personal enrichment?

It's important to approach age-based analysis in online education with sensitivity to privacy and ethics considerations. Ensure that data collection and analysis comply with relevant privacy regulations and ethical standards. Additionally, consider that age is just one demographic factor, and other factors like prior education, economic status, work experience, and cultural background may also influence online learning performance and usage patterns.

1.2 Purpose

The use of this project is to analyse the usage of online education system, patterns involved , summarize the data, find out the hidden relationships. The project helps to identify the significant factors that paly a vital role in online education system in comparison with various factors such as respective performance by usage of device, level of education, satisfaction, economic status, locality, usage of device to attend the classes, age group etc.

Even the Exploratory data analysis can be carried out with varies types:

1) Based on consideration of variables(univariate, bivariate, multivariate analysis) Ex: Performance in online by Time spent on social media (Hours) colored by Your level of satisfaction in Online Education, Ex2: Performance in online and Time spent on social media (Hours) by Home Location

2) Based on Statistical / Non graphical analysis (mean, mode , median , 5 number summary…etc),. Ex: Average marks scored before pandemic in traditional classroom colored by Time spent on social media (Hours) sized by Performance in online

3) Based on Graphical method/Non Statistical methods (visualization).

2. LITERATURE SURVEY

2.1 Existing problem: The existing methods involve and concentrate always on 1)Evaluation factor rather than the level of understanding the concept. If we observe clearly it can seen that students are more likely inclined towards to complete the work at faster rate using some internal or external sources, online materials, blogs etc to finish the given assignments or any assessment without even knowing the concepts.2) Digital Divide 3) Quality of Education 4) Lack of social interactions 5) Lack of Human values

2.2 Proposed solution: The solution for the problem mentioned is try to: 1)reduce the burden of assessment and evaluation, 2)incline towards inclusion of practical oriented teaching, teach the course with humor in it.

3 THEORITICAL ANALYSIS

3.1 Block diagram
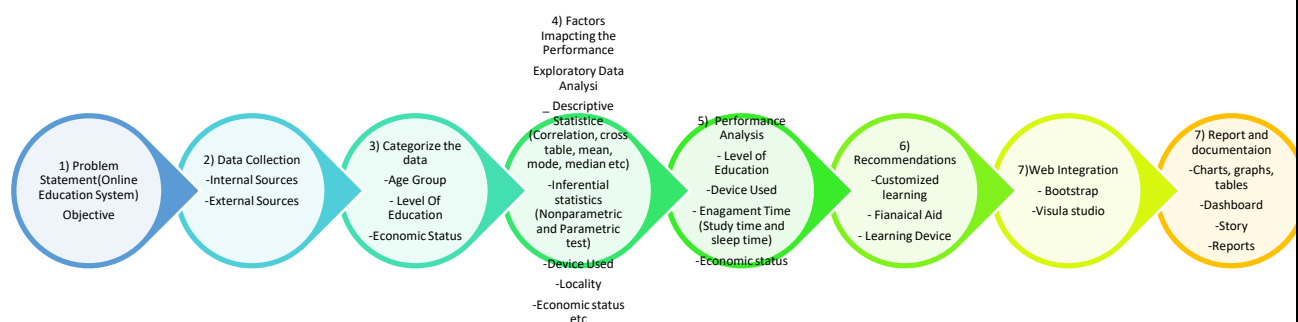
3.2 Hardware / Software designing

- Device (Laptop, Tabs, Desktop)

- Software (IBM Cognos, Smartinternz account, IBM skill build account)

- Web integration (Bootstrap template, Visual studio)

4 EXPERIMENTAL INVESTIGATIONS

Analysis or the investigation made while working on the solution: Analyzing the impact of age, economic status, and device usage on online education system performance requires a combination of quantitative and qualitative data analysis, as well as a nuanced understanding of the specific context and population being studied.

Table 1 provides a structured overview of the analysis conducted during the investigation of the online education system's performance with a focus on age groups, economic status, and device usage. Each aspect of the analysis is described, along with the specific data collected or segmented and key metrics or findings derived from the analysis.

Table 1: Structured overview analysis – online education system

SL.NO	Aspect of Analysis	Description	Data Collected/Segment ation	Key Metrics or Findings
1	Age Groups	Analyzing the impact of age on performance	Segmentation by age groups	- Course completion rates by age group. -Learning style preferences by age
2	Economic Status	Investigating the influence of economic status	Segmentation by economic status	- Course completion rates by economic status
		On online education performance	(e.g., low-income, middle-	- Access to devices and high-speed internet by income
3	Device Usage	Examining the effect of device types on performance	Segmentation by device types	- Performance variations based on device types
		Accessibility	(e.g., desktops, laptops, mobiles)	- Load times and compatibility issues with devices. Digital literacy levels

				affecting online experience
4	Performance Analysis	Comparative analysis of age, economic status, and	Comparative analysis	- Identifying trends and patterns among different groups
				- Statistical significance of differences observed Performance comparisons among subgroups (Level of education, age groups etc) - Engagement in clas - Interaction in class - Clearing Doubts in class
		device usage on performance		
5	Factors Impacting	Identifying external factors and pedagogical aspects	Analysis	- Factors influencing performance (e.g., economic status , locality, work, family)
6	Performance	affecting performance		- Consideration of diverse needs in course design
7	Recommend ations	Providing actionable recommendations based on	Research and analysis findings	- Support interventions (e.g., financial aid, device
		Analysis and insights		- Accessibility improvements for various devices Customized learning strategies for different groups.

5 FLOWCHART :

Figure 1: Flowchart of work – online education system

Data Collection	• Collect data on economic status • Device usage
Categorize the students - Economic status	• Categorize the data based on economic status • Locality
Categorize the Students- based on device used	• Categorize the data based on usage of device used to attend online classes (types: Desktop, laptop, mobiles)
Categorize the Students- - Based on levelof education	• Categorize the data based on level of education
Performance	• Analyze the performance metrices (level of satisfaction, involvement, completion etc) • Suggest strategies. • Customized learning
Recommen dation	• Recommend the courses • Sources • Strategies
Web Integration	• Visual code • Bootstrap template
Reprt Documentai on	• Reprt (Table, Graphs, Charts, Tables, Summarize) • Story creation • Dashboard creation • Documentation (Word doc- AS per template)

6 RESULT

Relation ship diagram: (Visulaizations)

Figure 1 (a): Relationship Building Sample   (Internet Facility)
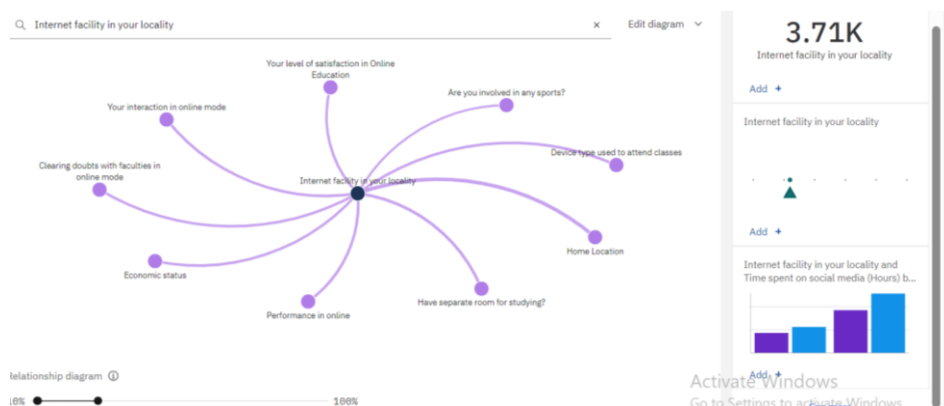
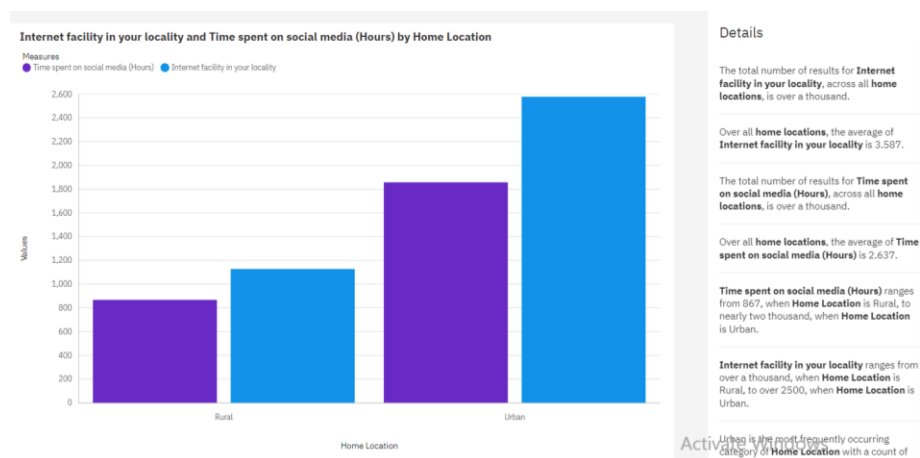## Figure 1 (b): Relationship Building Sample
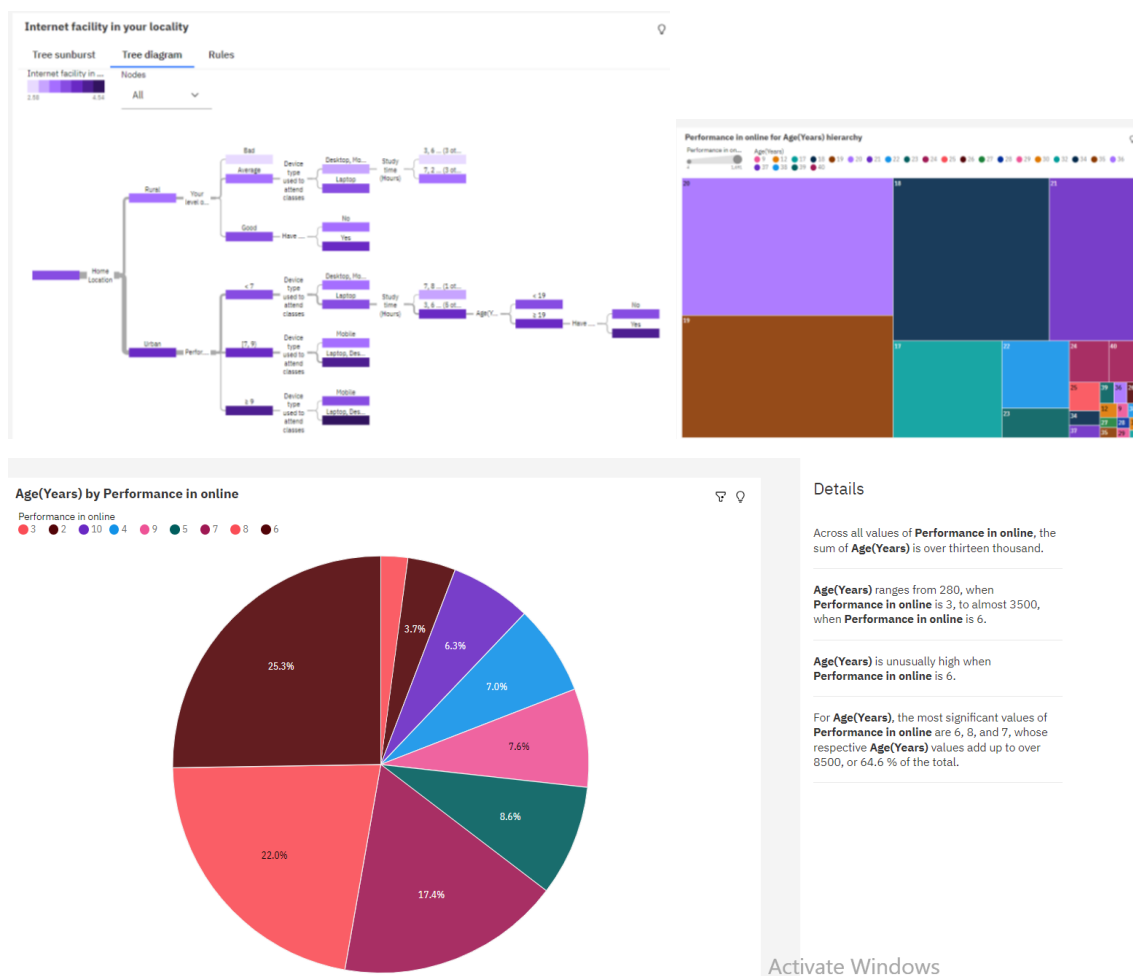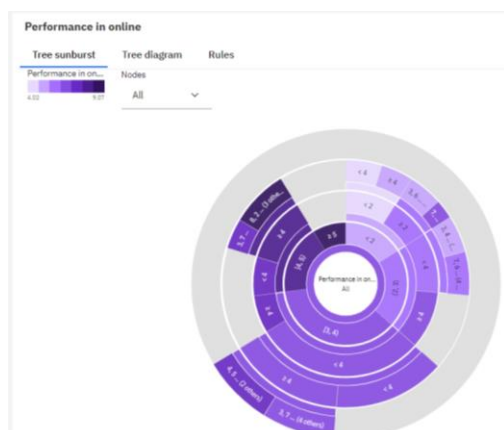

Figure 1 (c): Relationship Building Sample

Figure 1 (e): Relationship Building Sample

Performance in online

Tree sunburst | Tree diagram | Rules

Performance in on... | Nodes
All

Performance in online

Tree sunburst | Tree diagram | **Rules**

Predicted value ↓	Rules	Records
9.07	Clearing doubts with faculties in online mode ≥ 5	91 (9%)
8.38	4 ≤ Clearing doubts with faculties in online mode < 5 Your interaction in online mode ≥ 4 Study time (Hours) = 8, 2, 4, 5, 9	78 (8%)
7.49	4 ≤ Clearing doubts with faculties in online mode < 5 Your interaction in online mode ≥ 4 Study time (Hours) = 3, 7, 6, 1, 10	41 (4%)
7.32	3 ≤ Clearing doubts with faculties in online mode < 4 Your interaction in online mode ≥ 4	68 (7%)
7.30	3 ≤ Clearing doubts with faculties in online mode < 4 Your interaction in online mode < 4 Internet facility in your locality ≥ 4 Study time (Hours) = 4, 5, 10, 9	77 (7%)
7.01	4 ≤ Clearing doubts with faculties in online mode < 5 Your interaction in online mode < 4	70 (7%)
6.65	Clearing doubts with faculties in online mode < 2 Your interaction in online mode ≥ 2 Study time (Hours) = 7, 8, 4, 5, 10	26 (3%)

Age(Years) by Time spent on social media (Hours) colored by Average marks scored before pandemic in traditional classroom

Average marks scored before pandemic in traditional classroom
● 0-10 ● 11-20 ● 21-30 ● 31-40 ● 41-50 ● 51-60 ● 61-70 ● 71-80 ● 81-90 ● 91-100
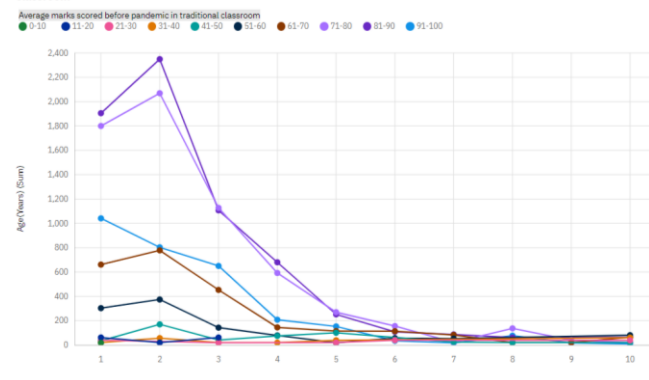
✓ Your exploration has been saved. ✕

Age(Years) is unusually high when **Time spent on social media (Hours)** is 2 and 1.

Across all values of **Time spent on social media (Hours)** and **Average marks scored before pandemic in traditional classroom**, the sum of **Age(Years)** is over twenty thousand.
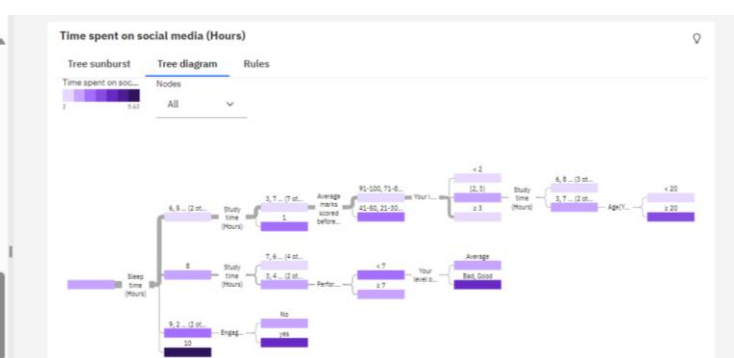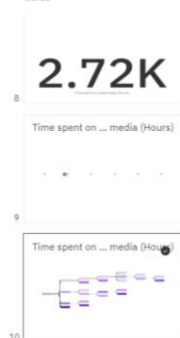
The summed values of **Age(Years)** range from 9 to almost 2500.

Age(Years) is unusually high when the combinations of **Time spent on social media (Hours)** and **Average marks scored before pandemic in traditional classroom** are 2 and 81-90, 2 and 71-80, 1 and 81-90 and 1 and 71-80.

Age(Years) is unusually high when **Average marks scored before pandemic in traditional classroom** is 81-90 and 71-80.

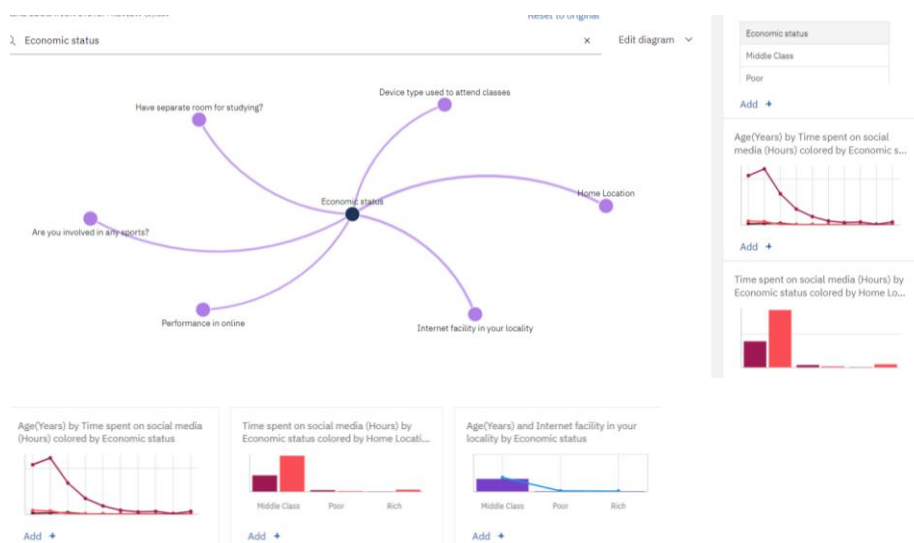For **Age(Years)**, the most significant values of **Time spent on social media (Hours)** are

Cards

2.72K

Time spent on ... media (Hours)

Time spent on ... media (Hours)

Time spent on social media (Hours)

Tree sunburst | **Tree diagram** | Rules

Time spent on soc... | Nodes
All

Details

Sleep time (Hours), **Study time (Hours)**, **Your interaction in online mode**, **Performance in online** and others predict **Time spent on social media (Hours)** with a strength of 17.9%.

Sleep time (Hours) is the most significant predictor of **Time spent on social media (Hours)** being two times better than any other field.
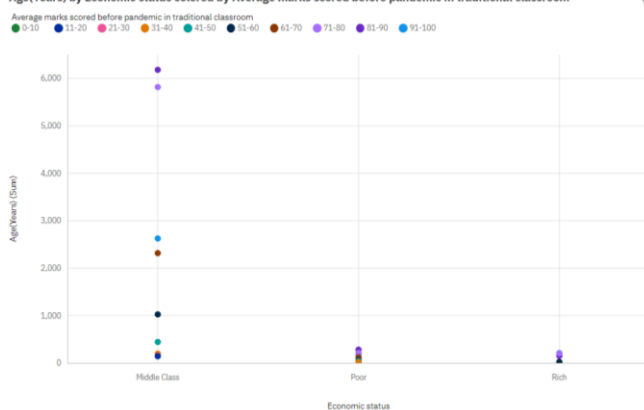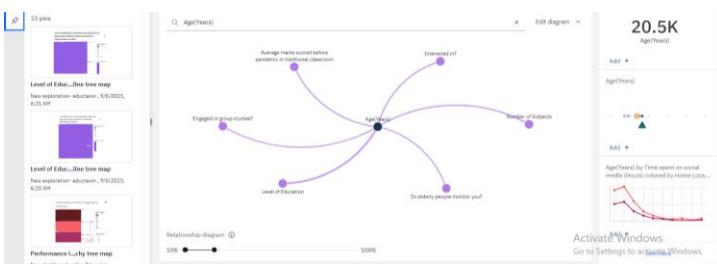
Engaged in group studies? is the least significant predictor of **Time spent on social media (Hours)** improving the predictive strength by about <0.1% only.

Economic Status:

Time spent on social media (Hours) by Average marks scored before pandemic in traditional classroom colored by Your level of satisfaction in Online Education

Details

Across all values of **Average marks scored before pandemic in traditional classroom** and **Your level of satisfaction in Online Education**, the sum of **Time spent on social media (Hours)** is over 2500.

The summed values of **Time spent on social media (Hours)** range from 1 to 440.

Time spent on social media (Hours) is unusually high when the combinations of **Average marks scored before pandemic in traditional classroom** and **Your level of satisfaction in Online Education** are 81-90 and Average and 71-80 and Average.

Time spent on social media (Hours) is unusually high when **Your level of satisfaction in Online Education** is Average.

Time spent on social media (Hours) is unusually high when **Average marks scored before pandemic in traditional classroom** is 81-90 and 71-80.

Age(Years) and Clearing doubts with faculties in online mode by Time spent on social media (Hours)

Your interaction in online mode by Time spent on social media (Hours) colored by Your level of satisfaction in Online Education

Your interaction in online mode and Internet facility in your locality by Age(Years)

Age(Years) by Your level of satisfaction in Online Education colored by Average marks scored before pandemic in traditional classroom

Age(Years) and Internet facility in your locality by Economic status

Performance in online

Dr.Rashmi L Malghan, MIT Manipal   Online Education System

Dashboard:

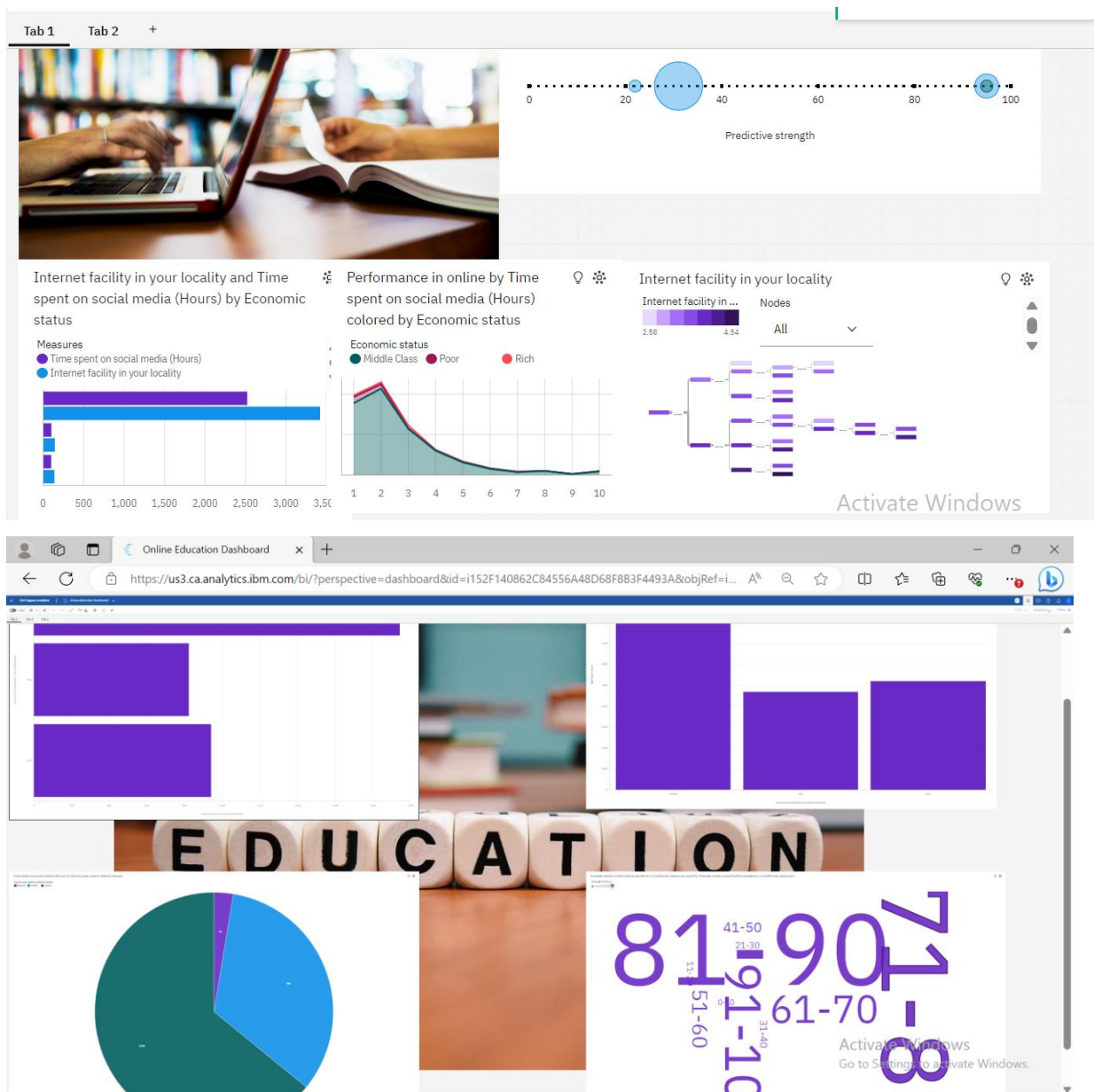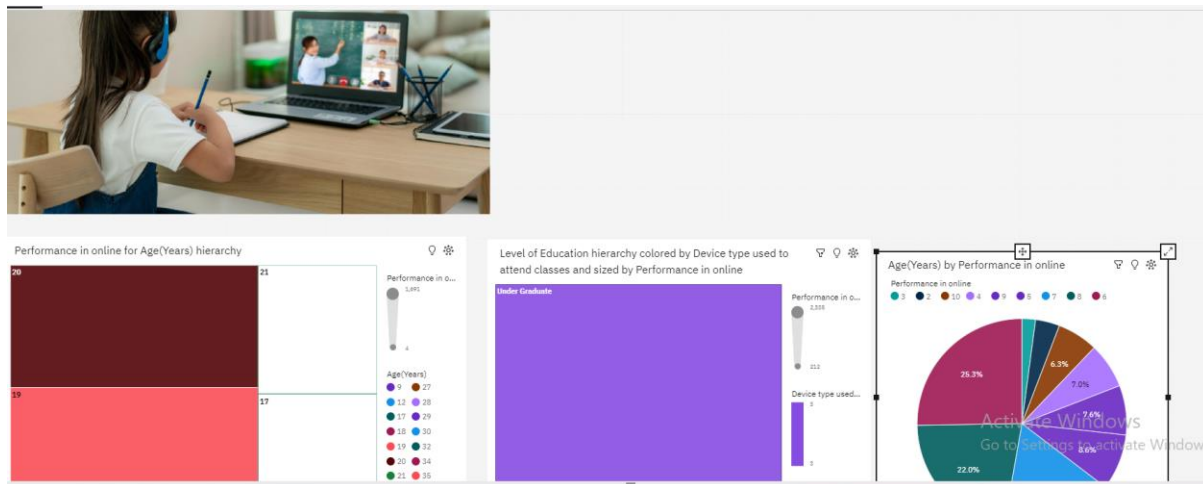**Figure 2 (a): Dashboard Building Sample**

Figure 2 (b): Dashboard Building Sample

Story:
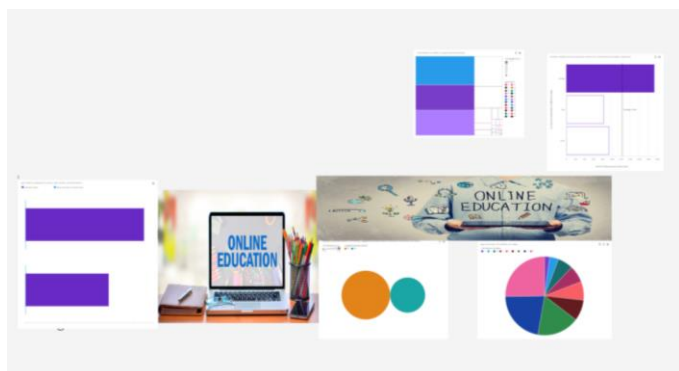
Figure 3 (a): Story Building Sample

Figure 3 (b): Story Building Sample
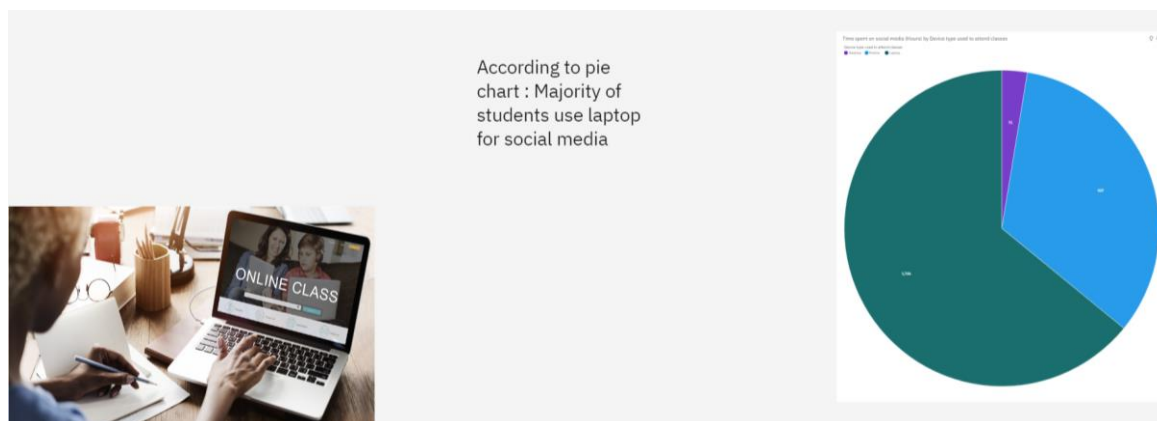
Figure 3 (c): Story Building Sample

According to the table: Rich rural students perform relatively better compared to other students

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
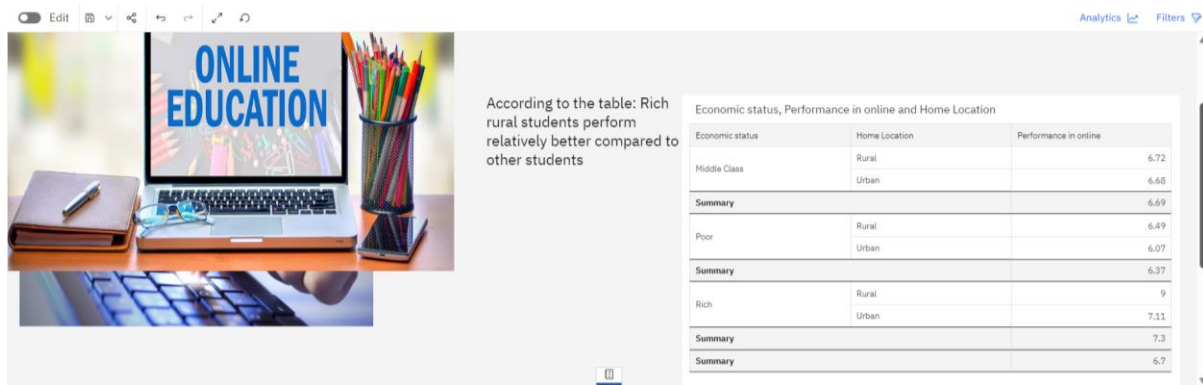
Performance Testing Report:

Figure 4 (a):Performance Testing Report

https://us3.ca.analytics.ibm.com/bi/?perspective=authoring&id=i8BEE4B106B964

IBM Cognos Analytics   Performance Testing Report ⌄

| Gender	Home Location	Level of Education	Age(Years)	Number of Subjects	Device type used to attend classes	Economic status	Family size	Internet facility in your locality	Are you involved in any sports?	Do elderly people monitor you?	Study time (Hours)	Interested in Gaming?	Time spent on social media (Hours)	Sleep time (Hours)
Female	Urban	School	9	6	Mobile	Middle Class	5	5	No	No	1	Yes	10	8
Male	Urban	Post Graduate		3		Middle Class	5	3	Yes	Yes	4	No	10	9
Male	Rural	School	12	8	Laptop	Middle Class	3	4	No	No	2	Yes	6	10
Female	Rural	School		12	Mobile	Poor	4	2	Yes	Yes	10	No	1	8
Male	Urban	School	17	6	Desktop	Middle Class	3	1	No	No	1	Yes	1	6
Male	Rural	School		5		Middle Class	6	4	No	Yes	5	Yes	6	10
Male	Urban	Under Graduate		5		Middle Class	4	5	Yes	Yes	4	Yes	1	7
Male	Rural	Under Graduate		8		Middle Class	4	3	No	Yes	6	No	2	7
Male	Urban	School		7		Middle Class	3	4	Yes	Yes	2	Yes	1	6
Male	Urban	Under Graduate		6		Middle Class	5	4	No	Yes	5	Yes	8	7
Male	Rural	Under Graduate		8		Middle Class	4	3	Yes	Yes	4	Yes	2	7
Male	Rural	Under Graduate		8		Middle Class	3	4	Yes	Yes	2	Yes	2	6
Female	Urban	Under Graduate		8		Middle Class	4	4	No	No	3	Yes	2	7
Female	Rural	Under Graduate		7	Laptop	Middle Class	4	3	Yes	Yes	8	No	2	6
Male	Urban	School		8		Middle Class	4	3	Yes	No	5	No	2	8
Male	Rural	Under Graduate		8		Middle Class	4	3	No	No	8	No	4	8
Female	Urban	School		6		Middle Class	4	4	No	Yes	4	Yes	6	7
Male	Rural	School		8		Middle Class	4	3	No	Yes	8	No	1	8
Male	Rural	School		7		Middle Class	4	3	No	Yes	3	Yes	4	8
Male	Urban	Under Graduate		4		Rich	4	5	Yes	Yes	2	No	6	8
Male	Rural	Post Graduate		8		Middle Class	4	3	Yes	Yes	4	No	2	9
Female	Rural	Post Graduate		8		Middle Class	3	3	No	Yes	3	Yes	1	6
Male	Urban	Post Graduate		7		Middle Class	4	2	Yes	Yes	2	Yes	6	10
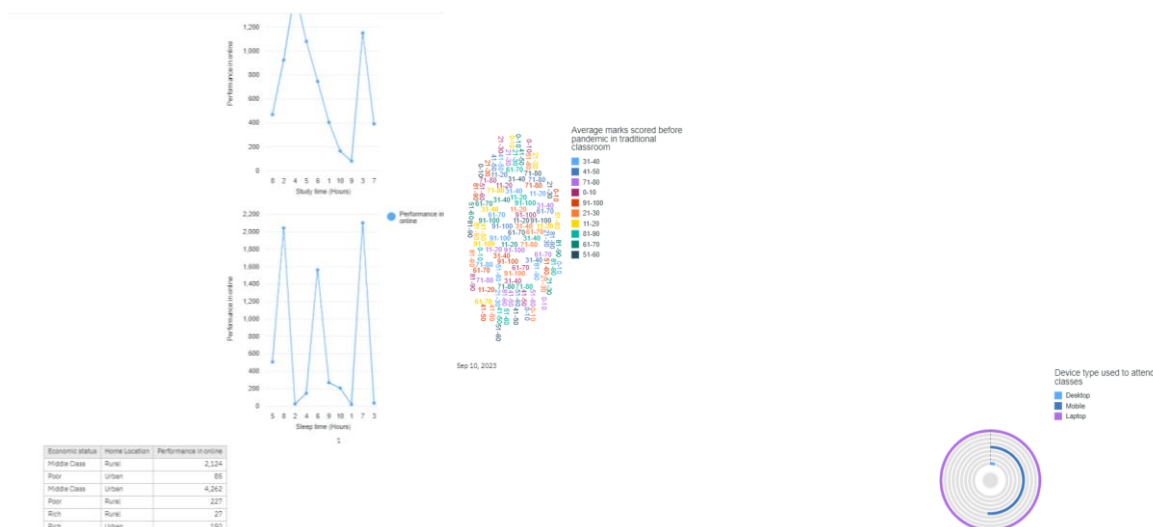
Figure 4 (B): Performance Testing Visualization

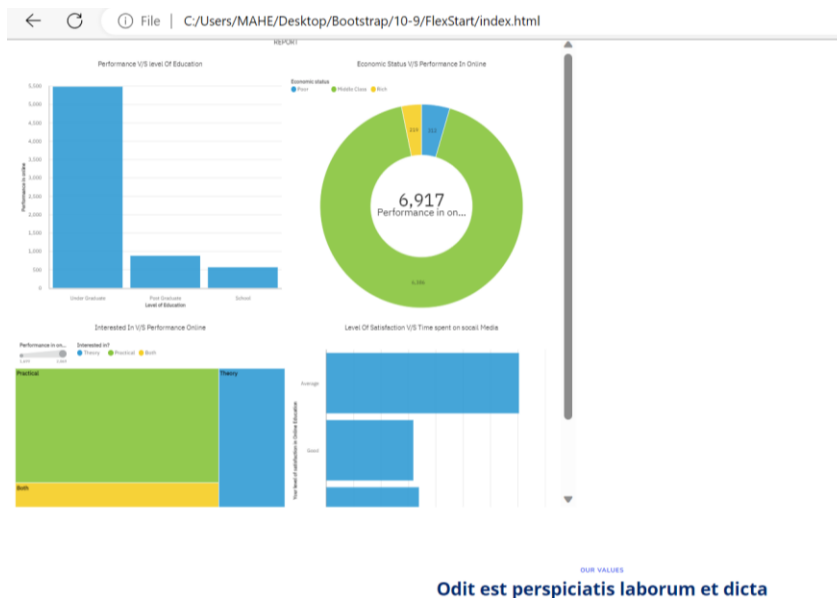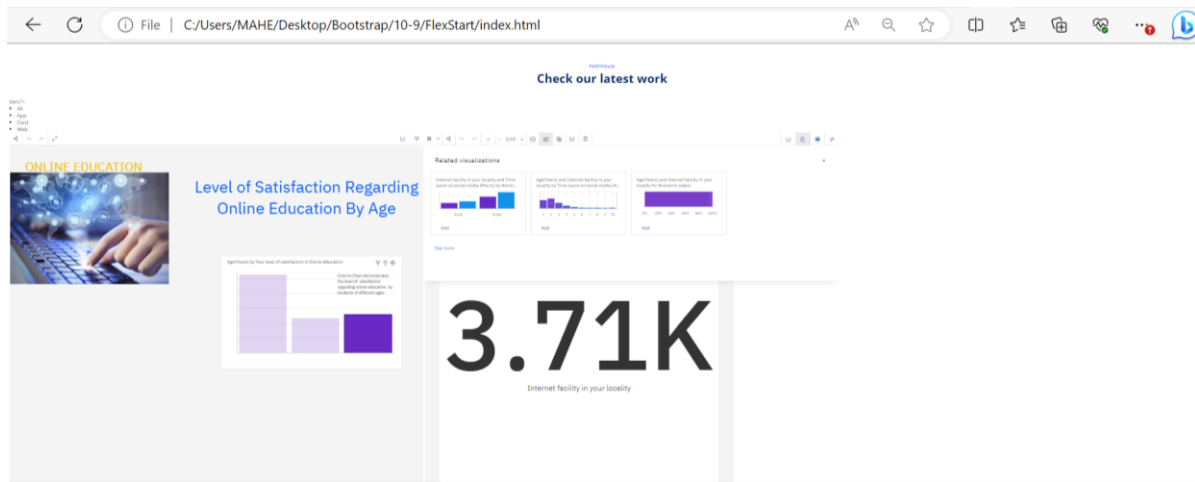**Web Integration:** FlexStart Bootstrap Template - Index
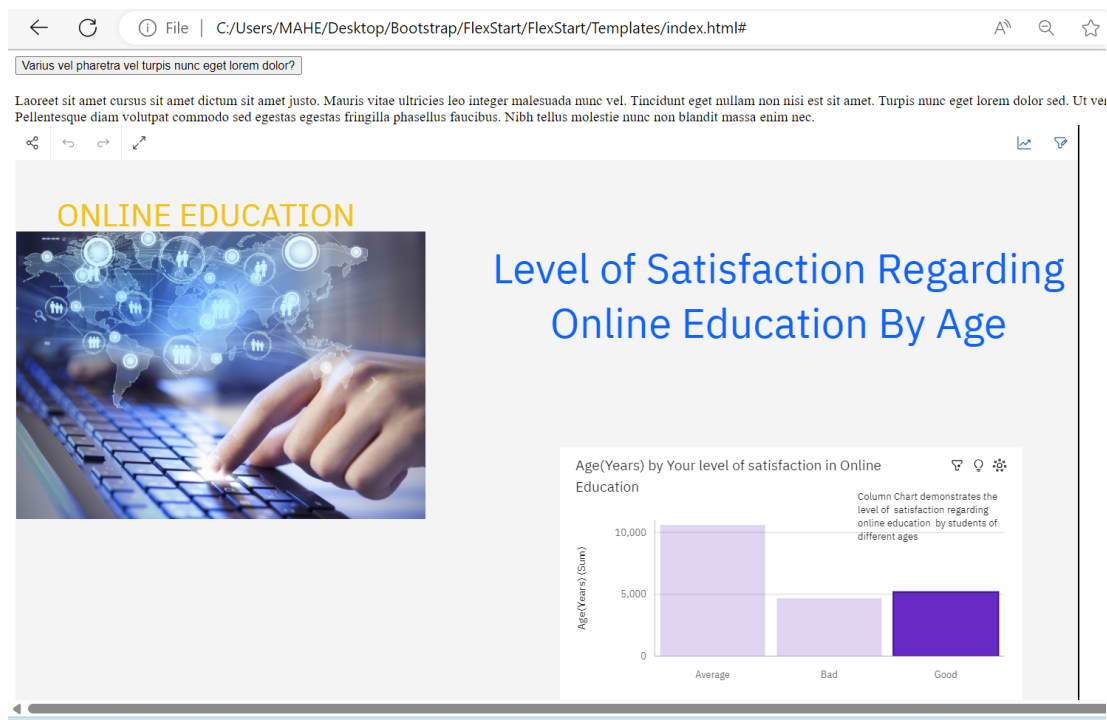
Figure 4 (B): Performance Testing Visualization

7 ADVANTAGES & DISADVANTAGES

Certainly, here are the advantages and disadvantages of the online education system's performance of students, considering factors like locality (accessibility) and the device used:

Pros: Can be spoken with consideration of various factors such as : accessibility & flexibility, convenience, Personalized Learning, cost savings and diverse learning sources.

1. Accessibility and Flexibility:

   - Locality: Online education breaks down geographical barriers, allowing students from remote or underserved areas to access quality education.

   - Device: Online education can be accessed on various devices, making it adaptable to students' preferences and resources.

2. Convenience:

- Locality: Students can learn from the comfort of their homes, eliminating the need for long commutes or relocating to attend a physical institution.

- Device: Students can choose the device that suits their learning style and circumstances, whether it's a computer, tablet, or smartphone.

3. Personalized Learning:

- Locality: Online platforms often offer personalized learning paths, adapting to individual student needs.

- Device: Students can tailor their learning experience based on the device they are comfortable with.

4. Cost Savings:

- Locality: Online education can be more cost-effective, as it reduces expenses related to commuting, housing, and textbooks.

- Device: Learning materials are often available digitally, reducing the cost of physical textbooks.

5. Diverse Learning Resources:

- Locality: Students can access a wide range of educational resources and experts, regardless of their location.

- Device: Online platforms offer multimedia resources, interactive simulations, and diverse content formats.

Cons: Can be spoken with consideration of various factors such as : limited connectivity, digital divide, lack of social interactions, self motivation required, technical issues, quality of education.

1. Limited Connectivity:

- Locality: Students in remote areas may lack reliable internet access, hindering their ability to participate in online classes.

- Device: Some devices may not support advanced online learning tools and resources.

2. Digital Divide:

- Locality: Socioeconomic disparities can lead to unequal access to devices and the internet, exacerbating educational inequalities.

- Device: Older or low-end devices may struggle to handle complex online learning applications.

3. Lack of Social Interaction:

- Locality: Students miss out on face-to-face interactions with peers and instructors, potentially impacting their social and emotional development.

- Device: Smaller screens and limited interaction features on certain devices can hinder collaboration and engagement.

4. Self-Motivation Required:

- Locality: Students in online programs often need strong self-discipline and motivation to stay on track.

- Device: Some students may find it challenging to stay focused when using devices with numerous distractions.

5. Technical Issues:

- Locality: Areas with unreliable electricity or infrastructure may face frequent disruptions in online learning.

- Device: Technical problems with devices, such as hardware malfunctions or software compatibility issues, can disrupt learning.

6. Quality of Education:

- Locality: In some cases, online education may not provide the same level of hands-on or practical experience as traditional education, affecting the quality of learning.

- Device: The effectiveness of online education may vary depending on the device's capabilities and the quality of internet connections.

t's important to recognize that the advantages and disadvantages of online education can vary significantly based on individual circumstances, local infrastructure, and the quality of the online education platform being used. Addressing the digital divide and providing support for students in underserved areas is crucial to ensuring equitable access to online education.

8   APPLICATIONS

The areas where this solution can be applied in various areas:

1. Community and Nonprofit Initiatives:

- Free Educational Resources: Nonprofit organizations and communities use online platforms to provide free educational resources to underserved populations.

2. Government and NGO Training Programs:

- Capacity Building: Government agencies and NGOs use online education to train staff and build capacity in various areas, from public health to governance.

3. Remote and Rural Education:

- Remote Learning: Online education bridges the educational gap for students in remote or rural areas with limited access to schools and teachers.

9   CONCLUSION

The application of online education systems continues to expand as technology advances and the demand for flexible, accessible learning options grows. These systems provide opportunities for diverse populations to access education and training tailored to their needs and goals.

10   FUTURE SCOPE

The future scope of online education is promising and likely to continue evolving in several directions:

Data-Driven Insights: Educational institutions will harness data analytics to gain insights into student performance and engagement, enabling more informed decision-making and personalized support.

Global Collaboration and Networking: Online education will facilitate international collaboration, enabling students from different parts of the world to work together on projects and share diverse perspectives.

Enhanced Assessments: Assessment methods will evolve beyond traditional exams to include more

performance-based and authentic assessments, fostering critical thinking and problem-solving skills.

11 BIBILOGRAPHY

Consulted multiple sources to gain a well-rounded understanding of the online education landscape.

- Education Journals and Research Databases: Academic databases like Google Scholar, STOR, and ERIC to find research papers, articles, and studies related to online education.

- Educational Technology Publications: Websites dedicated to educational technology, such as EdSurge, eCampus News, and EdTech Magazine, for news and insights on online education.

- Education Technology Blogs: Educational technology blogs like EdTechReview, EdSurge, and eLearning Industry often feature articles and reports on online education innovations.