Big Data Analytics of Socio-Economic Impact on UK University Graduates

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*Abstract*—The following report details how the socio-economic status of major UK towns and cities affects its universities and the students who are graduating from them. University is the biggest challenge that students will face in their academic careers, and for some, it is also a major financial decision. Students coming from more difficult backgrounds, or a lower financial standing may struggle with the challenges they face in this academic environment.

Utilizing datasets from various sources, which were subsequently read, explored, and visualized using a machine learning model, and then further cleaned and analyzed using a predictive model, demonstrates that students who study in an area with lower socio-economic standing tend to perform at a lower level. This argues that not enough support is given to students or the University institutions themselves by local councils due to insufficient funding requirements or substandard facilities surrounding campuses. Further concerns need to be raised with local councils or the wider government to ensure more awareness and support is raised.

Keywords— socio-economic status, graduating, financial standing, academic environment, machine learning model, predictive model, awareness and support.

# Introduction

## Opening

A big step in any academic career is attending a university. As of 2023, there are currently 166 registered Universities in the United Kingdom, with eleven of which occupying a space on the Times Higher Education[1] top one hundred University rankings. University is frequently a significant personal and financial decision for many students. Given that only a select few institutions exist across the country, students often find themselves having to relocate to attend. This relocation, coupled with course fees, can result in a substantial cost. Some students can often find this a struggle and end up with concerns about finances throughout their degree. While there are options such as the Student Loans Company and other government assistance, concerns can still arise due to the substantial costs associated not only with attending university but also with living and thriving in the nearby campus area. While these costs are increased for the nearly 700,000 international students[2] (data accurate as of 2022), It continues to pose challenges for domestic students, which will be the focus of this report.

## Problem Statement

Approximately one million students in the UK earn some form of an undergraduate degree annually. With a further 400,000 more obtaining a postgraduate degree. However, almost 1 in 10 students who attend University drop out, with one-third of those being first-generation students leaving in the very first year[3]. One might attribute a significant contribution to these statistics to the financial struggles faced by university students. In January 2023, a report stated that 41% of students were considering dropping out of university due to surmounting financial worries[4]. University life is stressful as is, with assignments, deadlines, and working towards a career. Adding financial stress on top of that can set students on the edge and prove to be disruptive to their academia. However, how much do these financial issues disrupt students, and are they self-inflicted, or is it a product of the environment and institution?

## Aims and Objectives

This report aims to research, investigate, and comprehend data and statistics related to UK university graduates, as well as the socio-economic status of each university institution’s geographical location. One will attempt to understand if these standings indeed influence graduation rates and the performance of students post-graduation.

The report will assess this hypothesis by acquiring appropriate datasets from various sources and importing said data into a deep-learning model. The model will then be manipulated to clean the data, and potentially predict any missing data from the datasets. Conclusions will be provided by visualizing the cleaned data in a suitable format.

## Contribution Statement

### Jack Morgan

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## Report Outline

# Literature review

## Student Performance in Response to Stress and Other Factors

## Financial Impact and Funding Within University Institutions

Universities encompass more than mere physical structures. They are a composite of their students, faculty, staff, resources, equipment, and educational offerings. Furthermore, a University can be affected by the quality, and sometimes quantity, of what it provides. These factors frequently impact student performance and may also influence graduation rates and post-education outcomes.

But what exactly affects what a University institution provides?

Firstly, one needs to assess exactly how a University receives its resources, and how exactly these resources can affect the institution. Universities tend to get financial funding from three diverse sources, either one, a mixture, or all. These sources could be the private sector through grants or donations, and national or regional governments through direct funding or further grants. or directly from its students from course fees (which could potentially be subsidized by government branches, i.e., Student Finance)[5]. The source of financing does indeed have an effect on the University, not directly in the quality of its equipment or the type of staff it can employ, but in its acceptance rates. Articles state that when a University gets its majority of funding from the private sector, it tends to affect interest from students planning to attend that University[6]. One part of this reason is simply, that interest from Government financial sources tends to reduce, and this has shown to have a following effect on tuition fees and maintenance loans for students. Students must pay more, and receive less, so fewer students are interested. Universities then lose that source of income. While the same source does tell one that Universities have an increase in funds and do not necessarily suffer, there is a force affecting students, and potentially student performance. Initially, local governments were considered a potential factor influencing students. However, the theory emphasized socio-economic status rather than competition among sectors providing funding. Further research will explore the socio-economic conditions in UK areas and their financial impact on universities.

As we’ve previously discussed, universities receive financial support from diverse sources. While the source of income may not directly impact performance, it can significantly influence the behaviour and objectives of the institution. Studies show that various financial sources can affect the behaviour and structure of a University, especially when the funding is competitive[7]. Different sources want different results and often want their own rules, regulations, methods and practices implemented as a result. In essence, the University can be influenced by the highest bidder (using that term loosely). The public often sees this happen in real time, there are documented examples of University institutions especially in England and across the UK cancelling courses, shutting down departments, and changing focus from one subject area to another. University performance is not inherently affected by this, often studies show that there is still a high production of research and articles presented by a University regardless of monetary source[8]. Often, however, students are not considered, especially considering the closure of departments. The interests and agendas of investors rarely align with those of students.

So, one has assessed that Universities do not suffer from any performance issues no matter the source of funding. A lack of funds will negatively impact a University, it will be inevitable. The original hypothesis was that lack of funding from local governments would be a potential problem for performance within institutions, so organizations situated in a lower-standing socio-economic area will have worse performances. However, research has shown that private funds are the majority of funding sources, so this may not be the resulting issue.

## Graduation and Degrees Affecting Employability

## University Acceptance and Performance in Relation to Socio-Economic Standing

## Post Study Impact in Response to Socio-Economic Standing

## Summary

# Methodology

# Results

# Further Discussion

# Conclusions

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