GRoup 12

* Rajvi Pinalbhai Mehta
* Amit Sharma
* Suhail Ahmed
* Jayraj Radadiya
* Harshil Patel

Case Study: Student College Experience

2023

**Contents**

[**Abstract** 2](#_Toc133591186)

[**Introduction** 3](#_Toc133591187)

[**Literature Review** 4](#_Toc133591188)

[**Timeline** 5](#_Toc133591189)

[**Architecture Diagram:** 7](#_Toc133591190)

[**Results and Discussions** 8](#_Toc133591191)

[**I.** **Story 1: DEMOGRAPHIC SNAPSHOT** 8](#_Toc133591192)

[**II.** **Story 2: EMPLOYMENT AND LIVABILITY STATUS** 9](#_Toc133591193)

[**III.** **Story 3: Academics/ Services** 9](#_Toc133591194)

[**IV. Story 4: Feedbacks** 10](#_Toc133591195)

[**Conclusion** 10](#_Toc133591196)

[**References** 11](#_Toc133591197)

# **Abstract**

The college experience is critical for students, and there are many factors that can influence its quality. This study aims to **examine the relationship between demographics, work history, living conditions, and educational background, and their impact on the day-to-day college experience of students**. A review of the literature suggests that these factors can all play a role in shaping the college experience, but there is a need for further research to identify the specific patterns and correlations that exist. This study uses a **survey-based approach to collect data from a sample of college students, with a focus on identifying the most salient factors that impact the college experience. By examining the data and identifying key patterns and correlations, this study aims to provide insights that can inform strategies to understand academic experience and support the success of college students.**

# **Introduction**

The college experience is a critical phase in every student's life. It is a time of growth, self-discovery, and academic advancement. Achieving an optimal college experience is a common goal among all students, but the factors that contribute to a desirable college experience can vary from student to student. Personal and professional background, residential life experience, living flexibility, and academic factors such as socioeconomic status, race, and ethnicity can all play a significant role in shaping one's college experience. Campus culture, extracurricular events, services provided, and social opportunities are also factors that can impact the overall college experience.

Given the importance of the college experience, it is crucial to understand how various factors affect students' day-to-day lives and overall quality of life. Therefore, this study aims to examine the relationship between three specific factors and the college experience: demographics, work history, and living conditions. By identifying patterns and correlations between these factors and the college experience, the study aims to provide insights that could be used to improve academic experience.

Demographics can influence the college experience in many ways, including but not limited to, one's race, ethnicity, and socioeconomic status. Work history may affect the college experience in terms of financial stability, work-life balance, and career prospects. Living conditions, including accommodation type and location, can impact the college experience by affecting a student's living standards, academic performance, and social life.

Through this study, we hope to gain a better understanding of how demographics, work history, and living conditions can influence the college experience. The results of this study could help universities and colleges create policies and programs that promote a more positive and supportive academic environment, leading to better outcomes for students.

The **hypothesis** of this study suggests that students who have stable work histories, relatable educational backgrounds, and better living situations are more likely to have a positive college experience. There are several reasons why these factors could be related to a positive college experience.

First, students who have stable work histories may have an easier time balancing work and academic commitments, leading to a better work-life balance. They may also have more financial stability, which could reduce stress and allow for a more enjoyable college experience.

Second, students who have educational backgrounds that are relatable to their academic pursuits may find it easier to navigate the academic environment and perform well in their courses. This could lead to a sense of accomplishment and satisfaction with their academic progress, contributing to a positive college experience.

Finally, students who have better living situations, such as comfortable and safe living accommodations, may feel more relaxed and focused, allowing them to better engage in academic and social activities. They may also have more opportunities to socialize and participate in extracurricular activities, which could contribute to a positive college experience.

By examining the relationship between these three factors and the college experience, this study aims to provide insight into how universities and colleges can better support their students. If the hypothesis is supported by the data, universities and colleges could create policies and programs that support stable work histories, provide relatable educational backgrounds, and improve living situations for their students, leading to a more positive and supportive academic environment.

# **Literature Review**

A comprehensive overview of the relevant research on the factors that impact the college experience, highlighting the most important findings and discussing the implications for the research question are given below:

1. The impact of demographics on college experience: There is a growing body of research that examines how demographic factors such as race, ethnicity, and socioeconomic status can impact college experience. For example, studies have shown that students from underrepresented racial and ethnic groups may experience social isolation and marginalization, which can negatively impact their academic and social experience (Chang, Astin, & Kim, 2014). Similarly, students from lower socioeconomic backgrounds may experience financial strain and have less access to resources, which can also negatively impact their college experience (Stephens, Hamedani, & Destin, 2014).
2. The role of work in college experience: Work can have both positive and negative effects on the college experience. On the one hand, work can provide financial stability and valuable work experience, which can be beneficial for career prospects (Goldrick-Rab, 2016). On the other hand, work can also contribute to stress and reduce the amount of time available for academic and social activities, which can negatively impact college experience (Goldrick-Rab, Broton, & Eisenberg, 2016).
3. The importance of living conditions for college experience: Living conditions, such as housing quality, safety, and location, can have a significant impact on the college experience. Studies have shown that students who live in comfortable and safe accommodations are more likely to have a positive college experience (Burt, Simons, & Gibbons, 2012). Similarly, students who live on campus or near campus may have more opportunities to engage in academic and social activities, which can contribute to a positive college experience (Hossler & Gallagher, 1987).
4. The relationship between educational background and college experience: Students who have educational backgrounds that are relatable to their academic pursuits may have an easier time navigating the academic environment and performing well in their courses. For example, students who have taken advanced courses in high school may be better prepared for college-level coursework (Horn & Chen, 2018). Similarly, students who have previous experience in a particular field may be more likely to succeed in related academic pursuits (Xu & Smith, 2016).

# **Timeline**

Timeline

Description automatically generated

Timeline for the whole project was 4 months.

The first month of the project was used to plan the overall data architecture and methodology for the project. This involved breaking down the problem and identifying the different data flow phases that would be required to solve it. The team also spent time researching different technologies and tools that could be used to support the data flow process.

The second month of the project was focused on collecting data through surveys from the users. This involved designing the surveys and distributing them to the target audience. Once the data was collected, exploratory data analysis (EDA) was performed, and data cleaning techniques were applied to ensure that the data was of high quality. The team also set up the landing zone for the database and established connection APIs to enable data transfer between different systems.

The third month of the project was dedicated to handling the data from the second survey and deriving predictions and sentiment analysis to solve the problem. The team also started working on the presentation layer to create descriptive graphs and dashboards that would display the outcomes of the project.

The last month of the project was used to conclude the results, finalize the dashboard and document the whole project into presentations and reports. The team spent time analyzing the data and creating insightful visualizations that would communicate the project outcomes effectively to the stakeholders.

Overall, the timeline for the project was structured in a way that ensured each phase of the data flow process was given adequate time and attention. This enabled the team to deliver a high-quality solution within the stipulated timeline, while also ensuring that the project outcomes were well-documented for future reference.

**Methodology**

Graphical user interface, website

Description automatically generated

The whole process is broken into 5 phases of Data flow, namely Data Collection, Pre-Processing, Transformation, Prediction and Presentation.

**Data Collection**: This is the first phase of the data flow, where data is collected from various sources such as Google Forms and Microsoft Forms. These forms provide an easy-to-use interface for data entry and can be customized to suit specific needs.

**Pre-processing**: Once the data is collected, it needs to be cleaned and prepared for further analysis. This is done in the pre-processing phase. Python is the tool for data pre-processing due to its ease of use, flexibility, and powerful data manipulation libraries.

**Transformation**: The transformed data is then fed into the transformation phase, where it is analyzed using various statistical and machine learning techniques to extract valuable insights. Big Query, which is a fully managed, serverless data warehouse provided by Google Cloud, is often used for large-scale data transformation due to its scalability and performance.

**Prediction**: Once the data has been transformed, it can be used for prediction using machine learning models. Python is again the choice for building and training machine learning models due to its rich set of libraries and frameworks. Feed-forward neural networks are a type of machine learning model that can be used for prediction tasks.

**Presentation**: Finally, the insights and predictions generated from the previous phases are presented to the end-users. Tableau Server is a business intelligence platform that provides interactive data visualization tools to create informative dashboards and reports for effective communication and decision-making.

Overall, this 5-phase data flow process ensures that data is collected, cleaned, analyzed, and presented in a systematic and efficient manner, making it easier to extract valuable insights and predictions from large amounts of data.

# **Architecture Diagram:**

Diagram

Description automatically generated

The entire architecture is a 3 tier architecture.

**Intake Tier:** The intake tier is responsible for collecting data from various sources such as Google Forms and storing it in Google Drive. This tier typically involves the use of web-based interfaces or APIs to gather data and transfer it to the next tier in the architecture. The data collected in this tier is typically unstructured and may require pre-processing before it can be used for further analysis.

**Landing DB Tier:** The landing DB tier is where the raw data is stored and processed. This tier involves a series of databases that are designed to store, manage, and manipulate large amounts of data. The landing DB tier is where data segregation occurs, and raw data is transformed into a structured format that can be easily analyzed. Algorithms are used in this tier to process the data and generate insights and predictions.

**Transfers and Presentations:** The transfers and presentations tier is responsible for transferring data between systems and presenting insights and predictions to the end-users. APIs are used to connect the different systems involved in the data flow process, enabling data to be transferred efficiently and securely. Tableau is a popular tool used for data visualization, and it is often used in this tier to create interactive dashboards and reports that can be easily understood by end-users.

Overall, the 3-tier architecture provides a scalable and modular framework for managing large amounts of data. Each tier is designed to handle a specific aspect of the data flow process, enabling data to be processed efficiently and effectively. By breaking the data flow process down into different tiers, it is easier to identify and isolate issues, enabling quick and efficient troubleshooting.

Diagram

Description automatically generated with medium confidence

# **Results and Discussions**

## **Story 1: DEMOGRAPHIC SNAPSHOT**

The first dashboard provides insights into the student population showing the data about where they are coming from such as their demographics, educational background, work experience, and field of experience. We have designed the dashboard with four factors that allow you to select a specific group of students based on their age, semester, educational background, and country. By selecting different combinations of these factors, you can gain valuable insights into the characteristics and needs of specific groups within the student population.

**Insights:**

* The majority of students have no previous work experience.
* Computer science is the most common educational background among students.
* Information technology is the most common field in which students have work experience.
* The age distribution of students is heavily concentrated in the 18-25 age group.

Graphical user interface, application

Description automatically generated

## **Story 2: EMPLOYMENT AND LIVABILITY STATUS**

The second dashboard in our data analysis project focuses on the living situation and insights of the student population. It includes geospatial analysis, accommodation insights, and data flow of students based on their years of experience to their current employment status. Additionally, it provides information on how students find their accommodation.

**Insights:**

* The college website is the least used source to find accommodation.
* Students with 6-10 years and 10+ years of experience tend to be unemployed in Windsor either by choice or due to some reason.
* Most students live in the downtown region with the N9B zip code having the highest accommodation score of 3.11 based on affordability, quality, ease of finding, and reliable commute.
* 85% of students want additional events to happen in downtown campus rather than South campus.

## **Story 3: Academics/ Services**

**COLLEGE EXPERIENCE PLAYGROUND**

The third dashboard allows for the selection of a specific group of the student population based on six factors, including semester, years of experience, education background, highest education level, current employment status, and accommodation score category. With more than 30 different combinations, this dashboard allows for the comparison of different student groups side by side. Additionally, it provides a College experience score, calculated by weighting five factors, including schedule, after-class workload, class hours, course content, and section allocation.

**Insights:**

* Semester 1 students with a high accommodation score category have a significantly higher College experience score than those with a low score category.
* Students with a dissatisfied accommodation score category have a significantly lower College experience score than those with a highly satisfied category.

**SERVICE ENGAGEMENT**

The fourth dashboard in our data analysis project provides insights into the college services and student preferences. It includes data on student awareness of the services provided by the college, as well as questions related to the need for specific services, including breaks between lectures, transportation between campuses, information related to services provided, study areas in downtown campus, and section switching policies.

**Insights:**

* Only 25% of students are aware of and use the services provided by the college.
* Career Services is the most needed service students want.
* 65% of students feel that breaks between lectures are appropriate.
* 54% of students feel the transportation between campuses is justified.
* 64% of students feel that the services provided are well-communicated.
* 54% of students feel the need for more study areas in downtown campus.
* 65% of students feel that the section switching policies are justified.

## **Story 4: Feedbacks**

# **Conclusion**

# **References**

1. Chang, M.J., Astin, A.W. & Kim, D. Cross-Racial Interaction Among Undergraduates: Some Consequences, Causes, and Patterns. *Research in Higher Education* **45**, 529–553 (2004). <https://doi.org/10.1023/B:RIHE.0000032327.45961.33>
2. Stephens, Hamedani, & Destin, Closing the Social-Class Achievement Gap: A Difference-Education Intervention Improves First-Generation Students’ Academic Performance and All Students’ College Transition. *Sage Journals*, 2014. <https://doi.org/10.1177/0956797613518349>
3. Broton, Katharine M., Sara Goldrick-Rab, and James Benson. "Working for college: The causal impacts of financial grants on undergraduate employment." *Educational Evaluation and Policy Analysis* 38.3 (2016): 477-494. [DOI](10.3102/0162373716638440)
4. Eisenberg, Daniel, et al. "Too distressed to learn." *Mental health among community college students* (2016): 1-15.
5. <https://ps.psychiatryonline.org/doi/full/10.1176/appi.ps.202000437>
6. Burt, Callie Harbin, Ronald L. Simons, and Frederick X. Gibbons. "Racial discrimination, ethnic-racial socialization, and crime: A micro-sociological model of risk and resilience." *American sociological review* 77.4 (2012): 648-677. [DOI](10.1177/0003122412448648)
7. Luna-Torres, Maria, et al. "Understanding loan use and debt burden among low-income and minority students at a large urban community college." (2018). <https://hdl.handle.net/10657/5506>
8. Yeboah, Alex Kumi, and Patriann Smith. "Relationships between minority students online learning experiences and academic performance." *Online Learning* 20.4 (2016): n4. <https://eric.ed.gov/?id=EJ1124650>