



# Chapter 1

## Enhancing Educational Quality Through AI and Data Science: A Study on Motivational Factors and Interventional Impact


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### ABSTRACT

*Student motivation is critical in academic success, driven by a combination of intrinsic and extrinsic factors. This study investigates the motivators influencing students in an academic program. Using a mixed-methods approach, the research combines qualitative interviews and quantitative data analysis to find the effects of various factors on student motivation. A Management Change Programme (MCP) was implemented as an intervention. A pre and post-test design is used, evaluating motivational shifts before and after the intervention. Data analysis techniques, including dimensionality reduction and reliability analysis, were used to construct a data-driven model. Results show that prior to the MCP, 59% of students were motivated, which increased to 66% post-intervention. Discriminant validity was confirmed, and the model demonstrated good fit (SRMR: 0.0783). Path coefficient analysis revealed that Placements had the strongest positive impact on students' Pursuit for Excellence (0.3429), followed by Program Content (0.3039), and College/Department Activities (0.1892).*

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## **INTRODUCTION**

Student motivation is a critical factor in shaping educational outcomes and overall academic success. Various factors affect the process of student motivation. Intrinsic factors are those internal influences which originate from within the student and is often linked to genetical, psychological or biological characteristics. Extrinsic factors are the external influences that originate from outside the individual or system.

Various intrinsic and extrinsic factors, such as personal goals, institutional support, and career prospects, play an essential role in driving students' pursuit of excellence. In higher education, understanding what motivates students to excel can help institutions design more effective curricula, support systems, and extracurricular activities, which, in turn, improve student engagement and satisfaction. This research aims to explore the motivational factors influencing students in a structured academic program, focusing on both intrinsic motivations, like personal achievements, and extrinsic motivations, such as job placements and faculty support. A study conducted by (Martínez et al., 2024) shows that post-pandemic, the motivation levels and engagement levels of students have been significantly affected.

The study employs a mixed-methods approach, combining both qualitative and quantitative data to gain insights into the factors driving student motivation. Through comprehensive data collection from students across different academic years and a structured pre-test and post-test design, this research investigates how specific elements of the academic environment, such as program content, faculty interaction, and extracurricular activities, influence students' pursuit of excellence. Additionally, an intervention in the form of a Management Change Programme (MCP) was introduced, allowing for a comparative analysis of motivational changes before and after the intervention.

By examining key latent variables, including program content, faculty, placements, and departmental activities, this study aims to construct a data-driven model that highlights the most significant drivers of student motivation. The findings of this research will provide actionable insights into how institutions can optimize their academic offerings and support systems to better align with students' intrinsic and extrinsic motivational needs, thereby fostering an environment that encourages both personal and academic excellence.

The study aims to create a scalable framework for assessing and enhancing student motivation in higher education. This phased approach ensures that the study is both comprehensive and impactful, addressing immediate needs while also fostering long-term institutional excellence.

### **Scope of Research**

This research focuses on the factors influencing student motivation within an academic program, emphasizing both intrinsic and extrinsic motivators. It examines how elements such as program content, faculty interaction, job placements, and extracurricular activities affect students' pursuit of academic excellence. Key to this investigation is understanding the role of intrinsic motivators—like personal achievement and fulfilment—alongside extrinsic factors, including job placements and faculty support. The research aims to create a data-driven model using techniques such as dimensionality reduction and reliability analysis to explore the relationship between these motivational factors and academic success.

A structured pre-test and post-test design, evaluates changes in motivation before and after implementing a Management Change Programme (MCP), which includes personality development sessions and industry collaborations. Additionally, a cross-sectional survey provides a snapshot of student mo-

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