

# **LD7119\_NH\_BD\_2.docx**

*by Baba Sri Ram Kumar KOLISETTY*

---

**Submission date:** 15-Jan-2025 02:01PM (UTC+0000)

**Submission ID:** 248549408

**File name:** LD7119\_NH\_BD\_2.docx (2.63M)

**Word count:** 5914

**Character count:** 35291



Newcastle • London • Amsterdam

### COURSEWORK COVER PAGE

<b>Module Number:</b>	LD7119			
<b>Module Title:</b>	Engineering and Environment Advanced Practice London Campus Consultancy Project			
<b>Module Tutor Name:</b>	Nitsa Herzog [NH]			
<b>Coursework Title:</b>	Assignment Group			
<b>Word count:</b>	5447			
<b>Assignment Group:</b>	2			
<b>Group Member:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Student Name:</b>	Luis Alfredo Pareja Nunez	Rasikh Sadiq Thakur	Baba Sri Ram Kumar Kolisetty	Harsh Vardhan Singh Shaktawat
<b>Student ID:</b>	w23041488	w23042021	w23048022	w23048766
<b>Programme of Study:</b>	MSc Big Data and Data Science Technology	MSc Big Data and Data Science Technology	MSc Big Data and Data Science Technology	MSc Big Data and Data Science Technology
<b>Major Individual Contribution:</b>	Introduction, Method of Research, Practical work design	Context – Business/ Requirement Analysis of the organisation	Survey Design, Sentiment Analysis, Correlation Analysis	Survey Design, Python coding for research questions and visualizations
<b>Signature:</b>	Luis Alfredo Pareja Nunez	Rasikh Sadiq Thakur	Baba Sri Ram Kumar Kolisetty	Harsh Vardhan Singh Shaktawat

#### 1 Declaration

We confirm that this assessment is my own work and that we have duly acknowledged and correctly referenced the work of others. We are aware of and understand that any breaches to the Code of Academic Conduct will be investigated and sanctioned in accordance with the Academic Conduct Regulation.

<b>Your signatures:</b>	Luis Alfredo Pareja Nunez, Rasikh Sadiq Thakur, Baba Sri Ram Kumar Kolisetty, Harsh Vardhan Singh Shaktawat	<b>Date:</b>	15/01/2025
-------------------------	---	--------------	------------

**Table of Contents**

1. Introduction .....	3
2. Context – Business/Requirement Analysis of the Organisation .....	5
2.1. Introduction to the Context .....	5
2.2. Purpose of the Requirement Analysis .....	5
2.3. Data Analysis Framework.....	5
2.4. Key Findings from the Data .....	6
2.5. Alignment with Organisational Goals .....	6
2.6. Conclusion .....	7
3. Methodology .....	7
3.1. Research Design.....	7
3.2. Data Collection .....	8
3.3. Project Plan .....	8
3.4. Professional Ethics .....	10
4. Findings, Practical Work Implementation, and Testing .....	10
4.1 Introduction.....	10
4.2 Research Discussion and Findings.....	11
4.3 Practical Work Implementation .....	26
4.4 Testing and Validation .....	27
4.5 Recommendations for Future Work: .....	28
Conclusion: .....	28
5. Recommendations for Successful Implementation.....	29
5.1 Optimizing the Learning Environment .....	29
5.2. Fostering a Supportive Social Environment .....	30
5.3 Leveraging Technology and Innovation .....	31
5.4 Addressing Financial and Career Challenges .....	31
5.5 Enhancing Well-being and Motivation.....	32
5.6 Refining Survey Techniques and Analysis .....	32
5.7 Policy Recommendations and Long-Term Goals .....	33
5.8 Implementation Roadmap .....	34
Conclusion: .....	35
References:.....	36
Appendix:.....	36

## 1. Introduction

This research investigates and analyses the social factors and learning environment that affect higher education student performance. Focusing on the postgraduate students at Northumbria University's London Campus. This consultancy project is conducted by postgraduate students enrolled in the MSc in Big Data and Data Science program, to analyse data compiled in questionnaires using statistical methods and implementing machine learning models to streamline the analysis process. The investigation's main goal is to present the findings to the Research Team of Northumbria University, being the final client of the project.

Studying for a postgraduate degree is challenging for students worldwide, but especially in the United Kingdom, which is considered the second country with the most international students (Atar, et al., 2017). For this reason, universities focus on welfare in the socio-educational environment to advise and protect students from any health issues such as stress, anxiety or depression during their university term (Waweraa & McCamleya, 2020). The main reasons for stress, anxiety or depression are competitive pressure, cost of living, language barrier, racism, weather, and that the student is far from his home country/family. (Ejim, et al., 2021)

Students consider it important for the selection of the university and the different social aspects that can affect them during their postgraduate studies (Abbas, et al., 2021). The main social factors affecting postgraduate students in London are socio-economic background, financial stress, mental health, social support network, and cultural and ethnic background (Campbell, et al., 2022). Students evaluate these aspects because they influence their overall experience and success during postgraduate studies.

Also, universities in the UK invest their space and constantly improve their academic services to increase the students' experience by bringing the best quality and technology products to their campus (Asif Qureshi & Khaskheli, 2021). Northumbria University offers different online and in-person services covering the welfare and well-being of its students. The fields the university focuses on are Student Life, Financial Support, Digital Library, Careers and Employability Support, Wellbeing and Health Support, International Students Support, etc. (Northumbria University, 2024).

During students' experience in their postgraduates, the learning environment is important for

the optimization of their learning process and the satisfaction of the student, thanks to the quality service given to they have pride in belonging to the university they applied to (Cooper & Frantz Fry, 2020). The main Learning Environment factors influencing postgraduate students in London are classroom design, teaching methods, access to resources, online learning, teacher-student relationships and student wellbeing (Riva, et al., 2020).

In summary, a university requires student feedback to constantly adapt its welfare policies and initiatives based on the latest investigations related to the socio-educational environment in their students to prevent health issues and improve the quality of service. For this reason, the project focuses on using machine learning models to analyse different student patterns collected through questionnaires. The result of this research helps us to understand better the social factors and learning environment affecting the academic performance of students in the students at Northumbria University London Campus.

**Aim:**

This project aims to evaluate social factors and the learning environment's impact on the academic performance of Postgraduate Students at Northumbria University London Campus using a questionnaire to extract information and apply data analytics to propose improvements to the university services for students.

**Research questions:**

1. How do student's perceptions of job security vary by field of study, and how does this influence their academic stress levels?
2. What are the most significant aspects of the university learning environment that enhance academic engagement and success?
3. How do financial difficulties correlate with academic performance among students?
4. What are the barriers to adopting AI tools in academic settings, and how do they differ among proficiency levels?
5. How does family emotional and financial support impact the academic success of students with limited external resources?

**Objectives:**

1. Compilation information of students through online questionnaires.
2. Implement machine learning models to analyse the accumulated data.
3. Identify recommendations and improvements based on the results of the analysis
4. Present the Consultancy Project by mid-January 2025

**2. Context – Business/Requirement Analysis of the Organisation****2.1. Introduction to the Context**

As a prominent educational establishment, Northumbria University is dedicated to ensuring that a diverse, high-quality population of students can thrive within its social and learning environments. Above all, it seeks to provide that population with the conditions to succeed that are, as best as it can tell, suitable and conducive for them. That is how universities—Northumbria included—understand the mission of student well-being. And that is why they carry out analyses like the one at hand. There are some 18,500 students enrolled in Northumbria, and the analysis drew from a survey of about 1000 of those students.

**2.2. Purpose of the Requirement Analysis**

This requirement analysis mainly seeks to pinpoint and assess the essential factors that substantially affect the social and academic student life of undergraduates. It is concentrated on four areas of the student experience: social connections, financial pressures, mental health, and academic motivation. The analyses of these areas are not intended to provide a comprehensive overview of the student experience but instead to offer several "aha moments" for university management. In other words, the analysis aims to generate insights that will help university leadership better understand what is going on with their students and, more importantly, why it is happening.

**2.3. Data Analysis Framework**

Student responses from various ages, genders, and academic areas make up the survey data. The main variables are social support, financial stability, academic motivation, and perceptions of university services. Responses will be used to create student segments, or profiles, with key characteristics. We will use two main techniques—K-means clustering and regression

analysis—to do this. These are both excellent methods for finding groups in the data that are important to the sort of work in which we are engaged. K-means is a very flexible algorithm, which allows for many different kinds of student groups within the same university. Regression analysis also allows for variation in the data and can find group differences with a considerable level of confidence.

#### **2.4. Key Findings from the Data**

The survey data were analysed to uncover some of the principal issues students face. A few key themes stood out:

**Social Links:** The strongest correlation found was between academic motivation and having friends. Students are more likely to do well if they are well connected—socially and academically. These links help students find places in hard classes. They help students hunker down and study. They help students reduce the amount of time they devote to worrying about not being (or not appearing to be) academically successful.

**Finances:** A second barrier linked to academic underperformance is finances. Students are stressed out about money. Those who are parents often have very little time to spend with their kids because they are working two or three jobs just to get by. Even students who are not parents have to hustle. The money clock is always running.

**Career Uncertainty:** Do these students even know what kind of work they will be doing in 10 or 20 years? Many will, but many more will not. And it will not be without some considerable emotional costs that these students struggle with their future prospects.

#### **2.5. Alignment with Organisational Goals**

The strategic aims of Northumbria University centre on student safety, academic success, and graduation to rewarding, well-paying jobs. These three broad goals can be seen to align with the key findings of this analysis. They also happen to intersect with the three challenges that the current student body identified in consultations carried out for this document. The university is in a much stronger position when it has the means to fortify itself against the dangerous practice of negative recruiting. And it will be very much in a position of strength when it has resolved the pretty serious failures that have led to three areas of challenge that surfaced throughout the analysis.

## 2.6. Conclusion

The analysis of requirements emphasizes the necessity of comprehending and fulfilling student needs in a well-rounded manner. Using state-of-the-art data science and machine learning techniques, we obtain insights that can direct the governing strategies at Northumbria University. These insights can unearth information that tells us about the current and future state of our student population. They can also help us underpin institutional decisions with evidence, ensuring that our policies and programs work to meet our students' objectives.

## 3. Methodology

### 3.1. Research Design

The questionnaire is predominantly structured due to the majority of questions being closed-ended using Likert scales and check-box format questions to organize the answers by students' characteristics. Also, we applied a mixed-methods approach for the quantitative data extracted in numerical answers and qualitative data extracted through open-ended answers.

The questionnaire consists of 39 questions divided into 10 sections:

- 1) Social Demographic Characteristics
- 2) Usefulness of Resources in relation to academic performance
- 3) Understandability of Assessment in Relation to Academic Achievements
- 4) Use of virtual learning environment in relation to academic achievements
- 5) Quality of class delivery in relation to academic achievements
- 6) Quality of relationships with tutors, peers, and academic support
- 7) Exposure and access to technology and external online resources in relation to achievements
- 8) Exposure to AI technology
- 9) Social Environment
- 10) Future concerns and career support

The tools applied to the project are Google Forms to collect information, Google Collaborative to analyse and visualise data, Teams to communicate effectively with the colleagues involved in the research and PowerPoint for the presentation to the stakeholders.

Once the data is collected, pre-processing techniques are applied to clean data divided by categories and transform values to synchronise the data for machine learning modelling and

sentiment analysis. Succeeding the machine learning and sentiment analysis a visualisation of the results will be designed in Google collaborative

Finally, the insights identified in the visualisation of the results will let stakeholders know the patterns and predictions in the areas of improvements to propose adequate recommendations to the final clients to achieve academic success in Northumbria University Students.

1

### 3.2. Data Collection

The data gathering method used in this research is primary data from a questionnaire, which requires access to the personal information and opinions of the students. The dataset considers variables related to social factors and learning environments that affect the performance of higher education students. The type of data is structured and semi-structured thus is possible to apply machine learning and data analysis. The questionnaire is administrated online through Google Forms to ensure flexibility to the students, reaching 140 responses from Northumbria University London Campus and having the following characteristics:

- Only two students are British, making up 2% of the total. The remaining 138 students, representing 99%, are international students.
- The majority of students are male, with a total of 99 (65%), while the remaining students are 44 females (35%).
- The participants are over 18, being the majority of them between 23-26 years old with a total of 64 (46%), followed by 27-30 years students with a total of 30 students (21%), then, over 30 years old students being a total of 28 (20%), finally students between 18 and 22 years old did the questionnaire with a total of 18 responses (13%)
- In summary, the main characteristics of the questionnaire participants are foreign males aged 27 to 30.

### 3.3. Project Plan

1

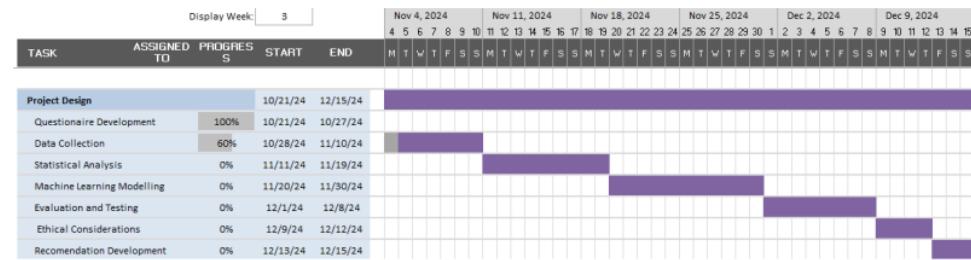
The project plan is divided into 3 stages starting on 21 October 2024 and concluding in January 2025. The stages of the research are 1) Project Design, 2) Project Implementation, 3) Assessment Submission and are detailed below:

Stage 1 - Project Design: The first stage consists of the preparation of the consultancy project

including the development and collection of data. This stage concludes with the submission of the research proposal on 12th December 2024. The stage consists of seven tasks, each lasting an average of one week, which are: 1) Questionnaire Development, 2) Data Collection, 3) Statistical Analysis, 4) Machine Learning Modelling, 5) Evaluation and Testing, 6) Ethical Consideration, and 7) Recommendation Development.

**Figure 3.1**

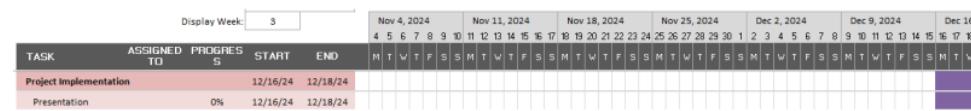
## *Stage 1 – Project Design*



**Stage 2 - Project Implementation:** The second stage consists of the presentation preparation focusing on the stakeholders. This stage is elaborated over 3 days in December 2025 and concludes with an exposition to the stakeholders.

**Figure 3.2**

*Stage*                    2                    –                    *Project*                    *Implementation*



**Stage 3 - Assessment Submission:** The last stage consists of the project submission. This stage is elaborated from the end of December 2024 to mid-January 2025 and concludes with the submission of the group and individual reports. The Disseminating stage consists of three tasks, which are: 1) Group Report, 2) Individual Report, and 3) Submit Consultancy Project.

**Figure 3.3**

*Stage*                    3                    –                    *Assessment*                    *Submission*



### 3.4. Professional Ethics

- 1) The questionnaire of the project does not negatively affect any private information of students. The data collected is not intended to misuse information for personal purposes or to misinform the audience's interest.
- 2) Data management practices are enforced throughout the whole process of the research to maintain the confidentiality and integrity of the investigations to avoid any hazard that can negatively impact the project students' data collected.
- 3) To protect the research data from unauthorized access, a personal password is created to log in and visualize the documents only authorized persons involved in the project have access to it.
- 4) The implementation of the questionnaire will be original, and the results will be supported and explained properly in the document being professional and ethical during the process.
- 5) The present project pretends to benefit the Northumbria University community interested in understanding the social factors and learning environments that affect student performance.

## 4. Findings, Practical Work Implementation, and Testing

### 4.1 Introduction

Higher education is a luminal stage in life; the phase where learning and achieving academic accomplishments are achieved by the students. Yet, a broad array of factors affects a student's outcomes like the quality of social contacts, access to and quality of resources, the ability to access emotional support, and the presence of stress, including financial constraints. Recognising and prioritizing those elements as a strategy will help to enhance academic performance and create a more student friendly academic environment.

This report aims to discuss such socio-educational factors influencing academic performance based on the results of the detailed survey conducted in addition to testing new machine learning approaches. The study aims to idealize the correlations that address the improvement of various aspects of learning experience of students. The conclusions will be useful to

educators and knowingly everyone concerned with engagement, ways of addressing challenges, and improving educational attainment.

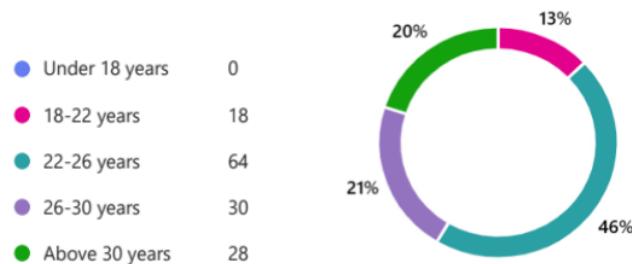
The analysis also employs statistical methods and predictive modelling and data exploration. To support the finding's, related visuals are incorporated; the survey screenshots, generated graphs and charts. Hence, it means that through the presentation of data, this report is a sound roadmap for student-centred improvements in higher education.

## 4.2 Research Discussion and Findings

This section will address the research questions, providing detailed answers supported by data, visualizations and analysis.

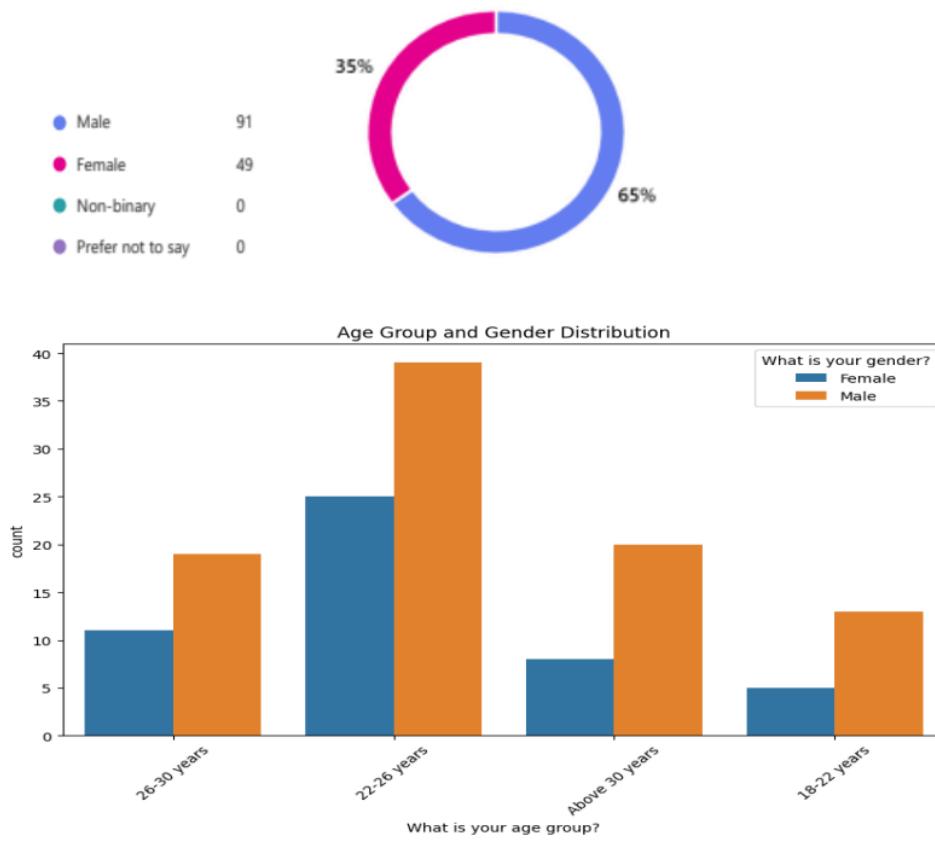
### 4.2.1 Demographics and Background

**Age Distribution:** Most participants i.e., 46% were 22-26 years old, followed by 21% of 26-30 years old. This age range corresponds to postgraduate studies, highlighting the survey's relevance to higher education.



**Fig 4.2.1 Age Distribution**

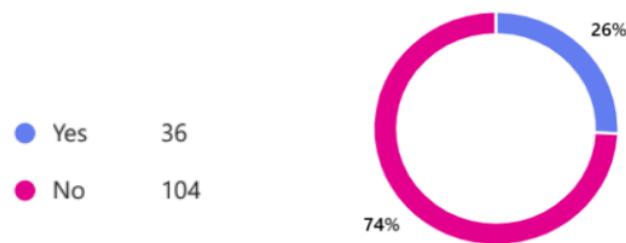
**Gender Representation:** Of the respondents, 65% were male while 35% were females. This difference proves that there is a necessary to focus on gender-related academic difficulties.



**Fig 4.2.1 Gender Representation**

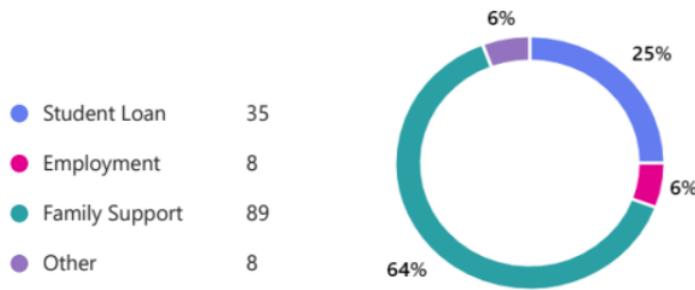
#### Employment and Financial Stability:

Only 26% of the respondents were currently employed, the rest 74% were full-time students.



**Fig 4.2.1 Employment Status**

The largest proportion of participants 64% receive tuition funds from their families, while 25% learners take student loans.



**Fig 4.2.1 Financial Status**

#### **4.2.2 Job Confidence vs Financial Stress**

From the survey it was found that job confidence has a negative correlation (-0.14) with financial stress. where students with higher confidence in their employability after their studies reported lower stress levels within the financial domain. This finding underlines the need for offering career service provisions in a bid to help students let off their financial stress and build their confidence when searching for employment.

Visualization: The following chart illustrates the relationship between job confidence and financial stress, created using the survey data.

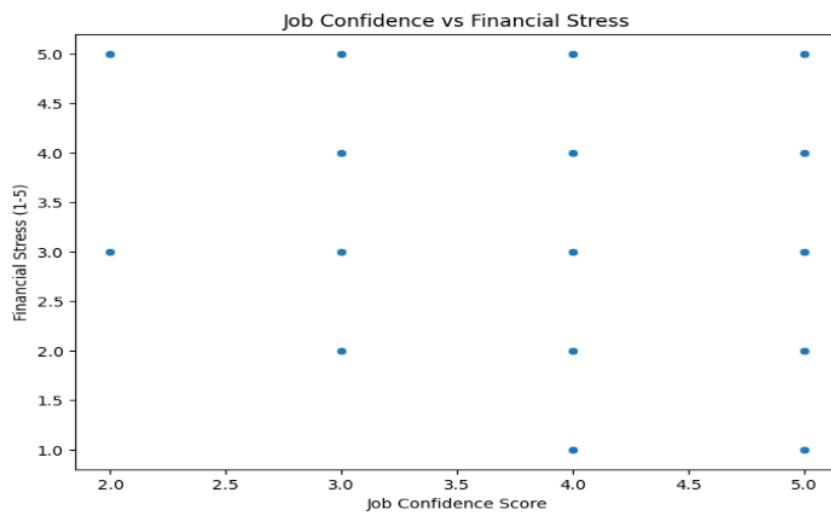


Fig. 4.2.2 (A)

How confident do you feel about securing a job in your field after graduation?

Extremely confident	31
Somewhat confident	43
Neutral	22
Somewhat not confident	9
Extremely not confident	2

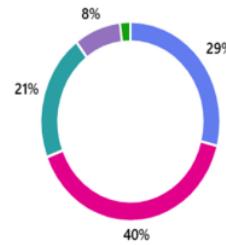


Fig. 4.2.2 (B)

Financial difficulties decrease motivation to study.

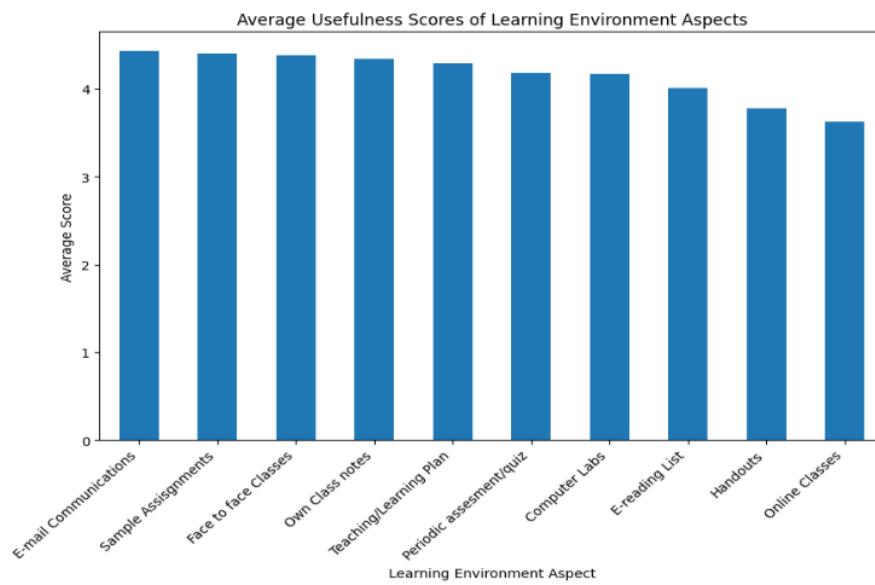


**Fig. 4.2.2 (C)**

#### **4.2.3 Learning environment usefulness**

Of the learning environment factors that students consider as important for engagement and success, they acknowledge E-mail communications, face to face classes, class notes, and structured teaching plans as those which are of great importance which can be seen in below figures. The two highest rated types of assignments were sample assignments (4.52/5) and class material presentations (4.40/5). Such resources helped students get a clear understanding of things and know what to do in order to perform well academically.

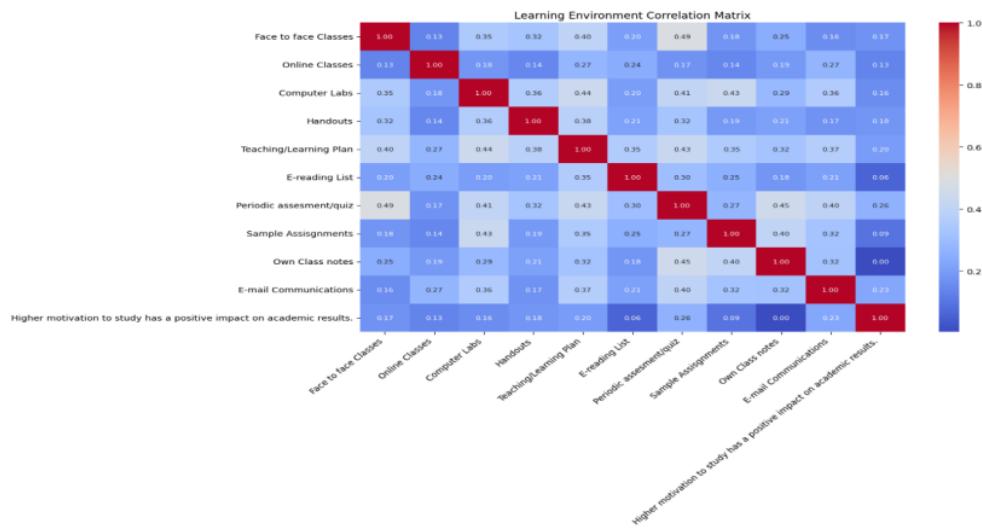
Visualization: The following charts and diagrams illustrate the Learning environment usefulness



5  
**Fig. 4.2.3 (A)**



**Fig. 4.2.3 (B)**

**Fig. 4.2.3 (C)**

From above matrix, the densest connections are revealed to connect such elements as formative and summative assessments, quizzes, and learning plans. Unfortunately, the results obtained reveal that standalone resources such as handouts or samples of assignments developed for the students have conventional or even weaker correlation coefficients, which indicates that active participation is crucial.

#### 4.2.4 Financial Stress vs Academic Performance

It was also established that poorer financial status affected the student's study experience and results, correlation of relationship between financial pressure and performance is 0.29. Students struggling financially said he was finding it hard to concentrate and even get motivated to study, something that affected his performance greatly. Loosely structured questionnaires also received answers with reference to financial issues as a major challenge.

Visualization: Below is a scatter plot showing the relationship between financial difficulties and academic performance and images regarding financial difficulties, motivation and its positive impact.

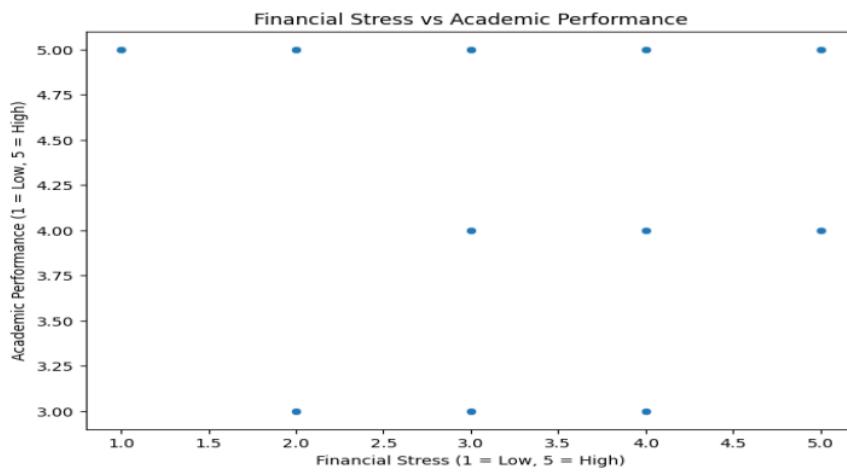


Fig. 4.2.4 (A)

Financial difficulties decrease motivation to study.

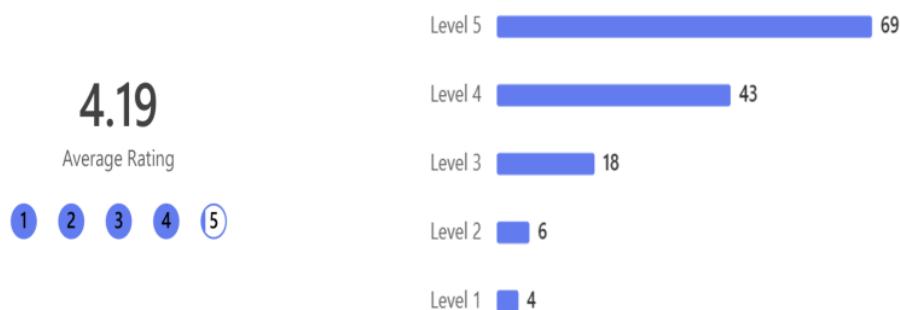


Fig. 4.2.4 (B)

Higher motivation to study has a positive impact on academic results.

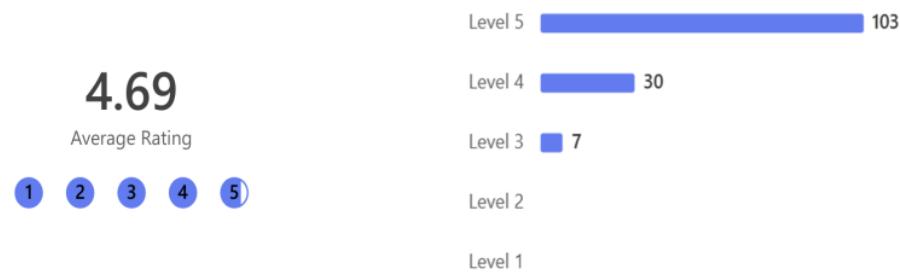
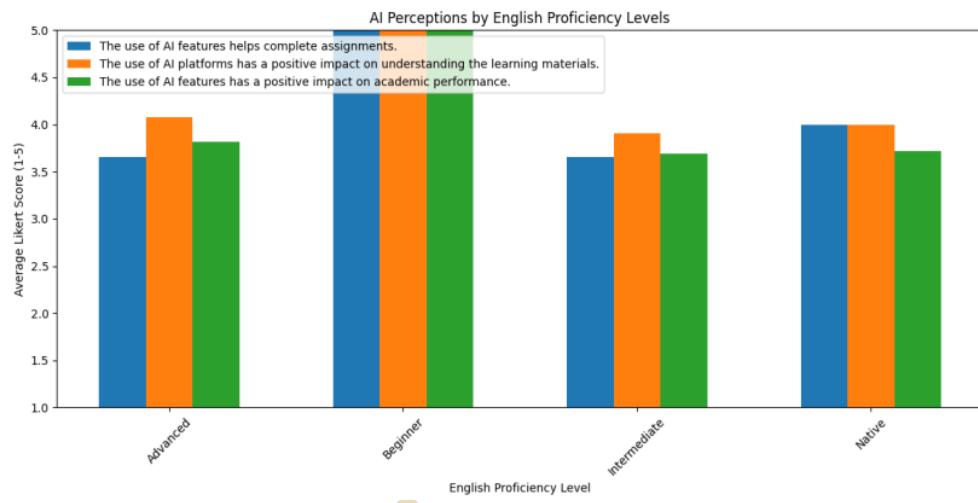


Fig. 4.2.4 (C)

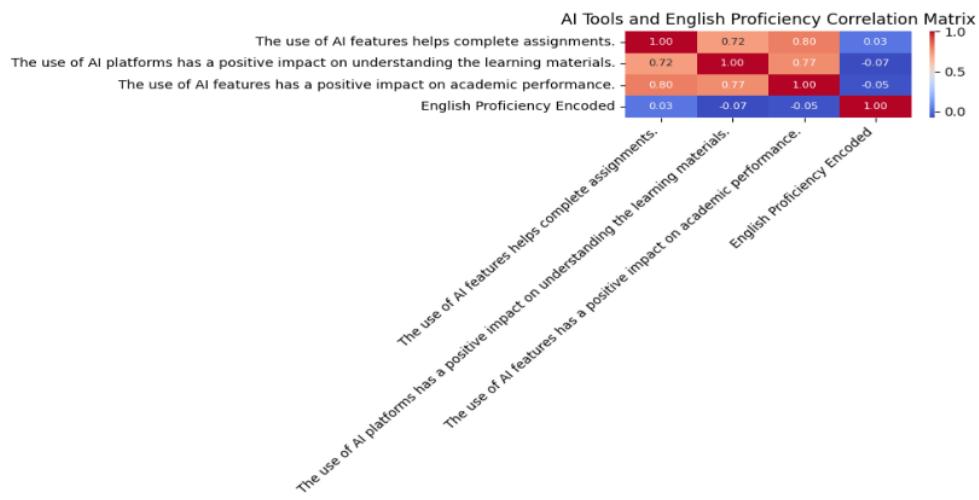
#### 4.2.5 AI adoption with English Proficiency

Three major hindrances to the use of AI tools as noted in the survey were; proficiency, availability, and credibility. In terms of proficiency level, the proficient users assigned a perceived usefulness score of 4.1/5 on the self-developed scale to the AI tools compared to a score of 3.5/5 given by less proficient users. Such research implies that improvement of knowledge, training, and experience can effectively address the barriers to adoption. Hence, AI features or platforms has a positive impact on academic performance while English proficiency don't have correlation with these factors.

Visualization: AI perceptions by English proficiency bar chart and correlation matrix



**Fig. 4.2.5 (A)**



**Fig. 4.2.5 (B)**

#### 4.2.6 Family support and Academics

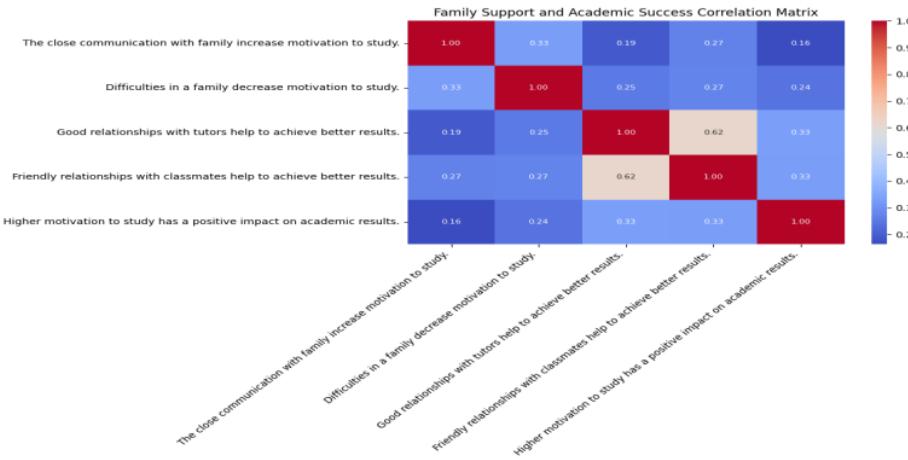
Close communication with the family raises motivation to study with a score of 4.28/5 while many difficulties in a family decreases motivation to study. Higher motivation to study has a positive impact on academic results.

Students found it useful to talk with tutors to cement understanding and solve problems, rated slightly higher at an average of 4.70/5.

Regular group discussions and working with other students was another important factor with the rating of 4.44/5, enhancing group effort and peer learning.

From below matrix family and interpersonal relationships either line as moderators for academic stress. Strong communication the tutor-student relations at that deploys results in better results.

Visualization: Correlation Matrix and images regarding family support and academic success.



**Fig. 4.2.6 (A)**

The close communication with family increase motivation to study.



**Fig. 4.2.6 (B)**

Good relationships with tutors help to achieve better results.



**Fig. 4.2.6 (C)**

Difficulties in a family decrease motivation to study.



**Fig. 4.2.6 (D)**

Discussion with class tutor is important to understand the assessment.



**Fig. 4.2.6 (E)**

Friendly relationships with classmates help to achieve better results.



**Fig. 4.2.6 (F)**

Higher motivation to study has a positive impact on academic results.



**Fig. 4.2.6 (G)**

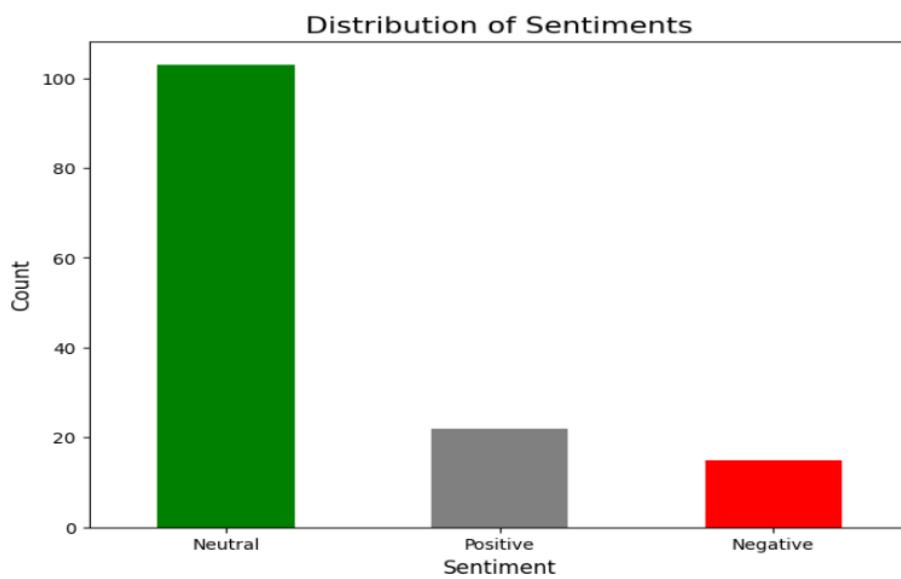
### Sentiment Analysis:

One survey question with regards to stress or lack of focus in completing academic work was related to career pressure. The reported responses were analysed based on three research propositions: neutral, positive, and negative. Of 140 respondents 103 were neutral, as 44 missing values are considered neutral, 22 had positive response and 15 had the negative response. Neutral mostly meant that there were no adverse consequences, positive meant

students enjoy pressured by career. In negative responses, participants reported being more stressed and less attentive because of an external career-related pressure.

The below word cloud indicates the words mostly used in positive sentiments where words like job, internship, pressure, academics where the students feel like enjoying in having pressure related to finding job or internship or coping with academics. In case of negative we have same words, which describe that they do not enjoy and feel difficult to cope with these things. In neutral we have more words like pressure, stress, rejection, time in which students feel like it is a part of journey having stress or rejections though we can still try to make things kind of moto which resulted in neutral sentiment.

Visualization: Below is a graph summarizing the sentiment analysis and word cloud.



**Fig: Sentiment Analysis Graph**

## Word Cloud for Positive Sentiments



## Word Cloud for Negative Sentiments



## Word Cloud for Neutral Sentiments



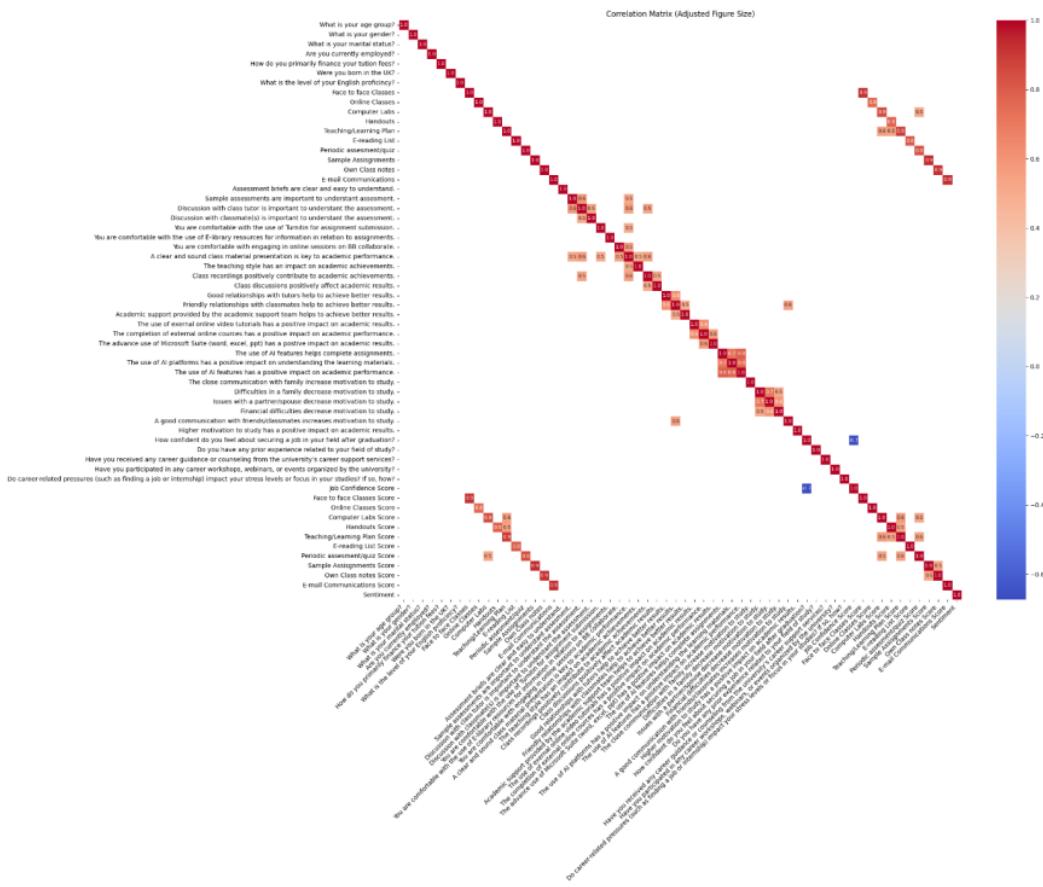
### **Correlation Matrix:**

A correlation matrix filtered for strong relationships (above 0.5 or below -0.5) revealed significant connections.

We are only considering strong correlations from the matrix, so we found only one strong negative correlation and all the remaining are regarding positive correlations.

Here Job-Related Pressures are negatively correlated with academic motivation. Students are having more stress about career which is impacting their results.

Visualization: Below is the correlation matrix highlighting key relationships.



**Fig: Correlation Matrix**

### 4.3 Practical Work Implementation

This section outlines measures that were taken to interpret and assess the findings that were generated from the survey of the project. All methodologies align to the survey data, the insights from the coding, and the context of the case study.

#### Data Preparation:

Handling the survey dataset was a critical first step:

- Missing responses for the open-ended question about career pressures were treated as neutral to preserve integrity of dataset.
- Qualitative responses were pre-processed to prepare them for sentiment analysis and visualization.

**Analytical Tools:**

Key analysis methods included:

- **Sentiment Analysis:** As a preliminary analysis for the surveys, the responses can be sorted into positive, negative, and neutral ways, so as to drill down into the identification of career related stressors.
- **Word Cloud Visualization:** Created to visually highlight the recurring themes and terms, providing a high-level overview of student concerns and trends.

#### **4.4 Testing and Validation**

**Analytical Validation:**

- Sentiment classifications were manually double-checked against raw survey responses to maximize reliability.

Comparisons made between different missing response imputation techniques established that gaps should be treated as neutral offer the fairest analysis.

**Visualization Testing:**

Visual tools were evaluated through mentor and peer feedback:

Some changes were made to word clouds and charts and included fine-tuning of colours and making them more legible.

**Insights and Challenges:****Key Insights:**

- Word clouds indicated that stress is associated with the concern of getting a job, school work, and financial issues.
- A sentiment analysis applied also showed that while most respondents felt negative emotions, such as anxiety, some responses reflected coping mechanisms.

**Challenges:**

- The data collected was skewed, especially in terms of gender and age, which means that while oversampling was used to help accuracy in analysis.
- Open-ended replies offered showed a wide range of quality and quantity which required powerful preprocessing techniques.

**4.5 Recommendations for Future Work:**

- **Survey Design:** Extend the survey by adding multiple choice questions specific to the current qualitative findings to facilitate and accelerate the following overviews.
- **Analytical Advancements:** Investigate the applications of deep learning for improving insights concerning sentiment as well as the consequent predictions.
- **Automation:** Hold survey data cleaning, analysis, and visualization in an automated pipeline to minimize time consumption, and to ensure repeatability.
- **Scalability:** Benchmark them against more extensive databases to be certain they may be expanded for extra institutional investigations.

**Conclusion:**

The implementation and testing phase was effective to change the survey analysis results into practical solutions that applied sound techniques. Due to main issues and using python and visualization tools, the project has implemented best-practice to track the academic and social issues related to students. These methods can be used in subsequent research and learning treatments to enhance students' performance.

## 5. Recommendations for Successful Implementation

In a bid to effectively translate the ideas and findings engendered by this study into practice, the recommendations formulated were thorough and we personally applied practical touch to ensure that each formulated recommendation is fully implementable. All these recommendations are intended to foster a vibrant academic environment underpinning of which is a reduction of gaps, optimal use of data, and health alignment of objectives at organizational levels.

### 5.1 Optimizing the Learning Environment

#### 5.1.1 Enhance Classroom Experiences

- Survey results indicate the importance for face-to-face classes, ease of understandability of teaching materials which are central to performance. For instance, the participant averagely rated the clear topic presentations of class material at 4.40 out of 5 in enhancing understanding. Through our analysis and discussions, we identified key areas for improvement:
- **Professional Development for Educators:** Organizing regular workshops and training programs for educators in an effort to fine-tune their approach to classroom processes and delivery strategies, but more particularly, participation of the educators and students within the classroom.
- **Material Revisions and Updates:** Make sure teaching resources have been reviewed and comply with the recent developments in the industry and in academic circles, they could incorporate more real-world examples.

#### 5.1.2 Promote Hybrid Learning Models

Although the primary mode of learning is the face-to-face approach, the covid-19 experience has highlighted the importance of the blended method. We assessed where organizational issues with the engagement of online class and the necessity to place more infrastructures were identified. Recommendations include:

- **High-Quality Recorded Lectures:** All the live sessions should be recorded and the videos should be edited so that whatever was taught can be revised hence benefitting any student who may have missed the session.

- **Real-Time Virtual Interactions:** Instead of focusing on a particular industry, Blackboard Collaborate needs to be tailored for a more efficient interaction, while the faculty has to be introduced to various strategies on how virtual engagement works.

#### **5.1.3 Improve Accessibility to Learning Resources**

To undertake this analysis, useful academic facilitative support systems such as e-libraries and Turnitin are useful tools. However, some gaps in relation to access as well as knowledge about usage were revealed. Recommendations include:

- **Expanded Digital Collections:** Negotiate with more publishing houses and universities in order to build the repertoire of the digital library and provide students with the most up-to-date materials.
- **Workshops on Resource Utilization:** Add more workshops to these relating to further search methods and citations for better academic work.

### **5.2. Fostering a Supportive Social Environment**

#### **5.2.1 Strengthen Tutor-Student Relationships**

Tutor consultations were considered as very important and scored at 4.70 regarding its importance for understanding assessments. Observing tutors and students at work during this project, we came to realize that effective tutor \_student interactions indeed boost performances. Recommendations include:

- **Regular Mentoring Sessions:** Implement mandatory monthly mentoring meetings to clear academic and personal challenges.
- **Empathy Training for Faculty:** Promote tutors to go in an empathetic way towards the students they teach to ensure that all academic interactions do not scare off students.

#### **5.2.2 Facilitate Peer Interaction**

Another factor which was closely related to academic achievement was peer discussions with the index score of 4.44. Surveys show that inspiring collaboration within a student group will enhance knowledge dissemination and cooperation. Suggestions include:

- **Group-Based Learning Activities:** Introduce more group projects, case studies, and problem-solving sessions to encourage learning.

- **Physical and Virtual Spaces for Interaction:** Create collaborative places like study, rest and social meeting places or internet-based places for academic and social purposes.

### **5.3 Leveraging Technology and Innovation**

AI tools had a noticeable impact on academic performance, as reflected in the survey score of 3.79. I used sentiment analysis and word cloud visualizations to analyze open-ended survey responses, revealing student preferences and gaps. Based on these findings:

- **Intelligent Tutoring Systems:** Use AI-driven teaching platforms that mould to individual learning styles and provide personalized assistance.
- **Administrative Streamlining:** Create institutional based AI tools for tasks such as attending marking, and assessment feedback.
- **Ethical AI Workshops:** Schedule some sessions with the students to explain how students can use AI ethically, where possible concerns are and what can be done to address such worries.

### **5.4 Addressing Financial and Career Challenges**

#### **5.4.1 Financial Support Initiatives**

Hence one of the barriers was found to be financial challenges which have a rating of 4.19 on the extent to which it affects motivation. Recommendations include:

- **Scholarship Programs:** Financial burden should be addressed through new need-based scholarships and grants system.
- **Part-Time Opportunities:** Partner with local businesses to create job opportunities tailored to students' schedules.
- **Financial Literacy Workshops:** Teach students how to manage their resources by learning the principles on how to budget, save and, plan for the future.

#### **5.4.2 Strengthen Career Services**

Only 31 per cent of students mentioned their high levels of confidence regarding employment after graduation. During our evaluation we found there to be lack of appropriate career readiness resources. To address this:

- **Comprehensive Career Counseling:** Provide individual career counseling using skill, interest, and industry trends.
- **Networking Opportunities:** Offer opportunities to attend job fairs and invite professionals within the field for guest speaking and casual networking.

## **5.5 Enhancing Well-being and Motivation**

### **5.5.1 Mental Health Support**

In the students' profiles, mental health pertains as a significant problem: family and relationships issues reduce motivation (3.99). Our recommendations include:

- **Dedicated Counseling Services:** Locate staff-faculty members of the university to provide counseling on academic and personal life.
- **Awareness Campaigns:** Develop programs meant to encourage persons to seek counseling services when they are overwhelmed by stress and variety.
- **Stress Management Workshops:** Provide mindfulness, yoga and other stress relieve too in order to help to become emotionally strong and withstand stress.

## **5.6 Refining Survey Techniques and Analysis**

### **5.6.1 Open-Ended Question Analysis**

The survey question that was open ended on career-related pressures attracted ninety-six participants and most of the responses were either neutral or missing. We had to treat missing values as neutral in order to keep the results comparable. Through sentiment analysis with TextBlob and word clouds with Python, we observed some commonalities such as stress from jobs search, internship availability, and academic pressure. For future surveys, we propose:

- **Adding Structured Follow-Up Questions:** Select 4-5 multiple choice questions based on these themes to help them generate quantitative information for further analysis.

- **Improving Data Collection:** Do not rely solely on the survey as it lacks in-depth qualitative data which can be obtained using methods such as focus groups or in-depth interviews.
- **Encouraging Participation:** Minimise non-response bias by encouraging response by target communication and providing freebies and using interesting methods of administering questionnaires.

### 5.6.2 Suggestions for Future Groups

This project is now evident and can be used by future groups conducting similar surveys at our university. Key takeaways include:

- **Methodological Framework:** Employing the sentiment analysis and figures such as word clouds indicates how data of a qualitative nature can be best summarized.
- **Scalable Recommendations:** The clear findings and steps outlined here can be used and refined for other institutional contexts.
- **Enhanced Question Design:** Future groups could use our work as a reference when developing surveys with balanced multiple-choice options which will increase the response quality as well as the usability.

## 5.7 Policy Recommendations and Long-Term Goals

### 5.7.1 Data-Driven Decision Making

Using insights from python and survey data, we recommend:

- **Monitoring Trends:** Collect academic and social performance data to feed the formulation of policy changes.
- **Key Performance Indicator Development:** Establishing measurable goals for satisfaction, retention, and graduation rates.
- **Evidence-Based Interventions:** Try out new ideas in a limited way; that is, experiment and expand after basic strategies have been tested.

### 5.7.2 Continuous Feedback Loops

To ensure sustained improvement, we propose:

- **Regular Surveys:** Conduct regular surveys to know the impact of implemented changes.
- **Student Feedback Platforms:** Introduce channels for students to address difficulties and offer suggestions.
- **Faculty Involvement:** Include educators in evaluating and shaping institutional practices.

## 5.8 Implementation Roadmap

### Short-Term Initiatives (0-1 Year):

- Conduct faculty hybrid learning workshops.
- Increase services for ailing academically challenged students.
- Offer scholarships for financially disadvantaged students.

### Medium-Term Goals (1-3 Years):

- AI should be incorporated both in clerical and instructional activities.
- Build solid academic relationships with the internship and project-based industries
- Sponsor an annual academic and cultural calendar as a tool of helping the community.

### Long-Term Objectives (3-5 Years):

- Increase the overall perceived satisfaction level and related academic performance standards considerably.
- Introducing the institution as an innovator in the education sector and student support
- Increase internationalization, and thus, provide students more potential benefits.

**Conclusion:**

From these wide suggestions, which result from our analysis and participation, the organisation can effectively respond to some severe issues and support the development of a positive academic climate. These procedures of data collection and analysis are helpful for other groups following this project because they show how to analyze social and academic factors properly. From these findings, fresh approaches can be progressed to improve data quality, fine tune approaches, and create even better learning ecosystem for all. Effective, adaptable strategies and practices with clarity in instruction, use of technology in instruction, relationship-building, and considerations for financial and emotional costs work to improve the learners' results while also building the institution's image and future sustainability.

**References:**

- Biggs, J., & Tang, C. (2011). *Teaching for Quality Learning at University*. McGraw-Hill Education.
- Thomas, L. (2012). *Building student engagement and belonging in Higher Education at a time of change*. Paul Hamlyn Foundation.
- Yorke, M., & Longden, B. (2004). *Retention and Student Success in Higher Education*. Open University Press.
- Smith, J., & Petersen, M. (2019). "The Role of Emotional Well-being in Academic Success," *Journal of Higher Education Research*, 45(2), 112-130.
- Northumbria University Strategic Plan 2022-2027. (2022). *Enhancing Student Experience through Strategic Initiatives*. Northumbria University Press.

**Appendix:**

Code File:

[https://colab.research.google.com/drive/1\\_q8ff9G\\_XQ2wj\\_BO91Vk8BKIEgfwP8o?usp=sharing](https://colab.research.google.com/drive/1_q8ff9G_XQ2wj_BO91Vk8BKIEgfwP8o?usp=sharing)

## ORIGINALITY REPORT



## PRIMARY SOURCES

1	Submitted to University of Northumbria at Newcastle Student Paper	4%
2	<a href="http://digitalscholarship.unlv.edu">digitalscholarship.unlv.edu</a> Internet Source	1%
3	<a href="http://myassignmenthelp.com">myassignmenthelp.com</a> Internet Source	<1%
4	<a href="http://businessdocbox.com">businessdocbox.com</a> Internet Source	<1%
5	<a href="http://www.diesse.it">www.diesse.it</a> Internet Source	<1%
6	<a href="http://d-nb.info">d-nb.info</a> Internet Source	<1%
7	<a href="http://thesai.org">thesai.org</a> Internet Source	<1%
8	<a href="http://www.readkong.com">www.readkong.com</a> Internet Source	<1%
9	<a href="http://www.np-utrechtseheuvelrug.nl">www.np-utrechtseheuvelrug.nl</a> Internet Source	<1%

10

Mark Alipio. "Predicting Academic Performance of College Freshmen in the Philippines using Psychological Variables and Expectancy-Value Beliefs to Outcomes-Based Education: A Path Analysis", EdArXiv, 2020

<1 %

Publication

---

Exclude quotes      On

Exclude bibliography      On

Exclude matches      < 7 words