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A Big Data-Driven Framework to Enhance Student Success in Higher Education

Universities are gathering extensive amounts of data, yet they frequently find it challenging to extract valuable insights from it. Despite accumulating a substantial amount of information during the student application and admission phases, this data is seldom converted into practical strategies to enhance student achievement. Consequently, these institutions continue to face challenges such as student failure, high dropout rates, and delayed graduations. This situation highlights a significant gap between the potential of data and its actual application in academic planning, student support, and institutional strategy.

This research offers a Big Data Analytics Framework meant to improve university students' achievement by using both current and new data sources to forecast possible obstacles in their academic path. The Framework seeks to solve this by allowing the smooth integration, analysis, and safe administration of student data, therefore enabling exact, real-time, predictive assistance measures. By means of predictive analytics, machine learning, and integrated dashboards to support decision-making across academic, advising, and administrative departments, it employs a student-centred approach, guaranteeing data protection and informed decision-making.

The study engages many stakeholders in this data ecosystem using a mixed methods approach to find and combine institutional data sources relevant to student performance and retention. With an eye on early interventions and methodically increasing student results, the research develops, executes, and evaluates the framework within a tertiary university in South Africa. The student experience suffers, and institutional performance metrics, financial allocations, and more general national goals for equal access and academic achievement in higher education suffer as a result of the inability to translate available data into meaningful information. The value of the research is in proving the great influence of big data when properly and ethically used, therefore showing how institutions may be enabled to establish fair, more responsive, and data-driven learning environments.

Keywords: Big Data Analytics, Student Success, Data-Driven, Higher Education, Insights.

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