# Student Management System Using Power BI

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## ABSTRACT

In response to the growing need for efficient student data management, this project introduces a  Student Management System leveraging the capabilities of Power BI. The system encompasses  essential student information including name, father's name, mother's name, Aadhar number, PAN  number, eligibility number, and other pertinent details. Additionally, it incorporates academic  performance metrics such as 10th and 12th-grade percentages, as well as cumulative grade point averages (CGPA) for First Year (FE) and Second Year (SE) courses. By centralizing and visualizing  this comprehensive dataset, stakeholders can gain valuable insights into student profiles and  academic progress, enabling informed decision-making and targeted interventions to support  student success.

**Keywords**: Dashboard, Management, Data Visualization, Analysis, Data Warehouse, etc.

## INTRODUCTION

In today's dynamic educational landscape, the effective management of student information is paramount  for institutions striving to provide quality education and enhance student outcomes. Leveraging cutting edge technology, our student management system harnesses the power of Microsoft's Power BI to offer a  robust platform for schools, colleges, and universities to streamline administrative processes, track student  progress, and drive data-informed decision-making.

▪ **Key Features:**

1. Data Integration and Centralization: Our system seamlessly integrates with existing student databases, learning management systems (LMS), and other relevant sources to centralize student information. This consolidation eliminates data silos, ensuring a unified view of student data across various departments and systems.

2. Interactive Dashboards: Through Power BI's intuitive interface, our system generates visually appealing and interactive dashboards. Administrators, faculty, and stakeholders can effortlessly explore key performance indicators (KPIs), enrolment trends, attendance records, and academic achievements in real-time. Customizable dashboards allow users to tailor views according to their specific roles and requirements.

3. Analytics and Insights: By leveraging Power BI's advanced analytics capabilities, our system enables institutions to derive actionable insights from vast amounts of student data. From identifying at-risk students and predicting academic performance to assessing the effectiveness of teaching methodologies, institutions can make data-driven decisions to enhance student success and institutional effectiveness.

4. Predictive Modelling: Employing predictive modelling techniques, our system forecasts future enrolment patterns, student retention rates, and graduation rates. By anticipating trends and potential challenges, institutions can proactively implement strategies to address emerging issues and optimize resource allocation.

5. Ad Hoc Reporting: With Power BI's ad hoc reporting features, users can create custom reports and visualizations on-the-fly, empowering administrators and faculty to delve deeper into specific areas of interest or concern. Whether it's analysing demographic trends, evaluating course efficacy,  or assessing student engagement, our system provides the flexibility to generate tailored reports  tailored to meet diverse informational needs.

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6. Accessibility and Collaboration: Our system promotes accessibility and collaboration by enabling authorized users to access student data and analytics anytime, anywhere, and from any device. Whether it's through desktop computers, tablets, or mobile devices, stakeholders can stay informed and collaborate seamlessly, fostering a culture of transparency and accountability.

## LITERATURE REVIEW

Marija Blagojevic et al.[1] studied on web-based intelligent report of e-learning system by using the technique of data mining and it deals about PDCA method such as (Plan, Do Check, Act) for improving the web-based intelligent reports of eLearning system by means of data mining techniques and concluded that their proposed system has an improvement since it predicts behavior patterns thus leading to the increase in count of participants and in there study ,it proved that their proposed system has improvements in terms of report system in the field of LMS (learning management system) or e-learning . Moreover, the development and implementation of new modules.

Daniel J.Power [2]studied the data-driven decision support system and it deals with data-driven decision support system and its advantages at Business Intelligence and concluded that mainframe-based decision support systems would need to be updated or replaced by web-based or web-enabled systems the accessibility reach for data-driven decision support systems are open source software's, new hardware's, web technologies, etc.

Zhijun Ren [3] studied the delivering of a comprehensive Business Intelligence solution using Microsoft Business Intelligence stack and it deals about features and advantages of business intelligence stack of Microsoft and concluded that by integrating several technologies such as database, connectors, SharePoint servers, and business intelligence tools will lead to faster delivery of comprehensive business intelligence solution within an enterprise.

Guangzhi Zheng et al. [4] studied on business intelligence to healthcare informatics Curriculum and their paper deals with the preliminary analysis of integration of Business Intelligence with Healthcare Information Technology and concluded that Business Intelligence had been a neglected part in many healthcare information technology programs yet both the industry and academia have realized the importance of Business Intelligence.

Michelle Hoda Wilkerson et al. [5] done work on youth reasoning with interactive data visualization and it deals with the youth understanding of data by interactive data visualization, they concluded that supporting learners in the coordination of any resources they choose to leverage is more likely helpful than supporting a particular approach or sequence of resource use.

## METHODOLOGY

Mixed Methods Approach

The mixed methods approach combines qualitative and quantitative research methods to provide a comprehensive understanding of the research topic. In the context of exploring the integration of Power BI into student management systems, this approach allows researchers to gather both numerical data on system performance and qualitative insights into user experiences and perceptions.

• Quantitative Method

The quantitative aspect of the research involves collecting numerical data on the implementation and usage of Power BI in student management systems. This data can be gathered through surveys, system logs, and performance metrics provided by educational institutions. Surveys can be distributed to administrators, educators, and students to gather feedback on their experiences with Power BI, including its usability, effectiveness, and impact on decision-making processes. System logs and performance metrics, such as data processing speed, query performance, and system uptime, can provide objective measures of Power BI's performance within student management systems.

The quantitative data collected will be analyzed using statistical methods to identify patterns, correlations, and trends related to the integration of Power BI into student management systems. Descriptive statistics will be used to summarize the characteristics of the data, while inferential statistics, such as regression analysis or ANOVA, can be used to test hypotheses and determine the significance of relationships between variables.

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The results of the quantitative analysis will provide insights into the overall effectiveness of Power BI in improving data management processes, decision-making capabilities, and student outcomes within educational institutions.

• Qualitative Method

The qualitative aspect of the research involves gathering in-depth insights into the experiences, perceptions, and attitudes of stakeholders regarding the integration of Power BI into student management systems. This data can be collected through interviews, focus groups, and open-ended survey questions. Interviews and focus groups can be conducted with administrators, educators, IT staff, and students to explore their experiences with Power BI, including any challenges encountered, benefits realized, and suggestions for improvement. Open-ended survey questions can also be included to allow respondents to provide detailed feedback on their experiences with Power BI.

The qualitative data collected will be analyzed using thematic analysis, which involves identifying recurring themes, patterns, and categories within the data. This analysis will help identify common issues, challenges, and successes related to the integration of Power BI into student management systems. The qualitative findings will complement the quantitative results by providing deeper insights into the human factors and contextual nuances that influence the implementation and use of Power BI in educational Integration of Quantitative and Qualitative Data

The final step of the mixed methods approach involves integrating the quantitative and qualitative data to provide a comprehensive understanding of the research topic. This integration can take various forms, such as triangulation, complementarity, or expansion. Triangulation involves comparing and contrasting findings from both quantitative and qualitative analyses to validate or Expansion involves using qualitative data to provide context or explanations for quantitative findings, or vice versa.

By employing a mixed methods approach, this research paper aims to provide a nuanced and holistic understanding of the integration of Power BI into student management systems. By combining numerical data on system performance with qualitative insights into user experiences, perceptions, and attitudes, the research will offer valuable insights and recommendations for educational institutions seeking to leverage corroborate results. Complementarity involves using one type of data to expand or clarify findings from the other type. Expansion involves using qualitative data to provide context or explanations for quantitative findings, or vice versa.

By employing a mixed methods approach, this research paper aims to provide a nuanced and holistic understanding of the integration of Power BI into student management systems. By combining numerical data on system performance with qualitative insights into user experiences, perceptions, and attitudes, the research will offer valuable insights and recommendations for educational institutions seeking to leverage Power BI to enhance their student management processes.

## RESULTS

A "Student Management System utilizing Power BI" project result would likely involve the use of Microsoft Power BI, a powerful data visualization tool, to analyze and present data related to student management. This could include visualizing student demographics, academic performance, attendance records, and other relevant data to help educators and administrators make informed decisions. The result would typically be a set of interactive dashboards and reports that provide insights into various aspects of student management.

Survey Results:

- Educational BI dashboards, including those created with Power BI, are instrumental in analyzing student performance. They consolidate various data into customizable visuals, offering deep insights into student progress and enabling data-driven decisions.

Interview Findings:

- A student performance analysis dashboard in Power BI allows educators to track crucial metrics such as attendance, grades, and exam results. This facilitates strategic decision-making and can be customized to display data for any combination of years and grades.

Case Studies:

- Power BI has been used to enhance student performance in a school district by aggregating data from attendance records, test scores, and demographic information. This integration enabled educators to identify at-risk students and tailor support to improve academic outcomes.

- In another instance, Power BI helped a global financial services firm create interactive dashboards for portfolio management, which is analogous to managing student data in educational institutions.

• **Stacked Bar Chart:-**
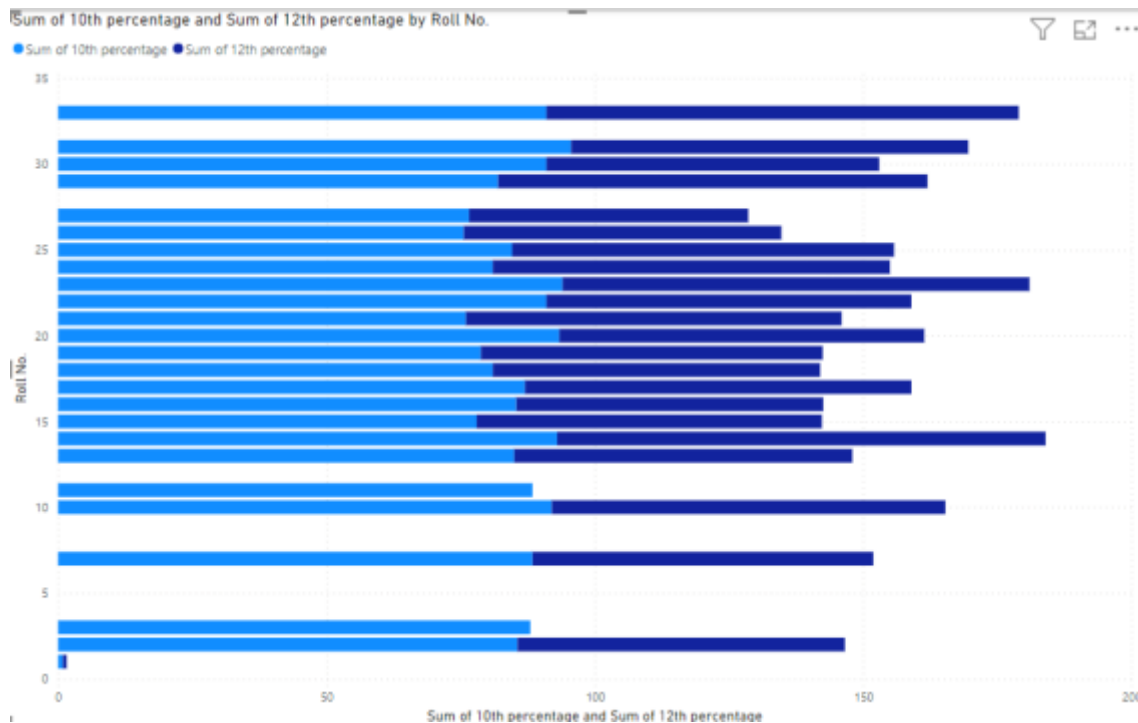


Above Stack Bar Chart is Represent The 10th &12th Percentage Of students By their Respective Roll No.

## CONCLUSION

In conclusion, this study has provided us an intelligence tool that can be used to create interactive dashboard and reports. Our student management system powered by Power BI represents a transformative tool for educational institutions seeking to optimize student management processes and drive academic excellence. By leveraging the capabilities of Power BI, institutions can harness the full potential of their student data to improve decision-making, enhance student outcomes, and ultimately, shape the future of education.

As a conclusion, the findings based on performed data analysis on the results of students have been identified as well as the area of weaknesses of students. It is proven that business intelligence plays a very significant role in education especially into improving students' performance. By undergoing data analysis using BI tools, higher educational institution able to use the collected data gathered and visualized them into a graphical representation to extract valuable insights into solving the problem. And by having this information extracted, it enables universities to perform better at important decision makings.

The study findings given in this research show that using Business Intelligence tools to analyze existing data and derive valuable information for decision making has a lot to promise. Students are also expected to improve their ways of learning instead of relying on the notes and learning materials provided by lecturer. The materials itself are insufficient to gain full understanding on the subject. More practice and self-experimenting on coding is required to equip with the knowledge to place themselves more competitive.

Furthermore, the bloom taxonomy contributed much beneficial outcomes by outlining the learning objectives for students and lectures to further understand the purpose of the course. With it, student's weaknesses are justified based on the domains and able to find out which area they poorly performed at. Besides, by getting additional data to the original dataset, the student performance analysis might be significantly enhanced.

For instance, it will be informative to see and compare the results of how other students performed in the other university courses they take during the semester to enhance the further analysis and discovering greater insights. This will aid in a greater understanding of the students' performance and learning capabilities. Finally, leading educational institutions throughout the world must employ innovative methods to tackle the problems and new possibilities that have arisen. Also, the overall research of this project has proven that gender, program studied, background experience has a significant impact on the student's performance. The implementation of advanced analytical techniques, such as business intelligence (BI) systems and data mining tools and techniques, allows for more substantial use and analysis of obtainable university data, resulting in much more effective and efficient.

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