**REFLECTIVE REPORT**

**Introduction**

Before diving into the visuals and findings of our project, I’d like to take a moment to reflect on the journey that brought us here because for me, this wasn’t just a data task; it was a learning experience that pushed me out of my comfort zone and helped me grow in more ways than I expected.

At the start, I’ll be honest I was a bit nervous. My experience with Tableau was limited, and I knew this project would demand not just technical ability, but also strong storytelling and collaboration. But instead of backing away, my team and I leaned into the challenge. We divided tasks based on our strengths: I used Python to clean and analyze the data, while others with more Tableau experience helped guide the visualisation process.

We faced several tricky moments. One was figuring out the best way to interpret the visuals. It wasn’t just about charts it was about making sense of them in a meaningful, engaging way. That’s when we decided to apply the “setup, conflict, resolution” storytelling method we’d learned in class. This changed everything. Suddenly, our visuals had a voice they told the story of UWE’s performance: the drop in 2016, the rise in 2020, and the impact of both internal initiatives and global events like the pandemic.

Working on this project taught me that data isn’t just about numbers it’s about people, context, and decisions. It’s about asking, “What happened here?” and using data to find answers. I now see storytelling as a vital skill in data science, and this experience has prepared me to approach future challenges with both confidence and curiosity.

**Milestone 1:**

**Data Exploration**

The data cleaning process was an insightful experience. Our team initially debated which tool would be best for exploring the dataset, and we ultimately chose Python due to its powerful libraries, such as NumPy and Pandas, that are excellent for data manipulation. One key point of discussion was whether to remove the Continuation column, which had a significant amount of missing data. I advocated for excluding it, referencing Little and Rubin (2002), who suggest that substantial missing data should be removed to prevent bias or skewed analysis. After discussing the pros and cons, the team agreed to exclude the column.

I have also provided the data set when it was in its raw state and when it have been cleaned by checking and addressing missing values below and all this was done on python with the df.isnull().sum() command.

|  |  |
| --- | --- |
| Data with missing values | Data after addressing missing values by replacing with ‘NA’. |
| Missing values:  Year 0  Rank 0  Institution 0  Satisfied with Course 9  Satisfied with Teaching 9  Satisfied with Feedback 10  Student to Staff Ratio 0  Spend per Student 8  Average Entry Tariff 1  Value Added Score 1  Career after 15 months 1  Continuation 951  Guardian Score 0  dtype: int64 | Missing values:  Year 0  Rank 0  Institution 0  Satisfied with Course 0  Satisfied with Teaching 0  Satisfied with Feedback 0  Student to Staff Ratio 0  Spend per Student 0  Average Entry Tariff 0  Value Added Score 0  Career after 15 months 0  Continuation 951  Guardian Score 0  dtype: int64 |
| Duplicate rows: 0 |  |
| No duplicates were identified. |  |

At first, I felt unsure about removing the column, as it meant losing data. However, the more we discussed the implications, the more confident I became in my opinion. I felt relieved when the team collectively agreed on the best course of action to maintain data integrity.

Removing the Continuation column turned out to be the right decision. Although we lost some data, keeping a column with so many missing values could have distorted the analysis. Additionally, Python's libraries allowed us to clean and manipulate the remaining data efficiently, which helped us preserve the dataset's overall quality. This aligns with guidance from Little and Rubin (2002), who emphasize that when missing data is substantial and not easily imputable, it may be more appropriate to exclude the affected variable rather than risk introducing bias or compromising the analysis.

This experience taught me how important it is to handle missing data thoughtfully and make informed decisions about whether to exclude problematic variables. In the future, I will approach missing data with more confidence, knowing that removing variables with excessive missingness is often the best approach. I also plan to explore advanced imputation techniques for scenarios where removal isn't viable.

**Milestone 2:**

**Identifying Stakeholders and Key Questions**

As part of our university performance analysis project, we were tasked with identifying key stakeholders and designing questions that would inform decision-making based on Guardian University League Table data. We considered various stakeholder groups, including students, academic staff, prospective applicants, and university administrators. Our aim was to determine which group would benefit most directly from performance insights, and tailor our analysis to meet their specific informational needs.

Initially, I felt that multiple stakeholders had valid interests in the university’s performance metrics. For example, students may be concerned with satisfaction scores and graduate outcomes, while academic staff might focus on teaching quality or research funding. However, as we continued our discussions, I increasingly felt that university administrators had the most influence over resource allocation, policy implementation, and strategic direction, and therefore would be best positioned to act on data insights.

Exploring multiple perspectives was valuable in helping us understand the broader relevance of university performance data. However, some groups, such as students, while affected by institutional changes, have less direct influence over decisions at the strategic level. In contrast, administrators routinely use performance data to make critical decisions that impact the entire university. Focusing on them allowed us to frame questions that are both high-impact and actionable.

We chose **University Administrators** particularly those involved in strategic planning and performance evaluation as our primary stakeholders because of their central role in steering institutional direction. Their decisions shape the university’s priorities, investments, and responses to performance trends. To support their decision-making, we formulated four key questions:

* **How has our institution’s Guardian ranking changed over the past 12 years compared to other universities within the same region as UWE Bristol?**  
  → This enables benchmarking and provides a regional context for performance assessment.
* **Which performance metrics (e.g., student satisfaction, spend per student, staff-to-student ratio) have the strongest correlation with changes in our rank?**  
  → This helps identify which levers most significantly affect the university’s position, informing resource allocation.
* **Have there been specific years where we observed major drops or gains in key performance scores?**  
  → This question links data to real-world events, helping administrators evaluate the effectiveness of past strategies or reforms.
* **What is our institution’s trajectory in value-added performance compared to the national trend?**  
  → This addresses educational impact and allows the institution to assess how well it supports student development beyond initial expectations.

**Milestone 3:**

**Visualizing the stakeholder’s questions**

This part of our project focused on answering critical stakeholder questions using data visualisation, specifically through Tableau and Python. The aim was to present insights that would help UWE Bristol understand its performance over time, in comparison with other institutions, and in relation to internal performance metrics. I initially found this part of the project to be the most difficult, especially as I had limited experience using Tableau. However, it also turned out to be the most rewarding. Working with my team, we tackled each stakeholder question methodically, employing tools like Python for data preprocessing and correlation analysis and Tableau for designing clear and impactful visuals. We began by visualizing each stakeholder question using Python to gain a preliminary understanding of how the data would appear. This step helped guide the structure and design of our final visualizations. Figure 1, for example, presents the Python visualization for the second stakeholder question, which focused on identifying performance metrics with the strongest correlation to UWE Bristol’s ranking. This method was consistently applied across all four stakeholder questions before we transitioned to building the final interactive dashboards in Tableau.

Figure 1.

A graph with different colored bars

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The stakeholder questions addressed included:

* Tracking Guardian rankings over 12 years relative to regional peers.
* Identifying performance metrics with the strongest correlation to ranking.
* Pinpointing years with major performance shifts.
* Comparing value-added performance with national trends.

At the beginning, I felt quite apprehensive. Tableau was unfamiliar territory, and I feared my lack of skills might hold the group back. However, these feelings gradually shifted. As we explored different chart types and discussed the best visual formats for each question, my confidence grew. I became particularly engaged in the correlation analysis, where I could apply my Python skills. It was gratifying to contribute in a technical capacity and to learn Tableau from teammates who were more experienced. What started as anxiety ended as motivation and pride in our work.

The project experience had its highs and lows. One of the highlights was how we collaborated to find appropriate visualisation strategies for each stakeholder question. For example, when bar plots for regional ranking comparisons became too cluttered, we conducted research and selected the top 10 universities in the region to simplify the visual. This showed adaptability and good judgement.

Calculating correlations using Spearman's method in Python was also a strong point. It provided a solid foundation for Tableau visuals that showed which performance metrics had the most influence on our ranking. Our team worked well by assigning tasks based on individual strengths: I focused on Python, while a teammate more familiar with Tableau took charge of the dashboard.

A challenge was identifying specific years of major performance changes and linking them to events. This was conceptually and technically complex. But by dividing the workload and cross-referencing institutional timelines, we created meaningful insights. Similarly, comparing value-added trends against national data was daunting, but our collective effort helped us overcome this obstacle.

I realise that the success of this project stemmed from structured teamwork, mutual support, and effective use of our combined skills. My initial lack of confidence in Tableau was balanced by my technical ability in Python, which provided value to the group.

The experience highlighted the importance of visual design in data storytelling. Even when we had accurate calculations and clean data, presenting it in a meaningful way was an entirely different skill. For instance, our decision to avoid cluttered bar charts and instead use a simplified comparison of top universities helped communicate our insights more clearly. This aligns with the recommendations from Kirk (2016), who emphasizes simplicity and clarity in data visualisation.

Moreover, this task reinforced the value of interdisciplinary skills knowing both programming and data visualisation tools allows for flexibility in problem-solving. It also supported reflective learning, as I continuously had to evaluate what worked, what didn’t, and why, while iterating on dashboard design.

Reflecting on this experience, I learned that being initially unfamiliar with a tool does not prevent meaningful contribution. It was through practice, team support, and a willingness to learn that I was able to overcome my initial fear and contribute effectively. The project made me appreciate the synergy between Python and Tableau and how the combination of both can enhance data storytelling. It also demonstrated the importance of working collaboratively and dividing tasks based on individual strengths.

I also recognised how vital it is to align visual choices with the nature of the stakeholder question. For example, comparing institutional rankings required comparative, multi-line visualisations, while correlation analysis was best suited for bar charts. These decisions, backed by research and trial-and-error, helped us deliver effective outcomes.

In the future, I plan to build on this experience by improving my Tableau proficiency through online courses and regular practice. I will also explore integration strategies between Python and Tableau to automate more parts of the data visualisation pipeline. Additionally, I aim to deepen my understanding of visual analytics literature to support better decision-making in design.

**Milestone 4:**

**Developing a narrative telling a story**

Next time I encounter a new tool or method, I’ll remind myself of this project and how discomfort often signals a steep but rewarding learning curve. I will continue collaborating in cross-functional teams and take on challenges that push me outside of my comfort zone, knowing that growth often comes through discomfort.

This project involved interpreting complex university performance data and answering stakeholder questions using visual analytics in Tableau, supported by Python for preprocessing and correlation analysis. One particularly challenging component was crafting compelling narratives from the visual outputs an area that pushed us to revisit and apply a structured storytelling method we had learned in class: setup, conflict, and resolution. This method became crucial in helping us interpret and communicate insights drawn from university metrics such as Guardian rankings, student satisfaction, and value-added scores.

For instance, in tracking UWE Bristol’s Guardian ranking over a 12-year span, we began with a simple time-series plot but struggled to decide how best to frame the narrative. After seeking clarity from a guest tutor who emphasized the storytelling approach, we restructured our interpretation:

* **Setup**: UWE Bristol's stable but modest ranking from 2011 to 2014.
* **Conflict**: A significant drop in 2016 suggested internal or external disruptions.
* **Resolution**: A steady and strategic rise from 2017 to 2021, peaking at 26th, indicating effective institutional reforms.

Initially, I felt overwhelmed not only due to my limited Tableau experience but also by the task of making data engaging and meaningful. Yet, these challenges sparked collaboration and resourcefulness. Revisiting class notes and working with peers turned anxiety into curiosity. The storytelling approach especially helped me shift from just “showing data” to truly “explaining” it. I felt more empowered, especially as I realized my Python skills could complement our Tableau work effectively.

Our biggest win was learning to blend visual and narrative techniques. Initially, our regional comparison bar charts were too cluttered, so we refined our focus to the top 10 regional peers, making the visuals cleaner and more meaningful. While interpreting value-added scores, we observed UWE Bristol’s volatility compared to the steady national trend. By applying a storytelling approach, we highlighted not just what changed, but why linking shifts in performance to internal reforms and external factors like the pandemic, which brought deeper insight to the analysis.

Correlating performance metrics with rankings via Spearman's method was technically sound, but bringing those findings to life through clear visuals and narrative framing was where real impact emerged. This aligns with insights from Few (2012), who highlights that effective communication of data requires more than accuracy it needs storytelling to be persuasive.

What worked well was our teamwork and willingness to adapt. Choosing to follow the setup-conflict-resolution framework provided a scaffold that clarified our message. When UWE dropped in the rankings in 2016, we didn't just present the dip we investigated contributing factors such as restructuring and changes in feedback systems. Similarly, a spike in graduate employment in 2019 wasn’t presented in isolation but linked to career initiatives and industry partnerships.

This project emphasized the value of contextual storytelling in data visualisation, which is supported by Kirk (2016), who stresses the importance of narrative thinking in dashboard design. Without context, data remains abstract; with story, it becomes actionable.

Moreover, comparing UWE’s value-added performance to national trends revealed another storytelling layer: while the national trajectory remained steady, UWE’s volatility suggested both innovation and instability. Interpreting this through narrative helped stakeholders understand that success needs to be both achieved and sustained.

This project taught me that data storytelling is as much a skill as technical analysis. My growth in Tableau and confidence in using structured narratives mark key takeaways. The project also reinforced the importance of collaboration my teammates' support and our collective effort to divide tasks strategically (e.g., Python filtering, Tableau visuals) enabled us to thrive.

Looking back, what started as the most daunting part of the project evolved into the most insightful. Our visuals weren't just charts; they became windows into institutional performance, contextualized through structured storytelling.

Going forward, I plan to:

* Deepen my Tableau skills via online tutorials and hands-on projects.
* Continue using the setup-conflict-resolution framework when interpreting and presenting data.
* Explore tools and techniques that further integrate Python with Tableau.
* Reference real-world events when presenting trends, so that stakeholders can better relate to the insights.
* Study works on visual storytelling to improve future dashboard design and presentations.

**Milestone 5:**

**Recommendation for Future improvement**

At the outset, I assumed that developing meaningful recommendations would involve extensive external research and consultation beyond the dataset. However, this project reshaped that view. Through collaborative reflection and guidance, I came to understand that the most impactful recommendations are often those directly derived from the data itself. By using stakeholder-driven visualisations and insights extracted from performance trends, we were able to identify evidence-based strategies tailored to institutional needs. This approach not only made our recommendations more relevant but also demonstrated the importance of aligning data analysis with real-world decision-making contexts (Few, 2009; Knaflic, 2015).

This experience underscored the value of data storytelling not just as a means of communication, but as a foundation for informed action. Making sense of patterns in student satisfaction, graduate outcomes, and ranking shifts enabled us to suggest practical, targeted improvements that would resonate with university administrators. It also deepened our team’s understanding of how data can guide policy and investment decisions in higher education settings (Mandinach & Gummer, 2016).

Ultimately, this insight has equipped us with a better framework for transforming analytical findings into strategic direction, an essential skill in any data science or evaluation role.

**Building an Interactive Dashboard in Tableau**

At the outset of building our Tableau dashboard, I assumed the process would be relatively straightforward, particularly given the widely held belief that Tableau simplifies dashboard creation compared to Excel (Knaflic, 2015). This assumption held true for our first, second, and fourth stakeholder questions, whose visualizations were imported and arranged with minimal difficulty. However, the third question presented an unforeseen challenge. It involved five separate visualizations each capturing a different performance metric which, when placed together, made the dashboard appear cluttered and overwhelming.

As a team, we quickly realized that visual overload would impair the clarity and usability of our dashboard (Few, 2012). We decided to merge the five charts into a single interactive visualization using a dropdown filter, allowing users to toggle between views. While the idea was promising, its execution proved difficult. None of us initially knew how to implement this level of interactivity in Tableau, and it became a point of frustration.

This challenge, however, became an opportunity for growth. Through collaboration, peer support, and especially with the assistance of ChatGPT, we navigated Tableau’s dashboard actions, parameter controls, and sheet swapping techniques. The successful outcome a cleaner, interactive dashboard was a moment of pride. It not only enhanced user experience but also deepened my technical competence in dashboard design. Figure 2. shows the interactive dashboard with the drop down for question three.

Figure 2.

A close-up of a graph

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This experience aligns with Kolb’s experiential learning theory (1984), which emphasizes learning through experience, reflection, and adaptation. It reinforced the importance of flexibility in problem-solving and collaboration when facing technical hurdles. More importantly, it highlighted how a commitment to clarity and usability in data presentation can lead to more impactful storytelling and decision-making.

**Feedback**

During our project, we received constructive feedback from our tutor focused primarily on our dashboard’s colour interpretation. The key issue was our use of multiple colours that lacked cohesion and meaning as we can see in Figure 3

Figure 3.

**A screenshot of a graph

Description automatically generated** This made the dashboard less communicative and visually overwhelming. Initially, our intention was to make the dashboard visually engaging, but we came to realise that excessive or inconsistent use of colour can actually detract from clarity and hinder effective data communication.

Effective dashboard design requires that every colour serves a specific purpose (Few, 2009). When colours are misused or overused, they can confuse users, distort data interpretation, and ultimately reduce usability (Evergreen, 2013). Based on the feedback, we refined the design by reducing the palette to two carefully chosen colours: purple and yellow. This allowed us to establish visual harmony while creating contrast between key elements, a practice supported by visualization best practices (Knaflic, 2015; Ware, 2012).

Purple was selected for its calm and professional tone, often associated with creativity and trust (Lidwell et al., 2010), while yellow provided a sharp contrast for emphasis and highlights (Harris, 2014). This approach aligns with accessibility standards, which recommend high contrast between elements for readability (W3C, 2018).

Though time constraints limited our ability to fully redesign the entire dashboard, this experience underscored the importance of thoughtful visual design. In future projects, we plan to apply colour theory principles and conduct usability checks to ensure that dashboards communicate insights clearly and efficiently (Tufte, 2001; Kirk, 2016).

This reflection taught us that effective data visualization is not about visual flair, but purposeful design. By embedding meaning into colour and maintaining consistency, we can enhance user experience and support decision-making. Figure 4 shows the revamped/corrected dashboard.

Figure 4.

A close-up of a graph

Description automatically generatedFuture dashboards will be approached not just as a data display tool, but as a visual narrative where colour plays a crucial storytelling role (Berinato, 2016; Yau, 2013).

**Conclusion**

In conclusion, our project journey has been both technically enriching and intellectually transformative. What initially appeared to be a straightforward task of building a dashboard in Tableau quickly evolved into a nuanced process that demanded attention to detail, collaboration, and iterative learning. While importing visualizations for most stakeholder questions was relatively smooth, the complexity of representing multiple visuals for one question required us to rethink our design approach. Through collaborative effort and the strategic use of tools like ChatGPT, we were able to implement an interactive solution using dropdown menus, enhancing user experience and avoiding clutter an approach supported by Few (2009), who emphasizes that dashboards should be concise, interactive, and user-friendly.

One of the most valuable learning moments came from tutor feedback concerning the use of colour. We learned that effective colour use is not just aesthetic but functional it should align with information meaning and aid comprehension. Ware (2012) argues that colour in data visualization must support cognitive processing and minimize misinterpretation. Although limited time restricted our ability to fully implement all feedback, it highlighted an important area of improvement for future practice.

Furthermore, our decision to frame the dashboard around stakeholder needs particularly university administrators allowed us to tailor visualizations toward strategic relevance. According to Kirk (2016), data visualizations that align with user objectives are more likely to support actionable insights and decision-making.

As we move forward, we are committed to applying these insights particularly around interactivity, colour design, and stakeholder-focused questions to future visualization projects. This experience has not only strengthened our technical proficiency in Tableau but also enhanced our understanding of effective data storytelling and user engagement.

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