Enhancing DAEN Program Effectiveness: Analysis of Alumni Interview Feedback at George Mason University

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Abstract

The effectiveness of the DAEN program at George Mason University is critical as the department aim to provide industry-relevant education, focusing on tools, technologies, and skills that are directly applicable in professional roles. This study presents analysis of the DAEN program at the College of Computing and Engineering at George Mason University, examining industry demands and program effectiveness through comprehensive alumni feedback. The research is conducted through alumni interviews. The interviews are designed with structured qualitative and quantitative questions to evaluate various aspects of program alumni including academic profile, employment trajectories, technical skill utilization in jobs, program technical skill utilization, and program feedback. Data was collected through anonymous interview recordings in either audio or text format based on the interview platform used. Audio interview recordings were processed confidentially using AWS transcribe to generate text transcripts. The text transcripts were cleaned and extracted into columns in a CSV file using local natural language processing toolkit. The data was visualized using Tableau to identify patterns in employment outcomes, skill utilization, and areas for program enhancement. The data visualizations provide actionable insights for curriculum development and program improvements, while also offering valuable metrics for assessing the program's effectiveness in preparing graduates for industry demands. This research contributes to the broader understanding of DAEN program effectiveness.

Keywords: DAEN, Alumni, Employment, Program, Data, Analysis, Skill, Interview, Industry

Contents

List of Abbreviations

DAEN	Data Analytics Engineering
AWS	Amazon Web Services
M.S.	Master of Science
NLP	Natural Language Processing
MS	Microsoft

1   Introduction

1.1   Purpose

The primary objective of this research is to evaluate the DAEN program's effectiveness through comprehensive alumni interviews. Through structured feedback obtained from program alumni, this study conducts a detailed analysis of employment outcomes and program performance metrics. These insights are instrumental in enabling the DAEN department to implement strategic enhancements to the program's curriculum development and technology integration.

1.2   Readership

The report is intended for the DAEN program academic and administrative personnel including leaderships, stackholders, and development team. The findings presented in this report will provide valuable insights for improving program effectiveness, curriculum design, and student outcomes.

1.3   Doc Structure

This report is organized into seven main sections. The Introduction establishes the research context and objectives. The Problem Statement formulates the research questions and scope. The Data section outlines the interview-based data collection methodology, data processing methodology, data quality interpretation, and interview question design. The Analysis section details the data processing pipeline and techniques employed. The Visualization section presents the derived data visualizations and their interpretations. The Findings section synthesizes key insights obtained through visualizations. Finally, the Next Steps and Lessons Learned section proposes future research directions and methodological improvements.

2   Problem Statement

2.1   Alumni Feedback

There are 14 alumni participated in the interview who graduated between year of 2019 and 2023. From the 14 alumni interviewed, the average program rating is 3.7 out of 5, the average number of jobs held after graduation is 2 jobs. Data Analyst emerges as the most prevalent job title. The most frequently used technologies are python and SQL, the most frequently used cloud platform is AWS, the most used tools are Power BI and Tableau. The common area for program improvement reported by the 14 alumni are more hands-on projects, cloud, and practical application.

2.2   Focus

The study aims to evaluate the gap between the most used skills in alumni career and the most valuable skills acquired in the program. The study also aims to identify the areas for program improvement and how well the program prepared alumni for their career.

2.3 Problem

The DAEN program faces significant challenges in evaluating program effectiveness as this represents the first systematic effort to gather alumni feedback. The absence of a centralized alumni database and limited alumni engagement mechanisms make it difficult to reach and collect comprehensive feedback from program graduates. After the alumni feedback was gathered and processed, some key problems with the program was discovered. First, the data reveals that while most alumni work with cloud platforms in their current roles, many received limited exposure to cloud technologies during their coursework. Second, there is a significant demand for hands-on projects as many alumni prefer the courseworks to be less theoretical but more practical. Additionally, alumni highlighted several emerging industry trends that should be incorporated into the curriculum, including AI Ethics, DataOps, and Machine Learning Operations, to better align with current market demands. These challenges must be addressed to maintain the program's effectiveness in preparing graduates for successful careers.

3 Data

3.1 Collection Process

The data collection process was conducted through structured interviews with program alumni. Alumni were identified and contacted through LinkedIn for interview scheduling. The interviews were conducted through multiple platforms based on alumni preferences: MS Teams, Zoom, or written surveys via LinkedIn. MS Teams interviews were recorded in both audio and text formats, Zoom sessions were captured in audio format, while LinkedIn surveys were collected as text documents. Each interview followed a standardized set of 12 questions to ensure unbiased and consistent data collection, covering academic background, career trajectory, technical skill utilization, and program evaluation. Interviews were conducted remotely and recorded with permission. All alumni personal information, including names and contact details, remained confidential to maintain privacy and data integrity throughout the study.

3.2 Questions

The interviews were structured with the following 12 questions and asked in the same order for each participating alumni:

1. What year and semester did you graduate from the DAEN program?

This question aims to establish the basic understanding of alumni's academic profile.

2. Did you receive an M.S. or Certificate?

This question aims to establish further understanding of alumni's academic profile based on degree type achieved.

3. What was the title of your first job, the name of the company, and the general responsibilities?

This question collects information on alumni's initial employment trajectory post-graduation including job title, company name, and responsibilities to identify career progression.

4. What technologies and tools did you use for this job title?

The question collects information on the most used technologies and tools in alumni's first job post-graduation to help identify industry trends.

5. What is your current job title, the name of the company and the general responsibilities?

This question collects information on alumni's current employment trajectory post-graduation including job title, company name, and responsibilities to identify career progression.

6. How many jobs have you had since you graduated?

This question aims to establish the average number of jobs held by alumni post-graduation to identify employment trends.

7. List the most used technologies/tools in your career. (E.g. Programming language, framework, cloud, ML)

This question collects information on the most used technologies and tools in alumni's career post-graduation to help identify industry trends.

8. What knowledge and skills that you acquired in the DAEN program have been the most valuable to your career? Can you specify the concepts/methodologies/technologies that were most valuable?

This question aims to identify the most valuable skills acquired in the DAEN program that are directly applicable in alumni's professional roles.

9. If DAEN program provided these specific courses, topics, or training, I would have been more prepared in my career. . .

This question aims to identify areas for program improvement based on alumni feedback.

10. How well did the DAEN courses prepare you for your career? (Scale: 1 – Not well at all, 5 – Very good)

This question aims to evaluate the program's effectiveness in qualitative format in preparing graduates for industry demands.

11. Have you completed any courses/certifications since you graduated from the DAEN program?

This question aims to identify alumni's continuous learning and professional development post-graduation.

3.3 Data Process

The interview recordings were uploaded into the AWS S3 bucket for secure storage and processing. Audio recordings were converted to text using AWS Transcribe, while maintaining confidentiality throughout the process. To ensure anonymity, each alumni was assigned a unique identifier following the format CEC-DAEN-[Graduation Year]-[MS/Cert]-[Sequence Number]. The transcript data was processed using a local NLP toolkit to systematically extract relevant information through text tokenization, pattern matching, and keyword extraction techniques. This automated extraction process helped identify and categorize key information from the interview responses. The processed interview data was structured into 15 columns in a CSV file including: Alumni ID, Graduation Year, Degree Type, Total Jobs, Job Titles, Job Companies, Technologies Used, Tools Used, DAEN Program Courses, DAEN Program Technologies, DAEN Program Tools, DAEN Program Rating, DAEN Program Valuable Skills, DAEN Program Potential Improvements, and Course Certifications Completed. The CSV file was saved into the AWS S3 bucket and processed using custom Python script in AWS SageMaker. The script per-

forms basic text preprocessing tasks, including removing empty spaces and standardizing string formats. To handle cases where alumni provided multiple program ratings, the script calculates their average value for consistent analysis. To facilitate data visualization in Tableau, the script transforms comma-separated values in multiple columns into separate numbered columns - for example, splitting a single job_titles column containing multiple job titles into distinct columns such as job_title_1, job_title_2. This transformation expanded the original 15 columns into 62 columns, creating a structured format that is Tableau-compatible.

3.4 Data Quality

The alumni responses are based on self-reported data, which may introduce bias or inaccuracies. To mitigate this potential limitation, interview questions were carefully designed to be clear and concise. To minimize interviewer influence, interviewers proceeded systematically through questions after each response was completed. Any responses containing ambiguous terminology were filtered out through human review and excluded from the analysis. To enable more meaningful data visualization and trend analysis, similar job titles and technologies were mapped to standardized categories through comprehensive research and human review. Job titles were consolidated based on standard industry classifications from job platforms like Indeed and LinkedIn - for example, business analyst, senior data analyst, and data analyst were all categorized as data analyst. Similarly, technologies were standardized by their core functionality - for instance, different SQL implementations including Oracle SQL, PostgreSQL, and MySQL were grouped under the broader category of SQL.

4 Analysis

Analysis was conducted using Tableau visualizations of the processed interview data from 14 DAEN alumni. The data reveals several key patterns: the largest cohort graduated in 2020 (5 alumni), all participants held MS degrees, and most had held two jobs since graduation. Data Analyst emerged as the most common job title, while employment companies showed diverse distribution with no dominant industry pattern. In terms of technical skills, SQL, Python, and AWS dominated as the most utilized technologies, while MS Power BI, Tableau, and MS Excel were the most commonly used tools. Regarding program evaluation, DAEN 690 and Database courses received the highest value ratings, with SQL and Python being the most beneficial technologies learned. Machine learning and database systems stood out as the most valuable tools acquired from the program. The program received positive feedback with most alumni rating it 4 out of 5. Alumni particularly valued database and data modeling skills gained from the program, while suggesting enhancements in cloud computing coverage and hands-on project opportunities. Post-graduation certifications and additional courses showed wide variation with no significant patterns emerging.
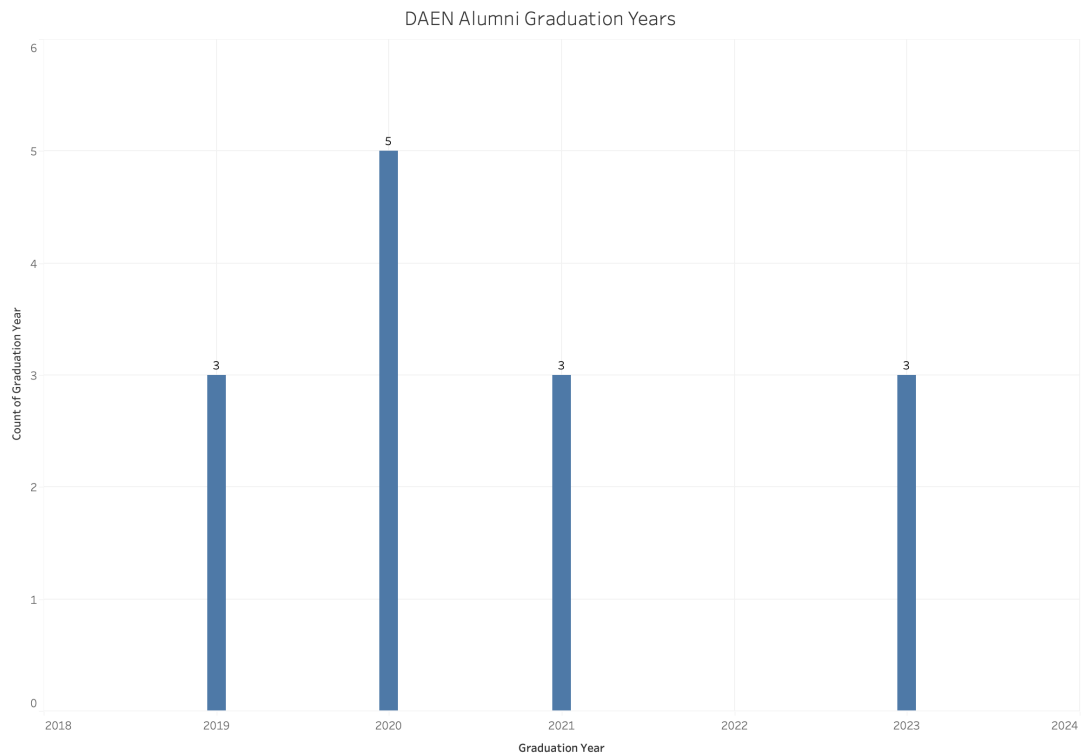
5 Visualization
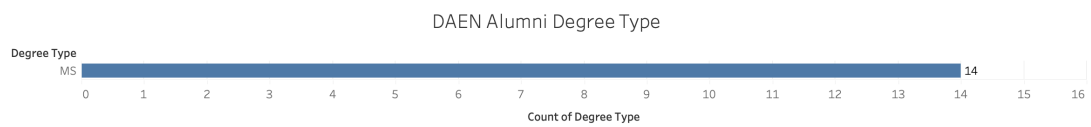

Figure 1: DAEN Alumni Graduation Year Distribution

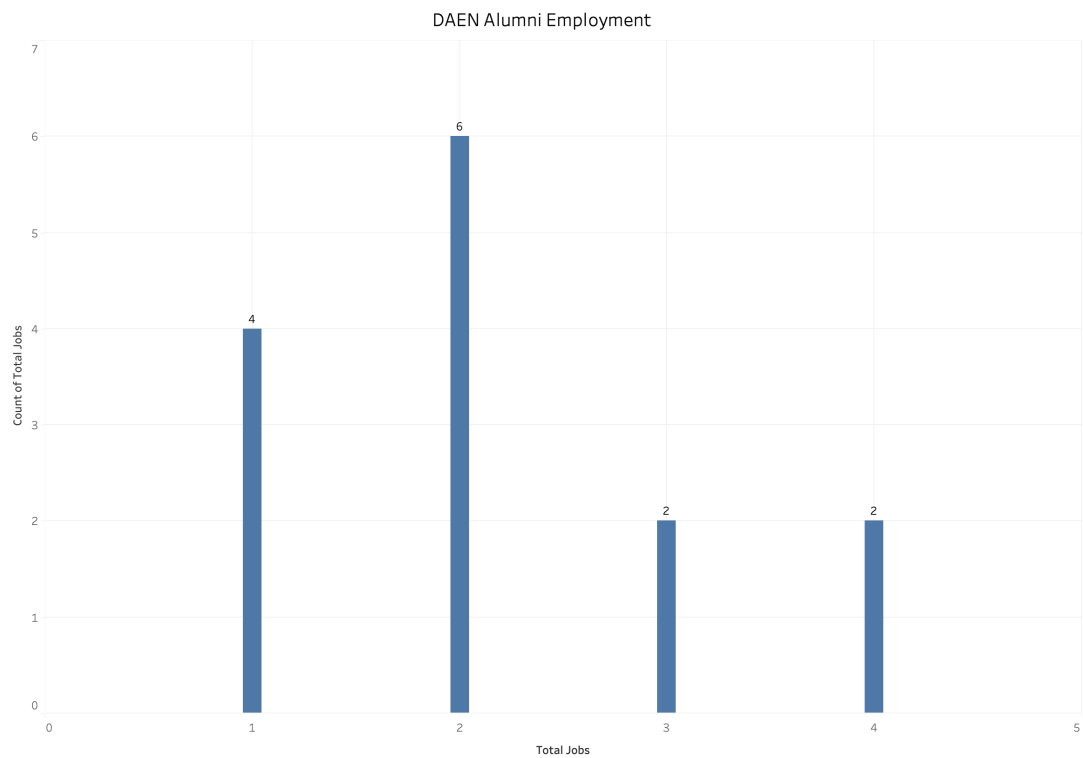Figure 2: DAEN Alumni Degree Type Distribution

Figure 3: DAEN Alumni Employment

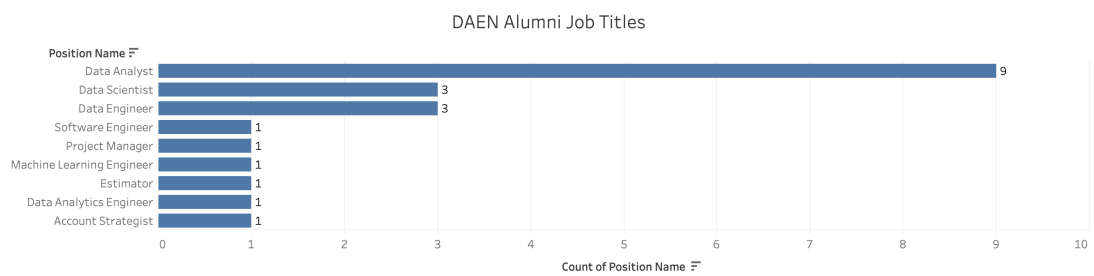Figure 4: DAEN Alumni Job Titles

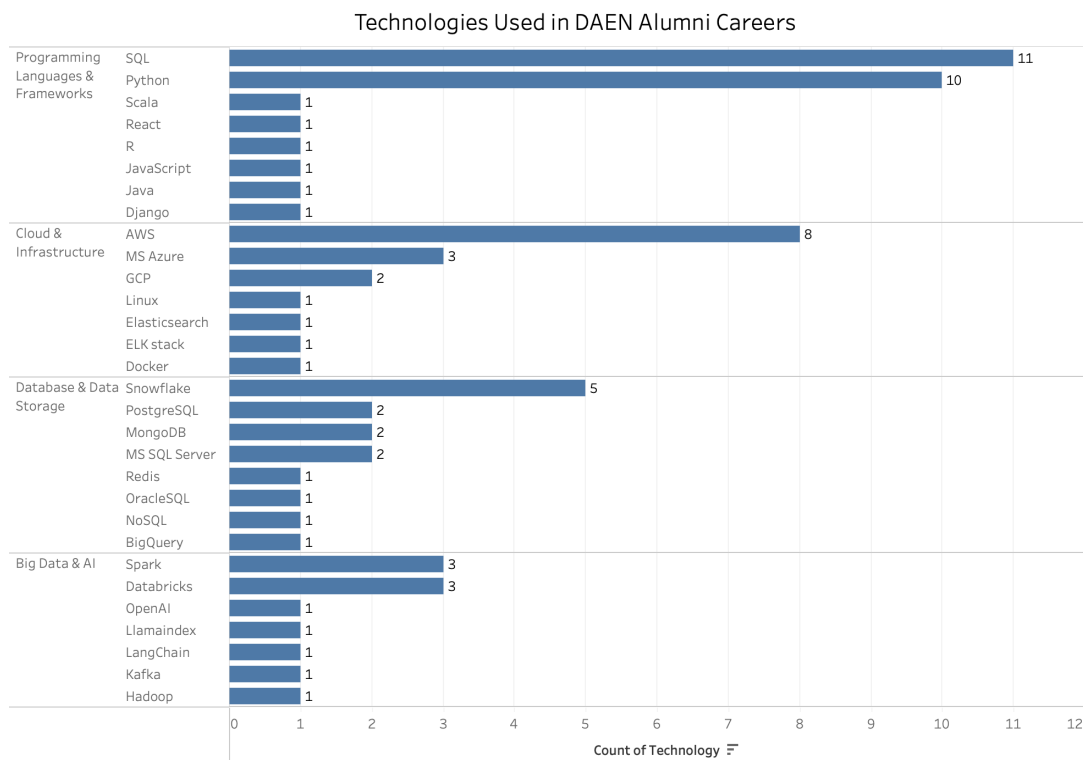Figure 5: DAEN Alumni Job Companies
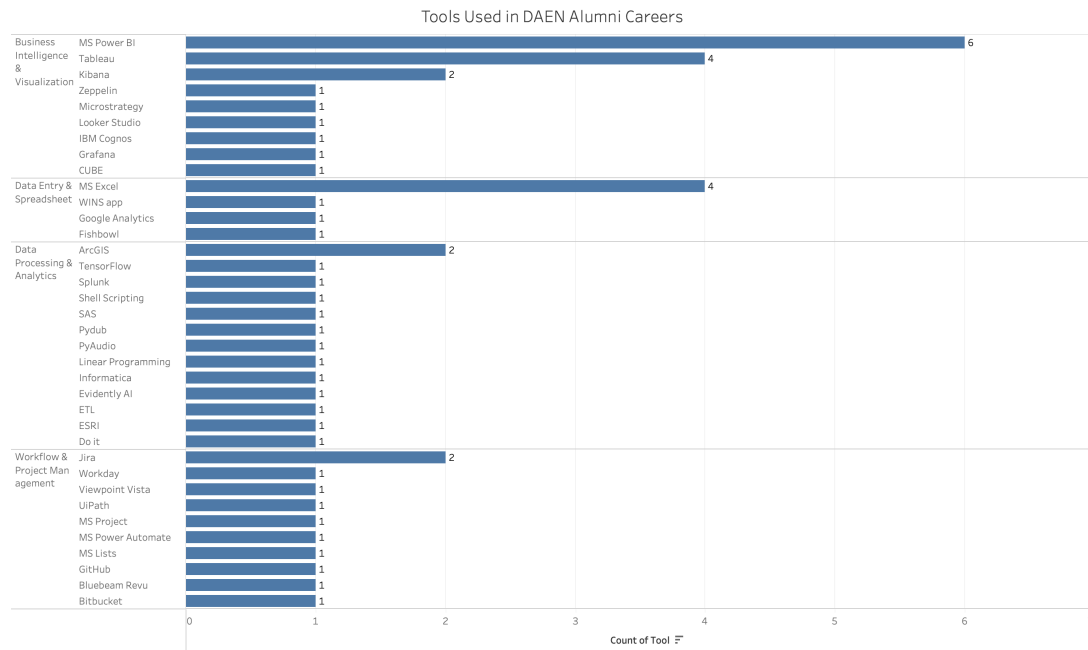

Figure 6: DAEN Alumni Career Technologies
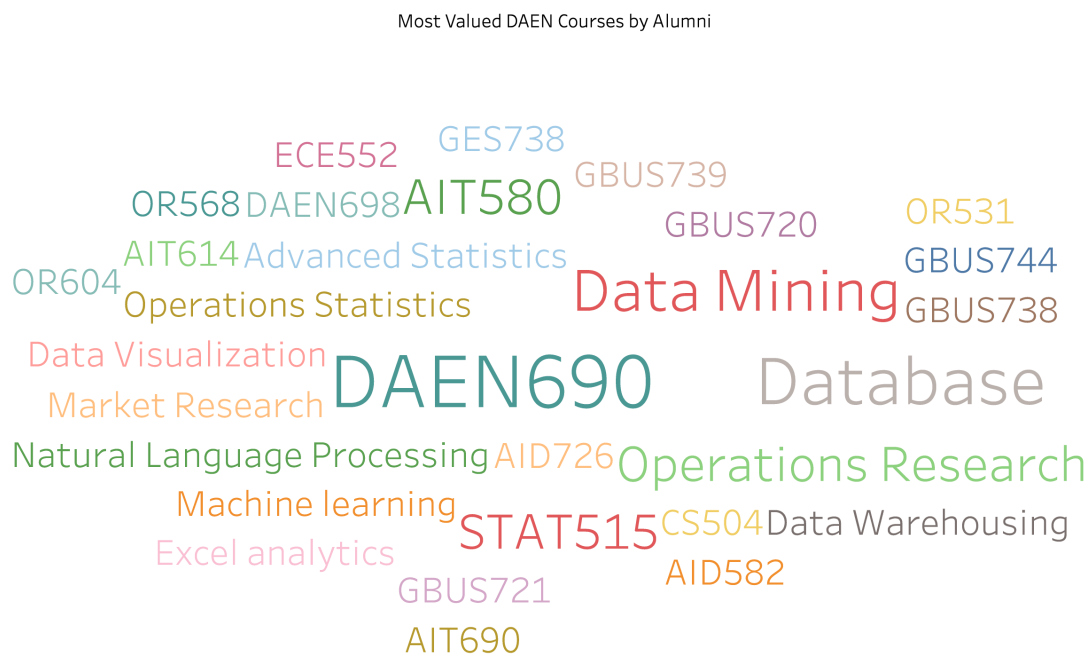
Figure 7: DAEN Alumni Career Tools

Figure 8: DAEN Alumni Program Courses
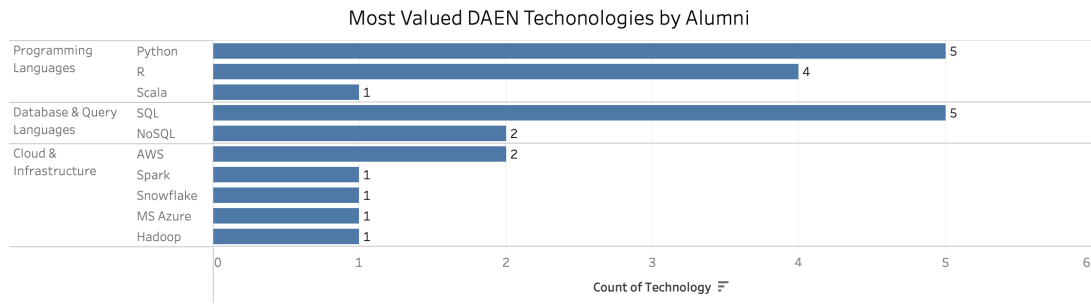
Figure 9: DAEN Alumni Program Technologies

Figure 10: DAEN Alumni Program Tools
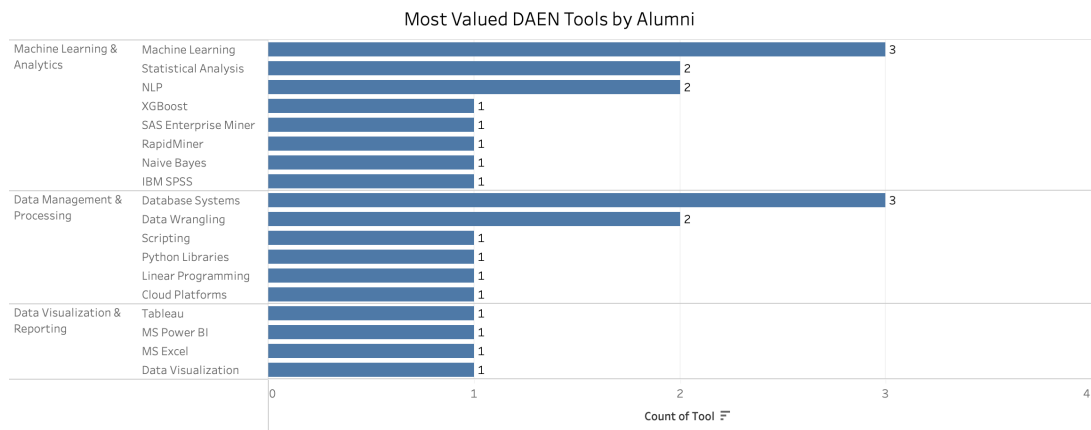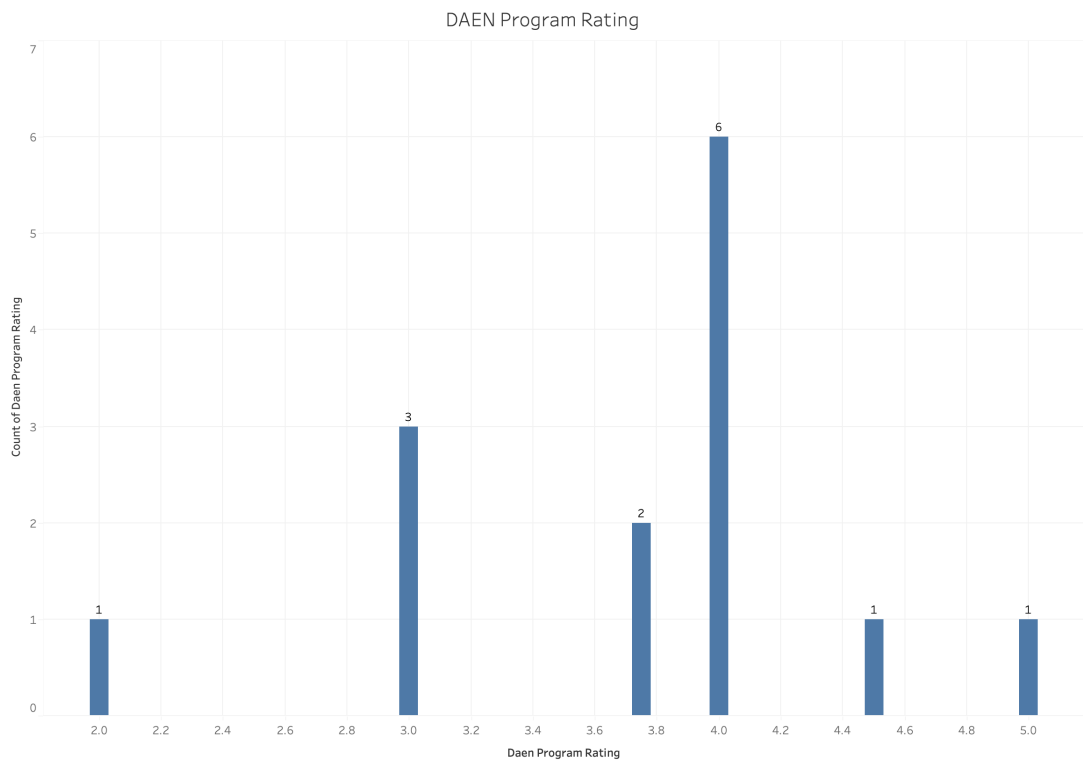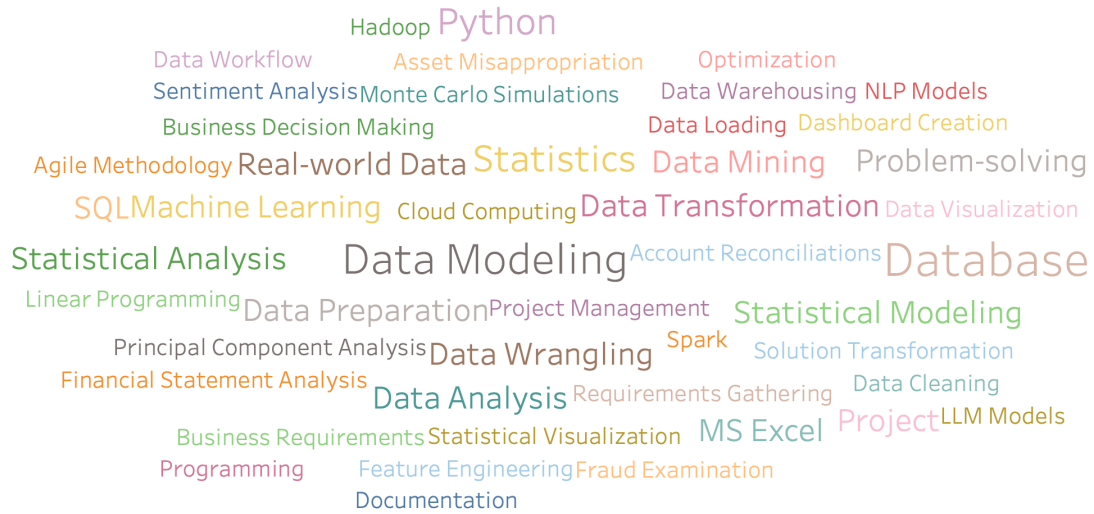

Figure 11: DAEN Alumni Program Ratings

Hadoop Python
Data Workflow Asset Misappropriation Optimization
Sentiment Analysis Monte Carlo Simulations Data Warehousing NLP Models
Business Decision Making Data Loading Dashboard Creation
Agile Methodology Real-world Data Statistics Data Mining Problem-solving
SQL Machine Learning Cloud Computing Data Transformation Data Visualization
Statistical Analysis Data Modeling Account Reconciliations Database
Linear Programming Data Preparation Project Management Statistical Modeling
Principal Component Analysis Data Wrangling Spark Solution Transformation
Financial Statement Analysis Data Cleaning
Data Analysis Requirements Gathering
Business Requirements Statistical Visualization MS Excel Project LLM Models
Programming Feature Engineering Fraud Examination
Documentation

Figure 12: DAEN Alumni Program Valuable Skills

DAEN Program Potential Improvements

Deep Learning
Data Analysis Tools
Business Intelligence Version Control Real-world Business Problems
Big Data Course Selection Options Statistics
AIT Courses Interdisciplinary Collaboration Cloud AI Ethics
Enterprise-level Visualization Tools Data Science Tableau Math
Python Hands-on Projects Communication
Machine Learning Data visualization Practical Application
Data Transfer Methodologies DAX Earlier Longer DAEN Capstone Project
Production Deployment Industry Collaboration MLOps Gen AI
DataOps Project Management Docker
Data Engineering

Figure 13: DAEN Alumni Program Potential Improvements

6   Findings

[Present your key findings]

7 Next Steps and Lessons Learned

7.1 Next Steps

[Outline future recommendations]

7.2 Lessons Learned

[Discuss key takeaways and learning points]

A Background

[Additional background information]

B References

References

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