**Student Behaviour Analysis**

Group 8

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**Introduction:**

This interim report aims to give a summary of our capstone project's ongoing progress and preliminary findings. The project focuses on improving the facilities and student experience at the Zekelman School of Information Technology (IT). This section will provide a brief overview of our project's goals and purpose, highlighting its importance in meeting the changing needs of our college students.

Our project aims to gather important information about the current college experience as it relates to the services offered to students. We hope to assist the college in making decisions about how best to upgrade facilities and support services, which will enhance program offerings and build a positive learning environment. These decisions will be made possible by measurable outcomes derived from student feedback. Achieving a high response rate, acquiring objective data from all IT programs, drawing conclusions that can be analyzed, identifying areas in need of improvement, executing timely data analysis, putting survey results into practice, and guaranteeing stakeholder satisfaction are among the main goals.

We will go into more detail about our project methodology, our progress so far, and the expected results in the sections that follow in this interim report. We think we can help achieve the overall objective of improving the student experience and developing an active academic community at the Zekelman School of IT by completing this project.

**Project Overview:**

Our project's main goal is to analyze and enhance the Zekelman School of Information Technology's (IT) facilities and student experience. The main goal is to identify areas for improvement by determining how satisfied students are with the current college facilities and support services.

Our method is a methodical procedure aided by multiple technologies. First, we use Microsoft Forms to create an online survey that asks students in all IT programs about their experiences. Program satisfaction, faculty interactions, facility usage, support services, and the overall student experience are just a few of the topics covered in this survey.

Next, in order to guarantee a quick response time and optimize data processing, we make use of automated data gathering methods made possible by Azure and Automate.

Python is used for data analysis after the data is gathered, allowing us to obtain measurable parameters and scores to evaluate student satisfaction and identify trends. Next, interactive dashboards and reports are created using Power BI for data visualization, and effectively conveying findings.

To improve student satisfaction and services at the Zekelman School of IT and enhance the overall student experience, the overall goal of our project is to offer practical insights and recommendations based on the feedback of students.

**Progress Summary:**

Since its beginning, our project has made considerable progress. We began by collecting data from students, focusing on key areas such as demographics, accommodation, and academic performance. To manage this data effectively, we developed a robust pipeline that stores information in an Azure SQL database. This streamlined process ensures that our data is organized and easily accessible for analysis.

In parallel, we leveraged Power BI to create visually engaging graphs, charts, and reports, providing insightful visualizations of our data. This visualization step has been crucial in gaining initial insights and understanding trends within our dataset.

Moreover, we have implemented data-cleaning techniques and generated additional graphs using Python, utilizing the pyodbc library for database connectivity. This allowed us to delve deeper into our dataset, uncovering patterns and anomalies that will inform our subsequent analyses.

Currently, our focus is on exploring various machine-learning models and testing their efficacy on our dataset. We are dedicated to selecting the most appropriate model that can accurately predict outcomes and provide valuable insights for our project's objectives.

**Literature Review:**

This project was done by our seniors who examined the conduct of St. Clair College's downtown campus's Data Analytics for Business Program students. It revealed important obstacles that students must overcome, most notably the lack of study spaces and their unwillingness to switch sections. These results highlighted the difficulties students face while attempting to get essential academic resources.

We are expanding the project to include all students at the Zekelman School of Information Technology on both campuses with our research. By taking into account variables like college location and academic program, this extension enables us to understand student behavior and preferences holistically.

Instead of giving each variable the same weight as before, our initiative takes a more nuanced approach based on data-driven ideas. We use data analysis methods to derive variable weights based on student preferences instead of depending on predefined weightings. We may modify our studies to reflect the reality of students’ experiences more accurately thanks to this nuanced approach, which recognizes the complex nature of student behaviors.

By integrating data-driven methodologies with insights from prior research, we aim to provide actionable recommendations to improve student satisfaction and academic success within the Zekelman School of Information Technology, contributing to the broader understanding of student behavior in education.

**Methodology:**

Our approach involves structured surveys distributed to students across both campuses of the Zekelman School of Information Technology. These surveys cover demographics, study habits, resource preferences, and satisfaction levels. We then employ descriptive analytics to identify trends and predictive analytics to forecast future behaviors using machine learning.

**Data Collection Process:**

We gather comprehensive data through structured surveys, capturing diverse perspectives and experiences among students. Additionally, qualitative methods like interviews provide context to quantitative findings while ensuring ethical data handling through anonymization and aggregation.

**Experimental Design:**

We utilize descriptive analytics for initial insights and predictive analytics for forecasting future behaviors. By integrating quantitative and qualitative approaches, we aim to derive actionable insights and recommendations for enhancing student satisfaction and academic success within the college.

**Results and findings:**

Our preliminary analysis has yielded several key insights into student behaviour within the Zekelman School of Information Technology.

1. Demographic Distribution:

We observed a diverse demographic composition among students, with a relatively balanced distribution across age groups, genders, and ethnicities.

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1. Program distribution by Education Level:

The graphs show a clear trend: students with High School Certificates tend to favour Networking-related programs, while those with Bachelor's and Master's degrees lean towards advancing their careers with the Data Analytics Program.

A screenshot of a computer

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1. Employment Status of student:

The pie chart illustrates the current employment status of students, indicating that over half of them are actively seeking employment opportunities.

A pie chart with different colored circles

Description automatically generated

1. Correlation of Features:

The heatmap displays correlations within our dataset, highlighting the strong connection between the quality and affordability of accommodation. Furthermore, it reveals a significant correlation between scheduling of classes and classes per work.

A screenshot of a game

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1. Service Awareness:

The bar graphs show student’s awareness and usage of college services, where most of the students know about the services provided by the college and most of them are using it.

A graph of a bar graph

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**Discussion:**

Analysing the results about our project objectives reveals several significant insights.

1. Data Gathering Challenge: Our project encountered a significant challenge in gathering data from students initially. Despite efforts to distribute surveys through digital platforms and personal emails, the response rate fell short of expectations. However, by pivoting to in-person survey presentations during classes, we were able to overcome this obstacle and achieve a higher response rate, ensuring more comprehensive data for our analysis.
2. Student Preferences: The analysis uncovered distinct preferences among students based on their educational background. High school graduates tended to favor networking-related programs, while those with higher degrees showed a preference for the Data Analytics Program. This alignment with our project objective of understanding student behavior and program preferences within the Zekelman School of Information Technology reinforces the relevance and validity of our findings.
3. Resource Utilization: Our data revealed a robust correlation between students' awareness of college-provided services and their utilization. This emphasizes the critical role of effective communication and outreach efforts in ensuring students are well-informed about available resources and encouraged to make use of them. By contributing to our goal of enhancing student satisfaction and success, this correlation underscores the significance of addressing resource utilization in our project objectives.

**Future Work:**

1. Identify Areas of Dissatisfaction: Our next steps involve delving deeper into understanding areas of dissatisfaction among students regarding academic and accommodation aspects. By conducting targeted surveys and interviews, we aim to gather qualitative insights into specific issues and concerns faced by students, allowing us to address them effectively.
2. Segmentation Analysis: We plan to segment students based on various factors such as their current program, age group, gender, country of origin, type of accommodation, employment status, and more. This segmentation will enable us to identify distinct groups of students with unique needs and preferences, paving the way for tailored interventions and support services.
3. Predictive Modeling: Leveraging machine learning and neural network models, we intend to predict students' academic scores based on a multitude of factors including demographic characteristics, program preferences, resource utilization patterns, and satisfaction levels. By developing predictive models, we aim to anticipate academic performance and identify at-risk students who may require additional support or intervention.
4. Further Research Opportunities: Beyond the current scope of our project, there are several avenues for further research and development. These may include exploring the impact of extracurricular activities, student engagement initiatives, and campus culture on academic success and satisfaction. Additionally, investigating the effectiveness of various support programs and interventions in addressing student needs and improving overall student outcomes could be valuable areas for future research endeavors.

**Conclusion:**

In conclusion, our interim report outlines the objectives, methodology, progress, findings, and future work of our capstone project focused on enhancing the student experience at the Zekelman School of Information Technology. Despite challenges in data gathering, we have made significant strides in analyzing student behavior and preferences. Our findings emphasize the importance of effective communication and targeted interventions to improve student satisfaction and success. Moving forward, we plan to delve deeper into areas of dissatisfaction and satisfaction, segment students based on various factors, develop predictive models, and explore further research opportunities. Overall, our project holds promise in creating a positive learning environment and fostering academic excellence at the Zekelman School of Information Technology.

Reference:

* <https://github.com/JayrajRadadiya/Capstone-Project>
* <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-022-00196-6>
* <https://link.springer.com/article/10.1007/s00500-023-07926-2#Tab5>
* <https://arxiv.org/pdf/2006.07860.pdf>

Appendices:

Creating Pipeline:

A diagram of a workflow

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Database:

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Connecting data:

A screenshot of a computer code

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Data Cleaning:

A screenshot of a computer screen

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Graph:

**A screen shot of a graph

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